



Software Manual



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1 SCANLAB laserDESK Laser Processing Software

1.1 Intended Use

The laserDESK software package is designed to create laser marking or material processing jobs and to execute them on laser scan systems. The software provides full control of all hardware components of the laser scan system.



WARNING!

The topic [Safety](#) must be read necessarily before using the laserDESK software.

NOTE:



The topic [laserDESK Software – Overview](#) gives a comprehensive overview about the functionality and the applications of the laserDESK software.

The topics "How to use ..." describe [Concepts for Using Parameters, Variables, Job Explorer, 3D Functions and Axis Control etc.](#)

It is recommended to read these topics before operating your laser marking system with this software.

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1.3 Scope of Supply

- 1 data CD containing a software package with
 - the laserDESK program,
 - the laserDESK help file,
 - software drivers for Microsoft's *Windows 7*, *Windows 8*, and *Windows 10* operating systems.
- 1 dongle (software-protection device)

When the system requirements (see below) are met, all functions and settings can be performed using the laserDESK software package. No further software or equipment is required.

1.4 System Requirements

- To run the program in full mode, the dongle (see 'Scope of Supply') must be installed on the PC that contains the laserDESK software.
- To run a laser marking or material processing job, a SCANLAB RTC5 or RTC6 PC interface board and its associated software must be installed on the production PC.



NOTE:

For detailed systems requirements, please refer to [Installation](#).

1.5 User Knowledge

To create jobs via laserDESK and run them on a laser scan system, the user should be experienced with computers and their operation.



NOTE:

For information on operating laser scan systems and related hazards of laser radiation, see [Safety](#).

1.6 laserDESK Help

This online help describes how to install and operate the laserDESK software and how to setup the laser scan system's hardware with parts of the laserDESK software.



NOTE:

To use the online help as effectively as possible, please refer to [How to Use the laserDESK Help](#).

1.7 Support

If a problem cannot be resolved, by using the information in this online help (i.e. an error can't be localized and corrected), then contact support@laserDESK.info.

2 How to Use laserDESK Help

Intended Use of laserDESK Help

Using laserDESK Help

Symbols and Signs used in the laserDESK Help

Links to Further Manuals

2.1 Intended Use of laserDESK Help

This online help is a part of the product. It is intended for helping users to become familiar with laserDESK. This online help is designed to assist all users of laserDESK in their day-to-day use and handling of the software. laserDESK Help supports you with information about

- installing the laserDESK software,
- features of the graphical user interface (GUI),
- customizing the GUI's layout,
- creating laserDESK jobs,
- using the parameter and system libraries,
- setting up your laser scan system's hardware and
- running laserDESK jobs.



WARNING!

The topic [Safety](#) must be read before utilizing the laserDESK software.



NOTE:

If there are any questions regarding the laserDESK software, please contact support@laserDESK.info.

2.2 Using laserDESK Help

laserDESK Help provides two windows for displaying help topics:

- The Dynamic Help is a window inside the laserDESK GUI which can be shown or hidden. The content of Dynamic Help is context-sensitive. When you perform a specific action, the associated help topic will be displayed.
- The *MadCap Help Viewer* is a stand-alone window. This help viewer can be set for context-sensitive or context-independent help. The Help Viewer contains comprehensive functions which are described in its own help. The *MadCap Help Viewer* can be opened even if Dynamic Help is activated.

Dynamic Help is launched and used as follows:

1. Activate 'Dynamic Help' via the '[View](#)' or '[Help](#)' menu.
A dockable window will open next to the work area.
2. Adjust its position and dimensions regarding to your requirements (see [Arranging the Windows](#)).
3. To close the Dynamic Help window, deactivate 'Dynamic Help' via the 'View' or 'Help' menu or click the close button {X} in the title bar.

The **MadCap Help Viewer** is launched and used as follows:

1. Press <F1> on the keyboard.
The *MadCap Help Viewer* opens.
Depending on the selected function or window, the associated help topic will be displayed.
or
Select 'Contents...' or 'Search...' from the '[Help](#)' menu.
The *MadCap Help Viewer* opens and the associated subject ('TOC' or 'Search') is displayed.
2. Navigate inside the *MadCap Help Viewer* in any order by using the 'TOC' (table of contents), 'Index' or 'Search' functions.
3. Click a link inside the help topics for additional information.
4. To close the *MadCap Help Viewer*, press <Alt>+<F4> on the keyboard or select 'Exit' in the 'File' menu or click the close button {X} in the title bar.

2.3 Symbols and Signs used in the laserDESK Help

| Symbol | Description | Example |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| ' ' | The expressions between these quotation marks are names of menus, windows, dialog boxes, parameters, check boxes, etc. | 'File' |
| \ | The backslash is used to select paths of menus, sub-menus and tabs in the window. | Edit\Paste' |
| " " | The expression between these quotation marks are excerpts, names, messages or values. | "2" |
| "abc" | The expression between these quotation marks, written in Courier typeface, are entries, which have to be entered. | "Supervisor" |
| < > | The expression between these quotation marks are keys on the keyboard. | <Ctrl> |
| { } | The expression between these quotation marks are buttons on the screen, which have to be clicked. | {Copy} |
| [] | The expression between these quotation marks are physical units or wild-card characters, e.g. for file names. | [mm]; [Parameter].sld |
|  | A triangle sign indicates DANGER , WARNING or CAUTION . Ignoring this information means a possible dangerous situation or a directly threatening to life and health of persons. | |
|  | This circular sign indicates ATTENTION . Ignoring this information may result in machine trouble. | |
|  | This circular sign indicates NOTE . Ignoring this information may result in missing necessary information for system operation. | |
|  | This circular sign indicates a reference to another topic or to a section of a further manual. It is recommended to read these topics or sections. | |

2.4 Links to Further Manuals

In addition to laserDESK Help, the laserDESK software offers the option to open further manuals/guides (in pdf format) when you create or edit a job.

1. Select 'Guides ▶' in the '[Help](#)'menu.
The available manuals will be listed.
2. Select the desired manual/guide.
The selected manual will be displayed.

3 Safety



NOTE:

Read these safety instructions completely before you proceed to use laserDESK.

If you have any questions regarding laserDESK, then contact support@laserDESK.info.

3.1 General

This is an overview of safety for optimum protection of personnel and secure failure-free operation. These safety instructions must be studied by all persons working with the laserDESK software. Non-observance of the safety instructions in this online help can result in serious hazards. Safety regulations may differ from country to country. It is the responsibility of the operating company to comply with all national safety regulations.

3.2 Intended Use

The intended use of laserDESK is to create laser marking or material processing jobs and to execute them in a laser material processing system that includes an integrated laser scan system. The software also provides for configuring the laser scan system's components.

Anything other than this use is not the intended use. SCANLAB is not liable for any consequences caused by such misuse.

3.3 Laser Safety

Generally, the laserDESK software controls the execution of a laser marking or material processing job in a laser material processing system that include an integrated laser scan system. If the laser emits harmful laser radiation or stray light or the laser radiation gets amplified by optical instruments, then there is a risk of injury when the laser radiation contacts parts of the human body. The level of risk depends on the laser class of the laser used in the laser scan system and optical components employed. Therefore, all relevant laser safety regulations must be known and adhered to before installation and application.

The system integrator and the operating company are solely responsible for ensuring laser safety of the overall system. SCANLAB has no influence on the used laser scan system or the overall system.

External Documents

Because the laserDESK software will be used in a laser material processing system, the following documentation - and particularly the corresponding safety instructions - must be read and understood:

- Documentation of the overall system
- If separate, documentation of the laser scan system
- Manual of the SCANLAB RTC5 PC interface board

Managerial Obligations

The operating company's management is obliged to allow only the following persons to use laserDESK in a laser material processing system with an integrated laser scan system:

- Persons who are familiar with national safety regulations and trained or instructed in operation of the overall system and usage of the laserDESK software.
- Persons who have read and understood the safety instructions, both in this online help and the above-mentioned external documentation.



NOTE:

Safety regulations may differ from country to country.

It is the responsibility of the operating company to comply with all national safety regulations.

Personnel Obligations

Before executing a laser marking or material processing job, all persons using the laserDESK software in a laser materials processing system with an integrated laser scan system must agree to the following:

- To comply with national safety regulations for operating of the overall system.
- To have read and understood the safety instructions, both in this online help and the above-mentioned external documentation.



WARNING!

Carefully check your application program before running it.

Programming errors can cause a break down of the system.

In this case it is possible that neither the laser nor the scan system can be controlled.



WARNING!

Always turn on the PC and the power supply for the scan head first before turning on the laser.

Otherwise there is the danger of uncontrolled deflection of the laser beam.

3.4 Error Evaluation



NOTE:

The parameter 'Scan Head Monitoring' in the Hardware Configuration lets you enable scan head monitoring, separate for temperature and power.

Activating the monitoring function, laserDESK will evaluate these errors, stop the job execution and switch off the automatic mode.

Please refer to '[Scan Head](#)' parameters.



ATTENTION!

Not every hardware (scan system) supports these functions.

Refer to the manual of your scan system to figure out whether it supports one or both monitoring functions.

In case of doubt, check your laser scan system.

4 laserDESK Software – Overview

4.1 Introduction

The laserDESK software package lets you create laser-marking and material-processing programs (jobs) for execution with a laser scanning system. The user-friendly interface provides access to all functions and helps you set up and control your system's hardware components.

Job Creation

Creating a laserDESK job requires the following steps:

- Define the marking objects and patterns for your application (e.g. labeling, cutting, weld contours etc.). These might be geometric shapes, text, graphics etc.
- Define any needed parameter sets. Marking parameters that affect laser and scanner behavior are always required. Filled marking objects require additional fill parameters and (rastered) pixel images require additional pixel image parameters.
- Define marking workflow. For this, you can insert control elements to regulate both process flow and installed hardware at defined points in time.

Each laserDESK job is stored in its own separate file and contains the above-mentioned information, including all defined parameter sets. Some marking objects and parameter sets might be needed by more than one job. To avoid having to define them from scratch each time, you can also export them to a library. From there, you can then import them to other jobs. Default parameter sets are supplied by the laserDESK software package.

Job Execution

Two modes are available for executing jobs: manual and automatic.

- In manual mode, you start a job via laserDESK's user interface. This might be useful, for example, during your application's development phase when you want to iteratively determine optimal marking parameters. External start signals are ignored.
- Automatic mode is used for jobs in a production environment. In this mode, the job is started and controlled exclusively by external input signals and job alterations are not permitted.

Before first-time execution of a job or after hardware changes, hardware parameters need to be set for configuration of your hardware components (see below). The laserDESK software contains functions that assist you in determining or defining some of these parameters.

4.2 Installation

PC and System Requirements

- 32- or 64-bit operating system:
Windows 7, Windows 8, Windows 10 (with MS framework 4.5).
- Required hard disk space:
Approx. 250 MB (incl. Help file)
- USB dongle
If you want to run the laserDESK program with full functionality (i.e. not just demo mode) you need a valid USB dongle (software-protection device). Without valid dongle, only the demo mode is usable. In demo mode, nothing is savable and hardware control isn't possible. Laser jobs can't be executed.
Furthermore, the dongle's configuration defines the functional range of laserDESK (see Editions / Functional Range).
- RTC5 or RTC6 PC interface board :
laserDESK jobs are executable only if the PC that controls the laser scan system (production PC) contains a SCANLAB RTC5 or RTC6 board. Certain functions (e.g. Processing-on-the-fly) are only usable if the corresponding option has been activated on the RTC board.
In contrast, **no** PC interface board is required for creating jobs. Thus, jobs can be created on any PC (even without an RTC board) for later execution on the production PC (with RTC board and installed laserDESK software).
- After laserDESK is installed, each laserDESK user must be assigned write and/or read permissions. Because the program's setup routine can't assign write or read permissions, the customer's system administrator must ensure that laserDESK users get the required write and/or read permissions (depending on their level of laserDESK access authorization):
 - Users with laserDESK "Administrator", "Supervisor" or "Designer" access authorization must get read and write permissions for the laserDESK data directory 'C:\ProgramData\ Scanlab\SLLaserDesk' (including subdirectories).
 - All other users ("Production" and "Viewer" access authorization) only need read permission for the directory 'C:\ProgramData\ Scanlab\SLLaserDesk' (including subdirectories).

Installing laserDESK

- First, install laserDESK by clicking the {Install} button in the autorun window or by launching "Setup.exe" from the software package directory.
Installation then proceeds automatically via the *Windows* Installer.
- Next, your system administrator must assign required read and write permissions for each user (access authorization, see above).
- Finally, insert the dongle into any USB port on the PC that will be running laserDESK in full mode (PC with or without RTC PC Interface Board).

4.3 Starting the Software

laserDESK can be started as follows:

- Open the program file “SLLaserDesk.exe” - directly or via a link or icon.
When the program window opens, a new job is automatically created. The user interface doesn't yet contain marking objects.
- Open a job file ([JobName].sld) via the right mouse button or by double clicking. The program window then shows any already-created marking objects.

User Interface (GUI)

laserDESK's windows and menu/status/symbol bars conform to accepted *MS Windows* conventions. The user interface's main component is the work area for creating and editing marking objects. You can edit settings via the dockable Job Explorer, Library Explorer and Property windows, which can be displayed, hidden or arranged as desired.

Most functions are accessible using the menus, symbol bar buttons, or right mouse button (context menu). Additionally, a toolbox can be displayed that contains marking objects and control elements for inserting into the job.

Depending on the user's task (creation, test, execution), different GUI profiles can be selected: design profile, test profile, pilot laser profile or production profile. In these profiles the needed windows will be displayed, but can also be changed arbitrarily.

For online help, press the <F1> function key. Additionally available is a continuously displayable window with context-sensitive online help.

Some laserDESK user interface settings can be customized via the 'GUI Settings' dialog box. This includes display colors, grids and lines, the GUI language, user groups and passwords. Likewise for the directories used by laserDESK's library management.

4.4 Creating Jobs

Jobs can be created via laserDESK on any PC (even without RTC interface board). When laserDESK starts, it automatically creates a new job. To further edit an already existing job ([JobName].sld), open it via the 'File' menu or the 'Open' button.

Only one job can be open at a time. If your production requires diverse marking operations, they can be integrated into a single job consisting of variants (partial jobs), as described below.

laserDESK jobs are created by defining elements for marking and the patterns to be used. The application may involve labeling, cutting, weld contours etc.

Job Structure

The Job Explorer displays a tree structure of elements for the opened job (including all its marking objects and control elements). The tree automatically lists any newly created marking objects and newly inserted control elements. At any time, you can set or change the executable order of marking objects, control elements and variants via their positions in the tree.



NOTE:

The concept of the job explorer is described under [How to Use the Job Explorer](#).

Creating and Editing Marking Objects

In laserDESK's program window, use the work area to create and edit marking objects. Marking objects are depicted visually and functions for their creation and editing mirror those of typical graphics applications. Users can create geometric shapes and text. The following marking objects can be freely created:

- Open geometric shapes: points, lines, circular arcs, spirals, polygons, graphic paths
- Closed shapes, which can be filled: rectangles, circles, ellipses, polygons, graphic paths
- Complex entities: alphanumeric (text, date/time, serial numbers), barcodes

Other marking objects include pixel images and vector graphics. These are imported rather than freely defined. laserDESK provides import filters for commonly used graphic formats.

All marking objects are initially manually created in the work area of the laserDESK program window. Use your mouse to place geometric forms, text and barcodes within the work area. When importing pixel images and vector graphics, you can also specify individual settings via a dialog box.

Once created, marking objects can be further edited:

- All marking objects can be enlarged, shrunk, moved and rotated.
- Closed marking objects can be filled.
- Two or more marking objects can be arranged with respect to each other, evenly distributed or grouped. Groups can be edited just like individual marking objects.
- An editing function is available for decomposing any marking object stepwise into sub-elements as small as an individual line. You can alter the geometric shapes of marking objects by inserting or deleting individual points and/or decomposing or closing polygons and graphic paths. You can also alter imported vector graphics in this manner.

You can edit by manually manipulating marking objects via the mouse or by changing the graphic parameters themselves. Editing via the mouse is particularly quick. Editing the respective graphic parameters is an especially accurate way of defining marking objects. The parameters are displayed in the Property window. Because each marking object type has its own special geometric properties, it also has its own corresponding set of graphic parameters.

laserDESK's mathematical precision ensures exceptional accuracy when determining position, size, geometry and fills as well as formats for text and images.

The work area, Job Explorer and graphic parameters in the Property window mutually update themselves during editing of marking objects. A marking object selected in the work area will also be selected in the Explorer tree. Likewise, a marking object selected in the Explorer tree will be selected in the work area. If you alter a marking object in the work area, its graphic parameters will also change and vice versa.

Assigning Marking Parameters

By assigning marking parameters, you tell the laser scan system how to handle individual marking objects for optimal marking and material processing. Because best results for such marking objects as dotted or striped patterns sometimes requires special handling (e.g. custom scan head delay settings), you can assign each marking object its own individual marking parameters.

Each marking object's defined marking parameters are always stored in the job - as individual parameters or as marking parameter sets in the (local) job library. Hence, you can simply assign marking parameters to additional marking objects instead of defining the parameters from scratch each time. You can also export parameter sets to the (global) Marking Library.

As delivered, the global marking library contains at least one default parameter set for importing into new jobs when they are opened. If you create further parameter sets, you can define one of them as the new default parameter set in the job or the marking library.

When a marking object gets created, it's automatically assigned the set that was designated as the job's default marking parameter set. Each individual marking object therefore receives assigned marking parameters right from the beginning. Settings can then be individually tuned for each marking object, either by assigning a different parameter set or by altering the various parameters.

If changes are made to a parameter set used by a job, these changes will automatically apply to any of the job's marking objects that were already assigned this parameter set, provided their individual parameters weren't altered in the meantime. This way, parameter assignment can be changed for multiple elements simultaneously.

You can change marking parameter values or properties via the Property window:

- **Marking parameters** define settings for the laser and scan head. You can define such laser attributes as power, frequency, pulse width or laser delay; and such scan head attributes as mark or jump speeds and scanner delays.
- For pixel images, you can define additional **pixel image parameters** specific to characteristics of the pixel image (e.g. pixel distances or grey levels).

NOTE:

- You might need to define different types of marking parameters for various lasers.
- The optimal marking parameters for a job or particular marking object strongly depend on the laser and the materials being processed. Marking- and material-processing tests might be necessary to determine optimal parameters.

NOTE:

For information on using parameter sets, see [Using Libraries](#).
The concept of the parameters is described under [How to Use the Parameters](#).

Assigning Fill Parameters

Fill parameters define such attributes as the fill type, line distance and outline reduction. As with the above-mentioned marking parameters, fill parameters defined for marking objects are always stored in the job (as an individual parameter or parameter set). This way, you can make assignments to additional marking objects without needing to create definitions from scratch each time.

The properties and handling of fill parameters (definition, assignment, export, import) are identical to those of marking parameters (see above).

For information on using parameter sets, see [Using Libraries](#).

Inserting Control Elements

To control and automate laser marking or material processing, you can insert various control elements as control nodes at any position in the job Explorer's tree. Such control elements can serve to change hardware activity (e.g. switch motors on or off) or respond to hardware states (e.g. a motor's motion or inactivity). Control elements can be implemented via bit patterns (digital I/O), voltage (analog output), pulse length (pulse output), or delay/wait periods (timer). The variant node is a special type of control element (see below).

Control elements can be directly inserted via mouse click into the Job Explorer's tree. You can change their positions as desired at any time. The Property window shows the value defined for the corresponding control mode (e.g. bit pattern).

Creating Variants

Variants are partial jobs (subroutines) within a (main) job. They can be any job sequence (and hence contain marking objects and control elements, but no further variants). A variant control node (control element) can only be defined directly below the job node. It serves to define a starting condition (states of input signals) for this partial job. Therefore, each variant needs to be assigned a bit pattern. If a start signal occurs in automatic mode, then the applied signal will be compared to a defined bit pattern of the variant. If identical, then it will be executed. Once started, the variant will be completed.

If you define multiple variants within a job, then different sequences (e.g. for diverse marking operations) can be executed depending on external control signals. Thus, you don't need to change the job manually via the user interface.

Variants can be inserted via a mouse click. Subsequently (as with normal jobs), you will then create or insert marking objects or control elements within the variants. Use the Property window to define a variant's bit pattern.



NOTE:

The concept of the variants is described under [How to Use the Variants](#).

Creating Symbols

Frequently used marking objects and groups thereof (e.g. company logos) can be defined as templates (called "Symbols") that include all assigned parameters (see above). Each symbol can be given a name. Like parameter sets, symbols can be managed via the Library Explorer. Accordingly, they get stored in the job and can be exported to the Marking Library for general usage.

When a symbol is used, a "Symbol To Reference" (referenced object, not a copy) will get inserted into the job in the same manner as for other mark elements (see above). If the symbol (i.e. template) gets changed, then the corresponding symbols to reference will accordingly be immediately updated.

For information on using symbols, see Using Libraries.

Managing Jobs

After creating a job, you can save it under any name (file extension ".sld"). Only one job can be stored in each file.

If the job was created on a production PC containing an RTC board, then you can also immediately run it. If the job was created on a non-production PC, then it can be transferred easily to a production PC. Because jobs are loadable from any point within your network, transferring a job to the production PC is easy and users can devise directory structures well-suited for their work.

4.5 Executing Jobs

A job (saved or unsaved) can only be started under the following conditions:

- The supplied dongle must be inserted into any USB connector of the PC.
- The job must be opened in laserDESK (only one job can be open at a time).
- The PC must contain a SCANLAB RTC5 or RTC6 PC interface board .
- During execution of a job, communication between the laserDESK software and the entire laser scan system's components takes place primarily via the RTC board. laserDESK's GUI makes the RTC board's functionality available for simultaneous laser and scan head control and incorporation of external control signals. Note that some functions (e.g. Processing-on-the-fly operations) require activation of options of the RTC board. The scope of functionality for scan head control (e.g. monitoring functions) also depends on the particular scan head that is attached. The RTC board supports all scan heads using the SL2-100 interface or via adapter the XY2-100 interface.
- Any hardware addressed by the job must be installed and operational.

Full and correct job execution requires the following:

- All required laser scan system components must be attached to the PC or RTC board.
- The laser scan system's components must be correctly configured, initialized, calibrated and aligned (see below).
- For automatic mode, the external control must be properly connected to the RTC board to ensure that the input signals (see Control Elements and Variants) will be correctly transmitted.

Via the Laser Control window, you can manually launch a job or switch it to automatic mode:

- In manual mode, the entire job or its variants can be launched via the laserDESK user interface. This might be useful, for example, during the development phase when you're iteratively determining optimal marking parameters. In this mode, only external starts and external variant selection are deactivated. All other signals will be taken into account. Starts and any variant selection take place manually, whereas signal exchange is always via global control.
- Automatic mode is for applying the job in actual production. In this mode, jobs are started and controlled exclusively via external input signals (e.g. via signals from a control PC or PLC). The laserDESK user interface then switches to 'View' user mode, from which things are displayed, but no functions can be executed.

4.6 Configuring Hardware Parameters

After installing laserDESK (but prior to first-time execution of a job via a specific laser scan system) or after hardware changes:

- You must set laserDESK's hardware parameters in 'Hardware Configuration' for appropriate configuration of your laser scan system's components (including the PC and RTC board).
- laserDESK provides additional functions for calibrating and/or aligning your laser scan system's components. These functions are accessible via the 'Hardware' menu.

Setting Hardware Parameters

Hardware parameters define the used hardware (laser scan system and PC), which is independent from any job. The jobs themselves, therefore, don't need to be altered for execution on different equipment having different hardware parameters (marking results may vary though). You can set hardware parameters via the 'Hardware Settings' dialog box inside Hardware Configuration. They are divided into the following categories:

- **Hardware Devices**
To process a laserDESK job via remote control, the connection type between server and client can be set here.
- **Processing Laser**
For RTC initialization, each processing laser to be used requires a laser definition file with special parameter settings (sll file in XML format). The laserDESK software package already contains laser definition files for a number of common laser types. To ensure that laserDESK uses the correct parameter settings, you must choose your laser type via a selection field.
For other lasers (so-called "GeneralType" lasers), you must create an sll file via the Laser Wizard (via 'Hardware' menu) and save it. The sll file gets created in the program directory. For actual usage, it needs to be manually copied into the subdirectory 'C:\Programs\Scanlab\LaserDesk\LaserDefinitions'. For different laser types, you might need to define various parameters (e.g. laser mode, output power, delay and frequency range).
In addition to selecting the used processing laser, it's useful to set parameters such as power, shutter and delays.
- **Optics**
The basic optics settings include the correction file, the calibration factor and the image field size. If these aren't (precisely) known, then scan head calibration can be performed via the Calibration Wizard (via 'Hardware' menu). At the end of this procedure, the required values will be automatically taken over.
- **PC Interfaces**
Here, settings are made for the interfaces between the PC and the system components.
- **Processing-On-The-Fly**
If Processing-on-the-fly (POF) is applied for marking/material-processing of rotating or linearly moving objects, then parameters need to be set relating to the used encoders (e.g. specifying linear or rotating motion as the POF type and defining calibration factors for the encoder signal).
Via the POF Calibration Wizard (via 'Hardware' menu), you can calibrate the used encoder. At the end of the procedure, the required values will be automatically taken over.



NOTE:

Processing-on-the-fly functionality can only be used if this option has been activated on the RTC board.

- **Vision System**
Here, settings can be made to define the setup of a vision system.
Currently, laserDESK supports the control of SCANLAB's SCANalign vision system.
- **Miscellaneous**
Parameters for IO-port, varioSCAN dynamic focusing units, cameras, servo motors etc.

The program always has only one active hardware parameter set (called 'Hardware Settings'), which can be managed via the 'Hardware Settings' dialog box in Hardware Configuration. After a restart, laserDESK always uses this 'Hardware Settings' parameter set. As delivered, the laserDESK software package contains one hardware parameter set.

To facilitate quick changes to your hardware configuration, laserDESK lets you archive different hardware parameter sets (hardware templates). These will be listed below the active hardware parameter set in the 'Hardware Settings' dialog box. If necessary (after changing the hardware), a corresponding template can be defined as the active 'Hardware Settings' hardware parameter set.

Testing the Hardware Parameter Settings

As in a job, marking objects can be created below Hardware Configuration and executed with a laser scan system. With it, you can immediately check parameter settings defined in the 'Hardware Settings' dialog box by conducting a marking test and modifying the settings if necessary.

Supplemental Functions

In addition to the above-mentioned assistance for calibrating the laser scan system, the 'Hardware' menu also provides the following functions (primarily for test purposes):

- The 'Manual Laser Control' dialog box lets you perform a marking-independent laser functionality test in which settings can be made for some laser parameters, the scan head's beam positions and, if applicable, the z position of a varioSCAN dynamic focusing unit.
- The 'Laser Wizard' lets you create a laser definition file for an unspecified laser type.
- The 'Supported Laser Wizard' lets you adjust the parameters for specified laser types.
- The 'Calibration Wizard' lets you calibrate the scan system.
- Use 'Restart' to reset an occurring error and reinitialize the laser.
- The 'RTC IO Desk' lets you query and set the 16 inputs and 16 outputs of the RTC's EXTENSION 1 connector. For example, you can check if I/O signals are being correctly issued and received by the RTC board.
- The 'Motor Control' serves for moving axes manually.
- The 'POF Calibration Wizard' lets you define the parameters and the encoder's calibration for Processing-on-the-fly operation.
- The 'Variable Polygon Delay Calibration' dialog box provides a procedure for creating an individual calibration curve of the variable polygon delay for iDrive scan systems.
- The 'Tracking Error Wizard' lets you evaluate the scan head's tracking error for iDRIVE scan systems.
- The 'Parameter Wizard' lets you find the most suited parameter set for your application.
- 'System Information' lets you query and view the current software and hardware properties and marking data as well as the current configuration data and return values of iDrive scan systems.

4.7 Using Libraries

To facilitate easier reuse of settings or marking objects at different positions within a job, you can define marking, pixel image and fill parameter sets as well as symbols, as described above. These are typically created in a job, but can also be created in the marking library, independently of a job.

Parameter sets and symbols created in a job are automatically saved to the corresponding (local) job library. Provided they weren't subsequently deleted there, they will then be saved in the job file ([JobName].sld). A job's parameter sets and symbols saved in the job library can't be directly used by another job. Instead, they can be exported to the (job-superordinate) Marking Library ([MarkingLibraryName].sld) and imported from there into the job library of another job.

The program's Marking Library already includes a default marking parameter set, a default pixel image parameter set and a default fill parameter set. Designated as "<default>", these sets are (as long as no others were defined as default) automatically used as default parameter sets in the job library when a new job is opened. The default marking parameter set from the job library will then be assigned initially to all newly created marking objects, and the default pixel image parameter set to all pixel images. And for fill assignments, the default fill parameter set from the job library will be initially used.

The Library Explorer is available for managing parameter sets and symbols - both in the job library and in the Marking Library. Like the Job Explorer, it has a tree structure with which you can create, copy, rename, delete, import or export data sets.

Use the 'GUI Settings' dialog box (see 'User Interface (GUI)' above) to specify the directory in which the used Marking Library ([MarkingLibraryName].sld) should be managed. You can freely select the path and filename. Firstly, this enables use of network paths and thus automatic backups, etc. Secondly, a directory can be chosen and configured to specifically provide laserDESK users with appropriate access rights.

**NOTE:**

As with the Marking Library, the Hardware Configuration's directory path is freely selectable.

NOTE:

The concept of the parameters is described under [How to Use the Job Explorer](#).

4.8 Special Functions

**NOTE:**

Most of the special functions are only available in the laserDESK Premium Edition. The dongle's configuration must be defined accordingly.

3D Functions

**NOTE:**

The usage of 3D functions in laserDESK requires that

- a varioSCAN focusing unit, which focuses the laser beam in z direction, is integrated in the scan system and
- the "3D Option" has been activated on the RTC board.

Following 3D functions are available:

'Z-Focus Control' Control Element

The z-focus control element defines the focus level. If the control node is inserted into the job (see [Inserting Control Elements](#)), all further 2D and 3D objects will be positioned with respect to this z-offset value and all z-values are relative to the control node's z-offset.

Simple 3D Objects (3D Helix ...)

Besides the point object only one simple 3D object is supported right now, the 3D helix. Its lead defines the z-value.

2D Marking Objects on 3D Surfaces

The processing on an inclined plane is supported. The inclined plane is defined by the plane's normal vector and an x-, y-, and z-shift of the origin. First, the objects are defined and assigned to a specific layer. Then the parameters for the position of this layer in space are defined. laserDESK automatically calculates the z-values for the objects.

3D Vector File Import

3D dxf files can be imported. laserDESK creates 3D polygons defined by point lists with x-, y-, and z-coordinates.

**NOTE:**

The concept of the 3D functions is described under [How to Use 3D Functions](#).

Motor Control Axes

laserDESK can command motor (axes) controllers for different purposes, especially for moving or rotating parts. This movement can be included into the job execution to be executed between different marking processes (without interaction of another control device like a PLC). laserDESK offers two possibilities for using axes:

- Every axis can be moved manually by using the 'Motor Control' (see [Supplemental Functions](#)).
- Motor control elements can be inserted into the job explorer's tree (see [Inserting Control Elements](#)), to use axis movements during job execution. The node defines the point in time when the axis movement is executed. In that case, the marking process will be interrupted, the axis movement executed, and then the laser process continued.

All supported motor controllers (the motor type can be selected from a list) use a serial interface for the communication. For this purpose laserDESK uses a serial interface of the PC.

**NOTE:**

The concept of the motor control axes is described under [How to Configure an Axis Control](#).

Tiling

If the size of the marking exceeds the dimensions of your laser scan system's marking area or the whole marking can't be executed at one time for some other reason (e.g. marking on a roll), the tile function lets you mark the work piece in several steps. Therefore, the marking objects will be divided in several tiles. Using positioning devices like motors, the work piece can then be moved to several positions to mark it stepwise.

In addition, a stripe and a cylinder mode are available, mainly intended for processing-on-the-fly.

Vision System

In combination with SCANLAB's *SCANalign* vision solution the 'Vision System' control element enables the evaluation of image data. The *SCANalign* package consists of software and hardware (SSI-camera, camera adapter, illumination). In combination with laserDESK, exact positioning of the marking on the work piece can be performed. This can also include the compensation of scanner and/or system drift.

Remote Control

The remote control is intended to enable a master control to command laserDESK via the remote control interface. The purpose of this control is to execute and adjust the processing of laserDESK jobs, especially the selection of the job to be processed, the definition of text contents and the execution start is possible. It is not intended to create or modify graphic objects inside a job.

When using the remote control, laserDESK 'serves' the client's queries and executes the desired actions. Thus the PC running laserDESK is the server and the customer program is the client.

The remote control of laserDESK has 2 possible connections with the same telegram and data format: serial connection or ethernet connection with TCP/IP protocol.

For easy integration into customer programs, a DLL can be provided. This enables remote control via function calls (only available for *Windows*).



NOTE:

The remote control, and especially its parameters, telegram syntax and commands, are described in the manual "[Definition of the Remote Control Functionality](#)".

4.9 Editions – Updates, Upgrades

Editions / Functional range

Currently, four laserDESK editions are available:

- **Basic Edition**

This edition comprises only basic functions to create and execute laser-marking and material-processing jobs. But this also includes the application of the parameter library, individual GUI settings and a context sensitive dynamic help.

- **Standard Edition:**

The functional range of the Standard Edition offers multitude functions, i.e. this edition comprises all essential functions to create and execute laser-marking and material-processing jobs. Beyond the functions of the Basic Edition, complex graphic elements and control elements are integrated. Furthermore, the Standard Edition also includes alignment, combine and repeat functions, language selection, special hatch line sorting functions and the control of all hardware components and calibration tools.

- **Standard Edition plus Remote Control:**

This special package includes all functions and program features of the Standard Edition and in addition the Remote Control function (which is also part of the Premium Edition).

- **Premium Edition:**

The Premium Edition includes all functions and program features of the Standard Edition. In addition, the Premium Edition enables you to execute very special functions such as remote control, vision control or 3D support (see [Special Functions](#)).

Beside these four editions there is a separate license available, which allows customers to create laser jobs off-line, i. e. independent from the laser-processing plant:

- The **Office Function** exclusively serves to create laser jobs. This function doesn't enable any hardware control and thus any laser job execution. For job creation, the Office Function includes all necessary features of the four editions mentioned above. Such created laser jobs can only be executed with an additional edition mentioned above.

The laserDESK software always supports all editions. Which laserDESK edition or functional range is usable, depends on the configuration of the USB dongle (see [USB Dongle](#)). A dongle upgrade (see below) can extend the functional range (e.g. from Standard Edition to Premium Edition).

Updates and Upgrades

Updating or upgrading laserDESK can be necessary in the following cases:

- You want to use laserDESK program features which are not yet activated on your dongle.
The dongle must be upgraded to a higher edition (usually with costs).
- SCANLAB releases an updated laserDESK program version (update – indicated by an increase of the third digit of the version number: "Version Nr. n.n.*n*"). The new (free) program version only has to be installed.
- SCANLAB offers a new laserDESK program version with new options (upgrade – indicated by an increase of the first or second digit of the version number: "Version Nr. *n.n.n*"). Both a (free) software upgrade and a dongle upgrade (usually with costs) is required.

Upgrading the Dongle

Upgrading the legal dongle is very easy:

- Inside the laserDESK GUI, create an upgrade request file (in XML format), which comprises all important data of the used software edition (application data, dongle data, options).
- Send this file together with an upgrade query to SCANLAB.
- SCANLAB will then send a license upgrade file in return.

- Execute the upgrade by using the returned file. The dongle will be actualized to enable the laserDESK software to use the new features.

Installing the new laserDESK Software

- Simply download the new laserDESK software (update or upgrade) from the laserDESK website (www.laserDESK.info) and install it subsequently.
- If you install a software upgrade, you must upgrade the legal dongle too.

5 Editions / Functional Range

The range of functions / program features executable with your laserDESK software depends on your software package configuration. Currently, four editions are available:

- **Basic Edition**

This edition comprises only basic functions to create and execute laser-marking and material-processing jobs. But this also includes the application of the parameter library, individual GUI settings and a context sensitive dynamic help.

- **Standard Edition:**

The functional range of the Standard Edition offers multitude functions, i.e. this edition comprises all essential functions to create and execute laser-marking and material-processing jobs. Beyond the functions of the Basic Edition, complex graphic elements and control elements are integrated. Furthermore, the Standard Edition also includes alignment, combine and repeat functions, language selection, special hatch line sorting functions and the control of all hardware components and calibration tools.

- **Standard Edition plus Remote Control:**

This special package includes all functions and program features of the Standard Edition and in addition the Remote Control function (which is also part of the Premium Edition).

- **Premium Edition:**

The Premium Edition includes all functions and program features of the Standard Edition. In addition, the Premium Edition enables you to execute very special functions such as remote control, vision control or 3D support.

Beside this four editions there is a separate license available, which allows customers to create laser jobs off-line, i. e. independent from the laser-processing plant:

- The **Office Function** exclusively serves to create laser jobs. This function doesn't enable any hardware control and thus any laser job execution. For job creation, the Office Function includes all necessary features of the four editions mentioned above. Such created laser jobs can only be executed with an additional edition mentioned above.

NOTE:

The laserDESK software always supports all editions. Which laserDESK edition or functional range is usable, depends on the configuration of the laserDESK dongle.

The application/edition of your laserDESK dongle is shown in the 'Licensing' dialog box (to be opened via 'Licensing...' in the '[Help](#)' menu): BASIC; STANDARD, REMOTE, PREMIUM or OFFICE.

If you want to extend the features of your laserDESK software, these must be activated on your dongle (see [Upgrading the laserDESK Software](#)).

The functions executable with laserDESK and their respective attribution to the editions are shown in detail in the table below:

| Program Feature | Basic Edition | Standard Edition | Standard Edition + Remote Control | Premium Edition |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-----------------------------------|-----------------|
| Standard Graphic Elements: – Point – Line – Rectangle – Circle – Arc – Ellipse – Polygon – Spiral – Font Text – Variable Text (Serial Number, Date) – Barcode (1D, 2D) – Import of Vector Graphics – Import of Pixel Images | X | X | X | X |

| Program Feature | Basic Edition | Standard Edition | Standard Edition + Remote Control | Premium Edition |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-----------------------------------|-----------------|
| Complex Graphic Elements: – Graphics Path – Vector Text – Symbols | | X | X | X |
| Basic Control Elements: – Digital In- and Output – Analog Output – Pulse Output – Timer Delay | | X | X | X |
| Further Control Elements: – Variants – Protocol Start, Protocol Stop | | X | X | X |
| Advanced Control Elements: – Timer Start, Timer Stop – Serial Communication – Motor Control – Z-Focus Control – Vision System – Laser Control – Wait for Encoder | | X | X | X |
| Hatch Type Graphic Path Enables fill type 'Path' | X | X | X | X |
| Sort Hatch Lines Sorting function for the vectors of a graphic object (in Fill Parameters) to optimize the processing sequence | | X | X | X |
| User Administration Assignment of user groups and user rights | | X | X | X |
| Language Selection Enables the selection of one of several languages | | X | X | X |
| Graphic Options Options settings for editing graphics | X | X | X | X |
| GUI Options Options settings for the Graphical User Interface | X | X | X | X |
| Keyboard Shortcuts Assignment/determination of shortcuts | | X | X | X |
| Measuring Functions | | X | X | X |
| Alignment Functions: – Sequencing – Aligning – Distributing | | X | X | X |
| Edit Elements Editing graphic objects in Graphic View | X | X | X | X |
| Contour and Combine Functions: – Union – Intersect – Exclusive or – Exclude – Connect – Merge – Round Corner – Offset | | X | X | X |
| Layers Support and management of layers | | X | X | X |
| Repeat Functions Copying and aligning/distributing graphic elements | | X | X | X |
| Dynamic Help Context sensitive help window inside the program window | X | X | X | X |
| intelliSCAN/Diagnosis Enables querying information about a used intelliSCAN/head | | X | X | X |
| Special Laser Types Support of special laser types | | X | X | X |

| Program Feature | Basic Edition | Standard Edition | Standard Edition + Remote Control | Premium Edition |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-----------------------------------|-----------------|
| Skywriting Enables the execution of the RTC5 skywriting mode | X | X | X | X |
| Manual Control of hardware: – RTC5-IOs – Laser – Motor Control Axes | | X | X | X |
| Calibration Wizard Enables a calibration routine for the scan system | | X | X | X |
| Variable Polygon Calibration Wizard Enables a calibration routine to determine a customized polygon delay curve | | X | X | X |
| POF and POF Calibration Wizard Enables the usage of the RTC5's POF option and a calibration routine to determine exact calibration factors for the processing-on-the-fly mechanism | | X | X | X |
| Parameter Wizard Helps to evaluate the best parameter set | | X | X | X |
| Parameter Library Parameter data base; user interface: Library Explorer | X | X | X | X |
| Import Text Enables the import of an (variable) external text file | X | X | X | X |
| Clipping Functions Several split modes | X | X | X | X |
| Pilot Laser Enables the usage of a pilot laser | | X | X | X |
| Second Scan Head Control Enables the control of two scan heads if a multiple scan head system is used | | X | X | X |
| Remote Control A marking process can be selected and executed completely via remote control; direct access to the RTC5 IOs; via TCP/IP or RS232 | | | X | X |
| 3D Support Hardware Support of a varioSCAN dynamic focusing unit: – static (2.5D) | | X | X | |
| – dynamic | | | | X |
| 3D Support Software – Creation of 3D objects – Import of 3D files – Inclined plane | | | | X |
| Tiling Splitting functions for – marking processes with dimensions larger than the marking field (in x-y) – marking on a roll – processing-on-the-fly applications | | | | X |
| Text Box Multi-line font text | | | | X |
| SCANalign Integration Direct integration of SCANLAB's SCANalign vision system; camera supported job execution (evaluation of image data); integration of background images | | | | X |

6 How to Use optimally the Program's Potential

To work with laserDESK in a structured manner, you need to optimally use the program's potential. To do so, refer to the following topics.

6.1 How to Use Parameters

In laserDESK, several different parameter sets exist:

- Graphic parameters
- Marking parameters
- Fill parameters
- Pixel image parameters
- Hardware configuration

The parameter sets and their individual parameters are handled in the Property Window, except for hardware configuration parameters. laserDESK uses a general scheme for parameter sets. Only the hardware configuration has different handling due to its usage. The program has default parameter sets, defined in the program library 'Marking Library'. Every time a new job is created, these default values are applied.

The program uses inheritance. Every time a new object is created and nested in a container object, the parameter sets of the container object are applied. A container object can collect several objects. This can be a group, a variant, a vector image or a job.

After creation, it's always possible to assign individual parameters to the object. Then the changed parameter set gets an anonymous name. To make this parameter set available to other objects, you have to save it explicitly and define a name for it.

All parameter sets are stored locally in the job library. Named parameter sets can be used and assigned to other objects of the job. The [Library Explorer](#) is the graphical user interface (GUI) for all these parameter sets.

Inheritance allows changing of all inherited parameter sets together. You merely need to change the top most parameter set. Individually assigned parameter sets remain unaffected. The [Property Window](#) is the GUI for all parameter sets. It shows whether a parameter set is inherited or individually defined. All actions related to parameter sets are done via the Property Window's context menu (click right mouse button).

Additionally, laserDESK has a general program library, the [Marking Library](#). No parameter set inside the marking library can be applied directly in a job, but it serves as a 'trading center' for all jobs. Parameter sets can be exported from the marking library for use in other jobs or imported into the Marking Library to be globally available for further usage. The Marking Library itself is a special job that several program functions deal with. In particular, the marking library is accessed by the functions 'Use', 'Export' and 'Export as ...' of the Property Window's context menu.

You can open the Marking Library via the menu 'File\Open ▶ Marking Library'. The job 'MarkingLibrary.sld' is then opened and offers the same possibilities as any other job as well as the program functions mentioned above. Here, the library explorer also serves as a GUI for manipulating the parameter sets. Because it is a job, the current opened job gets closed.

By copying the marking library, you can easily transfer parameter sets to different systems. Installing the Marking Library on a net drive allows multiple systems to share the same parameter source. You only need to define the correct path in all systems using laserDESK.

The 'Hardware Configuration' represents a special parameter set reflecting the actual hardware. Like the Marking Library, it is defined as a special job, which can be opened by the menu 'File\Open ▶ Hardware Configuration'. Because it is a job, the current opened job gets closed. The hardware configuration parameter set is independent of jobs and therefore used regardless of which job is executed. There is only one 'Hardware Configuration' and this parameter set is active until it is changed or replaced.

The 'Hardware Configuration' needs to be adapted when hardware components change, as well as one time after program installation, and before first execution of a job.

You can archive hardware configuration parameter sets and reload them. This is especially helpful if you exchange a component often and don't want to enter all the parameter changes every time. Then you can reload an adapted and archived parameter set for this exchange.

The hardware configuration parameter set can only be changed and replaced if the hardware configuration job is opened. Otherwise it can only be read.

6.2 How to Use Variants

A variant is a complete execution process inside a laserDESK job. It is defined by a special control node of laserDESK. Variants are used mainly in automatic mode to enable fast switching between different processings without any user intervention. Only in automatic mode are these input signals to the RTC5 or RTC6 evaluated.

To ensure a clearly structured job and avoid execution conflicts, a variant can only be included directly in the job node, not in any other container object. Additionally, all defined variants are collected in the 'variants node' to prevent a mixture between variants and other objects.

A variant's most important feature is that a selection bit pattern can be assigned to it (see 'Bit Pattern' parameter in [Graphic Parameters - Variant](#)). In automatic mode, the processing is started by an external signal to the RTC board's start input. If variants are defined additionally to this start signal, an input signal pattern must match a defined bit pattern of one variant when the start signal is sent. Then this variant is executed. If no signal pattern matches a defined variant pattern, nothing is executed. The input signals are the digital input lines 0-7 of the RTC board's 'Extension 1' connector (see [RTC5 Manual](#)). Which of these lines should be used must be defined in the job node (see parameter 'Variant Bit Mask' in [Graphic Parameters - Job](#)).

NOTE:

 To use a job with variants you have to define the bits (input lines) for the selection and you have to define unique bit pattern for each variant even if you select the variants by remote commands. Without an assigned bit pattern the behavior is unpredictable.

Objects defined outside any variant will be executed regardless of which variant is selected. But they will not be executed if no valid signal pattern is applied.

Furthermore, the variants behave like an ordinary group node. They can collect objects, define a transformation and assign parameter sets.

In manual mode, the signal pattern need not to be used and is not evaluated. Here, the user selects which variant should execute by entering its bit pattern via the laser control window.

A typical production procedure:

- Open a job
 - Select the '[Production Profile](#)'
 - Switch to [automatic mode](#)
 - The production line master controller (main control) applies a signal pattern to select a variant
 - The main control sends the start signal to start laser processing
 - The main controller changes the signal pattern to select the next variant for processing
 - The main control sends the start signal to start laser processing
 - ...
 - Switch back to manual mode
-

NOTE:

 In automatic mode, the RTC5 or RTC6 laser connector's external start input is used for starting. In manual mode, this input is disabled.

Except for variant nodes, the signals used by all other control nodes work in both automatic and manual modes.

6.3 How to Use the Job Explorer

The [Job Explorer](#) serves as a graphical user interface (GUI) to define the processing schedule and to give an overview of all defined objects.

The GUI is realized as a tree structure. The root is always the job node. Container objects are nodes which can be opened to show their children. Basic objects like circles or polygons can't be further expanded. They have a property called 'Points' which consists of a list of points defining the object.

Expanding a node (clicking the plus sign on the node's left side) is the same as selecting 'Edit' in the Job Explorer's [context menu](#) or the graphic view. There is one further function for 'Edit': If it is a basic object, it will be opened for manipulating its point list. This can be done in the graphic view by mouse interaction or in the [Property Window](#) by opening the table of points and editing their coordinates.

To finish edit mode, you can close the container tree node (clicking the minus sign on the node's left side) or select 'Finish (Edit)' in the context menu. Pressing <ESC> closes all containers up to the level below the root (job node).

If you move an object with inherited parameters to a different place, it will get the parameters of the new parent. If the object has individual parameters, it will keep these.

The filling belongs to the object where it is defined. Consider a group with 2 objects: A circle inside a rectangle. If the group is filled, the rectangle will be filled with a circular hole in it. If the circle and the rectangle are filled, then the circle is filled twice, because the rectangle filling overlaps the circle.

The characters of a text object and the filling object are special objects inside the job explorer. They are container nodes which can be expanded, but their children have only restricted parameter sets. They can't have their own filling and marking parameters. You are able to change their point tables, but this can only be the last step of editing. If you need to recalculate the point table of the object (e.g. for resizing), the point table editing will be lost.

The tree of the job explorer defines the order of execution. Starting from top to bottom, all objects are queued in an execution sequence. During this process, all nodes are expanded and the child nodes are queued, too. Therefore, the position of a control object is very important, because it defines when the control object is executed.

There is one exception of this rule: If there are no control nodes and no variable objects exist, then the variable objects are queued and executed at the end of the sequence. That enables laserDESK to calculate the variable data during execution of the constant objects and saves execution time.

6.4 How to Use 3D Functions

Requirements and Restrictions

- To use the laserDESK 3D functions, a varioSCAN dynamic focusing unit, which focuses the laser beam in z direction, must be integrated in the scan system.
- All 3D features can only be used if the 3D option is enabled on the RTC5 or RTC6 PC interface board (for details, see the 'Controlling a 3-Axis Scan System (optional)' chapter of the [RTC5 Manual](#)) and a 3D correction file (D3_nnn.ct5) is used (see 'Correction File' parameter in [Setting 'Optics' Parameters](#)).
- Most of the 3D features are only available in the laserDESK Premium Edition (see [Editions / Functional Range](#)). The dongle's configuration must be defined accordingly. If necessary, the dongle must be upgraded (see [Upgrading the laserDESK Software](#)).

NOTE:

The RTC interface board can only execute jump and mark commands in 3D. There are no arc or circle commands for 3D available. Therefore all defined splines have to be interpolated by polygons. laserDESK automatically converts the curve elements to polygons for 3D processing. No user interaction is needed. Bitmaps generally cannot be processed in 3D.

Available 3D Functions

Z-Focus Control Element

This function is available in the laserDESK Standard Edition.

The [z-focus control element](#) defines the focus level. It can be inserted in the job explorer / job execution sequence. All further 2D and 3D objects will be positioned with respect to this z-offset value. The focus level stays even when new jobs are loaded (no reset). The z-focus control element serves as an offset definition for all following processes.

NOTE:

Performing a 3D job with job parameter 'Use 3D = True' (see 'Realization' below), finally **no** jump back to the z-offset value will be executed.

In laserDESK there are 3 functions which affect the z-focus level directly:

- the z-focus control element,
- the [Manual Laser Control](#) (in the 'Hardware\Laser Control\Laser System' menu),
- the remote command (no. 26, see [Remote Control manual](#)).

Each of these functions will overwrite the settings of the other functions (same internal parameter).

Simple 3D Objects (3D helix ...)

This function is available in the laserDESK Standard Edition.

Simple 3D objects can be used together with the z-focus control elements. Only one simple 3D object is supported right now, the [3D helix](#). Its lead defines the z-value. During the execution the z-values of the helices are relative to the z-focus level (see 'Z-Focus Control Element' above).

NOTE:

When performing a 2D job with job parameter 'Use 3D = False' (see 'Realization' below), a jump back to the initial z-focus level will be inserted after the execution of this object.

2D Marking Objects on 3D Surfaces

This function is available in the laserDESK Premium Edition only.

The processing on an inclined plane is supported. The inclined plane can be defined in the '[Edit Layer](#)' dialog box by defining the normal vector and an x,y, and z-shift of the origin. It is very easy to use this feature. Just define the objects and add them to a specific layer. Then define the parameters for the position of this layer in space. laserDESK automatically calculates the z-values for the objects. The z-coordinates of the objects on the inclined plane are relative. They get an additional focus level offset defined by the z-focus control element (see above).

It is possible to define 3D objects on this inclined plane, too. They will be transformed in space and keep their shape.

3D Vector File Import

This function is available in the laserDESK Premium Edition only.

3D dxf files can be imported. laserDESK creates polygons defined by point lists with x-,y-, and z-coordinates (as an example, see '[Edit Points](#)' dialog box). The z-coordinate is relative, i.e. on execution, these objects get an additional focus level offset defined by the z-focus control element (see above). There is no error checking. The user has to take care whether the processing is possible (e.g. the laser spot in space may be blocked by material).

General 3D Objects

This function is available in the laserDESK Premium Edition only.

laserDESK doesn't support functions for creating and manipulating 3D objects except the ones described above. The only further possibility is to change the z-coordinates inside the point lists of the objects.

All z-coordinates are relative to the z-focus level (see 'Z-Focus Control Element' above). If the object is inserted into an inclined plane, it will be additionally transformed (see '2D Marking Objects on 3D Surfaces' above).

To apply the z-values, the job must be signed as a 3D job (job parameter 'Use 3D = True', see 'Realization' below).

Realization

The job node has a specific '[Use3D](#)' boolean parameter. If it is true and the requirements are satisfied, the job will get full 3D support. The z-coordinates of the point lists are applied. If Use 3D is false, the z-values are discarded even if they are unequal to 0 (zero).



NOTE:

Use 3D has no effect on z-focus control elements or 3D helices (see above)! They will be executed all the time.

3D objects can't be filled by laserDESK. But it is possible to fill the 2D objects on an inclined plane. Then the filling gets three-dimensional.

General rule:

Use 3D = True

- 3D-Objects: 3D-commands are used
- 2D-Object: Will be executed in the defined z-focus level
- The inclined plane definition is evaluated.

Use 3D = False (corresponds to no 3D option of laserDESK)

- 3D-Object: Only helices are executed in 3D, objects with 3D point lists are executed in 2D. Processing on an inclined plane is not possible.
- 2D-Object: Will be executed in the defined z-focus level.



NOTE:

Performing a helix with job parameter 'Use 3D = False', finally a jump back to the z-offset value will be executed.

If the 3D option of the RTC is not set, no z-coordinate support at all is possible. The marking is at the x, y, z=0 - plane.

6.5 How to Configure an Axis Control

laserDESK can command motor (axes) controllers for different purposes, especially for moving or rotating parts. This movement can be included into the job execution to be executed between different marking processes without interaction of another control device like a PLC.



If you use a step motor in a SCANLAB scan system, please note:

How to control the step motor via laserDESK is described comprehensively in [How to Control a Step Motor in a SCANLAB Scan System](#).

If an axis control should be used in laserDESK following steps have to be executed:

Defining the Interface

Almost all supported motor controllers use a serial interface for communication. For this purpose laserDESK uses a serial interface of the PC.



NOTE:

If you use the Stepper Motor via RTC5 or RTC6 board, the stepper motor doesn't use a serial connection. It will be connected to the STEPPER MOTOR connector of the RTC board.



NOTE:

If there is no (more) serial interface of the PC available, an USB serial interface adapter may be used.

In laserDESK the interface and its settings have to be defined in the 'Hardware Settings' dialog box (to open via 'Open ▶ Hardware Configuration' in the 'File' menu) on the 'PC Interfaces' page:

| Serial Connections | | | | | | | |
|--------------------|------|-----------|--------|-----------|-----------|---------------|--|
| Name | Port | Baud Rate | Parity | Data Bits | Stop Bits | Usage | |
| COM_1 | COM1 | 9600 | None | 8 | 1 | Motor Control | |

- The Serial Connections parameters must be defined according to the input of the motor controller's manual.
- The name can be chosen by the user. It will be used to identify the interface (see 'Defining the Motor Control Axes' below).

The detailed description of the interface's definition you will find in [Setting 'PC Interfaces' Parameters](#).

Defining the Motor Control Axes

The motor control axes have to be defined in the 'Hardware Settings' dialog box (to open via 'Open ▶ Hardware Configuration' in the 'File' menu) on the 'Hardware Devices' page:

| Motor Control Axes | | | | | | | | | | |
|--------------------|--------|------------|-------------------|--------------------|--------------------|-------|---------------------|--------------|---------------|--------------------------|
| | Name | Motor Type | Serial Connection | Calibration Factor | Reference Run Mode | Speed | Reference Run Speed | Acceleration | Origin Offset | Automatic Reference Run |
| ▶ | Axis X | Aerotech | COM_1 | 100000 | Reference Run | 50 | 25 | 0 | 0 | <input type="checkbox"/> |

Observe the following notes for the first three parameters:

- The (unique) axis 'Name' has to be defined by the user and is needed to identify the axis in laserDESK. Every time the axis should be used this name is needed as a parameter.
- The 'Motor Type' can be selected from a list which shows all supported motor controllers.
- The 'Serial Connection' is the interface defined in 'Hardware Settings\PC Interfaces' (see 'Defining the Interface' above).

**NOTE:**

If a controller controls more than one axis it is necessary to define this parameter set for each of these axes.

In that case every axis needs to have defined the same interface.

All further parameters have to be adapted to the used axis. Following items have to be taken into account:

- The parameters have to be in the valid range of the used axis.
- When using motor control elements in the job (see 'Using an Axis in laserDESK' below), the speed can be defined independent from the 'Speed' defined here.
- A negative 'Calibration Factor' inverts the movement's direction.
- The 'Automatic Reference Run' function is not available for security concerns. Otherwise, the stepper motor could move to an unintentional position which can lead to damage.
Activating the checkbox is without effect.

The reference run must be executed once manually before the axes can be moved.

The detailed description of the motor control axes' definition you will find in [Setting 'Hardware Devices' Parameters](#).

NOTE:

Some axes/motors of different manufacturers have special features or properties.

If you use

- Aerotech axes,
- a Faulhaber motor,
- an Isel controller,
- a step motor via RTC5 or RTC6 board or
- a SCANLAB scan system with step motor,

it is essential to read also [Special Settings for Motor Control Axes!](#)

Using an Axis in laserDESK

laserDESK offers two possibilities for using axes:

- Every axis can be moved manually by using the 'Motor Control' dialog box (to open via 'Manual Control\Motor Control' in the 'Hardware' menu).
The dialog is described in detail in [Testing the Motor Controllers](#).
- To use axis movements during job execution, motor control elements can be inserted into the job explorer's tree (= execution list) (see [Inserting a Motor Control Element](#)). The position in the job's execution list defines the point in time when the axis movement is executed. In that case, the marking process will be interrupted, the axis movement executed, and then the laser process continued.

The definition of the motor control elements' parameters is described in detail in [Graphic Parameters – Motor Control](#).

A simultaneous marking while the axis is moving is not possible when using only laserDESK. In that case the axes have to be controlled externally.

6.6 How to Control Step Motors of SCANLAB Scan Systems

laserDESK lets you control focusing systems inside SCANLAB scan systems. Currently, SCANLAB provides two scan systems with a dynamically variable focal length:

- The *varioSCAN40_{FLEX}* Dynamic Focusing System supplements an XY scan system to form a 3-axis system.
- The *powerSCAN II* 3-Axis Scan System includes the focusing system.

In both scan systems the focusing optic is fixed to a step motor controlled by the RTC5 or RTC6 board. Unlike other motors for moving or rotating parts, the step motor doesn't use a serial connection when used with laserDESK but uses the RTC board's stepper motor connector.

To control the step motor, SCANLAB's RTC 5 *varioSCAN_{FLEX}* Extension must be used. This extension board serves as an interface between the RTC board and the scan system including the step motor controller device.



NOTE:

Using laserDESK, it is not possible to control the step motor with the older RTC4 Step Motor Extension.
Only use the RTC5 *varioSCAN_{FLEX}* Extension (SCANLAB #128683).

Connecting the Scan System to the RTC5 or RTC6 Board

On the hardware side, the scan system must be connected as follows:

1. Connect the STEPPER MOTOR connector of the RTC5 *varioSCAN_{FLEX}* Extension board to the STEPPER MOTOR connector of the RTC board.
2. Connect the SECOND SCAN HEAD connector of the RTC5 *varioSCAN_{FLEX}* Extension board to the 2. SCAN HEAD connector of the RTC board.
3. Connect the STEP MOTOR OUT connector of the RTC5 *varioSCAN_{FLEX}* Extension board to the STEP MOTOR IN connector of the *varioSCAN40_{FLEX}* or *powerSCAN II*.
4. Connect the SECOND SCAN HEAD OUT connector of the RTC5 *varioSCAN_{FLEX}* Extension board to the data connector (DIGITAL IN or SL2-100 or Z IN) of the *varioSCAN40_{FLEX}* or *powerSCAN II*.

(For detailed description, please refer to the manuals of the RTC5 *varioSCAN_{FLEX}* Extension and *varioSCAN40_{FLEX}* or *powerSCAN II*.)

Defining the Motor Control Axes / Step Motor

The step motor has to be defined in the 'Hardware Settings' dialog box (to open via 'Open ▶ Hardware Configuration' in the '[File](#)' menu) on the 'Hardware Devices' page:

| Motor Control Axes | | | | | | | | | | | |
|--------------------|------|---------------|-------------------|--------------------|--------------------|-------|---------------------|--------------|---------------|-------------------------------------|--|
| | Name | Motor Type | Serial Connection | Calibration Factor | Reference Run Mode | Speed | Reference Run Speed | Acceleration | Origin Offset | Automatic Reference Run | |
| | FLEX | Stepper Motor | RTC5 - 1 | 78.74 | Lower end switch | 10 | 10 | 0 | 0 | <input checked="" type="checkbox"/> | |

All further parameters have to be adapted to the used axis. Following items have to be taken into account:

- The parameters have to be in the valid range of the used axis.
- Using the RTC5 *varioSCAN_{FLEX}* Extension, the 'RTC5 - 1' serial connection must be selected.
- The calibration factor is defined by the selected unit it ([mm], [cm], [mil] or [in]) and the step motor's travel. The unit [steps/user unit] is freely selectable, but we recommend using the same user unit as defined in the 'Options' window (see parameter 'Length' in [Defining the 'View' Parameters](#)).
 - The travel of the *varioSCAN40_{FLEX}*'s step motor is **0.0127 mm** or **0.0005 in** per step.
 - The travel of the *powerSCAN II*'s step motor is **0.0065 mm** or **0.0002559 in** per step.

In order that the input in the field 'Position Command' in the 'Motor Control' dialog box (see below) corresponds to the intended travel, the following calibration values must be set:

| | varioSCAN40_{FLEX} | powerSCANII |
|-----------------------------------------|-----------------------------------|--------------------|
| - when using the unit millimeter [mm]: | 78.74 | 153.85 |
| - when using the unit millimeter [cm]: | 787.4 | 1538.5 |
| - when using the unit millimeter [mil]: | 2 | 3.906 |
| - when using the unit millimeter [in]: | 2000 | 3906 |

- A negative 'Calibration Factor' inverts the movement's direction.
 - The 'Acceleration' of the stepper motor is preset. An entry is without effect.
 - The 'Automatic Reference Run' function is not available for security concerns. Otherwise, the stepper motor could move to an unintentional position which can lead to damage.
Activating the checkbox is without effect.
- The reference run must be executed once manually before the stepper motor can be positioned.

To define the parameters, proceed as follows:

1. Define a unique name for the stepper motor in the column 'Name'.
The stepper motor is referenced by this name in laserDESK.
2. Click the  button in the column 'Motor Type' to open a list with all supported motor types.
Select 'Stepper Motor'.
3. Click the  button in the Column 'Serial Connection'.
Select "RTC5 - 1".
4. Enter the calibration factor in the column 'Calibration Factor'.
In order that the input in the field 'Position Command' in the 'Motor Control' dialog box (see below) corresponds to the intended travel, select the suitable calibration value from the table shown above.
5. Click the  button in the column 'Reference Run Mode' to open a list of available types of reference runs for the selected controller.
Select "Lower end switch".
6. Enter the speed and reference run speed values in the corresponding columns.
These are used when testing the motion controllers via the 'Motor Control' dialog box (see below).



Note:

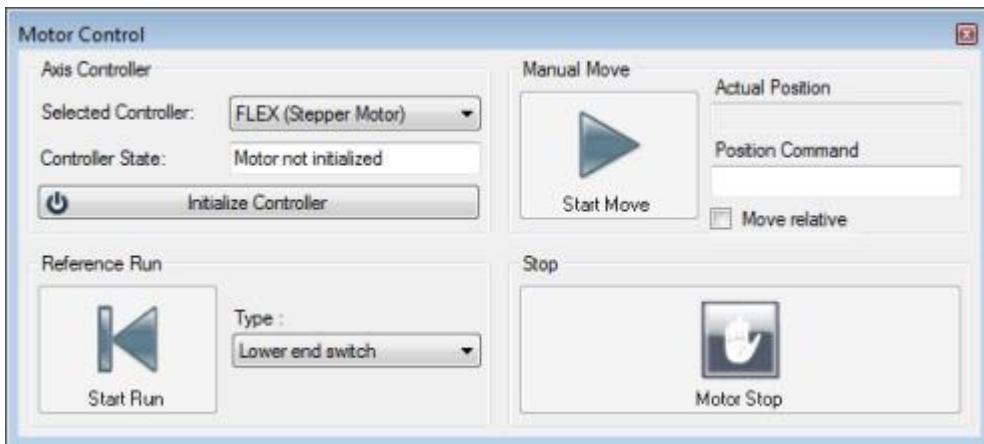
The maximum speed is
 - 10 mm/s for the powerSCAN II
 - 20 mm/s for the varioSCAN40_{FLEX}
 For reference run speed, we recommend not to exceed 10 mm/s.

7. Set the Origin Offset to "0" to keep the relationship between stepper motor position and correction file (see below).
8. Confirm your settings with {OK}.
The 'Hardware Settings' dialog box closes.
The settings are retained as long as 'Hardware Configuration' is open.
9. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.

Controlling the Step Motor

Executing a laserDESK job with the varioSCAN40_{FLEX} or powerSCAN II scan system primarily requires to move its step motor to the desired position and to load the corresponding correction file (the order does not matter). Subsequently, the job can be executed.

laserDESK lets you move the focusing system's step motor manually by using the 'Motor Control' dialog box (to open via 'Manual Control\Motor Control' in the '[Hardware](#)' menu):



To control the stepper motor, proceed as follows:

1. Select the required controller in the selection field 'Selected Controller'.
The 'Controller State' output field (not editable) shows the actual state of the selected controller.
2. If not done yet, click the {Initialize Controller} button to initialize the selected controller.
3. To execute a reference run,
– initially select the reference run type "Lower end switch",
– then click the {Start Run} button.
The reference run will start immediately, the controller state will be indicated in the 'Controller State' output field.
4. Define the step motor's required position by entering the value into the 'Position Command' input field.

Note:

The motor position must be calculated from the bit value given in the scan system's manual (see chapter 'System-specific Characteristics of the 3-Axis System', line 'Position of the focusing optic') by the following formula (exemplary for [mm] and [in]):



varioSCAN40_{FLEX}

$$\text{position [mm]} = x \text{ bit} \cdot 0.0127 \text{ mm/step} : 1 \text{ bit/step}$$

$$\text{position [in]} = x \text{ bit} \cdot 0.0005 \text{ in/step} : 1 \text{ bit/step}$$

powerSCANII

$$\text{position [mm]} = x \text{ bit} \cdot 0.0065 \text{ mm/step} : 1 \text{ bit/step}$$

$$\text{position [in]} = x \text{ bit} \cdot 0.000256 \text{ in/step} : 1 \text{ bit/step}$$

(We recommend using the same user unit as defined in the 'Options' window (see parameter 'Length' in [Defining the 'View' Parameters](#)).

-
5. If not done yet, deactivated the 'Move relative' checkbox to let the motor move to an absolute position.
 6. Click the {Start Move} button.
The motor will start immediately, the actual motor position is shown in the 'Actual Position' field.

If not done before, load the corresponding correction file in the 'Hardware Settings' dialog box (to open via 'Open ▶ Hardware Configuration' in the '[File](#)' menu) on the 'Scan Head' page. Now you can execute the desired laserDESK job

6.7 How to Use a Second Scan Head

The Second Scan Head has to be connected to the second scan head connector on the RTC5 or RTC6 interface board. Scan head 1 and 2 can have individual correction files, calibration factors and global transformations. If only one of the scan heads is used it will use its specific settings for list calculation and execution.

If both scan heads are used, they will use their specific settings (correction files, calibration factors, global transformation). But they will have the same list running on the RTC board. To calculate the list, the calibration factor of scan head 1 will be used to convert the user input [mm] into list units [bits]. This is different as in the situation when only scan head 2 is used. In that case the list will be calculated with the correction factors of scan head 2!



NOTE:

To get the same dimensions for both scan heads, the calibration factor of scan head 2 needs to be adapted to the list calculation for scan head 1.

Procedure in laserDESK:

Calibrate both scan heads individually.

If both scan heads are used, the RTC list will be calculated with calibration factors of scan head 1 and the global matrix of scan head 2 gets scaling factors to adapt the list values to the scan head 2 calibration factors.

6.8 How to Use Shortcut Keys

Shortcut keys let you execute functions with keyboard interaction in a very easy and quick way.

By default, the following shortcuts keys are already applied by laserDESK:

General

<Alt+F> <Enter>: Open new job
<Ctrl+C>*: Copy
<Ctrl+O>: Open a dialog box to select/open a job file
<Ctrl+S>: Save
<Ctrl+V>*: Paste
<Ctrl+X>*: Cut
<Ctrl+Y>*: Redo
<Ctrl+Z>*: Undo
*: Delete selected object(s)
<Esc>: Stop editing mode

Opening the Program Menus

<Alt+A>: Open the Arrange Menu
<Alt+E>: Open the Edit Menu
<Alt+F>: Open the File Menu
<Alt+H>: Open the Help Menu
<Alt+T>: Open the Tools Menu
<Alt+V>: Open the View Menu

Basic Settings

<Ctrl+H>: Open the 'Hardware Settings' window for hardware configuration
<Ctrl+K>: Open the 'Options' window for GUI settings

Opening several Windows

<F1>: Open 'Help' window
<F3>: Open 'Output' window
<F4>: Open 'Property' window

Changing between Profiles

<F5>: Change to Design Profile
<F6>: Change to Test Profile
<F7>: Change to Production Profile
<F8>: Change to Pilot Laser Profile

Opening Hardware Dialogs

<Ctrl+6>: Open 'Manual Laser Control' dialog box for laser control
<Ctrl+7>: Open 'Motor Control' dialog box for motor control
<Ctrl+8>: Open 'RTC IO Desk' dialog box for IO control
<Ctrl+9>: Open 'Information' dialog box for scan system information and marking statistics

Selecting Objects

<Ctrl+A>: Select all objects in the job explorer or on the work area;
within this group perform a detailed selection with
<Ctrl+L>: Open the 'Select' dialog box to select/deselect single objects
<Ctrl+N>: Circulate through the selection to select a single object;
this can be switched for editing by
<Ctrl+Enter>: Switch selected object to edit mode

Grouping several Objects

<Ctrl+G>: Group several selected objects
<Ctrl+Alt+G>: Ungroup selected group

Moving and Editing Objects

<↔>, <→>, <↑>, <↓>: Move selected object(s) on the work area in small steps
<Shift+↔>, ...: Move selected object(s) on the work area in larger steps
<Ctrl+F>: Fill selected object(s)
<Ctrl+Alt+F>: Remove filling
<Ctrl+Shift+M>: Open 'Move' dialog box to define the selected object's movement
<Ctrl+Shift+O>: Open 'Offset' dialog box to scale the selected object up or down
<Ctrl+Shift+P>: Open 'Place' dialog box to define the selected object's position
<Ctrl+Shift+R>: Open 'Rotate' dialog box to define the selected object's rotation

Defining the Objects' Execution Order

<Ctrl+Shift+I>: Move the selected object in the job explorer's tree upwards
<Ctrl+Shift+K>: Move the selected object in the job explorer's tree downwards

Viewing Marking Vectors

<Ctrl+M>*: Display of marking vectors
<Ctrl+P>*: Display of marking protocol

Changing Mouse Interaction Tools

<Ctrl+1>: Select mode
<Ctrl+2>: Pan mode
<Ctrl+3>: Measure distance
<Ctrl+4>: Zoom mode
<Ctrl+5>: Scan head positioning

Shifting the Work Area

<turn mouse wheel>: Shift work area top down / bottom-up in small steps
<Shift>+<turn mouse wheel>: Shift work area top down / bottom-up in large steps
<Alt>+<turn mouse wheel>: Shift work area from right to left / left to right in small steps
<Alt+Shift>+<turn mouse wheel>: Shift work area from right to left / left to right in large steps

Zooming

<Ctrl+PgDn> or <Ctrl++>: Zoom in
<Ctrl+PgUp> or <Ctrl+->: Zoom out
<Ctrl>+<turn mouse wheel>: Zoom in/out
<Shift>+draw rectangle from left to right: Zoom in
<Shift>+draw rectangle from right to left: Zoom out
<Ctrl+End>: Set zoom to selection
<Ctrl+Home>: Set zoom to work space

SCA\Align Background Images

<Ctrl+B>: Open 'Background Image' dialog box to load image
<Ctrl+Shift +B>: Update all existing images in the job

Additional to these shortcut keys, laserDESK lets you define more shortcut keys individually in the 'Options' (GUI Settings) window (see [Defining Shortcut Keys](#)). Furthermore, the shortcut keys listed above can there be changed individually.

Only the *Windows*-standard shortcut keys and the very special laserDESK shortcut keys signed with "*" can't be changed.

7 Installing the laserDESK Software

7.1 Scope of Supply

- 1 laserDESK data CD that contains the complete laserDESK software package:
 - laserDESK program,
 - laserDESK Help files,
 - Software drivers for Microsoft's *Windows Vista*, *Windows 7*, *Windows 8*, and *Windows 10* operating systems.
- 1 dongle (software-protection device) for running laserDESK in full mode.

7.2 Requirements

Before installing laserDESK, ensure that the PC on which laserDESK will be installed meets the following requirements:

- The PC must run on Microsoft's
 - *Windows 7*
 - *Windows 8* or
 - *Windows 10*32- or 64-bit operation system with MS *framework 4.5*.
- Required hard disk space is approx. 250 MB (incl. Help file)
- To run a laserDESK job, it is essential that a SCANLAB RTC5 or RTC6 PC interface board and its associated software is installed in the PC controlling the laser scan system (production PC).



NOTE:

The [RTC5 Manual](#) and the [RTC6 Manual](#) detail how to install the RTC5 or RTC6 board and its associated software.

**NOTE:**

For creating jobs, an RTC5 or RTC6 board is not necessary. Jobs can be created on any PC without an RTC5 or RTC6 board and run later on the production PC (with RTC5 or RTC6 board, laserDESK software and dongle).

- The RTC5 board can be configured for optional functionality not available in the standard version. This optional functionality must be enabled by SCANLAB or installed by the customer.
The following RTC5 and RTC6 options are available:
 - Processing-on-the-fly (POF),
 - 3D (for controlling a 3-axis scan system),
 - Second Scan Head Control (for controlling two XY scan systems simultaneously),
 - Optoelectronic Couplers (for optodecoupling the laser control signals).For details, see the 'Optional Functionality' chapter of the [RTC5 Manual](#) or [RTC6 Manual](#).



NOTE:

The 3D display is based on WPF (*Windows Presentation Foundation*) functions. These functions will be executed properly only with 32 or 16 Bit color depth setting (color quality) in the desktop properties. Using the laserDESK 3D option or if 3D display is required, your monitor must use one of these settings.

- Ensure that the laser is connected correctly to the RTC5 or RTC6 board's connectors (see [Connecting the Laser to the RTC5 or RTC6 PC Interface Board](#)).

After **laserDESK is installed**, laserDESK users must get specific write and/or read permissions. Because the program's setup routine can't assign write and read permissions, the customer's system administrator must ensure that the laserDESK users get the required write and/or read permissions depending on their level of laserDESK access authorization (see below).

Before starting the program, the appropriate dongle (software protection device) must be inserted to run laserDESK in full mode, i.e. unrestricted. Without dongle, laserDESK can only be used in demo mode. In demo mode, no saving or marking is allowed, thus no laser jobs can be executed.

7.3 Installing the laserDESK Software

1. Insert the laserDESK data CD into the PC's CD/DVD drive.
An Installation Wizard will start automatically.
2. Otherwise run "Setup.exe" from the software package directory.
3. Installation then proceeds automatically via the *Windows Installer*.
Follow the Wizard's instructions until the installation is completed.

7.4 Assigning Read and Write Permissions

Write and read permissions must be assigned by the customer's system administrator:

1. Assign write and read permissions for the laserDESK data directory - typically 'C:\ProgramData\Scanlab\SLLaserDESK' - to each user with laserDESK "Administrator", "Supervisor" or "Designer" access authorization.
2. Assign read permissions only to each other user ("Production" and "Viewer" access authorization) for the aforementioned directory.

7.5 Inserting the Dongle

1. Insert the appropriate dongle in any USB port of the PC that will be running laserDESK in full mode (PC with or without RTC5 PC interface board) latest before starting the program.



NOTE:

To start laserDESK, see [Starting laserDESK](#).

8 Starting laserDESK

8.1 Requirements

To create a laserDESK job on any PC, the following requirements must be fulfilled:

- The laserDESK software must be properly installed (for details, see [Installing the laserDESK software](#)).
- Full mode program usage requires that the legal dongle is inserted in any USB port of the PC. Without dongle, laserDESK can only be used in demo mode without allowing saving or marking. Starting the application without dongle, an appropriate message will be issued (which can be confirmed with {OK} or refused with {Cancel}).

NOTE:



If the dongle has been disconnected from the PC while running laserDESK in full mode, the program will switch to demo mode automatically.

To run laserDESK in full mode again, the program must be restarted with the dongle inserted in any USB port.

- The user must have specific write and/or read permissions appropriate for their level of laserDESK access authorization (for details, see [Installing the laserDESK software](#)).

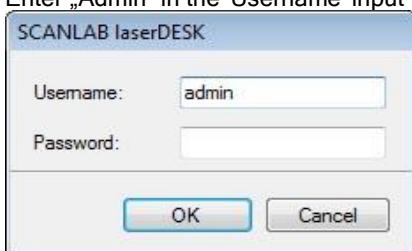
In addition to the above requirements, the production PC must fulfill the following prerequisites for executing a laserDESK job:

- A SCANLAB RTC5 or RTC6 PC interface board must be properly installed to control the laser scan system (for details, see [Installing the laserDESK software](#)).
- If necessary, optional RTC5 or RTC6 board functionality (POF, 3D, Second Scan Head Control, Optoelectronic Couplers) must be enabled (for details, see [Installing the laserDESK software](#)).
- Ensure that the laser is connected correctly to the RTC board's connectors (see [Connecting the Laser to the RTC5 or RTC6 PC Interface Board](#)).

8.2 Starting laserDESK the First Time after Installation

After laserDESK is installed, it will be started as follows:

1. Launch the "SLLaserDesk.exe" program file directly from the laserDESK program directory (typically 'C:\Programs\Scanlab\laserDESK\').
The "SCANLAB laserDESK" dialog box appears.
2. Enter „Admin“ in the 'Username' input field and **no** password. This is the default user.



Confirm by clicking the {OK} button.

3. When the program window opens, a new job is automatically created.

NOTE:

Following the first time start the following steps to configure the laser scan system should be performed:

- Assigning the RTC correction file (see [Setting 'Scan Head' Parameters](#))
- Defining the used laser type (see [Setting 'Processing Laser' Parameters](#))

This must be performed by a user with laserDESK access authorization "Administrator" (and thus has the respective write permissions).

NOTE:

If the error message "Help SQL server is not installed." appears when starting laserDESK, proceed as follows:

Double-click the LaserDeskHelp.de.mchelp file in the laserDESK program sub-directory '\Help\de'.

Possibly, the dialog box for selecting the help viewer appears. In this case, select the following file:

'C:\Program Files (x86)\MadCap Software\MadCap Help Viewer V5\ HelpViewer.app'.

When the LaserDeskHelp.de.mchelp file is opened, it is determined, that the SQL server is missing and the installation will be started. Follow the installation instructions.

or

Download and install the SQL server via the following link:

<http://www.microsoft.com/download/en/details.aspx?id=5783>

The SQL server is only necessary for the laserDESK help and does not affect the functionality of laserDESK itself.

NOTE:

If desired, create links/icons to start laserDESK simply from the desktop or taskbar.

It is recommended to assign the required user names and access authorizations to all program users (see [Defining User's Access Authorization](#)).

8.3 Starting laserDESK

laserDESK can be started as follows:

NOTE:

If the last user, who has closed the program, has a password (see [Defining Users' Access Authorization](#)), the "SCANLAB laserDESK" dialog box appears. Automatically, the respective name is shown in the field 'Username'. All users can log in by entering the own name and – if required – the own password.

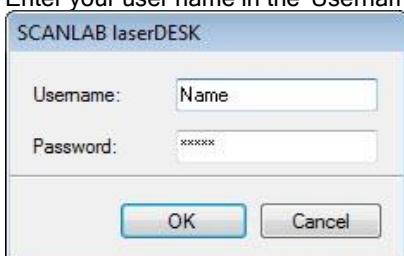
If the last user, who has closed the program, has no password, the program window opens immediately. All individual settings of the last user will be inherited. If required, you have to log in with your user name (see [New User Log-in](#)).

1. Launch the "SLLaserDesk.exe" program file
 - directly from the laserDESK program directory (typically 'C:\Programs\Scanlab\laserDESK\')
 - or via a link/icon.

If the last user has no password, the program window opens immediately. Continue with step 5. If necessary, log in with your user name.

If the user has a password, the "SCANLAB laserDESK" dialog box appears.

2. Enter your user name in the 'Username' input field.



3. If required, enter your password in the 'Password' input field.
4. Confirm your entry/entries by clicking the {OK} button.
5. When the program window opens, a new job is automatically created. The user interface doesn't yet contain marking objects.
6. To open an existing job ([JobName].sld),
 - select a recent file listed in the 'File' menu (if applicable)
 - or select 'Open ▶ Job...' in the 'File' menu and then the desired file in the (*Windows*-standard) 'Open' dialog box.

The program window shows any already-created job.

9 New User Log-in

The access to laserDESK is assigned to each user by the administrator (see [Defining Users' Access Authorization](#)). If a new user takes over laserDESK from an old user without exiting the program, he must log in with his user name and, if required, his password.



NOTE:

When you've finished using laserDESK, you should log in as 'Viewer' for locking program functions or exit the program.

For log-in the corresponding dialog box must be opened:



To log in proceed as follows:

1. Select 'Log In As...' from the '[Edit](#)' menu.
The 'SCANLAB laserDESK' dialog box appears.
2. Enter your user name into the corresponding input field.
3. If required, enter your password into the corresponding input field.
4. Confirm your entries by clicking the {OK} button.
The dialog box will close and you are logged in.



NOTE:

If you can't log in (e.g. if you have forgotten your password), contact your administrator.
In the worst case, you need to reinstall laserDESK to get the default login back.

10 Changing the Password

The access to laserDESK can be permitted by password only. Passwords can be assigned by the administrator individually to each user or for one user group (see [Defining Users' Access Authorization](#)). The assigned password can be changed later by the users themselves in the 'Change Password' dialog box:



NOTE:

Users can change the password only when they are logged in with their user name (see [Starting laserDESK](#) or [New User Log-in](#)). But all passwords can be changed by the administrator!

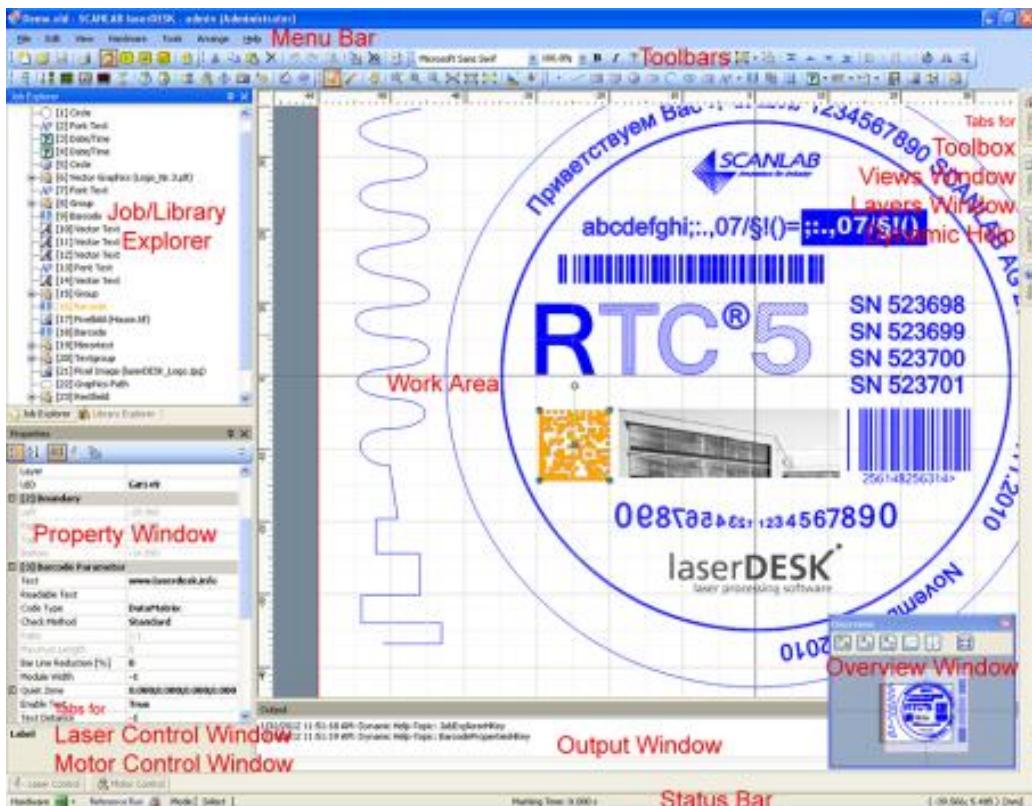
To change the password proceed as follows:

1. Select 'Change Password' from the '[Edit](#)' menu.
The 'Change Password' dialog box appears.
2. Enter your old Password into the corresponding input field.
3. Enter your new Password into the corresponding input field.
4. Repeat the new Password into the corresponding input field.
5. Confirm the entries by clicking the {OK} button.
The dialog box will close and the new password is valid.

11 Graphical User Interface

11.1 The GUI Elements

laserDESK's graphical user interface (GUI) is optimized for fast user access to needed functions. It offers all functions for fast and easy creation of a job. The GUI consists of several elements (the figure below shows an example):



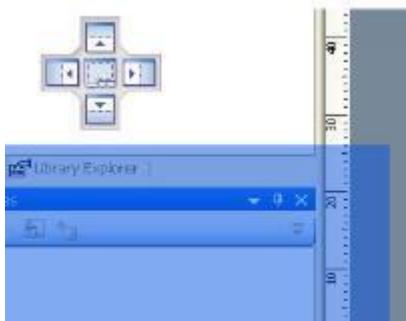
- The main GUI element is the **Work Area** which serves to create and manually edit marking objects. The content shown in the work area is a "picture" to be executed.
- The **Menu Bar** comprises all functions of the laserDESK program. It is subdivided into menus and sub-menus.
- Several **Toolbars** provide fast access to most program functions.
- The **Job Explorer** shows a job's structure and lets you create marking objects or control elements and define their sequence of execution.
- The **Library Explorer** lets you manage parameter sets for marking, filling and symbols.
- The **Laser Control Window** lets you quickly execute a manual marking or switch to the automatic mode. The laser control can be individually adjusted. Appropriate to the current work step, different profiles (design, test or production) are selectable.
- The **Motor Control Window** lets you test the axis/motion controllers.
- The **Property Window** lets you define the settings (properties) for graphic, marking and fill parameters.
- In addition to the menu bar and toolbars, the **Toolbox** provides an easy way to create all marking objects and control elements for a job.
- The **Views Window** serves to set elements in the work area to visible or invisible quickly.
- The **Layers Window** lets you create layers and define their properties.

- The **Output Window** shows the system's status during job execution.
- The **Overview Window** displays the work area in small format to give an overview of the current shown section of the work area.
- The **Status Bar** indicates the status of the [RTC connection](#), the mode (current selected function), the cursor position, and the defined [units](#).
 When marking a job, a progress bar is displayed, if the expected execution time will last for longer than 10 seconds (waiting periods due to long_delay and set_wait commands or waiting for digital input signals are not taken into account). When a marking job is finished, the actual marking time is indicated.
- The 'Help' window shows context sensitive [Dynamic Help](#).
- In addition to the menu bar, toolbars, and toolbox, laserDESK offers a fourth way to access functions: When you click the right mouse button, a **Context Menu** presents a number of functions optimized for the task of creating and editing marking objects.

11.2 Arranging the Windows

The menu bar and work area are always displayed. Other windows and the toolbars can be shown or hidden via the '[View](#)\...' menu. Apart from the status bar, all other windows are dockable so that user can arrange them according to individual preferences. If desired, the windows can appear or disappear automatically. To arrange a window, proceed as follows:

1. Activate a desired window via the '[View](#)' menu.
 That window appears in the program window.
2. Click the window's title bar and keep the mouse button pressed.
 The window will be highlighted blue.
3. Drag the window in the desired direction.
 One or several buttons appear:



4. Arrange the window via the buttons as follows:

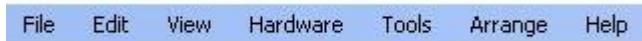
| Icon | Description |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Inserts the window above the subjacent window. |
| | Inserts the window below the subjacent window. |
| | Inserts the window to the left of the subjacent window. |
| | Inserts the window to the right of the subjacent window. |
| | Inserts the window inside the subjacent window. In this case the windows share one frame and the desired window must be selected with the appropriate tab (as an example, see Job Explorer / Library Explorer in the topmost figure). |

5. Define the window's behavior by selecting its thumbtack in the title bar:

| Icon | Description |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| | Arrests the open window. |
| | Shows the window, if the cursor is placed onto the respective tab - hides the window automatically when moving the cursor outside the window. |

11.3 Menu Bar

The menu bar is one of the main elements of laserDESK's user interface. In the menus and sub-menus, you will find almost all program functions. (A few functions are exclusively accessed via the right mouse button's [Context Menu](#).)



'File' Menu

The 'File' menu offers typical file functions.

The following functions are available:

| Function | Description |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New | Opens a new job. This job doesn't yet contain marking objects or control elements. |
| Open > | |
| Job... | Launches a (<i>Windows</i> -standard) 'Open' dialog box for selecting an already created job. This job contains any already-created marking objects or control elements. |
| Marking Library | Opens the Marking Library for setting and managing the marking, fill and pixel image parameters and the symbols. |
| Hardware Configuration | Opens Hardware Configuration for setting and managing hardware parameters. |
| Save | Saves the job, marking library or 'Hardware Configuration' under its current path and filename. |
| Save As... | Opens a (<i>Windows</i> -standard) 'Save' dialog box for freely selecting a path and filename. |
| Page Settings... | Open the 'Page Settings' dialog box. Lets you define paper size, orientation, margins, ... |
| Preview... | Shows the page in print output view. |
| Print... | Opens a (<i>Windows</i> -standard) 'Print' dialog box for printing a "picture" of the marking objects on the work area. |
| Import... > | |
| File... | Opens the 'Import' dialog box for importing pixel images or vector graphics (see Importing Pixel Images and Vector Graphics). |
| File Set... | Opens the 'Import' dialog box for importing file sets (see Importing File Sets). |
| [Recent Files] | Shows a list of recently used jobs. |
| Exit | Exits the laserDESK program. |

'Edit' Menu

The 'Edit' menu offers general (Copy, Paste,...) and laserDESK-specific (Select, Fill, ...) edit functions.

The following functions are available:

| Function | Description |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Undo | Cancels the last executed action. |
| Redo | Executes the last canceled action (Undo). |
| Select > | |
| Mode | Switches the program to select mode for selecting objects and elements (see Selecting Marking Objects for Editing). Select mode is the standard mode for creating marking objects, inserting control elements and editing them. |
| All | All marking objects on the work area will be selected simultaneously. |
| Scroll | Lets you scroll through several selected marking objects, if you've selected several marking objects at once (see 'Area Select' in Selecting Marking Objects for Editing or 'Select\All (Scroll)' in Defining the 'Edit' Parameters). The scroll function serves e.g. to define the marking object on which other objects will be adjusted when arranging multiple marking objects via the align or spacing buttons (see Arrange Toolbar). Select 'Edit>Select\Scroll' until the desired marking object is highlighted in a different color. |
| Marked | Lets you select one of many selected marking objects, if you've selected several marking objects at once (see 'Area Select' in Selecting Marking Objects for Editing or 'Select\All (Scroll)' in Defining the 'Edit' Parameters). – Use the scroll function (see above) until the desired marking object is highlighted. – Select 'Edit>Select\Marked'. Now, only the desired marking object will be selected. |

| Function | Description |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select | Lets you select one of many selected marking objects, if you've selected several marking objects at once (see 'Area Select' in Selecting Marking Objects for Editing or 'Select>All (Scroll)' in Defining the 'Edit' Parameters). Opens the 'Select' dialog box (see 'Select>All (Select)' in Defining the 'Edit' Parameters). |
| Clear | Cancels selection of an object or element. |
| Edit | For editing points or lines of a selected marking object (see Editing Objects – Overview). |
| Position > | |
| Place | Opens the 'Place' dialog box for positioning the selected object via numerical entry (see Arranging Marking Objects in the Work Area). |
| Center to Origin | Positions the selected marking object directly to the origin of the work area (see Positioning Marking Objects to the Origin). |
| Move | Opens the 'Move' dialog box for translating the selected object via numerical entry (see Arranging Marking Objects in the Work Area). |
| Rotate | Opens the 'Rotate' dialog box for rotating the selected object via numerical entry (see Arranging Marking Objects in the Work Area). |
| Mirror > | |
| Horizontal | Mirrors one or several marking objects with respect to a horizontal or vertical axis. |
| Vertical | |
| Fill | Fills selected marking objects such as rectangle, circle, ellipse, polygon, etc. The marking object must be closed (see Manually Editing Marking Objects). |
| Remove Filling | Removes filling of a marking object. |
| Finish (Edit) | Finishes editing of a marking object. |
| Cut | Cuts a selected marking object or control element. |
| Copy | Copies a selected marking object or control element. |
| Paste | Pastes a selected marking object or control element. |
| Delete | Deletes a selected marking object or control element. |
| Offset | Enlarges a marking object by a defined dimension. Its corners will be rounded simultaneously by the defined radius. (See Altering the Marking Object's Shape) |
| Round Corners | Rounds the marking object's corners by a defined radius. The marking object can be closed or open. (See Altering the Marking Object's Shape) |
| Combine > | See Combining Two Marking Objects |
| Union | Combines two overlapping marking objects via four different ways and thus create new objects. |
| Intersect | |
| Exclusive Or (Xor) | |
| Exclude | |
| Connect | Connects the end points of two open objects (line, polygon,graphic path - but not spiral and arc). |
| Merge | |
| Separate | |
| Split | Offers several modes to cut one or several marking objects (see Splitting Marking Objects). |
| Tile | Divides a marking object exceeding the work area into several tiles to mark it in several steps (see Defining the Tile Set). The tile set function requires, that the work piece to be marked can be moved with an appropriate device (e.g. positioning table) coordinated to the laser scan system. |
| Cutout | Cuts intersecting lines by to avoid poor marking quality at intersections (see Cutting Marking Objects). |
| Expand | Fits a curve by a polygon in single vectors (see Expanding Marking Objects). |
| Pass Down Transformation | Includes the transformation values of groups, graphic sets, polygons and graphics paths into the point list. The transformation (rotation, translation, flip) will be set to 0 (zero). |
| Convert To > | Converts text and variable objects (date/time, serial number) into other formats (font text, vector text, barcode) as well as groups or graphic sets to graphics paths and vice versa (see Converting Text Objects, Groups and Graphic Sets). |
| Font Text | |
| Vector Text | |
| Barcode | |
| Graphics Paths | |
| Graphic Set | |
| Group | |
| Save As Symbol | Creates a template called "Symbol" from the selected marking object. The symbol will be saved in the marking library (see Creating and Inserting a Symbol). |
| Options | Opens the 'GUI Settings' dialog box for configuring laserDESK's graphical user interface (see Configuring the Graphical User Interface). |
| Change Password | Opens the 'Change Password' dialog box for changing the current user's password (see Changing the Password). |
| Log In As... | Opens a login dialog box (see New User Log-in). |

'View' Menu

View menu functions serve to show or hide components of the laserDESK GUI and to select pan mode or the zoom functions for enhanced convenience when creating and editing marking objects in the work area.

The following functions are available:

| Function | Description |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Design Profile | |
| Test Profile | Alternatively one of this four profiles can be selected. |
| Production Profile | In test profile, production profile, and pilot laser profile, the 'Laser Control' window will be displayed by default (see Laser Control Window / GUI Profiles). |
| Pilot Laser Profile | |
| Reset Window Configuration | Lets you reset the arrangement of all GUI windows of laserDESK (see Arranging the Windows). The laserDESK default window configuration will be recovered. NOTE: Only the current GUI profile (see Laser Control Window / GUI Profiles) will be reset! |
| New Graphic View | Lets you open an additional Graphic View of the Work Area . This is advantageous, if you want to use different views (Top, Front/Side, and 3D View, see Views Window) of the marking objects. Active in <u>Design Profile</u> only. |
| Job Explorer | If activated, the dockable Job Explorer window is shown. |
| Library Explorer | If activated, the dockable Library Explorer window is shown. |
| Laser Control | If activated, the dockable Laser Control Window is shown. |
| Motor Control | If activated, the 'Motor Control' dialog box is shown (see Controlling the Motors). |
| Property Window | If activated, the dockable Property Window is shown. |
| Toolbox | If activated, the dockable Toolbox window is shown. |
| Views | If activated, the dockable Views Window window is shown. |
| Layers | If activated, the dockable Layers Window window is shown. |
| Output Window | If activated, the dockable Output Window is shown. |
| Graphic Overview | If activated, the dockable Overview Window is shown. |
| Status Bar | If activated, the status bar is shown. |
| Dynamic Help | If activated, the dockable 'Help' window is shown. |
| Toolbars > | |
| File | If activated, the ' File ' toolbar is shown. |
| Edit | If activated, the ' Edit ' toolbar is shown. |
| View | If activated, the ' View ' toolbar is shown. |
| Marking Objects | If activated, the ' Marking Objects ' toolbar is shown. |
| Control Elements | If activated, the ' Control Elements ' toolbar is shown. |
| Arrange | If activated, the ' Arrange ' toolbar is shown. |
| Text | If activated, the ' Text ' toolbar is shown. |
| Graphics Path | If activated, the ' Graphics Path ' toolbar is shown. |
| Pan > | |
| Mode | Switches the program to pan mode which moves the work area (see Moving the Work Area). |
| Up | |
| Down | |
| Left | Moves the work area directly in the appropriate direction; pan mode needn't to be activated. |
| Right | |
| Zoom > | |
| Mode | Switches the program to zoom mode which scales the work area (see Using the Zoom Functions). |
| To All Graphics | |
| To Work Area | |
| To Selection | Scales the work area in accordance with the selected function; zoom mode needn't to be activated. |
| In | |
| Out | |

'Hardware' Menu

The 'Hardware' menu serves to define hardware parameters, control hardware components and execute jobs.

The following functions are available:

| Function | Description |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laser Control > | |
| Laser System | The 'Manual Laser Control' dialog box lets you test the laser or scan head (see Direct Manual Control of the Laser System and Scan Head). |
| Laser Wizard | Serves to create a laser definition file (see Creating a Laser Definition File for a General Laser Type). |
| Supported Laser Wizard | Serves to adapt frequency range parameters of a full supported laser type (see Adapting Frequency Parameters of a Full Supported Laser Type). |
| Calibration Wizard | Serves to determine exact calibration factors for the work area (see Calibrating the Scan System). |
| Restart | Initializes the laser, if a malfunction occurs (see Manually Restarting the Laser). |
| Manual Control > | |
| RTC IO-Control | The RTC IO Desk serves to test signal exchange from the RTC5 interface board (see Testing the Signal Exchange via the RTC IOs). |
| Motor Control | Serves to control motors or axes (see Controlling Motors). Available only, if a motor and its serial connection is defined in the hardware settings (see Setting 'Hardware Devices' Parameters). |
| Adjustment > | |
| POF Calibration Wizard | Serves to determine exact calibration factors for the processing-on-the-fly (POF) mechanism (see Calibrating the Processing-On-the-Fly Mechanism). |
| Polygon Delay | The variable polygon calibration wizard serves to create a customized calibration curve (see Creating the Variable Polygon Delay Calibration Curve). Executable only with intelliSCAN/scan heads. |
| Tracking Error | The tracking error wizard serves to evaluate the tracking error of the scan head (see Evaluating the Scan Head's Tracking Error). The evaluated value can then be used to calculate the Laser Delays and Laser Delays in the Property Window. Executable only with intelliSCAN/scan heads. |
| Parameter Wizard | The parameter wizard serves to find the most suited parameter set for your application. This routine comprises the selection of a parameter set, the setting of the parameter's values, the execution of the test pattern marking, and finally the selection of the most suited parameters (see Evaluating the Best Parameter Set). |
| System Information > | |
| Scan System | Serves to query information and statistics (see Querying Information). |
| Edit Hardware Settings/ View Hardware Settings | Opens the 'Hardware Settings' dialog box. If Hardware Configuration is open, the dialog box serves to define the hardware parameters appropriate for the current system configuration. If a job or the Marking Library is open, the dialog box serves to select the active hardware parameter set temporarily . All other current settings can only be viewed but not changed. |
| RTC Connection | Lets you release (and regain) the RTC connection. Serves to disconnect laserDESK from the RTC5 interface board without closing the program (see Releasing/Regaining the RTC Connection). |
| Initialize Remote Control | This command resets the remote interface of laserDESK. This is necessary to make the remote interface available again if a client program has shut down (see Initializing the Remote Control). |

'Tools' Menu

The 'Tools' menu lets you create marking objects in the work area and insert control elements into the Job Explorer's tree. Additionally, several enhanced-convenience modes can be selected.

The following functions are available:

| Function | Description |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select Mode | Switches the program to select mode for selecting objects and elements (see Selecting Marking Objects for Editing). Select mode is the standard mode for creating marking objects, inserting control elements and editing them. |
| Pan Mode | Switches the program to pan mode for moving the work area (see Moving the Work Area). |

| Function | Description |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Zoom Mode | Switches the program to zoom mode, which offers several zoom functions (see Using the Zoom Functions). |
| Measure Distance | Switches the program to measure mode, which assists in measuring distances (see Measuring Distances). |
| Scan Head Positioning | Switches the program to the scan head mode. Serves to place the scan head's mirrors to a desired position in the work area (see Positioning the Scan Head). |
| Marking Objects > | |
| Point | |
| Line | |
| Rectangle | |
| Circle | |
| Ellipse | |
| Polygon | |
| Arc | |
| Spiral | |
| Graphics Path | |
| Font Text | |
| Text Box | |
| Vector Text | |
| Barcode | |
| Graphics Paths | |
| Graphics Set | |
| Group | Select a desired marking object to create it in the work area (see Inserting Objects – Overview). |
| Tile Set | |
| Date/Time > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Serial Number > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Import Text > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Reference To Symbol | |
| Pixel Image | |
| Vector Graphics | |
| Control Elements > | |
| Variant | |
| Digital Input | |
| Digital Output | |
| Analog Output | Select a desired control element, or the protocol node, to insert it into the Job Explorer (see Inserting Control Elements , |
| Pulse Output | Inserting a Serial Communication Control Element , |
| Timer Delay | Inserting a Motor Control Element , |
| Timer Start | Inserting Z-Focus Control Elements , |
| Timer Stop | Inserting a Vision System Control Element , |
| Serial Communication | Inserting a Laser Control Element , |
| Motor Control | Inserting a Wait For Encoder Control Element or |
| Z-Focus Control | Inserting Protocol and Timer Nodes). |
| Vision System | |
| Laser Control | |
| Wait For Encoder | |
| Protocol Start | |
| Protocol Stop | |
| Background Image | Opens the 'Background Image' dialog box to define a background image (see Inserting a Background Image) |

| Function | Description |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refresh Background Image | <p>This menu item is only available with a connected <i>SCANalign</i> system. This function checks the actual loaded job for the existence of background image(s). If any is present, its size and position is acquired and a new image is requested from <i>SCANalign</i>. This image will replace the old one.</p> <p>To use this function,</p> <ul style="list-style-type: none"> – create a job, – execute the background image function (see Inserting a Background Image), – define the size and position of the image. <p>Now you can use the refresh function to actualize this background image.</p> <p>Note: This function requires the image label “Background Image” in the selected GUI language. Therefore creating a job in one GUI language and executing the function in another GUI language will fail. So, do not change the image label!</p> |

'Arrange' Menu

The 'Arrange' menu serves to group, sort, align or distribute marking objects.

The following functions are available:

| Function | Description |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grouping > | Serves to group or ungroup marking objects: |
| Group | Combines several marking objects, selected together in the work area or in the job explorer, to one group. |
| Graphics Paths | Combines several independent marking objects, selected together in the work area or in the job explorer, to one graphics paths (set). Their individual parameter sets will be discarded. |
| Graphics Set | Combines several marking objects, selected together in the work area or in the job explorer, to one graphic set. |
| Tile Set | Combines several marking objects, selected together in the work area or in the job explorer, to one tile set. |
| Variant | Combines several marking objects, selected together in the work area or in the job explorer, to one variant. |
| Ungroup | Dissolves a selected group, graphic set, tile set or variable in single objects. |
| Sequencing > | For defining the sequence of the objects/elements in the Job Explorer's tree: |
| First | Positions the selected object to the top of the tree. |
| Move Up | Moves the selected object one position up. |
| Move Down | Moves the selected object one position down. |
| Last | Positions the selected object to the bottom of the tree. |
| By Position | Sorts several selected objects in the tree depending on their position in the work area: <ul style="list-style-type: none"> – Left To Right – Top To Bottom – Right To Left – Bottom To Top – Distance |
| By Layer | Sorts several selected objects in the tree depending on their assignment to different layers. |
| Aligning > | Serves to align several selected marking objects in the work area: |
| Lefts | Aligns the marking objects to the left. |
| Centers | Centers the marking objects horizontally. |
| Rights | Aligns the marking objects to the right. |
| Tops | Aligns the marking objects to the top. |
| Middles | Centers the marking objects vertically. |
| Bottoms | Aligns the marking objects to the bottom. |
| Put Text On Path | Aligns a selected text to a simultaneously selected marking object (here generally called path). |
| Remove Text From Path | Removes the text from a marking object, if aligned via 'Put Text On Path' (see above). |

| | |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Distributing > | For distributing several selected marking objects in the work area: |
| Left Border Spacing | Distributes with evenly spaced left borders. |
| Horizontal Center Spacing | Distributes horizontally with evenly spaced centers. |
| Right Border Spacing | Distributes with evenly spaced right borders. |
| Horizontal Distance | Distributes horizontally with even distance between objects. |
| Top Border Spacing | Distributes with evenly spaced top borders. |
| Vertical Center Spacing | Distributes vertically with evenly spaced centers. |
| Bottom Border Spacing | Distributes with evenly spaced bottom borders. |
| Vertical Distance | Distributes vertically with even distance between the objects. |
| Across Area | Opens a dialog box for distribution across the work area. 4 different layout types are available: "Grid", "Box", "Circle", "Arc". |
| Repeat | Opens the 'Repeat' dialog box to distribute a selected marking object as often as defined across the work area (see Copying and Aligning Marking Objects). 4 different layout types are available: "Grid", "Box", "Circle", "Arc". |

'Help' Menu

The 'Help' menu comprises online help, Dynamic Help, additional manuals, and information about laserDESK.

The following functions are available:

| Function | Description |
|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| Contents... | Opens the 'Help Viewer' window with the online help. |
| Search... | The selected topic ('TOC' or 'Search') is displayed. For details, see How to Use the laserDESK Help |
| Dynamic Help | Opens the 'Help' window which displays context sensitive help topics. |
| Guides > | For opening a user manual (guide) for one or several system components. |
| [Manuals] | ... e.g. the SCANLAB RTC5 manual. |
| Licensing... | Opens the window 'Licensing' for Upgrading the laserDESK Software . |
| About SCANLAB laserDESK | Shows information about SCANLAB's laserDESK program, e.g. the software version. |

11.4 Toolbars

The numerous buttons of the toolbars provide fast access to functions. Many of them can be executed directly with one mouse click. laserDESK provides the following toolbars. These toolbars can be shown or hidden via the ['View' Menu](#).

'File' Toolbar

The 'File' toolbar offers buttons for typical file functionality as well as buttons for defining hardware parameters, controlling hardware components and executing jobs.

This toolbar offers the following functions:

| Button | Description |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  New | Opens a new job. This job doesn't yet contain marking objects or control elements. |
|  Open | Opens a (Windows-standard) 'Open' dialog box for selecting an already created job. This job contains any already-created marking objects or control elements. |
|  Save | Saves the job, marking library or 'System Configuration' under its current path and filename. |
|  Print | Forwards the print job ("picture" of the marking objects) directly to the connected printer. |
|  Design Profile | |
|  Test Profile | Alternatively one of this four profiles can be selected. In test profile, production profile, and pilot laser profile, the 'Laser Control' window will be displayed by default (see Laser Control Window / GUI Profiles). |
|  Production Profile | |
|  Pilot Laser Profile | |
|  Hardware Settings | Opens the 'Hardware Settings' dialog box. If Hardware Configuration is open, the dialog box serve to define the hardware parameters appropriate for the current system configuration. If a job or the Marking Library is open, the dialog box serve to select the active hardware parameter set temporarily . All other current settings can only be viewed but not changed. |

'Edit' Toolbar

The buttons of the 'Edit' toolbar perform general and laserDESK specific edit functions (Copy, Paste, ... - Finish, Fill, ...). This toolbar offers the following functions:

| Button | Description |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Cut | Cuts a selected marking object or control element. |
|  Copy | Copies a selected marking object or control element. |
|  Paste | Pastes a selected marking object or control element. |
|  Delete | Deletes a selected marking object or control element. |
|  Undo | Cancels the last executed action. |
|  Redo | Executes the last canceled action (Undo). |
|  Finish (Edit) | Finishes editing of a marking object. |
|  Fill | Fills selected marking objects such as rectangle, circle, ellipse, polygon, etc. The marking object must be closed (see Filling Marking Objects). |
|  Remove Filling | Removes the filling of a marking object. |
|  Specify Options | Opens the 'GUI Settings' dialog box for configuring laserDESK's graphical user interface (see Configuring the Graphical User Interface). |

'View' Toolbar

The buttons of the 'View' toolbar serve to change the work area's view and switch between several modes:

- Select mode lets you select, create and edit marking objects and insert control elements
- Zoom mode and pan mode serve to change the work area's view
- Measuring mode assists in measuring distances

The "mode buttons" are marked by a point (see table below) Once a mode button is selected, this mode remains in effect until you switch to another mode. In zoom mode, pan mode and measuring mode you can alternatively select 'Finish' via the right mouse button. In this case, the program always returns to select mode.

This toolbar offers the following functions:

| Button | Description |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Select Mode Serves to select marking objects (see Selecting Marking Objects for Editing). NOTE: Only in 'Select Mode' marking objects can be edited. |
|  | Select Clear Serves to deselect selected marking objects. |
|  | Pan Mode For moving the work area (see Moving the Work Area). |
|  | Zoom Mode |
|  | Zoom In |
|  | Zoom Out Serves to enable zoom mode and directly apply a zoom function (see Using the Zoom Functions). |
|  | Zoom To All Graphics |
|  | Zoom To Work Area |
|  | Zoom To Selection |
|  | Measure Distance Assists in measuring the distance between points (see Measuring Distances). |
|  | Scan Head Positioning Switches the program to the scan head mode. Serves to place the scan head's mirrors to a desired position in the work area (see Positioning the Scan Head). |

'Marking Objects' Toolbar

The buttons of the 'Marking Objects' toolbar serve to create marking objects in the work area.

This toolbar offers the following functions:

| Button | Description |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|  | Point |
|  | Line |
|  | Rectangle |
|  | Polygon |
|  | Circle Select a desired marking object for creating it in the work area (see Inserting Objects – Overview). |
|  | Ellipse |
|  | Arc |
|  | Spiral |
|  | Graphics Path |

| Button | Description |
|---------------------------------------------------------------------------------------------------------------|-------------|
|  Text | |
|  Font Text | |
|  Text Box | |
|  Vector Text | |
|  Barcode | |
|  Graphics Set | |
|  Graphics Paths | |
|  Group | |
|  Tile Set | |
|  Date, Time | |
|  Font Text Date/Time | |
|  Vector Text Date/Time | |
|  Barcode Date/Time | |
|  Serial Number | |
|  Font Text Serial Number | |
|  Vector Text Serial Number | |
|  Barcode Serial Number | |
|  Import Text | |
|  Import Font Text | |
|  Import Vector Text | |
|  Import Barcode | |
|  Reference To Symbol | |
|  Pixel Image | |
|  Vector Graphics | |

'Control Elements' Toolbar

The buttons of the 'Control Elements' toolbar serve to insert control elements (which regulate job execution) directly into the Job Explorer's tree.

This toolbar offers the following functions:

| Buttons | Description |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|  Add Variant | Select a desired control element, or the protocol node, to insert it into the Job Explorer, see Inserting Control Elements , |
|  Digital Input | Inserting a Serial Communication Control Element , |
|  Digital Output | Inserting a Motor Control Element , |
|  Analog Output | Inserting Z-Focus Control Elements , Inserting a Vision System Control Element , |
|  Pulse Output | Inserting a Laser Control Element , Inserting a Wait For Encoder Control Element or |

| Buttons | | Description |
|-----------------------------------------------------------------------------------|----------------------|-----------------------------------------------------|
|  | Timer Delay | Inserting Protocol and Timer Nodes. |
|  | Timer Start | |
|  | Timer Stop | |
|  | Serial Communication | |
|  | Motor Control | |
|  | Z-Focus Control | |
|  | Vision System | |
|  | Laser Control | |
|  | Wait For Encoder | |
|  | Protocol Start | |
|  | Protocol Stop | |

'Arrange' Toolbar

The 'Arrange' toolbar buttons serve to group or ungroup several marking objects, to define the execution order for each marking object and to align several marking objects to each other.

This toolbar offers the following functions:

| Button | Description |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Group |
|  | Grouping To Group |
|  | Grouping To Graphics Paths Combines several selected marking objects in the work area or Job Explorer to one group, graphic set, tile set or variant. |
|  | Grouping To Graphics Set Additional, a group, graphic set, tile set or vector graphics can be created under a new group or variant. |
|  | |
|  | |
|  | Ungroup Dissolves a selected group, graphic set or variant in single objects. |
|  | Sequence First Positions the selected object to the top of the job explorer's tree. |
|  | Move Up Moves the selected object one position up in the Job Explorer's tree. |
|  | Move Down Moves the selected object one position down in the Job Explorer's tree. |
|  | Sequence Last Positions the selected object to the bottom of the Job Explorer's tree. |
|  | Align Left Aligns several selected marking objects in the work area to the left. Or - when clicking the arrow - opens a drop-down menu for aligning several selected marking objects in the work area. |
|  | Lefts Aligns the marking objects to the left. |
|  | Centers Centers the marking objects horizontally. |
|  | Rights Aligns the marking objects to the right. |
|  | Tops Aligns the marking objects to the top. |
|  | Middles Centers the marking objects vertically. |
|  | Bottoms Aligns the marking objects to the bottom. |

| Button | Description |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Horizontal Center Spacing Distributes several selected marking objects horizontally with evenly spaced centers. Or - when clicking the arrow - opens a drop-down menu for distributing several selected marking objects in the work area. |
|  | Left Border Spacing Distributes with evenly spaced left borders. |
|  | Horizontal Center Spacing Distributes horizontally with evenly spaced centers. |
|  | Right Border Spacing Distributes with evenly spaced right borders. |
|  | Horizontal Distance Distributes horizontally with even distance between the objects. |
|  | Top Border Spacing Distributes with evenly spaced top borders. |
|  | Vertical Center Spacing Distributes vertically with evenly spaced centers. |
|  | Bottom Border Spacing Distributes with evenly spaced bottom borders. |
|  | Vertical Distance Distributes vertically with even distance between the objects. |
|  | Across Area Opens a dialog box for distributing across the work area. Four different layout types are available: Grid, Box, Circle, Arc. |
|  | Rotate Opens a dialog box for rotating the selected object via numerical entry (see Arranging Marking Objects in the Work Area). |
|  | Mirror Horizontal Mirrors one or several marking objects with respect to a horizontal axis. |
|  | Mirror Vertical Mirrors one or several marking objects with respect to a vertical axis. |
|  | Center to Origin Positions the selected marking object directly to the origin of the work area (see Positioning Marking Objects to the Origin). |

'Graphics Path' Toolbar

The buttons of the 'Graphics Path' toolbar let you:

- select a desired mode when starting to [create a graphics path](#),
- switch between several modes while creating a graphics path.

This toolbar offers the following functions:

| Button | Description |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|  | Polygon Mode Serves to select polygon mode – when starting to create graphics path – while creating a graphics path. |
|  | Arc Modes Serves to select an arc mode – when starting to create graphics path – while creating a graphics path. |
|  | Three Point Arc Mode Defines an arc by three points. |
|  | Arc Quadrant Mode (CW) Defines an arc by a quadratic function (clockwise). |
|  | Arc Quadrant Mode (CCW) Defines an arc by a quadratic function (counterclockwise). |
|  | Arc Center Mode Defines an arc by the center point. |
|  | Bezier Curves Modes Serves to select a bezier curves mode – when starting to create graphics path – while creating a graphics path. |
|  | Bezier Points Mode Defines a parametric points curve mode. |
|  | Bezier Curves Mode Defines a parametric curves curve mode. |

'Text' Toolbar

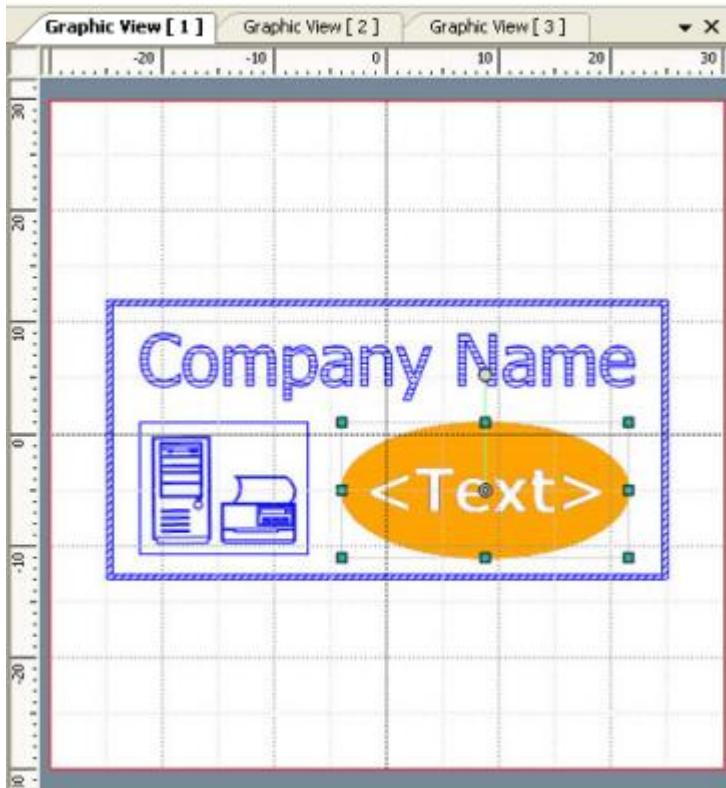
The buttons of the 'Text' toolbar serve to format text elements of the type 'font' (font text, font text date/time and font text serial number). Before formatting, the text element must be selected.

This toolbar offers the following text properties:

| Button | Description |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Arial  | Font Style Click on the selection field to open a context menu with a large number of font styles. Select a desired font style. |
| 8pt  | Font Size Click on the selection field to open a context menu offering a wide range of font sizes appears (8pt - 78pt). Select a desired font size. Alternatively, the font size can be input directly. In this case sizes smaller than 8pt or greater than 78pt are possible. |
| B | Bold Boldface can be set or reset. |
| <i>I</i> | Italic Italic can be set or reset. |
|  | Centerline Serves to create a centerline font (see Creating a Centerline Font). This font will then be saved below 'Fonts' in the local job's library (see Marking Library). |

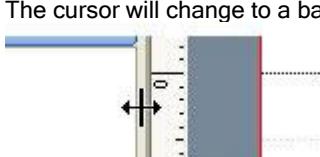
11.5 Work Area

The work area is the main element of the laserDESK program window. It is the drawing plane for creating marking objects (see [Inserting Objects](#)) and editing them manually (see [Manually Editing Marking Objects](#)). The work area ('Graphic View [1]' tab) is always displayed. To use different views of the marking objects (Top, Front/Side, 3D View, see [Views Window](#)), additional graphic views can be opened (in [Design Profile](#) only).



The work area's appearance can be customized by each user:

- Additional graphic views can be opened via the 'View' Menu (see [New Graphic View](#)).
Change between the several views by selecting the respective tabs (Graphic View [...]).
To close a graphic view, select it and click the {X} button.
- The work area's window dimensions can be changed (indirectly) by shifting the frames of the adjacent dockable windows (Job Explorer, Property Window, ...):
 - Move the cursor above the frame.
The cursor will change to a bar with arrows:



- Press the mouse button and – while keeping it pressed – shift the frame up or down or to the left or right.

NOTE:

The absolute dimensions of the work area should correspond to the dimensions of the marking area of your laser scan system.

These dimensions must be defined within 'Hardware Configuration' (see 'Marking Area Width/Height [mm]' in [Setting 'Optics' Parameters](#)).

- Grid, axes, ruler, work area's background, graphic elements (selected, unselected, edited), marking vectors, marking protocol, and marking sorting can be displayed or hidden as follows:
 - Activate or deactivate the respective elements' checkboxes in the GUI settings (see [Defining the View Parameters](#)).
 - Set the respective elements (if available) visible or invisible in the [Views Window](#).
 - Select 'Ruler' or 'Grid' from the right mouse button's [Context Menu](#).
- Grid style and units of length to be indicated on the ruler can be defined in the GUI settings (see [Defining the View Parameters](#)).
- Colors of work area's background, graphic elements (selected, unselected, edited), marking vectors, marking protocol, and marking sorting can be defined in the GUI settings (see [Defining the View Parameters](#)).

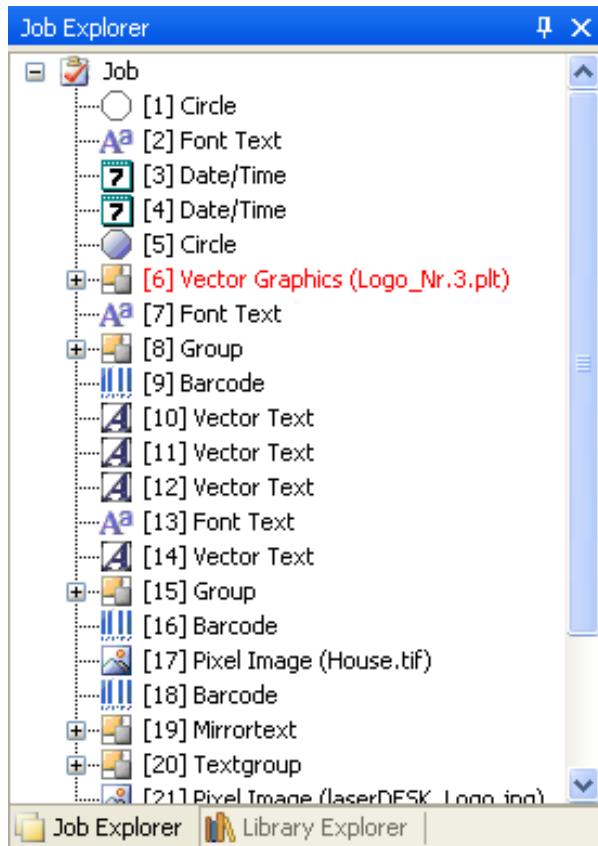
When you insert or edit marking objects in the work area, you'll appreciate the enhanced convenience offered by the zoom functions and pan mode (see [Using the Zoom Functions](#) and [Moving the Work Area](#)).

Additional, the scroll wheel of your mouse serves to move the work area:

1. Use the scroll wheel to scroll the work area up or down
2. Use the scroll wheel while pressing the <Shift> key to scroll the work area up or down very fast.
3. Use the scroll wheel while pressing the <Alt> key to scroll the work area left or right.
4. Use the scroll wheel while pressing the <Ctrl> key to zoom in or out.

11.6 Job Explorer

The Job Explorer displays a common tree structure of elements for the opened job, including all its marking objects and control elements:



The Job Explorer's tree automatically lists any newly created marking objects (including variants and groups) and newly inserted control elements. At any time, you can set or change the executable order of marking objects, control elements and variants via their positions in the tree. For creating, editing and sequencing marking objects and control elements, the Job Explorer offers a context menu, which appears when you click the right mouse button:

| Function | Description |
|-------------------|--------------------------------------------------------------------------------------------------------------------|
| New > | |
| Marking Objects > | |
| Point | |
| Line | |
| Rectangle | |
| Circle | |
| Ellipse | |
| Polygon | |
| Arc | |
| Spiral | Select a desired marking object to create it in the work area (see Inserting Objects – Overview). |
| Graphics Path | |
| Font Text | |
| Text Box | |
| Vector Text | |
| Barcode | |
| Graphics Paths | |
| Graphics Set | |
| Group | |
| Tile Set | |

| Function | Description |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date/Time > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Serial Number > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Import Text > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Reference To Symbol | |
| Pixel Image | |
| Vector Graphics | |
| Variant | |
| Digital Input | |
| Digital Output | |
| Analog Output | |
| Pulse Output | |
| Timer Delay | Select a desired control element, or the protocol node, to insert it into the Job Explorer (see Inserting Control Elements). |
| Timer Start | Inserting a Serial Communication Control Element , |
| Timer Stop | Inserting Z-Focus Control Elements , |
| Serial Communication | Inserting a Vision System Control Element , |
| Motor Control | Inserting a Wait For Encoder Control Element or |
| Z-Focus Control | Inserting Protocol and Timer Nodes). |
| Vision System | |
| Laser Control | |
| Wait For Encoder | |
| Protocol Start | |
| Protocol Stop | |
| Edit | Serves to edit points or lines of a selected marking object (see Editing Objects – Overview). |
| Fill | Fills selected marking objects such as rectangle, circle, ellipse, polygon, etc. The marking object must be closed (see Manually Editing Marking Objects). |
| Remove Filling | Removes the filling of a marking object. |
| Cut | Cuts a selected marking object or control element. |
| Copy | Copies a selected marking object or control element. |
| Paste | Pasts a selected marking object or control element. |
| Delete | Deletes a selected marking object or control element. |
| Save As Symbol | Creates a template (called a "Symbol") from the selected marking object. The symbol will be saved in the marking library (see Creating and Inserting a Symbol). |
| Grouping > | |
| Group | |
| Graphics Paths | Combines several marking objects, selected together in the work area or Job Explorer, to one group, graphic set, tile set or variant. |
| Graphics Set | Additional, a group, set or vector graphics can be assigned to a new group or variant. |
| Tile Set | |
| Variant | |
| Ungroup | Dissolves a selected group in single objects. |
| Sequencing > | |
| First | Positions the selected object to the top of the tree. |
| Move Up | Moves the selected object one position up. |
| Move Down | Moves the selected object one position down. |
| Last | Positions the selected object to the bottom of the tree. |
| By Position | Sorts several selected objects in the tree depending on their position in the work area: – Left To Right – Top To Bottom – Right To Left – Bottom To Top – Distance |
| By Layer | Sorts several selected objects in the tree depending on their assignment to different layers. |

When an object or element is selected in the tree, it will be color highlighted. The Job Explorer and work area mutually update themselves during editing of marking objects. A marking object selected in the Job Explorer tree will also be selected in the work area. Likewise, a marking object selected in the work area will be selected in the Job Explorer tree. Use the {+} and {-} buttons to show or hide the single elements of a group or variant.

If you insert one or several variants in a job, these will be listed below the 'Variants' node (see figure above). When a variant is inserted, this node gets created automatically. All of a job's variants will always be listed below one node - it is not possible to distribute several variants across the tree.

When laserDESK starts, it automatically creates a new job. As long as the job isn't saved, no job name will be indicated. When you save a job or open an already existing job, the job name is indicated in parentheses, e.g. "Job (Test_1.sld)", at the top of the tree. Likewise in a typical job, marking objects can be created under 'Hardware Configuration' and 'Marking Library', e.g. for checking hardware parameter settings or creating symbols. If 'Hardware Configuration' is open, then "Job (HardwareConfiguration.sld)" is displayed at the top of the tree, if 'Marking Library' is open, then "Job (MarkingLibrary.sld)" is displayed.

The Job Explorer window can be displayed or hidden and be arranged according to your individual preferences (see [Arranging the Windows](#)).

To perform tasks via the Job Explorer, proceed like follows:

1. If not done so far,
 - open a new or existent job,
 - or select tab 'Job Explorer' (if combined with another window, e.g. Library Explorer).

The Job Explorer will be displayed with "Job" at the tree's top.
2. Place the cursor in the Job Explorer.
 - or
 - If available, select a marking object or control element.
3. Press the right mouse button.
 - A context menu appears.
4. Select a desired function in the context menu (see table above), to create, edit or arrange objects.

11.7 Library Explorer / Marking Library

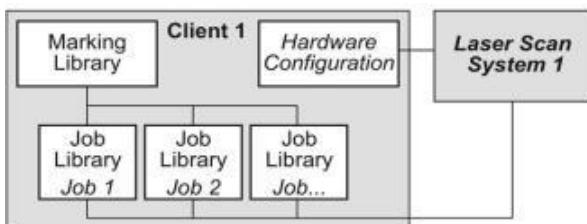
By assigning processing parameters (marking, pixel image and fill parameters), you tell the laser scan system how to handle individual marking objects for optimal marking and materials processing. **Marking Parameters** that affect laser and scanner behavior are always required. Filled marking objects require additional **Fill Parameters** and (rastered) pixel images require additional **Pixel Image Parameters**.

The process parameters can be assigned to each marking object in a job (see [Property Window](#)). But defining the process parameters for each marking object of a job is a extensive work. To facilitate easier reuse at different positions within a job, you can define marking, pixel image and fill parameter sets, which can be assigned to several or to all marking objects.

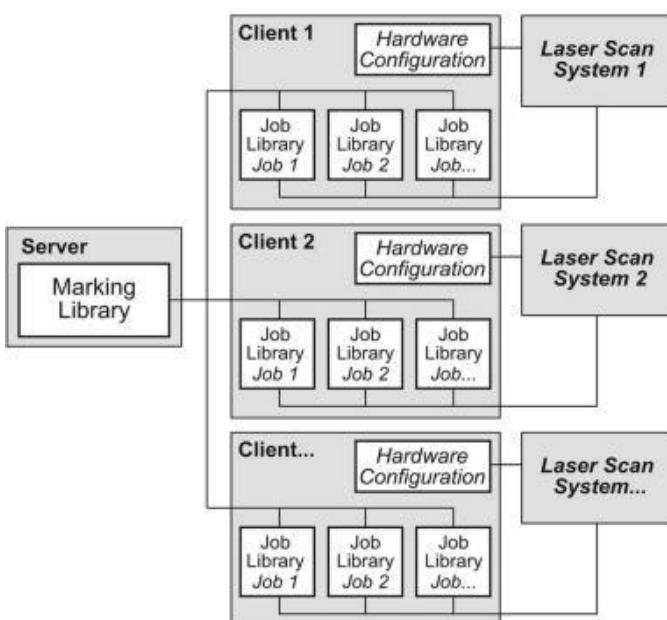
Additionally, frequently used marking objects needn't be created again and again. Theses can be created by the user and saved as "**Symbols**" (Also see [Creating Symbols](#)).

If you want to use **Fonts** with characters created/edited by yourself or centerline fonts (converted from standard fonts, see [Creating Centerline Fonts](#)), these fonts can be created in the Library Explorer and used again.

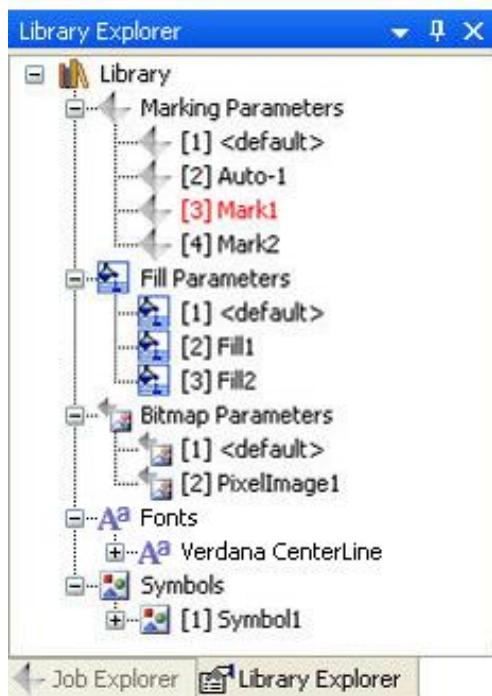
Parameter sets, fonts and symbols created in a job are automatically saved to the corresponding (local) job library. Provided they weren't subsequently deleted there, they will then be saved in the job file ([JobName].sld). A job's parameter sets and symbols in the job library can't be (directly) used by another job. Instead, they can be exported to the (job-superordinate) Marking Library ([MarkingLibraryName].sld) and imported from there into the job library of another job. Typically, process parameter sets will be created for a job, but can also be created in the marking Library, independent of a job.



The advantage of exporting parameter sets, fonts and symbols to the Marking Library and to import them into job libraries can be increased by expanding the easy data exchange to a network. Parameter sets evaluated as suitable and frequently used symbols and centerline fonts can be exported to a Marking Library on the network server and thus are available for all clients.



The Library Explorer is available for managing process parameter sets, fonts and symbols - both in the job and in the Marking Library. Like the Job Explorer, the Library Explorer has a tree structure for creating, copying, renaming, deleting, importing or exporting data sets, fonts and symbols.



- The (job-superordinate) Marking Library must be opened via the 'File\Open ▶ Marking Library' menu.
The Library Explorer will be shown automatically.
The title bar shows "MarkingLibrary.sld" and the work area's background colors pale blue.
- The (local) job library must be displayed by activating 'Library Explorer' in the 'View' menu and, if combined with another window (e.g. Job Explorer), by selecting the corresponding tab 'Library Explorer' (see figure above).
The title bar shows "[JobName].sld" and the work area's background colors gray.

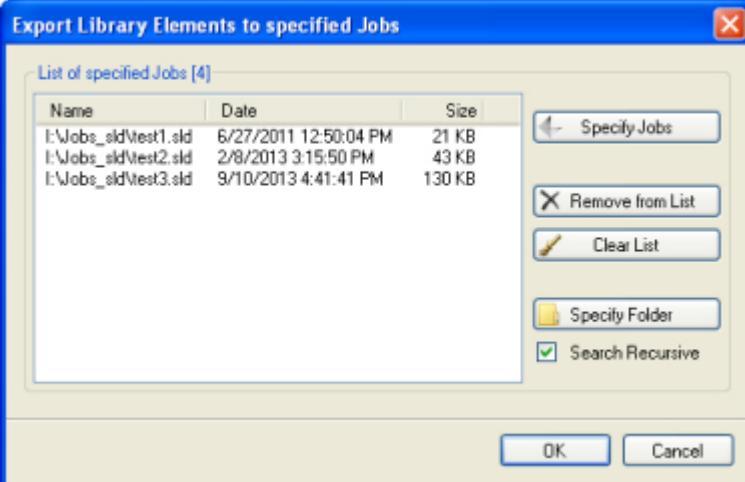
The program's Marking Library already includes a default marking parameter set, a default fill parameter set, and a default pixel image parameter set. Designated as "<default>", these sets are (as long as no others were defined as default) automatically used as default parameter sets in the job library when a new job is opened. The default marking parameter set from the job library will be assigned initially to all newly created marking objects, and the default pixel image parameter set to all pixel images. And for fill assignments, the default fill parameter set from the job library will be initially used.

Both in the Marking Library and in the job library new parameter sets can be created with arbitrary names. These will be listed below the <default> parameter set (as an example, see "Mark1" and "Mark2" in the figure above). Saving parameter settings in the property window without applying a name, these will be indicated as "Auto-..." automatically in the Library Explorer. How to edit the process parameters in the property window and how manage them is described in [Property Window](#).

Use the 'GUI Settings' dialog box (see 'User Interface (GUI)' above) to specify the directory in which the used Marking Library ([MarkingLibraryName].sld) should be managed. You can freely select the path and filename. Firstly, this enables use of network paths and thus automatic backups, etc. Secondly, a directory can be chosen and configured to specifically provide laserDESK users with appropriate access rights.

To manage the parameter sets, symbols and fonts, the right mouse button's context menu must be used. Depending on the function, the cursor must be placed in the Library Explorer or a parameter set or symbol must selected in the tree:

| Function | Description |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New > | Inserts a new parameter set or symbol into the tree: |
| Marking Parameters | Opens the 'New Template' dialog box. |
| Fill Parameters | Enter the parameter set's name and confirm with {OK}. |
| Pixel Image Parameters | The new parameter set will be listed below '<default>' in alphabetical order. |
| Font | Opens the 'New Laser Font' dialog box to Create a new Font . |
| Symbol | Opens the 'Create New Symbol' dialog box. Enter the symbol's name and confirm with {OK}. Create a marking object in the work area (see Inserting Objects). The new symbol will be listed in alphabetical order. |
| Edit | Serves to edit selected fonts and symbols (marking objects) in the work area (see Editing Objects). |
| Rename... | Opens the 'New Template' dialog box. Enter a desired name and confirm with {OK}. The new name will be displayed in the tree. Not enabled for fonts. |
| Use As Default | The selected parameter set (not <default>) will be set to "<default>". NOTE: The selected parameter set will disappear from the tree! |
| Cut | Cuts a selected parameter set or symbol. If stored in the cache, it can be pasted in a new opened job or library. Not enabled for fonts. |
| Copy | Copies a selected parameter set or symbol. Not enabled for fonts. |
| Paste | Pastes a cut or copied parameter set or symbol into the tree. A copied parameter set is named "Copy of ..." or "Copy (#) of ...". |
| Delete | Deletes a selected parameter set, symbol or font. If the parameter set/symbol/font is not used in the job, it will be deleted directly. If the parameter set/symbol/font is used in the job, a message appears. – Click the {Cancel} button to abort the action. or – Click the {OK} button. The 'Template' dialog box appears. Select the parameter set/symbol/font to be used instead of the deleted one and confirm with {OK} (also see function 'Use...' in Managing Parameter Sets). |
| Import > | Imports parameter sets, symbols or fonts from the marking library into a job. Only available in a job. |
| Marking Parameters | Opens the 'Template' dialog box. |
| Fill Parameters | Select a desired parameter set, symbol or font of the marking library in the 'Name' selection field and confirm with {OK}. |
| Pixel Image Parameters | The selected parameter set, symbol or font will be imported in the job and listed in its library explorer. |
| Font | |
| Symbol | |
| Update | Inherits the settings from the parameter set, symbol or font of the same name in the marking library. Only available in a job. |
| Export As... | Exports a job's parameter set, symbol or font to the marking library. Opens the 'New Template' dialog box. Enter a desired name and confirm with {OK}. The selected parameter set, symbol or font will be exported directly to the marking library. Only available in a job. |
| Export As Default | Exports a job's parameter set, symbol or font to the marking library. The selected parameter set, symbol or font will be exported directly to the marking library. Only available in a job. |

| Function | Description |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Update Jobs | <p>Updates an existing parameter set, symbol or font in specified jobs. I.e. the settings of a parameter set, symbol or font, selected in the marking library or in a job, will be transferred to the correspondent parameter set, symbol or font in the specified jobs.</p> <p>Opens the 'Export Library Elements to specified Jobs' dialog box:</p>  <p>Specify (select) the required jobs or folder. Confirm your selection with {OK}. The settings of the correspondent parameter set, symbol or font in all listed jobs will be updated.</p> |
| Export to Jobs | <p>Exports a parameter set, symbol or font, selected in the marking library or in a job, to specified jobs.</p> <p>Opens the 'Export Library Elements to specified Jobs' dialog box (see figure above). Specify (select) the required jobs or folder. Confirm your selection with {OK}. The selected parameter set, symbol or font will be exported to all listed jobs.</p> |

The Library Explorer window can be displayed or hidden and be arranged according to your individual preferences (see [Arranging the Windows](#)).

For managing the Library Explorer, proceed like follows:

1. To manage a local job library inside a job, select the 'Library Explorer' window.
 or
 To manage the job-superordinate Marking Library, select 'Open ▶ Marking Library' in the [File](#) menu.
 The Library Explorer's tree shows "Library" at the top.
2. Place the cursor in the Library Explorer or select a parameter set or symbol and press the right mouse button.
 A context menu appears.
3. Select the desired function from the context menu (see table above).
4. For editing the individual parameters, see [Property Window](#).

11.8 Laser Control Window / GUI Profiles

laserDESK jobs are implemented in two phases: creating the job and executing the job. Creating the job is divided again into creating the marking objects and testing the parameter settings. Additionally, if your laser scan system is equipped with a pilot laser, this can be used for aligning the job's marking objects to the marking surface.

For each of these four steps, users benefit from well-arranged program windows and quick access to the functions to be performed. To execute a job either manually (e.g. for testing the process parameter settings), or automatically (via external input signals in a production environment), or to use the pilot laser alignment, you'll need an appropriate software tool. Therefore, laserDESK provides its Laser Control window with a start button and different GUI profiles suited to the current step. The required GUI profile can be selected from the 'View' menu or the 'File' toolbar:

- When you create marking objects for a job, the work area is your most important program window. On the one hand, inserting and editing the marking objects requires screen space and on the other hand, no marking procedure needs to be started. So for this step, laserDESK lets you select the '**Design Profile**'. By default, no laser control window is displayed.
- When all marking objects, variants and control elements have been created, you may iteratively determine optimal marking parameters by executing test markings. To provide quick and convenient job execution for this step, laserDESK lets you select the '**Test Profile**', which displays the laser control window as shown below.



- The {Manual Marking} button lets you directly execute the job marking.
- The 'Start' input field lets you enter the number of multiple executions if required.
- The 'Sel.' selection field lets you select a desired variant or desired marking object (if present).
- The 'Head' selection field is active only, if scan head [2] has been activated in the Hardware Configuration (a desired variant, if the job comprises two or more variants, see [Setting 'Scan Head' Parameters](#)). In this case you can select scan head [1], [2] or [1]+[2].
- If required, you can click the {STOP Marking} button as an emergency stop.

How to execute a job manually is described in [Start a job manually](#).

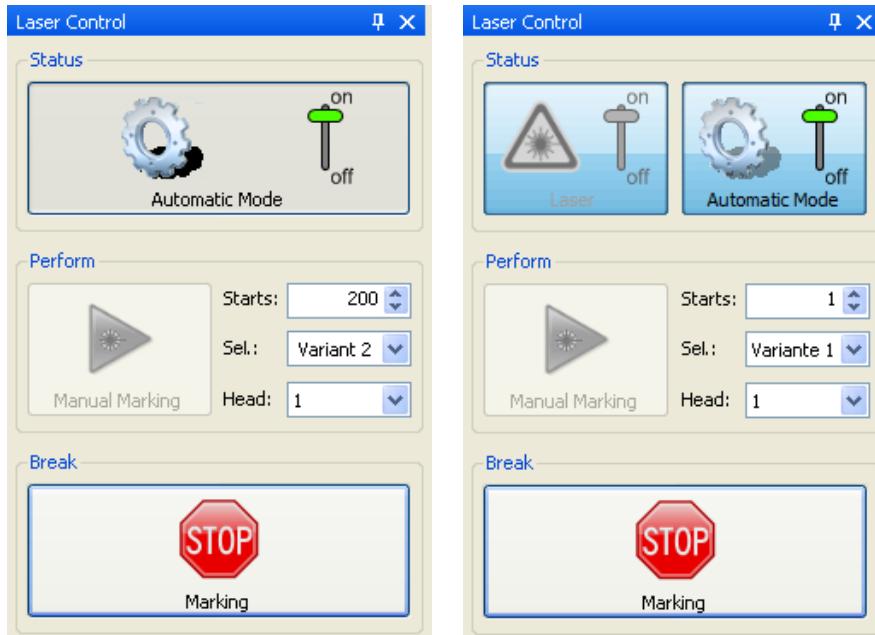
- If your laser scan system is equipped with a pilot laser, you can check whether the objects are aligned correct to the laser scan system after the job has been created and adjust it if necessary. To do so, select the 'Pilot Laser Profile' (which can only be selected in manual mode). The corresponding laser control window (see figure below) provides selection fields and buttons for pilot laser transformation.



While the pilot laser, started with the {Pilot Laser} button, scans the job's objects continually (number of scans will be set in the input field 'Starts'), the marking objects can be aligned in x/y directions and in rotation by using the respective pilot laser transformation selection fields or buttons. (Additionally, keys on the keyboard can be used.) When the correct position is found, the transformation values can be applied to the job with one click on the {Apply to Job Data} button.

The complete procedure is described detailed in [Using the Pilot Laser for Alignment](#).

- When you're finished with creating the job and testing the process parameters, and where necessary and applicable, adjusting the job, the final step is the job execution. In actual production, jobs are typically started and controlled exclusively via external input signals (e.g. via signals from a control PC or PLC). To do so, laserDESK must be switched to automatic mode. laserDESK lets you select the '**ProductionProfile**' which displays the corresponding laser control window (see figures below; left: General Type laser; right: fully supported laser).



The important button is the {Automatic Mode} button, which lets you toggle automatic mode on or off. As soon as automatic mode is selected (the status bar indicates "Automatic Mode"), the control elements in the 'Perform' field get disabled.

How to start the automatic mode is described in [Switch to Automatic Mode](#).

NOTE:


laserDESK lets you configure certain GUI components individually, including arrangement of the various windows. These settings are saved separately for each user in a user data directory.

The laser control window's arrangements for the 'Test Profile', 'Production Profile', and 'Pilot Laser Profile' can also be changed by each user individually (see [Arranging the Windows](#)).

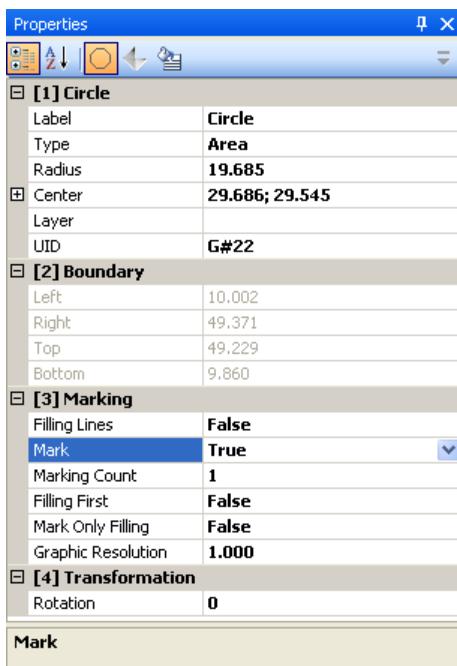
Likewise, you can hide or display the laser control window for each of the four profiles via the '[View](#)' menu.

11.9 Property Window

The Property Window lets you

- view the settings of the displayed parameter set
- edit individual parameters or manage the assigned parameter set of a selected marking object
- edit individual parameters or manage parameter sets inside a job library and 'Marking Library'.

When you select a marking object in the work area or Job Explorer or select a parameter set in a library, the corresponding parameters appear in the Property Window:



Graphic parameters determine the shape, dimensions, orientation and position of marking objects. Due to the different shapes of each type of marking object (e.g. lines, circles, spirals, polygons), every marking object type has specific graphic parameter types defining its properties. Groups' and variants' properties are also displayed.

Likewise, parameters of control elements and protocol nodes (which define the signal mode) are also shown inside the graphic parameters.

In contrast, each set of the following process parameters always comprises the same individual parameter types (but not the same parameter settings!). The parameter sets can be assigned to individual, several or all marking objects of one job (see [Library Explorer / Marking Library](#)).

Marking parameters define the laser and scan head settings, which are crucial for good results in the marking process. Additionally, **pixel image parameters** can be set for pixel images.

Like marking parameters, the **fill parameter** types are the same for all marking objects. The fill parameters define the properties for filling closed marking objects.



NOTE:

To create a new job, we recommend inserting and editing the marking objects first. Only after defining the marking object's layout you should specify the process parameters (marking, fill, and pixel image parameters).

- When Editing Individual Parameters, you can modify individual values, select one of several items and define several items.
- When Editing Shared Properties , you can modify specific graphic properties for several marking objects.
- When Managing Parameter Sets, you can copy, rename, delete, and export parameter sets according to your requirements.

The various parameter types must be selected via the following buttons located in the property window's topmost line:

| Button | Description |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 'Categorized' view mode: Click button to sort the parameters according to categories. |
| | 'Alphabetical' view mode: Click button to sort the parameters alphabetically. |
| | 'Graphic Parameters' (icon of the selected object, here ellipse): Click button to display the graphic parameters. |
| | 'Shared Properties': Click button to display the shared properties of the selected objects. |
| | 'Marking Parameters': Click button to display the marking parameters. |
| | 'Fill Parameters': Click button to display the fill parameters. |
| | 'Pixel Image Parameters': Click button to display the pixel image parameters. |
| | 'Edit': Not enabled in 'Graphic Parameters'. Select button to open a context menu that lets you activate individual parameters for editing and to manage the parameter set (described in the table below). |

The Property Window can be displayed or hidden and be arranged according to your individual preferences (see [Arranging the Windows](#)).

Editing Individual Parameters

To edit individual parameters, proceed as follows:

1. Select
 - the Marking Library via '\Open ▶ \Marking Library' in the '[File](#)' menu
 - or the [Library Explorer](#) inside a job.
 The Library Explorer appears.
2. Select a desired process parameter set below 'Marking Parameters', 'Fill Parameters' or 'Pixel Image Parameters'.

The corresponding marking parameter set appears in the property window.

Continue with step 5.

or

1. Select a marking object in the work area or Job Explorer.
2. Select the desired parameter type in the property window (see buttons in the table above).

The parameter set assigned to the selected object is displayed.

If you want to edit a graphic parameter set, continue with step 5.
3. Select the button:

A context menu appears.
4. Select 'Modify'.

The individual parameters become active (black font = editable).
5. Select the parameter to be changed in the left column.

The parameter will be highlighted blue.
6. If you need to modify a value press the <Tab> key.

The current value in the right column will be highlighted blue.

Input the desired value using integers or floating point numbers.

Confirm your input by pressing the <Enter> key.

If graphic parameters have been modified, the marking object in the work area will immediately refreshed to reflect the changes

7. If one of several items must be selected, the  button will be displayed at the side.
Click the button to select the desired item via a drop-down menu.
8. If one or several items must be defined in a dialog box, the  button will be displayed at the side.
Click the button to define the item(s) via the dialog box.


NOTE:

If you subsequently close the job or Marking Library without saving, the changes will not be applied!
 If you want to save the settings permanently, proceed as described below.

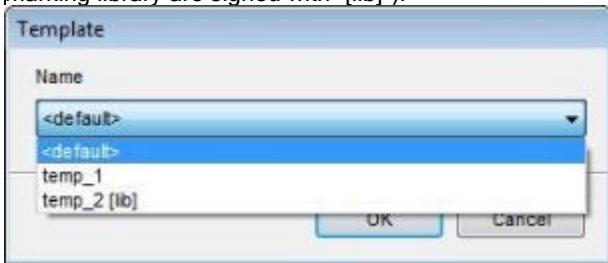
9. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
 or
 When you close the job or marking library (by opening a new job or 'Hardware Configuration' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
 Confirm with the {OK} button.
10. If you want to save settings local under a new name or export to the marking library, see 'Managing Parameter Sets' below.

Editing Shared Properties

To edit the graphic parameters for several objects, refer to [Shared Properties](#).

Managing Parameter Sets

To manage parameter sets a context menu must be opened via the 'Edit' button (see table above) or by pressing the right mouse button with the cursor in the property window. A context menu with the following functions will appear:

| Function | Description |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use... | <p>Serves to assign a parameter set to a selected marking object. The 'Template' dialog box appears. Select the desired template / parameter set in the 'Name' selection field (parameter sets from the marking library are signed with "[lib]").</p>  <p>Confirm with {OK}. The selected parameter set will be assigned to the marking object and thus the parameters' values will be modified accordingly. The line 'Inherited From' indicates "Template: [Name]." If a parameter set was assigned from the marking library, it will be inserted in the job library.</p> |
| Use Default | <p>Serves to assign the settings of the <default> parameter set to a selected marking object or to a selected parameter set. The 'Local Data' dialog box with the query "Do you want to overwrite local parameters?" appears. Confirm with {OK}. The <default> parameter set will be assigned to the marking object and thus the parameters' values will be modified accordingly. The line 'Inherited From' indicates "Template: <default>".</p> |
| Save (Local) | Saves the current parameter settings in the property window directly (without querying a name) in a new parameter set. This will be inserted into the Library Explorer as "Auto-#". |

| Function | Description |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Calculate Delays | <p>NOTE: This functions will only be shown when modifying the 'Marking Parameters'. Serves to calculate the laser and scanner delays (see Marking Parameters – Laser Delays and Marking Parameters – Scanner Delays) basing on the tracking error of the used scan head. If your laser scan system is equipped with an intelliSCAN scan head, the tracking error can be calculated before with the Tracking Error Wizard (see Evaluating the Scan Head's Tracking Error). If your laser scan system is equipped with another scan head, refer to the 'Technical Specifications' in the scan head's manual.</p> <p>To calculate the delays proceed as follows:</p> <ul style="list-style-type: none"> – Select primarily {Marking Parameters} and subsequently {Modify} in the property window's topmost line. A context menu appears. – Select 'Calculate Delays'. The 'Calculate Delays' dialog box appears. – Refer to the technical specifications in the scan head's manual to read the tracking error, then enter the value (in [μs]) in the input field . – Confirm with {OK}. The '[4] Laser Delays' and '[5] Scanner Delays' will be calculated immediately. |
| Save (Local) As... | <p>Serves to save the current parameter settings in the property window in a new parameter set. The 'New Template' dialog box appears. Enter the desired name in the 'Name' selection field and confirm with {OK}. The new parameter set will inserted into the Library Explorer.</p> |
| Reset | <p>Serve to overwrite the current parameter settings in the property window with the settings of the <default> parameter set. The 'Local Data' dialog box with the query "Do you want to overwrite local parameters?" appears. Confirm with {OK}. The settings of the <default> parameter set will be inherited.</p> |
| Export As... | <p>Only available in a job. Serve to export the current parameter settings in the property window to the marking library. The 'New Template' dialog box appears. Enter the desired name in the 'Name' selection field and confirm with {OK}. The new parameter set will exported to the marking library and (if not already done) inserted into the job's Library Explorer.</p> |
| Export As Default | <p>Only available in a job. Serve to export the current parameter settings in the property window as <default> parameter set to the marking library. The 'Save Template' dialog box with the message "Default template will be overwritten!" appears. Confirm with {OK}. The parameters' settings will be exported to the marking library's <default> parameter set and copied into the job library's <default> parameter set.</p> |

For managing parameter sets proceed as follows:

1. Select the  button

or

place the cursor in the property window and press the right mouse button.

A context menu appears.

2. Select the required function (see table above) and perform the corresponding actions.



NOTE:

If you close the job or marking library subsequently without saving, the changes will not be applied!
 If you want to save the settings permanently, proceed as described below.

3. Select 'Save' from the [File](#) menu or click the {Save} button in the [File](#) toolbar to save the settings permanently.

or

When you close the job or marking library (by opening a new job or 'Hardware Configuration' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.

Confirm with the {OK} button.

11.10 Toolbox

The Toolbox serves exclusively to insert marking objects and control elements. The Toolbox differs from menu bar, toolbar and context menu in the following items:

- The Toolbox offers (additionally to basic shapes, variable objects, and control elements) extended shapes (symmetric polygons).
- The marking objects and control elements can be inserted with one move only (exceptions: polygon, graphic path, pixel image, vector graphics).

The Toolbox contains the following marking objects and control elements:

| Function | Description |
|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Basic Shapes | |
|  Point | |
|  Line | |
|  Rectangle | |
|  Polygon | |
|  Arc | |
|  Circle | |
|  Ellipse | |
|  Spiral | |
|  Graphics Path | |
|  Font Text | |
|  Text Box | |
|  Vector Text | |
|  Barcode | |
|  Reference To Symbol | |
|  Pixel Image | Insert a marking object like described below. For inserting a polygon, graphic path, pixel image or vector graphics, see Inserting Objects – Overview . |
|  Vector Graphics | |
|  Extended Shapes | How to edit the predefined marking objects is described in Editing Objects – Overview . |
|  Triangle (EL) | |
|  Triangle (RA) | |
|  Rhombus | |
|  Trapezoid | |
|  Pentagon | |
|  Hexagon | |
|  Octagon | |
|  Date/Time | |
|  Font Text | |
|  Vector Text | |
|  Barcode | |
|  Serial Number | |
|  Font Text | |
|  Vector Text | |
|  Barcode | |
|  Import Text | |

| | |
|--------------------------------------------------------------------------------------------------|-------------------------|
|  A ^a | Font Text |
|  A | Vector Text |
|  BII | Barcode |
| | Control Elements |
|  I | Digital Input |
|  O | Digital Output |
|  A | Analog Output |
|  P | Pulse Output |
|  T | Timer Delay |
|  S | Timer Start |
|  ST | Timer Stop |
|  SC | Serial Communication |
|  M | Motor Control |
|  Z | Z-Focus Control |
|  V | Vision System |
|  L | Laser Control |
|  E | Wait For Encoder |
|  PS | Protocol Start |
|  PS | Protocol Stop |

The Toolbox window can be displayed or hidden and be arranged according to your individual preferences (see [Arranging the Windows](#)).

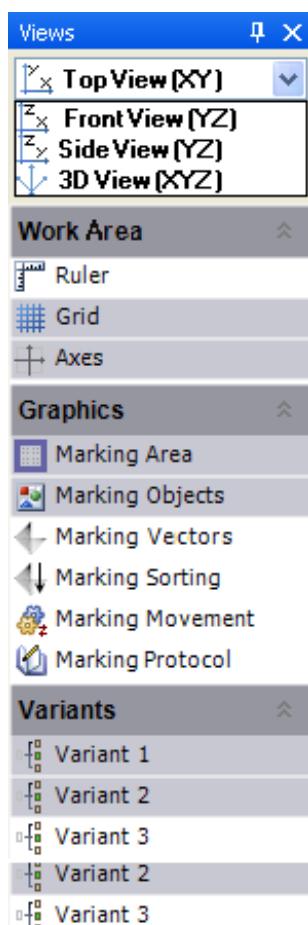
To create marking objects, proceed as follows:

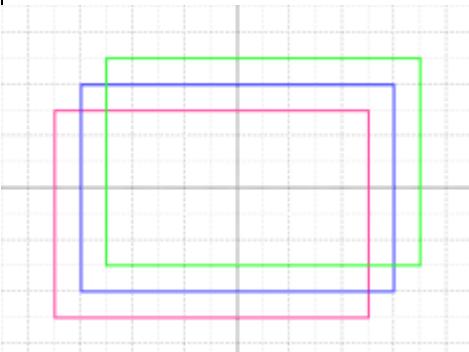
1. Select an marking object or control element in the Toolbox and – while keeping the mouse button pressed – simply draw it into the work area.
Marking objects will be inserted in a predefined dimension into the work area.
Control elements will be inserted into the Job Explorer's tree.

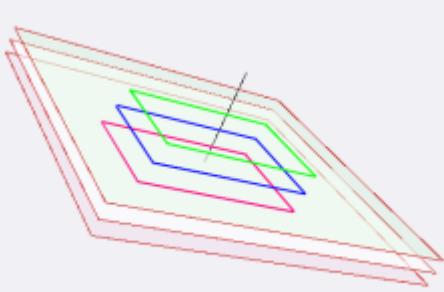
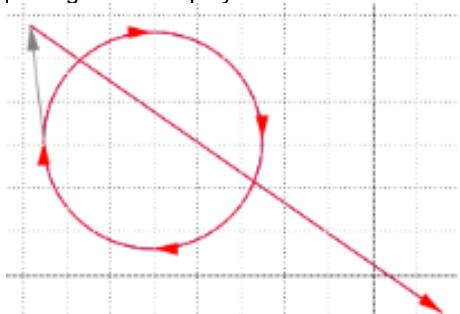
11.11 Views Window

The Views window serves to quickly set elements in the work area to visible or invisible. With one click on the respective element, this will be displayed or hidden.

The Views window shows the following elements:



| Item | Description |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Selection Field | Lets you select different views of the marking objects in the work area. You can change quickly and comfortably between different views of one job using multiple Graphic Views (see Graphical User Interface\The GUI Elements). |
| Top View (XY) | The marking objects are visible from the top (xy direction). This (preset) view displays standard 2D marking and is the only view where you can insert and edit the marking objects graphically.  |

| Item | Description |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FrontView (YZ) | <p>The marking objects are visible from the front or side (yz direction). This view is suitable especially if you want to check the positions of marking objects in different z-planes or layers. No graphical editing is possible.</p> |
| Side View (YZ) |  |
| 3D View (XYZ) | <p>The marking objects are spatially visible (xyz direction). Click the left mouse button and move the cursor to rotate and tilt the marking objects relative to the center line. No graphical editing is possible.</p>  |
| Work Area | |
| Ruler | <p>If selected (highlighted gray), the rulers will be displayed. If not, the rulers will be hidden. (Also see 'Ruler' in the View Parameters.)</p> |
| Grid | <p>If selected (highlighted gray), the grid will be displayed. If not, the grid will be hidden. (Also see 'Grid' in the View Parameters.)</p> |
| Axes | <p>If selected (highlighted gray), the axes will be displayed. If not, the axes will be hidden. (Also see 'Axes' in the View Parameters.)</p> |
| Graphics | |
| Marking Area | <p>If selected (highlighted gray), the marking area will be displayed. If not, the marking area will be hidden. (Also see 'Graphics\Marking Area' in the View Parameters.)</p> |
| Marking Objects | <p>If selected (highlighted gray), the created marking objects will be displayed. If not, the marking objects will be hidden. (Also see 'Graphics\Marking Objects' in the View Parameters.)</p> |
| Marking Vectors | <p>If selected (highlighted gray), only the marking vectors will be displayed in the defined color. If not, the exclusive display of the marking elements is not shown. (Also see 'Graphics\Marking Vectors' in the View Parameters.)</p> |
| Marking Sorting | <p>If highlighted gray and the 'Marking Elements' (see above) are highlighted gray, the marking sorting will be displayed.</p>  <p>If not, the marking sorting will be hidden. (Also see 'Graphics\Marking Sorting' in the View Parameters.)</p> |

| Item | Description |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marking Movement | If selected (highlighted gray), the position of the graphic objects with simulated axes movements (defined by the motor control element) is shown. The axes movement is shown as a shift of the objects. NOTE: For a correct simulation, the parameter 'Movement Direction' of the motor control node (see Graphic Parameters – Motor Control) has to be set according to the installed position of this axis. |
| Marking Protocol | If selected (highlighted gray), the marking protocol will be displayed. If not, the marking protocol will be hidden. (Also see 'Graphics\Marking Protocol' in the View Parameters .) |
| Variants | If selected (highlighted gray), the respective variant will be displayed. If not, the variant will be hidden. (Also see 'Variants' in the View Parameters .) |

The Views window can be displayed or hidden and arranged according to your individual preferences (see [Arranging the Windows](#)).

To select a required view, proceed as follows:

1. If desired, open a new Graphic View (see 'View' Menu\New Graphic View).
2. Click the  button to select the required view (Top, Front, Side or 3D View).

To set an element to visible or invisible, proceed as follows:

1. If not yet done, click on the respective field to open the desired group (Work Area, Graphics or Variants).
The corresponding elements will be listed.
2. Click on the desired element to set it to visible (highlighted gray) or invisible (highlighted white).
The element will be displayed or hidden.

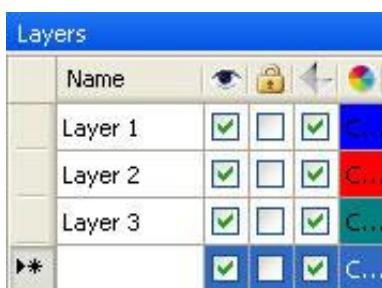
11.12 Layers Window

The layer function serves to assign marking objects or groups to various layers. It is well suited for creating marking objects to be marked in different z positions (see [Inserting Z-Focus Control Elements](#)).

Because each layer can be enabled or disabled for viewing, editing and marking, the corresponding marking objects can be set to visible or invisible, editable or not editable, markable or not markable. To differentiate between the single layers, each one can be assigned a different color. Furthermore, for all objects of one layer a new marking parameter set can be assigned.

The layer settings are made in the Layers window (see below), the assignment of marking objects to the layers is performed in the object's [Graphic Parameters](#) (see parameter 'Layer').

The Layers window can be displayed or hidden and arranged according to your individual preferences (see [Arranging the Windows](#)). It is structured as follows:



| Column | Description |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name | Lets you enter an arbitrary name. |
| | If the checkbox is activated, the marking objects assigned to this layer are visible. If deactivated, invisible. (Also see 'Layers' in the View Parameters .) |
| | If the checkbox is activated, the marking objects assigned to this layer are not editable. If deactivated, editable. |
| | If the checkbox is activated, the marking objects assigned to this layer are markable. If deactivated, not markable. |
| | Click in the colored field to open the (<i>Windows-standard</i>) 'Color' dialog box. Select or define a color and confirm with {OK}. (Also see 'Layers' in the View Parameters .) |

Additionally, a context menu appears when selecting a row (layer) in the table and clicking the right mouse button:

| Function | Description |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select 4 Clear | Lets you unselect the selected layer (row). |
| New | Lets you create a new layer. |
| Edit | Lets you open the 'Edit Layer' dialog box (see Editing a Layer). |
| Rename | Lets you rename the selected layer in the 'Rename Layer' dialog box. |
| Visibility 4 On/Off | Lets you switch the visibility of the selected layer on or off. |
| Locking 4 On/Off | Lets you switch the locking of the selected layer on or off. |
| Marking 4 On/Off | Lets you switch the marking of the selected layer on or off. |
| Color... | Opens the (<i>Windows-standard</i>) 'Color' dialog box. Select or define a color and confirm with {OK}. |
| Set Marking Parameters | Opens the 'Template' dialog box to let you assign a marking parameter set for all objects of the selected layer. Select the desired parameter set of the Marking Library (identified by the extension [lib]) or job and confirm with {OK}. If the selected parameter set is from the Marking Library, it will be adopted automatically into the job's Library Explorer. |
| Delete | Lets you delete an existing layer. |
| Delete Unused | Lets you delete all unused layers. |

Above all, objects can be set to an inclined plane and then processed in the z-direction. Thus, marking objects created in the xy-plane can then, for example, be marked on the inclined side of a workpiece as a correct 2D shape. To do so, double click a row in the table or select 'Edit' in the context menu (see above). The 'Edit Layer' dialog box appears.

To define a layer, proceed as follows:

1. Enter the layer's name in a blank row of the table.
or
Select 'New' in the context menu.
The 'New Layer' dialog box appears.
Enter the layer's name and confirm with {OK}.
2. To enable or disable the layer's properties (visibility, locking, marking):
– activate or deactivate the corresponding checkboxes in the table
– or select 'On' or 'Off' in the respective functions of the context menu.
3. To define the layer's color:
– click in the table's color field
– or select 'Color...' in the context menu.
Then select the color in the 'Color' dialog box.
4. If you want to set an object to an inclined plane, double click a row/layer or select 'Edit' in the context menu.
The 'Edit Layer' dialog box appears (for a description, refer to [Editing a Layer](#)).
5. Rename a layer directly in the column 'Name'.
or
Select 'Rename' in the context menu.
The 'Rename Layer' dialog box appears.
Enter the layer's name and confirm with {OK}.
6. To assign a marking parameter set, select 'Set Marking Parameter' in the context menu.
The 'Template' dialog box appears.
Select the desired parameter set and confirm with {OK}.
7. Delete a layer by selecting 'Delete' in the context menu.
The selected layer will be deleted immediately.
8. Delete all unused layers by selecting 'Delete Unused' in the context menu.
All unused layers will be deleted immediately.

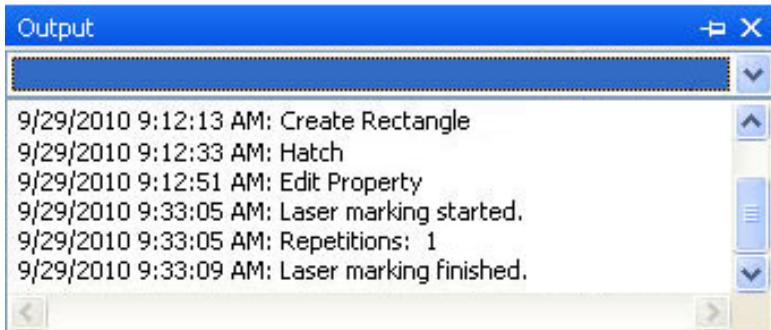


NOTE:

A layer's visibility and color can also be defined in the 'GUI Settings' window (see the 'Layers' parameter in [View Parameters](#)).

11.13 Output Window

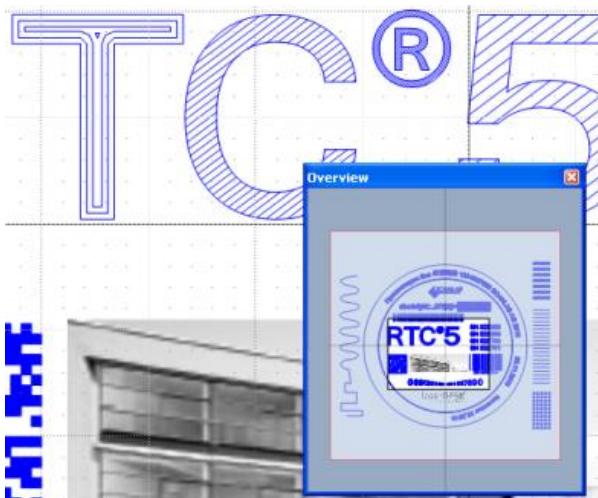
The Output Window shows the system's status during job execution. All work steps (workflow) are listed in chronological order with date and time put in front:



The Output Window can be displayed or hidden and be arranged according to your individual preferences (see [Arranging the Windows](#)).

11.14 Overview Window

The (Graphic) Overview window displays the work area in small format:



- On the one side the Overview window gives an overview of the current shown section of the work area (see figure below).
- On the other side it serves to select a section of the work area quickly.
Similar to the [zoom mode](#), a frame in desired size and position can be drawn in the Overview window. The work area will then be zoomed to the corresponding section.

The (Graphic) Overview window can be displayed or hidden and be arranged according to your individual preferences (see [Arranging the Windows](#)).

11.15 Context Menu (Right Mouse Button)

In addition to the menu bar, toolbars, and toolbox, laserDESK offers a fourth way to perform functions that is specifically optimized for creating and editing marking objects. When you click the right mouse button while the cursor is in the work area or Job Explorer, a context menu appears with a number of functions (the number of functions depends on whether the context menu is for the work area or Job Explorer). This context menu offers the following functions:

| Function | Description |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select > | |
| Mode | Changes to the select mode. |
| All | Selects all marking objects in the work area. |
| Scroll | Lets you scroll through several selected marking objects, if you've selected several marking objects at once (see 'Area Select' in Selecting Marking Objects for Editing or 'SelectAll (Scroll)' in Defining the 'Edit' Parameters). The scroll function serves e.g. to define the marking object on which other objects will be adjusted when arranging multiple marking objects via the align or spacing buttons (see 'Arrange' Toolbar). Select 'Edit>SelectScroll' until the desired marking object is highlighted in a different color. |
| Marked | Lets you select one of many selected marking objects, if you've selected several marking objects at once (see 'Area Select' in Selecting Marking Objects for Editing or "SelectAll (Scroll)" in Defining the 'Edit' Parameters). – Use the scroll function (see above) until the desired marking object is highlighted. – Select 'Edit>Select\Marked'. Now, only the desired marking object will be selected. |
| Select | Lets you select one of many selected marking objects, if you've selected several marking objects at once (see 'Area Select' in Selecting Marking Objects for Editing or 'SelectAll (Scroll)' in Defining the 'Edit' Parameters). Opens the 'Select' dialog box (see 'SelectAll (Select)' in Defining the 'Edit' Parameters). |
| Clear | Deselects all selected marking objects. |
| New > | |
| Point | |
| Line | |
| Rectangle | |
| Polygon | |
| Circle | |
| Ellipse | |
| Arc | |
| Spiral | |
| Graphics Path | |
| Font Text | |
| Text Box | |
| Vector Text | |
| Barcode | |
| Graphics Paths | |
| Graphics Set | |
| Group | Select a desired marking object to create it in the work area (see Inserting Objects – Overview). |
| Tile Set | |
| Date/Time > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Serial Number > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Import Text > | |
| Font Text | |
| Vector Text | |
| Barcode | |
| Reference To Symbol | |
| Pixel Image | |
| Vector Graphics | |
| Variant | |

| Function | Description |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Edit | Serves to edit points or lines of a selected marking object (see Editing Objects – Overview). |
| Position > | |
| Place | Opens the 'Place' dialog box to define the exact position of the selected marking object (see Placing Marking Objects in the Work Area). |
| Center to Origin | Positions the selected marking object directly to the origin of the work area (see Positioning Marking Objects to the Origin). |
| Move | Opens the 'Move' dialog box for translating the selected object via numerical entry (see Moving Marking Objects in the Work Area). |
| Rotate | Opens the 'Rotate' dialog box for rotating the selected object via numerical entry (see Rotating Marking Objects in the Work Area). |
| Fill | Fills selected marking objects such as rectangle, circle, ellipse, polygon, etc. The marking object must be closed (see Editing Marking Objects manually). |
| Remove Filling | Removes the filling of a marking object. |
| Cut | Cuts a selected marking object or control element. |
| Copy | Copies a selected marking object or control element. |
| Paste | Pasts a selected marking object or control element. |
| Delete | Deletes a selected marking object or control element. |
| Offset | Enlarges a marking object by a defined dimension. Its corners will be rounded simultaneously by the defined radius. (See Altering the Marking Object's Shape) |
| Round Corners | Rounds the marking object's corners by a defined radius. The marking object can be closed or open. (See Altering the Marking Object's Shape .) |
| Split | Splits two closed marking objects into three marking objects (see Splitting Two Marking Objects). |
| Combine > | |
| Union | Combines two overlapping marking objects via four different ways and thus create new objects (see Combining Two Marking Objects). |
| Intersect | |
| Exclusive Or (Xor) | |
| Exclude | |
| Connect | |
| Merge | |
| Separate > | |
| Split | Offers several modes to cut one or several marking objects (see Splitting Marking Objects). |
| Tile | Divides a marking object exceeding the work area into several tiles to mark it in several steps (see Defining the Tile Set). The tile set function requires, that the work piece to be marked can be moved with an appropriate device (e.g. positioning table) coordinated to the laser scan system. |
| Cutout | Cuts intersecting lines by to avoid poor marking quality at intersections (see Cutting Marking Objects). |
| Expand | Fits a curve into single vectors by a polygon (see Expanding Marking Objects). |
| Pass Down Transformation | Includes the transformation values of groups, graphic sets, polygons and graphics paths into the point list. The transformation (rotation, translation, flip) will be set to 0 (zero). |
| Convert To > | |
| Font Text | Serves to convert text and variable objects (date/time, serial number) into another format (font text, vector text or barcode format): |
| Vector Text | – barcode (not vector text) to font text, |
| Barcode | – font text or barcode to vector text, – barcode to font text or vector text. |
| Graphics Paths | Serves to convert |
| Graphic Set | – a group or a graphic set to graphics paths, |
| Group | – a group or graphics paths to a graphic set, – graphics paths or a graphic set to a group. |
| Save As Symbol | Creates a template (called a "Symbol") from the selected marking object. The symbol will be saved in the marking library (see Creating and Inserting a Symbol). |
| Grouping > | |
| Group | Combines several marking objects, selected together in the work area or Job Explorer, to one group, graphics paths (set), graphic set, tile set or variant. Additional, a group, set or vector graphics can be assigned to a new group or variant. |
| Graphics Paths | |
| Graphics Set | |
| Tile Set | |
| Variant | |
| Ungroup | Dissolves a selected group in single objects. |

| Function | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aligning > | For aligning several selected marking objects in the work area: |
| Lefts | Aligns the marking objects to the left. |
| Centers | Centers the marking objects horizontally. |
| Rights | Aligns the marking objects to the right. |
| Tops | Aligns the marking objects to the top. |
| Middles | Centers the marking objects vertically. |
| Bottoms | Aligns the marking objects to the bottom. |
| Distributing > | For distributing several selected marking objects in the work area: |
| Left Border Spacing | Distribute with evenly spaced left borders. |
| Horizontal Center Spacing | Distribute horizontally with evenly spaced centers. |
| Right Border Spacing | Distribute with evenly spaced right borders. |
| Horizontal Distance | Distribute horizontally with even distance between the objects. |
| Top Border Spacing | Distribute with evenly spaced top borders. |
| Vertical Center Spacing | Distribute vertically with evenly spaced centers. |
| Bottom Border Spacing | Distribute with evenly spaced bottom borders. |
| Vertical Distance | Distribute vertically with even distance between the objects. |
| Across Area | Opens a dialog box for distribution across the work area. 4 different layout types are available: Grid, Box, Circle, Arc. |
| Repeat... | Opens the 'Repeat' dialog box to distribute a selected marking object as often as defined across the work area (see Copying and Aligning Marking Objects). 4 different layout types are available: "Grid", "Box", "Circle", "Arc". |
| Pan > | |
| Mode | Switches the program to pan mode which serves to move the work area (see Moving the Work Area). |
| Up | Moves the work area directly to the appropriate direction; pan mode needn't be activated. |
| Down | |
| Left | |
| Right | |
| Zoom > | |
| Mode | For selecting a desired zoom mode (see Using the Zoom Functions). |
| Zoom In | |
| Zoom Out | |
| Position | |
| Zoom To All Graphics | |
| Zoom To Work Area | |
| Zoom To Selection | |
| Scan Head | Serves to place the scan head's mirrors to a desired position in the work area (see Positioning the Scan Head). |
| Mode | Switches the program to the scan head mode. Lets you position the scan head several times in series. |
| Position | Lets you position the scan head once. The position is defined by the mouse click to open the context menu. Does not require the scan head mode. |
| New Graphic View | Lets you open one or more additional Graphic View(s) of the Work Area . This is advantageous, if you want to use different views (Top, Front/Side, and 3D View, see Views Window) of the marking objects. |
| Options [View] > | |
| Marking | If selected, the marking vectors will be displayed colored as defined in the GUI settings. The corresponding check box 'Marking Vectors' in the GUI settings will be activated (see field 'Color' in the View Parameters). If the marking vectors are already displayed, the selection of 'Marking' will deactivate the check box mentioned above. |
| Marking Protocol | If selected, the marking protocol will be displayed colored as defined in the GUI settings. The corresponding check box 'Marking Protocol' in the GUI settings will be activated (see field 'Color' in the View Parameters). If the marking vectors are already displayed, the selection of 'Marking Protocol' will deactivate the check box mentioned above. |
| Ruler | Shows a ruler (in the x and y directions) in the work area window |
| Grid | Shows a grid which helps you align marking objects easily. |

11.16 Configuring the Graphical User Interface

The appearance of the graphical user interface (GUI) and the behavior of certain GUI components can be individually configured by each laserDESK user according to personal preference. GUI configuration options encompass:

- Snap functions
- Behavior of objects while scaling
- Pre-settings of marking and graphics properties
- Display of grid and ruler
- Definition of colors
- Definition of units
- Directory assignment for hardware and marking parameter files
- Language
- Shortcut key definition
- Password setting

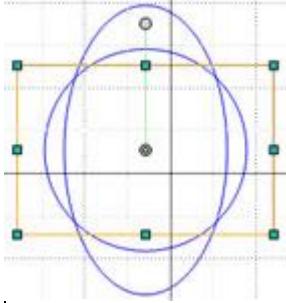
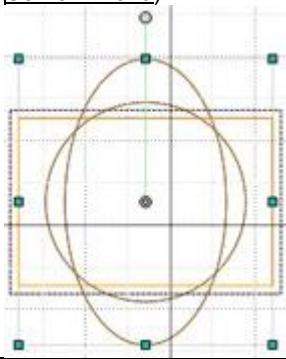
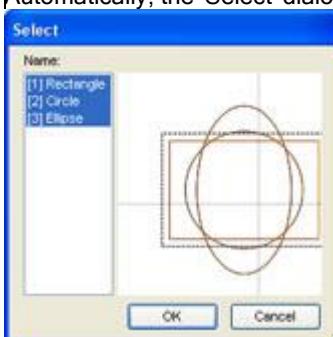
The GUI can be configured by each user at any time via the 'GUI Settings' dialog box (to open, select 'Options' in the '[Edit](#)' menu or {Specify Options} in the '[Edit](#)' toolbar). These settings are saved separately for each user in a user data directory.

Defining the 'Edit' Parameters

The 'Edit' parameters settings define the behavior of the cursor and the marking objects when creating and editing them. The user can configure these settings according to his personal preference and thus makes his job easier.

The following parameters can be defined:

| Parameter | Description |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Edit - Measure | |
| Snap To Grid | If activated, the cursor snaps to the grid (snap distance, see below). A reticle indicates the respective grid point. NOTE: If created in the work area with this function activated, a marking object's location will then be constrained to the grid points. |
| Snap To Cursor | If activated, the reference point of an object is snapped by the cursor during movement. |
| Snap To Graphic | If activated, the cursor snaps to the graphics when Measuring Distances . A small circle indicates snapping of the cursor to the graphic's edge. |
| Snap Distance ... Units | Defines the snap distance for 'Snap To Grid'. The units correspond to the settings of the ' View Parameters ([mm], [cm], [mil] or [in]). |
| Recalculate Filling | If activated, changes of the fill parameters will be recalculated after editing. If deactivated, the marking object will lose its filling when changing the parameters; the marking object must be filled with the new parameter settings again. |
| Resize | |
| Keep Shape | If activated, marking objects such as circles will not lose their shape. |
| Keep Aspect Ratio | If activated, the aspect ratio of marking objects will persist when scaled. |
| Move - Rotate | |
| X/Y Increment [Units] | |
| Rotation Increment [Units] | Defines the step size for (pilot laser) transformation in x/y direction and rotation in [units]. |
| Select Position | Lets you define how many overlapping marking objects are selectable by the cursor. |

| Parameter | Description |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Single | <p>From all marking objects captured by the cursor, only the marking object next to the cursor is selected.</p>  |
| All (Scroll) | <p>All marking objects captured by the cursor are selected. Subsequent, you can scroll through or select one of the marking objects (see 'Select 4' in Context Menu).</p>  |
| All (Select) | <p>All marking objects captured by the cursor are selected (see figure above). Automatically, the 'Select' dialog box opens to let you select one of these marking objects.</p>  |

To set the 'Edit' parameters proceed as follows:

1. Select 'Options' in the [Edit](#) menu.
or
Select 'Specify Options' in the [Edit](#) toolbar.
The 'GUI Settings' window appears.
2. Select 'Edit' in the window's left column.
The corresponding parameters are shown at the right side.
3. Change the settings:
– Activate or deactivate the desired check boxes and radio button.
– Enter the required values in the input fields.
4. Select another parameter inside the desired GUI settings.
or
Confirm your settings with {OK}.
The 'GUI Settings' window will be closed.
The settings are saved permanently.

Defining the 'Create' Parameters

The 'Create' parameters settings lets you define default properties of some specific parameters of the marking objects as default properties. I.e. each new marking object (if featuring these parameters) will get these settings automatically when created or imported. Nevertheless, these settings can be modified later for each marking object in the [Property Window](#). Assuming that the settings are applied mainly to all marking objects featuring these parameters, the pre-settings will help you to save time.

The following parameters can be defined:

| Parameter | Description |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marking Properties (also see group 'Marking' in the Graphic Parameters) | |
| Mark | <p>Lets you enable or disable the marking process for this object. When enabling the marking process, the order of hatchlines and outlines will be defined. One of the following items can be selected:</p> <ul style="list-style-type: none"> – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Graphic Resolution [Units]: | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| Point Time Duration [μ s]: | Lets you define the marking time duration (in [μ s]) especially for marking points. |
| Z-Focus Control | |
| Jump Speed [m/s]: | Speed (in [m/s]) of the 'virtual' laser beam while positioning to the next mark in z-direction. |
| Jump Delay [μ s]: | The jump delay is needed to equalize the tracking error at the end of the jump. Because the z-focusing optics have larger tracking errors, this value can be adapted here. |
| Graphic Properties | |
| Layer: | <p>A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable (see Layers Window). By default none layer is assigned, the selection field is blank.</p> <p>Open the 'Select' dialog box via the  button, to select a listed layer or "<None>".</p> |
| Text Content: | <p>Lets you define the text content of static font and vector text (also see parameter 'Text' in Graphic Parameters – Font Text and Graphic Parameters – Vector Text). The default setting is "<Text>".</p> |
| Text Justification: | <p>Lets you define the reference point of static font text:</p> <ul style="list-style-type: none"> – Left Bottom – Left Baseline – Left Center ... – Right Top <p>The default setting is 'Left Bottom'. Click the  button to select the desired reference point. (Also see parameter 'Justification' in Graphic Parameters – Font Text.)</p> |
| Barcode Type: | <p>laserDESK offers a large number of linear and matrix barcode types, which can be selected here from a drop-down menu.</p> <p>This parameter lets you pre-set the code type for the 'Barcode' objects. Click the  button to select the required code type. (Also see parameter 'Code Type' in Graphic Parameters – Barcode.)</p> |

To set the 'Create' parameters proceed as follows:

1. Select 'Options' in the [Edit](#) menu.
or
Select 'Specify Options' in the [Edit](#) toolbar.
The 'GUI Settings' window appears.
2. Select 'Create' in the window's left column.
The corresponding parameters are shown at the right side.

3. Change the settings:
 - Activate or deactivate the desired check boxes and radio button.
 - Enter the required values in the input fields.
 - Select the required items in the selection fields.
4. Select another parameter inside the desired GUI settings.
or
Confirm your settings with {OK}.
The 'GUI Settings' window will be closed.
The settings are saved permanently.

Defining the 'View' Parameters

The 'View' parameters decisively determine the appearance of the Graphical User Interface (GUI), in particular the display of the work area and the marking objects.

The following parameters can be defined:

| Parameter | Description |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drawing Plane | |
| Grid | If activated, the grid will be shown in the work area. (The grid can also be set to visible or invisible via 'Grid' in the Context Menu and Views Window .) |
| Axes | If activated, x and y axes will be shown in the work area. (The axes can also be set to visible or invisible via 'Axes' in the Views Window .) |
| Ruler | If activated, two rulers (x and y directions) will be shown in the work area. (The rulers can also be set to visible or invisible via 'Ruler' in the Context Menu and Views Window .) |
| Grid Style | |
| Automatic | If activated, a grid will be set automatically. |
| Points Distance | If activated, points will be shown. The points distance must be defined. The distance corresponds to the settings of the 'Units' ([mm], [cm], [mil] or [in], see below). |
| Graphics | |
| Marking Area | If the checkbox in column 'Visible' is activated, the work area will be displayed. Click on a colored field in the column 'Color' to open the 'Color' dialog box. Select or define a color and confirm with {OK}. Defines the color of the work area. The work area can also be set to visible or invisible via 'Marking Area' in the Views Window .) |
| Marking Objects | If the checkbox in column 'Visible' is activated, all marking objects will be displayed. Click on a colored field in the column 'Color' to open the 'Color' dialog box. Select or define a color and confirm with {OK}. (The marking objects can also be set to visible or invisible via 'Marking Objects' in the Views Window .) |
| Selected Objects | If the checkbox in column 'Visible' is activated, the selected marking object(s) will be displayed in the defined color. Click on a colored field in the column 'Color' to open the 'Color' dialog box. Select or define a color and confirm with {OK}. |
| Edited Objects | If the checkbox in column 'Visible' is activated, marking objects selected with 'Edit' will be displayed. Click on a colored field in the column 'Color' to open the 'Color' dialog box. Select or define a color and confirm with {OK}. |
| Marking Vectors | If the checkbox in column 'Visible' is activated, the marking vectors will be displayed. Click on a colored field in the column 'Color' to open the 'Color' dialog box. Select or define a color and confirm with {OK}. (The marking vectors can also be set to visible or invisible via 'Marking' in the Context Menu and via 'Marking Vectors' in the Views Window .) |
| Marking Sorting | If the checkbox in column 'Visible' is activated and the 'Marking Vectors' are activated (see above), the marking sorting will be displayed. Click on a colored field in the column 'Color' to open the 'Color' dialog box. Select or define a color and confirm with {OK}. (The marking sorting can also be set to visible or invisible via 'Marking Sorting' in the Views Window .) |

| Parameter | Description |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marking Movement | If the checkbox in column 'Visible' is activated, the position of the graphic objects with simulated axes movements, defined by the motor control nodes, is shown. The axes movement is shown as a shift of the objects. NOTE: To get a correct simulation, the parameter 'Movement Direction' of the motor control node (see Graphic Parameters – Motor Control) has to be set according to the build in position of this axis. |
| Marking Protocol | If the checkbox in column 'Visible' is activated, the marking protocol will be displayed in the defined color. The RTC protocol data will be shown, if the protocol nodes are defined in the job and the job was executed once minimum.the marking sorting will be displayed. Click on a colored field in the column 'Color' to open the 'Color' dialog box. Select or define a color and confirm with {OK}. (The protocol data can also be set to visible or invisible via 'Marking Protocol ' in the Context Menu and Views Window .) |
| Variants | For creating and editing a variant, it can be useful to hide already created variants. If the 'Visible' checkbox is activated, the corresponding variant is visible in the work area. The columns 'Identifier' and 'Bit Pattern' are not editable. (Variants can also be set to visible or invisible via 'Variant #' in the Views Window .) |
| Layers | If the 'Visible' checkbox is activated, the corresponding layer is visible in the work area. Click on a colored selection field to open the 'Color' dialog box. Select or define a color and confirm with {OK}. The column 'Identifier' is not editable. To define the complete setting of the layers, see Layers Window . |
| Marking | |
| Vectors: | If parameter 'Marking Vectors' (see above) has been selected, the display of the marking vectors' can be adjusted like follows: – Arc – Ellipse – Polygon Click the  button to select the desired vector display. |
| Fill Distance [px] | Filling lines within the specified distance (in [px]) will be displayed as a filled area and not as separate lines to save drawing time. |
| {Reset Protocol} | Click this button to delete the protocol data memory. |
| Units | |
| Length | Click the  button to select the desired units of length: "mm", "cm", "mil" or "in". |
| Angle | Applied unit: [deg] (not editable). |
| Proportion | Applied unit: [%] (not editable). |
| Decimal Places | To define the number of decimal places – enter the desired value into the input field – or click the arrow buttons (up/down). Range: "0" (min.) to "10" (max.). |
| Explorer | |
| Number of Shown Nodes | Defines the maximum number of nodes to be shown in the Job Explorer. Input field range : "0" (min.) to "9999" (max.). |
| 3D | |
| Activate 3D Views | If this checkbox is activated, the 3D View is applicable (see selection field 3D View (XYZ) in Views Window). |

To set the 'View' parameters proceed as follows:

1. Select 'Options' in the [Edit](#) menu.
or
Select 'Specify Options' in the [Edit](#) toolbar.
The 'GUI Settings' window appears.
2. Select 'View' in the window's left column.
The corresponding parameters are shown at the right side.
3. Change the settings:
 - Activate or deactivate the desired check boxes and/or radio buttons to show or hide grid, rulers, variants,etc.
 - Select or define desired colors.
 - Define the units and number of shown nodes.

4. Select another parameter inside the desired GUI settings.

or

Confirm your settings with {OK}.

The 'GUI Settings' window will be closed.

The settings are saved permanently.

Defining the Directories

The settings of the 'Hardware Configuration' and the 'Marking Library' as well as the user administration will always be saved in predefined files and directories as long as these will not be changed. If laserDESK is started the first time, default HardwareConfiguration.sld and MarkingLibrary.sld files will be created. The same happens, if one file is missing.

Log files will be created, if logging is activated (see 'Log Level' in [Defining the GeneralParameters](#)). Protocol files are created, if protocol nodes are inside the job and no log file name is defined or a relative path is used (only for intelliSCAN scan heads). The default directory (including subdirectories) for all these files is *C:\ProgramData ScanlabISLLaserDesk*. If not yet present, it will be created. All files mentioned above can be renamed and collected in an own directory. It is recommended not to change the file names.

NOTE:



E.g. for data exchange between several laser scan systems or jobs (see [Library Explorer / Marking Library](#)), we recommend to copy the marking library file onto a network server.

Please observe the read and write permissions for each user when changing the directory (see [Installing the laserDESK Software](#))!

In the first step, the files must be copied into a desired directory, in the second step, the directories can be defined here:

| Parameter | Description |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hardware Configuration | The select button  launches a (<i>Windows-standard</i>) 'Open' dialog box. Define the directory for the required "[HardwareConfigurationName].sld" file. |
| Marking Library | The select button  launches a (<i>Windows-standard</i>) 'Open' dialog box. Define the directory for the required "[MarkingLibraryName].sld" file. |
| User Administration | The select button  launches a (<i>Windows-standard</i>) 'Open' dialog box. Define the directory for the required "[LaserDeskName].pwd" file. |
| Log Files | The select button  launches a (<i>Windows-standard</i>) 'Open' dialog box.. Define the directory for both the "[LaserDesk.log].txt" file and the "[protocol<timestamp>].csv" file. |

To define the directories proceed as follows:

1. Select 'Options' in the '[Edit](#)' menu.
or
Select 'Specify Options' in the '[Edit](#)' toolbar.
The 'GUI Settings' window appears.
2. Select 'Directories' in the window's left column.
The corresponding parameters are shown at the right side.
3. Define the directory of the 'Hardware Configuration':
– Click  button to open the (*Windows-standard*) 'Open' dialog box.
– Select the desired path/directory.
– Confirm with {Open}.
The defined directory is shown in the field 'Hardware Configuration':.
4. Repeat step 3 for 'Marking Library', 'User Administration', and 'Log Files'.
5. Select another parameter inside the desired GUI settings.
or
Confirm your settings with {OK}.
The 'GUI Settings' window will be closed.
The settings are saved permanently.

Defining Shortcut Keys

Shortcut keys let you execute functions with keyboard interaction in a very easy and quick way.

By default, a whole string of shortcut keys are already applied by laserDESK. These are listed in [How to Use Shortcut Keys](#).

laserDESK lets you define individually keyboard shortcuts in the 'Options' (GUI Settings) window and, if desired, lets you change most of the applied shortcut keys.

The list item 'Shortcut Keys' serve to define shortcut keys for most of the actions of the laserDESK program.

| Item | Description |
|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shows actions containing: | This input field serves to find a desired action quickly. Enter a word or only a few characters. The table below will list the corresponding action(s). |
| Action | Lists of the actions of laserDESK. To select a desired action, just click in the corresponding line. |
|  Keys | The shortcut keys of actions signed with the lock icon can't be changed. These are <i>Windows</i> -standard shortcut keys. |
| Press new shortcut keys: | Shows the defined shortcut key of the corresponding action. |
| {Assign} | Click this button to assign the entered shortcut key to the selected action. |
| {Clear} | Click this button to delete the assigned shortcut key of the selected action. |

To define the shortcut keys proceed as follows:

1. Select 'Options' in the '[Edit](#)' menu.
or
Select 'Specify Options' in the '[Edit](#)' toolbar.
The 'GUI Settings' window appears.
2. Select 'Shortcut Keys' in the window's left column.
The corresponding parameters are shown at the right side.
3. Define the shortcut keys for the desired action(s).
 - Select an action in the table by clicking the corresponding line.
 - Place the cursor in the 'Press new shortcut keys:' input field.
 - Enter new shortcut key.
 - Click the {Assign} button to confirm.
 The shortcut key will be displayed in the 'Keys' column.
or
If the key is already used, an appropriate message will be displayed.
In this case, enter another shortcut key.
4. Select another parameter inside the desired GUI settings.
or
Confirm your settings with {OK}.
The 'GUI Settings' window will be closed.
The settings are saved permanently.

Defining Users' Access Authorization

laserDESK enables assignment of access rights to users. Five user groups are available, each with different access rights (the classifications and the access rights associated with them cannot be changed). The access rights of a superordinate group always acquire the access rights of subordinate groups.

The access rights are hierarchized as follows (from bottom up):

- Users assigned to the **Viewer** group can only view existing jobs. Therefore, job files can be opened and printed, but not edited or saved. The view functions (Select, Zoom, Pan, Measure) can be used for closer inspection of the marking objects in the work area. All parameter and hardware settings and some GUI settings can only be viewed. Exceptions are the 'View' and 'General' GUI settings, which can be edited (e.g. for setting colors, selecting the language, etc). The 'Hardware Control' can only be opened for additional 'System Information'.

- Users assigned to the **Production** group are permitted to start existing jobs. Furthermore, these users can restart the laser system, switch between automatic and manual mode, and stop a running job (executable via the Laser Control Window).
- Users assigned to the **Designer** group have all rights to create and execute jobs. All functions for creating, inserting, and editing objects or elements are available, including setting of graphic and process parameters. A "designer" can save created jobs and rename existing jobs.
- Users assigned to the **Supervisor** group are permitted to perform all functions offered by 'Hardware Control' with the exception of the 'Calibration Wizard' (used for calibration factor calculation). Thus, a supervisor can define nearly all settings for hardware control and perform marking tests.
- Only users assigned to the **Administrator** group have the permission to perform all functions of the laserDESK program. This includes 'Hardware Configuration', definition of library directories and definition of access authorization.

Only the administrator can assign users to a group, by defining a username. A username can be assigned both individually to each user and for all users of one group. For log in, each user must enter his user name in the 'SCANLAB laserDESK' dialog box. The current user (name) and the assigned group will then be displayed in the title bar of the program window:



If desired, an individual password can be assigned for each user - independently of the assigned group - or for all members of the same group. In this case, also the password must be entered for log in (see dialog box above). If passwords are not used, then this line must be left blank.

| | |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: Individual passwords can be changed by the users themselves (see Changing the Password). |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|

The table below serves to define the user's access authorization:

| Column | Description |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| User | Input field for the user's name. Assign – a unique user name to each user – or one name for all members of one group. |
| Group | The selection field offers the different user groups: – Viewer – Production – Designer – Supervisor – Administrator Click the  button to select the required user group and thus assign the corresponding access rights. |
|  | The key icon opens the 'Change Password' dialog box to enter and repeat the password. If passwords are used, assign a unique password to each user or one password for one group. |

Assign the user group as follows:

1. Select 'Options' in the '[Edit](#)' menu.
or
Select 'Specify Options' in the '[Edit](#)' toolbar.
The 'GUI Settings' window appears.
2. Select 'User And Groups'.
3. Click into a blank field in the 'User' column and enter the user's name.
4. In the same line, click on the  button in the 'Group' column.
A drop-down list appears with the five user groups.
5. Select the required user group.

6. If a password is to be assigned, then click the key icon.
 The 'Change Password' dialog box will appear:
7. Enter and reenter the password in the 'New Password' and 'Repeat Password' input fields.
 Confirm the password with {OK}.
 The 'Change Password' dialog box then closes.
8. To save your settings permanently, you must click the {OK} button of the 'Options' dialog box.

Defining the 'General' Parameters

The 'General' parameters serve to select the GUI's language and the handling with recent files.

The following parameters can be defined:

| Parameter | Description |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Language | Text elements of the laserDESK GUI are displayable in different languages. Currently Chinese, English, German and Russian are available in the selection field. |
| Recent Files | |
| Items shown in menu list | Number of recent files to be listed in the ' File ' menu. The selection field offers a number from "4" (min.) to "16" (max.). |
| Load most recent file at startup | If activated, the most recently saved file (job) will open automatically when laserDESK starts up. |
| Automatic Mode | |
| Save file after marking | If this check box is activated, the current job will be saved after the marking procedure: – If the job has been saved before, the existing file will be automatically overwritten. – If a new job hasn't already been saved, a (<i>Windows-standard</i>) 'Save As ...' dialog box appears. |
| Remote Control Mode | <p>If laserDESK is controlled via remote control (see Setting 'Hardware Devices' Parameters in 'Hardware Configuration') the 'Remote Control' window, which acts as blocking dialog, is shown.</p> <p>If this check box is activated, the blocking dialog / 'Remote Control' window disappears automatically when switching off the remote control.</p> |
| Hide Program at Start | <p>If this check box is activated, the laserDESK program GUI is hidden and in the system tray (task bar notification area) a notification icon is displayed:</p> <p>If this check box is deactivated (normal behaviour), the notification icon is not displayed. To restore the program GUI (if hidden), select 'Show Program' in the notify icon's context menu and enter your user name in the 'SCANLAB laserDESK' dialog box (see New User Log-in). This requires, that you are logged in as supervisor or administrator. Note: This feature is only useful in remote mode. Therefore it can be activated by a remote command, too (please refer to the Remote Control manual).</p> |

| Parameter | Description |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage Mode | |
| Compress new files | If this check box is activated, the Job files will be compressed when saving them. |
| Undo / Redo | |
| Maximal possible Undo Actions | Number of maximal possible undo actions. Large values may lead to memory exceptions because they require a lot of memory (RAM). Values of 0 (zero) or less will disable the undo actions. |
| Log Level | <p>For every activated check box, all command and program events belonging to the selected log level will be logged in a file 'laserDESK.log.txt'. This log file will be stored in the 'laserDESK' program directory (see Defining the Directories). All combinations of activated and deactivated check boxes are possible. Some log messages belong to more than one log level. The following events will be logged:</p> <ul style="list-style-type: none"> – Log Error: all error messages; – Log Warning: all warning messages (e.g. not allowed parameter modifications); – Log Execution: job handling (load, execution) and user login. When finishing the automatic mode, the number of executed actions (e.g. executed variants). – Log Creation: all actions to create and edit marking objects and control elements (typically listed in the output window), opening a job; – Log Communication: communication data received from remote control and motor control axes; – Log Hardware: initialization of motors/axes, application of SCANalign, RTC error states, manual execution of laser jobs. <p>NOTE: Be careful when using that function constantly (particularly Log Creation and Log Communication during production). This may slow down program execution and may result in a huge log file. The maximum log file size is 50 MB; if this value is exceeded, the log file is labeled with a number (e.g. laserDESK.log1.txt) and a new file will be created. If more than 20 log files exist, the oldest one will be deleted to restrict the needed hard disk space.</p> |

To set the 'Edit' parameters proceed as follows:

1. Select 'Options' in the [Edit](#) menu.
or
Select 'Specify Options' in the [Edit](#) toolbar.
The 'GUI Settings' window appears.
2. Select the 'General' section in the window's left column.
The corresponding parameters are shown at the right side.
3. Change the settings:
– Select the desired language.
– Define the number of recent files to be listed.
– Activate or deactivate the check boxes regarding the corresponding mode.
4. Select another parameter inside the desired GUI settings.
or
Confirm your settings with {OK}.
The 'GUI Settings' window will be closed.
The settings are saved permanently.

12 Using the Zoom Functions

The laserDESK GUI provides several zoom functions for selecting desired display sizes of the work area and marking objects. Seven different zoom functions can be selected via the '[View](#)' menu bar, the '[View](#)' toolbar buttons or the [context menu](#) opened via the right mouse button.

| Icon | Function | Description |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Zoom Mode | When selected you can draw a frame in desired size and position in the work area. Depending on the cursor direction, the section will be – enlarged (cursor direction from top left to bottom right) – or shrink (cursor direction from bottom right to top left). |
|  | Zoom In | Each click scales up the work area. Zoom mode needn't be activated. |
|  | Zoom Out | Each click scales down the work area. Zoom mode needn't be activated. |
|  | Zoom Position (context menu only) | When selected, the work area aligns with the cursor position at the center of the work area window – but without scaling up or down. Zoom mode needn't be activated. |
|  | Zoom To All Graphics | When selected, the work area scales up or down to show all marking objects with the largest size possible. Zoom mode needn't be activated. |
|  | Zoom To Work Area | When selected, the work area scales up or down to fit the work area window. Zoom mode needn't be activated. |
|  | Zoom To Selection | When selected , the work area scales up or down to show selected marking objects at the largest size possible. Zoom mode needn't be activated. |

To use the zoom functions, proceed as follows:

Zoom Mode

1. Select 'Zoom ▶ Mode' or {Zoom Mode}.
The cursor changes to a square.
2. **To enlarge a section**, click a desired position in the work area and – while keeping the mouse button pressed – draw a frame from top left to bottom right.
When the frame reaches the desired dimensions, release the mouse button.
The section scales up to the frame's size.
or
To shrink a section, click a desired position in the work area and - while keeping the mouse button pressed – draw a frame from bottom right to top left.
When the frame reaches the desired dimensions, release the mouse button.
The section scales down.

Zoom In / Zoom Out

1. Select
 - 'Zoom ▶ In' / {Zoom In}
 - or 'Zoom ▶ Out' / {Zoom Out}.
 The work area scales up or down.
2. Repeat until the work area reaches the desired size.

Zoom Position

1. Place the cursor on a desired position in the work area and click the right mouse button.
2. Select 'Zoom ▶ Position' from the context menu.
The work area centers itself in the work area window corresponding to the cursor position.
The work area will not scale up or down.

Zoom To All Graphics

1. Select 'Zoom ▶ To All Graphics' or {Zoom To All Graphics}.
The work area scales up or down to show all marking objects at the largest size possible.

Zoom To Work Area

1. Select 'Zoom ▶ To Work Area' or {Zoom To Work Area}.
The work area will be displayed completely.

Zoom To Selection

1. Select one or several marking objects (see [Selecting Marking Objects for Editing](#)).
2. Select 'Zoom ▶ To Selection' or {Zoom To Selection}.
The work area scales up or down to show the selected marking objects at the largest size possible.

Zoom in or out independently from zoom functions

1. Use the scroll wheel of your mouse while pressing the <Ctrl> key.

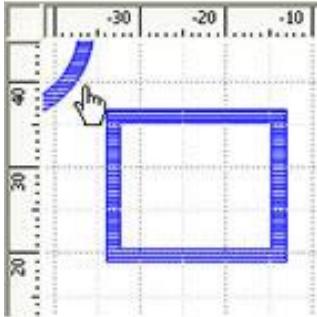
13 Moving the Work Area

Depending on the work area's extent of enlargement (zoom factor), it might occur that a marking object is undisplayed or only partially visible in the work area window. In this case, use pan mode to move the work area to the desired position. Independent from pan mode, the work area can be moved via the mouse wheel in the select, zoom or measure modes.

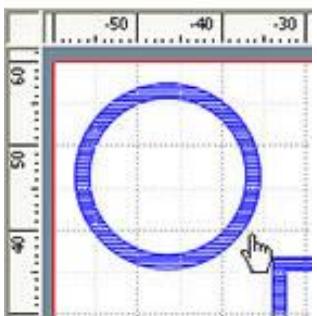
Move the work area by using the **pan mode** as follows:

1. Select 'Pan Mode' from the
 - [View](#) menu,
 - or right mouse button's [Context Menu](#)
 - or in the '[View](#)' toolbar.

The cursor's form changes to a hand.



2. Click a desired position in the work area and – while keeping the mouse button pressed – drag the work area to the desired position.



3. To exit pan mode, click the right mouse button and select 'Finish.'

The program switches to select mode.

or

Choose 'Select Mode', 'Zoom Mode' or 'Measure Mode'.

The chosen mode then becomes active.

Move the work area **independently of pan mode** as follows:

1. Select 'Pan ▶ Up /Down / Left / Right' from the
 - [View](#) menu
 - or right mouse button's [Context Menu](#).

The work area then shifts correspondingly.

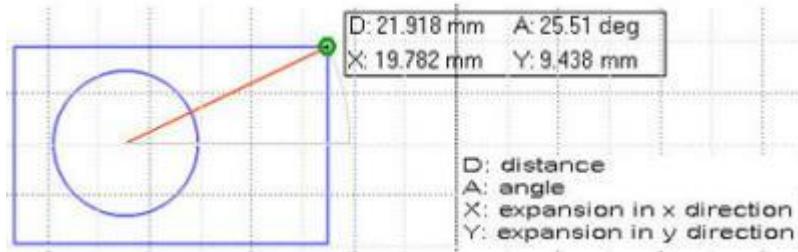
or

1. Use the scroll wheel of your mouse to scroll the work area up or down.
2. Use the scroll wheel of your mouse while pressing the <Alt> key to scroll the work area left or right.
3. Use the scroll wheel of your mouse while pressing the <Shift> key to scroll the work area up or down very fast.
4. Use the scroll wheel of your mouse while pressing the <Alt>+<Shift> keys to scroll the work area left or right very fast.

14 Measuring Distances

Measuring mode assists in measuring distances, e.g. between marking objects or characteristic points of marking objects.

Measured distances are shown as a colored line and the measured result is displayed in a rectangle frame:



NOTE:

The indicated units of length ([mm], [cm], [mil] or [in]) depend on definitions in 'GUI Settings' (see [Defining the 'View' Parameters](#)).

To measure distances, we recommend selecting 'Snap To Graphics' in 'GUI Settings' (see [Defining the 'Edit' Parameters](#)). If the cursor nears a specific point, then a green circle appears and the cursor will snap to the specific point.

To measure distances proceed as follows:

1. Select 'Measure Distance' in the
 - [Tools](#) menu
 - or [View](#) toolbar.

A cruciform cursor appears:



2. Place the cursor above the starting point and press the mouse button.
A rectangle frame appears (all values are "0").
3. Drag the cursor - while keeping the mouse button pressed - to the ending point.
If set, the cursor will snap to a specific point.
The measured result displays in the rectangle frame.
4. To terminate the measurement, just release the mouse button.
5. To exit measuring mode
 - select 'Finish' via the right mouse button (and return to 'Select Mode')
 - or select another mode.

15 Positioning the Scan Head

For special applications, the scan head's mirrors can be positioned to a desired position in the work area with one mouse click. This function is mainly applied when using a camera adapter (for positioning the mirrors to a new camera image) or for testing the scan head.

To position the scan head **once**, proceed as follows:

1. Place the cursor at a desired position in the work area.
2. Select 'Scan Head ▶ Position' in the right mouse button's [Context Menu](#).
The scan head's mirrors will be positioned directly to the cursor's position.

To position the scan head **several times in series**, proceed as follows:

1. Select 'Scan Head Positioning' from the
 - [Tool](#) menu
 - or in the [View](#) toolbar
 - orSelect 'Scan Head ▶ Mode' in the right mouse button's [Context Menu](#).
The scan head mode is indicated by a cruciform cursor.



2. Just click on desired positions in the work area.
The scan head's mirrors will be moved to these positions.
3. To exit the scan head mode, click the right mouse button and select 'Finish'.
The program switches to select mode automatically.
or
Choose 'Select Mode', 'Zoom Mode', 'Pan Mode' or 'Measure Mode'.
The chosen mode then becomes active.

16 Inserting Objects

When creating a new job, you must insert marking objects and may insert control elements and protocol nodes.

NOTE:

To create a new job, we recommend inserting and editing the marking objects first.

Define a marking object's layout first before specifying the production parameters (marking, hatching, and pixel image parameters).

The procedure for inserting a new **marking object** into the work area is easy, but not always identical for all marking objects:

- Inserting a new line, rectangle, circle, ellipse, arc, spiral or barcode directly into the work area is performed via a common procedure.
- Inserting a new point, text, or variable object (date/time, serial number or import text) is similar.
- Inserting a new polygon or graphics path is similar too, but differs somewhat a little due to additional steps (depending on the number of points).
- Creation of a group, graphic set or variant is divided into several steps: first a group, graphic set or variant must be created, then the marking objects must be inserted.
- In contrast, pixel images and vector graphics are imported via a dialog box that allows picture-specific settings.

The procedure for inserting a **control element** or **protocol/timer node** into the Job Explorer's tree only requires one mouse click.

laserDESK offers several options for inserting new objects. They can be inserted via:

- the '[Tools](#)' menu,
- the '[Marking Objects](#)' and '[Control Elements](#)' toolbars,
- the [Toolbox](#)
- or the right mouse button's [Context Menu](#).

NOTE:

The Job Explorer must be selected.

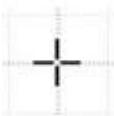
When the Library Explorer is selected, you can't insert new objects.

16.1 Inserting Marking Objects

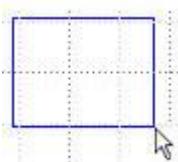
The procedure for inserting new marking objects which applies for rectangles, circles, ellipses, spirals and barcodes is very easy.

The procedure described here will use the example of a rectangle:

1. Select 'Rectangle' from the
 - [Tools](#)Marking Objects ▶ ' menu
 - or [Marking Objects](#) toolbar.A cruciform cursor appears:



2. Click a desired position in the work area and – while keeping the mouse button pressed – draw a rectangle. The rectangle will be enlarged in drawing direction to its reference point (normally the lower left corner). Pressing the <Ctrl> key simultaneously, the reference point of the rectangle will be changed to the center.



When the rectangle reaches the desired dimensions, release the mouse button..

or

1. Place the cursor in the work area and click the right mouse button.
A [Context Menu](#) appears.
2. Select 'New ▶ Rectangle'.
A rectangle will get inserted, which can be stretched to the desired dimensions with the cruciform cursor.
3. Click the left mouse button to finish the action.

or

1. Select 'Rectangle' from the [Toolbox](#) and - while keeping the mouse button pressed - drag it into the work area.
A rectangle of predefined dimensions will be inserted.

The inserted marking object can be edited afterward [manually](#) or via the [Property Window](#).

16.2 Inserting Arcs

For inserting new arcs, laserDESK offers several arc creation modes:

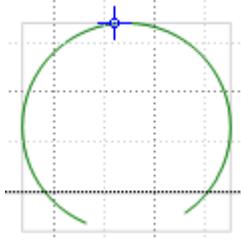
- Three point arc mode: Define the arc by (1) the starting point, (2) the end point and (3) an arc point.
- Arc quadrant modes (cw and ccw): Define the arc by specifying a rectangle in which the arc fits in - clockwise or counterclockwise.
This always results in a 90° arc.
- Arc center mode: Define the arc by (1) center point, (2) diameter, and (3) end point of arc (=> angle extent).

To insert a new arc, proceed as follows:

1. Select 'Arc' from the
 - [Tools](#)\Marking Objects ▶ ' menu
 - or [Marking Objects](#) toolbar.



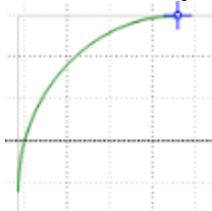
-
2. Select the required arc mode (three point, quadrant (cw/ccw) or center mode)
 - in the toolbox '[Graphics Path](#)'
 - or via the [Context Menu](#) (click the right mouse button).
3. Create the arc via the **three points mode**:
 - Click two desired positions in the work area to define the arc's endpoints.
 - Draw the arc to the desired radius/diameter.
 - Select a third point, which lies on the arc, to define the radius.



or

Create the arc via **quadrant mode (clockwise/counterclockwise)**:

- Click a desired position in the work area to define the arc's start point,
- Draw the arc by defining a bounding rectangle in which the arc fits as a 90° arc.

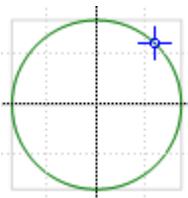


- Click a desired position in the work area to define the arc's end point.

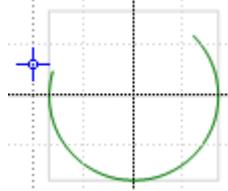
or

Create the arc via **center mode**:

- Click a desired position in the work area to define the arc's center point.
- Draw the circle to the desired diameter.
- Place the cursor on a desired position of the circle and click the left mouse button to define the angle start and to define the diameter.



– Move the cursor to define the angle extent (by setting the end point).



– Click the left mouse button to finish the arc.

or

1. Place the cursor in the work area and click the right mouse button.
A [Context Menu](#) appears.
2. Select 'New ▶ Arc'.
An arc with predefined angle extent (270°) will get inserted, which can be stretched to the desired dimensions with the cruciform cursor.
3. Click the left mouse button to finish the action.

or

1. Select 'Arc' from the [Toolbox](#) and - while keeping the mouse button pressed - drag it into the work area.
An arc with predefined radius and angle extent (270°) will be inserted.

The inserted marking object can be edited afterward [manually](#) or via the [Property Window](#).

16.3 Inserting Points

The procedure for inserting a new point is very easy.

1. Select 'Point' from the
 - [Tools](#)|Marking Objects ▶ ' menu
 - or [Marking Objects](#) toolbar.
 - or
 - Select 'New ▶ Point' via the right mouse button's [Context Menu](#).
2. Click a desired position in the work area.
The point gets inserted automatically.

or

1. Select 'Point' from the [Toolbox](#) and - while keeping the mouse button pressed - drag it into the work area.

The inserted point can be edited afterward [manually](#) or via the [Property Window](#).

16.4 Inserting Lines

The procedure for inserting a new line is easy.

1. Select 'Line' from the
 - [Tools](#) [Marking Objects](#) ▶ ' menu
 - or [Marking Objects](#) toolbar.A cruciform cursor appears:



2. Click a desired position in the work area and – while keeping the mouse button pressed – draw a line.
If you press the <Shift> key while drawing, then the line will be constrained to 45 degree steps.
3. When the line reaches the desired dimensions and direction, click the mouse button.

or

1. Select 'New ▶ Line' from the right mouse button's [Context Menu](#).
A line will be inserted, with one point fixed and one point freely positionable.
2. Draw a line.
If you press the <Shift> key while drawing, then the line will be constrained to 45 degree steps.
3. When the line reaches the desired dimensions and direction, click the mouse button.

or

1. Select 'Line' from the [Toolbox](#) and - while keeping the mouse button pressed - drag it into the work area.
A line of predefined dimensions will be inserted.

The inserted line can be edited afterward [manually](#) or via the [Property Window](#).

16.5 Inserting Polygons or Graphics Paths

The procedure of inserting a new polygon (consisting of lines) or graphics path (consisting of curves and/or lines) is similar to the procedure for other marking objects, but differs somewhat due to additional steps - depending on the numbers of points. Moreover, polygonal or graphics paths can be created as unclosed or closed marking object (you can subsequently hatch closed marking objects).

The procedure described here uses the example of a polygon:

1. Select 'Polygon' from the
 - [Tools](#)\Marking Objects ▶ ' menu
 - or [Marking Objects](#) toolbar
 - or [Toolbox](#).
 A cruciform cursor appears.
2. For each point of the polygon, click a desired position in the work area.
Each new point gets connected by a line to the previous point.
3. To edit or change the polygon during creation, several functions are available via the right mouse button's context menu:

| Function | Description |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------|
| New Point | Adds another point |
| Append To Polygon | Resumes successive creation of a polygon, if this had been interrupted (see 'Release Polygon' below) |
| Open Polygon | Opens a closed polygon |
| Remove Point | Deletes the last fixed point |
| Close Polygon | Closes the open polygon (required for filling) |
| Reverse Points | Lets you change the point to continue creating the polygon or graphics path: from the last point to the start point or reverse. |
| Release Polygon | Interrupts successive creation of a polygon; points can be edited and new points can be inserted |
| Zoom > | Lets you execute zoom functions (description, see Using the Zoom Functions). |
| In | |
| Out | |
| Position | |
| To All Graphics | |
| To Work Area | Lets you show or hide the work area's ruler and grid. |
| To Selection | |
| Options [View] > | |
| Ruler | |
| Grid | |
| Finish | Finishes the creation procedure |

4. To complete the polygon, click the right mouse button and select 'Finish (Edit)' from the context menu.

or

1. Place the cursor in the work area and click the right mouse button.
A context menu appears.
2. Select 'New ▶ Polygon'.
A line will be inserted, with one point fixed and one point freely positionable.
3. Continue as described in steps 2 to 4 in the section above.

The procedure for creating a graphics path is similar to that for creating a polygon. To edit or change a graphics path during creation, additional functions are available via the right mouse button's context menu and (partly) via the 'Graphics Path' toolbar:

| Function | Description |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New Point | Adds another point |
| Append To Path | Resumes successive creation of a path, if this had been interrupted (see 'Release Path' below) |
| Open Path | Opens a closed path |
| Delete | Deletes the last fixed point |
| Unround Corner | Restores the round corner of the selected edge to angular shape, if it has been rounded before with 'Round Corner' (see Altering the Marking Object's Shape). |
| Close Path | Closes the open path (required for filling) |
| Reverse Points | Lets you change the point to continue creating the polygon or graphics path: from the last point to the start point or reverse. |
| Release Path | Interrupts successive creations of a path; points can be edited and new points can be inserted. |
| Polygon Mode | Applies the polygon mode. |
| Arc Modes > | Applies the selected arc mode. |
| Three Point Arc Mode | Defines the arc by three points. |
| Arc Quadrant Mode (CW) | Defines the arc by a quadratic function (clockwise). |
| Arc Quadrant Mode (CCW) | Defines the arc by a quadratic function (counterclockwise). |
| Arc Center Mode | Defines the arc by center point, radius and angle extent. |
| Bezier Curve Modes > | Applies the selected bezier curve mode. |
| Bezier Points Mode | Defines a parametric points curve mode. |
| Bezier Curves Mode | Defines a parametric curves curve mode. |
| Expand | Fits a curve by a polygon in single vectors (see Expanding Marking Objects). |
| Zoom > | Lets you execute zoom functions (description, see Using the Zoom Functions). |
| In | |
| Out | |
| Position | |
| To All Graphics | |
| To Work Area | |
| To Selection | |
| Finish | Finishes the creation procedure |

The inserted polygon or graphics path can be edited afterward [manually](#) or via the [Property Window](#).

16.6 Inserting Text

To create static text, a placeholder or frame is inserted first, then the placeholder gets overwritten / the frame gets filled with the desired text. Static text, which is displayed in the work area, can be selected in two different formats:

- Single-line **Font Text** uses properties of a font – the proportions are fixed. Therefore, the font text always retains its shape and aspect ratio when moved, rotated or scaled manually. More extensive editing – e.g. resolving the shape or manipulating single points – is not possible.
Multiline font text can be created by using the **Text Box**. The text-enclosing rectangle in the work area can be edited manually (position, rotation, size) – but without affecting the font text's size.
- **Vector Text** (always single-line) is fully editable. Each character can be edited separately by manipulating single points.

NOTE:



The textual content will be defined during creation (see below) or can be edited later in the graphics parameters (see [Font Text](#), [Text Box](#) and [Vector Text](#)).

Font text and text box content can be modified later very easily:

- double click on the text (in the work area or Job Explorer) to open a dialog box.
- Modify the text content and confirm with {OK}.

NOTE:



Non regular fonts (which doesn't support the 'regular' attribute) can be used. If such a font is chosen, laserDESK checks the available attributes and selects an available one automatically for creation. If later a non supported attribute is activated, the font is switched to GenericSansSerif. *Undo* will roll back this action and restores the original font.

NOTE:



In contrast to static text, text can be imported from external text files (see [Inserting Variable Objects](#)).

NOTE:



This topic describes how to create text in standard font format. Additionally, laserDESK lets you create text in centerline fonts format (see [Creating Centerline Font](#)).

To insert **single-line text**, proceed as follows:

1. Select 'Font Text' or 'Vector Text' from the [Toolbox](#) and – while keeping the mouse button pressed – drag it into the work area.
A text element of predefined dimensions gets inserted and the placeholder "<Text>" (default setting) appears.
2. Continue with step 3 in the section below.

or

1. Select
 - 'Font Text' or 'Vector Text' from the '[Tools](#)\Marking Objects ▶ ' menu
 - or 'Text ▾ Font Text' or 'Text ▾ Vector Text' from the '[Marking Objects](#)' toolbar.A cruciform cursor appears.
2. Click on a desired position in the work area:
A text element in predefined dimensions gets inserted, the "<Text>" placeholder appears.
3. Enter the desired text.
4. When you have completed text input, click the right mouse button and select 'Finish' from the context menu.

or

1. Place the cursor in the work area and click the right mouse button.
A [Context Menu](#) appears.
2. Select 'New ▶ Font Text' or 'New ▶ Vector Text'.
A placeholder "<Text>" gets inserted, which can be stretched directly to the desired dimensions via the mouse.

3. Click the left mouse button.
The placeholder changes color.
4. Continue with step 3 in the section above.

To insert **multi-line font text**, proceed as follows:

1. Select 'Text Box' from the [Toolbox](#) and – while keeping the mouse button pressed – drag it into the work area.
The 'Text Box' dialog box appears.
2. Continue with step 3 in the section below.

or

1. Select
 - 'Text Box' from the [Tools](#)\Marking Objects ▶ ' menu
 - or 'Text ▾ Text Box' from the '[Marking Objects](#)' toolbar.A cruciform cursor appears.
2. Click on a desired position in the work area and – while keeping the mouse button pressed – draw a frame.
The frame will be enlarged in the drawing direction.
Pressing the <Ctrl> key simultaneously, the frame will be enlarged relative to its center point.
Upon releasing the mouse button, the 'Text Box' dialog box appears.
3. Enter the desired text.
4. When you have completed text input, confirm with {OK}.
5. Click the left mouse button to finish.

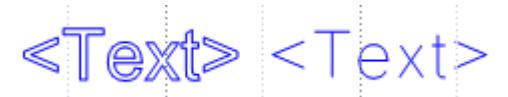
or

1. Place the cursor in the work area and click the right mouse button.
A [Context Menu](#) appears.
2. Select 'New ▶ Text Box'.
A rectangle/frame gets inserted, which can be stretched directly to the desired dimensions via the mouse.
3. Click the left mouse button.
The 'Text Box' dialog box appears.
4. Continue with step 3 in the section above.

Afterward, font text (single- and multi-line) can be changed in a dialog box and vector text can be edited [manually](#). Font and vector text can be edited via the [Property Window](#).

16.7 Creating a Centerline Font

TrueType fonts are defined by a closed outline (type 'Area'). For many applications, a centerline font is advantageous (e.g. it shortens the marking time). laserDESK lets you easily reduce TrueType fonts to centerline fonts – the single line will be placed in the center of the source font:



Centerline fonts are handled as an attribute like bold or italic. Just click the Centerline button to assign this attribute to the text object. Centerline fonts will be created automatically when creating or editing any kind of text object in font or vector format: single line text, multi line text (text box), variable objects (date/time, serial number, import text). The text objects can be converted directly by clicking a respective button or via parameter setting in the Property Window. Additionally, a centerline font can be created in the Library Explorer via the right mouse button's context menu.

The default for automatically created centerline fonts includes all characters A-Z, a-z and numbers 0-9. If other characters are used in the text they will be automatically created and added. If the centerline font gets created in the Library Explorer, the range of created characters can be defined. Thus it is possible to create centerline characters for all available Unicode characters including Chinese or Japanese glyphs.

laserDESK saves the centerline font in the local job library. Later, the font can be exported to the global Marking Library (using and exchanging fonts is described in [Library Explorer / Marking Library](#)). The centerline font can be edited in the Library Explorer, e.g. if you want to improve the conversion result to your requirements. The centerline characters will be edited like any other marking object (see [Editing Fonts](#)).

If a character of a centerline font is created and stored in the job library, it can be used in all job objects. During execution of the job, the stored characters are used and no further calculation is necessary.

To create a centerline font in the Library Explorer, see [Creating a new Font](#).

To create a centerline font while creating or editing text, proceed as follows:

1. Before creating a text object, select the desired font and click (activate) the {Centerline} button in the '[Text](#)' toolbar.
The 'Font' dialog box appears, asking for confirmation to create a center line font.
2. Confirm with {Yes}.
3. Create the text as described in [Inserting Text](#).
The text will be converted to center line font.
The new font will be saved in the job library.

or

1. Create the text as described in [Inserting Text](#).
2. Select the text object (see [Selecting Marking Objects for Editing](#)).
3. Click (activate) the {Centerline} button in the '[Text](#)' toolbar.
The 'Font' dialog box appears, asking for confirmation to create a center line font.
4. Confirm with {Yes}.
The text will be converted to a center line font.
The new font will be saved in the job library.

or

1. Create the text as described in [Inserting Text](#).
2. Select the text object (see [Selecting Marking Objects for Editing](#)).
3. Select the graphic parameter 'Centerline' in the [Property Window](#).
4. Select 'True' in the corresponding selection field.
The text will be converted directly to a center line font.
The new font will be saved in the job library.

If desired, edit the individual characters of the new font (see [Editing Fonts](#)).



NOTE:

Once a centerline font has been created, the text object will be automatically created with centerline characters when you select {Centerline}.

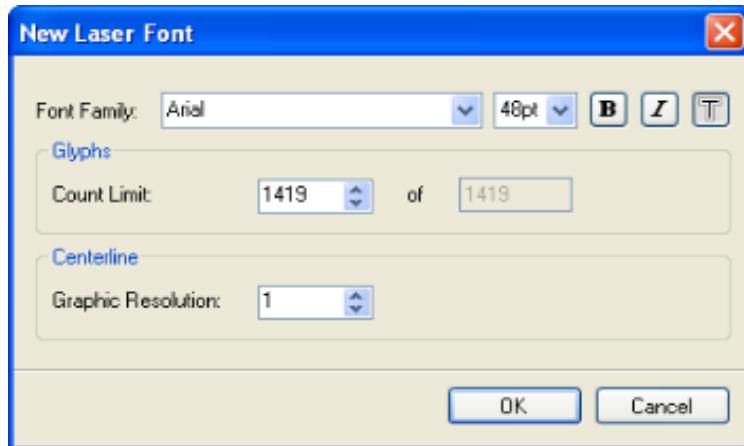
16.8 Creating a New Font

laserDESK not only offers a huge number of fonts, it also lets you edit fonts to modify characters based on your ideas or requirements. Because standard TrueType fonts can't be modified, new fonts must be created. First, these fonts will be automatically saved in the local job library and can be exported later to the global Marking Library. In a second step, each character of the saved fonts can be edited.

laserDESK provides two options to create new fonts:

- Outline and centerline fonts can be created inside the local job library or the global Marking Library as described below.
- Centerline fonts only can be created when creating or editing text (see [Creating a Centerline Font](#)).

Inside the library, a new font will be created by using the 'New Laser Font' dialog box:



| Function | Description |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Font Family: | |
| Font Style | Click the  button to open a drop-down list with a large number of font styles. Select a desired font style. |
| Font Size | Click the  button to open a drop-down list offering a wide range of font sizes (8pt - 78pt). Select a desired font size. Alternatively, the font size can be entered directly. In this case, sizes smaller than 8pt or greater than 78pt are possible. NOTE: Larger font sizes are more accurate, but need a longer processing time for creating centerline fonts. |
| {Bold} | Boldface can be set or reset. |
| {Italic} | Italic can be set or reset. |
| {Centerline} | Centerline can be set or reset. |
| Glyphs | |
| Count Limit | Lets you limit the number of characters to be created. By default, the total number of characters will be created. Enter the desired value in the input field or use the arrow buttons. |
| Centerline | |
| Graphic Resolution | Lets you define the graphic resolution of the centerline font. This factor is used for calculating the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) the curve fitting. Only available if {Centerline} (see above) is activated. |

To create a new font, proceed as follows:

1. Select the 'Library Explorer' window inside a job
or
select 'Open ▶ Marking Library' in the '[File](#)' menu.
The Library Explorer's tree shows "Library" at the top.
2. Place the cursor in the Library Explorer and press the right mouse button.
A context menu appears.
3. Select 'New ▶ Font'.
The 'New Laser Font' dialog box appears (see figure above).
4. Select the font family and font size; if desired activate {Bold}, {Italic} or {T} (Centerline).
5. If desired, limit the number of characters to be created.
6. If available (with centerline only), define the graphic resolution.
7. Click {OK} to confirm your settings.
The new font will be created and listed below 'Fonts' in the library explorer.

To edit the individual characters of the new font, see [Editing Fonts](#).

To export fonts to the global Marking Library or import them into a local job library, see [Library Explorer / Marking Library](#).



NOTE:

Once a font has been created (and the characters have been modified), the text/characters will be displayed accordingly when selecting this font.

16.9 Creating Groups, Sets or Variants

Some objects of the laserDESK software let you collect multiple objects:

- A **group** can collect multiple marking objects and control elements. The marking objects keep their individual parameters.
- A **graphics set** is similar to a group, but has no individual parameters. Therefore, it is possible to sort all the objects inside a graphics set. If a single object needs individual parameters, it has to be ungrouped from the graphics set. Characters of a text object are special graphics sets.
- A **graphics paths (set)** is similar to a graphics set, but the marking objects include only the graphic information without any parameter set, i.e. the objects inside a graphics paths (set) can't be individually parameterized. Filling paths are special graphics paths (sets).
(The difference between a graphics paths (set) and a graphics path is that the graphics paths (set) can consist of several independent individual graphic elements whereas a graphics path is a collection of connected curves or lines which represent one path.)
- A **tile set** lets you mark a workpiece in several steps if (e.g.) the size of a workpiece exceeds the dimensions of the laser scan system's marking area. Therefore, the marking object(s) will be divided into several tiles. The marking objects lose their individual parameters and get the tile set parameters.
- A **variant** is a partial job (subroutine) within a (main) job. It can include marking objects and control elements, which keep their individual parameters. A variant requires a control node which defines a starting condition for this partial job. Therefore, each variant needs to be assigned a bit pattern.

The procedure to create a collecting object (group, graphics paths (set), graphics set, tile set, variant) is the same for all. You first select the collecting object and then insert the marking objects (and, if applicable, the control elements).

Alternatively, it is possible to create a collecting object by grouping several already created marking objects (and control elements).

NOTE:

When creating a collecting object, the following restrictions apply for inserting objects:

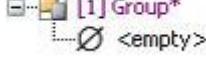
- Generally, variants can't be inserted in any other object.
 - A graphics set can't comprise groups, graphics sets, tile sets, variable objects ('Date', 'Time', 'Serial Number', 'Import Text') or control elements.
 - A graphics paths (set) can't comprise groups, graphics paths (sets), graphics sets, and control elements.
 - A tile set can't comprise tile sets, variable objects ('Date', 'Time', 'Serial Number', 'Import Text') or control elements.
-

Creating a Group, Set or Variant

To insert a collecting object, proceed as follows:

1. Select
 - 'Group', 'Graphics Paths', 'Graphics Set' or 'Tile Set' from the '[Tools](#)\Marking Objects ▶' menu
 - or 'Variant' from the '[Tools](#)\Control Elements ▶' menu
 - or 'Group', 'Graphics Paths', 'Graphics Set' or 'Tile Set' from the '[Marking Objects](#)' toolbar
 - or 'Variant' in the '[Control Elements](#)' toolbar
 - or 'New ▶ Graphics Paths/Graphics Set/Group/Tile Set/Variant' via the right mouse button's [Context Menu](#).

The collecting object will be listed in the Job Explorer and below it '<empty>'.

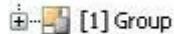


Inserted marking objects still in the work area are shown in light gray.

2. Insert one or multiple marking objects and (if applicable) control elements as described in [Inserting new Objects](#). In the Job Explorer, each marking object and control element is listed below the collecting object.

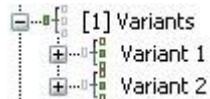
3. After inserting all marking objects and control elements, click the right mouse button and select 'Finish (Edit)' from the context menu.

In the Job Explorer, the collecting object is preceded with a '+':



NOTE:

If one or several variants are inserted into a job, these will be listed below the 'Variants' node:



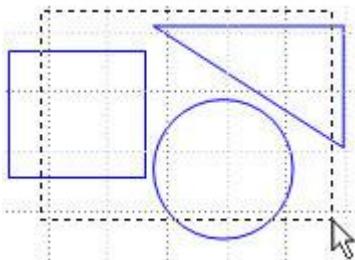
This node gets created automatically when a variant is inserted. All variants are always listed below this node, because laserDESK doesn't allow distribution of several variants across the tree .

NOTE:

After you've inserted variants into a job, you must define the 'Variant Bit Mask' in the [Graphics Parameters – Job](#) and the 'Bit Pattern' in the [Graphics Parameters – Variant](#). Otherwise the variants can't be distinguished and selected (see [How to Use Variants](#) for a detailed description).

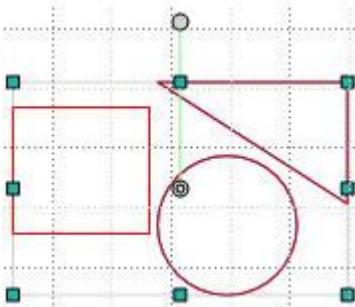
Grouping Several Marking Objects

1. To select several marking objects and (if applicable) control elements simultaneously, hold down the <Ctrl> key while consecutively clicking the shapes in the work area or the objects in the Job Explorer.
or
Click in the work area and – while keeping the mouse button pressed – drag a selection frame across several shapes.



Finally, release the mouse button.

The shapes change color and will be enclosed by one rectangle frame with support points for editing:



2. Select 'Grouping ▶ Group/Graphics Paths/Graphics Set/Tile Set/Variant' from the – ['Arrange'](#) menu
– or the right mouse button's [Context Menu](#).
or
Select 'Grouping ▶ Grouping To Group/Graphics Paths/Graphics Set/Tile Set/Variant' in the ['Arrange'](#) toolbar.
The marking objects will be grouped as a group, set or variant.
In the Job Explorer, the collecting object is preceded with a '+'.

Like other marking objects, the collecting object can be edited afterward [manually](#) or via the [Property Window](#).

16.10 Inserting Variable Objects

Date/time as well as serial number and import text are special marking objects embedded with a function that can change the information:

- The variable object '**Date,Time**' always updates the time. laserDESK lets you define the date/time format (e.g. "July 4, 2010 - 2:53 pm" or "14.12.2010 - 14:53") by using several format identifiers in the graphic parameters.
- The variable object '**Serial Number**' counts upwards or downwards with each marked object. A start and end value as well as an increment value can be set in the graphics parameters.
- Additional to static text, laserDESK allows to import an external text file. The file's text content will be assigned to the **Import Text** variable object via the definition of lines and columns to be done in the graphics parameters.



NOTE:

The file format for the imported text must be a Unicode text file.

Only the Unicode format ensure that all characters will be displayed correctly.

The variable objects can be selected in different formats:

- **Font Text Date/Time**, **Font Text Serial Number**, and **Import Font Text** behave like font text. The variable object always retains its shape and aspect ratio when moved, rotated or scaled manually. Furthermore, the variable object can't be edited manually.
- **Vector Text Date/Time**, **Vector Text Serial Number**, and **Import Vector Text** behave similarly, but unlike the font text objects, they don't retain their aspect ratio when edited manually.
- **Barcode Date/Time**, **Barcode Serial Number**, and **Import Barcode** display the date/time, serial numbers or import text in barcode format. Apart from that, their behavior is similar to the vector text objects.

The procedure for inserting a new variable object is very easy, followed by defining the functions in the property window.

To insert a new variable object, proceed as follows:

1. Select the required variable object ('Date/Time\Font Text' ... 'Import Text\Barcode') from the [Toolbox](#).
Continue with step 3 below.

or

1. Select
 - 'Marking Objects ▶ Date/Time ▶ '
 - or 'Marking Objects ▶ Serial Number ▶ '
 - or 'Marking Objects ▶ Import Text ▶ 'from the [Tools](#) menu or via the right mouse button's [Context Menu](#).
A list box appears.
2. Select
 - 'Font Text' or 'Vector Text' or 'Barcode'.
3. Continue with step 3 below.

or

1. Select 'Date/Time ▾', 'Serial Number ▾' or 'Import Text ▾' in the [Marking Objects](#) toolbar.
A list box appears.
2. Select the corresponding '...Font Text...' or '...Vector Text...' or '...Barcode...'.
3. Click on a desired position in the work area.
The variable object will be inserted and remains selected.
4. If desired, edit the settings of the embedded function via the [Graphic Parameters](#).
or
Click next to the marking object in the work area to finish the action.

The inserted variable object can be edited afterward [manually](#) or via the [Property Window](#).

16.11 Inserting Reference To Symbol

Marking objects or groups with marking objects, which will be used periodically (e.g. company logo, specific shape), can be saved as a master to the local library labeled as 'Symbol' (see Creating Symbols). New marking objects can then be inserted by 'Reference To Symbol'.



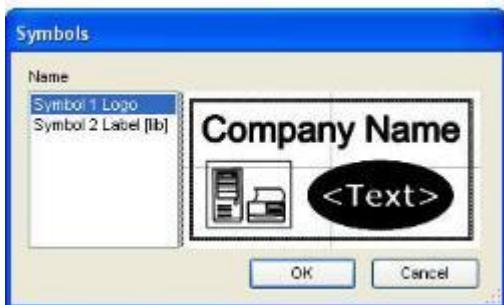
NOTE:

The marking object inserted in the work area by 'Reference To Symbol' is not a copy of the symbol in the library, it is a real reference. Modifying the library's symbol will change the referenced marking object in the work area!

To insert a marking object with reference to a symbol proceed as follows:

1. Select 'Reference To Symbol' from the
 - [Tools](#) [Marking Objects](#) ▶ ' menu
 - or [Marking Objects](#) toolbar.
orSelect 'Reference To Symbol' from the [Toolbox](#) and - keeping the mouse button pressed – drag it in the work area.
or
Select 'New ▶ Reference To Symbol' from the right mouse button's [Context Menu](#).

The dialog box 'Symbols' appears:



Symbols in the [Marking Library](#) are signed by the extension [lib].

2. Select a symbol in the column 'Name'.
The shape of the symbol will be shown in the field beside.
3. If necessary, select further symbols until you will find the desired one.
4. Click onto the button {OK} to confirm your selection.
The reference to symbol will be inserted in the work area and in the job explorer's tree.

16.12 Importing Pixel Images and Vector Graphics

laserDESK uses import filters that let users import pixel images and vector graphics in common formats. Importation is via dialog boxes that allow you to select the format and file and to make size and position adjustments. Alternatively, the pixel images and vector graphics can be inserted via the right mouse button's context menu, which lets you define the position and size of the image/graphics directly in the work area with the mouse.

Pixel images can be imported with the following formats:

- Bitmap (*.bmp)
- JPEG (*.jpg)
- Graphics Interchange Format (*.gif)
- Portable Networks Graphics (*.png)
- Tagged Image File (*.tif)
- from a scanner (*.twain)
- PCX Files (*.pcx)
- Truevision Targa (*.tga)



NOTE:

Inside laserDESK all imported pixel images – regardless of which format – are converted to bitmap images (bmp-Format).

Vector graphics can be imported in the following formats:

- Adobe Illustrator (*.ai)
- DXF (*.dxf)
- HPGL (*.plt)
- Scalable Vector Graphics (*.svg)

Associated **File Sets** can be imported both in vector and in bitmap format.

Importing Vector Graphics / Importing Files



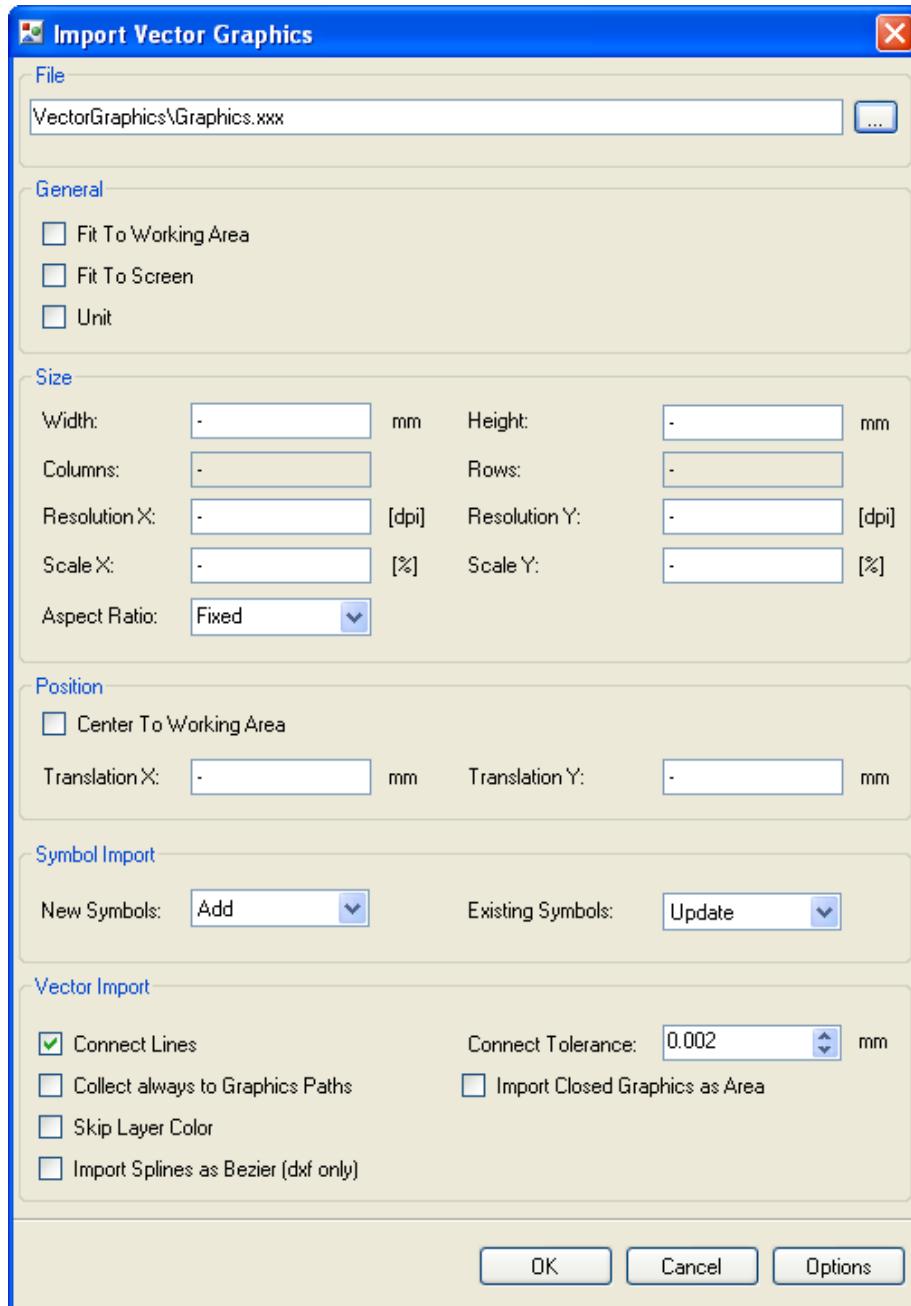
NOTE:

The procedure described below is the same for importing vector graphics and importing files. In addition to the vector graphics import, the file import lets you import pixel images to.

The import procedure will be described for both in this topic. Differences between vector graphics import and pixel image import will be indicated.

- You can import vector graphics via the 'Import Vector Graphics' dialog box, which appears automatically when you select 'Vector Graphics' from the 'Tools' menu or 'Marking Objects toolbar or when or when you select 'Vector Graphics' from the toolbox and drag it into the work area.
- You can import graphic files (vector graphics and pixel images) via the 'Import File' dialog box, which appears automatically when you select 'Import\File' from the 'File' menu.

The dialog box 'Import Vector Graphics' or 'Import File' lets you select the desired file and make size and position adjustments:



| Field | Description |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| File | <p>The  button helps you select the desired file. A (<i>Windows-standard</i>) dialog box appears.</p> <p>Selectable formats:</p> <ul style="list-style-type: none"> - graphic files: *.ai⁽¹⁾, *.dxf, *.plt, *.svg - image files: *.bmp, *.jpg, *.gif, *.pcx, *.png, *.tga, *.tif, *.twain <p>NOTE: laserDESK supports only the pure 'ai' format up to Adobe Illustrator Version 8.0. In higher versions, Adobe has extended the ai-Format to a pdf-Format without a need to change the extension 'ai' to 'pdf'. This format is not supported by laserDESK. SCANLAB recommends to use ai-Format 3.</p> |

| Field | Description |
|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General | |
| Fit To Working Area | If this checkboxes is activated, then the graphics will be fitted to the work area, |
| Fit To Screen | If this checkboxes is activated, then the graphics will be fitted to the screen. |
| Unit (vector graphics only!) | If this checkboxes is activated, the graphics will be opened by applying the selected unit to the file. In this case the user should know the file's units. |
| Activating one of the checkboxes above , all settings in the 'Size' field are disabled - except the "Aspect Ratio" selection field. | |
| NOTE: | It is recommended to deactivate the checkboxes to let the graphics/images in original size, else every file may be resized different. The desired size should be defined in the CAD-program the graphics/images were created. |
| Embed Image (pixel images only!) | If the checkbox is activated, then the image will be embedded in the job file. If the checkbox is deactivated, then the image will be referenced. Then deleting or changing the image will affect the job. Embedded images will increase the file size. |
| Size | Size can be defined via the input fields – 'Width/Height' (absolute [mm, cm, mil or in]; the units are set in View Parameter via the 'Options' window), – 'Scale X / Scale Y' (relative in [%]) or – (pixel images only!) 'Resolution X / Resolution Y' (in [dpi]). NOTE: It is recommended to maintain the proportions, else the files may be skewed. The aspect ratio can be set in the 'Aspect Ratio' selection field. Click the  button to select: – "Fixed": shape keeps aspect ratio; or – "Variable": shape doesn't keep aspect ratio; or – "1:1". |
| Position | If the 'Center to Working Area' checkbox is activated, then the graphics will be centered (and the input fields disabled, see below). The 'Translation X' and 'Translation Y' input fields serve to define an offset. |
| Symbol Import (vector graphics only!) | |
| New Symbols | If the vector graphics contains new symbols, you can define how to proceed with the symbols during import: – If "Add" is selected, then the new symbols will be inserted in the marking library automatically. – If "Expand" is selected, then all symbol data will be inserted and resolved. This mode is required for vector graphics with nested symbols. Click the  button to select "Add" or "Expand". |
| Existing Symbols | If the vector graphics contains existing symbols, you can define how to proceed with the symbols during import: – If "Skip" is selected, the vector graphics' symbol will be skipped and the existent symbol will be kept. – If "Update" is selected, the existent symbol will be updated with the data of the vector graphics' symbol. – If "Copy" is selected, the vector graphics' symbol will be saved with a new name. Click the  button to select "Skip", "Update" or "Copy". |
| Vector Import (vector graphics only!) | |
| Connect Lines | If the checkbox is activated, then the lines' end points within a defined tolerance (see below) will be connected automatically. This corresponds to the 'Connect' function (see Combining Two Marking Objects). |
| Connect Tolerance [mm] | Defines the maximum distance (in [mm]) of the lines' end points which will be connected, if 'Connect Lines' (see above) is activated. The first line which satisfies the condition will be connected. Enter the value directly in the input field or use the arrow buttons. |
| Collect always to Graphics Paths | If the checkbox is activated, then all graphics path objects will be imported as pure graphics objects – not as full marking objects. The graphics objects have no individual parameters and can't be modified individually (with the exception of point lists). This results in a faster import and reduces memory capacity problems. |
| Import Closed Graphics as Area | If the checkbox is activated, then all closed objects will be defined as 'Area' even if the objects are defined as 'Outline' inside the vector file. Thus these objects can be filled immediately. |

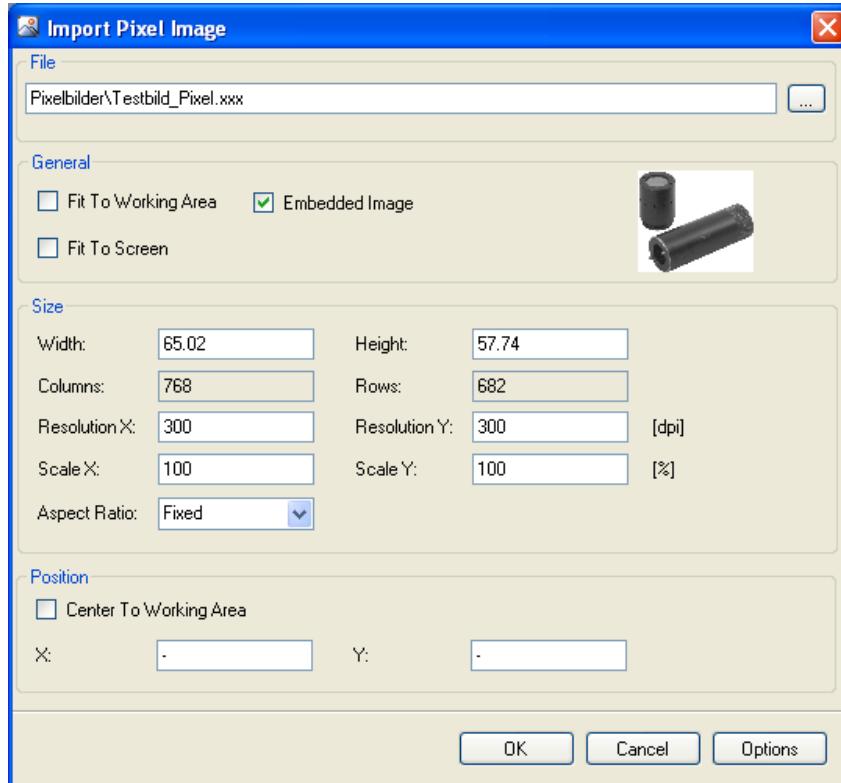
| Field | Description |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Skip Layer Color | If the checkbox is activated, then the respective colors of the layers will not be inherited. |
| Import Splines as Bezier (dxf only) | This checkbox is only usable for the import of dxf files. If the checkbox is activated, the splines will be approximated by Bezier curves. If it is not checked, the splines will be calculated using the graphic resolution defined in the ' Create ' parameters page in the 'Options' window and stored as polygons. (The 'Options' window can be opened directly with the {Options} button, see below). NOTE: The Bezier curve approximation has the advantage of saving disc space but - depending on the spline type - can be inaccurate. |
| {Options} | Clicking this button opens the ' Create ' parameters page in the 'Options' window to let you define required parameters (e.g. 'Graphic Resolution'). |

To import a vector graphics or file, proceed as follows:

1. Select 'Vector Graphics' from the '[Tools](#)' menu or '[Marking Objects](#)' toolbar.
or
Select 'Vector Graphics' from the [Toolbox](#) and – while keeping the mouse button pressed – drag it into the work area.
or
Select 'Import ▶ File' from the '[File](#)' menu.
The 'Import Vector Graphics / Import File' dialog box (see above) appears.
2. Click the  button in the 'File' field.
The (*Windows*-standard) 'Open' dialog box appears.
3. Select the desired vector graphics or pixel image.
If necessary, choose the desired file format in the 'File Type' selection field.
4. Confirm your selection with the {Open} button.
The selected path/file will be shown.
5. Define the size and the position of the graphics/image:
– Activate/deactivate the appropriate checkboxes,
– enter the desired values in the corresponding input fields.
6. Define the symbol and vector import settings (vector graphics only!).
– Select the required settings in the selection fields,
– activate or deactivate the appropriate checkboxes.
7. To confirm your settings, click the {OK} button.
The graphics/image will be inserted into the work area.

Importing Pixel Images

Importation of pixel images is via the 'Import Pixel Image' dialog box. This dialog box appears automatically when you select 'Pixel Image' from the 'Tools' menu or 'Marking Objects' toolbar, or when you select 'Pixel Image' in the toolbox and drag it into the work area. The dialog box lets you select the desired file and make size and position adjustments:



| Field | Description |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| File | The <input type="button" value="..."/> button lets you select the desired file. A (Windows-standard) 'Open' dialog box appears. Selectable formats: *.bmp, *.jpg, *.gif, *.pcx, *.png, *.tga, *.tif, *.twain. |
| General | |
| Fit To Working Area | If the checkbox is activated, then the image will be fitted into the work area or screen. In this case, all settings in the 'Size' field are disabled - except 'Keep Aspect Ratio'. |
| Fit To Screen | If the checkbox is activated, then the image will be fitted into the screen. In this case, all settings in the 'Size' field are disabled - except 'Keep Aspect Ratio'. |
| Embed Image | If the checkbox is activated, then the image will be embedded in the job file. If the checkbox is deactivated, then the image will be referenced. Then deleting or changing the image will affect the job. Embedded images will increase the file size. |
| Size | The size can be defined via the input fields - 'Width/Height' (absolute in [mm, cm, mil or in]; the units will be set in View Parameter via the 'Options' window) - 'Resolution X / Resolution Y' (in [dpi]) - or 'Scale X / Scale Y' (relative in [%]). The aspect ratio can be set in the 'Aspect Ratio' selection field. Click the <input type="button" value="▼"/> button to select: - "Fixed": shape keeps aspect ratio indefinitely; or - "Variable": shape doesn't keep aspect ratio indefinitely; or - "1:1". |
| Position | If the 'Center to Working Area' checkbox is activated, then the image will be centered (and the input fields disabled, see below). The 'Translation X' and 'Translation Y' input fields serve to define an offset. |
| {Options} | Clicking this button opens the ' Create ' parameters in the 'Options' window to let you define required parameters (e.g. 'Graphic Resolution'). |

To import a pixel image, proceed as follows:

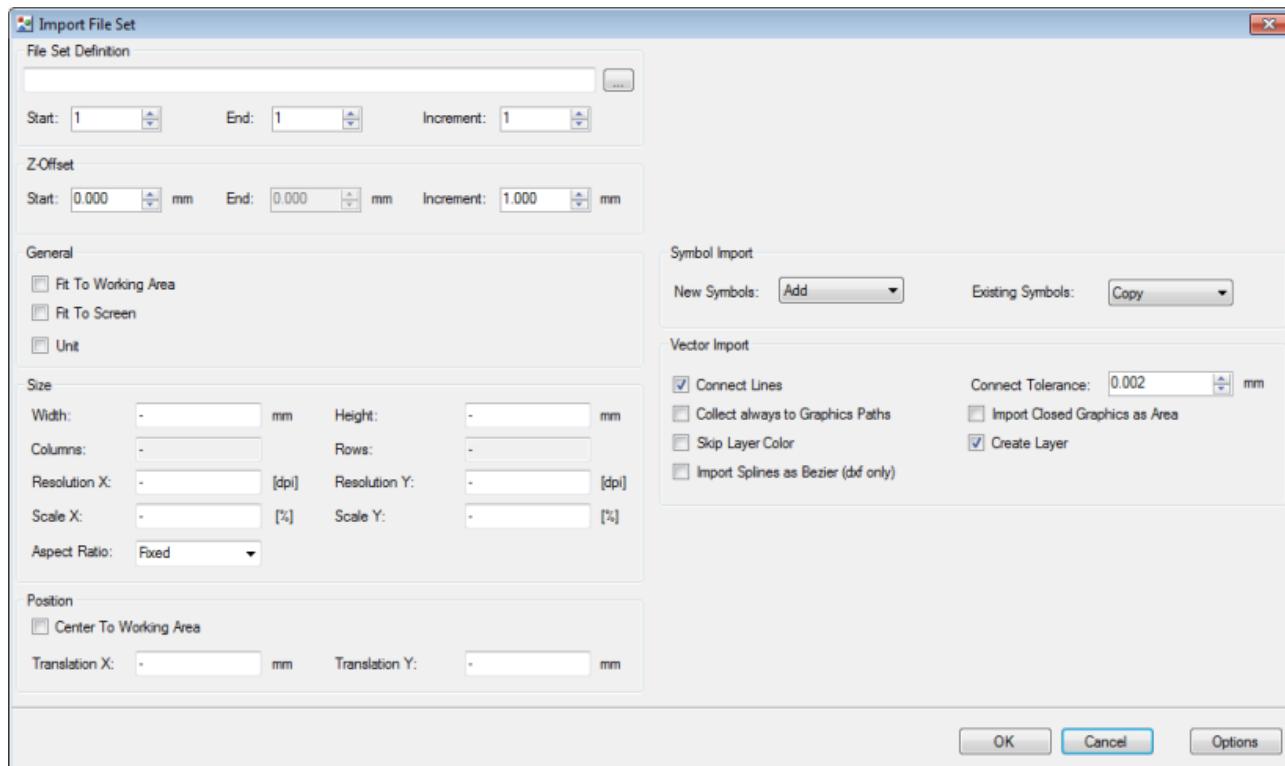
1. Select 'Pixel Image' from the '[Tools](#)' menu or '[Marking Objects](#)' toolbar.
or
Select 'Pixel Image' from the [Toolbox](#) and – while keeping the mouse button pressed – drag it into the work area. The 'Import Pixel Image' dialog box appears (see above).
2. Click the  button in the 'File' field.
The (*Windows* -standard) 'Open' dialog box appears.
3. Select the desired pixel image.
If necessary, select the desired file format via the 'File Type' selection field.
4. Confirm your selection with the {Open} button.
The selected path/file will be displayed.
5. Define the size and position of the pixel image:
– Enter the desired values in the corresponding input fields,
– activate/deactivate the appropriate checkboxes.
6. To confirm your settings, click the {OK} button.
The pixel image will be inserted into the work area.

Importing File Sets

The importing of file sets allows you to arrange associated files (vector graphics or pixel images) one upon the other in the z-direction. This function is very beneficial when files are to be arranged for 2.5D applications (e.g. deep engraving) and every file defines one layer. The required [Z-Focus Control Elements](#) between the several files/objects will be inserted automatically in the Job Explorer.

The file names need a special syntax. They consist of a constant string and an increasing number (e.g. xxxxx001.dxf – xxxxx100.dxf).

The 'Import File Set' dialog box lets you select the desired files, define the z-offset and make size and position adjustments:



| Field | Description |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| File Set Definition | |
| [Selection field] | <p>The  button helps you select the desired files. A (Windows-standard) dialog box appears. Selectable formats: 'All Files', 'All Graphic Files', 'All Image Files' and each file format separately. Select the first file of the desired file set.</p> |
| Start | <p>Defines the first file to be imported. Enter the value directly in the input field or use the arrow buttons. NOTE: <ul style="list-style-type: none"> – The number must be a component of an available file name. – All file names of one file set must have the same syntax (e.g. "Name_1", "Name_2", "Name_3", ... or e.g. "01_name", "02_name", "03_name", ...). – Only ascending order is possible. </p> |
| End | <p>Defines the last file to be imported. Enter the value directly in the input field or use the arrow buttons. NOTE: <ul style="list-style-type: none"> – The number must be a component of an available file name. – All file names of one file set must have the same syntax (see above). </p> |

| Field | Description |
|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increment | <p>Defines the increment inside the file set. Enter the value directly in the input field or use the arrow buttons: – 1: all files (within the start and end file, see above) will be imported – 2: every second file will be imported – 3: every third file will be imported ...</p> |
| Z-Offset | <p>Start</p> <p>Defines the start file's position in the z-direction. Positive and negative values are possible. <u>Enter the value directly in the input field or use the arrow buttons.</u></p> <p>End</p> <p>Information field, not editable. Shows the end file's position in the z-direction.</p> <p>Increment</p> <p>Defines the distance between the several files in the z-direction (absolute [mm, cm, mil or in]; the units are set in View Parameter via the 'Options' window). Positive and negative values are possible. Enter the value directly in the input field or use the arrow buttons.</p> <p>NOTE: The increment must be defined such, that the maximum focus shift in the z direction of your focusing unit will not be exceeded!</p> |
| General | <p>Fit To Working Area</p> <p>If this checkbox is activated, then the graphics will be fitted to the work area.</p> <p>Fit To Screen</p> <p>If this checkbox is activated, then the graphics will be fitted to the screen.</p> <p>Unit (vector graphics only!)</p> <p>If this checkbox is activated, then the graphics will be opened by applying the units of the file. In this case the user should know the file's units</p> |
| Activating one of the checkboxes above disables all settings in the 'Size' field – except the "Aspect Ratio" selection field. | |
| NOTE: | We recommend deactivating the checkboxes to keep the graphics/images in their original size, otherwise every file may be resized differently. The desired size should be defined in the program in which the graphics/images were created. |
| Embed Image (pixel images only!) | <p>If the checkbox is activated, then the image will be embedded in the job file. If the checkbox is deactivated, then the image will be referenced. Embedded images will increase the file size.</p> |
| Size | <p>Size can be defined via the input fields: – 'Width/Height' (absolute [mm, cm, mil or in]; the units are set in View Parameter via the 'Options' window), – 'Scale X / Scale Y' (relative in [%]) or – (for pixel images only) 'Resolution X / Resolution Y' (in [dpi]).</p> <p>NOTE: We recommend maintaining the proportions, otherwise the files may be skewed. The aspect ratio can be set in the 'Aspect Ratio' selection field. Click the  button to select: – "Fixed": shape keeps aspect ratio indefinitely; or – "Variable": shape doesn't keep aspect ratio indefinitely; or – "1:1".</p> |
| Position | <p>If the 'Center to Working Area' checkbox is activated, then the graphics will be centered (and these input fields are disabled, see below). The 'X' and 'Y' input fields serve to define an offset. Enter the values into the input fields.</p> |
| Symbol Import (vector graphics only!) | <p>New Symbols</p> <p>If the vector graphics contain new symbols, you can define how to proceed with the symbols during import: – If "Add" is selected, then the new symbols will be inserted in the marking library automatically. – If "Expand" is selected, then all symbol data will be inserted and resolved. This mode is required for vector graphics with nested symbols. Click the  button to select "Add" or "Expand".</p> <p>Existing Symbols</p> <p>If the vector graphics contain existing symbols, you can define how to proceed with the symbols during import: – If "Skip" is selected, the vector graphics' symbol will be skipped and the existing symbol will be kept and used. – If "Update" is selected, the existing symbol will be updated with the data of the vector graphics' symbol. – If "Copy" is selected, the vector graphics' symbol will be saved with a new name. Click the  button to select "Skip", "Update" or "Copy".</p> |

| Field | Description |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vector Import (vector graphics only!) | |
| Connect Lines | If the checkbox is activated, then the lines' end points within a defined tolerance (see below) will be connected automatically. This corresponds to the 'Connect' function (see Combining Two Marking Objects). |
| Connect Tolerance | Defines the maximum distance of the lines' end points which will be connected if 'Connect Lines' (see above) is activated. Enter the value directly in the input field or use the arrow buttons. |
| Collect always to Graphics Paths | If the checkbox is activated, then all graphics path objects will be imported as pure graphics objects – not as full marking objects. The graphics objects have no individual parameters and can't be modified individually (with the exception of point lists). This results in a faster import and reduces memory capacity constraints. |
| Import Closed Graphics as Area | If the checkbox is activated, then all closed objects will be defined as 'Area' even if the objects are defined as 'Outline' inside the vector file. Thus, these objects can be filled immediately. |
| Skip Layer Color | If the checkbox is activated, then the respective colors of the layers will not be inherited. |
| Create Layer | If activated, the layer information inside the files (see Layers Window) is evaluated and assigned. |
| Import Splines as Bezier (dxf only) | This checkbox is only usable for the import of dxf files. If the checkbox is activated, the splines will be calculated accurately or approximated by Bezier curves. The calculation will be executed with the graphic resolution defined in the ' Create ' parameters in the 'Options' window. (The 'Options' window can be opened directly with the {Options} button, see below). NOTE: The Bezier curve approximation has the advantage of saving disc space but can be - depending on the spline type - inaccurate. |
| {Options} | Clicking this button opens the ' Create ' parameters in the 'Options' window to let you define required parameters (e.g. 'Graphic Resolution'). |

To import a file set, proceed as follows:

1. Select 'Import ▶ File Set...' from the '[File](#)' menu.
The 'Import File' dialog box (see above) appears.
2. Click the  button in the 'File Set Definition' selection field.
The (*Windows*-standard) 'Open' dialog box appears.
3. Select one of the desired files.
If necessary, choose the desired file format in the 'File Type' selection field.
4. Confirm your selection with the {Open} button.
The selected path/file will be shown.
5. Define the file set's first and last file and the increment by selecting the respective values in the 'Start', 'End', and 'Increment' selection fields.
6. Define the z-offset by selecting the respective values in the 'Start' and 'Increment' selection fields.
Make sure not to exceed the maximum focus shift of your scan system.
7. Define the size and position of the vector graphics:
– activate/deactivate the appropriate checkboxes,
– enter the desired values in the corresponding input fields.
8. Define the symbol and vector import settings (vector graphics only!):
– activate or deactivate the appropriate checkboxes,
– select the desired settings in the selection fields.
9. To confirm your settings, click the {OK} button.
The vector graphics will be inserted into the work area.

Inserting Pixel Images or Vector Graphics

Pixel image or vector graphics insertion via the toolbox or the right mouse button's context menu is different from importing a pixel image or vector graphics. You have to first define the position and size of the image/graphics in the work area, before selecting the image/graphics via a (*Windows*-standard) dialog box. Pixel images with bmp, jpg, gif, pcx, png, tag, tif or twain format and vector graphics with ai, dxf, plt or svg format can be inserted.

NOTE:

laserDESK supports only the pure 'ai' format up to Adobe Illustrator Version 8.0.

In higher versions, Adobe has extended the ai-Format to a pdf-Format without a need to change the extension 'ai' to 'pdf'. This format is not supported by laserDESK.

SCANLAB commands to use ai-Format 3.

To insert a pixel image or vector graphics proceed as follows:

1. Click 'Pixel Image' or 'Vector Graphics' in the [toolbox](#).

A cruciform cursor appears.

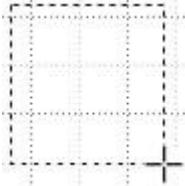


2. Click a desired position in the work area and – while keeping the mouse button pressed – draw a rectangle.
When the rectangle reaches the desired dimensions, release the mouse button.
The (*Windows*-standard) 'Open' dialog box appears (see figure above).
3. Continue with step 3 in the section below.

or

1. Select 'New ▶ Pixel Image' or 'New ▶ Vector Graphics' via the right mouse button's [Context Menu](#).

A frame will be inserted, which can be stretched to the desired size with the cruciform cursor.



2. When the rectangle reaches the desired dimensions, click the left mouse button.
The (*Windows*-standard) 'Open' dialog box appears.
3. Select the desired pixel image or vector graphics.
If necessary, choose the desired file format in the 'File Type' selection field.
4. Click the {Open} button.

The selected pixel image or vector graphics will be inserted into the work area.



NOTE:

The GUI settings (see '[Edit Parameters](#)') determine whether the inserted image/graphics will keep its aspect ratio.

16.13 Inserting a Background Image

laserDESK can display background images, created with SCANLAB's *SCANalign* vision solution. For this purpose, it is necessary, that *SCANalign* has been configured and an appropriate vision job has been created.

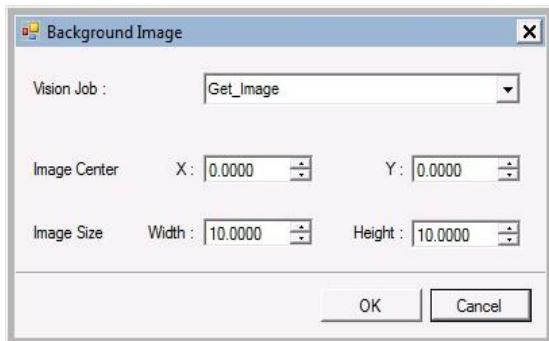


NOTE:

How to create a vision job with *SCANalign* is described in the *SCANalign* documentation.

How to use laserDESK together with the *SCANalign* vision solution is described in [Inserting a Vision System Control Element](#).

The 'Background Image' dialog box lets you define the size and the position of the background image in the work area.



To define a background image, proceed as follows:

1. Select 'Background Image' from the '[Tools](#)' menu.
The 'Background Image' dialog box appears.
The default vision job (Get_Image) is indicated in the Vision Job selection field.
2. If desired, select another Vision Job in the corresponding selection field.
Clicking the select button, a drop-down list with all available vision jobs is shown.
3. Enter the desired values for the image center in the fields 'X:' and 'Y:' or use the arrow buttons.
4. Enter the desired values for the image size in the fields 'Width:' and 'Height:' or use the arrow buttons.
5. Confirm your entries with {OK}.
The desired background image will be displayed.
The 'Background Image' dialog box disappears.

16.14 Inserting Control Elements

Analog or digital control elements serve to control the marking process. Input control elements serve to start a marking process via an external control signal. Output control elements serve to regulate the program flow between a job's marking objects and an external system via signal outputs (e.g. for triggering a conveyor system). The parameters or signal mode depend on the control element. The values or settings of the respective control mode are defined via the property window (graphic parameters).

- [Digital Input](#): digital input signal [bit pattern]
- [Digital Output](#): digital output signal [bit pattern]
- [Analog Output](#): analog output signal [V]
- [Pulse Output](#): pulse length [ms]
- [Timer Delay](#): waiting time [ms]

Control elements get inserted into the Job Explorer's tree. Depending on their position in the tree, control elements can control a complete job or a job sequence. You can change their position in the tree arbitrarily.

NOTE:

To insert a variant control element, see [Creating Groups, Sets or Variants](#).

To insert a serial communication control element, see [Inserting a Serial Communication Control Element](#).

To insert a motor control element, see [Inserting a Motor Control Element](#).

To insert a z-focus control element, see [Inserting a Z-Focus Control Element](#).

To insert a vision system control element, see [Inserting a Vision System Control Element](#).

To insert a laser control element, see [Inserting a Laser Control Element](#).

To insert a wait for encoder control element, see [Inserting a Wait For Encoder Control Element](#).

To insert protocol and timer nodes, see [Inserting Protocol and Timer Nodes](#).

If the Processing-on-the-fly (POF) option is enabled on the RTC5 or RTC6 PC interface board enabled, the RTC supports processing of parts in motion (e.g. parts on a conveyor belt or rotating plate), as well as stationary parts with a moving scan system (e.g. via a robot arm). To adjust laser scan processes to the current workpiece position, the position of the workpiece relative to the scan system can be detected with the RTC by counting encoder signals (for detailed description, please refer to the 'Processing-on-the-fly' chapter in the [RTC5 Manual](#)).

To insert a control elements, proceed as follows:

1. Select the desired control element from the
 - [Tools](#)\Control Elements ▶ ' menu
 - or [Control Elements](#) toolbar.
orSelect the desired control element from the [Toolbox](#) and – while keeping the mouse button pressed – drag the cursor into the work area.

The control element will be inserted automatically into the Job Explorer's tree.

To change the control element's position in the tree (and thus the program flow) proceed as follows:

1. Select the desired control element in the tree.
It will be highlighted.
2. To move the control element to the desired position
 - simply move the control element up or down via the cursor
 - or click the right mouse button and select 'Sequencing ▶ ...' in the [Context Menu](#)
 - or use the {Sequence ...} buttons in the '[Arrange](#)' toolbar.

NOTE:

To define the control elements' input or output modes, see [Graphic Parameters – Overview](#).

When defining the control elements' signal input or output observe the pin assignment of the RTC board (see [Connecting the Laser to the RTC5 or RTC6 PC Interface Board](#))

Inserting a Serial Communication Control Element

The serial communication control element is a flexible tool, which serves to interrupt the RTC5 or RTC6 list execution for implementing actions like axes control commands, PLC commands or changing laser parameters.

To insert a serial communication control element, proceed as follows:

1. Select 'Serial Communication' from the
 - ['Tools'Control Elements ▶'](#) menu
 - or ['Control Elements'](#) toolbar.
 - or
 - Select 'Serial Communication' from the [Toolbox](#) and – while keeping the mouse button pressed – drag the cursor into the work area.
- The control element will be inserted automatically into the Job Explorer's tree.

To change the serial communication control element's position in the tree proceed as follows:

1. Select the desired control element in the tree.
It will be highlighted.
2. To move the control element to the desired position
 - simply move the control element up or down via the cursor
 - or click the right mouse button and select 'Sequencing ▶ ...' in the [Context Menu](#)
 - or use the {Sequence ...} buttons in the ['Arrange'](#) toolbar.



NOTE:

To define the serial communication control element's parameters, see [Graphic Parameters – Serial Communication](#).

Inserting a Motor Control Element

laserDESK can command motor (axis) controllers for different purposes, especially for moving or rotating parts. This movement can be included into the job execution to be executed between different marking processes without interaction of another control device like a PLC. The motor control element is used to execute this task.

To insert a motor control element, proceed as follows:

1. Select 'Laser Control' from the
 - ['Tools'Control Elements ▶'](#) menu
 - or ['Control Elements'](#) toolbar.
 - or
 - Select 'Motor Control' from the [Toolbox](#) and – while keeping the mouse button pressed – drag the cursor into the work area.
- The control element will be inserted automatically into the Job Explorer's tree.

To change the motor control element's position in the tree proceed as follows:

1. Select the desired control element in the tree.
It will be highlighted.
2. To move the control element to the desired position
 - simply move the control element up or down via the cursor
 - or click the right mouse button and select 'Sequencing ▶ ...' in the [Context Menu](#)
 - or use the {Sequence ...} buttons in the ['Arrange'](#) toolbar.



NOTE:

To define the motor control element, see [Graphic Parameters – Motor Control](#).

Inserting a Z-Focus Control Element

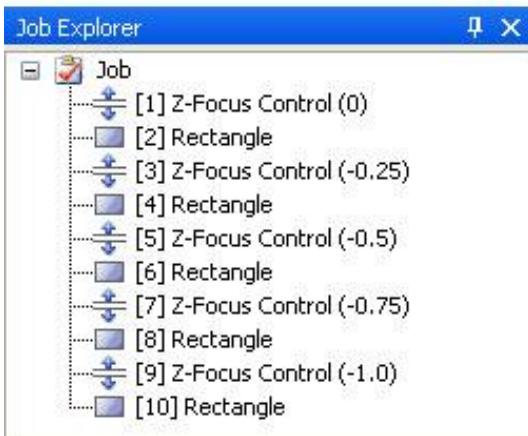
A 3-axis scan system with a dynamic focusing unit allows you to focus the laser beam in the z direction. The z-focus control element serves to control a varioSCAN and thus to focus the laser beam in a defined z position. With the z-focus control element, you can implement 2.5D applications, e.g. deep engraving.

NOTE:

Z-focus control is only possible if the 3D option is enabled on the RTC5 or RTC6 PC interface board (see 'Controlling a 3-Axis Scan System (optional)' in the [RTC5 Manual](#)) and a 3D correction file (D3_nnn.ct5) is used (see 'Correction File' parameter in [Setting 'Optics' Parameters](#)).

The z position set with this control element remains active until changed by another z-focus control element. If a marking object (or several marking objects) should be marked in different levels (z positions), you must define the z position for each level:

- Create and edit the marking object(s).
- Copy and paste the desired number of marking object(s).
- Align the marking object(s) to each other.
- Insert the corresponding number of z-focus control elements.
- Align one z-focus control element in front of each object / group of objects (see figure below).
- Define the z position for each z-focus control element in the Properties Window.



NOTE:

After a job terminates, the dynamic focusing unit's diverging optic doesn't return to the neutral/zero position by itself. The most-recently-set z position remains active and thus in effect across-jobs. This can cause an unintended z-focus position when executing the next job.

When using a 3-axis scan system, we recommend always inserting a z-focus control element at the top of the Job Explorer and defining the z position (normally "0").

NOTE:

If you want to mark one or several marking objects in different levels as described above, it can be helpful to assign different layers to the marking objects to distinguish more easily between the objects (see parameter 'Layer' in the graphic parameters).

To insert a z-focus control element, proceed as follows:

1. Select 'Z-Focus Control' from the
 - [Tools](#)\Control Elements ▶ ' menu
 - or [Control Elements](#) toolbar.
 - or
- Select 'Z-Focus Control' from the [Toolbox](#) and – while keeping the mouse button pressed – drag the cursor into the work area.
- The control element will be inserted automatically into the Job Explorer's tree.

To change a z-focus control element's position in the tree, proceed as follows:

1. Select the desired control element in the tree.
It will be highlighted.
2. To move the control element to the desired position
 - simply move the control element up or down via the cursor
 - or click the right mouse button and select 'Sequencing ▶ ...' in the [Context Menu](#)
 - or use the {Sequence ...} buttons in the '[Arrange](#)' toolbar.



NOTE:

To define the z-focus position, see [Graphic Parameters – Z-Focus Control](#).

Inserting a Vision System Control Element

The 'Vision System' control node lets you control a vision system. Typically, a vision system consists of software and hardware (e.g. SSI-camera, camera adapter, illumination).

Currently, laserDESK supports the control of SCANLAB's *SCANalign* vision system.

If you want to use the *SCANalign* vision system together with laserDESK, please contact SCANLAB.

SCANalign in combination with laserDESK enables the following applications:

- Precise scanner calibration
- Feature guided laser placement
- Compensation for scanner and/or system drift
- Fast and easy alignment of fixtures and jigs

These features may vary in the future and depend on the connected vision system.



NOTE:

When using the 'Vision System' control node, transformation via remote control (see [Definition of the Remote Control](#)) is not possible.



NOTE:

When using a vision system, do not define any transformation in the Hardware Configuration (see Note in [Setting 'Scan Head' Parameters](#)).

Otherwise, the vision system will calculate incorrect transformation values.

To insert the vision system control element, proceed as follows:

1. Select 'Vision System' from the
 - [Tools](#)|Control Elements ▶ ' menu
 - or [Control Elements](#) toolbar.or
Select 'Vision System' from the [Toolbox](#) and – while keeping the mouse button pressed – drag the cursor into the work area.
The control element will be inserted automatically into the Job Explorer's tree.

To change the vision system control element's position in the tree, proceed as follows:

1. Select the desired control element in the tree.
It will be highlighted.
2. To move the control element to the desired position:
 - simply move the control element up or down via the cursor
 - or click the right mouse button and select 'Sequencing ▶ ...' in the [Context Menu](#)
 - or use the {Sequence ...} buttons in the '[Arrange](#)' toolbar.



NOTE:

To define the vision system's parameters, see [Graphic Parameters – Vision System](#).

To define the setup of the Vision Engine in the Hardware Settings, see [Setting 'Vision Engine' Parameters](#).

Inserting a Laser Control Element

The laser control element serves for defining special settings for individual lasers only (e.g. the SPI laser of the HS series allows adjustment of the simmer current and pulse form).



NOTE:

When a job executes, the laser control element will be skipped if a laser (selected in the Hardware Settings) is used that doesn't correspond to the control element's laser type parameter.

To insert a laser control element, proceed as follows:

1. Select 'Laser Control' from the
 - [Tools](#)\Control Elements ▶ ' menu
 - or [Control Elements](#) toolbar.
or
- Select 'Laser Control' from the [Toolbox](#) and – while keeping the mouse button pressed – drag the cursor into the work area.

The control element will be inserted automatically into the Job Explorer's tree.

To change the laser control element's position in the tree, proceed as follows:

1. Select the desired control element in the tree.
It will be highlighted.
2. To move the control element to the desired position:
 - simply move the control element up or down via the cursor
 - or click the right mouse button and select 'Sequencing ▶ ...' in the [Context Menu](#)
 - or use the {Sequence ...} buttons in the [Arrange](#) toolbar.



NOTE:

To define the laser control element, see [Graphic Parameters – Laser Control](#).

Inserting a Wait For Encoder Control Element

With the RTC5 or RTC6 PC interface board's Processing-on-the-fly (POF) option enabled, the RTC supports processing of workpieces in motion (e.g. workpieces on a conveyor belt or rotating plate), as well as stationary workpieces with a moving scan system (e.g. via a robot arm). To adjust laser scan processes to the current workpiece position, the position of the workpiece relative to the scan system can be detected with the RTC by counting encoder signals (for a detailed description, refer to the 'Processing-on-the-fly' chapter in the [RTC5 Manual](#)).

To start part of an execution at an exactly defined position, the 'Wait_for_Encoder' control node can be used. The intended use of this element is to separate the overall marking into execution sequences (marking parts) and define a 'Wait_for_Encoder' control element before its appropriate marking part to eliminate the problems caused by marking time differences between them. This ensures that the marking starts only when its position is inside the marking area of the scan head.



NOTE:

Wait for encoder control is only possible if the RTC PC interface board's Processing-on-the-fly option is enabled (see 'Processing-on-the-fly' in the [RTC5 Manual](#)) and the Hardware Configuration's POF parameters are set correctly (see '[Setting 'Processing-On-The-Fly' Parameters](#)').

Further execution of a list can be postponed via the 'Wait For Encoder' control node until the selected encoder counter (i.e. the workpiece position) has exceeded or fallen below a predefined value. The 'Wait For Encoder' control element can be inserted several times. It is important to ensure that their parameters are adapted to the overall marking process.

The parameter 'Mode' can have the values 'Exceed', 'Fall Below' or 'Pass By'. Only with 'Pass By' does the process wait until the encoder count actually passes the defined distance. For both other both values, the process doesn't wait if the condition is already fulfilled (see '[wait_for_encoder_mode](#)' command in the [RTC5 Manual](#)).

To insert a wait for encoder control element, proceed as follows:

1. Select 'Wait For Encoder' from the
 - [Tools](#)|Control Elements ▶ ' menu
 - or [Control Elements](#) toolbar.or
Select 'Wait For Encoder' from the [Toolbox](#) and – while keeping the mouse button pressed – drag the cursor into the work area.
The control element will be inserted automatically into the Job Explorer's tree.

To change a wait for encoder control element's position in the tree, proceed as follows:

1. Select the desired control element in the tree.
It will be highlighted.
2. To move the control element to the desired position:
 - simply move the control element up or down via the cursor
 - or click the right mouse button and select 'Sequencing ▶ ...' in the [Context Menu](#)
 - or use the {Sequence ...} buttons in the [Arrange](#) toolbar.



NOTE:

To define the wait for encoder parameters, see [Graphic Parameters – Wait For Encoder](#).

Inserting Protocol and Timer Nodes

- To record signals of the scan head or RTC5 or RTC6 PC interface board, you must additionally insert one pair of protocol nodes (Protocol Start/Stop) into the Job Explorer's tree. The sampling rate can be set from 10 µs.
- The timer (Timer Start/Stop) serves to measure the marking execution time, using the very precise timer of the RTC interface board. If the timer is set, the time measured by the timer will be indicated in the status bar and not the time of the complete job (exception: the timer frames the complete job). There is only one measuring possible.

Both protocol and timer nodes can be positioned arbitrarily in the tree, but must always be set with 'Protocol/Timer Start' above 'Protocol/Timer Stop'. Only program flow (this can be the complete job or a job sequence) that is framed by the protocol nodes or the timer will be recorded or measured.

The value of the protocol node's sampling rate will be defined in the window 'Element properties'. For the timer no definitions are required.

[Protocol Nodes](#): sampling rate [µs]

[Timer Nodes](#)

To insert protocol or timer nodes, proceed as follows:

1. Select 'Protocol Start' or 'Timer Start' from the
 - [Tools](#)|Control Elements ▶ ' menu
 - or [Control Elements](#) toolbar.or
Select 'Protocol Start' or 'Timer Start' from the [Toolbox](#) and – while keeping the mouse button pressed – drag the cursor into the work area.
'Protocol Start' or 'Timer Start' will be inserted automatically in the Job Explorer's tree.
2. Proceed similarly to insert 'Protocol Stop' or 'Timer Stop'.
'Protocol Stop' or 'Timer Stop' will be inserted automatically in the Job Explorer's tree.

To position the protocol or timer nodes in the Job Explorer's tree (and thus in the program flow) proceed as follows:

1. Select 'Protocol Start' or 'Timer Start' in the tree.
It will be highlighted.
2. Simply move 'Protocol Start' or 'Timer Start' via the cursor.
or
Click the right mouse button and select 'Sequencing ▶ ...' in the [Context Menu](#).
or
Use the {Sequence ...} buttons in the '[Arrange](#)' toolbar
3. Proceed similarly to move 'Protocol Stop' or 'Timer Stop'.



NOTE:

'Protocol Stop' or 'Timer Stop' must always be positioned below 'Protocol Start' or 'Timer Start'!

17 Editing Objects

After you've inserted new marking objects, they can be edited in the work area or via the property window. For editing, the marking objects must be selected in the work area or in the Job Explorer's tree. Generally, you can choose between two methods, depending on individual preferences or the demands on precision:

- To edit marking objects (as well as groups and variants) manually with the mouse in the work area is the most simple and fastest method. This comprises hatching, moving, scaling, rotating and changing the marking object's shape.
- Modifying the marking object's graphic parameters is the most accurate method.

After you've inserted control elements and/or protocol nodes, their respective control modes can be edited via the property window (graphic parameters). To modify, simply select the control element or protocol node in the Job Explorer's tree.

17.1 Selecting Marking Objects for Editing

After you've inserted a new marking object, it can be manually edited (moving, rotating, aligning, ...) in the work area or inside the property window by modifying its graphic parameters. For editing, the respective object(s) must be selected, which can be done directly in the work area or in the Job Explorer.

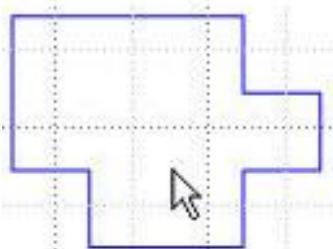
Click to Select

NOTE:

The number of marking objects selected with one mouse click in the work area can be defined in the GUI Settings. You can choose between a single or all captured marking objects (see parameter 'Select' in [Defining the 'Edit' Parameters](#)).

The procedure below is described for the setting 'Single'.

1. If you haven't already done, select 'Select ▶ Mode' from the
 - 'Edit' menu
 - or the right mouse button's [Context Menu](#).or
Select 'Select Mode' in the '[View](#)' toolbar.
2. Click on the shape of the desired marking object in the work area.

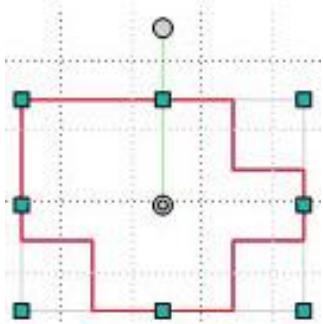


or

Select the desired marking object in the Job Explorer.



The shape changes color and will be enclosed by a rectangle frame with support points for editing.

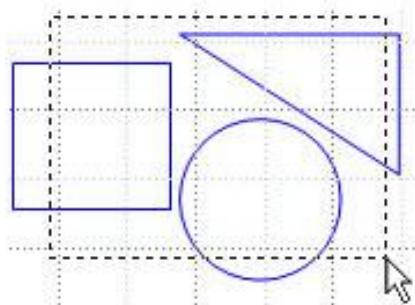


3. To select several marking objects simultaneously, keep the <Ctrl> key pressed while consecutively clicking the shapes.

The shapes changes color and will be enclosed by one rectangle frame with support points for editing.

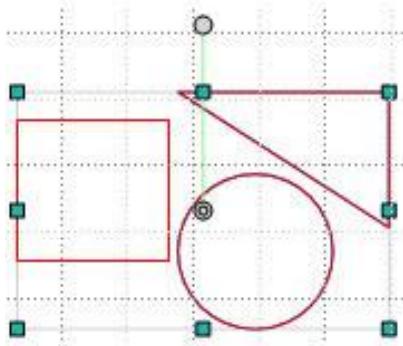
Using Area Select

1. If you haven't already done, select 'Select ▶ Mode' from the
 - ['Edit'](#) menu
 - or ['View'](#) toolbar
 - or the right mouse button's [Context Menu](#).
2. Click in the work area and – while keeping the mouse button pressed – drag a selection frame across the desired shape.
 Finally, release the mouse button.
 The shape changes color and will be enclosed by a rectangle frame with support points for editing (see figure above).
3. To select several marking objects simultaneously, drag the selection frame across the desired shapes.



Finally release the mouse button.

The shapes change color and will be enclosed by one rectangle frame with support points for editing.



Select All

1. Select 'Select ▶ All' from the
 - '[Edit](#)' menu
 - or the right mouse button's [Context Menu](#).
 - or
 - Press <Ctrl>+<A> on the keyboard.
- All marking objects in the work area will be selected.

Deselecting One or More Marking Objects

1. To deselect a separately selected object or deselect all simultaneously selected objects, just click on a blank area in your work area.
 - or
 - Select 'Select ▶ Clear' from the
 - '[Edit](#)' menu
 - or right mouse button's [Context Menu](#).
 - or
 - Select 'Select Clear' in the '[View](#)' toolbar.
2. To deselect one object when several are selected, press the <Ctrl> key and click the desired shape to cancel its selection.

The selected marking objects can now be edited [manually](#) or via the [Property Window](#).

17.2 Manually Editing Marking Objects

Marking objects (including groups and variants) can be edited manually in the work area as follows:

- Move the marking object
- Rotate the marking object
- Scale the marking object
- Move single points of the marking object (and thereby change its shape)
- Add single points to the marking object (and thereby change its shape)
- Change an open marking object to a closed polygon by connecting points

NOTE:

The scaling behavior of marking objects can be set globally in [Edit Parameters](#) ('GUI Settings' window).

– Activate the 'Keep Shape' checkbox, marking objects such as circle will not lose their shape.

– Activate the 'Keep Aspect Ratio' checkbox, the aspect ratio of marking objects will persist when scaled.

For each marking object, this behavior can be individually specified in the [Graphic Parameters](#) (Property Window):

– <default>: the shape inherits the settings of the edit parameters (see above).

– Fixed: shape keeps aspect ratio definitely.

– Variable: shape doesn't keep aspect ratio definitely.

NOTE:

Font text, barcode and variable objects (Date/Time, Serial Number and Import Text in any format) can only be moved, rotated, scaled, and filled.

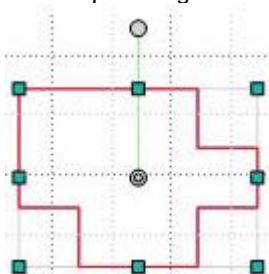
More extensive editing - e.g. resolving the shape or manipulating single points - is not possible.

The content of single- and multi-line font text (see [Inserting Text](#)) can be modified in a dialog box, the content of variable objects can only be modified in the graphic parameters.

Proceed as follows:

1. Select the desired marking object (see [Selecting Marking Objects for Editing](#)).

The shape changes color and will be enclosed by a rectangle frame with support points for editing:



2. For editing, move the cursor above a desired support point.

The cursor changes appearance, e.g.:



3. Press the mouse button and manipulate the marking object:

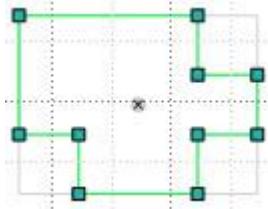
– Use the rectangle support points on the frame to change the shape's dimensions (if 'Keep Aspect Ratio' is not activated, then simultaneously press the <Shift> key for proportional scaling).
– Use the round center support point to move the shape in the work area.
– Use the round upper support point to rotate the shape.

4. Click the right mouse button.

A [Context Menu](#) appears.

5. Select 'Edit'.

The shape will change color and manipulation points are shown:



NOTE:

Depending on the marking object, the 'Edit' function in the context menu can be selected one or several times. E.g. vector text can be edited in several steps/levels: text, character or outline:



NOTE:

If (single- or multi-line) font text has been selected, a dialog box opens. Change or overwrite the text content and confirm with {OK}. Further editing is not possible.

6. Click the right mouse button again.

A context menu appears - the following functions are selectable:

| Function | Description |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New Point | Adds another point. |
| Append To Path/Polygon | Resumes successive creation of the path/polygon, if this has been interrupted (see 'Release Path/Polygon' below). |
| Release Path/Polygon | Interrupts successive creation of the path/polygon; points can be edited and new points can be inserted. |
| Close Path/Polygon | Closes the open path/polygon (requirement for filling). |
| Remove from Path/Polygon | Deletes the last fixed point or selected edge. |
| Polygon Mode | Applies the polygon mode (only path). |
| Arc Modes > | (only path) |
| Three Point Arc Mode | Defines the arc by three points. |
| Arc Quadrant Mode (CW) | Defines the arc by a quadratic function (clockwise). |
| Arc Quadrant Mode (CCW) | Defines the arc by a quadratic function (counterclockwise). |
| Center Mode | Defines an arc by the center point. |
| Bezier Curve Modes > | (only path) |
| Bezier Points Mode | Defines a parametric points curve. |
| Bezier Curves Mode | Defines a parametric curves curve. |
| Reserve Points | Inverts the points' order from the start point to the end point (or reverse). |
| Unround Corner | Restores the round corner of the selected edge to angular shape, if it has been rounded before with 'Round Corner' (see Altering the Marking Object's Shape). (only path) |
| Expand | (only path) |
| Zoom > | |
| In | |
| Out | |
| Position | see Using the Zoom Functions |
| To All | |
| To Work Area | |
| To Selection | |
| Finish (Edit) | Finishes the editing procedure |

7. Select a desired function.

If desired, several functions can be selected one after the other.

8. To finish editing the marking object, click the right mouse button and select 'Finish' via the [Context Menu](#).

Depending on the editing depth, 'Finish' must be selected one or several times.

17.3 Manually Editing Groups, Sets, Variants and Vector Graphics

NOTE:

When you edit a graphics paths (set), graphics set, tile set, variant or vector graphics, these marking objects have the same properties as a group.

Therefore; the following description uses the term "group" only.

Groups can be edited manually in the work area as follows:

- Editing a Complete Group:
 - move the group
 - scale up the group (up or down)
 - rotate the group
- Editing a Single Marking Object of the Group
- Dissolving a Group

NOTE:

The group's scaling behavior can be set globally in [Edit Parameters](#) ('GUI Settings' window).

- If the 'Keep Shape' checkbox is activated, then the shape of the marking object will persist when scaled.
- If the 'Keep Aspect Ratio' checkbox is activated, then the aspect ratio of the marking object will persist when scaled.

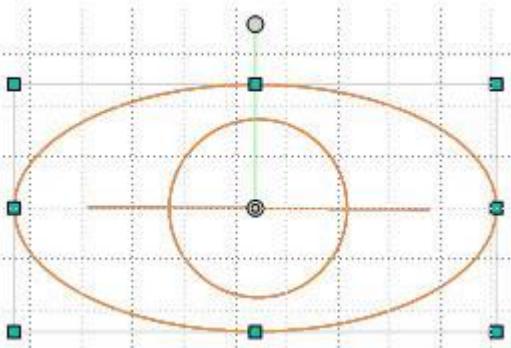
For each marking object or group, this behavior can be individually specified in [Graphic Parameters](#) ('Element Properties' window):

- <default>: the shape inherits the settings of the edit parameters (see above).
- Fixed: shape keeps aspect ratio definitely.
- Variable: shape doesn't keep aspect ratio definitely.

Editing a Complete Group

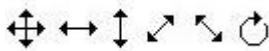
1. Select the desired group (see [Selecting Marking Objects for Editing](#)).

The shapes change color and will be enclosed by a rectangle frame with support points for editing.



2. Move the cursor above a desired support point.

The cursor changes appearance, e.g.:



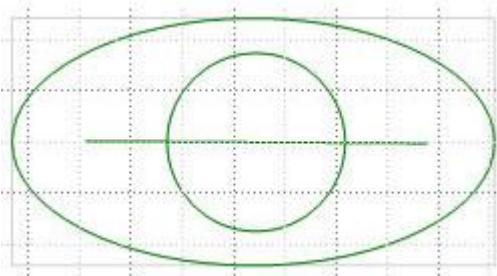
3. Click mouse button and manipulate the group:

- Use the rectangle's support points on the frame to change the shape's dimensions (if 'Keep Aspect Ratio' is not activated (see note above), then simultaneously press the <Shift> key for proportional scaling).
- Use the round center support point to move the shape in the work area.
- Use the round upper support point to rotate the shape.

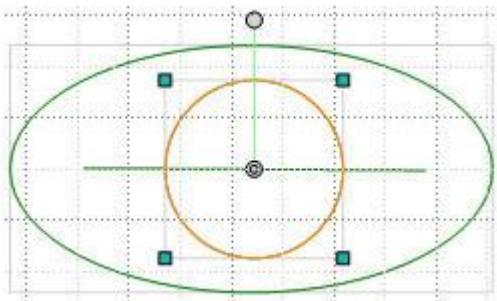
4. After manipulating the group, click the right mouse button and select 'Finish' from the [Context Menu](#).

Editing a Single Marking Object of the Group

1. Select the desired group (see [Selecting Marking Objects for Editing](#)).
The shapes change color and will be enclosed by a rectangle frame with support points for editing.
2. Click the right mouse button.
A context menu appears.
3. Select 'Edit' from the context menu.
The group's objects change the color.



4. Select one of the marking objects in the work area or in the Job Explorer's tree.
Its shape changes color and the manipulation points will be shown.



5. Edit the marking object as described in [Manually Editing Marking Objects](#).
6. After editing the marking object(s), click the right mouse button and select 'Finish' from the [Context Menu](#).

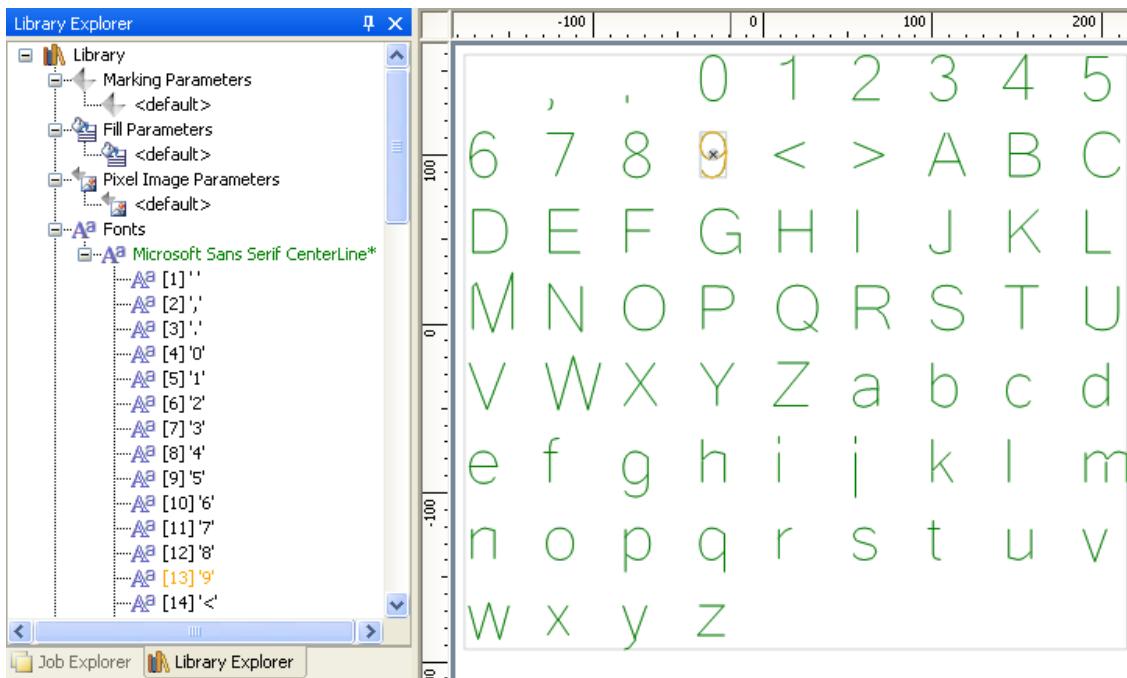
Dissolving a Group

1. Select the desired group (see [Selecting Marking Objects for Editing](#)).
The shapes change color and will be enclosed by a rectangle frame with support points for editing.
2. Click the right mouse button.
A context menu appears.
3. Select 'Grouping/Ungroup'.
The group will be dissolved.
The marking objects will be listed without 'Group' in the Job Explorer's tree.

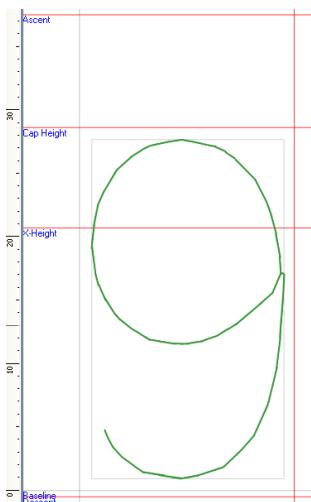
17.4 Editing Fonts

After a new font has been created (see [Creating a New Font](#) and [Creating a Centerline Font](#)), each character of the font can be edited. The new font, which is initially saved in the local job library and may be exported later to the global Marking Library, is listed in the Library Explorer below 'Fonts'.

When you click the plus sign on the new font's left side, all characters will be shown in the work area (see figure below). The individual character to be edited can then be selected in the Job Explorer or work area.



After you select an individual character, it will be shown embedded in horizontal lines (see figure below). These lines define 'Baseline Descent', 'x Height', 'Cap Height' and 'Ascent' to facilitate the character's alignment inside the font. The positions of these lines are defined by the original TrueType Font. The further editing procedure corresponds to the editing procedure of all other marking objects.



To edit the font's characters, proceed as follows:

1. To edit a font in the local job library, select the 'Library Explorer' window.
or
- To edit a font in the global Marking Library, select 'Open ▶ Marking Library' in the '[File](#)' menu.
The [Library Explorer](#)'s tree shows "Library" at the top.

2. Click the plus sign on the left side of 'Fonts'.
All present fonts will be listed below.
3. Click the plus sign on the left side of the desired font.
All characters of this font will be listed below and shown in the work area.
4. Select the character to be edited by double clicking in the job explorer or work area.
The character will be immediately shown embedded in horizontal lines.
or
First, select the character to be edited in the library explorer or work area, then select 'Edit'
– from the '[Edit](#)' menu
– or from the right mouse button's [Context Menu](#).
The character will be shown embedded in horizontal lines.
5. Select the character (see [Selecting Marking Objects for Editing](#)).
6. Edit the character as described in [Manually Editing Marking Objects](#).

17.5 Filling Marking Objects

Marking objects (e.g. rectangles, circles, ellipses, polygons, ...) can be filled if their shapes are closed. You can fill a selected marking object simply by clicking the appropriate button in the 'Edit' toolbar or by selecting the function in the 'Edit' menu. Alternatively, the marking object can be filled by setting the corresponding parameter in Graphics Parameters (shown in the property window), where additional fill settings can be modified.

Likewise single marking objects, groups, i.e. the group's marking objects, can be filled. Depending on their number and aligning to each other, the overlapping areas will be filled or not (see table below). If a group comprises open marking objects also, these will not be provided for filling.

NOTE:


A marking object (stand-alone or inside a group) can only be filled, if its 'Type' parameter is set to "Area" (see [Graphics Parameters](#)). If this parameter is set to "Outline", objects can't be filled.

If a marking object can't be filled, check the 'Type' parameter's setting.

The filling behavior of several overlapping marking objects inside a group, like described in the table below, assumes that all marking objects are closed.

| Filling | Description |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Single marking object: Will always be filled completely. |
| | Group of two ore more marking objects without overlapping: Each marking object will be filled completely. |
| | Group of two marking objects partially overlapped: The not overlapped areas of each marking object will be filled, the overlapped area will not be filled. |
| | Group of two marking objects totally overlapped: The outer, overlapping marking object will be filled, the inner, smaller marking object will not be filled. |
| | Group of three or more marking objects partially overlapped: The not overlapped areas of each marking object will be filled, the areas with overlapping of two marking objects will not be filled, the areas with overlapping of three marking objects will be filled, the areas with overlapping of four marking objects will not be filled, |
| | Group of three or more marking objects totally overlapped: The marking objects will be filled and not filled alternately from the outside inwards. The outer/largest marking object will always be filled. |

The filling's properties correspond to the default settings in the [Fill Parameters](#) (shown in the property window). Here, you can modify the settings regarding the filling type (hatch or path), the filling's alignment and other properties.

Fill

To fill a closed marking object proceed as follows:

1. Select the desired marking object or group (see [Selecting Marking Objects for Editing](#)).
The shape changes color and gets enclosed by a rectangle frame with support points for editing.
2. Select 'Fill'
 - in the '[Edit](#)' toolbar
 - or from the '[Edit](#)' menu
 - or from the right mouse button's [context menu](#).or
Select "True" in the 'Filling Lines' parameter inside the [Graphics Parameters](#).
The marking object or group will then be filled.
The filling lines' properties correspond to the predefined settings for the job.
3. To modify the filling lines' properties, select the [Graphics Parameters](#) and [Fill Parameters](#) in the property window.

Remove Filling

To remove filling, proceed as follows:

1. Select the desired marking object or group (see [Selecting Marking Objects for Editing](#)).
2. Select 'Remove Filling'
 - in the '[Edit](#)' toolbar
 - or from the '[Edit](#)' menu
 - or from the right mouse button's [Context Menu](#).or
Select "False" in the 'Filling Lines' parameter inside the [Graphics Parameters](#).
The marking object's or group's filling will then be removed.

17.6 Altering the Marking Object's Shape

laserDESK offers two functions to alter the marking objects' shape easily: 'Round Corners' and 'Offset'.

| Function | Shape original | Shape edited | Description |
|------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Round Corners |  |  | <p>Lets you round the marking object's corners by a defined radius. The marking object can be closed or open.</p> <p>The radius to be defined is limited according to the marking object's dimension. E.g. the radius for a square can be maximum its half side length - with the result of a circle.</p> |
| |  |  | <p>For marking objects with round corners (e.g. graphics path with arcs/curves), these round corners can be excepted from rounding to the defined radius.</p> <p>NOTE: The command 'Round Corners' can be executed once only for a marking object.</p> |
| Offset |  |  | <p>Lets you scale up or down a marking object by a defined dimension.</p> <ul style="list-style-type: none"> – Scale Up: the marking object's corners will be rounded simultaneously. The radius corresponds to the offset value. – Scale Down: the marking object's corners will not be rounded. |
| |  |  | <p>NOTE: The command 'Offset' can be applied only to closed marking objects.</p> |

Round Corners

To alter the marking object's shape, proceed as follows:

1. Select the desired marking object (see [Selecting Marking Objects for Editing](#)).
The shape changes color and will be enclosed by a rectangle frame with support points for editing.
 2. Select 'Round Corners' from the
 - '[Edit](#)' menu
 - or right mouse button's [Context Menu](#).
 The 'Round Corners' dialog box appears.
 3. Enter the desired radius in the input field or use the arrow buttons.
 4. If enabled, activate the checkbox 'Skip round Corners', if you want to avoid rounding existent round corners.
 5. Confirm your settings with {OK}.
- The marking object's corners will be rounded as defined.

Offset

To alter the marking object's shape, proceed as follows:

1. Select the desired marking object (see [Selecting Marking Objects for Editing](#)).
The shape changes color and will be enclosed by a rectangle frame with support points for editing.
 2. Select 'Offset' from the
 - '[Edit](#)' menu
 - or right mouse button's [Context Menu](#).
 The 'Offset' dialog box appears.
 3. Enter the desired offset in the 'Offset' input field.
 4. Select 'Scale Up' or 'Scale Down' in the selection field.
 5. Confirm your settings with {OK}.
- The marking object will be scaled up with round corners or scaled down as defined.

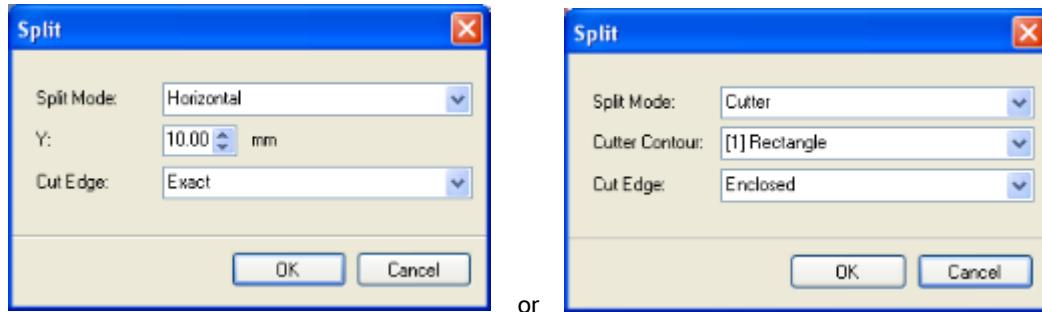
17.7 Splitting Marking Objects

Marking objects can be split in two ways:

- One or multiple selected marking objects can be split horizontally or vertically by defining a cutting line relative to the x or y axis of the working area's coordinate system.
- Two or more overlapping objects can be split by assigning one of them as the cutter. Here, the outline of the cutter object defines the cutter contour and cuts all other selected objects at their intersections.

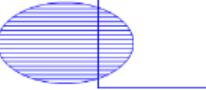
Both open and closed objects can be split. If splitting closed marking objects (filled or not filled), the parameter 'Cut Edge' defines whether the cut object keeps its type (outline or area) or always becomes an outline. To keep the type 'Area' (Cut Edge = Enclosed), the object needs a closed outline which will be created using the cutter's shape. The split marking objects will change their identifiers in the Job Explorer.

When you select the split function, the 'Split' dialog box serves to define several split settings (see examples below).



The table below shows and describes examples for the several split settings:

| Initial Object(s) / Identifier | Split Setting (in the 'Split' dialog box) | Split Objects / Identifiers (objects misaligned after splitting) | Description |
|--------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 'Arc' | - Split Mode: Horizontal - Y: n mm - Cut Edge: Exact |  'Graphics Path - Composition' 'Graphics Path - Composition' | An open marking object is split horizontally or vertically by the cutting line running parallel to the working area's x or y axis at the distance n. The result is 2 graphics paths, independent from the cut edge setting 'Exact' or 'Enclosed'. |
| | - Split Mode: Vertical - X: n mm - Cut Edge: Enclosed | | |
| 'Rectangle' | - Split Mode: Horizontal - Y: n mm - Cut Edge: Exact |  'Graphics Path - Composition' 'Graphics Path - Composition' | A closed marking object is split horizontally (or vertically) by the cutting line running parallel to the working area's x (or y) axis at the distance n. The result is 2 graphics paths which are open at the cutting line (graphic parameter outline type). |
| | - Split Mode: Vertical - X: n mm - Cut Edge: Enclosed |  'Graphics Path - Composition' 'Graphics Path - Composition' | A closed marking object is split vertically (or horizontally) by the cutting line running parallel to the working area's y (or x) axis at the distance n. The result is 2 graphics paths which are closed at the cutting line (graphic parameter area type). |

| Initial Object(s) / Identifier | Split Setting (in the 'Split' dialog box) | Split Objects / Identifiers (objects misaligned after splitting) | Description |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  'Ellipse' | <ul style="list-style-type: none"> - Split Mode: Horizontal - Y: n mm - Cut Edge: Exact |  'Group - Composition' 'Group - Composition' | <p>A closed and filled marking object is split horizontally (or vertically) by the cutting line running parallel to the working area's x (or y) axis at the distance n.</p> <p>The result is 2 groups which are open at the cutting line (graphic parameter outline type).</p> |
| | <ul style="list-style-type: none"> - Split Mode: Vertical - X: n mm - Cut Edge: Enclosed |  'Graphics Path - Composition' 'Graphics Path - Composition' | <p>A closed and filled marking object is split vertically (or horizontally) by the cutting line running parallel to the working area's y (or x) axis at the distance n.</p> <p>The result is 2 graphics paths which are closed at the cutting line (graphic parameter area type).</p> |
|  'Line' 'Arc' | <ul style="list-style-type: none"> - Split Mode: Cutter - Cutter Contour: Line - Cut Edge: Exact |  'Line' 'Graphics Path - Composition' 'Graphics Path - Composition' | <p>An open marking object is split once by the cutter contour of another marking object.</p> <p>The result is 2 graphics paths independent from cut edge setting 'Exact' or 'Enclosed'.</p> |
|  'Line' 'Graphics Path' | <ul style="list-style-type: none"> - Split Mode: Cutter - Cutter Contour: Line - Cut Edge: Enclosed |  'Line' 'Group - Composition' 'Graphics Path - Composition' | <p>An open marking object is split twice (or several times) by the cutter contour of another marking object.</p> <p>The result is 1 graphics path and 1 group (or several groups) independent from cut edge setting 'Exact' or 'Enclosed'.</p> |
|  'Ellipse' 'Rectangle' | <ul style="list-style-type: none"> - Split Mode: Cutter - Cutter Contour: Ellipse - Cut Edge: Exact |  'Ellipse' 'Graphics Path - Composition' 'Graphics Path - Composition' | <p>A closed marking object is split by the cutter contour of another marking object.</p> <p>The result is 2 graphics paths which are open at the cutting line (graphic parameter outline type).</p> |
| | <ul style="list-style-type: none"> - Split Mode: Cutter - Cutter Contour: Ellipse - Cut Edge: Enclosed |  'Ellipse' 'Graphics Path - Composition' 'Graphics Path - Composition' | <p>A closed marking object is split by the cutter contour of another marking object.</p> <p>The result is 2 graphics paths which are closed at the cutting line (graphic parameter area type).</p> |
| | <ul style="list-style-type: none"> - Split Mode: Cutter - Cutter Contour: Rectangle - Cut Edge: Exact |  'Group - Composition' 'Group - Composition' 'Rectangle' | <p>A closed and filled marking object is split by the cutter contour of another marking object.</p> <p>The result is 2 groups which are open at the cutting line (graphic parameter outline type).</p> |
| | <ul style="list-style-type: none"> - Split Mode: Cutter - Cutter Contour: Rectangle - Cut Edge: Enclosed |  'Graphics Path - Composition' 'Graphics Path - Composition' 'Rectangle' | <p>A closed and filled marking object is split by the cutter contour of another marking object.</p> <p>The result is 2 graphics paths which are closed at the cutting line (graphic parameter area type).</p> |

To split one or more marking objects, proceed as follows:

1. Select one or several marking objects (see [Selecting Marking Objects for Editing](#)).
The shape changes color and gets enclosed by a rectangle frame.
2. Select 'Separate ▶ Split' from the
– 'Edit' menu
– or right mouse button's [Context Menu](#).
The 'Split' dialog box appears (see figures above).
3. Click the button in the 'Split Mode' selection field to define the split mode.
 - Select 'Horizontal' or 'Vertical' to split marking objects relative to the x or y axis of the work area's coordinate system.
 - Continue with step 4.
 - Select 'Cutter' to split one or more marking objects by another overlapping object.
 - Continue with step 5.
 - 4. Define the distance to the coordinate system's x or y axis in the 'Y' or 'X' selection field.
Enter the desired value or use the arrow buttons.
Continue with step 6.
 - 5. Click the button in the 'Cutter Contour' selection field to select the marking object, which should be the cutter object.
(All selected marking objects with a closed outline are shown in the drop-down list.)
 - 6. If you want to split closed objects, select the desired cut edge mode.
Click the button in the 'Cut Edge' selection field to select 'Exact' or 'Enclosed' (for outline or area type, see description above).
 - 7. Confirm your entries with {OK}.
The marking object(s) will be split horizontally, vertically or by another object.
The respective identifiers in the Job Explorer will change.

17.8 Cutting Marking Objects

During a marking process, the intersections of overlapping lines / marking objects will be marked twice. To avoid poor surface quality at these points, intersecting lines can be cut (interrupted) with a defined clearance.

NOTE:

The cutout function can be applied only with the following marking objects:

- line, rectangle, polygon, arc, graphics path
- font text and vector text

The cutout function is **not available** with all other marking objects (including group/set/variant, all variable objects,image/graphics, barcode, text box) or with filling lines.

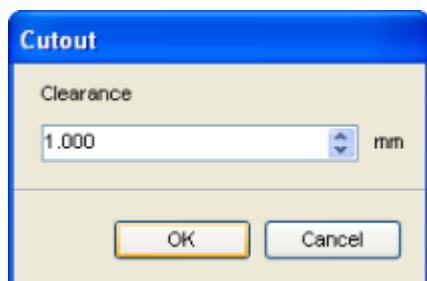
One of two or more marking objects with intersecting lines always cuts the other marking object(s).

NOTE:

Which marking object cuts the other marking object(s) depends on the selection procedure:

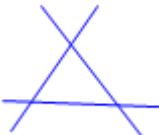
- When selecting each marking object via [mouse click](#), the marking object selected first will be the cutter.
 - When selecting the marking objects [using the area select](#) or [select all](#) function, the marking object with the highest position in the Job Explorer's tree will be the cutter.
-

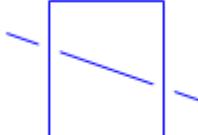
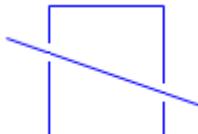
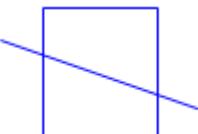
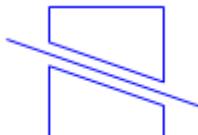
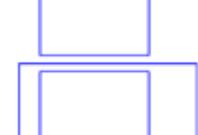
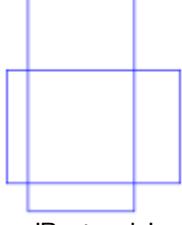
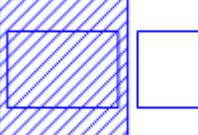
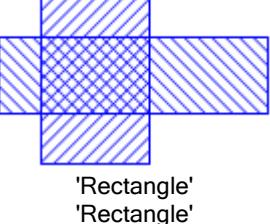
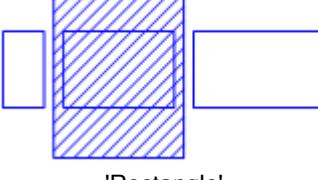
When you select the cutout function, the 'Cutout' dialog box (see figure below) serves to define the clearance of the intersecting lines.


NOTE:

The cutout function can be executed only if 'Clearance' in the 'Cutout' dialog box is set to > 0.

The table below shows and describes examples for several cutout configurations:

| Initial Object(s) / Identifiers | Cut out Objects / Identifiers | Description |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  'Line' 'Line' 'Line' |  'Line' 'Polygon (Line)' 'Polygon (Line)' 'Polygon (Line)' 'Polygon (Line)' 'Polygon (Line)' | <p>Depending on the sequence of selection or the position in the Job Explorer's tree, the higher lines always cut the lower lines.</p> <p>In this example with 3 intersecting lines, the result is a unchanged line and 5 polygons with clearance n.</p> |

| Initial Object(s) / Identifiers | Cut out Objects / Identifiers | Description |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| |  'Rectangle' 'Polygon (Line)' 'Polygon (Line)' 'Polygon (Line)' 'Polygon (Line)'  'Graphics Path (Rectangle)' 'Graphics Path (Rectangle)' 'Line' | <p>The line is cut by the rectangle ('Area' or 'Outline' type) selected first or with higher position in the Job Explorer's tree.</p> <p>The result is an unchanged rectangle and 3 polygons with clearance n.</p> |
|  'Rectangle' 'Line' |  'Graphics Path (Rectangle)' 'Graphics Path (Rectangle)' 'Line' | <p>The rectangle is cut by the line selected first or with higher position in the Job Explorer's tree.</p> <p>Because the rectangle is defined as an 'Outline' type, the result is an unchanged line and 2 open graphics paths ('Outline' type) with clearance n.</p> |
| |  'Graphics Path (Rectangle)' 'Graphics Path (Rectangle)' 'Line' | <p>The rectangle is cut by the line selected first or with higher position in the Job Explorer's tree.</p> <p>Because the rectangle is defined as an 'Area' type (closed object), the result is a unchanged line and 2 closed graphics paths ('Area' type) with clearance n.</p> |
|  'Rectangle' 'Rectangle' |  'Rectangle' 'Graphics Path (Rectangle)' 'Graphics Path (Rectangle)' 'Graphics Path (Rectangle)' | <p>The vertical rectangle is cut by the horizontal rectangle selected first or with higher position in the Job Explorer's tree. Both rectangles are closed marking objects ('Area' type).</p> <p>The result is a unchanged rectangle and 3 closed graphics paths ('Area' type) with clearance n.</p> |
|  'Rectangle' 'Rectangle' |  'Rectangle' 'Graphics Path (Rectangle)' 'Graphics Path (Rectangle)' 'Graphics Path (Rectangle)' | <p>The horizontal rectangle is cut by the vertical rectangle selected first or with higher position in the Job Explorer's tree. Both rectangles are closed and filled marking objects ('Area' type).</p> <p>The result is a unchanged rectangle and 3 closed graphics paths ('Area' type) with clearance n and without filling lines.</p> |

To cut out marking objects, proceed as follows:

1. Select two or more intersecting/overlapping marking objects (see [Selecting Marking Objects for Editing](#)).
 The cutting marking object must be selected first or have the highest position in the Job Explorer's tree.
 The shapes change their color and get enclosed by a rectangle frame.

2. Select 'Separate ▶ Cutout' from the
 - 'Edit' menu
 - or right mouse button's [Context Menu](#).The 'Cutout' dialog box appears (see figure above).
3. Define the clearance of the lines to be cut in the 'Clearance' selection field.
The value must be > 0 !
Enter the desired value or use the arrow buttons.
4. Confirm your entries with {OK}.
The marking object(s) will be cut out.
The respective identifiers in the Job Explorer will change.

17.9 Combining Marking Objects and Groups

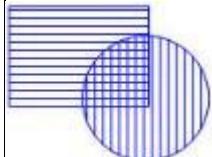
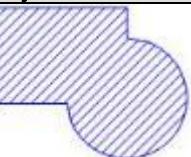
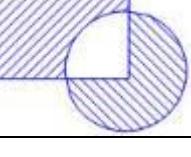
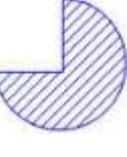
To simplify the creation of graphics paths, laserDESK offers four combine functions. These functions let you combine two overlapping marking objects and thus create new objects. The table below describes how to use the combine functions.

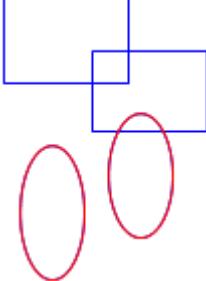
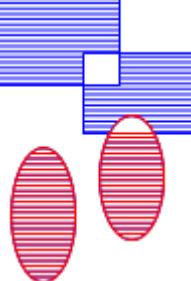
NOTE:

With the functions 'Union', 'Intersect', 'Exclusive Or' or 'Exclude', only closed marking objects can be combined.

The 'Type' parameter of both objects must be set to "Area" (see [Graphics Parameters](#)). If this parameter is set to "Outline", objects can't be combined. If marking objects can't be combined, check the 'Type' parameter's setting.

The function 'Connect' is executable only with the open marking objects Line, Polygon and Graphics Path.

| Original Objects | Combine 4 | Combined Objects | Description |
|-------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Union |  | The two marking objects will be combined into one marking object. The new marking object is a 'Graphics Path - Combined'. |
| | Intersect |  | The intersecting area of the two marking objects will be cropped. The new marking object is a 'Graphics Path - Combined'. |
| | Exclusive Or (Xor) |  | The overlapping area of the two marking objects will be cut out. Each of the remaining two marking objects changes to 'Graphics Path', both forming a 'Group'. |
| | Exclude |  | One marking object and the overlapping area will be removed. The remaining marking object changes to 'Graphics Path - Combined'. Which marking object will be removed depends on the selection procedure: <ul style="list-style-type: none"> – When selecting each marking object via mouse click, the marking object selected last will be removed. – When selecting both marking objects using area select, the marking object positioned lower in the Job Explorer will be removed. |
|  | Connect |  | The function combines 2 open paths into one if their endpoints are closer than a user defined limit. A new graphic path is created where the end point of one open marking object will be shifted to the end point of the other open marking object. This function is (e.g.) very useful for post-editing vector graphics to create a closed path for filling. Which marking object's end point will be shifted, depends on the selection procedure: <ul style="list-style-type: none"> – When selecting each marking object via mouse click, the end point of the marking object selected last will be shifted. – When selecting both marking objects using area select, the end point of the marking object positioned lower in the Job Explorer will be shifted. NOTE: This function is executable only with open paths, not closed polygons or not closed graphic paths. |

| Original Objects | Combine 4 | Combined Objects | Description |
|-----------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Merge |  | <p>This function lets you combine two or more groups (groups, graphic sets, tile sets and variants) into one single group containing all marking objects. Additionally, all closed marking objects will be filled, overlapping areas will not be filled.</p> <p>Which kind of group will result depends on the following requirements:</p> <ul style="list-style-type: none"> – If the selection to be merged comprises a group, the result is always a group. – If the selection to be merged comprises a variant but no group, the result is always a variant. – If the selection to be merged comprises different sets only, the result is the set selected first. <p>NOTE: There is only one restriction for the selection of groups: the selection exclusive of variants is not possible.</p> |

To combine two **closed** marking objects, proceed as follows:

1. Select two overlapping marking objects (see [Selecting Marking Objects for Editing](#)).
The shape changes color and will be enclosed by a rectangle frame.
2. Select
 - 'Combine ▶ Union'
 - or 'Combine ▶ Intersect'
 - or 'Combine ▶ Exclusive Or'
 - or 'Combine ▶ Exclude'
 from the '[Edit](#)' menu or from the right mouse button's [Context Menu](#).
The marking objects will be directly combined corresponding to the selected function (see table above).

To connect two **open** marking objects, proceed as follows:

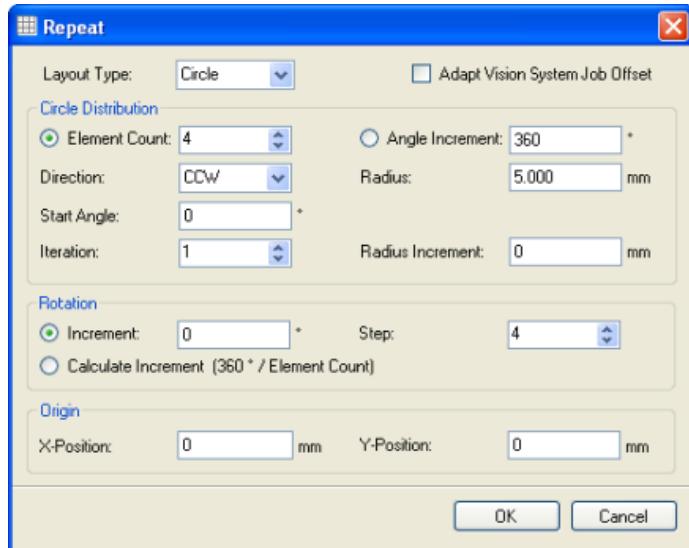
1. Select two neighboring open objects (see [Selecting Marking Objects for Editing](#)).
The marking object to be misaligned must be selected last or have the lower position in the Job Explorer's tree.
The shape changes color and will be enclosed by a rectangle frame.
2. Select 'Combine ▶ Connect' from the '[Edit](#)' menu or from the right mouse button's [Context Menu](#).
The 'Connect' dialog box appears.
3. Define the distance within the marking objects' pass points that will be connected by entering the value in the input field or using the arrow buttons.
4. Click {OK} to connect the two objects.
If the distance of the pass points is within the entered value, the marking objects will be directly connected.
If the distance of the pass points is outside the entered value, the marking objects will not be connected.

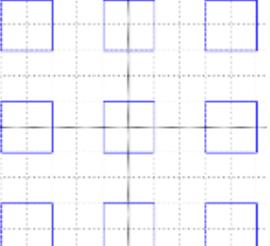
To **merge** two or more groups, proceed as follows:

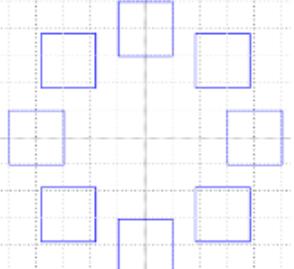
1. Select two or more groups (groups, sets, variants) (see [Selecting Marking Objects for Editing](#)).
The shapes change color and will be enclosed by a rectangle frame.
2. Select 'Combine ▶ Merge' from the '[Edit](#)' menu or from the right mouse button's [Context Menu](#).
The groups will be directly merged into one group (group, set or variant, depending on the selection).

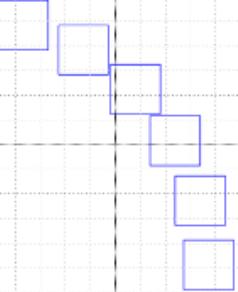
17.10 Copying and Aligning Marking Objects

The 'Repeat' dialog box serves to copy marking objects as well as collecting objects (group, set, variant), and to align these simultaneously in the work area.



| Field | Description |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Layout Type | Lets you define how the marking objects will be aligned. Click the  button to select the required layout type: – Grid, – Box, – Circle or – Arc. |
| Adapt Vision System Job Offset | Activating the checkbox lets you adapt the offset of the Vision System camera job (see Graphic Parameters – Vision System\Parameter 'Translation'). That serves to create arrays, in which each position will be checked with the same camera job. If the checkbox is activated, the field 'Rotation' (see below) will be faded out, because the camera can't expose rotated pictures. |
| Grid Distribution | These parameters will be shown if the 'Grid' layout type is selected (see above). The marking objects will be aligned on a grid.  |
| Column Count | Lets you define the grid's number of columns and thus the number of marking objects in the x-direction. Enter the desired number or use the arrow buttons. |
| Row Count | Lets you define the grid's number of rows and thus the number of marking objects in the y-direction. Enter the desired number or use the arrow buttons. |
| Horizontal Gap | Lets you define the gap between the marking objects in the y- and x-directions (in user units). |
| Vertical Gap | NOTE: The value defines the distance between the marking objects' centers . Enter the desired value in the input field. |

| Field | Description |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Column Angle | Lets you define the arrangement of the grid's columns and rows (in [deg]). If the angles are set to 0 deg and 90 deg (or 90 deg and 0 deg), this results in a rectangular grid. |
| Row Angle | If the angles are set to 0 deg and 90 deg (or 90 deg and 0 deg), this results in a rectangular grid. |
| Iteration | Not active/editable in layout type 'Grid'. |
| Box Distribution | These parameters will be shown if the 'Box' layout type is selected (see above). The marking objects' alignment will result in a bounding box arrangement.    |
| Width Count | Lets you define the number of objects in the width direction. Enter the desired number or use the arrow buttons. |
| Height Count | Lets you define the number of objects in the height direction. Enter the desired number or use the arrow buttons. |
| Horizontal Gap | Lets you define the gap between the marking objects in the width and height directions (in user units). |
| Vertical Gap | NOTE: The value defines the distance between the marking objects' centers . Enter the desired value in the input field. |
| Column Angle | Lets you define the arrangement of the box's columns and rows (in [deg]). If the angles are set to 0 deg and 90 deg (or 90 deg and 0 deg), this results in a rectangular box. |
| Row Angle | |
| Iteration | Lets you define the number of interleaved arranged boxes. Ensure that the definition of width and height count and gaps enables the defined number of iterations. |
| Circle Distribution | These parameters will be shown, if the 'Circle' layout type is selected (see above). The marking objects will be aligned around a circle.  |
| Element Count | If this radio button is activated, you can define the number of objects on the circle. The objects will be distributed evenly in a 360° circle. Enter the desired number or use the arrow buttons. |
| Angle Increment | If this radio button is activated, you can define the angle increment (in [deg]) (instead of element count, see above). Depending on the value, the objects may not be distributed evenly on the circle. Enter the desired number or use the arrow buttons. |
| Direction | Lets you define the rotation direction of the circle. Click the  button to select "CW" (clockwise) or "CCW" (counterclockwise). |
| Radius | Lets you define the circle's radius (in user units). Enter the required value in the input field. |
| Start Angle | Lets you define the start angle (in [deg]). Enter the required value in the input field. |
| Iteration | Let you define the number of circles to be created. Enter the desired number or use the arrow buttons. |
| Radius Increment | Let you define the radius increment (in user units) if multiple circles should be created (see 'Iteration' above). Positive and negative values are possible. Enter the required value in the input field. |

| Field | Description |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Arc Distribution | <p>These parameters will be shown if the 'Arc' layout type is selected (see above). The marking objects will be aligned to an arc.</p>  |
| Element Count | <p>If this radio button is activated, you can define the number of objects on the arc. The objects will be distributed evenly. Enter the desired number or use the arrow buttons.</p> |
| Angle Increment | <p>If this radio button is activated, you can define the angle increment (in [deg]) (instead of element count, see above). Enter the required value in the input field.</p> |
| Direction | <p>Lets you define the rotation direction of the arc. Click the  button to select "CW" (clockwise) or "CCW" (counterclockwise).</p> |
| Radius | <p>Lets you define the arc's radius (in user units). Enter the required value in the input field.</p> |
| Start Angle | <p>Lets you define the arc's start angle (in [deg]). Enter the required value in the input field.</p> |
| End Angle | <p>Lets you define the arc's end (in [deg]). Enter the required value in the input field.</p> |
| Iteration | <p>Let you define the number of arcs to be created. Enter the desired number or use the arrow buttons.</p> |
| Radius Increment | <p>Let you define the radius increment (in user units) if multiple arcs should be created (see 'Iteration' above). Positive and negative values are possible. Enter the required value in the input field.</p> |
| Rotation | <p>Serves to rotate the marking objects stepwise by an increasing angle (for all layout types).</p> |
| Increment | <p>If this checkbox is activated, you can define an absolute angle increment (in [deg]) for the objects. Enter the desired value in the input field.</p> |
| Step | <p>Only editable if the 'Increment' checkbox (see above) is activated. Lets you define the number of objects (origin and copies) before the next increment will be set. Enter the desired number or use the arrow buttons.</p> |
| Calculate Increment (360° / Element Count) | <p>If this checkbox is activated, the angle increment will be calculated depending on the number of objects: 360° / number of objects.</p> |
| Origin | (for all layout types) |
| X-Position | Lets you define the x- and y-position (in user units) of the original object which will be repeated. |
| Y-Position | |

To copy and align marking objects, proceed as follows:

1. Select a marking or collected object (see [Selecting Marking Objects for Editing](#)).
2. Select
 - 'Repeat' from the '[Arrange](#)' menu or
 - 'Repeat...' from the right mouse button's [Context Menu](#).
 The 'Repeat' dialog box will open (see figure above).
3. Select the layout type in the corresponding selection field.
4. If required, activate the checkbox to adapt the offset of a Vision System job.
5. Define the distribution of the objects.
Enter the required values in the input fields.

6. If required, define the rotation.
Select the required radio button.
7. Define the origin.
Enter the required values in the input fields.
8. Click the {OK} button to execute the repeat function.
The marking objects will be aligned in the work area according to the settings.

17.11 Creating Symbols

Marking objects or groups with marking objects, which will be used periodically (e.g. company logo, specific shape), can be saved as a master to the local library labeled as 'Symbol'. New marking objects can then be inserted by [Reference To Symbol](#). In a second step, the symbol can be exported to the global Marking Library and imported again to another job.

NOTE:

The marking object inserted in the work area by 'Reference To Symbol' is not a copy of the symbol in the library, it is a real reference. Modifying the library's symbol will change the referenced marking object in the work area!

To create a symbol proceed as follows:

1. Insert a marking object like described in [Inserting a new Marking Object](#) or create a group like described in [Creating Groups, Sets or Variants](#).
2. Select the desired marking object (see [Selecting Marking Objects for Editing](#)).
The shape will change the color and will be enclosed by a rectangle frame with supporting points for editing.
3. Select 'Save as Symbol' in the
 - 'Edit' menu or
 - in the right mouse button's [Context Menu](#).The dialog box 'Create New Symbol' appears.
4. Enter the desired name in the 'Name' input field and confirm with {OK}.
The reference object will be added to the job's library explorer in the directory 'Symbols'.
5. If desired, export the symbol to the Marking Library.
(For detailed description how to use the library, refer to [Library Explorer / Marking Library](#).)

17.12 Converting Text Objects, Groups and Graphic Sets

In laserDESK for static text and variable objects (date/time, serial number, import text) different formats are available: font text, vector text, and barcode. If required, a number of these formats can be converted into another format:

- Font text to vector text and barcode
- Vector text to font text and barcode
- Barcode to font text and vector text

NOTE:

For variable objects (date/time, serial number, import text) each format can be converted as shown above. Single-line static text can only be converted from font text to vector text and vice versa. It is not available for barcode.

The text box always uses font text.

NOTE:

When converting vector text to font text, the font text always regains the regular shape and aspect ratio of the respective font.

Furthermore, groups and graphic sets can be converted:

- Groups or graphic sets to graphics paths
- Groups or graphics paths to graphic sets
- Graphics paths or graphic sets to groups

This can be advantageous to assign e.g. specific properties to the group (content of control elements or variable objects) or the graphic set (marking objects can be sorted to decrease the marking time).

To convert text objects, groups or graphic sets, proceed as follows:

1. Select the marking object(s) (font text, vector text, date/time, serial number, import text, group or graphic set) in the work area or Job Explorer.
2. Select 'Convert To ▾' from the
 - [Edit](#) menu
 - or the right mouse button's [Context Menu](#).

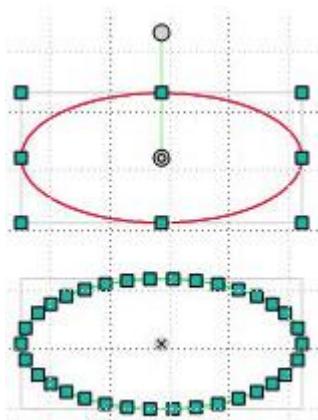
The available text format(s) or the available grouping will be displayed black colored in a pop-up menu.

3. Depending on the selected object, select (if provided)
 - 'Font Text', 'Vector Text' or 'Barcode'
 - or 'Group' or 'Graphic Set' .

The current format/grouping will be converted immediately to the selected format/grouping.

17.13 Expanding Marking Objects

If required (e.g. for editing), marking objects consisting of curves (circle, ellipse, arc, spiral, graphics path) can be fitted by a polygon into single vectors. The figure below shows an ellipse in edit mode, on top in initial state and below after fitted by a polygon:



To fit a marking object by a polygon, proceed as follows:

1. Select the desired marking object or group (see [Selecting Marking Objects for Editing](#)).
The shape changes color and will be enclosed by a rectangle frame with support points for editing.
2. Select 'Expand' from the '[Edit](#)' menu or from the right mouse button's [Context Menu](#).
The curves of the marking object will be fitted immediately.
3. Select 'Edit' from the '[Edit](#)' menu or from the right mouse button's [Context Menu](#).
The marking object shows multiple single vectors and the corresponding manipulation points.

17.14 Defining a Tile Set

If the size of the marking exceeds the dimensions of your laser scan system's marking area or if the overall marking can't be executed at one time for some other reason (e.g. marking on a roll), then the tile function lets you mark the workpiece in several steps. Therefore, the marking objects will be divided into several tiles. Using positioning devices with motors, the workpiece can then be moved to several positions to mark it stepwise. Mainly intended for processing-on-the-fly, a stripe and cylinder mode are available.



NOTE:

A tile set / tiles can't comprise tile sets, variable objects ('Date, Time', 'Serial Number', 'Import Text') or control elements.



NOTE:

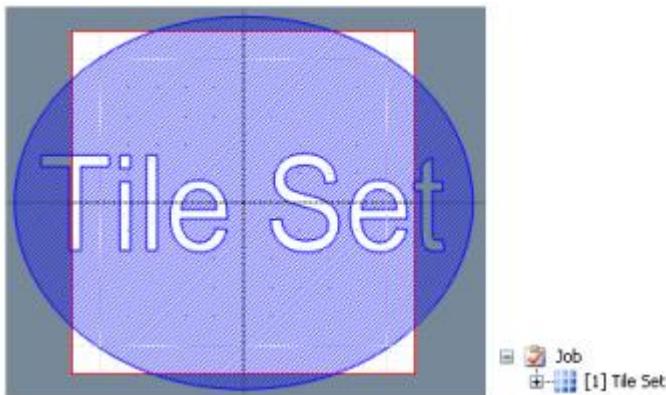
Marking tile sets require positioning devices to move the workpieces to the defined position.

To control the motor(s), laserDESK's control elements can be used. These have to be created in the laserDESK job (see [Inserting a Motor Control Element](#)). Motor control elements can be inserted directly in the 'Tile' dialog box (see below).

The axis can also be controlled with an independent system – then a signal handshake with laserDESK must be used.

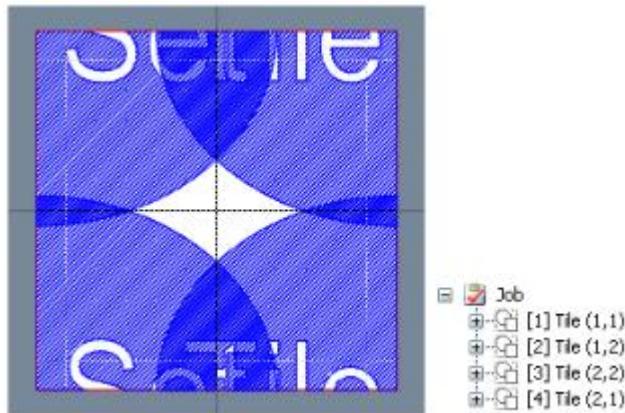
The tile function can be applied in two ways:

- Using the "**Online Mode**", first a tile set must be created with one or several marking objects (see [Creating Groups, Sets or Variants](#)). Then the partition of the marking object(s) must be defined and saved. The marking object(s) will still remain as whole object(s), thus the Job Explorer still indicates '**Tile Set**'.



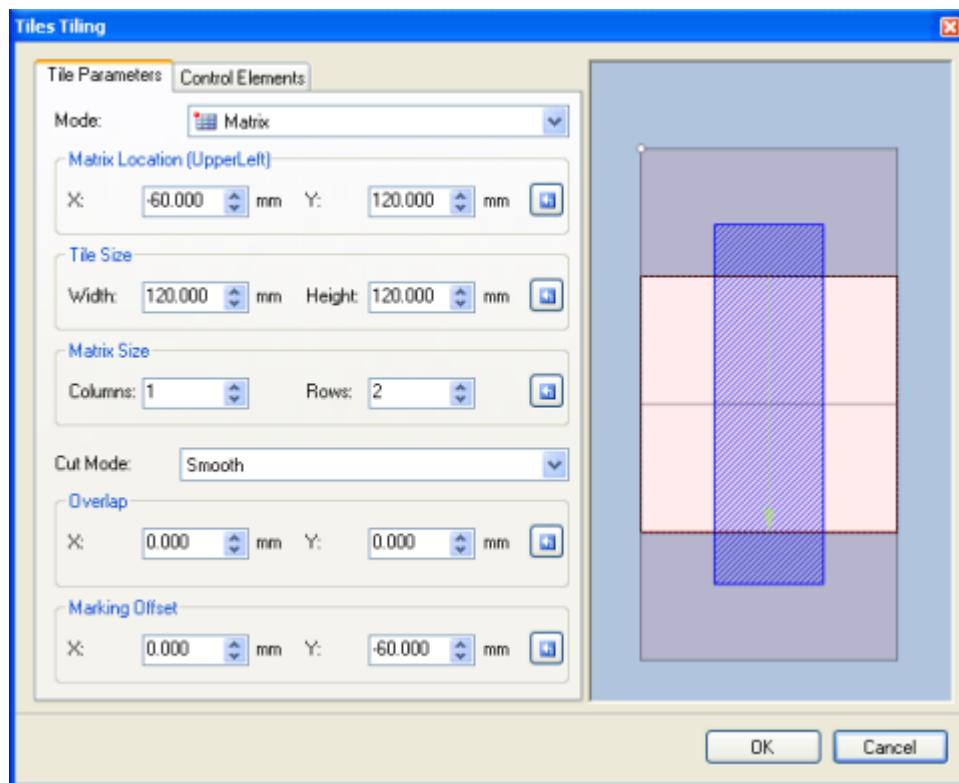
The separation of the tile set won't be carried out until marking. The advantage of "Online Mode" is that the tile set / marking object(s) can be edited even directly before marking. The disadvantage is a longer executing time caused by the calculation during marking. Post processing after the separation is not possible. The tile set is similar to a graphics set with an additional tiling action at execution time.

- Using "Offline Mode", existing marking object(s) will be divided directly into as many tiles as defined. The tiles will be arranged properly in the work area and thus the Job Explorer lists the several 'Tile's.



The advantage of "Offline Mode" is faster execution when marking the separated marking object(s), because a new calculation isn't required. After tiling, post processing is possible. The new created 'Tiles' are of the type 'Graphics Set'.

To define the tile set's partitions or the single tiles, the 'Tiles' dialog box must be selected.



The dialog box lets you define the tile parameters (tab 'Defining a Tile Set') and create and define control elements (tab 'Control Elements').

The 'Tiles' dialog box is opened as follows:

- If a tile set should be edited ("Online Mode"):
 - If not yet existing, create a tile set (see [Creating Groups, Sets or Variants](#)).
 - Select the tile set (see [Selecting Marking Objects for Editing](#))
 - Select the  button for the 'Tile Parameter' in the Property Window (see [Graphic Parameters – Tile Set](#)).

- If tiles should be created ("Offline Mode"):
 - Create one or more marking objects (see [Inserting Objects](#)).
 - Select the marking object(s) (see [Selecting Marking Objects for Editing](#)).
 - Select 'Separate ▶ Tile' in the 'Edit' menu or via the right mouse buttons [context menu](#).

Tile Parameters


NOTE:

The units are indicated in [mm, cm, mil or in] depending on the settings in the 'Options' window (see 'Units\Length' in the [View Parameter](#)).

| Field | Description |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [Display field] | The following elements are shown: <ul style="list-style-type: none"> – The tiles/stripes are colored gray. Their size corresponds to the tile/stripe size or cylinder diameter setting (see below). – The marking area is indicated by the rectangular area. Its size corresponds to the Hardware Settings (see Setting 'Optics' Parameters). – In cylinder mode, the direction of rotation is indicated by blue arrows. – The order of the tiles (sequence of execution) is indicated by green arrows. – The overlap of tiles (if set, see below) is indicated by double lines. – The marking offset (new tile position, see below) is indicated by a broken rectangle not congruent with the marking area. – The tile set's reference point (indicated by a small dot): <ul style="list-style-type: none"> - center position in grid, stripe and cylinder mode, - upper left position in matrix mode. |
| Mode | Lets you select the mode of the tile set: <ul style="list-style-type: none"> – Grid: The tiles will be optimally placed and centered. – Matrix: Lets you define the starting point for marking; used (e.g.) for set-ups with a fixed starting position. – Stripe (tiling in one dimension): Stripes are arranged behind one another with a fixed starting position to be processed stepwise. Mainly intended for processing-on-the-fly. – Cylinder (for marking on a roll): Stripes are arranged behind one another on a cylinder to be processed stepwise. Click the button to select "Grid", "Matrix", "Stripe" or "Cylinder". The fields below will change accordingly. |
| Graphic Location (Center) / Matrix Location (UpperLeft) | This field is only shown if 'Grid' or 'Matrix' is selected in the 'Mode' field (see above). Lets you move the tile set's reference point in the x and y directions. Enter the value in the input fields or use the arrow buttons. |
| X | The values in the 'Marking Offset' field (see below) will change. |
| Y | |
| Tile Size | This field is only shown if 'Grid' or 'Matrix' is selected in the 'Mode' field (see above) |
| Width | Lets you define the tiles' size. The minimum tile size is 1.0 mm. Enter the value in the input fields or use the arrow buttons. |
| Height | Ensure that the tile size defined here will not lead to conflicts with the marking area's dimensions defined in the Hardware Settings (see Setting 'Optics' Parameters). |
| Matrix Size | This field is only shown, if 'Matrix' is selected in the 'Mode' field (see above). |
| Columns | Lets you define the number of columns and rows for the Matrix mode. Enter the number of columns and rows in the input fields or use the arrow buttons. |
| Rows | NOTE: Be careful to choose values which ensure that all graphic objects will fit in the defined tiles. Otherwise parts will not be marked. |
| Stripe | This field is only shown if 'Stripe' is selected in the 'Mode' field (see above). |
| Offset | Lets you define the offset in or against the direction of movement. Enter the value in the input fields or use the arrow buttons. |
| Placement | Lets you define the processing direction: <ul style="list-style-type: none"> – Rightward (X): The process is executed in the positive x-direction (i.e. material flow in negative x-direction). – Downward (Y): The process is executed in the negative y-direction (i.e. material flow in positive y-direction). – Leftward (X): The process is executed in the negative x-direction (i.e. material flow in positive x-direction). |

| Field | Description |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> Upward (Y): The process is executed in the positive y-direction (i.e. material flow in negative y-direction). <p>Click the  button to select "Rightward (X)", "Downward (Y)", "Leftward (X)" or "Upward (Y)".</p> |
| Size | <p>Lets you define the stripes' size. Enter the value in the input field or use the arrow buttons. The smallest possible stripe size is 1 mm.</p> <p>NOTE: Be careful to choose 'Size' and 'Count' (see below) values which ensure that all graphic objects will fit in the defined stripes. Otherwise parts will not be marked.</p> |
| Count | <p>Lets you define the number of stripes. Enter the value in the input field or use the arrow buttons.</p> <p>NOTE: Be careful to choose 'Count' and 'Size' (see above) values which ensure that all graphic objects will fit in the defined stripes. Otherwise parts will not be marked.</p> |
| Cylinder | This field is only shown if 'Cylinder' is selected in the 'Mode' field (see above). |
| Offset | <p>Lets you define the offset in or against the direction of movement. Enter the value in the input fields or use the arrow buttons.</p> |
| Placement | <p>Lets you define the processing direction:</p> <ul style="list-style-type: none"> Axis 0° (Y): The process is executed in the positive y-direction (i.e. material flow in negative y-direction). Axis 90° (X): The process is executed in the positive x-direction (i.e. material flow in negative x-direction). Axis 180° (Y): The process is executed in the negative y-direction (i.e. material flow in positive y-direction). Axis 270° (X): The process is executed in the negative x-direction (i.e. material flow in positive x-direction). <p>Click the  button to select "Axis 0° (Y)", "Axis 90° (X)", "Axis 180° (Y)" or "Axis 270° (X)".</p> |
| Diameter | <p>Lets you define the arc length and thus the stripe size indirectly by defining the diameter and portion (angle extent):</p> $\text{Arc Length} = \text{Diameter} \cdot n (\text{Pi}) / 360^\circ \cdot \text{Portion} [\%]$ <p>The smallest possible stripe size resulting from that is 1 mm. If the resulting stripe size is smaller than 1 mm, no tiles are created. Enter the values in the input fields or use the arrow buttons. The minimum diameter which can be defined is 5 mm.</p> <p>NOTE: Because the cylinder's shape is not in the same z-plane (increasing effect with decreasing diameter), the laser beam cannot focus exactly over the complete size of the stripes. For high accuracy requirements, we recommend defining a small stripe size (Portion).</p> |
| Processing-on-the-fly (POF) | <p>If this checkbox is activated, tiling for Processing-on-the-fly will be applied. In this case, a Wait For Encoder control element is inserted automatically (see Control Elements). No offset of stripes can be defined. Therefore the 'Cut Mode', 'Overlap' and 'Marking Offset' parameters are deactivated. In contrast to standard tiling, the tiles are not shifted, but the virtual marking field is used.</p> <p>NOTE: POF can only be used if the RTC5 or RTC6 interface board's POF option is enabled.</p> |
| Cut Mode | <p>Lets you select how the graphic objects should be cut:</p> <ul style="list-style-type: none"> Exact: the cut edge is a straight line. Smooth: the cut edge is not a straight line but an area and allows overlaps (the 'Overlap' field, see below, will be enabled). None (if possible): If possible, objects are assigned as a whole to one tile/stripe and will not be cut. This mode is especially recommended for text objects. Automatic (Contour Exact - Hatching Smooth): The objects' contour will be cut exactly, hatch lines with overlaps. Enclosed: The cut objects will keep their type, i.e. areas will remain areas. Therefore, they will be closed automatically. Filled objects will lose filling lines. If desired, the new objects must be filled again. <p>Outlines will remain outlines and are not changed.</p> <p>Click the  button to select "Exact", "Smooth", "None", "Automatic" or "Enclosed".</p> |

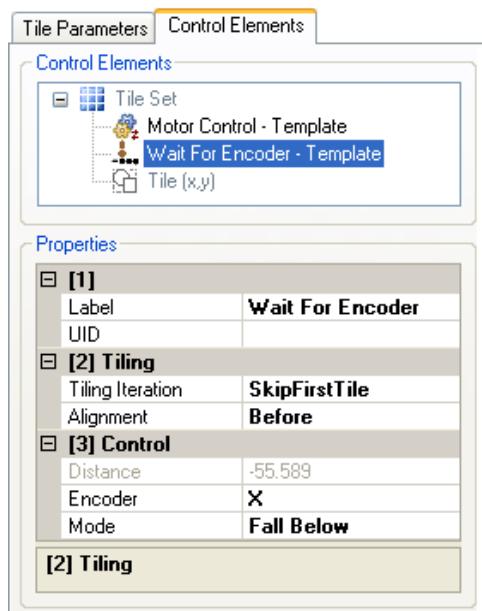
| Field | Description |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Overlap | This field is only enabled if 'Smooth' or 'Automatic' is selected in the 'Cut Mode' field (see above). |
| X | Lets you define the dimensions of the overlap areas which serve to avoid unintentional cutting of curves. |
| Y | Lets you define the dimensions of the overlap areas which serve to avoid unintentional cutting of curves. Outlines will not be cut, if they don't exceed the overlap area. Enter the value in the input fields or use the arrow buttons. |
| Marking Offset | This field is only enabled, if 'Grid' or 'Matrix' is selected in the 'Mode' field (see above). |
| X | Lets you define a marking offset (indicated by a broken rectangle in the display field). Enter the value in the input fields or use the arrow buttons. |
| Y | NOTE: Ensure that the offset doesn't result in displacement outside the marking area or marking objects lying outside the tiles. |

To define 'Tile Parameters', proceed as follows:

1. Select "Grid", "Matrix", "Stripe" or "Cylinder" in the 'Mode' field.
2. Depending on the selected mode, define the values for
 - Graphic/Matrix Location,
 - Tile Size,
 - Matrix Size,
 - Stripe,
 - Cylinder.
3. If applicable, activate or deactivate the 'Processing-on-the-fly-' checkbox.
4. Select the Cut Mode: "Exact", "Smooth", "None", Automatic" or "Enclosed".
5. If applicable, define the values for the
 - Overlap and
 - Marking Offset.
6. If desired, insert control elements into the tile set.
For how to insert and edit them, see 'Control Elements' below.
7. Confirm your entries with {OK}.
The dialog box will close.
 - If you have edited a 'Tile Set', the tile parameters will be saved.
 - If you have edited marking objects via 'Separate ▶ Tile' command, tiles will be generated directly and listed in the Job Explorer with the possibility to post process the tiles (graphics sets).

Control Elements

If you edit a tile set, the tile dialog box lets you insert and edit control elements directly in the tab 'Control Elements'. These control elements serve as templates for the insertion into the job tree after the tiling.



| Field | Description |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control Elements | The tree is similar to the Job Explorer, but only control elements can be inserted. For how to insert, place or delete control elements, see the description of the context menu in the table below. |
| Properties | With the exception of the Motor Control (see below), all other parameters (groups [1] and [3]) are described in the graphic parameters of the respective control elements (see Graphic Parameters – Overview). The parameters can be edited as described in Property Window . |
| [2] Tiling | The group '[2] Tiling' parameters are the same for all control elements! |
| Tiling Iteration | Lets you define the amount of inserts: <ul style="list-style-type: none"> - None: The control element is only inserted one time defined by the alignment. - Each Tile: The control element is inserted for each tile. - Skip First Tile: The control element is inserted for each tile except the first. |
| Alignment | Lets you define the position where the control element is inserted: <ul style="list-style-type: none"> - Before: before the tile or tile set. - After: after the tile or tile set. |
| [3] Control | For the Motor Control control element only! |
| Movement Type | Lets you select the desired movement type: <ul style="list-style-type: none"> - Absolute: The motor will move to the absolute position defined in 'Position / Distance' (see below). - Relative: The motor will move over the distance defined in 'Position / Distance' (see below). - Reference Run: The motor will execute a reference run, using the reference run type defined in the Hardware Configuration (see Setting 'Hardware Devices'\Motor Control Axis). This selection need not be used here. Click the  button to select the required movement type. |
| Axis (Horizontal), Axis (Vertical) | Lets you select one of the available axes to be moved. These are defined in the Hardware Configuration (see Setting 'Hardware Devices'\Motor Control Axis). Click the  button to open the 'Select' dialog box. |
| Distance (Horizontal), Distance (Vertical) | Not editable. Shows the distance (relative or absolute, depending on the setting in the 'Movement Type' parameter, see above) where the axis should move to. This value is calculated automatically. For this calculation it is assumed, that the units of the calibration factor defined for the axis is in [mm], except for cylinder mode (see Motor Units below). |

| Field | Description |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Speed | Lets you define the speed in [units of the calibration factor defined for the axis / s], normally [mm/s]. Enter the desired value. |
| Motor Units | Lets you select the motor units: [Increments / mm]: Must (and can only) be selected if Grid, Matrix or Stripe mode has been selected (see Tile Parameters above) [Increments / °]: Can be selected if Cylinder mode has been selected. NOTE: Only if the motor calibration has this selected unit, the automatic calculation will be correct. |

The context menu (right mouse button) serves to insert and define the control elements:

| Function | Description |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select > Clear | Lets you deselect the selected control element. |
| New > | Lets you insert a new control element. |
| Serial Communication | |
| Motor Control | |
| Wait For Encoder | Select a desired control element to insert it into the tree (see Inserting a Serial Communication Control Element , Inserting a Motor Control Element , Inserting a Wait For Encoder Control Element , Inserting Control Elements , Inserting Z-Focus Control Elements , Inserting a Vision System Control Element or Inserting a Laser Control Element). |
| Digital Input | |
| Digital Output | |
| Analog Output | |
| Pulse Output | |
| Timer Delay | |
| Z-Focus Control | |
| Vision System | |
| Laser Control | |
| Delete | Lets you delete the selected control element. The control element will be directly deleted. |
| Sequencing > | Serves to define the sequence of the control elements in the tree. (Corresponds to the 'Alignment' parameter, see table above.) |
| Move In | Inserts the selected control element into the tile set. |
| Move Down | Moves the selected control element one position down. |
| Move Up | Moves the selected control element one position up. |
| Move Out | Removes the selected control element from the tile set. |

To define control elements, proceed as follows:

1. Insert a new control element via the Context Menu (New ▶ ...).
2. To place a control element in the desired position, use the
 - Context Menu (Sequencing ▶ ...)
 - or the 'Alignment' parameter.
3. Define the parameters listed in the 'Properties' field.
The parameters are described in the graphic parameters of the respective control element (see [Graphic Parameters – Overview](#)).
4. Confirm your entries with {OK}.
The dialog box will close and the parameters will be saved in the tile set's graphic parameters.

18 Arranging Marking Objects

Marking objects can be arranged in different ways:

- Single marking objects can (for instance) be placed, moved, rotated or mirrored.
- Several marking objects can be aligned or distributed.

Most of these functions will be performed via the '[Arrange](#)' menu, the '[Arrange](#)' toolbar or via the right mouse button's [Context Menu](#). Further functions will be performed via dialog box.

18.1 Positioning Marking Objects to the Origin

The 'Center to Origin' function lets you position marking objects directly to the origin of the work area. This is only possible with one object or one group or one graphics paths.



NOTE:

For most marking objects, the reference point is the center (point).

To deviate from that, the font text's reference point can be changed with the parameter 'Justification' (see [Graphic Parameters – Font Text](#)).

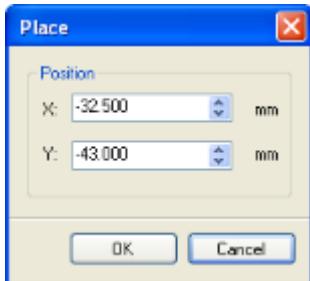
To position a marking object to the origin, proceed as follows:

1. Select the desired marking object or group / graphics paths (see [Selecting Marking Objects for Editing](#)).
The shape changes color and will be enclosed by a rectangle frame with support points for editing.
2. Select 'Position ▶ Center to Origin'
 - from the '[Edit](#)' menu
 - or from the right mouse button's [Context Menu](#).

or
select 'Center to Origin' in the '[Arrange](#)' toolbar.
The selected marking object will be positioned directly to the origin of the work area.

18.2 Placing Marking Objects in the Work Area

To place marking objects accurately and quickly to an exact position, laserDESK offers the 'Place' dialog box which can be called via the menu or context menu:



The (Position) 'X:' and 'Y:' input fields define the position in the work area's coordinate system.


NOTE:

For most marking objects, the reference point is the center (point).

To deviate from that, the font text's reference point can be changed with the parameter 'Justification' (see [Graphic Parameters – Font Text](#)).

To place the marking object, proceed as follows:

1. Select 'Position ▶ Place' from the
 - [Edit](#) menu
 - or right mouse button's [context Menu](#).
 The 'Place' dialog box appears.
2. Enter the desired values in the fields 'X:' and 'Y:' or use the arrow buttons.
3. Confirm your entries with {OK}.
 The marking object will be placed at the defined position.

18.3 Moving Marking Objects in the Work Area

To move marking objects accurately and quickly, laserDESK offers the 'Move' dialog box which can be called via the menu or context menu:



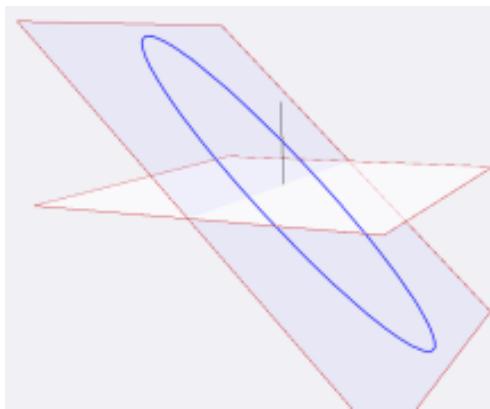
The (Distance) 'X:' and 'Y:' input fields define positive or negative translation in the x and y directions.

To move the marking object, proceed as follows:

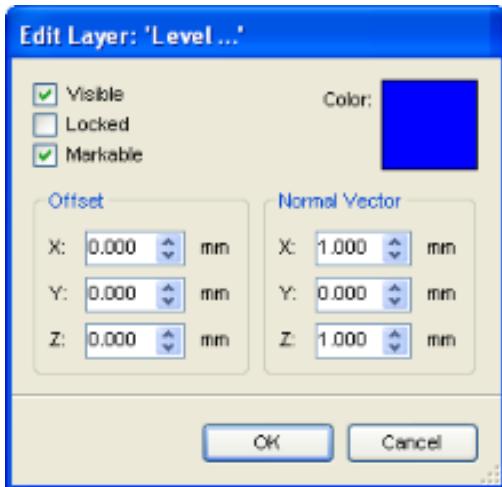
1. Select 'Move' from the
 - [Edit](#) menu
 - or right mouse button's [context Menu](#).
 The 'Move' dialog box appears.
2. Enter the desired values in the fields 'X:' and 'Y:' or use the arrow buttons.
3. Confirm your entries with {OK}.
 The marking object moves by the defined values.

18.4 Setting Objects to an Inclined Plane (Editing a Layer)

Additionally to the table in the 'Layers' window, the layers can be edited in the 'Edit Layer' dialog box. It is primarily intended to set objects to an inclined plane and then process them in the z-direction. Thus, marking objects created in the xy-plane can then (e.g.) be marked on the inclined side of a workpiece as a correct 2D shape:



When you double click a row in the [Layers Window](#), the 'Edit Layer' dialog box appears:



| Parameter | Description |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Visible | If the checkbox is activated, the marking objects assigned to this layer are visible. If deactivated, invisible. (Also see 'Layers' in the View Parameters .) |
| Locked | If the checkbox is activated, the marking objects assigned to this layer are not editable. If deactivated, editable. |
| Markable | If the checkbox is activated, the marking objects assigned to this layer are markable. If deactivated, not markable. |
| Color: | Click in the colored field to open the (<i>Windows-standard</i>) 'Color' dialog box. Select or define a color and confirm with {OK}. (Also see 'Layers' in the View Parameters .) |
| Offset X [mm]: Y [mm]: Z [mm]: | Serve to define an offset in the x-, y- and/or z-directions (in [mm]). Enter the values into the input fields or use the arrow buttons. |
| Normal Vector X [mm]: Y [mm]: Z [mm]: | Serve to set the marking object's tilt (inclined plane). NOTE: The z-value and the x- or y- value must be not equal zero. Otherwise, the object has no tilt (x=y=0 corresponds to standard 2D marking) or a non-markable 90° tilt. Use the 3D View (see Views Window) to check the setting. Enter the values into the input fields or use the arrow buttons. |

To edit a layer, proceed as follows:

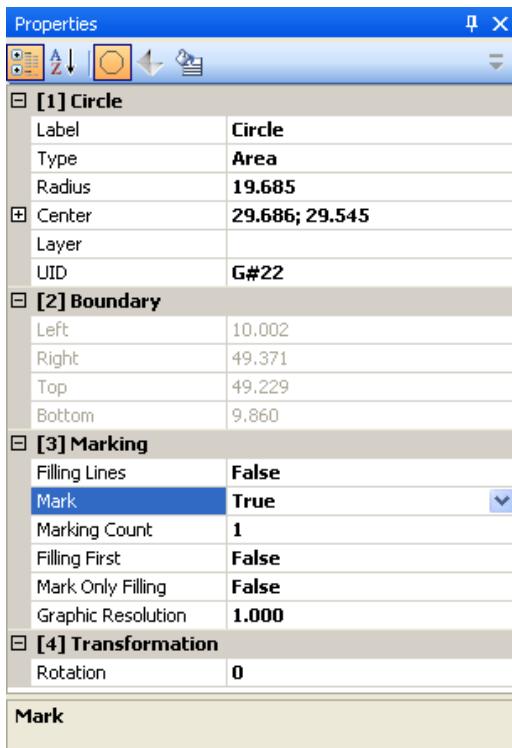
1. To enable or disable the layers properties (visible, locked, markable), activate or deactivate the corresponding checkboxes.
2. To define the layer's color, click the colored field.
The 'Color' dialog box appears.
Select or define the color and confirm with {OK}.
3. To set an object to an inclined plane, define the tilt values in the 'Normal Vector' field.
4. If you want to define an additional offset, modify the values in the corresponding field.
5. Confirm your settings with {OK}.
The objects assigned to this layer will inherit the defined settings.

19 Property Window

The Property Window lets you

- view the settings of the displayed parameter set
- edit individual parameters or manage the assigned parameter set of a selected marking object
- edit individual parameters or manage parameter sets inside a job library and 'Marking Library'.

When you select a marking object in the work area or Job Explorer or select a parameter set in a library, the corresponding parameters appear in the Property Window:



Graphic parameters determine the shape, dimensions, orientation and position of marking objects. Due to the different shapes of each type of marking object (e.g. lines, circles, spirals, polygons), every marking object type has specific graphic parameter types defining its properties. Groups' and variants' properties are also displayed.

Likewise, parameters of control elements and protocol nodes (which define the signal mode) are also shown inside the graphic parameters.

In contrast, each set of the following process parameters always comprises the same individual parameter types (but not the same parameter settings!). The parameter sets can be assigned to individual, several or all marking objects of one job (see [Library Explorer / Marking Library](#)).

Marking parameters define the laser and scan head settings, which are crucial for good results in the marking process. Additionally, **pixel image parameters** can be set for pixel images.

Like marking parameters, the **fill parameter** types are the same for all marking objects. The fill parameters define the properties for filling closed marking objects.



NOTE:

To create a new job, we recommend inserting and editing the marking objects first. Only after defining the marking object's layout you should specify the process parameters (marking, fill, and pixel image parameters).

- When Editing Individual Parameters, you can modify individual values, select one of several items and define several items.
- When Editing Shared Properties , you can modify specific graphic properties for several marking objects.

- When Managing Parameter Sets, you can copy, rename, delete, and export parameter sets according to your requirements.

The various parameter types must be selected via the following buttons located in the property window's topmost line:

| Button | Description |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 'Categorized' view mode: Click button to sort the parameters according to categories. |
|  | 'Alphabetical' view mode: Click button to sort the parameters alphabetically. |
|  | Graphic Parameters (icon of the selected object, here ellipse): Click button to display the graphic parameters. |
|  | Shared Properties : Click button to display the shared properties of the selected objects. |
|  | Marking Parameters : Click button to display the marking parameters. |
|  | Fill Parameters : Click button to display the fill parameters. |
|  | Pixel Image Parameters : Click button to display the pixel image parameters. |
|  | 'Edit': Not enabled in 'Graphic Parameters'. Select button to open a context menu that lets you activate individual parameters for editing and to manage the parameter set (described in the table below). |

The Property Window can be displayed or hidden and be arranged according to your individual preferences (see [Arranging the Windows](#)).

19.1 Editing Individual Parameters

To edit individual parameters, proceed as follows:

1. Select
 - the Marking Library via '\Open ▶ \Marking Library' in the '[File](#)' menu
 - or the [Library Explorer](#) inside a job.The Library Explorer appears.
2. Select a desired process parameter set below 'Marking Parameters', 'Fill Parameters' or 'Pixel Image Parameters'.
The corresponding marking parameter set appears in the property window.
Continue with step 5.

or

1. Select a marking object in the work area or Job Explorer.
2. Select the desired parameter type in the property window (see buttons in the table above).
The parameter set assigned to the selected object is displayed.
If you want to edit a graphic parameter set, continue with step 5.
3. Select the  button:
A context menu appears.
4. Select 'Modify'.
The individual parameters become active (black font = editable).
5. Select the parameter to be changed in the left column.
The parameter will be highlighted blue.
6. If you need to modify a value press the <Tab> key.
The current value in the right column will be highlighted blue.
Input the desired value using integers or floating point numbers.
Confirm your input by pressing the <Enter> key.
If graphic parameters have been modified, the marking object in the work area will immediately refreshed to reflect the changes
7. If one of several items must be selected, the  button will be displayed at the side.
Click the button to select the desired item via a drop-down menu.
8. If one or several items must be defined in a dialog box, the  button will be displayed at the side.
Click the button to define the item(s) via the dialog box.



NOTE:

If you subsequently close the job or Marking Library without saving, the changes will not be applied!
If you want to save the settings permanently, proceed as described below.

9. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or
When you close the job or marking library (by opening a new job or 'Hardware Configuration' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.
10. If you want to save settings local under a new name or export to the marking library, see 'Managing Parameter Sets' below.

19.2 Editing Shared Properties

To edit the graphic parameters for several objects, refer to [Shared Properties](#).

19.3 Managing Parameter Sets

To manage parameter sets a context menu must be opened via the 'Edit' button (see table above) or by pressing the right mouse button with the cursor in the property window. A context menu with the following functions will appear:

| Function | Description |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use... | <p>Serves to assign a parameter set to a selected marking object. The 'Template' dialog box appears. Select the desired template / parameter set in the 'Name' selection field (parameter sets from the marking library are signed with "[lib]").</p>  <p>Confirm with {OK}. The selected parameter set will be assigned to the marking object and thus the parameters' values will be modified accordingly. The line 'Inherited From' indicates "Template: [Name]". If a parameter set was assigned from the marking library, it will be inserted in the job library.</p> |
| Use Default | <p>Serves to assign the settings of the <default> parameter set to a selected marking object or to a selected parameter set. The 'Local Data' dialog box with the query "Do you want to overwrite local parameters?" appears. Confirm with {OK}. The <default> parameter set will be assigned to the marking object and thus the parameters' values will be modified accordingly. The line 'Inherited From' indicates "Template: <default>".</p> |
| Save (Local) | <p>Saves the current parameter settings in the property window directly (without querying a name) in a new parameter set. This will be inserted into the Library Explorer as "Auto-#".</p> |
| Calculate Delays | <p>NOTE: This functions will only be shown when modifying the 'Marking Parameters'. Serves to calculate the laser and scanner delays (see Marking Parameters – Laser Delays and Marking Parameters – Scanner Delays) basing on the tracking error of the used scan head. If your laser scan system is equipped with an intelliSCAN scan head, the tracking error can be calculated before with the Tracking Error Wizard (see Evaluating the Scan Head's Tracking Error). If your laser scan system is equipped with another scan head, refer to the 'Technical Specifications' in the scan head's manual. To calculate the delays proceed as follows: – Select primarily {Marking Parameters} and subsequently {Modify} in the property window's topmost line. A context menu appears. – Select 'Calculate Delays'. The 'Calculate Delays' dialog box appears. – Refer to the technical specifications in the scan head's manual to read the tracking error, then enter the value (in [μs]) in the input field . – Confirm with {OK}. The '[4] Laser Delays' and '[5] Scanner Delays' will be calculated immediately.</p> |
| Save (Local) As... | <p>Serves to save the current parameter settings in the property window in a new parameter set. The 'New Template' dialog box appears. Enter the desired name in the 'Name' selection field and confirm with {OK}. The new parameter set will inserted into the Library Explorer.</p> |
| Reset | <p>Serve to overwrite the current parameter settings in the property window with the settings of the <default> parameter set. The 'Local Data' dialog box with the query "Do you want to overwrite local parameters?" appears. Confirm with {OK}. The settings of the <default> parameter set will be inherited.</p> |
| Export As... | <p>Only available in a job. Serve to export the current parameter settings in the property window to the marking library. The 'New Template' dialog box appears. Enter the desired name in the 'Name' selection field and confirm with {OK}. The new parameter set will exported to the marking library and (if not already done) inserted into the job's Library Explorer.</p> |

| Function | Description |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Export As Default | <p>Only available in a job.</p> <p>Serve to export the current parameter settings in the property window as <default> parameter set to the marking library.</p> <p>The 'Save Template' dialog box with the message "Default template will be overwritten!" appears.</p> <p>Confirm with {OK}.</p> <p>The parameters' settings will be exported to the marking library's <default> parameter set and copied into the job library's <default> parameter set.</p> |

For managing parameter sets proceed as follows:

1. Select the  button
or
place the cursor in the property window and press the right mouse button.
A context menu appears.

2. Select the required function (see table above) and perform the corresponding actions.



NOTE:

If you close the job or marking library subsequently without saving, the changes will not be applied!
If you want to save the settings permanently, proceed as described below.

3. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or
When you close the job or marking library (by opening a new job or 'Hardware Configuration' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

19.4 Graphic Parameters

Graphic parameters determine the shape, dimension, orientation and position of marking objects. Due to the different shape and properties of each type of marking object - geometric shape (point, line, circle, spiral, ...), text, function (date and time, serial number), group and variant - every marking object type has specific graphic parameters.

The various signal modes of control elements and sampling rate of protocol node will also be defined by the graphic parameters.

To edit an object, use the following buttons for selection:

| Button | Description |
|--------|-------------------------------------------------------------------------------------------------------------|
| | 'Graphic Parameters': icon of the selected object (here ellipse). Select to edit the graphic parameters. |
| | 'Categorized' view mode: Select to sort the parameters according to categories. |
| | 'Alphabetical' view mode: Select to sort the parameters in alphabetical order. |

The various graphic parameters are described in the following topics:

| | |
|--|-----------------------------------------------|
| | Analog Output |
| | Arc |
| | Barcode |
| | Character |
| | Circle |
| | Date/Time Font Text |
| | Date/Time Vector Text |
| | Date/Time Barcode |
| | Digital Input |
| | Digital Output |
| | Ellipse |
| | Graphics Path |
| | Graphics Paths (Set) |
| | Graphics Set |
| | Group (incl. Vector Graphics) |
| | Image |
| | Import Font Text |
| | Import Vector Text |
| | Import Barcode |
| | Job |
| | Laser Control |
| | Line |
| | List |

| | |
|-------------------------------------------------------------------------------------|-------------------------------------------------|
|  | Motor Control |
|  | Outline |
|  | Point |
|  | Polygon (incl. Extended Shapes) |
|  | Protocol Nodes |
|  | Pulse Output |
|  | Rectangle |
|  | Reference To Symbol |
|  | Serial Communication |
|  | Serial Number Font Text |
|  | Serial Number Vector Text |
|  | Serial Number Barcode |
|  | Spiral |
|  | Text (Box) |
|  | Text (Font) |
|  | Text (Vector) |
|  | Tile Set |
|  | Timer Delay |
|  | Timer Nodes |
|  | Variant |
|  | Vision System |
|  | Wait For Encoder |
|  | Z-Focus Control |

Analog Output

These parameters of the 'Analog Output' control element serve to define the signal output to an external system.

The analog output must be connected to pin 15 of the RTC5 or RTC6 board's 'Laser' connector (Analog Out 2, see [Connecting the Laser to the RTC5 or RTC6 PC Interface Board](#)).

The following table describes each parameter.

| Parameter | Description |
|--------------------------|------------------------------------------------------------------------------------------------|
| [1] Analog Output | |
| Label | Default name: "Analog Output". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Voltage [0-10 V] | The analog output voltage can be an integer or floating-point number within a range of 0-10 V. |

Information on editing parameters is described in [Property Window](#).

Arc

These graphic parameters precisely define the geometric properties of arcs. The following table describes each parameter.

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). | |
| Parameter | |
| [1] Arc | Description |
| Label | Default name: "Arc". If desired, you can change the name. |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Angle Start | Lets you define the angle start position: "0" or "360" equates to the x axis in the positive direction. "90" or "-270" = equates to the y axis in the positive direction. |
| Angle Extent | Lets you define the angular degree relative to the angle start (see above). Positive value (unsigned): counterclockwise direction of rotation. Negative value (with minus "-"): clockwise direction of rotation. |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window) |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the arc in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [3] Marking | |
| Mark | Lets you enable or disable the marking process for this object. Click the  button to select 'True' for marking or 'False' for not marking. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) in mathematical positive direction. |
| Flip X | The arc can be mirrored with respect its orientation in the x direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |

| Parameter | Description |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flip Y | The arc can be mirrored with respect to its orientation in the y direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |

Information on editing parameters is described in [Property Window](#).

Barcode

These graphic parameters precisely define properties of barcodes. These comprise the geometric properties (Appearance, Boundary, Transformation), the barcode properties (Barcode) and the marking properties (Marking). The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the View Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Barcode | |
| Label | Default name: "Barcode". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window) |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the barcode in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Barcode | |
| Text | Shows the value of the displayed barcode (not editable). |
| Readable Text | Lets you define text that will be displayed below the barcode. NOTE: Inserting readable text will disable the display of barcode text/values in the form of numbers. |

| Parameter | Description |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Code Type | <p>laserDESK offers a large number of linear and matrix barcode types, which can be selected here from a drop-down menu.</p> <p>Click the  button to select the required code type.</p> |
| Check Method | <p>Most barcodes have a defined checksum calculation.</p> <p>Using this calculation, select "Standard".</p> <p>For some barcodes it is possible to leave out the checksum. Then select "None". In this case your barcode reader has to support the reading without checksum.</p> <p>Click the  button to select "Standard" or "None".</p> |
| Ratio | <p>Ratio between small and wide bars.</p> <p>The availability depends on the barcode type (not editable).</p> |
| Maximum Length | Allowed number of digits, depending on the code type (not editable). |
| Bar Line Reduction [%] | Lets you define the reduction of the bar lines. Corresponds to outline reduction (see Fill Parameters), but in % and not absolute. |
| Module Width | Lets you define the width of the module (smallest bar). The width of the wider bars will be set respectively. |
| Quiet Zone | |
| Left | Lets you define the dimensions of the margin quiet zone. |
| Right | All values can be entered/modified in 'Quiet Zone' or each value in 'Left', 'Right', 'Top' and 'Bottom'. |
| Top | |
| Bottom | |
| Enable Text | <p>Lets you display the barcode's text/value (see 'Text' above) below the barcode.</p> <p>Click the  button to select "True" for enabling text or "False" for disabling text.</p> |
| Text Distance | <p>Lets you define the distance between the barcode and the text below (if enabled).</p> <p>With increasing distance the height of the barcode will decrease.</p> |
| Font Name | <p>laserDESK offers a large number of font types, which can be selected here from a drop-down menu.</p> <p>Click the  button to select the desired font.</p> |
| Size | Lets you define the desired font size (in [Points]). |
| Font Style | <p>Lets you define the font style: "Regular", "Bold" or "Italic".</p> <p>Click the  button to select the desired font style.</p> |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| Code Page | <p>Lets you select a code page (each with an own interpretation of the character display).</p> <p>Necessary, because barcodes are not always unicode capable and the barcode library does not support unicode.</p> <p>Click the  button to select the required code page.</p> |
| Inverse | <p>The barcode can be marked inverse. The barcode will be framed to mark the area outside the bars and inside the frame.</p> <p>Click the  button to select "True" for inverse marking or "False" for normal marking.</p> |
| [4] Marking | |
| Filling Lines | <p>Lets you fill the barcode with filling lines.</p> <p>If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling.</p> <p>Click the  button to select "True" for filling the barcode or "False" for not filling.</p> |
| Mark | <p>This parameter let you define the kind of execution of this object.</p> <p>One of the following items can be selected:</p> <ul style="list-style-type: none"> – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Variable | <p>Lets you allow to change the text content in remote mode.</p> <p>Click the  button to select "True" for changeable/variable text or "False" for not changeable/variable text.</p> <p>(For further information, see Definition of the Remote Control.)</p> <p>NOTE:</p> <p>If you don't use a remote control or if you don't want to change text inside remote mode, you should set this parameter to "False", because execution will then proceed faster.</p> |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |

| Parameter | Description |
|---------------------------|------------------------------------------------------------------------------------------|
| [5] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Translation | Offset in the x and y directions to the value set in the 'Center' parameter (see above). |
| X | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Y | |

Information on editing the parameters is described in [Property Window](#).

Character

These graphic parameters precisely define the properties of characters. These comprise the geometric properties (Appearance, Boundary, Transformation) and marking properties (Marking). The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Character | |
| Label | Default name: "[character]". If desired, you can change the name. |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Center | Marking object's center position in the x and y direction in the work area's coordinate system (not editable) |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the character in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. |
| Z Height | The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [3] Marking | |
| Filling Lines | Lets you fill the character with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the character or "False" for not filling. |

| Parameter | Description |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mark | <p>This parameter let you define the kind of execution of this object. One of the following items can be selected:</p> <ul style="list-style-type: none"> - Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. - Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. - Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. - Hatchlines only: only the hatchlines will be marked. - None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Circle

These graphic parameters precisely define the geometric properties of circles. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Circle | |
| Label | Default name: "Circle". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Radius | Lets you define the circle's radius. |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary Category | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the circle in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [3] Marking | |
| Filling Lines | <p>Lets you fill the circle with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the circle or "False" for not filling.</p> |
| Mark | <p>This parameter let you define the kind of execution of this object. One of the following items can be selected:</p> <ul style="list-style-type: none"> – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Date/Time Barcode

These graphic parameters precisely define the geometric properties of this variable object. The following table describes each parameter.

| | |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Date/Time | |
| View | "Barcode" (not editable) |
| Label | Default name: "Date/Time". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x-direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y-direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: <ul style="list-style-type: none"> – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings window'). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the barcode in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |

| Parameter | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------|-----------|------------|---------------|-------|--------|-------|------|--|--------|-------|------|--|---------------|-------|------|--|---------------|-------|-------|--|------------|-------|------|--|------------|-----|------------|---------------------------------|--------------|-------|------|--|--------------|-----|------------|---------------------------------|------|-----------------|----------------|--|-------------|-----|---|----------------------------------------------------------------|-----------------|-------|------|--------------------------------------------|-------------|---------|--------|--|----------------------|---|-------|----------------------------------|----------|--------|------------|------------|------------|--------------|---------|----------------|----------|----------|---------|---------|--------|--------|-------|-------|
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [3] Time Parameter | <p>Lets you define a date/time format string by using several format identifiers:</p> <table border="1"> <thead> <tr> <th>Date/Time</th> <th>Identifier</th> <th>Display (Ex.)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>Second</td> <td>ss/SS</td> <td>4/04</td> <td></td> </tr> <tr> <td>Minute</td> <td>nn/NN</td> <td>5/05</td> <td></td> </tr> <tr> <td>12-hour-clock</td> <td>kk/KK</td> <td>6/06</td> <td></td> </tr> <tr> <td>24-hour-clock</td> <td>hh/HH</td> <td>18/18</td> <td></td> </tr> <tr> <td>Day (Date)</td> <td>dd/DD</td> <td>7/07</td> <td></td> </tr> <tr> <td>Day (Name)</td> <td>e/E</td> <td>Mon/Monday</td> <td>First 3 letters / complete name</td> </tr> <tr> <td>Month (Date)</td> <td>mm/MM</td> <td>8/08</td> <td></td> </tr> <tr> <td>Month (Name)</td> <td>g/G</td> <td>Aug/August</td> <td>First 3 letters / complete name</td> </tr> <tr> <td>Year</td> <td>yy/YY/yyyy/YYYY</td> <td>9/09/2009/2009</td> <td></td> </tr> <tr> <td>Day in Week</td> <td>f/F</td> <td>2</td> <td>f: 1 = Sunday ... 7 = Saturday F: 1 = Monday ... 7 = Sunday</td> </tr> <tr> <td>(Calendar) Week</td> <td>ww/WW</td> <td>3/03</td> <td>Week 1 with 4 days of the new year minimum</td> </tr> <tr> <td>Day in Year</td> <td>aaa/AAA</td> <td>89/089</td> <td></td> </tr> <tr> <td>12-hour-clock Suffix</td> <td>p</td> <td>am/pm</td> <td>Typically set with 12-hour-clock</td> </tr> </tbody> </table> <p>Using capitals, the numerical digit is displayed definitely, including leading zeros. Using lowercases, leading zeros will not be displayed.</p> <p>Each letter of an identifier equates to a numerical digit, except for the names (identifiers "e, E, g, G, p"). Date and time can be split into individual digits. The digits will then be written in correct order.</p> <p>The following delimiters can be used inside the format string: / () \ + * # < > , ; . : -</p> <p>All characters apart from these delimiters and the identifiers listed in the table above will be ignored!</p> <p>Examples:</p> <table> <tbody> <tr> <td>mm/dd/yy</td> <td>6/7/09</td> <td>DD.MM.YYYY</td> <td>07.06.2009</td> </tr> <tr> <td>G mm, yyyy</td> <td>June 7, 2009</td> <td>E, G dd</td> <td>Sunday, June 7</td> </tr> <tr> <td>HH:NN:SS</td> <td>08:36:07</td> <td>kk:nn p</td> <td>8:36 am</td> </tr> <tr> <td>DMYYMD</td> <td>000967</td> <td>MY.YM</td> <td>00.96</td> </tr> </tbody> </table> | | | Date/Time | Identifier | Display (Ex.) | Notes | Second | ss/SS | 4/04 | | Minute | nn/NN | 5/05 | | 12-hour-clock | kk/KK | 6/06 | | 24-hour-clock | hh/HH | 18/18 | | Day (Date) | dd/DD | 7/07 | | Day (Name) | e/E | Mon/Monday | First 3 letters / complete name | Month (Date) | mm/MM | 8/08 | | Month (Name) | g/G | Aug/August | First 3 letters / complete name | Year | yy/YY/yyyy/YYYY | 9/09/2009/2009 | | Day in Week | f/F | 2 | f: 1 = Sunday ... 7 = Saturday F: 1 = Monday ... 7 = Sunday | (Calendar) Week | ww/WW | 3/03 | Week 1 with 4 days of the new year minimum | Day in Year | aaa/AAA | 89/089 | | 12-hour-clock Suffix | p | am/pm | Typically set with 12-hour-clock | mm/dd/yy | 6/7/09 | DD.MM.YYYY | 07.06.2009 | G mm, yyyy | June 7, 2009 | E, G dd | Sunday, June 7 | HH:NN:SS | 08:36:07 | kk:nn p | 8:36 am | DMYYMD | 000967 | MY.YM | 00.96 |
| Date/Time | Identifier | Display (Ex.) | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Second | ss/SS | 4/04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minute | nn/NN | 5/05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-hour-clock | kk/KK | 6/06 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-hour-clock | hh/HH | 18/18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day (Date) | dd/DD | 7/07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day (Name) | e/E | Mon/Monday | First 3 letters / complete name | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Month (Date) | mm/MM | 8/08 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Month (Name) | g/G | Aug/August | First 3 letters / complete name | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Year | yy/YY/yyyy/YYYY | 9/09/2009/2009 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day in Week | f/F | 2 | f: 1 = Sunday ... 7 = Saturday F: 1 = Monday ... 7 = Sunday | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (Calendar) Week | ww/WW | 3/03 | Week 1 with 4 days of the new year minimum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day in Year | aaa/AAA | 89/089 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-hour-clock Suffix | p | am/pm | Typically set with 12-hour-clock | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| mm/dd/yy | 6/7/09 | DD.MM.YYYY | 07.06.2009 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G mm, yyyy | June 7, 2009 | E, G dd | Sunday, June 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HH:NN:SS | 08:36:07 | kk:nn p | 8:36 am | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DMYYMD | 000967 | MY.YM | 00.96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date/Time | Shows the system date/time of the PC. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Offset | Entering an unsigned value (> 0) will increase the displayed time entering a value (> 0) with minus sign, will decrease the displayed time. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Text | Shows the displayed date/time (not editable). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prefix | Lets you insert a prefix or suffix. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Suffix | A static text will be displayed in front of or after the date/time, e.g. "P [date/time] S". | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [4] Barcode Parameter | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Text | Shows the value of the displayed barcode (not editable). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Code Type | laserDESK offers a large number of linear and matrix barcode types, which can be selected here from a drop-down menu. Click the  button to select the required code type. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ratio | Ratio between small and wide bars. The availability depends on the barcode type (not editable). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bar Line Reduction [%] | Lets you define the reduction of the bar lines. Corresponds to outline reduction (see Fill Parameters), but in % and not absolute. |
| Module Width | Lets you define the width of the module (smallest bar). The width of the wider bars will be set respectively. |
| Enable Text | Lets you display the barcode's text/value (see 'Text' above) below the barcode. Click the  button to select "True" for enabling text or "False" for disabling text. |
| Text Distance | Lets you define the distance between the barcode and the text below (if enabled). With increasing distance the height of the barcode will decrease. |
| Font Name | laserDESK offers a large number of font types, which can be selected here from a drop-down menu. Click the  button to select the desired font. |
| Size | Lets you define the desired font size (in [Points]). |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the adaptation. |
| Code Page | Lets you select a code page (each with an own interpretation of the character display). Necessary, because barcodes are not always Unicode capable and the barcode library does not support Unicode. Click the  button to select the required code page. |
| Quiet Zone | Lets you define the dimensions of the margin quiet zone. All values can be entered/modified in 'Quiet Zone' or each value in 'Left', 'Right', 'Top' and 'Bottom'. |
| Left | |
| Right | |
| Top | |
| Bottom | |
| Inverse | The barcode can be marked inverse. The barcode will be framed to mark the area outside the bars and inside the frame. Click the  button to select "True" for inverse marking or "False" for normal marking. |
| [5] Marking | |
| Filling Lines | Lets you fill the barcode with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the barcode or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Translation | Offset in the x and y directions to the value set in the 'Center' parameter (see above). |
| X | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Y | |

Information on editing parameters is described in [Property Window](#).

Date/Time Font Text

These graphic parameters precisely define the geometrical properties of this variable object. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Date/Time | |
| Text Layout | "Font" (not editable) |
| Label | Default name: "Date/Time". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Origin | Marking object's reference point position in the x and y directions in the work area's coordinate system. |
| X | The reference point can be selected in 'Justification' (see below). Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | The reference point can be selected in 'Justification' (see below). Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Center | Position of the marking object's center in the work area's coordinate system (not editable) |
| Justification | Lets you define the object's reference point. Affects all other alignment settings. Click the  button to open a drop-down menu. Select the desired origin: "Left Bottom", ..., "Center Center", ..., "Right Top". |
| Text | Shows the displayed text / date/time (not editable). |
| Font Name | laserDESK offers a large number of fonts, selectable here from a drop-down menu. Click the  button to select the desired font. |
| Font Size [Points] | Lets you enter the desired font size (in [Points]). |
| Italic | The text can be displayed in italic style. Click the  button to select "True" for italic style or "False" for normal style. |
| Bold | The text can be displayed in bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will be created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |

| Parameter | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z Top | <p>Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node.</p> <p>The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals.</p> <p>Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly.</p> <p>Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [3] Time Parameter | <p>Lets you define a date/time format string by using several format identifiers:</p> <table border="1"> <thead> <tr> <th>Date/Time</th> <th>Identifier</th> <th>Display (Ex.)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>Second</td> <td>ss/SS</td> <td>4/04</td> <td></td> </tr> <tr> <td>Minute</td> <td>nn/NN</td> <td>5/05</td> <td></td> </tr> <tr> <td>12-hour-clock</td> <td>kk/KK</td> <td>6/06</td> <td></td> </tr> <tr> <td>24-hour-clock</td> <td>hh/HH</td> <td>18/18</td> <td></td> </tr> <tr> <td>Day (Date)</td> <td>dd/DD</td> <td>7/07</td> <td></td> </tr> <tr> <td>Day (Name)</td> <td>e/E</td> <td>Mon/Monday</td> <td>First 3 letters / complete name</td> </tr> <tr> <td>Month (Date)</td> <td>mm/MM</td> <td>8/08</td> <td></td> </tr> <tr> <td>Month (Name)</td> <td>g/G</td> <td>Aug/August</td> <td>First 3 letters / complete name</td> </tr> <tr> <td>Year</td> <td>yy/YY/yyyy/YYYY</td> <td>9/09/2009/2009</td> <td></td> </tr> <tr> <td>Day in Week</td> <td>f/F</td> <td>2</td> <td>f: 1 = Sunday ... 7 = Saturday F: 1 = Monday ... 7 = Sunday</td> </tr> <tr> <td>(Calendar) Week</td> <td>ww/WW</td> <td>3/03</td> <td>Week 1 with 4 days of the new year minimum</td> </tr> <tr> <td>Day in Year</td> <td>aaa/AAA</td> <td>89/089</td> <td></td> </tr> <tr> <td>12-hour-clock Suffix</td> <td>p</td> <td>am/pm</td> <td>Typically set with 12-hour-clock</td> </tr> </tbody> </table> <p>Using capitals, the numerical digit is displayed definitely, including leading zeros. Using lowercases, leading zeros will not be displayed.</p> <p>Each letter of an identifier equates to a numerical digit, except for the names (identifiers "e, E, g, G, p"). Date and time can be split into individual digits. The digits will then be written in correct order.</p> <p>The following delimiters can be used inside the format string: / () \ + * # < > , ; : -</p> <p>All characters apart from these delimiters and the identifiers listed in the table above will be ignored!</p> <p>Examples:</p> <table> <tbody> <tr> <td>mm/dd/yy</td> <td>6/7/09</td> <td>DD.MM.YYYY</td> <td>07.06.2009</td> </tr> <tr> <td>G mm, yyyy</td> <td>June 7, 2009</td> <td>E, G dd</td> <td>Sunday, June 7</td> </tr> <tr> <td>HH:NN:SS</td> <td>08:36:07</td> <td>kk:nn p</td> <td>8:36 am</td> </tr> <tr> <td>DMYYMD</td> <td>000967</td> <td>MY.YM</td> <td>00.96</td> </tr> </tbody> </table> | | | Date/Time | Identifier | Display (Ex.) | Notes | Second | ss/SS | 4/04 | | Minute | nn/NN | 5/05 | | 12-hour-clock | kk/KK | 6/06 | | 24-hour-clock | hh/HH | 18/18 | | Day (Date) | dd/DD | 7/07 | | Day (Name) | e/E | Mon/Monday | First 3 letters / complete name | Month (Date) | mm/MM | 8/08 | | Month (Name) | g/G | Aug/August | First 3 letters / complete name | Year | yy/YY/yyyy/YYYY | 9/09/2009/2009 | | Day in Week | f/F | 2 | f: 1 = Sunday ... 7 = Saturday F: 1 = Monday ... 7 = Sunday | (Calendar) Week | ww/WW | 3/03 | Week 1 with 4 days of the new year minimum | Day in Year | aaa/AAA | 89/089 | | 12-hour-clock Suffix | p | am/pm | Typically set with 12-hour-clock | mm/dd/yy | 6/7/09 | DD.MM.YYYY | 07.06.2009 | G mm, yyyy | June 7, 2009 | E, G dd | Sunday, June 7 | HH:NN:SS | 08:36:07 | kk:nn p | 8:36 am | DMYYMD | 000967 | MY.YM | 00.96 |
| Date/Time | Identifier | Display (Ex.) | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Second | ss/SS | 4/04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minute | nn/NN | 5/05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-hour-clock | kk/KK | 6/06 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-hour-clock | hh/HH | 18/18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day (Date) | dd/DD | 7/07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day (Name) | e/E | Mon/Monday | First 3 letters / complete name | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Month (Date) | mm/MM | 8/08 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Month (Name) | g/G | Aug/August | First 3 letters / complete name | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Year | yy/YY/yyyy/YYYY | 9/09/2009/2009 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day in Week | f/F | 2 | f: 1 = Sunday ... 7 = Saturday F: 1 = Monday ... 7 = Sunday | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (Calendar) Week | ww/WW | 3/03 | Week 1 with 4 days of the new year minimum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day in Year | aaa/AAA | 89/089 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-hour-clock Suffix | p | am/pm | Typically set with 12-hour-clock | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| mm/dd/yy | 6/7/09 | DD.MM.YYYY | 07.06.2009 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G mm, yyyy | June 7, 2009 | E, G dd | Sunday, June 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HH:NN:SS | 08:36:07 | kk:nn p | 8:36 am | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DMYYMD | 000967 | MY.YM | 00.96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date/Time | Shows the system date/time of the PC. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Offset | Entering an unsigned value (> 0), will increase the displayed time, entering a value (> 0) with minus sign, will decrease the displayed time. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Text | Shows the displayed date/time (not editable). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prefix | Lets you insert a prefix or suffix. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Suffix | A static text will be displayed in front of or after the date/time, e.g. "P [date/time] S". | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [4] Text Alignment | <p>Text can be aligned on a (virtual) circle or a marking object (here called graphics path). In this case, further parameter settings (see below) are required.</p> <p>Click the <input checked="" type="checkbox"/> button to select "<None>", "On Circle" or "On Path".</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Text Rotate Radius | Lets you define the text's radius, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Text Rotate Start Angle | Lets you define the text's start angle. Only available when "Alignment On Circle" (see above) has been selected. |
| Counter Clock | Lets you define the text's rotation direction, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "False" for clockwise or "True" for counterclockwise. |
| Inside | Lets you define the text's position as inside or outside position, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "True" for inside or "False" for outside. |
| Path | Lets you select an already (in this job) created marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to open the 'Select' dialog box for selecting the required path. If a path has been selected, the parameters 'Justification' and 'Origin' (see above) are adapted when values are changed. |
| Offset | Lets you define an offset between text and marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. The entered value defines the offset from the path start point to the text start point. Positive and negative values are possible. |
| Direction | Lets you align text to the marking object direction or opposite to it, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Path Direction" or "Opposite Path Direction". |
| Alignment | Lets you align text to the right or left side of the marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Right Hand Side of Path" or "Left Hand Side of Path". |
| Vertical | Lets you align the text in vertically direction (perpendicular to the y axis). Click the  button to select "False" or "True". |
| Spacing | Lets you define the space between the characters (in [%]). – 0 % spacing: totally overlapping of all characters. – 100 % spacing: normal space between the characters. |
| Mono Spaced | Lets you define a non-proportional text. (like e.g. Courier). Each character has the same width. Click the  button to select "False" for proportional text or "True" for mono spaced text. |
| Character Mirror X | The characters can be mirrored with respect to their orientation in the x direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Character Mirror Y | The characters can be mirrored with respect to their orientation in the y direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Right To Left | The order of the characters can be changed from left-to-right ("text") to right-to-left ("text"). Click the  button to select "True" for arranging the characters from right-to-left or "False" for normal ordering. |
| [5] Marking | |
| Filling Lines | Lets you fill the text with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the text or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Date/Time Vector Text

These graphic parameters serve to define the geometrical properties of this variable object accurately. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
| [1] Date/Time | |
| Text Layout | "Vector" (not editable) |
| Label | Default name: "Date/Time". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in x- and y-direction in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Width | Lets you define the width in x-direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in y-direction (with parameter 'Rotation'= "0", see below). |
| Text | Shows the displayed text / date/time(not editable). |
| Font Name | laserDESK offers a large number of fonts, which can be selected here from a drop-down menu. Click the  button to select the desired font. |
| Italic | The text can be displayed in italic style. Click the  button to select "True" for italic style or "False" for normal style. |
| Bold | The text can be displayed in bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will be created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |

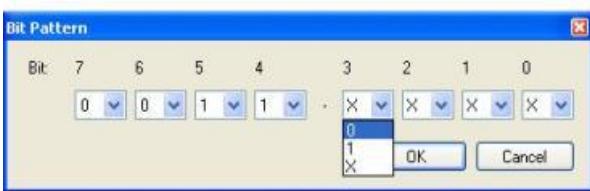
| Parameter | Description | | | | | | | | | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------|----------|--------|------------|------------|------------|--------------|---------|----------------|----------|----------|---------|---------|--------|--------|-------|-------|
| [3] Time Parameter | | | | | | | | | | | | | | | | | | | |
| Format | Lets you define a date/time format string by using several format identifiers: | | | | | | | | | | | | | | | | | | |
| | Date/Time | Identifier | Display (Ex.) | | | | | | | | | | | | | | | | |
| | Second | ss/SS | 4/04 | | | | | | | | | | | | | | | | |
| | Minute | nn/NN | 5/05 | | | | | | | | | | | | | | | | |
| | 12-hour-clock | kk/KK | 6/06 | | | | | | | | | | | | | | | | |
| | 24-hour-clock | hh/HH | 18/18 | | | | | | | | | | | | | | | | |
| | Day (Date) | dd/DD | 7/07 | | | | | | | | | | | | | | | | |
| | Day (Name) | e/E | Mon/Monday | | | | | | | | | | | | | | | | |
| | Month (Date) | mm/MM | 8/08 | | | | | | | | | | | | | | | | |
| | Month (Name) | g/G | Aug/August | | | | | | | | | | | | | | | | |
| | Year | yy/YY/yyyy/YYYY | 9/09/2009/2009 | | | | | | | | | | | | | | | | |
| | Day in Week | f/F | 2 f: 1 = Sunday ... 7 = Saturday F: 1 = Monday ... 7 = Sunday | | | | | | | | | | | | | | | | |
| | (Calendar) Week | ww/WW | 3/03 Week 1 with 4 days of the new year minimum | | | | | | | | | | | | | | | | |
| | Day in Year | aaa/AAA | 89/089 | | | | | | | | | | | | | | | | |
| | 12-hour-clock Suffix | p | am/pm Typically set with 12-hour-clock | | | | | | | | | | | | | | | | |
| Using capitals, the numerical digit is displayed definitely, including leading zeros. Using lowercases, leading zeros will not be displayed. | | | | | | | | | | | | | | | | | | | |
| Each letter of an identifier equates to a numerical digit, except for the names (identifiers "e, E, g, G, p"). Date and time can be split into individual digits. The digits will then be written in correct order. | | | | | | | | | | | | | | | | | | | |
| The following delimiters can be used inside the format string: / () \ + * # < > , ; : - | | | | | | | | | | | | | | | | | | | |
| All characters apart from these delimiters and the identifiers listed in the table above will be ignored! | | | | | | | | | | | | | | | | | | | |
| Examples: | | | | | | | | | | | | | | | | | | | |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">mm/dd/yy</td><td style="width: 25%;">6/7/09</td><td style="width: 25%;">DD.MM.YYYY</td><td style="width: 25%;">07.06.2009</td></tr> <tr> <td>G mm, yyyy</td><td>June 7, 2009</td><td>E, G dd</td><td>Sunday, June 7</td></tr> <tr> <td>HH:NN:SS</td><td>08:36:07</td><td>kk:nn p</td><td>8:36 am</td></tr> <tr> <td>DMYYMD</td><td>000967</td><td>MY.YM</td><td>00.96</td></tr> </table> | | | | mm/dd/yy | 6/7/09 | DD.MM.YYYY | 07.06.2009 | G mm, yyyy | June 7, 2009 | E, G dd | Sunday, June 7 | HH:NN:SS | 08:36:07 | kk:nn p | 8:36 am | DMYYMD | 000967 | MY.YM | 00.96 |
| mm/dd/yy | 6/7/09 | DD.MM.YYYY | 07.06.2009 | | | | | | | | | | | | | | | | |
| G mm, yyyy | June 7, 2009 | E, G dd | Sunday, June 7 | | | | | | | | | | | | | | | | |
| HH:NN:SS | 08:36:07 | kk:nn p | 8:36 am | | | | | | | | | | | | | | | | |
| DMYYMD | 000967 | MY.YM | 00.96 | | | | | | | | | | | | | | | | |
| Date/Time | Shows the system date/time of the PC. | | | | | | | | | | | | | | | | | | |
| Offset | Entering an unsigned value (> 0), will increase the displayed time, entering a value (> 0) with minus sign, will decrease the displayed time. | | | | | | | | | | | | | | | | | | |
| Text | Shows the displayed date/time (not editable). | | | | | | | | | | | | | | | | | | |
| Prefix | Lets you insert a prefix or suffix. | | | | | | | | | | | | | | | | | | |
| Suffix | A static text will be displayed in front of or after the date/time, e.g. "P [date/time] S". | | | | | | | | | | | | | | | | | | |
| [4] Text Alignment | | | | | | | | | | | | | | | | | | | |
| Alignment | Text can be aligned on a (virtual) circle or a marking object (here called graphics path). In this case, further parameter settings (see below) are required. Click the  button to select "<None>", "On Circle" or "On Path". | | | | | | | | | | | | | | | | | | |
| Text Rotate Radius | Lets you define the text's radius, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. | | | | | | | | | | | | | | | | | | |
| Text Rotate Start Angle | Lets you define the text's start angle. Only available when "Alignment On Circle" (see above) has been selected. | | | | | | | | | | | | | | | | | | |
| Counter Clock | Lets you define the text's rotation direction, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "False" for clockwise or "True" for counterclockwise. | | | | | | | | | | | | | | | | | | |
| Inside | Lets you define the text's position as inside or outside position, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "True" for inside or "False" for outside. | | | | | | | | | | | | | | | | | | |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Path | Lets you select an already (in this job) created marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to open the 'Select' dialog box for selecting the required path. If a path has been selected, the parameters 'Justification' and 'Origin' (see above) are adapted when values are changed. |
| Offset | Lets you define an offset between text and marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. The entered value defines the offset from the path start point to the text start point. Positive and negative values are possible. |
| Direction | Lets you align text to the marking object direction or opposite to it, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Path Direction" or "Opposite Path Direction". |
| Alignment | Lets you align text to the right or left side of the marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Right Hand Side of Path" or "Left Hand Side of Path". |
| Vertical | Lets you align the text in vertically direction (perpendicular to the y axis). Click the  button to select "False" or "True". |
| Spacing | Lets you define the space between the characters (in [%]). - 0 % spacing: totally overlapping of all characters. - 100 % spacing: normal space between the characters. |
| Mono Spaced | Lets you define a non-proportional text. (like e.g. Courier). Each character has the same width. Click the  button to select "False" for proportional text or "True" for mono spaced text. |
| Character Mirror X | The characters can be mirrored with respect to their orientation in the x direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Character Mirror Y | The characters can be mirrored with respect to their orientation in the y direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Right To Left | The order of the characters can be changed from left-to-right ("text") to right-to-left ("text"). Click the  button to select "True" for arranging the characters from right-to-left or "False" for normal ordering. |
| [5] Marking | |
| Filling Lines | Lets you fill the text with filling lines. If the 'Type' parameter (see above) is 'Outline', this parameter can't be set to 'True' and thus can't be filled. Click the  button to select "True" for filling the text or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: - Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. - Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. - Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. - Hatchlines only: only the hatchlines will be marked. - None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Digital Input

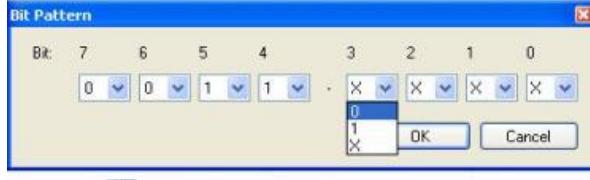
These parameters of the 'Digital Input' control element precisely define the digital signal input. The marking process is interrupted until the defined condition for the signal input signals is satisfied. The following table describes each parameter.

| Parameter | Description |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Digital Input | |
| Label | Default name: "Digital Input". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Bit Pattern | <p>Lets you define the digital input's bit pattern. The job execution stops until this bit pattern is applied. Click the  button to open the 'Bit Pattern' dialog box:</p>  <p>Click the  button for each bit: – To define the bit pattern, select "0" or "1". – For unused lines select "X". Confirm your settings with {OK}. The bit pattern is assigned to the pins of the 'Extension 1' connector of the RTC5 or RTC6 board (Digital In 0-7, see Connecting the Laser to the RTC5 or RTC6 PC Interface Board). NOTE: The pins can be used optionally for the selection of variants.</p> |

Information on editing parameters is described in [Property Window](#).

Digital Output

These parameters of the 'Digital Output' control element precisely define the digital signal output to an external device (e.g. for triggering a conveyor system). The following table describes each parameter.

| Parameter | Description |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Digital Output | |
| Label | Default name: "Digital Output". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Bit Pattern | <p>Lets you define the digital output's bit pattern. Click the  button to open the 'Bit Pattern' dialog box:</p>  <p>Click the  button for each bit: – To define the bit pattern, select "0" or "1". – For unused lines select "X". Confirm your settings with {OK}. The bit pattern is assigned to the pins of the 'Extension 1' connector of the RTC5 or RTC6 board (Digital Out 0-7, see Connecting the Laser to the RTC5 or RTC6 PC Interface Board).</p> |

Information on editing parameters is described in [Property Window](#).

Ellipse

These graphic parameters precisely defines the geometric properties of ellipses. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Ellipse | |
| Label | Default name: "Ellipse". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window) |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the ellipse in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Filling Lines | Lets you fill the ellipse with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the ellipse or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the  button to select the required item. |

| Parameter | Description |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Font Text

These graphic parameters serve to define the geometrical properties of the font text accurately. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Text | |
| Label | Default name: "Font Text". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Origin | Marking object's reference point position in the x and y directions in the work area's coordinate system. |
| X | The reference point can be selected in 'Justification' (see below). |
| Y | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Center | Position of the marking object's center in the work area's coordinate system (not editable) |
| Text | Shows the displayed text. To edit the text, click in this field. |
| Font Name | laserDESK offers a large number of fonts, selectable here from a drop-down menu.. Click the  button to open a drop-down menu. |
| Font Size [Points] | Lets you enter the desired font size (in [Points]). |
| Italic | The text can be displayed in italic style. Click the  button to select "True" for italic style or "False" for normal style.. |
| Bold | The text can be displayed in bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will be created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Justification | Lets you define the object's reference point. Affects on all other alignment settings. Click the  button to open a drop-down menu. Select the desired origin: "Left Bottom", ..., "Center Center", ..., "Right Top". |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |

| Parameter | Description |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Text Alignment | |
| Alignment | Text can be aligned on a (virtual) circle or a marking object (here called graphics path). In this case, further parameter settings (see below) are required. Click the  button to select "<None>", "On Circle" or "On Path". |
| Text Rotate Radius | Lets you define the text's radius, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. |
| Text Rotate Start Angle | Lets you define the text's start angle. Only available when "Alignment On Circle" (see above) has been selected. |
| Counter Clock | Lets you define the text's rotation direction, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "False" for clockwise or "True" for counterclockwise. |
| Inside | Lets you define the text's position as inside or outside position, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "True" for inside or "False" for outside. |
| Path | Lets you select an already (in this job) created marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to open the 'Select' dialog box for selecting the required path. If a path has been selected, the parameters 'Justification' and 'Origin' (see above) are adapted when values are changed. |
| Offset | Lets you define an offset between text and marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. The entered value defines the offset from the path start point to the text start point. Positive and negative values are possible. |
| Direction | Lets you align text to the marking object direction or opposite to it, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Path Direction" or "Opposite Path Direction". |
| Alignment | Lets you align text to the right or left side of the marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Right Hand Side of Path" or "Left Hand Side of Path". |
| Vertical | Lets you align the text in vertically direction (perpendicular to the y axis). Click the  button to select "False" or "True". |
| Spacing | Lets you define the space between the characters (in [%]). – 0 % spacing: totally overlapping of all characters. – 100 % spacing: normal space between the characters. |
| Mono Spaced | Lets you define a non-proportional text. (like e.g. Courier). Each character has the same width. Click the  button to select "False" for proportional text or "True" for mono spaced text. |
| Character Mirror X | The characters can be mirrored with respect to their orientation in the x direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Character Mirror Y | The characters can be mirrored with respect to their orientation in the y direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Right To Left | The order of the characters can be changed from left-to-right ("text") to right-to-left ("text"). Click the  button to select "True" for arranging the characters from right-to-left or "False" for normal ordering. |

| Parameter | Description |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [4] Marking | |
| Filling Lines | <p>Lets you fill the text with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling.</p> <p>Click the  button to select "True" for filling the text or "False" for not filling.</p> |
| Mark | <p>This parameter let you define the kind of execution of this object. One of the following items can be selected:</p> <ul style="list-style-type: none"> – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Variable | <p>Lets you allow to change the text content in remote mode. Click the  button to select "True" for changeable/variable text or "False" for not changeable/variable text.</p> <p>(For further information, see Definition of the Remote Control.)</p> <p>NOTE: If you don't use a remote control or if you don't want to change text inside remote mode, you should set this parameter to "False", because execution will then proceed faster.</p> |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [5] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

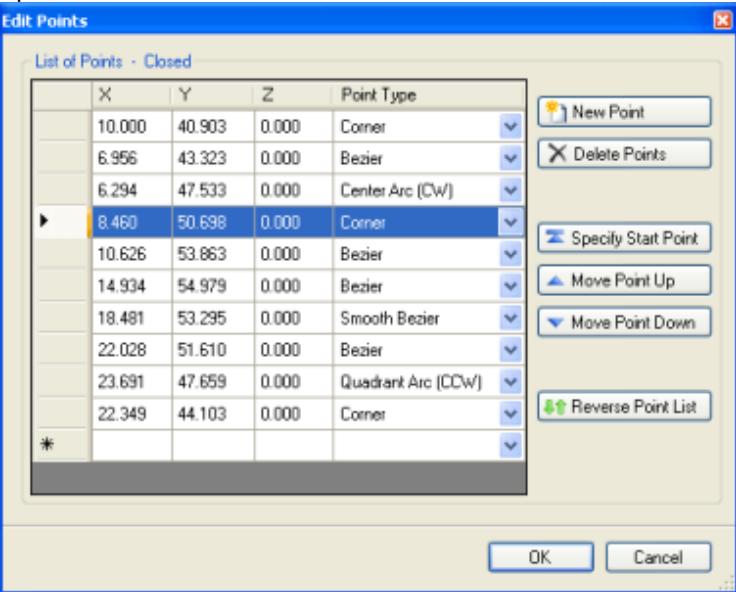
How to edit the parameters is described in [Property Window](#).

Graphics Path

These graphic parameters precisely define the geometric properties of graphics paths. The following table describes each parameter.

| | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Graphics Path | |
| Label | <p>Default name: "Graphics Path". If desired, you can change the name.</p> |
| Type | <p>Graphics paths can be closed or unclosed.</p> <ul style="list-style-type: none"> – If closed, the type is "Area" and the object can be filled. – If unclosed, the type is "Outline" and the object can't be filled. In this case, the parameter 'Filling Lines' (see below) can't be set to "True". – If the parameter 'Closed' (see below) is set to "False", the type changes automatically to "Outline". |

| Parameter | Description |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Points | <p>Open the 'Edit Points' table via the  button:</p>  <p>The table facilitates the following settings:</p> <ul style="list-style-type: none"> For each point of the graphics path, the position in the x-, y-, and z-directions can be defined individually by entering the value into the input field (open and closed graphics path). For each point of the graphics path, the point type can be defined individually: Click the  button to select "Corner", "Three Points Arc", "Quadrant Arc (CW)", "Quadrant Arc (CCW)", "Center Arc (CW)", "Center Arc (CCW)", "Bezier" or "Smooth Bezier". If you change the point type, it may be necessary to insert or change neighboring points, too, due to the curve definition. To create a new point, click the {New Point} button. The 'Edit Point' dialog box opens to let you define the x-, y-, z-value and select the point type. To delete one or more points, first select the desired row(s), then click the {Delete Points} button. The point(s) will be deleted immediately. To change a point's ('Corner' point type only) position in the table, first select the desired row, then click the {Move Point Up} or {Move Point Down} button. To specify a point ('Corner' point type only) as start point (closed graphics path only), first select the desired row, then click the {Specify Start Point} button. To set all points in reverse order, click the {Reverse Point List} button. <p>Click {OK} to confirm your settings.</p> |
| Number of Points | Displays the number of the object's points (not editable). |
| Closed | <p>Lets you define whether the object is closed or unclosed and thus can be filled or not. When set to unclosed, one segment between two points will be removed and the parameter 'Type' (see above) changes to "Outline".</p> <p>Click the  button to select "True" for closed or "False" for unclosed.</p> |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | <p>Scaling behavior of the shape:</p> <ul style="list-style-type: none"> Fixed: shape keeps aspect ratio indefinitely; Variable: shape doesn't keep aspect ratio indefinitely; <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Center | The marking object's center position in the x and y directions in the work area's coordinate system (not editable). |
| Layer | <p>A marking object can be assigned to a layer. Then you can set the marking object to visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window).</p> <p>By default, no layer is assigned, the selection field is blank.</p> <p>Open the 'Select' dialog box via the  button to select a listed layer or "<None>".</p> |

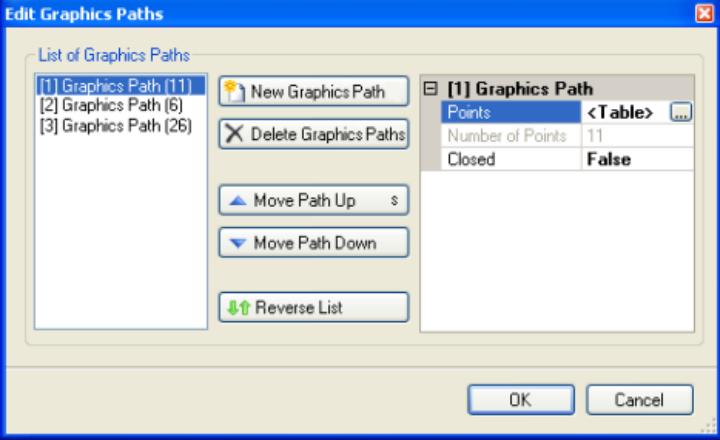
| Parameter | Description |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the graphics path in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Filling Lines | Lets you fill the graphics path with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the <input checked="" type="checkbox"/> button to select "True" for filling the text or "False" for not filling. |
| Mark | This parameter lets you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the <input checked="" type="checkbox"/> button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for calculating the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position. |
| Translation | Offset in the x and y directions to the value set in the 'Center' parameter (see above). |
| X | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Y | |
| Flip X | The graphics path can be mirrored with respect to its orientation in the x direction. Click the <input checked="" type="checkbox"/> button to select "True" for mirroring or "False" for not mirroring. |
| Flip Y | The graphics path can be mirrored with respect to its orientation in the y direction. Click the <input checked="" type="checkbox"/> button to select "True" for mirroring or "False" for not mirroring. |

Information on editing parameters is described in [Property Window](#).

Graphics Paths (Set)

These graphic parameters precisely define the geometrical properties of (a) graphics paths (set). The following table describes each parameter.

| |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Graphics Paths | |
| Label | Default name: "Graphics Set". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting, an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Graphics Paths | <p>Open the 'Edit Graphics Paths' table via the  button:</p>  <p>The table facilitates the following settings:</p> <ul style="list-style-type: none"> To create a new graphics path, click the {New Graphics Path} button. The list in the left field will be expanded correspondingly. To delete one or more graphics paths, select it/them in the left field and click the {Delete Graphics Paths} button. The graphics path(s) will be deleted immediately. To change a graphics path's position in the left field, click the {Move Path Up} or {Move Path Down} button. To set the complete list in the left field in reverse order, click the {Reverse List} button. To edit a graphics path, select it in the left field. The parameters 'Points', 'Number of Points' and 'Closed' will be displayed in the right field. Editing of the parameters is described in Graphics Parameters - Graphics Path. <p>Click {OK} to confirm your settings.</p> |
| Count | Number of graphics paths included in this graphics paths object (not editable). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: <ul style="list-style-type: none"> Fixed: shape keeps aspect ratio indefinitely; Variable: shape doesn't keep aspect ratio indefinitely; <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Center | The graphics set's center position in the x and y directions in the work area's coordinate system.(not editable). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object to visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default, no layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |

| Parameter | Description |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the graphics set in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Filling Lines | Lets you fill the graphics set with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to 'True' and thus can't enable filling. Click the <input checked="" type="checkbox"/> button to select "True" for filling the group or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the <input checked="" type="checkbox"/> button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Sort Mode | Lets you define the marking order kind of sorting algorithm of the marking objects/vectors: – None: Sort mode will not be applied. – Position: Intended to be used with POF applications; defines the marking order depending on the moving direction. – Distance: Sorts the marking objects / vectors by shortest distance to reduce marking time. Click the <input checked="" type="checkbox"/> button to select 'None', 'Position' or 'Distance'. |
| Sort Direction | Lets you define – if sort mode 'Position' has been selected (see above) –, by which direction the marking objects / vectors should be sorted: – Left ToRight – Top To Bottom – Right To Left – Bottom To Top For sort mode 'Distance' (see above) this parameter defines the starting point. Click the <input checked="" type="checkbox"/> button to select 'Left ToRight', 'Top To Bottom', 'Right To Left' or 'Bottom To Top'. |
| Search Radius | If sort mode 'Position' or 'Distance' has been selected (see above), the program searches for optimum jumps by calculating alternatives between the marking objects / vectors. This parameter lets you define the radius / distance for the calculation. If a vector is closer than this parameter, this vector is used, but there may be another vector which is more close. A larger value reduces calculation time, a smaller value normally reduces execution time. |
| Point Time Duration [μs] | Lets you define the time duration (in [μs]) for marking points. This is the laser's power-on time. Because no individual parameters are allowed in a graphics set, this value is used for all included points. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Translation | Offset in the x and y directions to the value set in the 'Center' parameter (see above). |
| X | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Y | |

| Parameter | Description |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flip X | The graphics set can be mirrored with respect to its orientation in x direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |
| Flip Y | The graphics set can be mirrored with respect to its orientation in y direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |

Information on editing parameters is described in [Property Window](#).

Group

These graphic parameters precisely define the geometrical properties of groups (including vector graphics). The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Group | |
| Label | Default name: "Group". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Center | The group's center position in the x and y directions in the work area's coordinate system.(not editable). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the group in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Filling Lines | Lets you fill the group with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to 'True' and thus can't enable filling. Click the  button to select "True" for filling the group or "False" for not filling. |

| Parameter | Description |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mark | <p>This parameter let you define the kind of execution of this object. One of the following items can be selected:</p> <ul style="list-style-type: none"> – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Translation | Offset in the x and y directions to the value set in the 'Center' parameter (see above). |
| X | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Y | |
| Flip X | The group can be mirrored with respect to its orientation in x direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |
| Flip Y | The group can be mirrored with respect to its orientation in y direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |

Information on editing parameters is described in [Property Window](#).

Pixel Image

These graphic parameters precisely define the geometric properties of pixel images. The following table describes each parameter.

| | |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the View Parameters (see 'Units\Length'). |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Pixel Image | |
| Label | Default name: "Pixel Image ([FileName.ext])". If desired, you can change the name. |
| File Path | Shows the complete file path. |
| Embedded | True/False |
| Embedded Format | Lets you select the format (bmp, tif, gif, jpg, png) for embedding the pixel image. Click the  button to select the desired format from a drop-down menu. |
| Grayscale | Serves to change color images to gray scale images. Click the  button to select "False" for color images or "True" for gray scale images. |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction and the height in the y direction (with parameter 'Rotation'= "0", see below). NOTE: |
| Height | Width and height always preserve the aspect ratio - when one parameter is edited, the other gets refreshed immediately. |
| Aspect Ratio | Scaling behavior of the shape: <ul style="list-style-type: none"> – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window) |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |

| Parameter | Description |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the image in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Mark | Lets you enable or disable the marking process for this object. Click the <input checked="" type="checkbox"/> button to select "True" for marking or "False" for not marking. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Mark on the Fly | Using Mark on the Fly (MOF), each image line will be marked at the same place. Internally Wait For Encoder control elements are set respectively. The feed rate must be slower than the marking of one image line. Thus, the marking can be executed always on a roll's top position. For this purpose the pixel image must be aligned parallel to the coordinate axes (0°, 90°, 180° or 270°). NOTE: Mark on the Fly is applicable for pixel images only with one encoder. Click the <input checked="" type="checkbox"/> button to select "True" for applying MOF or "False" for not applying. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Flip X | The pixel image can be mirrored with respect to its orientation in the x direction. Click the <input checked="" type="checkbox"/> button to select "True" for mirroring or "False" for not mirroring. |
| Flip Y | The pixel image can be mirrored with respect to its orientation in the y direction. Click the <input checked="" type="checkbox"/> button to select "True" for mirroring or "False" for not mirroring. |

Information on editing parameters is described in [Property Window](#).

Import Barcode

These graphic parameters precisely define the geometric properties of import barcodes. The following table describes each parameter.

| | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Import Text | |
| View | "Barcode" (not editable) |
| Label | Default name: "Import Text ([filename])". If desired, you can change the name. |
| File Path | Lets you select a text file. Click the <input type="button" value="..."/> button to open a (<i>Windows</i> -standard) 'Open' dialog box to select the required text file. After selection, the line shows the complete path. |

| Parameter | Description |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y direction in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window) |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the barcode in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Import Parameter | |
| Text | Shows the imported text (not editable). |
| Start Index | Lets you define the row number in the text file to be imported as start line. The value to be entered is restricted by the number of lines in the text file. |
| End Index | Lets you define the row number in the text file to be imported as end line. The value to be entered is restricted by the number of lines in the text file. After the end index is executed in the automatic mode, this will be switched off automatically. In this case no further external starts are executable. |
| Current Index | Lets you define the row number in the text file to be imported as current line. The value to be entered is restricted by the number of lines in the text file. |
| Column Index | If the text file is divided into columns (with a respective delimiter, see below), you can define the column number in the text file to be imported. If the value "0" is set, the complete line with all columns will be imported. |
| Column Delimiter | To read out columns in the text file, the column delimiter used in the text file (e.g. comma or semicolon) must be defined here. |
| Text Qualifier | Indicates a text, if a delimiter symbol (e.g. comma or semicolon) is part of the text. If a text qualifier (typically " ") is set, the delimiter symbol will be displayed with the text. If not, the delimiter symbol will be interpreted as column delimiter (see above) and the text will be divided into text blocks. |
| Prefix | Lets you insert a prefix or suffix. |
| Suffix | A static text will be displayed in front of or after the date/time, e.g. "P [date/time] S". |
| Repetitions | Lets you define the number of text repetitions. |
| Reset Start Index | Serves to reset the current index (see above) to the start index (see above) when changing into the automatic mode. Click the  button to select "True" for reset or "False". |

| Parameter | Description |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [4] Barcode Parameter | |
| Text | Shows the value of the displayed barcode (not editable). |
| Code Type | laserDESK offers a large number of linear and matrix barcode types, which can be selected here in a drop-down menu. Click the  button to select the required code type. |
| Multiplicator | Defines the ratio between small and wide bars. The value defined here results in the ratio below. Some barcodes have an internal multiplicator. In this case, this parameter is not editable. |
| Ratio | Ratio between small and wide bars. The availability depends on the barcode type (not editable). |
| Bar Line Reduction [%] | Lets you define the reduction of the bar lines. Corresponds to outline reduction (see Fill Parameters), but in % and not absolute. |
| Module Width | Lets you define the width of the module (smallest bar). The width of the wider bars will be set respectively. |
| Enable Text | Lets you display the barcode's text/value (see 'Text' above) below the barcode. Click the  button to select "True" for enabling text or "False" for disabling text. |
| Text Distance | Lets you define the distance between the barcode and the text below (if enabled). With increasing distance the height of the barcode will decrease. |
| Font Name | laserDESK offers a large number of font types that can be selected here from a drop-down menu. Click the  button to select the desired font. |
| Size | Lets you define the desired font size (in [Points]). |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the adaptation. |
| Code Page | Lets you select a code page (each with an own interpretation of the character display). Necessary, because barcodes are not always Unicode capable and the barcode library does not support Unicode. Click the  button to select the required code page. |
| Quiet Zone | |
| Left | Lets you define the dimensions of the marginal quiet zone. |
| Right | All values can be entered/modified in 'Quiet Zone' or each value in 'Left', 'Right', 'Top' and 'Bottom'. |
| Top | |
| Bottom | |
| Inverse | The barcode can be marked inverse. The barcode will be framed to mark the area outside the bars and inside the frame. Click the  button to select "True" for inverse marking or "False" for normal marking. |
| [5] Marking | |
| Filling Lines | Lets you fill the barcode with filling lines. If the parameter 'Type' (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling Click the  button to select "True" for filling the barcode or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Translation | Offset in the x and y directions to the value set in the 'Center' parameter (see above). |
| X | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Y | |

Information on editing parameters is described in [Property Window](#).

Import Font Text

These graphic parameters precisely define the geometric properties of import font text. The following table describes each parameter.



NOTE:
If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the ['View' Parameters](#) (see 'Units\Length').

| Parameter | Description |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Import Text | |
| Text Layout | "Font" (not editable) |
| Label | Default name: "Import Text ([filename])". If desired, you can change the name. |
| File Path | Lets you select a text file. Click the  button to open a (<i>Windows</i> -standard) 'Open' dialog box to select the required text file. After selection, the line shows the complete path. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Origin | Marking object's reference point position in the x and y directions in the work area's coordinate system. |
| X | The reference point can selected in 'Justification' (see below). |
| Y | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Center | Position of the marking object's center in the work area's coordinate system (not editable) |
| Justification | Lets you define the object's reference point. Affects on all other alignment settings. Click the  button to open a drop-down menu. Select the desired origin: "Left Bottom", ..., "Center Center", ..., "Right Top". |
| Text | Shows the displayed text / date/time (not editable). |
| Font Name | laserDESK offers a large number of fonts, selectable here from a drop-down menu. Click the  button to select the desired font. |
| Font Size [Points] | Lets you enter the desired font size (in [Points]). |
| Italic | The text can be displayed in italic style. Click the  button to select "True" for italic style or "False" for normal style. |
| Bold | The text can be displayed in normal or bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. |
| Z Height | The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |

| Parameter | Description |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly.</p> <p>Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane.</p> |
| [3] Import Parameter | |
| Text | Shows the imported text (not editable). |
| Start Index | Lets you define the row number in the text file to be imported as start line. The value to be entered is restricted by the number of lines in the text file. |
| End Index | Lets you define the row number in the text file to be imported as end line. The value to be entered is restricted by the number of lines in the text file. After the end index is executed in the automatic mode, this will be switched off automatically. In this case no further external starts are executable. |
| Current Index | Lets you define the row number in the text file to be imported as current line. The value to be entered is restricted by the number of lines in the text file. |
| Column Index | If the text file is divided into columns (with a respective delimiter, see below), you can define the column number in the text file to be imported. If the value "0" is set, the complete line with all columns will be imported. |
| Column Delimiter | To read out columns in the text file, the column delimiter used in the text file (e.g. comma or semicolon) must be defined here. |
| Text Qualifier | Indicates a text, if a delimiter symbol (e.g. comma or semicolon) is part of the text. If a text qualifier (typically " ") is set, the delimiter symbol will be displayed with the text. If not, the delimiter symbol will be interpreted as column delimiter (see above) and the text will be divided into text blocks. |
| Prefix | Lets you insert a prefix or suffix. |
| Suffix | A static text will be displayed in front of or after the date/time, e.g. "P [date/time] S". |
| Repetitions | Lets you define the number of text repetitions. |
| Reset Start Index | Serves to reset the current index (see above) to the start index (see above) when changing into the automatic mode. Click the <input checked="" type="checkbox"/> button to select "True" for reset or "False". |
| [4] Text Alignment | |
| Alignment | Text can be aligned on a (virtual) circle or a marking object (here called graphics path). In this case, further parameter settings (see below) are required. Click the <input checked="" type="checkbox"/> button to select "<None>", "On Circle" or "On Path". |
| Text Rotate Radius | Lets you define the text's radius, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. |
| Text Rotate Start Angle | Lets you define the text's start angle. Only available when "Alignment On Circle" (see above) has been selected. |
| Counter Clock | Lets you define the text's rotation direction, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the <input checked="" type="checkbox"/> button to select "False" for clockwise or "True" for counterclockwise. |
| Inside | Lets you define the text's position as inside or outside position, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the <input checked="" type="checkbox"/> button to select "True" for inside or "False" for outside. |
| Path | Lets you select an already (in this job) created marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to open the 'Select' dialog box for selecting the required path. If a path has been selected, the parameters 'Justification' and 'Origin' (see above) are adapted when values are changed. |
| Offset | Lets you define an offset between text and marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. The entered value defines the offset from the path start point to the text start point. Positive and negative values are possible. |
| Direction | Lets you align text to the marking object direction or opposite to it, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the <input checked="" type="checkbox"/> button to select "Path Direction" or "Opposite Path Direction". |
| Alignment | Lets you align text to the right or left side of the marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the <input checked="" type="checkbox"/> button to select "Right Hand Side of Path" or "Left Hand Side of Path". |
| Vertical | Lets you align the text in vertically direction (perpendicular to the y axis). Click the <input checked="" type="checkbox"/> button to select "False" or "True". |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Spacing | Lets you define the space between the characters (in [%]). – 0 % spacing: totally overlapping of all characters. – 100 % spacing: normal space between the characters. |
| Mono Spaced | Lets you define a non-proportional text. (like e.g. Courier). Each character has the same width. Click the <input checked="" type="checkbox"/> button to select "False" for proportional text or "True" for mono spaced text. |
| Character Mirror X | The characters can be mirrored with respect to their orientation in the x direction. Click the <input checked="" type="checkbox"/> button to select "True" for mirrored characters or "False" for normal characters. |
| Character Mirror Y | The characters can be mirrored with respect to their orientation in the y direction. Click the <input checked="" type="checkbox"/> button to select "True" for mirrored characters or "False" for normal characters. |
| Right To Left | The order of the characters can be changed from left-to-right ("text") to right-to-left ("text"). Click the <input checked="" type="checkbox"/> button to select "True" for arranging the characters from right-to-left or "False" for normal ordering. |
| [5] Marking | |
| Filling Lines | Lets you fill the text with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the <input checked="" type="checkbox"/> button to select "True" for filling the text or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the <input checked="" type="checkbox"/> button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Import Vector Text

These graphic parameters precisely define the geometric properties of import vector text. The following table describes each parameter.

| | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Import Text | |
| Text Layout | "Vector" (not editable) |
| Label | Default name: "Import Text ([filename])". If desired, you can change the name. |
| File Path | Lets you select a text file. Click the <input type="button" value="..."/> button to open a (<i>Windows</i> -standard) 'Open' dialog box to select the required text file. After selection, the line shows the complete path. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |

| Parameter | Description |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window) |
| Text | Shows the displayed text / date/time(not editable). |
| Font Name | laserDESK offers a large number of fonts, which can be selected here in a drop-down menu. Click the  button to select the desired font. |
| Italic | The text can be displayed in italic style. Click the  button to select "True" for italic style or "False" for normal style. |
| Bold | The text can be displayed in normal or bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will be created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [3] Import Parameter | |
| Text | Shows the imported text (not editable). |
| Start Index | Lets you define the row number in the text file to be imported as start line. The value to be entered is restricted by the number of lines in the text file. |
| End Index | Lets you define the row number in the text file to be imported as end line. The value to be entered is restricted by the number of lines in the text file. After the end index is executed in the automatic mode, this will be switched off automatically. In this case no further external starts are executable. |
| Current Index | Lets you define the row number in the text file to be imported as current line. The value to be entered is restricted by the number of lines in the text file. |
| Column Index | If the text file is divided into columns (with a respective delimiter, see below), you can define the column number in the text file to be imported. If the value "0" is set, the complete line with all columns will be imported. |
| Column Delimiter | To read out columns in the text file, the column delimiter used in the text file (e.g. comma or semicolon) must be defined here. |
| Text Qualifier | Indicates a text, if a delimiter symbol (e.g. comma or semicolon) is part of the text. If a text qualifier (typically " ") is set, the delimiter symbol will be displayed with the text. If not, the delimiter symbol will be interpreted as column delimiter (see above) and the text will be divided into text blocks. |

| Parameter | Description |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prefix | Lets you insert a prefix or suffix. |
| Suffix | A static text will be displayed in front of or after the date/time, e.g. "P [date/time] S". |
| Repetitions | Lets you define the number of repetitions of the text. |
| Reset Start Index | Serves to reset the current index (see above) to the start index (see above) when changing into the automatic mode. Click the <input checked="" type="checkbox"/> button to select "True" for reset or "False". |
| [4] Text Alignment | |
| Alignment | Text can be aligned on a (virtual) circle or a marking object (here called graphics path). In this case, further parameter settings (see below) are required. Click the <input checked="" type="checkbox"/> button to select "<None>", "On Circle" or "On Path". |
| Text Rotate Radius | Lets you define the text's radius, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. |
| Text Rotate Start Angle | Lets you define the text's start angle. Only available when "Alignment On Circle" (see above) has been selected. |
| Counter Clock | Lets you define the text's rotation direction, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the <input checked="" type="checkbox"/> button to select "False" for clockwise or "True" for counterclockwise. |
| Inside | Lets you define the text's position as inside or outside position, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the <input checked="" type="checkbox"/> button to select "True" for inside or "False" for outside. |
| Path | Lets you select an already (in this job) created marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the <input type="button"/> button to open the 'Select' dialog box for selecting the required path. If a path has been selected, the parameters 'Justification' and 'Origin' (see above) are adapted when values are changed. |
| Offset | Lets you define an offset between text and marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. The entered value defines the offset from the path start point to the text start point. Positive and negative values are possible. |
| Direction | Lets you align text to the marking object direction or opposite to it, if 'Alignment On Path' (see above) has been selected. Only then is the parameter displayed. Click the <input checked="" type="checkbox"/> button to select 'Path Direction' or 'Opposite Path Direction'. |
| Alignment | Lets you align text to the right or left side of the marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the <input checked="" type="checkbox"/> button to select "Right Hand Side of Path" or "Left Hand Side of Path". |
| Vertical | Lets you align the text in vertically direction (perpendicular to the y axis). Click the <input checked="" type="checkbox"/> button to select "False" or "True". |
| Spacing | Lets you define the space between the characters (in [%]). – 0 % spacing: totally overlapping of all characters. – 100 % spacing: normal space between the characters. |
| Mono Spaced | Lets you define a non-proportional text. (like e.g. Courier). Each character has the same width. Click the <input checked="" type="checkbox"/> button to select "False" for proportional text or "True" for mono spaced text. |
| Character Mirror X | The characters can be mirrored with respect to their orientation in the x direction. Click the <input checked="" type="checkbox"/> button to select "True" for mirrored characters or "False" for normal characters. |
| Character Mirror Y | The characters can be mirrored with respect to their orientation in the y direction. Click the <input checked="" type="checkbox"/> button to select "True" for mirrored characters or "False" for normal characters. |
| Right To Left | The order of the characters can be changed from left-to-right ("text") to right-to-left ("text"). Click the <input checked="" type="checkbox"/> button to select "True" for arranging the characters from right-to-left or "False" for normal ordering. |
| [5] Marking | |
| Filling Lines | Lets you fill the text with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the <input checked="" type="checkbox"/> button to select "True" for filling the text or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. |

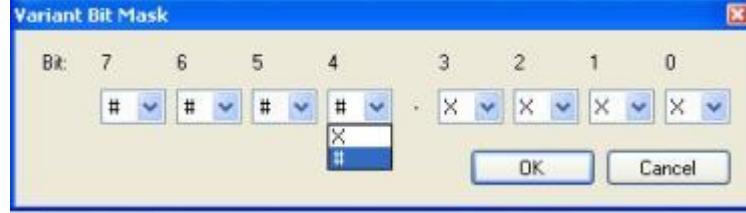
| Parameter | Description |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Job

These graphic parameters precisely define the properties of jobs. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Job | |
| Label | Default name: "Job". If desired, you can change the name. |
| Comment | Lets you enter a comment/description. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the job in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Variant Bit Mask | Serves to define which bits are enabled for a variant's bit pattern. If you use variants in a job, you have to define unique bit patterns for the variants and therefore activate the used lines here. NOTE: One or more bits must be enabled. Otherwise the variants' bit patterns can't be set and thus the variants can't be executed. To define the bit pattern proceed as follows: – Click the  button to open the 'Variant Bit Mask' dialog box:  – For each bit click the  button and select # for "Use line" (activated) or X for "Don't |

| Parameter | Description |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>care" (disabled).</p> <ul style="list-style-type: none"> – Confirm your settings with {OK}. |
| Number Of Executions | <p>Shows the number of executions started from external in the automatic mode (not editable).</p> <p>The value can be reset - in manual mode only - as follows:</p> <ul style="list-style-type: none"> – Place the cursor above 'Number Of Executions' and click the right mouse button. A pop-up window shows "Reset Number Of Executions". – Select the message to confirm. <p>NOTE:</p> <p>If the job includes one or more variants, this parameter will not be shown. In this case the variants' 'Number Of Execution' will be applied.</p> |
| Target Quantity | <p>Serves to exit the automatic mode automatically when the target quantity of marking procedures is achieved. In this case no further external starts are executable.</p> <p>Setting the value to "-1", the number of executions is unlimited, the automatic mode will not be exited.</p> <p>NOTE:</p> <p>If the job includes one or more variants, this parameter will not be shown. In this case the variants' 'Target Quantity' will be applied.</p> |
| Mark Rotation | <p>Defines the global rotation (in [deg]) of all marking objects of a job, including the variants. The reference for rotation is always the origin of the work area's coordinate system.</p> <p>If the pilot laser transformation is applied to the job data (see Using the Pilot Laser for Transformation), the corresponding value will be set here.</p> <p>NOTE:</p> <p>The rotation is visible only in the work area when activating the marking vectors (via shortcut <Ctrl>+<M> or via 'Options [View] 4 Marking' in the context menu).</p> <p>NOTE:</p> <p>To avoid confusion, we recommend not to define the mark rotation parameter for the job, if this comprises variants (which also feature a mark rotation parameter).</p> |
| Mark Translation | <p>Defines the global translation in x/y directions of all marking objects of a job, including the variants.</p> |
| X | <p>If the pilot laser transformation is applied to the job data (see Using the Pilot Laser for Transformation), the corresponding values will be set here.</p> <p>NOTE:</p> <p>The translation is visible only in the work area when activating the marking vectors (via shortcut <Ctrl>+<M> or via 'Options [View] 4 Marking' in the context menu).</p> <p>NOTE:</p> <p>To avoid confusion, we recommend not to define the mark translation parameters for the job, if this comprises variants (which also feature mark translations parameters).</p> |
| Y | |
| Use 3D (with 3D option only) | <p>Lets you activate the job for 3D execution. In this case, the program applies the z-coordinate of 3D objects. When the execution is finished, the z-coordinate will be reset to the previous value.</p> <p>Click the <input checked="" type="checkbox"/> button to select "True" for activating the 3D execution or "False" for deactivating.</p> <p>NOTES:</p> <ul style="list-style-type: none"> – To execute any 3D function, the 3D option on the RTC5 or RTC6 PC interface board must be enabled (see 'Controlling a 3-Axis Scan System (optional)' in the RTC5 Manual). – The 3D option is available in the laserDESK Premium Edition only. – Z-focus control elements and 3D spirals can generally be executed in the Standard Edition without the laserDESK 3D option. 'Use 3D' must not be set "True". |
| Speed dependent Laser Control | <p>NOTES:</p> <ul style="list-style-type: none"> – The speed dependent laser control parameters can only be applied when using an excelliSCAN or intelliSCAN scan head. The usage of an intelliSCAN additionally requires a special firmware version (please contact SCANLAB). – For the restrictions of this feature, please refer to the RTC5 Manual. Especially the execution of bitmaps will not work with activated speed dependent laser control. <p>To activate the speed dependent laser control, click the <input checked="" type="checkbox"/> button and select "True". Only then the parameters below are visible and thus editable.</p> |

| Parameter | Description |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signal to vary | <p>Available signals are: "Frequency", "Pulse Width", "Analog Out 1", "Analog Out 2", "Digital Out (8 bit; Ext. 2)".</p> <p>Click the <input checked="" type="checkbox"/> button to select the required signal.</p> <p>If the power control is varied, the default value, which is set during jumps, is set to the job parameter.</p> |
| Upper Limit [%] | The upper and lower limit values are defined in percent and relative to the 100% value. |
| Lower Limit [%] | The 100% value and the limits will be adapted to the individual settings of the object. |
| [4] Processing-On-The-Fly (POF) | <p>Lets you apply the POF function.</p> <p>Click the <input checked="" type="checkbox"/> button to select "True" for using the POF function or "False" for not using.</p> <p>NOTE: If "True" is selected, ensure that the Processing-on-the-fly option is enabled on the RTC5 or RTC6 interface board (see 'Processing-on-the-fly (optional)' in the RTC5 Manual).</p> |
| Used Encoder For Delays | <p>Lets you define the used encoder (X or Y), only if you've selected POF-Type "XY" in the Hardware Settings (see Setting 'Processing-On-The-Fly' Parameters). If you've selected POF-Type "X" or "Y" or "Rotation", the corresponding encoder will be used automatically and this parameter will not be shown.</p> <p>Click the <input checked="" type="checkbox"/> button to select "X" or "Y".</p> |
| Encoder Delay [mm] | Lets you define the encoder delay (in [mm]). |
| Number Of Simulated Starts | <p>Lets you define the number of simulated starts (see RTC5 Manual). These starts are created internal by the system to repeat the job execution.</p> <p>"-1" means an unlimited number of simulated starts.</p> <p>To stop the execution send a stop signal to the RTC5 or RTC6 board.</p> |
| Delay Simulated Start [mm] | Lets you define a track delay (in [mm]) for the simulated starts. This value defines the distance between adjacent start positions. |

Information on editing parameters is described in [Property Window](#).

Laser Control

This control element is used only for specific laser types. These lasers need some special adjustment which can't be automatically set by the RTC5 or RTC6 interface board during the marking process. The following table describes each parameter.

| Parameter | Description |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Laser Control | |
| Label | Default name: "Laser Control". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Laser Type | <p>Lets you select the laser type.</p> <p>Available are all lasers, which need some special parameter settings for adjustment.</p> <p>Every laser type may have different parameters.</p> <p>Click the <input checked="" type="checkbox"/> button to select the required laser type.</p> <p>NOTE: If the selected laser does not correspond to the laser type of this control element, this element is skipped.</p> |
| Simmer Current [0-100%] | <p>Only for SPI Laser Type G3 Interface (HS Series) and SPI Laser Type G4 Interface (HS and RM Series).</p> <p>Lets you define the simmer current (in [%]).</p> <p>Enter the desired value.</p> |
| Pulse Form [0-29] | <p>Only for SPI Lasers of the HS Series (Type G3 and G4 Interface).</p> <p>Lets you define the pulse form.</p> <p>Enter the desired value (from 0 to 29).</p> |

Information on editing parameters is described in [Property Window](#).

Line

These graphic parameters precisely define the geometric properties of lines. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Line | |
| Label | Default name: "Line". If desired, you can change the name. |
| Point 1 | |
| X | The line's point 1 position in the x, y and z directions in the work area's coordinate system. Both values can be entered/modified in 'Point 1' or each value in 'X', 'Y' and 'Z'. |
| Y | |
| Z | |
| Point 2 | |
| X | The line's point 2 position in the x, y and z directions in the work area's coordinate system. Both values can be entered/modified in 'Point 2' or each value in 'X', 'Y' and 'Z'. |
| Y | |
| Z | |
| Layer | Each marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the line in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Mark | Lets you enable or disable the marking process for this object. Click the  button to select "True" for marking or "False" for not marking. |
| Marking Count | If an application requires repeated marking, you can define the number of marking procedures here. |

Information on editing parameters is described in [Property Window](#).

List

These graphic parameters precisely define the geometric properties of lists (selection of several marking objects). The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
| [1] Appearance | |
| Label | Default name: "List". If desired, you can change the name. |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the list in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Motor Control

These parameters of the 'Motor Control' control element precisely define the used motor (axis) and its movement. The following table describes each parameter.

| | |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Description |
| [1] Motor Control | |
| Label | Default name: "Motor Control". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Movement Type | Lets you select the desired movement type: – Absolute: The motor will move to the absolute position defined in 'Position / Distance' (see below). – Relative: The motor will move over the distance defined in 'Position / Distance' (see below). – Reference Run: The motor will execute a reference run, using the reference run type defined in the Hardware Configuration (see Setting 'Hardware Devices' Parameters\ Motor Control Axis). Click the  button to select the required movement type. |
| Axis | Lets you select one of the available axes to be moved. These are defined in the Hardware Configuration (see Setting 'Hardware Devices' Parameters\ Motor Control Axis). Click the  button to open the 'Select' dialog box. |

| | |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Movement Direction | <p>Only needed for simulation in the graphic view (see 'Graphics\Marking Movement' in the Views Window).</p> <p>Click the  button to select the required movement direction:</p> <ul style="list-style-type: none"> - Undefined - Horizontal - Vertical <p>NOTE: To get a correct simulation, the parameter has to be set according to the installed position of this axis.</p> |
| Position / Distance | <p>Lets you define the position (absolute) or distance (relative) (depending on the setting in the 'Movement Type' parameter, see above) where the axis should move to. In [units of the calibration factor defined for the axis], normally [mm].</p> <p>Enter the desired value.</p> |
| Speed | <p>Lets you define the speed in [units of the calibration factor defined for the axis / s], normally [mm/s].</p> <p>Enter the desired value.</p> |

Information on editing parameters is described in [Property Window](#).

Outline Polygon

These graphic parameters precisely define the geometric properties of outline polygons. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the View Parameters (see 'Units\Length').</p> |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Polygon | |
| Label | Default name: "Outline". If desired, you can change the name. |
| Points | Each point of the outline can be defined (position in the x and y directions, point type). Open the 'Points' table via the  button to define the points. |
| Number of Points | Displays the object's number of points (not editable). |
| Closed | Lets you define whether the object is closed or unclosed and thus can be filled or not. When set to unclosed, one segment between two points will be removed. Click the  button to select "True" for closed or "False" for unclosed. |
| Width | Width in the x direction (not editable). |
| Height | Height in the y direction (not editable). |
| Center | The outline's center position in the x and y direction in the work area's coordinate system (not editable). |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the outline polygon in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |

Information on editing parameters is described in [Property Window](#).

Point

These graphic parameters precisely define the geometric properties of points. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Point | |
| Label | Default name: "Point". If desired, you can change the name. |
| Point | |
| X | The point's position in the x, y and z directions in the work area's coordinate system. |
| Y | All values can be entered/modified in 'Point' or each value in 'X', 'Y' and 'Z'. |
| Z | |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Marking | |
| Mark | Lets you enable or disable the marking process for this object. Click the  button to select "True" for marking or "False" for not marking. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| External Stop | You can define an external signal which stops the marking process else the laser will be switched off after the 'Duration' time. The stop signal will be defined in the parameter 'Stop Signal' (see below). NOTE: Point objects inside a graphics set, graphics paths (set) or tile set have no individual parameters (see Creating Groups, Sets, Paths or Variants). In that case the external stop is always set to false. The 'Time Duration' parameter can't be set individually, but is a parameter of the graphics set, graphics paths (set) or tile set. All included points use the same time duration. Click the  button to select "True" for external stop or "False" for stop via parameter 'Time Duration' (see below). |
| Time Duration [μs] | Lets you define the marking time duration (in [μs]). Active only, if the parameter 'External Stop' (see above) is set to "False". For precise timing, see the Note in Marking Parameters – Laser Delays . |
| Stop Signal [0-7] | Lets you define the stop signal which switches off the laser. Active only, if the parameter 'External Stop' (see above) is set to "True". Enter the required bit value into the input field. |

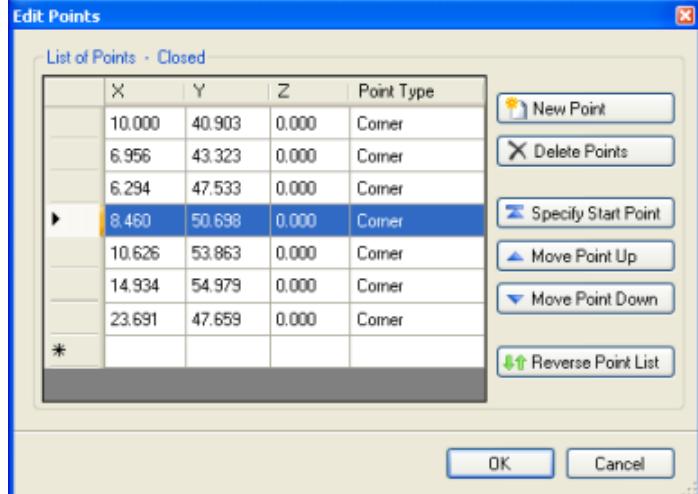
Information on editing parameters is described in [Property Window](#).

Polygon

These graphic parameters precisely define the geometric properties of polygons (including extended shapes like triangle, rhombus, ...). The following table describes each parameter.

i
NOTE:

If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the ['View' Parameters](#) (see 'Units\Length').

| Parameter | Description |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Polygon | |
| Label | Default name: "Polygon". If desired, you can change the name. |
| Type | Polygons can be closed or unclosed. – If closed, the type is "Area" and the object can be filled. – If unclosed, the type is "Outline" and the object can't be filled. With this setting, the 'Filling Lines' parameter (see below) can't be set to "True". – If the 'Closed' parameter (see below) is set to "False", the type changes automatically to "Outline". |
| Points | <p>Open the 'Edit Points' table via the  button:</p>  <p>The table facilitates the following settings:</p> <ul style="list-style-type: none"> For each point of the polygon, the position in the x-, y- and z-direction can be defined individually by entering the value into the input field (open and closed polygon). To create a new point, click the {New Point} button. The 'Edit Point' dialog box opens to let you define the x-, y-, z-value and select the point type. To delete one or more points, first select the desired row(s), then click the {Delete Points} button. The point(s) will be deleted immediately. To change a point's position in the table, first select the desired row, then click the {Move Point Up} or {Move Point Down} button. To specify a point as start point (closed polygon only), first select the desired row, then click the {Specify Start Point} button. To set all points in reverse order, click the {Reverse Point List} button. <p>Click {OK} to confirm your settings.</p> |
| Number of Points | Displays the object's number of points (not editable). |
| Closed | Lets you define whether the object is closed or unclosed and thus can be filled or not. When set to unclosed, one segment between two points will be removed and the 'Type' parameter (see above) changes to "Outline". Click the  button to select "True" for closed or "False" for unclosed. |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |

| Parameter | Description |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Center | The marking object's center position in the x and y directions in the work area's coordinate system (not editable). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default, no layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the polygon in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Filling Lines | Lets you fill the polygon with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to 'True' and thus can't enable filling. Click the  button to select "True" for filling the polygon or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for calculating the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) the curve fitting. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Translation | Offset in the x and y directions to the value set in the 'Center' parameter (see above). |
| X | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Y | |
| Flip X | The polygon can be mirrored with respect to its orientation in the x direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |
| Flip Y | The polygon can be mirrored with respect to its orientation in the y direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |

Information on editing parameters is described in [Property Window](#).

Protocol Nodes

These parameters of the 'Protocol' control elements precisely define the sampling rates, which serve to record signals of the RTC5 or RTC6 board or scan head. The following table describes each parameter.

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Protocol Start | |
| Label | Default name: "Protocol Start". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Protocol Type | Using a intelliSCAN scan head, you can select the desired protocol type. Click the  button to select the desired protocol type. |
| Protocol File | Using a intelliSCAN scan head, laserDESK generate a csv file, recording x/y coordinates and speed. The select button  launches a (<i>Windows-standard</i>) 'Open' dialog box. Define the directory and the required csv file. If no file name is defined, a unique name is created and used. |
| Graphic File | Using a intelliSCAN scan head, laserDESK can generate a plt file, which can be imported in laserDESK again. This lets you compare several files (e.g. for long term drift evaluation). – To open the files, use a 'File Import' dialog box (see Importing Vector Graphics). – Set 'Scale X' and 'Scale Y' to "0.04" to match the recorded data. The select button  launches a (<i>Windows-standard</i>) 'Open' dialog box. Define the directory and the required plt file. |
| Sampling Rate [μs] | Lets you define the sampling rate (in [μs]). The minimum period is 10 μs. |

| Parameter | Description |
|--------------------------|------------------------------------------------------------------------|
| [1] Protocol Stop | |
| Label | Default name: "Protocol Stop". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |

Information on editing parameters is described in [Property Window](#).

Pulse Output

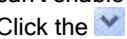
These parameters of the 'Pulse Output' control element precisely define the signal output, to control program flow between a job's marking objects and an external system. The following table describes each parameter.

| Parameter | Description |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] PulseOutput | |
| Label | Default name: "Pulse Output". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Pulse Length [ms] | Lets you define the pulse length (in [ms]). The value can be defined as an integer or floating-point number. |
| Output Pin [0-7] | For pulse output the output pins 0...7 (Digital Out 0...7 of the Extension 1 connector on the RTC5 or RTC6 board) are selectable". Enter the required output pin. |

Information on editing parameters is described in [Property Window](#).

Rectangle

These graphic parameters precisely define the geometric properties of rectangles. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
| [1] Rectangle | |
| Label | Default name: "Rectangle". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Rounded Radius | Lets you define a rounding of the corners. In contrast to the function Round Corners , this parameter allows to set different values for the x and y directions, which results in an unequal arc. |
| X | |
| Y | Both values can be entered/modified in 'Rounded Radius' or each value in 'X' and 'Y'. |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the rectangle in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Filling Lines | Lets you fill the rectangle with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the rectangle or "False" for not filling. |

| Parameter | Description |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mark | <p>This parameter let you define the kind of execution of this object. One of the following items can be selected:</p> <ul style="list-style-type: none"> – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Reference to Symbol

These graphic parameters precisely define the geometric properties of referenced objects. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Reference To Symbol | |
| Label | Default name: "Reference To Symbol ([SymbolName])". If desired, you can change the name. |
| Reference | Name of the symbol in the job library or marking library (not editable). |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Width | Lets you define the width in the x direction. |
| Height | Lets you define the height in the y direction. |
| Aspect Ratio | Scaling behavior of the shape: <ul style="list-style-type: none"> – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system (not editable). This value corresponds to the symbol's position in the marking library. |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the reference to symbol in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. |
| Z Height | The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. |

| Parameter | Description |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [3] Marking | |
| Filling Lines | Lets you fill the reference to symbol with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the reference to symbol or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Sort Mode | Lets you define the marking order kind of sorting algorithm of the marking objects/vectors: – None: Sort mode will not be applied. – Position: Intended to be used with POF applications; defines the marking order depending on the moving direction. – Distance: Sorts the marking objects / vectors by shortest distance to reduce marking time. Click the  button to select 'None', 'Position' or 'Distance'. |
| Sort Direction | Lets you define – if sort mode 'Position' has been selected (see above) –, by which direction the marking objects / vectors should be sorted: – Left ToRight – Top To Bottom – Right To Left – Bottom To Top For sort mode 'Distance' (see above) this parameter defines the starting point. Click the  button to select 'Left ToRight', 'Top To Bottom', 'Right To Left' or 'Bottom To Top'. |
| Search Radius | If sort mode 'Position' or 'Distance' has been selected (see above), the program searches for optimum jumps by calculating alternatives between the marking objects / vectors. This parameter lets you define the radius / distance for the calculation. If a vector is closer than this parameter, this vector is used, but there may be another vector which is more close. A larger value reduces calculation time, a smaller value normally reduces execution time. |
| [4] Transformation | |
| Rotation | Rotation (in [deg]) of the symbol in the library (not editable). |
| Scaling | |
| X | Scaling factor in the x and y directions relative to the values of the 'Width' and 'Height' parameters (see above) (not editable). |
| Y | |
| Translation | |
| X | Offset in the x and y directions relative to the value of the 'Center' parameter (see above). |
| Y | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |

Information on editing parameters is described in [Property Window](#).

Serial Communication

These graphic parameters precisely define the properties of the 'Serial Communication' control element, which serve as a flexible tool to interrupt the RTC list execution for implementing actions like axes control commands, PLC commands or changing laser parameters. The following table describes each parameter.

| Parameter | Description |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Serial Communication | |
| Label | Default name: "Serial Communication". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Serial Connection | Serves to define the serial connection. Only PC interfaces (COM), which have been defined in the Hardware Configuration (see Setting 'PC Interfaces' Parameters), are shown and can be selected. Open the 'Select' dialog box via the  button, to select a listed serial connection. |
| Data | Lets you enter the command or message to be send to the respective receiver. Therefor, the receiver must be able to identify this command/data. Only ASCII characters are allowed. |
| Block Start | Serve to define the block start and end. Only binary numbers are allowed. |
| Block End | Example: "0x13" for carriage return as the message end character. |
| Wait For Reply | Lets you define, whether laserDESK will wait for reply or not after the command (see above) has been executed. If it will wait, the execution of a laserDESK job (marking) will be interrupted until the reply will return. If not, marking will continue immediately. Click the  button to select "True" for waiting or "False" for not waiting. |
| Response Time [ms] | Defines the time (in [ms]), laserDESK will wait for a reply. (Input is only necessary if the parameter 'Wait for Reply', see above, has been set to 'True'). If the reply will not return within this period, the further process execution will be canceled. |
| 'Continue Marking' Reply | Serves to define which reply text laserDESK is waiting for to continue or to cancel marking. Only one of the two parameters must be defined (condition to continue or condition to cancel marking). Only ASCII characters are allowed. |
| 'Cancel Marking' Reply | As a prerequisite the reply text must be known – at least approximately, because it is sufficient to define a textual part (e.g. "OK"). If the parameter is not defined (empty input field), this condition will be ignored. Example: 'Continue Marking' Reply : " " (empty) 'Cancel Marking' Reply: "Error" |

Information on editing parameters is described in [Property Window](#).

Serial Number Barcode

These graphic parameters precisely define the geometric properties of this variable object. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Serial Number | |
| View | "Barcode" (not editable) |
| Label | Default name: "Serial Number". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y direction in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the barcode in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [3] Serial Number Parameter | |
| Text | Displayed number (not editable). |
| Start Value | Lets you define the start value / first number. max. value: "2147483647" min. value: "- 2147483648" |
| Increment Value | Lets you define the increment or decrement per marking sequence. For decrementing a minus (-) must be inserted. |
| End Value | Lets you define the end value. Maximum value for increment: "2147483647" Minimum value for decrement: "- 2147483648" |

| Parameter | Description |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current Value | Lets you define a current value if you don't want to use the start value (see above). |
| Number Of Digits (Min.) | Lets you define the minimum number of digits. If the current number has fewer digits than defined here, a corresponding number of zeros will be inserted in front of the number. |
| Prefix | Lets you insert a prefix or suffix. |
| Suffix | A static text will be displayed in front of or after a serial number, e.g. "1.[serialnumber]-0". |
| Repetitions | Lets you define the number of repetitions of the serial number. |
| Reset Start Value | Serves to reset the current value (see above) to the start value (see above) when changing into the automatic mode or after each manual start. Click the  button to select "False" or "True". |
| [4] Barcode Parameter | |
| Text | Shows the value of the displayed barcode (not editable). |
| Code Type | laserDESK offers a large number of linear and matrix barcode types, which can be selected here from a drop-down menu. Click the  button to select the required code type. |
| Multiplicator | Defines the ratio between small and wide bars. The value defined here results in the ratio below. Some barcodes have an internal multiplicator. In this case, this parameter is not editable. |
| Ratio | Ratio between small and wide bars. The availability depends on the barcode type (not editable). |
| Bar Line Reduction [%] | Lets you define the reduction of the bar lines. Corresponds to outline reduction (see Fill Parameters), but in % and not absolute. |
| Module Width | Lets you define the width of the module (smallest bar). The width of the wider bars will be set respectively. |
| Enable Text | Lets you display the barcode's text/value (see 'Text' above) below the barcode. Click the  button to select "True" for enabling text or "False" for disabling text. |
| Text Distance | Lets you define the distance between the barcode and the text below (if enabled). With increasing distance the height of the barcode will decrease. |
| Font Name | laserDESK offers a large number of font types, which can be selected here from a drop-down menu. Click the  button to select the desired font. |
| Size | Lets you define the desired font size (in [Points]). |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the adaptation. |
| Code Page | Lets you select a code page (each with an own interpretation of the character display). Necessary, because barcodes are not always Unicode capable and the barcode library does not support Unicode. Click the  button to select the required code page. |
| Quiet Zone | |
| Left | Lets you define the dimensions of the margin quiet zone. |
| Right | All values can be entered/modified in 'Quiet Zone' or each value in 'Left', 'Right', 'Top' and 'Bottom'. |
| Top | |
| Bottom | |
| Inverse | The barcode can be marked inverse. The barcode will be framed to mark the area outside the bars and inside the frame. Click the  button to select "True" for inverse marking or "False" for normal marking. |
| [5] Marking | |
| Filling Lines | Lets you fill the barcode with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the barcode or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: <ul style="list-style-type: none"> - Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. - Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. - Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. - Hatchlines only: only the hatchlines will be marked. - None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |

| Parameter | Description |
|---------------------------|------------------------------------------------------------------------------------------|
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Translation | Offset in the x and y directions to the value set in the 'Center' parameter (see above). |
| X | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Y | |

Information on editing parameters is described in [Property Window](#).

Serial Number Font Text

These graphic parameters precisely define the geometric properties of this variable object. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Serial Number | |
| View | "Font Text" (not editable) |
| Label | Default name: "Serial Number". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Origin | Marking object's reference point position in the x and y directions in the work area's coordinate system. |
| X | The reference point can be selected in 'Justification' (see below). Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Center | Position of the marking object's center in the work area's coordinate system (not editable). |
| Justification | Lets you define the object's reference point. Affects all other alignment settings. Click the  button to open a drop-down menu. Select the desired origin: "Left Bottom", ..., "Center Center", ..., "Right Top". |
| Text | Shows the displayed text / serial number (not editable). |
| Font Name | laserDESK offers a large number of fonts, selectable here from a drop-down menu. Click the  button to select the desired font. |
| Font Size [Points] | Lets you enter the desired font size (in [Points]). |
| Italic | The text can be displayed in italic style. Click the  button to select "True" for italic style or "False" for normal style. |
| Bold | The text can be displayed in bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will be created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default no layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique Identifier. If desired, you can change the UID. |

| Parameter | Description |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [3] Serial Number Parameter | |
| Text | Shows the displayed text / serial number (not editable). |
| Start Value | Lets you define the start value / first number. This is the value of the first marking after switching to automatic mode . max. value: "2147483647" min. value: "- 2147483648" |
| Increment Value | Lets you define the increment or decrement per marking sequence. This value will be added each time the next marking starts. For decrementing a minus (-) must be inserted. |
| End Value | Lets you define the end value. Exceeding this value, the automatic mode will be finished. Maximum value for increment: "2147483647" Minimum value for decrement: "- 2147483648" |
| Current Value | Lets you define a current value, if you don't want to use the start value (see above). This value will be used for the next marking. |
| Number Of Digits (Min.) | Lets you define the minimum number of digits. If the current number has fewer digits than defined here, a corresponding number of leading zeros will be inserted. |
| Prefix | Lets you insert a prefix or suffix. |
| Suffix | A constant static text will be displayed in front of and/or after a serial number, e.g. "A [serialnumber] - 0". |
| Repetitions | Lets you define the number of repetitions of the same serial number. |
| Reset Start Value | Serves to reset the current value (see above) to the start value (see above) when changing into the automatic mode or after each manual start. Click the  button to select "False" or "True". |
| [4] Text Alignment | |
| Alignment | Text can be aligned on a (virtual) circle or a marking object (here called graphics path). In this case, further parameter settings (see below) are required. Click the  button to select "<None>", "On Circle" or "On Path". |
| Text Rotate Radius | Lets you define the text's radius, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. |
| Text Rotate Start Angle | Lets you define the text's start angle. Only available when "Alignment On Circle" (see above) has been selected. |
| Counter Clock | Lets you define the text's rotation direction, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "False" for clockwise or "True" for counterclockwise. |
| Inside | Lets you define the text's position as inside or outside position, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "True" for inside or "False" for outside. |
| Path | Lets you select an already (in this job) created marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to open the 'Select' dialog box for selecting the required path. If a path has been selected, the parameters 'Justification' and 'Origin' (see above) are adapted when values are changed. |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Offset | Lets you define an offset between text and marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. The entered value defines the offset from the path start point to the text start point. Positive and negative values are possible. |
| Direction | Lets you align text to the marking object direction or opposite to it, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Path Direction" or "Opposite Path Direction". |
| Alignment | Lets you align text to the right or left side of the marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Right Hand Side of Path" or "Left Hand Side of Path". |
| Vertical | Lets you align the text in vertically direction (perpendicular to the y axis). Click the  button to select "False" or "True". |
| Spacing | Lets you define the space between the characters (in [%]). – 0 % spacing: totally overlapping of all characters. – 100 % spacing: normal space between the characters. |
| Mono Spaced | Lets you define a non-proportional text. (like e.g. Courier). Each character has the same width. Click the  button to select "False" for proportional text or "True" for mono spaced text. |
| Character Mirror X | The characters can be mirrored with respect to their orientation in the x direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Character Mirror Y | The characters can be mirrored with respect to their orientation in the y direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Right To Left | The order of the characters can be changed from left-to-right ("text") to right-to-left ("text"). Click the  button to select "True" for arranging the characters from right-to-left or "False" for normal ordering. |
| [5] Marking | |
| Filling Lines | Lets you fill the text with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the text or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Serial Number Vector Text

These graphic parameters precisely define the geometric properties of this variable object. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Serial Number | |
| Text Layout | "Vector" (not editable) |
| Label | Default name: "Serial Number". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y direction in the work area's coordinate system. |
| X | The exact position depends on the origin setting in 'Justification' (see below). |
| Y | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Text | Shows the displayed text / serial number (not editable). |
| Font Name | laserDESK offers a large number of fonts, which can be selected here from a drop-down menu. Click the  button to select the desired font. |
| Italic | The text can be displayed in italic style. Click the  button to select 'True' for italic style or 'False' for normal style. |
| Bold | The text can be displayed in bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will be created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |

| Parameter | Description |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [3] Serial Number Parameter | |
| Text | Shows the displayed text / serial number (not editable). |
| Start Value | Lets you define the start value / first number. max. value: "2147483647" min. value: "- 2147483648" |
| Increment Value | Lets you define the increment or decrement per marking sequence. For decrementing a minus (-) must be inserted. |
| End Value | Lets you define the end value. max. value for increment: "2147483647" min. value for decrement: "- 2147483648" |
| Current Value | Lets you define a current value if you don't want to use the start value (see above). |
| Number Of Digits (Min.) | Lets you define the minimum number of digits. If the current number has fewer digits than defined here, a corresponding number of zeros will be inserted in front of the number. |
| Prefix | Lets you insert a prefix or suffix. |
| Suffix | A static text will be displayed in front of or after a serial number, e.g. "1.[serialnumber]-0". |
| Repetitions | Lets you define the number of repetitions of the serial number. |
| Reset Start Value | Serves to reset the current value (see above) to the start value (see above) when changing into the automatic mode or after each manual start. Click the  button to select "False" or "True". |
| [4] Text Alignment | |
| Alignment | Text can be aligned on a (virtual) circle or a marking object (here called graphics path). In this case, further parameter settings (see below) are required. Click the  button to select "<None>", "On Circle" or "On Path". |
| Text Rotate Radius | Lets you define the text's radius, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. |
| Text Rotate Start Angle | Lets you define the text's start angle. Only available when "Alignment On Circle" (see above) has been selected. |
| Counter Clock | Lets you define the text's rotation direction, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "False" for clockwise or "True" for counterclockwise. |
| Inside | Lets you define the text's position as inside or outside position, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "True" for inside or "False" for outside. |
| Path | Lets you select an already (in this job) created marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to open the 'Select' dialog box for selecting the required path. If a path has been selected, the parameters 'Justification' and 'Origin' (see above) are adapted when values are changed. |
| Offset | Lets you define an offset between text and marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. The entered value defines the offset from the path start point to the text start point. Positive and negative values are possible. |
| Direction | Lets you align text to the marking object direction or opposite to it, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Path Direction" or "Opposite Path Direction". |
| Alignment | Lets you align text to the right or left side of the marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Right Hand Side of Path" or "Left Hand Side of Path". |
| Vertical | Lets you align the text in vertically direction (perpendicular to the y axis). Click the  button to select "False" or "True". |
| Spacing | Lets you define the space between the characters (in [%]). – 0 % spacing: totally overlapping of all characters. – 100 % spacing: normal space between the characters. |
| Mono Spaced | Lets you define a non-proportional text. (like e.g. Courier). Each character has the same width. Click the  button to select "False" for proportional text or "True" for mono spaced text. |
| Character Mirror X | The characters can be mirrored with respect to their orientation in the x direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Character Mirror Y | The characters can be mirrored with respect to their orientation in the y direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Right To Left | The order of the characters can be changed from left-to-right ("text") to right-to-left ("text"). Click the <input checked="" type="checkbox"/> button to select "True" for arranging the characters from right-to-left or "False" for normal ordering. |
| [5] Marking | |
| Filling Lines | Lets you fill the text with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the <input checked="" type="checkbox"/> button to select "True" for filling the text or "False" for not filling. |
| Mark | This parameter let you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the <input checked="" type="checkbox"/> button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [6] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

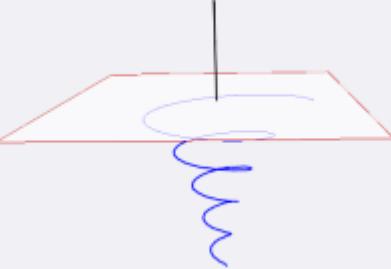
Information on editing parameters is described in [Property Window](#).

Spiral

These graphic parameters precisely define the geometric properties of spirals. The following table describes each parameter.

| | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Parameter | Description |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Spiral | |
| Label | Default name: "Spiral". If desired, you can change the name. |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Y | |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the spiral in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. |
| Z Top | The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [3] Geometry | |
| Rise Type | Lets you define one of three rise types. – "Fix Distance" defines the spiral by the distance of the turns. – "Fix Turns" defines the spiral by the number of the turns. – "Percentage Decrease" defines the spiral by the decrease in percent. The corresponding values must be set in the parameters below. These will be displayed depending on the selection here. Click the  button to select the desired rise type. |
| Decrease [%] | Lets you define the decrease in [%] inside the selection frame. This parameter is only displayed, if "Decrease" is selected in the 'Rise Type' parameter (see above). |
| Start Radius | Lets you define the start radius the spiral will begin with. |
| Clockwise | Lets you define the direction of rotation from the inside out. Click the  button to select "True" for clockwise or "False" for counterclockwise. |
| Start Point | Lets you define the spiral's start point: – Start from inside or – Start from outside. Click the  button to select "Outside" for outside start point or "Inside" for inside start point. |
| Lead | Lets you define the lead of a 3D spiral. Because this parameter/function is typically used for drilling, a positive value results in a negative z-coordinate.  The z-coordinate will always be executed relative to a z-focus control element (if set) or to the z=0 plane (normally the working plane). When the execution is finished, the laser focus returns to the initial z-position. NOTE: Defining a 3D spiral is only possible, if the 3D option is enabled on the RTC5 PC interface board (see RTC5 Manual). |
| [4] Marking | |
| Mark | Lets you enable or disable the marking process for this object. Click the  button to select "True" for marking or "False" for not marking. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [5] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |
| Flip X | The spiral can be mirrored with respect to its orientation in the x direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |
| Flip Y | The spiral can be mirrored with respect to its orientation in the y direction. Click the  button to select "True" for mirroring or "False" for not mirroring. |

Information on editing parameters is described in [Property Window](#).

Text Box

These graphic parameters serve to precisely define the geometrical properties of the text box. The following table describes each parameter.

| Parameter | Description |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Text Box | |
| Label | Default name: "Text Box". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting, an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Origin X | Marking object's reference point position in the x and y directions in the work area's coordinate system. |
| Y | The reference point can be selected in 'Justification' (see below). Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Center | Position of the marking object's center in the work area's coordinate system (not editable) |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the height in the y direction (with parameter 'Rotation'= "0", see below). |
| Text | Open the text box via the  button to write, modify or delete the text |
| Font Name | laserDESK offers a large number of fonts, selectable here from a drop-down menu.. Click the  button to open a drop-down menu. |
| Font Size [Points] | Lets you enter the desired font size (in [Points]). |
| Italic | The text can be displayed in italic style. Click the  button to select "True" for italic style or "False" for normal style. |
| Bold | The text can be displayed in bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will be created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Alignment | The text can be aligned left, right or center. Click the  button to select "Left" (default), "Right" or "Center". |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object to visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default, no layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |

| Parameter | Description |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. |
| Z Height | Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [4] Marking | |
| Filling Lines | Lets you fill the text box with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the text or "False" for not filling. |
| Mark | This parameter lets you define the kind of execution of this object. One of the following items can be selected: – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. Click the  button to select the required item. |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Sort Mode | Lets you define the kind of marking order sorting algorithm for marking objects/vectors: – None: Sort mode will not be applied. – Position: Intended to be used with POF applications; defines the marking order depending on the moving direction. – Distance: Sorts the marking objects / vectors by shortest distance to reduce marking time. Click the  button to select 'None', 'Position' or 'Distance'. |
| Sort Direction | If sort mode 'Position' has been selected (see above), then this parameter lets you define in which direction the marking objects / vectors should be sorted: – Left To Right – Top To Bottom – Right To Left – Bottom To Top For sort mode 'Distance' (see above), this parameter defines the starting point. Click the  button to select 'Left To Right', 'Top To Bottom', 'Right To Left' or 'Bottom To Top'. |
| Search Radius | If sort mode 'Position' or 'Distance' has been selected (see above), the program searches for optimum jumps by calculating alternatives between the marking objects / vectors. This parameter lets you define the radius / distance for the calculation. If a vector is closer than this parameter, this vector is used, but there may be another vector which is even closer. A larger value reduces calculation time, a smaller value normally reduces execution time. |
| Clearance | To avoid laser beam intersection and thus penetrations, intersecting lines will be cut out. Lets you define the clearance of the cutout. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for calculating the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) the curve fitting. |
| [5] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

How to edit the parameters is described in [Property Window](#).

Tile Set

These graphic parameters precisely define the geometric properties of tile sets. The following table describes each parameter.



NOTE:
If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the ['View' Parameters](#) (see 'Units\Length').

| Parameter | Description |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | |
| Label | Default name: "Tile Set. If desired, you can change the name. |
| Width | Lets you define the width in the x direction. |
| Height | Lets you define the height in the y direction. |
| Center | Position of the marking object's center in the work area's coordinate system (not editable). |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the spiral in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| Z Height | |
| [3] Marking | |
| Mark | Lets you enable or disable the marking process for this object. Click the <input checked="" type="checkbox"/> button to select "True" for marking or "False" for not marking. |
| Tile Parameter | Open the 'Tile' dialog box via the  button to define the tile set. How to define the tile set is described in Defining a Tile Set . |
| Sort Mode | Lets you define the marking order kind of sorting algorithm of the marking objects/vectors: – None: Sort mode will not be applied. – Position: Intended to be used with POF applications; defines the marking order depending on the moving direction. – Distance: Sorts the marking objects / vectors by shortest distance to reduce marking time. Click the <input checked="" type="checkbox"/> button to select 'None', 'Position' or 'Distance'. |
| Sort Direction | Lets you define – if sort mode 'Position' has been selected (see above) –, by which direction the marking objects / vectors should be sorted: – Left To Right – Top To Bottom – Right To Left – Bottom To Top For sort mode 'Distance' (see above) this parameter defines the starting point. Click the <input checked="" type="checkbox"/> button to select 'Left To Right', 'Top To Bottom', 'Right To Left' or 'Bottom To Top'. |
| Search Radius | If sort mode 'Position' or 'Distance' has been selected (see above), the program searches for optimum jumps by calculating alternatives between the marking objects / vectors. This parameter lets you define the radius / distance for the calculation. If a vector is closer than this parameter, this vector is used, but there may be another vector which is more close. A larger value reduces calculation time, a smaller value normally <i>reduces</i> execution time. |
| Point Time Duration [μ s] | Lets you define the time duration (in [μ s]) for marking points. This is the laser's power-on time. Because no individual parameters are allowed in a Tile Set, this value is used for all included points. |

| Parameter | Description |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Home Jumps | If set to "True", a check is done during the list calculation and before each control node sequence (which may last some time) a home jump is inserted. The home jump position is defined in the Hardware Configuration (refer to Setting 'Optics' Parameters). The home jump feature of the tile set and the hardware configuration is independent from each other. Only the same position is used. |

Information on editing parameters is described in [Property Window](#).

Timer Delay

These parameters of the 'Timer Delay' control element precisely define the waiting time, to control program flow.
The following table describes each parameter.

| Parameter | Description |
|------------------------|----------------------------------------------------------------------|
| [1] Timer Delay | |
| Label | Default name: "Timer Delay". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Delay [ms] | Job execution will be interrupted for this duration. |

Information on editing parameters is described in [Property Window](#).

Timer Nodes

The parameters of the 'Timer' control elements needn't to be modified for time measurement. The following table describes each parameter.

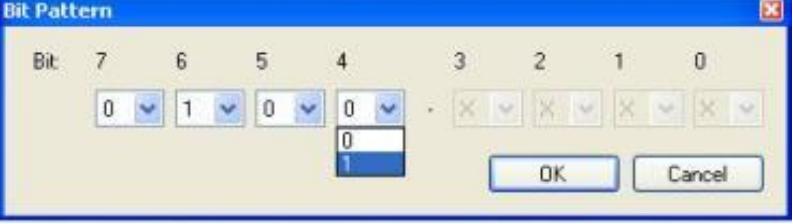
| Parameter | Description |
|------------------------|----------------------------------------------------------------------|
| [1] Timer Start | |
| Label | Default name: "Timer Start". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |

| Parameter | Description |
|-----------------------|---------------------------------------------------------------------|
| [1] Timer Stop | |
| Label | Default name: "Timer Stop". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |

Information on editing parameters is described in [Property Window](#).

Variant

These graphic parameters precisely define the geometric properties of variants. The following table describes each parameter.

| Parameter | Description |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Variant | |
| Name | <p>Default name: "Variant [No.]". If desired, you can change the name. NOTE: This name is the reference when selecting a variant in the laser control window (see 'Variant Selection' field in Laser Control Window / GUI Profiles).</p> |
| Bit Pattern | <p>Lets you define the bit pattern, which selects the variant for execution. The bit pattern is assigned to the pins of the 'Extension 1' connector of the RTC5 or RTC6 board (Digital In 0-7, see Connecting the Laser to the RTC5 or RTC6 PC Interface Board).</p> <p>NOTES:</p> <ul style="list-style-type: none"> - Only bits enabled in the job node's 'Variant Bit Mask' parameter (see Graphic Parameters – Job) are available. - The bit pattern "0000 0000" must not be defined. Because this bit pattern is exclusive for idle and reset state, its not valid. - The selected variant is only started by the start signal to the 'Laser' connector of the RTC board (see Connecting the Laser to the RTC5 or RTC6 PC Interface Board), not by applying the selection signals. <p>To define the bit pattern proceed as follows:</p> <ul style="list-style-type: none"> - Click the  button to open the 'Bit Pattern' dialog box: <div style="text-align: center; margin-top: 10px;">  </div> <ul style="list-style-type: none"> - To define the bit pattern, click the  button for each enabled bit and select "0" or "1". - Confirm your settings with {OK}. |
| Visible | <p>When creating two (or more) variants overlapping another, it can be advantageous to set one variant to invisible while creating the other one.</p> <p>Click the  button to select "True" for visible or "False" for invisible.</p> |
| [2] Appearance | |
| Type | <p>Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled. In this case, the 'Filling Lines' parameter (see below) can't be set to "True".</p> |
| Width | Width in the x direction (not editable). |
| Height | Height in the y direction (not editable). |
| Center | The variant's center position in the x and y direction in the work area's coordinate system (not editable). |
| UID | <p>Unique IDentifier. If desired, you can change the UID.</p> |
| [3] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the variant in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |

| Parameter | Description |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [4] Marking | |
| Filling Lines | <p>Lets you fill the variant with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling.</p> <p>Click the  button to select "True" for filling the variant or "False" for not filling.</p> |
| Mark | <p>This parameter let you define the kind of execution of this object. One of the following items can be selected:</p> <ul style="list-style-type: none"> – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Number Of Executions | <p>Shows the number of executions started from external in the automatic mode (not editable). The value can be reset - in manual mode only - as follows:</p> <ul style="list-style-type: none"> – Place the cursor above 'Number Of Executions' and click the right mouse button. A pop-up window shows "Reset Number Of Executions". – Select the message to confirm. |
| Target Quantity | <p>Serves to exit the automatic mode automatically when the target quantity of marking procedures is achieved. In this case no further external starts are executable. Setting the value to "-1", the number of executions is unlimited, the automatic mode will not be exited.</p> |
| Mark Rotation | <p>Defines the rotation of all marking objects inside a variant. The reference for rotation is always the origin of the work area's coordinate system.</p> <p>NOTE: The rotation is visible only in the work area when activating the marking vectors (via shortcut <Ctrl>+<M> or via 'Options [View] 4 Marking' in the context menu).</p> |
| Mark Translation | Defines the translation in x/y directions of all marking objects inside a variant. |
| X | NOTE: |
| Y | The translation is visible only in the work area when activating the marking vectors (via shortcut <Ctrl>+<M> or via 'Options [View] 4 Marking' in the context menu). |

Information on editing parameters is described in [Property Window](#).

Variants

The graphic parameters of the variant node needn't to be modified. The variants node gets created automatically when a variant is inserted in the job. The following table describes each parameter.

| Parameter | Description |
|-----------------------|-------------------------------------------------------------------|
| [1] Appearance | |
| Label | Default name: "Variants". If desired, you can change the name. |
| Comment | Lets you enter a comment/description. |

Information on editing parameters is described in [Property Window](#).

Vector Text

These graphic parameters precisely define the geometric properties of text. The following table describes each parameter.

| | |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | NOTE: If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, then the respective values correspond to the units defined in the 'View' Parameters (see 'Units\Length'). |
| [1] Text | |
| Text Layout | "Vector" (not editable) |
| Label | Default name: "Vector Text". If desired, you can change the name. |
| Type | Closed marking objects are set to "Area" by default. With this setting an object can be filled. If "Outline" is selected, an object can't be filled even if it has a closed outline. In this case, the 'Filling Lines' parameter (see below) can't be set to "True". |
| Center | Marking object's center position in the x and y directions in the work area's coordinate system. |
| X | |
| Y | Both values can be entered/modified in 'Center' or each value in 'X' and 'Y'. |
| Width | Lets you define the width in the x direction (with parameter 'Rotation'= "0", see below). |
| Height | Lets you define the width in the y direction (with parameter 'Rotation'= "0", see below). |
| Aspect Ratio | Scaling behavior of the shape: – Fixed: shape keeps aspect ratio indefinitely; – Variable: shape doesn't keep aspect ratio indefinitely; – <default>: shape inherits the aspect ratio settings of the Edit Parameters ('GUI Settings' window). |
| Text | Serves to enter the desired text. |
| Font Name | laserDESK offers a large number of fonts, selectable here from a drop-down menu. Click the  button to select the desired font. |
| Italic | The text can be displayed in italic style. Click the  button to select "True" for italic style or "False" for normal style. |
| Bold | The text can be displayed in bold style. Click the  button to select "True" for bold style or "False" for normal style. |
| Centerline | Lets you reduce standard fonts (typically, these fonts' characters are areas with outline) to a single-line font. The single line will be converted to the center of the source font. If the centerline font is not yet available in the job's library, it will be created automatically when defining the centerline font. Furthermore, the parameter 'Type' (see above) will change automatically to 'Outline'. Click the  button to select "True" for centerline font or "False" for the standard font. The characters of the centerline font can be edited in the library (see Marking Library). |
| Layer | A marking object can be assigned to a layer. Then you can set the marking object visible or invisible, editable or not editable, markable or not markable and assign a new marking parameter set for all objects of one layer (see Layers Window). By default none layer is assigned, the selection field is blank. Open the 'Select' dialog box via the  button, to select a listed layer or "<None>". |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Boundary | |
| Left | |
| Right | Left, right, top and bottom position of the bounding box of the text in the work area's coordinate system (not editable). |
| Top | |
| Bottom | |

| Parameter | Description |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Z Bottom | Only if 'Use 3D = true' is selected in the job node (see Parameter Use 3D), for all objects these z-dimensions are evaluated and displayed. |
| Z Top | Z Bottom and Z-Top are 'read only'. They are evaluated from the z values of the point list. To shift the object in z you can use the z-focus control node. The parameter 'Z Height' can be changed to rescale the object(s) in the z-dimension. Thus this parameter is particularly suitable for spirals. |
| Z Height | Using this parameter in the job node, all 3D objects inside the job will be rescaled correspondingly. Note: This feature has no effect on 2D objects which are transformed on an inclined plane. This feature scales the z-dimension of 3D objects previous to the transformation on an inclined plane. |
| [3] Text Alignment | |
| Alignment | Text can be aligned on a (virtual) circle or a marking object (here called graphics path). In this case, further parameter settings (see below) are required. Click the  button to select "<None>", "On Circle" or "On Path". |
| Text Rotate Radius | Lets you define the text's radius, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. |
| Text Rotate Start Angle | Lets you define the text's start angle. Only available when "Alignment On Circle" (see above) has been selected. |
| Counter Clock | Lets you define the text's rotation direction, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "False" for clockwise or "True" for counterclockwise. |
| Inside | Lets you define the text's position as inside or outside position, if "Alignment On Circle" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "True" for inside or "False" for outside. |
| Path | Lets you select an already (in this job) created marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to open the 'Select' dialog box for selecting the required path. If a path has been selected, the parameters 'Justification' and 'Origin' (see above) are adapted when values are changed. |
| Offset | Lets you define an offset between text and marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. The entered value defines the offset from the path start point to the text start point. Positive and negative values are possible. |
| Direction | Lets you align text to the marking object direction or opposite to it, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Path Direction" or "Opposite Path Direction". |
| Alignment | Lets you align text to the right or left side of the marking object, if "Alignment On Path" (see above) has been selected. Only then is the parameter displayed. Click the  button to select "Right Hand Side of Path" or "Left Hand Side of Path". |
| Vertical | Lets you align the text in vertically direction (perpendicular to the y axis). Click the  button to select "False" or "True". |
| Spacing | Lets you define the space between the characters (in [%]). – 0 % spacing: totally overlapping of all characters. – 100 % spacing: normal space between the characters. |
| Mono Spaced | Lets you define a non-proportional text. (like e.g. Courier). Each character has the same width. Click the  button to select "False" for proportional text or "True" for mono spaced text. |
| Character Mirror X | The characters can be mirrored with respect to their orientation in the x direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Character Mirror Y | The characters can be mirrored with respect to their orientation in the y direction. Click the  button to select "True" for mirrored characters or "False" for normal characters. |
| Right To Left | The order of the characters can be changed from left-to-right ("text") to right-to-left ("text"). Click the  button to select "True" for arranging the characters from right-to-left or "False" for normal ordering. |
| [4] Marking | |
| Filling Lines | Lets you fill the text with filling lines. If the 'Type' parameter (see above) is "Outline", this parameter can't be set to "True" and thus can't enable filling. Click the  button to select "True" for filling the text or "False" for not filling. |

| Parameter | Description |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mark | <p>This parameter let you define the kind of execution of this object. One of the following items can be selected:</p> <ul style="list-style-type: none"> – Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. – Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. – Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. – Hatchlines only: only the hatchlines will be marked. – None: the marking object will not be marked. <p>Click the <input checked="" type="checkbox"/> button to select the required item.</p> |
| Variable | <p>Lets you allow to change the text content in remote mode. Click the <input checked="" type="checkbox"/> button to select "True" for changeable/variable text or "False" for not changeable/variable text. (For further information, see Definition of the Remote Control.)</p> <p>NOTE: If you don't use a remote control or if you don't want to change text inside remote mode, you should set this parameter to "False", because execution will then proceed faster.</p> |
| Marking Count | If an application requires repeated marking, you can define the number of marking iterations here. |
| Sort Mode | <p>Lets you define the marking order kind of sorting algorithm of the marking objects/vectors:</p> <ul style="list-style-type: none"> – None: Sort mode will not be applied. – Position: Intended to be used with POF applications; defines the marking order depending on the moving direction. – Distance: Sorts the marking objects / vectors by shortest distance to reduce marking time. <p>Click the <input checked="" type="checkbox"/> button to select 'None', 'Position' or 'Distance'.</p> |
| Sort Direction | <p>Lets you define – if sort mode 'Position' has been selected (see above) –, by which direction the marking objects / vectors should be sorted:</p> <ul style="list-style-type: none"> – Left ToRight – Top To Bottom – Right To Left – Bottom To Top <p>For sort mode 'Distance' (see above) this parameter defines the starting point. Click the <input checked="" type="checkbox"/> button to select 'Left ToRight', 'Top To Bottom', 'Right To Left' or 'Bottom To Top'.</p> |
| Search Radius | <p>If sort mode 'Position' or 'Distance' has been selected (see above), the program searches for optimum jumps by calculating alternatives between the marking objects / vectors.</p> <p>This parameter lets you define the radius / distance for the calculation.</p> <p>If a vector is closer than this parameter, this vector is used, but there may be another vector which is more close.</p> <p>A larger value reduces calculation time, a smaller value normally reduces execution time.</p> |
| Clearance | To avoid laser beam intersection and thus penetrations, intersecting lines will be cut out. Lets you define the clearance of the cutout. |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| [5] Transformation | |
| Rotation | Rotation (in [deg]) relative to the original position |

Information on editing parameters is described in [Property Window](#).

Vision System

These graphic parameters precisely define the properties of the 'Vision System' control element, which lets you control a vision system.


NOTE:

When using the 'Vision System' control node, transformation via remote control (see [Definition of the Remote Control](#)) is not possible.

The following table describes each parameter.

| Parameter | Description |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Vision System | |
| Label | Default name: "Vision System". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Camera Job | Name of the vision system camera job. This name must exist in the vision system software. |
| Processing Type | <p>Lets you select one of five evaluation types:</p> <ul style="list-style-type: none"> – Position: Evaluation of offset and rotation. – Scale: Evaluation of scale factor and gain factor. – Transformation: Evaluation of offset, rotation, scale factor, gain factor. – External Evaluation: The camera job will be executed, but the results (Transformation) will not be used. – Shift: The evaluation excludes the rotation (0,0), only the x,y offset is applied. A shifted vision job evaluates local rotations. laserDESK can only apply a global rotation around 0,0 which may lead to misalignment. <p>Click the  button to select the required processing type.</p> <p>NOTE: In automatic mode, the evaluation will remain until a new evaluation is executed. Using variants, one evaluation will be applied to all further markings (with the effect of saving time).</p> |
| Translation | The vision job will be executed with this offset. |
| X | Offset in the x and y directions to the picture positions set in the vision job. |
| Y | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |
| Keep Reference fix | <p>Lets you define the reference behavior when shifting the camera picture:</p> <ul style="list-style-type: none"> – False: The defined offset (see 'Translation' above) is applied to the picture position and to the reference. Therefore the whole evaluation is executed at the shifted position in the working field. – True: The camera picture will be shifted while the reference remains at the defined position in the vision job. This results in an absolute offset to the reference. <p>Click the  button to select the required reference behavior.</p> |
| Continue on Error | <p>Lets you define the job's subsequent progress if an error occurs during evaluation.</p> <ul style="list-style-type: none"> – False: The job will be aborted immediately. – True: The job execution will be continued with laser signals switched off up to the next vision control node or until the job's end. <p>Click the  button to select the desired job progress.</p> |
| Log File | <p>The processing/evaluation data will be written to a log file. Consequently, the data can be used for process analyses (e.g. long term drift analyses).</p> <p>The  select button will launch a (Windows-standard) 'Save As' dialog box for creating the log file (without any restrictions).</p> |

Information on editing parameters is described in [Property Window](#).


NOTE:

If you use SCANLAB's SCANalign vision solution to execute vision system camera jobs, please refer to the SCANalign documentation.

Wait For Encoder

These parameters of the 'Wait For Encoder' control element precisely define the distance and wait mode for the required encoder. The following table describes each parameter.

| Parameter | Description |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Wait For Encoder | |
| Label | Default name: "Wait For Encoder". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Distance | Lets you define the distance in units (see 'Defining the 'View' Parameters\Units'). The distance is measured from the position at the start of marking. Enter the desired value. |
| Encoder | This parameter is only shown if POF-Type XY is set in the Hardware Configuration (see 'Setting 'Processing-On-The-Fly' Parameters\POF-Type'). In this case, the required encoder - for the x or y direction - must be selected. Click the  button to select the required encoder: – X – Y |
| Mode | Lets you define the waiting mode. NOTE: For a description of this parameter, see "Processing-on-the-fly" and "Normal List Command wait_for_encoder_mode" in the RTC5 Manual . Click the  button to select the required mode: – Exceed: Further execution of a list will be postponed until the encoder counter has overstepped the defined distance (see above). – Fall Below: Further execution of a list will be postponed until the encoder counter has understepped the defined distance. – Pass By: Further execution of a list will be postponed until the encoder counter has overstepped or understepped the defined distance depending on the sign of the parameter. In contrast to the other values, this passing by has to occur! If the encoder counts already have passed the distance, then you must wait for a full cycling of the counter. |

Information on editing parameters is described in [Property Window](#).

Z-Focus Control

These graphic parameters precisely define the z-focus position when using a SCANLAB varioSCAN dynamic focusing unit within a 3-axis scan system (see [Inserting Z-Focus Control Elements](#)).



NOTE:

Z-focus control is only possible, if the 3D option is enabled on the RTC5 or RTC6 PC interface board (see 'Controlling a 3-Axis Scan System (optional)' in the [RTC5 Manual](#)) and a 3D correction file (D3_[nnn].ct5) is used (see 'Correction File' parameter in [Setting 'Optics' Parameters](#)).

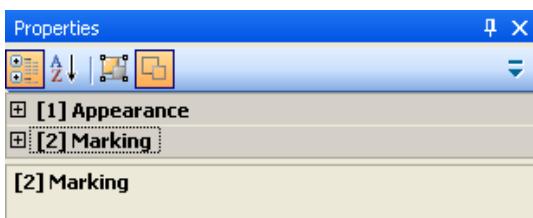
The following table describes each parameter.

| Parameter | Description |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Z-Focus Control | |
| Label | Default name: "Z-Focus Control". If desired, you can change the name. |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [2] Control | |
| Z Position | <p>Lets you define the z-focus position. A positive value (without "+") moves the marking level up (direction opposite to the laser beam), a negative value (with "-") down (direction of the laser beam). Normally, the value "0" defines the working plane. The z-focus position is handled as a z-offset to all defined z-coordinates of the objects. To change or reset the z-focus position a further z-focus control element must be inserted and defined. The defined z-focus position will be maintained if a simple 3D object (e.g. spiral/helix) is executed in a standard 2D job (job parameter 'Use 3D = False', see Graphic Parameters – Job). A jump back to the z position set here will be executed!</p> <p>NOTE: Manually change of the z-coordinate in the 'Manual Laser Control' window or by the appropriate remote command changes this z-focus position too.</p> |
| Movement Type | <p>Lets you define the movement type: – Absolute: Movement to an absolute position within the coordinate system. – Relative: Movement relative to the last z-focus position.</p> <p>ATTENTION: Take care to stay in the allowed z coordinate range when using relative movements, especially if you use variants and don't know the execution sequence in advance.</p> |
| NOTE: | |
| Using 3D scan system with a varioSCAN/dynamic focusing unit, jumps in z-direction must be executed slower than with a 2D scan system. Thus the two parameters below let you define individual settings for the jump speed and jump delay which are applied for this movement in z-direction. | |
| Jump Speed (v _j) [m/s] | Speed (in [m/s]) of the 'virtual' laser beam while positioning to the next mark in z-direction. |
| Jump Delay [μs] | The jump delay is needed to equalize the tracking error at the end of the jump. Because the z-focusing optics have larger tracking errors, this value can be adapted here. |

Information on editing parameters is described in [Property Window](#).

19.5 Shared Properties

The Shared Properties parameters serve to define specific parameters for several marking objects (selected in the work area or Job Explorer) at one go. The corresponding button in the topmost line of the properties window is active only, if a group, graphic set, variant or several marking objects are selected. Click button to display the shared properties of the selected objects:



The following parameters can be edited:

| [1] Appearance | Description |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type | <p>Graphic objects can have closed or open outlines.</p> <ul style="list-style-type: none"> - Objects with open outlines are always of type 'Outline' and can't be filled. - Objects with closed outline may be of type 'Outline' or of type 'Area'. Only the 'Area' type objects can be filled. <p>This parameter lets you define the type of all selected objects, but only the closed outline objects can and will be changed.</p> <p>If on or several objects are 'Area' type and one or several objects are 'Outline' type, no type will be displayed here, but the closed objects can be filled.</p> |
| Layer | <p>The marking objects combined for shared properties can be assigned to a layer. Then you can set them visible or invisible, editable or not editable, markable or not markable (see Layers Window).</p> <p>By default none layer is assigned, the selection field is blank.</p> <p>Open the 'Select' dialog box via the  button, to select a listed layer or "<None>".</p> |

| [2] Marking | Description |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mark | <p>Lets you enable or disable the marking process for this object. When enabling the marking process, the order of hatchlines and outlines will be defined. One of the following items can be selected:</p> <ul style="list-style-type: none"> - Hatchlines BEFORE Outlines: the hatchlines will be marked before the outlines. - Hatchlines AFTER Outlines: the hatchlines will be marked after the outlines. - Hatchlines AND Outlines: must be selected, if the whole object shall be sorted. - Hatchlines only: only the hatchlines will be marked. - None: the marking object will not be marked. <p>Click the  button to select the required item.</p> |
| Graphic Resolution | Lets you define the graphic resolution. This factor is used for the calculation of the curve's polygon adaptation. The bigger the factor, the rougher (less accurate) is the curve fitting. |
| Point Time Duration [μs] | <p>Lets you define the marking time duration (in [μs]) for points.</p> <p>Is only editable, if several points are selected exclusively.</p> <p>If several points are selected together with other objects, the entered value will be applied to these points and deleted afterwards in the shared properties.</p> |

To edit the shared properties for several objects, proceed as follows:

1. Select a group, graphic set, variant or several marking objects in the work area or Job Explorer.
The {Shared Properties} button will be activated in the property window's topmost line.
2. Select the {Shared Properties} button.
The shared graphic parameters will be listed.
3. Select the parameter to be changed in the left column.
The parameter will be highlighted blue.

4. If you need to modify a value press the <Tab> key.
The current value in the right column will be highlighted blue.
Input the desired value using integers or floating point numbers.
Confirm your input by pressing the <Enter> key.
5. If one of several items must be selected, the  button will be displayed at the side.
Click the button to select the desired item via a drop-down menu.
6. If one or several items must be defined in a dialog box, the  button will be displayed at the side.
Click the button to define the item(s) via the dialog box.



NOTE:

If you subsequently close the job without saving, the changes will not be applied!

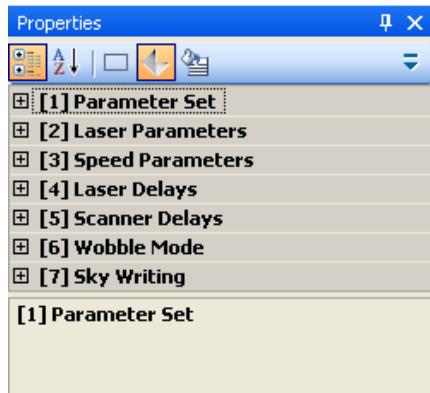
If you want to save the settings permanently, proceed as described below.

7. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or
When you close the job or marking library (by opening a new job or 'Hardware Configuration' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

Information on editing parameters is described in [Property Window](#).

19.6 Marking Parameters

Marking parameters let you define the laser and scan head settings that are crucial for good results when marking. All marking parameters are integrated into one parameter set (see figure below), which is displayed in the property window. Parameter sets can be defined for one or several marking objects or for the job. Generally, each parameter set provides the same parameter types:



Information on editing the individual parameters and managing the parameter sets is described in [Property Window](#).

Parameter Set

The group [1] parameters provide information about the displayed parameter set. The parameter set displayed in the property window is either selected in the Library Explorer (job library or marking library) or assigned to a marking object selected in the work area or Job Explorer.

| [1] Parameter Set | Description |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inherited From | Shows the source of the object's parameter settings: – If the settings were assigned from a template in the job library or marking library, the field shows "Template: [TemplateName]" (see Library Explorer / Marking Library). – As long as the marking object's parameters weren't modified and no parameter set was assigned to the marking object, the field will show "Element: Job". But note, when a marking object gets created, it's automatically assigned the parameter set that was designated as the job's default marking parameter set. – If the settings were modified for a selected marking object, but the settings aren't assigned to a parameter set, the field will show "<None>". |
| Name | If a marking object is selected in the work area or Job Explorer, the object's name will be displayed. If a parameter set is selected in the job library or marking library, the parameter set's name will be displayed. |
| Description | The input field lets you enter a description/comment. |

Information on managing the parameter set is described in [Property Window](#).

Laser Parameters

The laser parameters (group [2]) let you define laser performance. Output power, frequency and pulse length settings are fundamental to the results of the marking process. Additionally, the operation mode of the used laser must be set. The following laser parameters can be edited:

| [2] Laser Parameters | Description |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laser Power (P) [%] | Lets you define the output power of the used laser as a [%] of the laser power defined in the hardware settings (see 'Calibration Factor Of Power' parameter in 'Processing Laser' Parameters). |
| Operation Mode | An operation mode must be selected that corresponds to the used laser type: – Pulsed – Continuous Wave Click the  button and select the required operation mode from the drop-down menu. If "Continuous Wave" is selected, the parameters 'Laser Frequency' and 'Pulse Length' (see below) are deactivated. |
| Laser Frequency (f) [kHz] | If a pulsed laser is used, the required pulse frequency (in [kHz]) can be entered here. If "Continuous Wave" is selected (see above), this input field gets deactivated. |
| Pulse Length [μ s] | If a pulsed laser is used, the required pulse length (in [μ s]) can be entered here. If "Continuous Wave" is selected (see above), this input field gets deactivated. NOTE: This parameter will not be shown, if a GeneralCO2 laser (laser mode 0) has been selected in the Hardware Settings (see Setting 'Processing Laser' Parameter\Laser Type). In this case the pulse length will be defined by the power parameter (duty cycle). |
| FirstPulseKiller (FPK) [μ s] | Some laser types (e.g. YAG) show pulse-to-pulse energy variation at the start of a pulse train (i.e. marking vector). A device for appropriately suppressing or compensating this behavior comes with some laser models. The FirstPulseKiller signal can be used to trigger or enable such a device at the start of mark vectors. Enter the length of the FirstPulseKiller signal (in [μ s]). For further information about the FirstPulseKiller signal, see "Laser Control - YAG Modes" in the RTC5 Manual . |

Information on editing the individual parameters and managing the parameter set is described in [Property Window](#).

Speed Parameters

The speed parameters (group [3]) define the speed with which the laser focus moves along the surface of the image field. The mark and jump speed settings are decisive for the total execution time of a marking process. The following speed parameters can be edited:

| [3] Speed Parameters | Description |
|-----------------------|------------------------------------------------------------------------|
| Mark Speed (vm) [m/s] | Speed (in [m/s]) of the laser beam while marking. |
| Jump Speed (vj) [m/s] | Speed (in [m/s]) of the laser beam while positioning to the next mark. |

For further information about the mark and jump speeds, see "set_jump_speed" and "set_mark_speed" in the [RTC5 Manual](#).

Information on editing individual parameters and managing the parameter set is described in [Property Window](#).

Laser Delays

Laser delays affect the accuracy of the marking process result. But they don't influence the duration of the marking process. Laser delays define when the "laser active" laser control signals get turned on or off before or after a mark or arc command or a series of mark and arc commands. The following laser delays can be edited:

| [4] Laser Delays | Description |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laser On Delay [μs] | To avoid burn-in effects (because the mirrors first have to be accelerated up to the defined marking speed) this delay is automatically inserted at the start of a mark or arc command. Defines the moment when the RTC5 or RTC6 turns on the laser. Delay (in [μs]) until the laser gets activated. |
| Laser Off Delay [μs] | The laser should not turn off before the scanner reaches the final set position. Automatically inserted before the laser is turned off. Delay (in [μs]) until the laser gets deactivated. |

NOTE:


The laser (and scanner) delays can be calculated via the property window's context menu basing on the tracking error of the used scan head. The calculated values will then be entered automatically (see [Calculate Delays in Property Window](#)).

If the used scan head is an intelliSCAN, the tracking error can be evaluated within the hardware control (see [Evaluating the Scan Head's Tracking Error](#)).

NOTE:


The RTC board sets new position data every 10 μs. Therefore the point marking duration (see parameter 'Time Duration' in [Graphic Parameters – Point](#)) is rounded to 10 μs. To get a more precise timing, the laser on delay and laser off delay can be used, which are applied during the point marking with defined laser on time. These delays are independent of the position output and can be adjusted to units of 0.5 μs.

Example:

Point time duration = 10 μs

LaserOn = 6 μs

LaserOff = 0 μs

The resulting laser on time is : Time duration – LaserOn + LaserOff = 4 μs.

For further information about the laser delays, see "Laser Delays" in the [RTC5 Manual](#).


NOTE:

If [Sky Writing](#) is activated, the laser delays (as well as the [scanner delays](#)) will not be taken into account in the sky writing mode.

They will be fully functional again after deactivating of sky writing mode.


NOTE:

The laser and the scanner, and thus the laser delays and the [scanner delays](#) are highly interdependent. Changing the laser delays may require changing the scanner delays too.

For information on optimizing delays, see "Notes On Optimizing The Delays" in the [RTC5 Manual](#).

Information on editing the individual parameters and managing the parameter set is described in [Property Window](#).

Scanner Delays

The scanner delays affect the accuracy of the marking process result. After each vector or arc command, the RTC5 or RTC6 inserts one of the scanner delays before the next command is started. The following scanner delays can be edited:

| [5] Scanner Delays | Description |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jump Delay [μs] | Compensates the lag caused by the mirror's settling. Delay (in [μs]) after a jump command, before the next command is executed. |
| Mark Delay [μs] | Compensates an occurring lag during a mark or arc command to ensure that the scanners reach the set position properly before the next command starts. Delay (in [μs]) after a single mark or arc command or after the last mark or arc command of a polyline. For point marking the mark delay can be used to wait for a slow reaction of the laser system. Although for point marking the scanners stay (and thus there is no tracking error), but the laser may be switched off too late. |
| Polygon Delay [μs] | Replaces the mark delay between two successive mark or arc commands to ensure that the corners of the polyline will be marked accurately. Applies for the complete polyline. Delay (in [μs]) after a mark command. |

NOTE:



The scanner (and laser) delays can be calculated via the property window's context menu basing on the tracking error of the used scan head. The calculated values will then be entered automatically (see [Calculate Delays in Property Window](#)).

If the used scan head is an intelliSCAN, the tracking error can be evaluated within the hardware control (see [Evaluating the Scan Head's Tracking Error](#)).

For further information about the scanner delays, see "Scanner Delays" in the [RTC5 Manual](#).

NOTE:



If [Sky Writing](#) is activated, the scanner delays (as well as the [laser delays](#)) will not be taken into account in the sky writing mode.

They will be fully functional again after deactivating of sky writing mode.

NOTE:



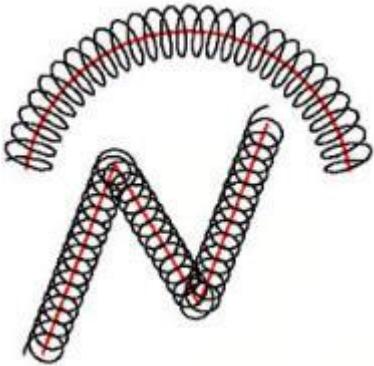
The scanner and the laser, and thus scanner delays and [laser delays](#) are highly interdependent. Changing the scanner delays may require changing the laser delays too.

For information on optimizing delays, see "Notes On Optimizing The Delays" in the [RTC5 Manual](#).

Information on editing individual parameters and managing the parameter set is described in [Property Window](#).

Wobble Mode

Wobble mode (wobble function) varies the line width during laser marking. An ellipse-shaped motion is added to the regular, linear motion, resulting in a spiral movement of the laser beam:



The following wobble mode parameters can be edited:

| [6] Wobble Mode | Description |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wobble Mode | Serves to activate or deactivate wobble mode. Click the <input checked="" type="checkbox"/> button to select "On" or "Off". If 'On' is selected, the parameters below are enabled for editing. |
| Wobble Frequency [Hz] | Defines the wobble frequency (in [Hz]). Number of ellipses per second. Only enabled if 'Wobble Mode' is "On" (see above). |
| Wobble Amplitude Longitudinal [mm] | Height of the longitudinal amplitude (in [mm]). Amplitude of the ellipse-shaped wobble movement parallel to the current movement direction. Only enabled if 'Wobble Mode' is "On" (see above). |
| Wobble Amplitude Transversal [mm] | Height of the transversal amplitude (in [mm]). Amplitude of the ellipse-shaped wobble movement perpendicular to the current movement direction. Only enabled if 'Wobble Mode' is "On" (see above). |

For further information about wobble mode, see "Wobbel Function" in the [RTC5 Manual](#).

Information on editing individual parameters and managing the parameter set is described in [Property Window](#).

Sky Writing

The RTC5 or RTC6 PC interface board provides sky writing modes for applications with elevated accuracy requirements. In the sky writing modes, every mark vector is precisely executed at a constant marking speed over the entire vector length. The following sky writing parameters can be edited:

| [7] Sky Writing | Description |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sky Writing | <p>Serves to select one of three sky writing modes and thus to activate sky writing mode or to deactivate sky writing mode:</p> <ul style="list-style-type: none"> – <u>Off</u>: deactivates the sky writing mode. – <u>Mode 1</u>: In the run-in phase, the vector (or arc) is preceded by a “forerun” movement performed by the galvanometer scanners at marking speed: the scanners are driven a short distance parallel to the vector (or along the arc extension), initially from the start point in the opposing direction, then back to the start point. After the vector (or arc) is processed at marking speed, it is then appended in the run-out phase with a short deceleration and retrace movement of the scanners (at marking speed). – <u>Mode 2</u>: Like in Mode 1, each to-be-executed vector (or arc) gets preceded and appended with a run-in motion and a run-out motion in extension of the vector (or arc) at mark speed. But within this time-optimized marking sequence, however, neither scanner forerun motions (in the run-in phase) nor retrace motions (in the run-out phase) occur. Instead, jumps are executed (at the currently defined jump speed) from jump vector start points to run-in start points, from run-out endpoints to run-in start points, and from run-out endpoints to jump vector endpoints. – <u>Mode 3</u>: To minimize execution time, sky writing can be deactivated for vectors and arcs having only small directional changes within a polygon train. An angle limit has to be defined. Below that limit, standard marking using the (variable) polygon is executed. Above that limit, sky writing Mode 2 is executed. <p>For further information about the sky writing modes, see "Sky Writing" in the RTC5 Manual.</p> <p>NOTE: Mode 3 is the recommended mode. Click the  button to select "Off", "Mode 1", "Mode 2" or "Mode 3". If a sky writing mode is selected, the parameters below are enabled for editing.</p> |
| Timelag [μs] | <p>Serves to compensate the tracking error of the galvanometer scanners. Depends on the used scan head.</p> <p>Time period (in [μs]).</p> <p>NOTE: Initially this parameter should be adjusted and only afterwards the parameter 'LaserON Shift' (see below).</p> |
| LaserOn Shift [μs] | <p>Allows adjustment of the "laser active" laser control signal's switch-on time point.</p> <p>Time period (in [μs]).</p> <p>Is used instead of the LaserOn-delay when sky writing is active.</p> |
| Forerun [μs] | <p>Defines the acceleration time (in [μs]) for the "forerun" movement (run-in phase). Shown in Mode 2 and Mode 3 only.</p> |
| Overrun [μs] | <p>Defines the deceleration time (in [μs]) for the "overrun" movement (run-out phase). Shown in Mode 2 and Mode 3 only</p> |
| Angular Limit | <p>Defines the angular limit for vectors or arcs to be executed with Sky Writing. If consecutive vectors or arcs enclose a lower angle no sky writing is executed. Shown in Mode 3 only.</p> |



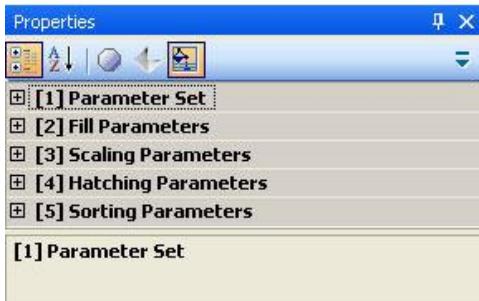
NOTE:

If a sky writing mode is activated, previously defined laser on and laser off delays (see [Laser Delays](#)) as well as mark and polygon delays (see [Scanner Delays](#)) will not be taken into account.
They will be fully functional again after deactivating the sky writing mode.

Information on editing individual parameters and managing the parameter set is described in [Property Window](#).

19.7 Fill Parameters

The fill parameters let you define properties affecting the marking result of filled shapes. All fill parameters are integrated into one parameter set (see figure below), which is displayed in the property window. Parameter sets can be defined for one or several marking objects or for the job. Generally, each parameter set provides the same parameter types:



Information on editing individual parameters and managing the parameter sets is described in [Property Window](#).

Parameter Set

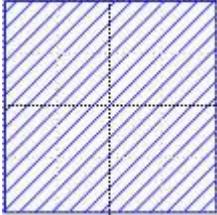
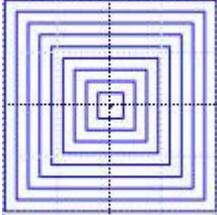
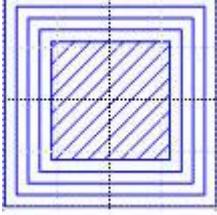
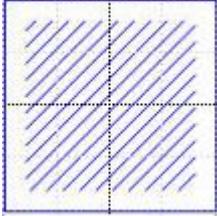
The group [1] parameters provide information about the displayed parameter set. The parameter set shown in the property window is either selected in the Library Explorer (job library or marking library) or is assigned to a marking object selected in the work area or Job Explorer.

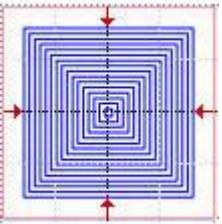
| [1] Parameter Set | Description |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inherited From | Shows the source of the object's parameter settings: – If the settings were assigned from a template in the job library or marking library, the field shows "Template: [TemplateName]" (see Library Explorer / Marking Library). – As long as the marking object's parameters weren't modified and no parameter set was assigned to the marking object, the field will show "Element: Job". But note, when a marking object gets created, it's automatically assigned the parameter set that was designated as the job's default marking parameter set. – If the settings were modified for a selected marking object, but the settings aren't assigned to a parameter set, the field will show "<None>". |
| Name | If a marking object is selected in the work area or Job Explorer, the object's name will be displayed. If a parameter set is selected in the job library or marking library, the parameter set's name will be displayed. |
| Description | The input field lets you enter a description/comment. |

Information on managing the parameter set is described in [Property Window](#).

Fill Parameters

The fill parameters (group [2]) let you define basic properties for aligning the filling lines. The following fill parameters can be edited:

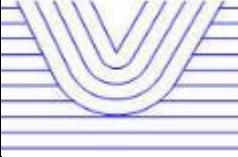
| [2] Fill Parameters | Description |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Filling Type | <p>Click the  button to select the required filling type:</p> <p>Hatch:</p>  <p>The filling lines are always parallel. Hatch density is defined by the 'Line Distance' (see below). If "Hatch" is selected, then the parameters 'Outline Reduction' and 'Beam Compensation' (see below) get disabled, as do the complete [3] Scaling Parameters.</p> <p>Path:</p>  <p>The filling lines are decreasing duplicates of the outline and downscale inward. The filling lines' concentration is defined by the 'Line Distance' (see below) and the number of 'Loops' (see [3] Scaling Parameters). If "Path" is selected, the parameter 'Line Reduction' (see below) gets disabled, as do most parameters in the [4] Hatching Parameters and [5] Sorting Parameters.</p> <p>Path With Hatch:</p>  <p>The filling lines are a combination of decreasing outline duplicates (Path) and hatching (see Hatch).</p> <p>NOTE: Which filling type you need for your marking process, depends on several factors: the material, the used laser, the desired marking result, and the intended maximum marking time.</p> |
| Line Distance [mm] | <p>Lets you define the distance between the filling lines (in [mm]).</p> <p>Lets you define the distance between the hatch lines and the outline (in [mm]) in the x and y directions.</p>  |
| Line Reduction [mm] | <p>If the distance is "0", the filling lines will contact the outline (see topmost figure). Disabled if "Path" is selected as the filling type (see above).</p> |

| [2] Fill Parameters | Description |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outline Reduction [mm] | <p>Lets you define the reduction of the outline's diameter (in [mm]) when using the filling type "Path" (see above). This function is mainly required when marking very small objects.</p>  <p>Disabled if type "Hatch" is selected as the filling type (see above).</p> |
| Beam Compensation [mm] | <p>Serves to compensate the beam width, to avoid the filling lines to exceed the outline. If this parameter is defined, the value of the 'Outline Reduction' parameter (see above) will automatically get set to the half the value defined here.</p> <p>Disabled if type "Hatch" is selected as the filling type (see above).</p> |

Information on editing individual parameters and managing the parameter set is described in [Property Window](#).

Scaling Parameters

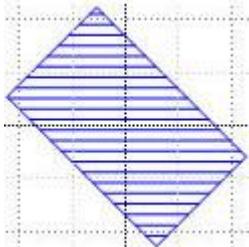
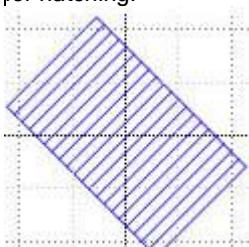
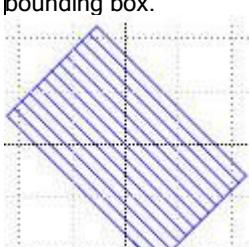
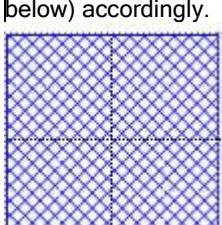
The scaling parameters (group [3]) let you define the properties of the filling lines / loops for the filling type 'Path' (or 'Path With Hatch'). If the filling type 'Hatch' is selected in the [\[2\] Fill Parameters](#), then the complete scaling parameters get disabled. The following scaling parameters can be edited:

| [3] Scaling Parameters | Description |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number Of Loops | Defines the number of filling lines (loops) for the filling type "Path". The loops are decreasing duplicates of the outline and downscale inward. To fill the complete object, a sufficient number of loops must be defined. |
| Join First Lines Around | Sets the first/outer filling lines to 'Line Join Type' = "Round" (see above). For the further filling lines the settings defined by the user remain. Click the  button and select "True" for rounding off the first contour lines or "False" for not rounding. |
| Line Join Type | Click the  button to select the required line join type: Miter:  The fill contour will be continued until it will be cut by the next edge. Bevel:  The fill contour will result in a miter cut at the edge. Round:  Results in a (polygon approximation of a) arc. Each point of the inner contour has the same distance to the corner. |
| Innermost first | Defines the marking sequence: from inside out or from outside in. If set to "True", the innermost filling line will be marked first, then the marking sequence will be continued to the outer contour. If set to "False", the outer contour will be marked first, then the marking sequence will be continued to the innermost filling line. Click the  button and select "True" or "False". |

Information on editing individual parameters and managing the parameter set is described in [Property Window](#).

Hatching Parameters

The hatching parameters (group [4]) let you define hatching properties, primarily for when the filling type 'Hatch' has been defined for the filling lines (see [\[2\] Fill Parameters](#)). The following hatching parameters can be edited:

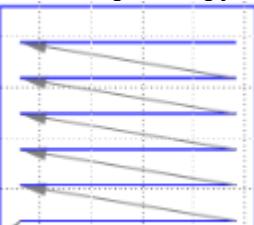
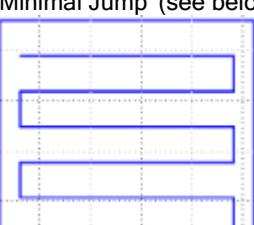
| [4] Hatching Parameters | Description |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Click the <input checked="" type="checkbox"/> button to select the required reference axis of the hatch angle:</p> <p>Absolute: The hatch lines correspond to the work area's coordinate system, independent of the rotation angle of the marking object. The hatching angle is defined by the 'Angle Start' parameter (see below).</p>  <p>Relative: The hatch lines correspond to the marking object. The hatching angle is defined by the 'Angle Start' parameter (see below). The defined rotation angle of the marking object is also applied for hatching.</p>  <p>Aligned: The angle of the hatch lines is measured relative to the x axis of the marking object and additional, the x axis of the marking objects coordinate system is the longer side of the bounding box.</p>  |
| Hatch Angle | |
| Number Of Hatch Levels | <p>For hatching, several hatch levels can be defined, which will be executed consecutively. When defining two or more hatch levels, define the parameters 'Angle Start' and 'Angle Step' (see below) accordingly.</p>  |
| Angle Start [deg] | <p>Disabled if "Path" is selected as the filling type (see [2] Fill Parameters).</p> <p>Defines the hatch angle (in [deg]) and the marking direction. The value "0" (or "-180") defines horizontal hatch lines, the marking will be executed from left to right. In contrast, the value "180" defines marking from right to left. The value "90" (or "-270") defines vertical hatch lines, the marking will be executed from</p> |

| [4] Hatching Parameters | Description |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | bottom to top. In contrast, the value "270" (or "-90") defines marking from top to bottom. Positive values rotate the angle counterclockwise, negative values clockwise. Disabled if "Path" is selected as the filling type(see [2] Fill Parameters). |
| Angle Step [deg] | If several 'Numbers Of Hatch Levels' (see above) are defined, this parameter defines the incremental increasing hatch angle (in [deg]) for each hatch level on the basis of the 'Angle Start' (see above). Disabled if filling type "Path" is selected (see [2] Fill Parameters). |

Information on editing individual parameters and managing the parameter set is described in [Property Window](#).

Sorting Parameters

The sorting parameters (group [5]) let you define the marking cycle (order of vectors and jumps) of hatch lines. With them, you can influence the execution time of the marking process. The following sorting parameters can be edited:

| [5] Sorting Parameters | Description |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sort | <p>Allows adjusting the marking direction and using the jump reduction. If set to "True", laser processing can be carried out bidirectionally and thus the lengths of jump vectors can be minimized:</p>  <p>If set to "False", laser processing is carried out only monodirectionally, possibly with the disadvantage of long jump vectors:</p>  <p>Click the  button and select "True" or "False". Editing of the parameters listed below requires "True". Disabled if "Path" is selected as the filling type (see [2] Fill Parameters).</p> |
| Search Radius [mm] | <p>If 'Sort' is set to "True" (see above), the program searches for optimum jumps by calculating alternatives between the hatch lines. This parameter lets you define the radius / distance for the calculation.</p> <p>If 'Angle Start' (see [4] Hatching Parameters) is set to "0" [deg], then the value defined here (in [mm]) must be higher than the value defined for the 'Line Distance' parameter (see [2] Fill Parameters).</p> |
| Jump Reduction | <p>Allows replacing jump vectors with marking vectors - depending on the threshold defined in 'Minimal Jump' (see below):</p>  <p>Click the  button and select "True" if you want to replace jump vectors. Disabled if "Path" is selected as the filling type (see [2] Fill Parameters).</p> |
| Minimal Jump [mm] | <p>Defines the minimal jump length (in [mm]) that makes the 'Jump Reduction' (see above) possible.</p> <p>The value must be identical to the value specified for the 'Search Radius' parameter (see above) and higher than the value set for the 'Line Distance' parameter (see [2] Fill Parameters). Disabled if "Path" is selected as the filling type (see [2] Fill Parameters).</p> |

Information on editing individual parameters and managing the parameter set is described in [Property Window](#).

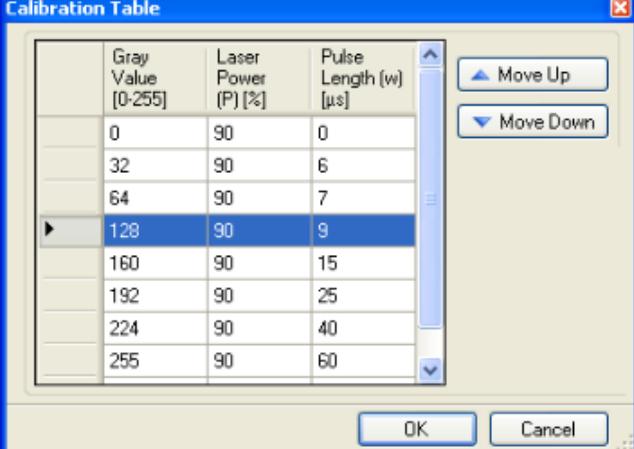
19.8 Pixel Image Parameters

For jobs comprised of pixel images (file formats bmp, jpg, gif, png, tif, twain, pcx, tga) you can (additionally to the marking parameters) define pixel image parameters specific to the characteristics of those images. All pixel image parameters are integrated into one parameter set (see figure below), which is displayed in the property window. Parameter sets can be defined for one or several marking objects or for the job. Generally, each parameter set provides the same parameter types:



The following parameters can be edited:

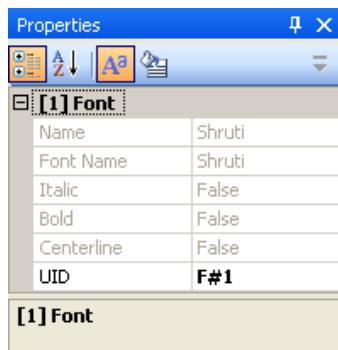
| [1] Parameter Set | Description |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inherited From | Shows the source of the object's parameter settings: – If the settings were assigned from a template in the job library or marking library, the field shows "Template: [TemplateName]" (see Library Explorer / Marking Library). – As long as the marking object's parameters weren't modified and no parameter set was assigned to the marking object, the field will show "Element: Job". But note that when a marking object gets created, it's automatically assigned the parameter set that was designated as the job's default marking parameter set. – If the settings were modified for a selected marking object, but the settings aren't assigned to a parameter set, then the field will show "<None>". |
| Name | If a marking object is selected in the work area or Job Explorer, the object's name will be displayed. If a parameter set is selected in the job library or marking library, the parameter set's name will be displayed. |
| Description | The input field lets you enter a description/comment. |

| [2] Bitmap Parameters | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------|------------------------------------|---|----|---|----|----|---|----|----|---|-----|----|---|-----|----|----|-----|----|----|-----|----|----|-----|----|----|
| Pixel Distance [µm] | Defines the pixel distance (in [μm]). The value defined here is a fixed value. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dithering Procedure | In computer graphics, dithering is one method to create illusions of color depth, in particular for color reduction. A special pixel alignment avoids hard transitions between the colors. There are several algorithms designed to perform dithering. laserDESK lets you chose between two algorithms: <ul style="list-style-type: none"> – the Floyd Steinberg algorithm results in very fine-grained dithering, – the Jarvis Judice Ninke algorithm is coarser, but has fewer visual artifacts. Click the  button to select "FloydSteinberg" or "JarvisJudiceNinke". | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calibration Table | Lets you define the laser power and pulse length individually for different gray values. Click the  button to open the 'Calibration Table' dialog box:  <table border="1"> <thead> <tr> <th>Gray Value [0-255]</th> <th>Laser Power (P) [%]</th> <th>Pulse Length (W) [μs]</th> </tr> </thead> <tbody> <tr><td>0</td><td>90</td><td>0</td></tr> <tr><td>32</td><td>90</td><td>6</td></tr> <tr><td>64</td><td>90</td><td>7</td></tr> <tr><td>128</td><td>90</td><td>9</td></tr> <tr><td>160</td><td>90</td><td>15</td></tr> <tr><td>192</td><td>90</td><td>25</td></tr> <tr><td>224</td><td>90</td><td>40</td></tr> <tr><td>255</td><td>90</td><td>60</td></tr> </tbody> </table> Click on a line and enter or modify the <ul style="list-style-type: none"> – Gray value [0-255] – Laser Power (P) [%] – Pulse Length (W) [μs]. Enter the values for each desired gray value in a new line. NOTES: <ul style="list-style-type: none"> – For proper handling, it is important to define laser parameters for the gray value "0" where the laser is switched off. The laser power and/or the pulse length (depending on the used laser) must be set to "0"! – The defined laser power level works only for CO₂ lasers and laser systems controlled by an analog voltage. Digital controlled laser power via the extension 2 connector (like IPG lasers) cannot adjust their power during bitmap marking. For these systems you should keep the power settings constant and use only the pulse length parameter. If required, change the lines' sequence via the {Move Up} and {Move Down} buttons. Confirm your setting with {OK}. The intermediate values will be generated by the program. | Gray Value [0-255] | Laser Power (P) [%] | Pulse Length (W) [μs] | 0 | 90 | 0 | 32 | 90 | 6 | 64 | 90 | 7 | 128 | 90 | 9 | 160 | 90 | 15 | 192 | 90 | 25 | 224 | 90 | 40 | 255 | 90 | 60 |
| Gray Value [0-255] | Laser Power (P) [%] | Pulse Length (W) [μs] | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 90 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 90 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64 | 90 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 128 | 90 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 90 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 192 | 90 | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 224 | 90 | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 255 | 90 | 60 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Black Value [0 or 255] | The black value setting affects the result of the marking process as brightness or darkness: <ul style="list-style-type: none"> – If black value is set to "0", the material will become brighter with increasing laser power. – If black value is set to "255", the material will become darker with increasing laser power. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bidirectional | Lets you enable bidirectional marking of image lines. Click the  button to select "True" for bidirectional marking or "False" for mono-directional marking. If "True" is selected, the row synchronization parameter (see below) is enabled. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Row Synchronization [mm] | If 'Bidirectional' is set to "True" (see above), enter the value for row synchronization (in [mm]). | | | | | | | | | | | | | | | | | | | | | | | | | | | |

How to edit the individual parameters and how to manage the parameter set is described in [Property Window](#).

19.9 Font Parameters

The font properties show the specific parameters of the selected font created by the user, which are listed in the local job library or/and the global Marking Library.



Only the UID parameter may be edited, all other parameters are not editable.

To display the font parameters, proceed as follows:

1. Select a font in the [Library Explorer](#) below 'Fonts'.
The font properties will be shown in the Property Window.

Glyph Parameters

The glyph properties show the specific parameters for characters (glyphs) of fonts, which are listed in the local job library or/and the global Marking Library. When editing the glyphs, the parameters will change automatically.



The parameters are not editable.

To display the glyph parameters, proceed as follows:

1. Select a font in the [Library Explorer](#) below 'Fonts'.
2. Click on the plus sign on the left side of the desired font.
All characters will be listed below.
3. Select the desired character.
The glyph properties will be shown in the Property Window.

Outline Parameters (Graphics Path)

These graphic parameters precisely define the geometric properties of outline graphics paths. The following table describes each parameter.


NOTE:

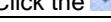
If units of length ([mm], [cm], [mil] or [in]) are not explicitly indicated, the respective values correspond to the units defined in the ['View' Parameters](#) (see 'Units\Length').

| Parameter | Description |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Polygon | |
| Label | Default name: "Outline". If desired, you can change the name. |
| Points | Each point of the outline can be defined (position in the x and y directions, point type). Open the 'Points' table via the  button to define the points. |
| Number of Points | Displays the object's number of points (not editable). |
| Closed | Lets you define whether the object is closed or unclosed and thus can be filled or not. When set to unclosed, one segment between two points will be removed. Click the  button to select "True" for closed or "False" for unclosed. |
| Width | Width in the x direction (not editable). |
| Height | Height in the y direction (not editable). |
| Center | The outline's center position in the x and y direction in the work area's coordinate system (not editable). |
| [2] Boundary | |
| Left | Left, right, top and bottom position of the bounding box of the outline polygon in the work area's coordinate system (not editable). |
| Right | |
| Top | |
| Bottom | |

Information on editing parameters is described in [Property Window](#).

19.10 Symbol Parameters

The symbol parameters lets you define the properties of the symbol. Inserting a [Reference To Symbol](#) in a job, this will inherit all settings from the symbol defined here. The following symbol parameters can be edited:

| Parameter | Description |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] Symbol | |
| Name | [SymbolName] (not editable). |
| [2] Appearance | |
| Type | References to symbols can be closed or unclosed. If closed, the type is "Area" and the object can be filled. If unclosed, the type is "Outline" and the object can't be filled. In this case, the parameter 'Filling Lines' (see below) can't be set to "True". |
| Width | Lets you define the width in x-direction. |
| Height | Lets you define the width in y-direction. |
| Center | Marking object's center position in x- and y-direction in the work area's coordinate system (not editable). |
| UID | Unique IDentifier. If desired, you can change the UID. |
| [3] Boundary | |
| Left | |
| Right | Maximum distance to the left, right, top and bottom between the frame enclosing the symbol and the x- or y-axis of work area's coordinate system (not editable) |
| Top | |
| Bottom | |
| [4] Marking | |
| Filling Lines | Lets you fill the symbol with filling lines. If the parameter 'Type' (see above) is "Outline", this parameter can't be set to "True" and thus can't be filled. Click the  button to select "True" for filling the symbol or "False" for not filling. |
| [5] Transformation | |
| Translation | |
| X | Offset in x- and y-direction related to the value in the parameter 'Center' (see above). |
| Y | Both values can be entered/modified in 'Translation' or each value in 'X' and 'Y'. |

How to edit the individual parameters and how to manage the parameter set is described in [Property Window](#).

20 Hardware Configuration

'Hardware Configuration' lets you edit and manage parameters that define the used hardware. These general settings are closely related to the used hardware and independent of the job. This enables you to transfer and execute a job on a different setup without any changes, because the machine specific parameters are defined separately in the 'Hardware Configuration'. You must define a parameter set for your laser scan system's hardware after installing laserDESK on your production PC , but before first-time execution of a job via a specific laser scan system.

The program always has only one active hardware parameter set, which can be managed via the 'Hardware Settings' dialog box. To facilitate quick changes to your hardware configuration, laserDESK lets you archive different hardware parameter sets (hardware templates). Management of hardware parameter sets is described in [Managing System Parameter Sets](#).

Opening 'Hardware Configuration'

To open 'Hardware Configuration' proceed as follows:

1. Select 'Open ▶ Hardware Configuration' from the '[File](#)' menu.
If a job was created previously, then the 'Save changes?' dialog box appears.
Then you need to proceed step 2, else step 3 is executed.
2. Select {OK} to save the changes.
A (*Windows*-standard) 'Save as...' dialog box appears.
Save the changes and confirm with {OK}.
or
Select {No} to cancel the changes.
3. The work area's background changes to orange.
The hardware configuration job is loaded.
The 'Hardware Settings' dialog box appears.

NOTE:

Inside 'Hardware Configuration', you can close the 'Hardware Settings' dialog box via the {OK} button and the close button {X} in the title bar. Closing the dialog box via {OK}, the changes will be applied temporarily. When saving the hardware configuration job file, the settings are saved permanent.



You can reopen the dialog box via the 'Hardware\Edit Hardware Settings' menu or the {Hardware Settings} button in the 'File' toolbar.
Furthermore, the dialog box can be opened inside a job to view the current settings, but all parameters are read-only and the settings can't be changed.

Managing the Hardware Configuration

Inside laserDESK, 'Hardware Configuration' is managed like a job. Because only one job can be open at a time, a current job must be closed when opening 'Hardware Configuration'.

At the first start laserDESK creates a default hardware parameter set stored in the "HardwareConfiguration.sld" file in the users directory. Use the 'GUI Settings' dialog box to specify the directory in which the defined parameter sets ([HardwareConfigurationName].sld) should be managed (see [Defining the Directories](#)). You can freely select the path and filename. Firstly, this enables the use of network paths and thus automatic backups, etc. Secondly, a directory can be chosen and configured to specifically provide laserDESK users with appropriate access authorizations.

Testing the Parameter Settings

Similarly to a normal job, marking objects can be created inside the 'Hardware Configuration' job (after closing the 'Hardware Settings' dialog box) and executed with the laser scan system. Thus, after defining parameter settings in the 'Hardware Settings' dialog box, you can immediately check those settings via a marking test (and modify them subsequently if necessary). To create marking objects, see [Inserting Objects – Overview](#).

Setting Hardware Parameters

Hardware parameters are edited via the 'Hardware Settings' dialog box, which appears automatically when 'Hardware Configuration' is opened. To define a hardware parameter set for the current system configuration, several parameters need to be set for the following system components:

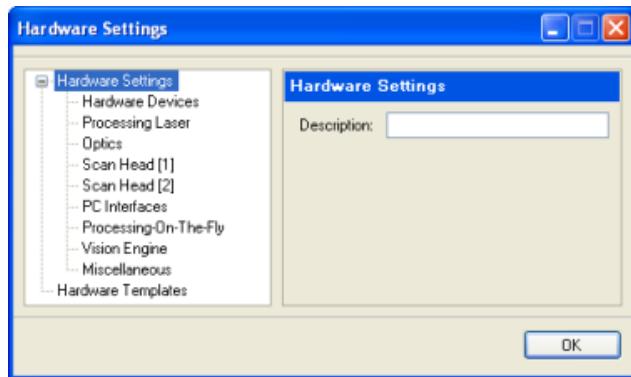
- ['Hardware Devices' Parameters](#)
- ['Processing Laser' Parameters](#)
- ['Optics' Parameters](#)
- ['Scan Head' Parameters](#)
- ['PC Interfaces' Parameters](#)
- ['Processing-On-The-Fly' Parameters](#)
- ['Vision Engine' Parameters](#)
- ['Miscellaneous' Parameters](#)

20.1 Managing Hardware Parameter Sets

Delivery Status

After installing laserDESK on the production PC (PC controlling the laser scan system), you must define the hardware parameters appropriate for configuring your laser scan system's components (including the PC and board). laserDESK always has only one active hardware parameter set, called 'Hardware Settings', whose parameters must be appropriate for the current system configuration. The 'Hardware Settings' dialog box serves both for setting the hardware parameters and defining the active hardware parameter set.

As delivered, laserDESK provides one default and thus active hardware parameter set shown in the 'Hardware Settings' dialog box. The dialog box appears automatically when 'Hardware Configuration' is opened. After a restart, laserDESK always uses the 'Hardware Settings' parameter set as the active one.



NOTE:

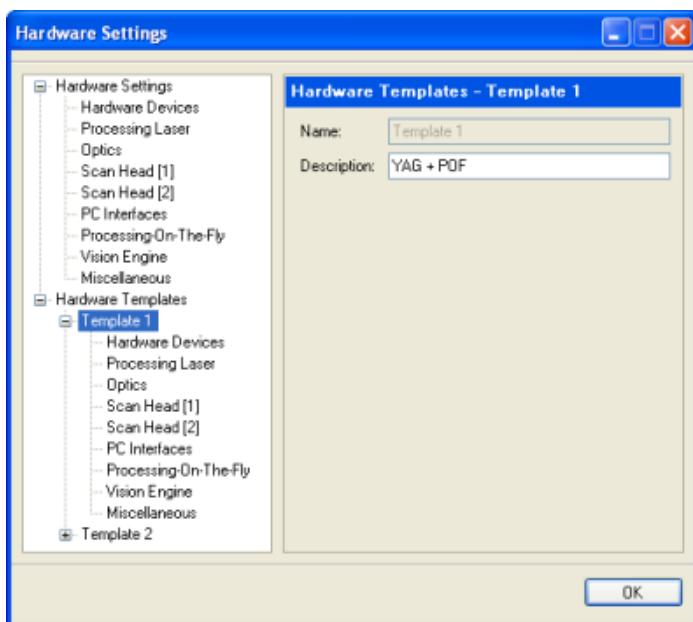


For more extensive editing of 'Hardware Settings' (and later 'Hardware Templates', see below), we recommend creating a new system parameters set or copying an existing one first and then subsequently modifying the hardware parameters.

To clearly identify the active system parameter set ('Hardware Settings'), we recommend providing a meaningful description (see 'Description' input field in the figure above) for each hardware parameter set.

Creating a New Hardware Parameter Set

To facilitate quick changes to your hardware configuration, laserDESK lets you archive different hardware parameter sets as templates. These are listed inside the 'Hardware Templates' node. The templates can be renamed, deleted, copied and edited.



To create a new hardware parameter set (template), proceed as follows:

1. Place the cursor above the right field in the 'Hardware Settings' dialog box and click the right mouse button.
A context menu appears.
2. Select 'Save Hardware Parameters As...' from the context menu.
The 'New Template' dialog box appears.
Continue with step 3.

or

1. Place the cursor above the left field in the 'Hardware Settings' dialog box and click the right mouse button.
A context menu appears.
2. Select 'New...' from the context menu.
The 'New Template' dialog box appears (see figure above).
3. Enter the desired name and confirm with {OK}.
The new hardware parameter set will be inserted below 'Hardware Templates' alphabetically.
Parameter settings are inherited from the **active 'Hardware Settings'** hardware parameter set.
4. Continue with step 4 in the section below.

or

1. If applicable, place the cursor onto an existing template and click the right mouse button.
A context menu appears.
2. Select 'Copy...'.
The 'New Template' dialog box appears (see figure above).
3. Enter the desired name and confirm with {OK}.
The new hardware parameter set will be inserted below 'Hardware Templates' alphabetically.
Parameter settings are inherited from the **copied** hardware parameter set.

4. For clear identification, the 'Description' input field should be filled with a meaningful name.



NOTE:

The new hardware parameter set is created so far.

To keep the new settings, these must be saved (see [Saving the Settings](#)).

After creating a new hardware parameter set, its individual parameters can now be modified (see [Setting Hardware Parameters](#)).

Renaming a Hardware Parameter Set

The archived hardware parameter sets listed inside the 'Hardware Templates' node can be renamed regarding to your requirements. To rename a hardware parameter set proceed as follows:

1. Select the desired hardware parameter set in the left field of the 'Hardware Settings' dialog box.
2. Click the right mouse button.
A context menu appears.
3. Select 'Rename...'.
The 'New Template' dialog box appears.
4. Enter the desired name and confirm with {OK}.
The name of the hardware parameter set will change.



NOTE:

The parameter set is renamed so far.

To keep the new settings, these must be saved (see [Saving the Settings](#)).

Deleting a Hardware Parameter Set

If an archived hardware parameter set listed inside the 'Hardware Templates' node isn't required any more, this can be deleted. To delete a hardware parameter set proceed as follows:

1. Select the desired hardware parameter set in the left field of the 'Hardware Settings' dialog box.
2. Click the right mouse button.
A context menu appears.
3. Select 'Delete'.
The hardware parameter set will be deleted immediately without user information!



NOTE:

The parameter set is deleted so far.

To keep the new settings, these must be saved (see [Saving the Settings](#)).

Defining the Active Hardware Parameter Set

If the laser processing system's configuration changes, an appropriate hardware parameter set must be created (see above) or an already existing appropriate hardware parameter set (template) must be applied. The suitable hardware parameter set must be defined as the active hardware parameter set as follows:

1. Select a desired hardware parameter set in the left field of the 'Hardware Settings' dialog box.
2. Click the right mouse button.
A context menu appears.
3. Select 'Use' from the context menu.
The selected hardware parameter set will be applied as the active hardware parameter set ('Hardware Settings').

or

1. Place the cursor above the right column of the 'Hardware Settings' dialog box and click the right mouse button.
A context menu will appear.
2. Select 'Use...' from the context menu.
The 'Template' dialog box appears.
3. Select the suitable hardware parameter set in the selection field.
4. Confirm with the {OK} button.
The selected hardware parameter set will be applied as the active hardware parameter set ('Hardware Settings').



NOTE:

The active parameter set will be overwritten so far.

To keep the new settings, these must be saved (see Saving the Settings).

Selecting the Active Hardware Parameter Set temporarily

Unlike all other hardware parameter settings (which can only be done in the Hardware Configuration with administrator or supervisor user rights) the active hardware parameter set can be selected by all users with at least production rights outside the Hardware Configuration.



NOTE:

Setting the active hardware parameter set outside the Hardware Configuration will remain temporarily only. Closing the laserDESK program, this setting will be aborted. Restarting the program, the active hardware parameter set defined in the Hardware Configuration will be applied.

User switching with new log-in will not reset the temporary setting!

To define the active hardware parameter set outside the Hardware Configuration, proceed as follows:

1. Select
 - 'View Hardware Settings' in the '[Hardware](#)' menu
 - or {Hardware Settings} in the '[File](#)' toolbar.

The 'Hardware Settings' dialog box appears and the current activated hardware parameter set will be shown.
2. Click the  button in the 'Template:' selection field.
The available templates (hardware configuration sets) will be shown in a drop-down-list.
3. Select the desired template.
The description of this hardware configuration set will be shown below.
4. Confirm with the {OK} button.
The selected hardware configuration set will be applied as the active hardware parameter set temporarily (see note above).

To reset the active hardware parameter set defined in the Hardware Configuration, proceed as follows:

1. Select
 - 'View Hardware Settings' in the '[Hardware](#)' menu
 - or {Hardware Settings} in the '[File](#)' toolbar.

The 'Hardware Settings' dialog box appears and the current activated hardware parameter set will be shown.
2. Click the  button in the 'Template:' selection field.

A drop-down list be shown.
3. Select "[Restore default settings]".

The original default hardware parameter set defined in the Hardware Configuration will be applied.

Saving the Settings

After managing the hardware parameters sets, the settings are saved in two steps:

- When closing the 'Hardware Settings' dialog box via the {OK} button, the RTC5 or RTC6 board will be reinitialized to take over the settings. The settings will then be temporarily saved as long as the 'Hardware Configuration' is open. In this state you can, for example, check the parameter settings via marking tests (and change the settings if required).
- When you have found the correct settings, these can be saved permanently. Here, you must select 'Save' from the 'File' menu or click the {Save} button in the 'File' toolbar or confirm the user confirmation query with {OK} when closing 'Hardware Configuration'.



NOTE:

If you leave the 'Hardware Configuration' without saving, the settings will not be applied, because the RTC board will restore the old settings when initialized again.

To avoid this, save the settings when leaving the 'Hardware Configuration'.

To save your settings proceed as follows:

1. Click the 'Hardware Settings' dialog box's {OK} button.

The dialog box closes.
The settings will be retained as long as 'Hardware Configuration' is open.
2. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.

or
When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

20.2 Setting 'Hardware Devices' Parameters

Remote Control

The remote control is intended to enable a master control to command laserDESK via the remote control interface. The purpose of this control is to execute and adjust the processing of laserDESK jobs. It is not intended to create or modify graphic objects inside a job.


NOTE:

The remote control, and especially its parameters, telegram syntax and commands, are described in [Definition of the Remote Control](#).


NOTE:

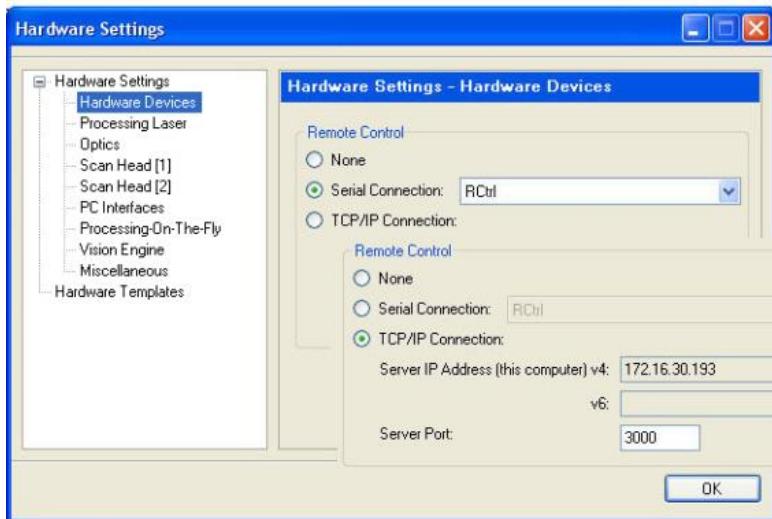
When using the remote control, laserDESK serves the client's queries and executes the desired actions.

Thus:

- the PC running laserDESK is the server
- and the customer program is the client.

The remote control of laserDESK has 2 possible connections (see figure below) with the same telegram and data format:

- **Serial Connection:**
If you want to use a serial connection (this must be previously defined in the ['PC Interfaces' Parameter](#)), then select the corresponding serial connection here.
- **TCP/IP Connection:**
If you use an Ethernet connection with TCP/IP protocol, the required server port must be defined.



To set the remote control, proceed as follows:

1. If you don't want to use a remote control, activate the 'None' radio button.
or
If you want to use a serial connection for remote control, activate the 'Serial Connection' radio button.
The corresponding selection field will be enabled.
2. Click the  button to select the required serial connection.


NOTE:

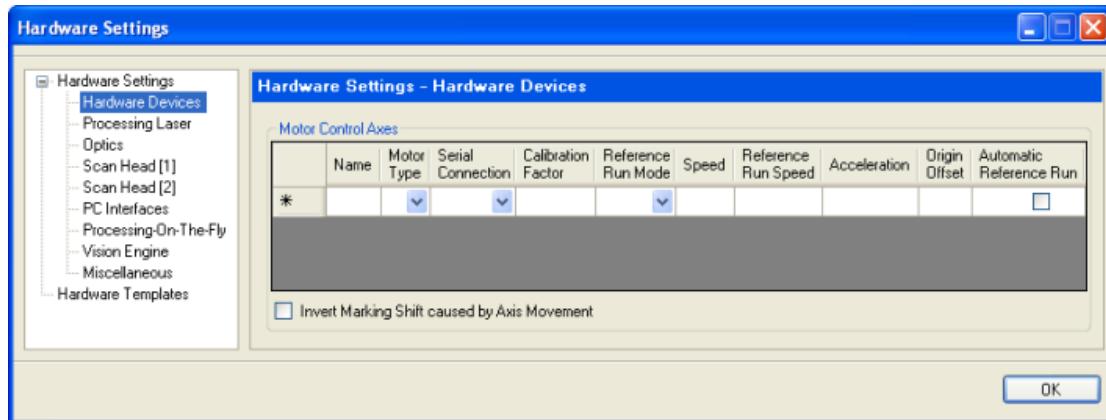
The serial connection must have been defined before in the ['PC Interfaces' Parameters](#).

or

1. If you want to use an Ethernet connection with TCP/IP protocol for remote control, activate the 'TCP/IP Connection' radio button.
The 'Server IP-Address' (PC running laserDESK) is evaluated by the program.
The corresponding 'Server Port' input field will be enabled.
2. Enter the required value of the server port.

Motor Control Axes

If you use motors for moving or rotating parts, the motor control axes and their parameters have to be defined in the field 'Motor Control Axes'.



All further parameters have to be adapted to the used axis. Following items have to be taken into account.

- If the motor is controlled via a serial interface, the serial connection to be used must be defined in the ['PC Interfaces' Parameters](#) before defining the parameters here.
- The parameters have to be in the valid range of the used axis.
- A negative 'Calibration Factor' inverts the movement's direction.
- When using motor control elements in the job (see ['Using an Axis in laserDESK'](#)), the speed can be defined independent from the 'Speed' defined here.
- The 'Automatic Reference Run' function is not available for security concerns. Otherwise, the stepper motor could move to an unintentional position which can lead to damage.

Activating the checkbox is without effect.

The reference run must be executed once manually before the axes can be moved.

NOTE:

Additional to this universal description, some axes/motors of different manufacturers have special features or properties.

If you use

- Aerotech axes,
- a Faulhaber motor,
- an Isel controller,
- a step motor via RTC5 or RTC6 board or
- a SCANLAB scan system with step motor,

it is essential to read also [Special Settings for Motor Control Axes!](#)

To define the parameters of a motor control axis, proceed as follows:

1. Define a unique name for the axis in the column 'Name'.
The axis is referenced by this name in laserDESK.
2. Click the  button in the column 'Motor Type' to open a list with all supported motor types.
Select the desired motor type.
3. Click the  button in the Column 'Serial Connection' to select the serial connection of the PC to which the motor controller is connected.
The serial connection must have been defined in the ['PC Interfaces' Parameters](#).
If you use a stepper motor via RTC board, select "RTC5".
4. Define the calibration factor in the column 'Calibration Factor'.
The calibration factor depends on the used axis, gear ratio and pitch. The unit [steps/user unit] is freely selectable, but we recommend using the same user unit as defined in the 'Options' window (see parameter 'Length' in [Defining the 'View' Parameters](#)).



If you use **Aerotech axes**, a step motor via RTC5 or RTC6 board or a SCANLAB scan system with step motor refer to [Special Settings for Motor Control Axes!](#)

5. Click the  button in the column 'Reference Run Mode' to open a list of available types of reference runs for the selected controller.
This selection is used if 'Reference Run' is selected in the motor control element's 'Movement Type' parameter (see [Graphic Parameters – Motor Control](#)).
Select the desired reference run mode.
6. Enter the speed and reference run speed values in the corresponding columns.
These are used when testing the motion controllers via the ['Motor Control'](#) dialog box.
7. Enter the acceleration value in the corresponding column.
This parameter is only used if it is adjustable by the controller.
8. If desired, define an offset in the column 'Origin Offset'.
The origin offset allows the user to shift the axis reference (zero) to a defined position (away from the reference switch).
– Checkbox activated: scan head moves; marking offset is parallel to the coordinate system of the scan head.
– Checkbox deactivated (default): material/workpiece moves; marking offset is in opposite direction to the coordinate system of the scan head.
9. Activate or deactivate the checkbox 'Invert Marking Shift caused by Axis Movement'.
The checkbox serves to switch the display when marking with axial movement and for calculating the position in the motor control node when using the [tile function](#).
– Checkbox activated: scan head moves; marking offset is parallel to the coordinate system of the scan head.
– Checkbox deactivated (default): material/workpiece moves; marking offset is in opposite direction to the coordinate system of the scan head.



NOTE:

Normally every axis needs to perform a reference run before it can be positioned.
The reference run can be executed via the ['Motor Control'](#) dialog box.

Special Settings for Motor Control Axes

The integration of motor control axes respectively the defining of the parameters is described in general in [Setting 'Hardware Devices' Parameters](#). But this description cannot include all special features of some axes/motors of different manufacturers. Thus, the special features to be observed are described here for the following axes/motors:

Aerotech Axes

When defining the calibration factor in the column 'Calibration Factor', please note:

- The calibration factor for the *Aerotech* axes can also be set in the *Aerotech Configuration Manager* (setup program ConfigurationManager.exe) under 'Axis – Units – CountsPerUnit'.
During initialization, laserDESK sets the calibration factor defined here in the Hardware Settings and overwrites the *Aerotech* controller value unless it is 0 (zero).
To avoid malfunction,
 - the calibration factor should be set identically in the laserDESK Hardware Settings and the *Aerotech Configuration Manager*
 - or the calibration factor should be set to 0 (zero) in the laserDESK Hardware Setting. In this case the calibration factor stored in the *Aerotech* controller will be used and not changed.
- The ASCII interface has to be activated in the *Aerotech Configuration Manager* under 'System - Communication - ASCII'.
The parameter 'CommandSetup' has to be set to "0x00010001". This activates the ASCII interface on the primary RS232 interface and sets "Always send EOS".

NOTE:

The ASCII interface of the *Aerotech* controllers is not defined consistently. Each controller type has a specific ASCII interface, which is not compatible to another controller's ASCII interface.
laserDESK only supports the ASCII interface of the **Ensemble** controller!

Faulhaber Motor

laserDESK supports the following *Faulhaber* model types of brushless servo motors with integrated controller:

- Series 3564...B CS
- Series 32xx...BX4 CS
- Series 22xx...BX4 CSD

NOTE:

Maybe the motors with external controllers (MCDC 300x RS, MCBL 300x RS) can be controlled too, because they use the same command set. But that is not tested yet.
The controllers need a serial interface (RS 232). The CAN bus version is not supported.

Every motor needs an own serial connection to the PC and uses the default axis number 0. The network mode is not supported.

The motors are controlled using the positioning mode with 2 end switches. The end switch inputs and logic is defined as

- Lower end switch - Analog In (AnIn) input (wire colour brown)
- Upper end switch - reconfigured Fault Pin (FAULT, wire colour white)

The end switches are defined as normally closed to avoid movement if a wire is broken. The end switch logic where the movement will be interrupted is active low. Because laserDESK defines the settings only temporary and doesn't save them permanently we recommend to save the Fault Pin setting as input permanently (commands REFIN and SAVE, see *Faulhaber* manual).

The connection between Analog GND (grey) and Power Supply GND (blue) has to exist, else the serial communication will not work!

The voltage level for the inputs should be set to 5 V but it is possible to use 24 V, too. The level can be defined by the Faulhaber commands SETTTL (5 V) or SETPLC (24 V). Please refer to the *Faulhaber* manual for these commands. This

setting will not be changed by laserDESK and can therefore be set externally and should be set permanent using the SAVE command.

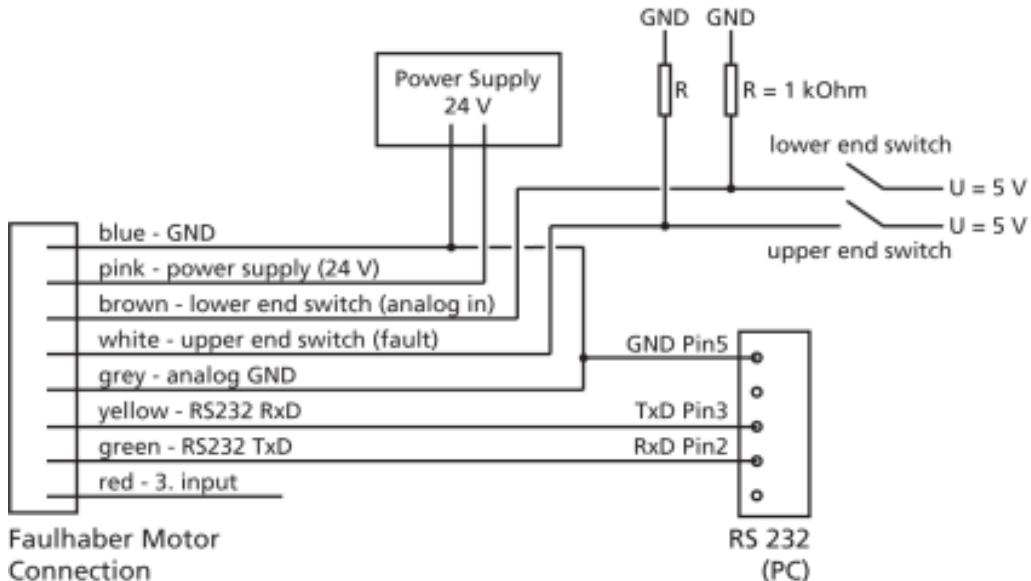
Summary

To setup the *Faulhaber* motor we recommend to enter and send following commands with the *Faulhaber Motion Manager*:

REFIN
SETTTL
SAVE

Connection drawing

(proposal; please refer to the *Faulhaber* manual, too)



U = 5 V or 24 V, user defined using SETTTL (5 V) or SETPLC (24 V) command

The calibration factor has to be positive. Negative or zero values will use the default factor of 3000 [steps/rotation] and 1 rotation corresponds to 1 mm movement. An acceleration factor of 0 (or negative) will use the internal saved factor of the controller.

If the movement is interrupted by an emergency stop, the motor may get disabled. In that case you have to initialize the motor again in the manual motor control dialog and possibly switch off the automatic mode first.

/se/ Controller

The */se/* controllers with CNC operating system 5.x are supported.

Step Motor via RTC5 or RTC6 Board

If you use a step motor via RTC5 or RTC6 board, the step motor doesn't use a serial connection.

The step motor will be connected to the STEPPER MOTOR connector of the RTC board (pin-out, see [RTC5 Manual](#), chapter 'Stepper Motor Control').

You can define the appropriate RTC connection in the 'Serial Connection' column of the [Motor Control Axes](#) table.

SCANLAB Scan System with Step Motor



The control of the step motor (e.g. inside a varioSCAN 40_{FLEX} or powerSCAN II) is described comprehensively in [How to Control a Step Motor of a SCANLAB Scan System](#).

Setting and Saving the Parameters

To set the 'Hardware Devices' Parameters, proceed as follows:

1. If you haven't already done so, select 'Open ▶ Hardware Configuration' from the '[File](#)' menu.
The 'Hardware Settings' dialog box appears'.
2. Select 'Hardware Devices' within the desired system parameter set in the left field of the dialog box.
The respective parameters will be shown on the right side of the dialog box.
3. Define the parameters as described in the subdirectories above.
4. Select another parameter within the desired system parameter set.

or

Confirm your settings with {OK}.

The 'Hardware Settings' dialog box closes.

The settings are retained as long as 'Hardware Configuration' is open.



NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!

If you want to save the settings permanently, proceed as described below.

5. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or

When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK),
the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.

Confirm with the {OK} button.

20.3 Setting 'Processing Laser' Parameters

The 'Processing Laser' parameters serve to define the correct configuration of the laser in use. Additionally to the selection of the used processing laser, it is useful to set parameters such as power limit, shutter timing and standby settings.

laserDESK supports several specific laser systems. These lasers can be completely controlled by the program. Therefore, no additional equipment is required for switching the laser on or off or for malfunction monitoring.

For these lasers (e.g. FiberLaser_IPG, FOBA, GeneralCO2, SpectraPhysics_Hippo), the connection to the PC and the RTC5 or RTC6 PC interface board is predefined. Depending on the laser type, this is done by specific I/O pins or the serial interface. All connections and specified parameter settings are defined in an XML file (sll file) for each laser type. The laserDESK package contains laser definition files for specified lasers that include a number of common laser types. To ensure that laserDESK uses the correct parameter settings, you must choose your laser type via the laser type selection field.

For unspecified lasers (so-called "GeneralType" and "GeneralPlusType" lasers), you must create an sll file and save it. (Here, it is sufficient to establish the standard connections to the RTC board, see [RTC5 Manual](#)). The laser wizard helps you define these settings and create an adapted 'GeneralType.sll' file (see [Creating a Laser Definition File for a General Laser Type](#)). The sll file gets created in the 'C:\Programs\Scanlab\LaserDesk\Libraries' directory.

The following parameters of the processing laser can be edited:

| Parameter | Description |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laser Type | <p>The selection field offers several predefined laser types:</p> <ul style="list-style-type: none"> – FOBA – GeneralCO2 – IPG_FiberLaser_B (Type B and Type B2 interface) – IPG_FiberLaser_D (Type D interface) – IPG_FiberLaser_E (Type EG interface) – SpectraPhysics_Hippo – SPI_FiberLaser_G4_HS/EP (Type G4 interface, HS/EP series) – SPI_FiberLaser_G4_RM (Type G4 interface, RM series) – SPI_FiberLaser_HS (Type G3 interface, HS series) – SPI_FiberLaser_RM (Type G3 interface, RM series) – GeneralType (for unspecified lasers) – GeneralPlusType (corresponds to the GeneralType laser with support of two additional signals; has to be created with the laser wizard, because there is no predefined definition file) <p>Click the  button to select the required laser (type).</p> <p>NOTE:</p> <ul style="list-style-type: none"> – If you have selected a laser type controlled via an RS232 connection, you must define and assign a serial connection (see below). – If you've selected "General Type", you must create an adapted sll file (see information above). – Some of the specified lasers may have frequency ranges deviating from the predefined settings in the laser definition file. In this case, refer to Adapting Frequency Parameters of a Supported Laser Type. |
| Calibration Factor Of Power [0-1] | <p>This value restricts the output power of the laser.</p> <p>For analog power control, this factor defines the fraction of 10V.</p> <p>For digital control, it is the fraction of 8 bits (= 256).</p> <p>For CO2 lasers: The duty cycle (defined by the pulse length) will be restricted by that factor (0.5 is equal to 50% duty cycle as the maximum output power).</p> <p>The value set here will affect all other laser power settings (e.g. a value of 100% defined in the marking parameters (see 'Laser Power (P) [%]' in the Laser Parameters) will result in output of the value defined here).</p> |
| Power Change Delay [ms] | <p>Period of power change delay in [ms].</p> <p>Maximum value: "4294967295"</p> <p>Enter the desired value in the input field.</p> |
| Shutter Open Delay [ms] | <p>Period of delay until shutter opens in [ms].</p> <p>Enter the desired value in the input field.</p> |
| Shutter Close Delay [ms] | <p>Period of delay until shutter closes in [ms].</p> <p>Enter the desired value in the input field.</p> |

| Parameter | Description |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| In Automatic Mode: Switch Shutter For Each Marking | If the checkbox is activated, the shutter will be switched for each marking. |
| Standby Power [%] | Reduced power (in [%] of the maximum output power, defined by the calibration factor of power, see above) during standby. Not used for CO2 lasers. There the standby power is defined by the standby signal settings in the laser wizard. Enter the desired value in the input field. |
| Delay To Standby [ms] | Period of delay until laser switches to standby in [ms]. Enter the desired value in the input field. |
| QSwitch Delay [μ s] | Period of delay between Laser-On and Laser 1 signal (see 'YAG Modes' in the RTC5 Manual) Enter the desired value in the input field. |
| Marking Resolution [mm] | Resolution of the calculation of vectors. Points closer than this resolution are merged to one point. Enter the desired value in the input field. |
| Serial Connection | Lets you assign a serial connection. Click the  button to select a serial interfaces of the PC or "<None>". NOTE: If the serial connection wasn't previously defined in the 'PC Interfaces' Parameters , it will not appear in the selection list. Serial connections used otherwise will also not appear. Only the interface has to be labeled. The 'PC Interfaces' parameters are not used for specified laser types. These values are taken from the laser definition file. |

To set the 'Processing Laser' parameters, proceed as follows:

1. If you haven't already done so, select 'Open ▶ Hardware Configuration' from the '[File](#)' menu.
The 'Hardware Settings' dialog box appears'.
2. Select 'Processing Laser' within the desired system parameter set in the left field of the dialog box.
The respective parameters will be shown on the right side of the dialog box.
3. Define the settings:
 - Select the required items (laser type and serial port) in the selection fields.
 - Modify the settings in the input fields.
4. If desired, subsequently click the {Wizard} button to create a laser definition file for a 'General Type' or 'General Plus Type' laser (see [Creating a Laser Definition File for a General Laser Type](#)) or to evaluate the best parameter set for a fully supported laser (see [Evaluating the Best Parameter Set](#)).
5. Select another parameter within the desired system parameter set.
 - or
 - Confirm your settings with {OK}.
 The 'Hardware Settings' dialog box closes.
The settings are retained as long as 'Hardware Configuration' is open.



NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!
If you want to save the settings permanently, proceed as described below.

6. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
 - or
 - When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

20.4 Setting 'Optics' Parameters

The 'Optics' parameters serve to define the optical settings of the laser scan system. This comprises the objective, dimensions, home position, and the correction file, reference points, dimensions, and calibration factors.

The following optics parameters can be edited:

| Parameter | Description |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description/Objective | This comment line serves for entering the name and technical specifications of the used objective. |
| Marking Area Size X [mm]: Y [mm] | Width and height of the laser scan system's marking area in x and y directions (in [mm]). laserDESK's work area dimensions will be adjusted with respect to these values. NOTE: These values are only a hint for the user. They don't restrict the applied values. |
| Home Position X [mm]: Y [mm] | This function is suitable for the following cases: – Laser types, which can't be completely switched off, must find a stand-by or home position (e.g. a beam dump) to avoid damaging of the products to be marked or the production line. – For the POF functionality these settings are used after every marking to jump to the next marking's start position. If this checkbox is activated, the associated 'X [mm]:' and 'Y [mm]:' input fields will then be enabled to define the home (or start) position. And thus after every marking process a jump to this position will be executed. NOTE: Using the POF functionality without activating this checkbox, the laser spot will jump to the coordinate '0 0' automatically. |
| Variable Polygon Delay | If the checkbox is activated, the variable polygon delay mechanism is applied. Then a desired variable polygon delay file can be applied optional (see Creating the Variable Polygon Delay Curve). The  select button will launch a (<i>Windows</i> -standard) 'Open' dialog box for selecting the variable polygon delay file. If no file is selected and the checkbox is activated, the internal curve is used (see 'Polygon Delay' in the RTC5 Manual). |
| Use Second Scan Head | If you want to use a second scan head, this checkbox must be activated. NOTE: Activating or deactivating the 'Use Second Scan Head' checkbox in the ' Scan Head [2] ' parameters, will activate/deactivate this checkbox too. |

To set the 'Optics' parameters proceed as follows:

1. If you haven't already done so, select 'Open File ▶ Hardware Configuration' from the '[File](#)' menu.
The 'Hardware Settings' dialog box appears.
 2. Select 'Optics' within the desired system parameter set in the left field of the dialog box.
The respective parameters will be shown on the right side of the dialog box.
 3. Define the settings:
– Modify the settings in the input fields.
– Enable or disable the checkboxes, if required.
 4. Select another parameter inside the desired system parameter set for modification.
or
Confirm your settings with {OK}.
The 'Hardware Settings' dialog box will be closed.
The settings will be retained as long as 'Hardware Configuration' is open.
-
- 

NOTE:
If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!
If you want to save the settings permanently, proceed as described below.
5. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or
When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

20.5 Setting 'Scan Head' Parameters

The 'Scan Head [1]' and 'Scan Head [2]' parameters let you define settings for the scan head adjustment (offset, rotation angle) and optical settings (correction file, calibration factor). If in addition to the processing laser a pilot laser will be used, different correction files and calibration factors can be defined respectively.

The following scan head parameters can be edited:

| Parameter | Description |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laser | |
| Correction File | <p>The  select button launches a (<i>Windows-standard</i>) 'Open' dialog box to select the required RTC correction file ([FileName].ct5).</p> <p>NOTE: The RTC correction file corresponding to your laser scan system should be copied before into the 'C:\Programs\SCANLAB\LaserDesk\RTC5' directory.</p> <p>NOTE: Correction files for older RTC boards ([FileName].ctb) are not supported.</p> <p>NOTE: As long as "<default>" is indicated, a user input is expected.</p> |
| Δ Calibration Factor X [%]: Y [%]: | <p>The values for x, y and z directions are the deviation (in [%]) of the correction file calibration factors. When you use the Calibration Wizard to define calibration factors, the determined calibration factor values will be entered automatically in these fields.</p> <p>If you evaluate the calibration by another method, you may enter the values by yourself.</p> |
| NOTE: When using a vision system (see Inserting a Vision System Control Element), do not define any transformation here (offset or rotation values '0'; mirroring checkboxes activated; see parameters below). Otherwise, the vision system will calculate incorrect transformation values. | |
| Offset X [mm]: Y [mm]: | <p>The values define the shift of the scan head coordinate system in x, y and z directions in [mm].</p> <p>Their intended use is to adapt the scan head coordinate system to the machine setup (equal origin).</p> |
| Coordinate System Rotation - Mirroring | |
| α [deg] | <p>The value defines the rotation of the scan head coordinate system (ccw) (in [deg]).</p> <p>Its intended use is to align the coordinate axis of the scan head to the machine setup (parallel axis).</p> <p>NOTE: This setting is not visible in the work area. The defined rotation will only be applied during job execution.</p> |
| Flip X-Coordinate Flip Y-Coordinate | <p>By activating one or both checkboxes the scan head coordinate system will be mirrored to the y-axis or/and x-axis.</p> <p>This setting is useful when using an additional deflection mirror or when processing transparent materials.</p> <p>NOTE: This setting is not visible in the work area. The defined mirroring will only be applied during job execution.</p> |
| Pilot Laser | |
| Correction File | <p>If a pilot laser will be used, activate the checkbox to enable the selection of a correction file.</p> <p>The  select button launches a (<i>Windows-standard</i>) 'Open' dialog box to select the required RTC correction file ([FileName].ct5).</p> <p>NOTE: The RTC correction file corresponding to your laser scan system should be copied before into the 'C:\Programs\SCANLAB\LaserDesk\RTC5' directory.</p> <p>Correction files for older RTC boards ([FileName].ctb) are not supported.</p> |
| Δ Calibration Factor X [%]: Y [%]: Z [%]: | <p>The values for x, y and z directions are the deviation (in [%]) of the correction file calibration factors. When you use the Calibration Wizard to define calibration factors, the determined calibration factor values will be entered automatically in these fields.</p> <p>If you evaluate the calibration by another method, you may enter the values by yourself. To do so, activate the checkbox to enable the input fields.</p> <p>NOTE: The calibration factor 'Z [%]' will only be shown, if the 3D option on the RTC5 PC interface board is enabled (see 'Controlling a 3-Axis Scan System (optional)' in the RTC5 Manual).</p> |

| Parameter | Description |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scan Head Monitoring Temperature Power | <p>Lets you enable scan head monitoring, separate for temperature and power. Activate the desired checkboxes for monitoring.</p> <p>NOTE: The "Scan-System-Error-Induced Laser-Signal Auto-Suppression" function of the RTC5 board will be activated (see RTC5 Manual) and laserDESK will evaluate these errors. In case of an error, laserDESK stops the job execution and switches off the automatic mode.</p> <p>ATTENTION! Not every hardware (scan system) supports these functions. Refer to the manual of your scan system to figure out whether it supports one or both monitoring functions. In case of doubt, check your laser scan system.</p> |
| Use Second Scan Head | <p>This checkbox is only present for the 'Scan Head [2]' parameters. It must be activated to let you define the settings.</p> <p>NOTE: To avoid nonconformance when processing a list with 2 scan heads, refer to How to Use a Second Scan Head.</p> <p>NOTE: Activating or deactivating the 'Use Second Scan Head' checkbox in the 'Optics' parameters', will activate/deactivate this checkbox too.</p> |

To set the 'Scan Head' parameters proceed as follows:

1. If you haven't already done so, select 'Open File ▶ Hardware Configuration' from the '[File](#)' menu.
The 'Hardware Settings' dialog box appears.
2. Select 'Pilot Laser' within the desired system parameter set in the left field of the dialog box.
The respective parameters will be shown on the right side of the dialog box.
3. Define the settings:
– Select a correction file.
– Modify the settings in the input fields.
– Enable or disable the checkboxes.
4. Select another parameter inside the desired system parameter set for modification.
or
Confirm your settings with {OK}.
The 'Hardware Settings' dialog box will be closed.
The settings will be retained as long as 'Hardware Configuration' is open.



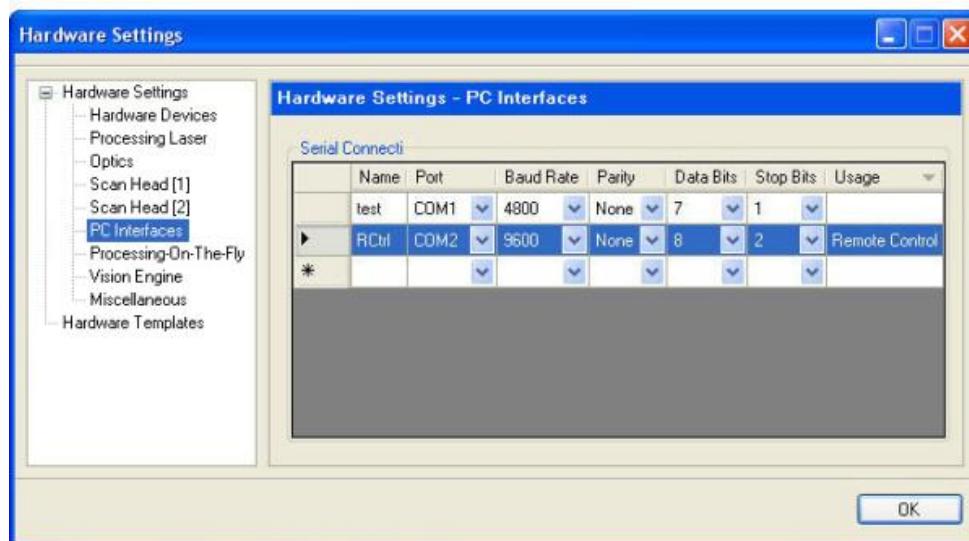
NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!
If you want to save the settings permanently, proceed as described below.

5. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or
When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

20.6 Setting 'PC Interfaces' Parameters

The PC 'Interfaces' parameters serve to define one or several PC interface connections for data transfer. Each connection is defined by several parameters (port, baud rate, parity and data bits) in one line of a table (see figure below). New connections can be created in an (always available) blank line, existent connections can be edited.



The PC interfaces table can be edited like follows:

| Column | Description |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name | Input field for entering the name - maximum 20 characters. When a serial connection must be defined inside the hardware configuration, the name serves as reference (as an example, see "RCtrl" in the 'Serial Connection' selection field within the ' Hardware Devices' Parameters '). |
| Port | Lets you select the desired port. Click the button to open a list with the available ports (COM1, ...). |
| Baud Rate | Lets you select the desired baud rate. Click the button to open a list with the available baud rates (4800, 9600, 19200, 38400, 57600, 115200, 128000, 256000 [Bd]). |
| Parity | Lets you define the used parity of the serial connection. Click the button to open a list with the available mode (Even, Odd, None). |
| Data Bits | Lets you define the data bits of the serial connection. Click the button to open a list with the available bits (5, 6, 7, 8). |
| Stop Bits | Lets you define the stop bits of the serial connection. Click the button to open a list with the available bits (1, 1.5, 2). |
| Usage | This field isn't editable. It will be set by the program, when the defined connection is used by a hardware device. |

To set the 'PC Interfaces' parameters proceed as follows:

1. If you haven't already done so, select 'Open ▶ Hardware Configuration' from the '[File](#)' menu.
The 'Hardware Settings' dialog box appears.
2. Select 'PC Interfaces' within the desired system parameter set in the left field of the dialog box.
The respective parameters will be shown in a table on the right side of the dialog box.
3. To define a new connection, click in the last line and then
 - Enter the name.
 - Define the various parameters in the selection fields.
4. To modify existing settings, select the parameters and edit the appropriate fields.

5. Select another parameter inside the desired system parameter set for modification.

or

Confirm your settings with {OK}.

The 'Hardware Settings' dialog box will be closed.

The settings will be retained as long as 'Hardware Configuration' is open.



NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!

If you want to save the settings permanently, proceed as described below.

6. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.

or

When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.

Confirm with the {OK} button.

20.7 Setting 'Processing-On-The-Fly' Parameters

If your production line is used with the RTC5 or RTC6 interface board's POF option enabled, the 'Processing-on-the-fly' (POF) parameters serve to define the encoder (X, Y, XY directions or rotation) used for the POF mechanism.


NOTE:

When using a transportation system with the RTC5 or RTC6 interface board's POF option enabled, exact calibration factors for the processing-on-the-fly mechanism must be determined.

To do so, see [Calibrating the Processing-On-the-Fly Mechanism](#).

The following POF parameters can be edited:

| Parameter | Description |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| POF-Type | This selection field defines the type of movement: for motion in the x direction, y direction, xy directions as well as for rotation. Click the  button to select the motion direction (X, Y, XY, or Rotation) corresponding to your application. |
| Calibration Factors | When you use the processing-on-the-fly Calibration Wizard to define calibration factors, the determined calibration factor value will be entered automatically in one of the fields below. |
| X [increments/mm] | Defines the number of encoder increments – per 1 mm material flow in x or y or x and y directions or – per 1 deg material flow in rotation. |
| Y [increments/mm] | For a gear ratio of 1 (mm/rotation), this is the encoder resolution in [increments / rotation]. The fields are enabled or disabled depending on the selection of the 'POF-Type' parameter (see above). |
| Rotation [increments/deg] | Enter the values in the input fields. The fields are enabled only if "Rotation" is selected (see 'POF-Type' parameter above). |
| Rotation Center | The input fields below must only be edited when using a rotating transportation system. |
| X [mm] | Defines the position (x, y coordinates) of the transport system's rotation center in relation to the laser scan system. |
| Y [mm] | Enter the values in the input fields. The fields are enabled only if "Rotation" is selected (see 'POF-Type' parameter above). |
| Simulate Encoder | If your transportation system isn't equipped with an encoder and runs with constant speed, you can activate this checkbox to simulate an encoder. The RTC5 interface board then provides a periodic 1 MHz clock signal which feeds the internal encoder counter(s). These will be incremented at this clock rate which simulates a transportation system with constant speed. NOTE: If activated, the signals of an attached incremental encoder will be ignored. |
| Check Marking Area Limits | Lets you check the marking area limits. Encoder failures will also be checked when indicated (message in the output window: "Encoder or Out-Of-Range error during POF execution"), the marking execution will be canceled. – Activated checkbox: the defined marking area and the encoder (failures) will be checked. – Inactivated checkbox: the maximum field limits of the RTC board will be checked, but no encoder errors. |

To set the 'Processing-on-the-fly' parameters, proceed as follows:

1. If you haven't already done so, select 'Open File ▶ Hardware Configuration' in the '[File](#)' menu.
The 'Hardware Settings' dialog box appears'.
2. Select 'Processing-On-The-Fly' within the desired system parameter set in the left field of the dialog box.
The corresponding parameters will be shown on the right side of the dialog box.
3. Define the settings:
– Select the required POF type in the selection field.
– Modify the settings in the input fields.
– Enable or disable the checkbox.

4. Select another parameter inside the desired system parameter set

or

confirm your settings with {OK}.

The 'Hardware Settings' dialog box will be closed.

The settings will be retained as long as 'Hardware Configuration' is open.



NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!

If you want to save the settings permanently, proceed as described below.

5. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.

or

When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.

Confirm with the {OK} button.

20.8 Setting 'Vision Engine' Parameters

If you want to control a vision system with laserDESK, the 'Vision Engine' parameters serve to define the setup.


NOTE:

Currently, laserDESK supports the control of SCANLAB's SCANalign vision system.

The following parameters can be edited:

| Parameter | Description |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Path to Vision Engine | |
| Vision Engine (SSEI Vision Engine.exe) | <p>When using SCANLAB's SCANalign vision system, the path to the Vision Engine's exe-file must be set.</p> <p>Click the button to select the SSEIVisionEngine.exe in the corresponding folder (also refer to the <i>SCANalign Manual</i>).</p> <p>NOTE: As long as "<default>" is indicated, a user input is expected.</p> |
| Configuration File | <p>If desired, an internally generated configuration file can be selected.</p> <p>Click the button to select the required configuration file.</p> <p>Otherwise, the default configuration file (Engine.Configuration.exe, refer to the <i>SCANalign Manual</i>) will be used.</p> |
| Vision Engine Connection | Lets you define the required server connection: |
| Server IP Address: | Simply enter the server IP address |
| Server Port: | Simply enter the server port value |
| Connection Timeout: | <p>Simply enter the connection timeout value. The default value is 30,000 ms.</p> |
| Log Connection: | If activated, the connection data will be logged. |

To set the 'Vision Engine' parameters, proceed as follows:

1. If you haven't already done so, select 'Open File ▶ Hardware Configuration' in the '[File](#)' menu.
The 'Hardware Settings' dialog box appears'.
2. Select 'Vision Engine' within the desired system parameter set in the left field of the dialog box.
The corresponding parameters will be shown on the right side of the dialog box.
3. Define the settings:
 - Select the path to Vision Engine.
 - Select the desired configuration file.
 - Enter the server IP address.
 - Enter the server port value.
 - Enter the connection timeout value.
 - If desired, activate the Log Connection check box.
4. Select another parameter inside the desired system parameter set
or
confirm your settings with {OK}.

The 'Hardware Settings' dialog box will be closed.

The settings will be retained as long as 'Hardware Configuration' is open.


NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!

If you want to save the settings permanently, proceed as described below.

5. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or
When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

20.9 Setting 'Miscellaneous' Parameters

The following parameters can be edited:

| Parameter | Description |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IO-port initialization | |
| Bit 7 ... 0 | Lets you define a bit pattern for setting the output pins (see control element Digital Output), which is applied when switching to automatic mode. This enables you to define the initial state of a signal exchange. |
| Apply Initialization | If you don't want the output lines/pins to be initialized when switching into automatic mode, the 'Apply Initialization' checkbox can be deactivated. |
| Automatic Mode | |
| No break for undetected end of list execution | <p>If the executed job has no variable data and needs no list reloading and no part count checking, there is the possibility to realize very short dead times between execution starts.</p> <p>For this purpose this checkbox can be activated optionally. In this case, the automatic mode will not be switched off, if consecutive starts are executed without proper job end detection.</p> <p>NOTE: The problem here is, that the status update is not executed prior to the next start. This can cause wrong variable data processing, wrong part count checking wrong list reloading and other side effects.</p> |
| Enable activation by IO signals | <p>For activation of the automatic mode and switching the laser by a PLC without using the Remote Control interface, two IO lines can be used:</p> <ul style="list-style-type: none"> – Digital In 12 for Automatic Mode, – Digital In 13 for Laser Switching (only full supported lasers). (Pins 26 and 28 at RTC Extension 1 connector) <p>For this purpose this checkbox can be activated optionally.</p> <p>The IO lines are edge-sensitive, i.e. a rising edge will switch on, a falling edge will switch off.</p> <p>NOTE: If for some reason the action was not performed, you need to reset the line and set it again to create the appropriate edge.</p> |

To set the 'Miscellaneous' parameters proceed as follows:

1. If you haven't already done so, select 'Open ▶ Hardware Configuration' from the '[File](#)' menu.
The 'Hardware Settings' dialog box appears'.
2. Select 'Miscellaneous' within the desired system parameter set in the left field of the dialog box.
The respective parameters will be shown on the right side of the dialog box.
3. Define the parameters just by activating or deactivating the individual radio buttons and the checkboxes.
4. Select another parameter within the desired system parameter set.
or
Confirm your settings with {OK}.
The 'Hardware Settings' dialog box closes.
The settings are retained as long as 'Hardware Configuration' is open.



NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!
If you want to save the settings permanently, proceed as described below.

5. Select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or
When you close the 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

21 Hardware Control

The 'Hardware' menu lets perform several tasks for controlling and testing the hardware, such as setting laser control parameters, calibrating the scan system, checking signal transfer or querying system information. Independently from jobs, almost all hardware control functions can be executed alongside an opened job, the 'Marking Library' or 'Hardware Configuration'.

If you use fully supported lasers, please note:

- Fully supported lasers need an additional special wiring to the RTC5 or RTC6 PC interface board (see [Laser-dependent Connections](#) in [Connecting the Laser to the RTC5 or RTC6 PC Interface Board](#)).
- Before starting any tasks, the fully supported lasers must be switched on in the laser control window in the Production Profile.
For General Type lasers, laserDESK and the RTC control only the laser beam synchronized with the scan head positioning.
For full supported lasers, the laser system itself is switched on and is error checked. In case of an error, the job execution will be canceled, all signals to switch the laser beam on are switched off and in the Output Window an error message is displayed.
Normally, the security mechanism of the laser system will switch off the laser. Switching the laser system on again will reset the error, if it isn't present anymore.



21.1 Direct Manual Control of the Laser System and Scan Head

The 'Manual Laser Control' dialog box lets you test the laser or scan head. Independently of marking procedures, you can switch the laser on. This allows you to test the performance of your laser or scan head during maintenance work or compare different laser parameter settings, etc.

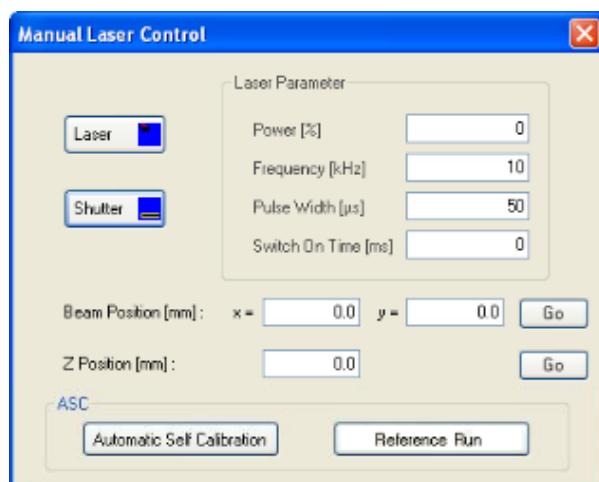
WARNING!



During testing the harmful laser radiation can be emitted, particularly with an opened shutter and a demounted scan system.

This presents a risk of injury when the laser radiation contacts parts of the body.

Therefore, all relevant laser safety regulations must be known and adhered to before testing the laser (see [Laser Safety](#)).



The 'Manual Laser Control' dialog box offers the following settings and buttons:

| Parameter/Button | Description |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| {Laser} | Switches on the laser for the duration defined in 'Switch on time [ms]' (see above). If the laser is switched on, it can be switched off by clicking the button again. The operating state (on/off) is indicated. |

| Parameter/Button | Description |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| {Shutter} | Opens or closes the shutter (if this function is supported by the laser system). The shutter position (opened/closed) is indicated. WARNING! With an opened shutter, laser radiation can be emitted! See safety note above. |
| Laser Parameter | |
| Power | Defines the laser power (in [%]). |
| Frequency [kHz] | Defines the laser frequency (in [kHz]). |
| Pulse Width [μ s] | Defines the pulse width (in [μ s]). |
| Switch On Time [ms] | Defines the time (in [ms]) the laser is switched on. If set to the value "-1" the laser will remain continuously on until switched off. |
| Beam Position [mm] x/y | Defines the beam position within the work area in the x and y directions (in [mm]). |
| {Go} | Sets the scan system's mirrors to the defined x/y beam position (see above) |
| Z Position [mm] | Defines the focus position in the z direction (in [mm]) by adjusting the varioSCAN. Only available if the 3D option is activated on the RTC5 or RTC6 interface board. |
| {Go} | Sets the scan system's focusing lens to the defined z position (see above) |
| ASC | The Automatic Self Calibration is described detailed in the 'Automatic Self Calibration' chapter in the RTC5 Manual . NOTES: – This field is only shown, if a scan system is connected, which is enabled for Automatic Self Calibration. – The Automatic Self Calibration should only be performed after warm-up. |
| {Automatic Self Calibration} | Click the button to proceed an Automatic Self Calibration. The calibration will be executed, the scan system will be referenced to the home position saved in the RTC's EPROM. |
| {Reference Run} | Click the button to create a new reference position. The calculated position will be written into the RTC's EPROM. |

To **test the laser**, proceed as follows:

1. Select 'Laser Control ▶ Laser System' from the '[Hardware](#)' menu.
The 'Manual Laser Control' dialog box appears.
2. Enter the laser parameter's values.
3. Enter the x and y values for the beam position.
Click the {Go} button to set the scan system to the defined beam position
4. If available, enter the z value for the z position.
Click the {Go} button to set the scan system to the defined z position.
5. Click the {Shutter} button to open or close the shutter.
The shutter position indicator will change accordingly.
6. Click the {Laser} button to switch on the laser.
The defined laser parameters will be applied.
The operating state indicator displays a beam and the laser is switched on as long as defined in the 'Laser parameter'.
To abort running the laser, click the {Laser} button again.
7. If necessary, repeat the procedure with changed parameters.
8. When you have finished testing, click the {X} button to close the 'Manual Laser Control' dialog box.

To **calibrate the scan system**, proceed as follows:

1. Select 'Laser Control ▶ Laser System' from the '[Hardware](#)' menu.
The 'Manual Laser Control' dialog box appears.
2. If desired, click the {Reference Run} button, to create a new reference position.
3. Click the {Automatic Self Calibration} button, to proceed an Automatic Self Calibration.

21.2 Creating a Laser Definition File for a General Laser Type

For RTC initialization, each used processing laser requires a laser definition file with special parameter settings (sll file in XML format) that adapts the RTC output signals to the laser system.

NOTE:

 For a number of common laser types (see 'Laser Type' selection field in 'Hardware Configuration\Hardware Settings\Processing Laser'), laser definition files already exist that predefine parameter settings and connection to the RTC5 or RTC6 PC interface board. These laser definition files can't be modified. Because laserDESK contains laser definition files for these lasers, you don't need to create them.

If your laser processing system uses an unspecified (so-called "GeneralType") laser, then you must create a laser definition file to ensure that laserDESK uses the correct parameter settings.

NOTE:

 After installation, the laser definition files are copied into the laserDESK data directory 'C:\ProgramData\Scanlab\LaserDesk\LaserDefinitions' if they are not present yet.

(For this reason, the administrator must have write permission for the corresponding directory - see [Installing the laserDESK software](#)).

The laser definition files will not be changed by a new installation. When you create a new laser definition file, the existing "GeneralType.sll" laser definition file automatically gets overwritten and the new file will persist and used even after a new installation.

If you want to save the existing laser definition file, then rename or copy it before creating the new laser definition file.

To create a laser definition file, proceed as follows:

1. Save (rename or copy) the existing "GeneralType.sll" laser definition file in the C:\ProgramData\Scanlab\LaserDesk\libraries\ directory.
2. Select 'Laser Control ▶ Laser Wizard' from the '[Hardware](#)' menu.
The 'Laser Wizard' dialog box appears.
3. Click the {Next} button to start the definition procedure.
The page for selecting the laser mode appears.
4. Select a radio button to define the required laser mode (Mode 0 ... Mode 5 and Pulse Picker Mode).
(For descriptions of the laser modes, see the 'Laser Control' chapter in the [RTC5 Manual](#).)
5. If you want to use output synchronization activate the correspondent checkbox in the 'Laser Signal Synchronization' field. In this case, the scan system's scanning motions will be synchronized to the laser pulses of a free-running laser. (For details, refer to the RTC Output Synchronization Description.)
NOTE:
Laser signal synchronization is available only as of RTC5DLL version 5.30 and requires an additional hardware connection.
6. If you want to select, which edge (rising or falling) should be used for the output synchronization pulses, activate the 'Count the Positive Edge' checkbox.
Click the {Next} button to continue.
The page for selecting the signal level appears.
7. Select the required signal levels:
 - LaserON Signal High Active or LaserON Signal Low Active
 - Laser 1,2 Signals High Active or Laser 1,2 Signals Low ActiveClick the {Next} button to continue.
The page for defining the maximum output power appears.

8. Define the maximum laser power (in [%]).

For analog control, it is the percentage of 10 V; for digital control it is the percentage of 8 bits (= 256). This value restricts the output power of the laser. A value of "100%" defined in the marking parameters (see 'Laser Power (P)' in [Marking Parameters – Laser Parameter](#)) results in outputting of the value defined here.

Click the {Next} button to continue.

The page for defining the laser's frequency range appears.

9. Define the laser's frequency range (Minimum, Maximum, Default, in [kHz]).

Marking parameters outside this range are clipped to the limits.

Click the {Next} button to continue.

The page for defining the standby pulses appears.

10. If your laser needs standby pulses, activate the corresponding check box.

In this case, you must define the standby frequency (in [kHz]) and the standby pulse width (in [μ s]).

If the standby pulse width is set to "0" [μ s], then standby signals are sent with the values last used in the current program - not with the values defined here.

Click the {Next} button to continue.

The page for finishing the calibration procedure appears.

11. If desired, enter a unique file name (different from the default name).

NOTE:

To activate the new laser, it must be selected in the Hardware Configuration if the wizard was not started there.

If you use a 'General Plus Type' laser type, you can activate the 'Activate a general IO support' check box for hardware signal support.

Click the {Finish} button.

The laser definition file 'GeneralType.sll' (if not renamed) gets created automatically in the 'C:\ProgramData\Scanlab\LaserDesk\LaserDefinitions' directory (typically, if not changed during installation). Make sure that "GeneralType" or "GeneralPlusType" (if renamed "[GeneralTypeName]" or "[GeneralPlusTypeName]") is selected in the 'Laser Type' field (see [Setting the 'Processing Laser' Parameters](#)).

21.3 Adapting Frequency Parameters of a Fully Supported Laser Type

For RTC5 or RTC6 initialization, each used processing laser requires a laser definition file with special parameter settings (sll file in XML format) that adapts the RTC output signals to the laser system. For a number of common laser types (see 'Laser Type' selection field in 'Hardware Configuration\Hardware Settings\Processing Laser'), laser definition files already exist and define parameter settings and connection to the RTC5 or RTC6 PC interface board. These definition files include (among others) predefined parameters for the laser's frequency range. The table below shows the predefined frequency ranges of the fully supported laser types.

| Laser Type | Minimum Frequency | Maximum Frequency | Default Frequency |
|-----------------------------------------------------------|-------------------|-------------------|-------------------|
| Foba | 0 kHz | 20 kHz | 10 kHz |
| GeneralCO2 (active high) | 0 kHz | 20 kHz | 5 kHz |
| GeneralCO2 (active low) | 0 kHz | 20 kHz | 5 kHz |
| DPSS | 30 kHz | 300 kHz | 30 kHz |
| IGP_FiberLaser_B (Type B and B2 interface) | 20 kHz | 80 kHz | 30 kHz |
| IGP_FiberLaser_D (Type D interface) | 1 kHz | 500 kHz | 30 kHz |
| IGP_FiberLaser_E (Type E and EG interface) | 1 kHz | 1,000 kHz | 30 kHz |
| Spectra Physics_Hippo | 15 kHz | 300 kHz | 30 kHz |
| SPI_FiberLaser_G3_HS (Type G3 interface, HS series) | 1 kHz | 500 kHz | 30 kHz |
| SPI_FiberLaser_G3_RM (Type G3 interface, RM series) | 1 kHz | 500 kHz | 30 kHz |
| SPI_FiberLaser_G4_HS/EP (Type G4 interface, HS/EP series) | 0 kHz | 1,000 kHz | 30 kHz |
| SPI_FiberLaser_G4_RM (Type G4 interface, RM series) | 1 kHz | 500 kHz | 30 kHz |



NOTE:

The values in the table above are typical values, but individual laser systems may be altered by the manufacturer.

For laser types with frequency ranges deviating from the values shown in the table above, the Supported Laser Wizard serves to define the valid frequency range for the laser definition file.

For the SPI laser types FiberLaser_G4-HS/EP, _G4_RM, and _HS only, the default simmer current can be defined also. This value will be used when switching the laser on.

To adapt the valid frequency range, proceed as follows:

1. Select 'Laser Control ▶ Supported Laser Wizard' from the '[Hardware](#)' menu.
The 'Laser Wizard' dialog box appears.
2. Click the {Next} button to start the procedure.
The page for selecting the used laser type appears.
3. Click the  button to select the used laser type.
Click the {Next} button to continue.
The page for defining the frequency range appears.
4. Define the
 - Minimum Laser Frequency (in [kHz]),
 - Maximum Laser Frequency (in [kHz]),
 - Default Laser Frequency (in [kHz]).
 Enter the values into the corresponding input fields.
Click the {Next} button to continue.
Using a none SPI laser type or the SPI laser type FiberLaser_RM, the page for finishing the procedure appears (continue with step 6).
Using an SPI laser type mentioned above, the page for defining the default simmer current appears.
5. Define the Default Simmer Current (in [%]).
Enter the value into the input field.
Click the {Next} button to continue.
The page for finishing the procedure appears.

6. Click the {Finish} button.
The data will be overwritten in the laser definition file.
The defined parameters will be applied when executing a job.

21.4 Calibrating the Scan System

To determine exact calibration factors for the work area, a calibration routine must be performed. This calibration routine is executed within the 'Calibration Wizard' dialog box. The calibration routine comprises a test marking, measurement of the marking and input of the test results. The scan system will then calculate and apply the determined calibration factors.

NOTE:

For calibrating the system the correction file's values should be used. Therefore the 'use pure correction file factors' checkbox should be activated.

If the checkbox is not activated, the current values from the 'Hardware Configuration' (see ' Δ Calibration Factor X/Y [%]' in [Optics](#) parameters) are applied for the calibration. That's fine if you want to check the values.

NOTE:

You can start the scan system's calibration routine only if 'Hardware Configuration' has already been opened.

To calibrate the scan system, proceed as follows:

1. Select 'Hardware Configuration' from the [File](#)\Open' menu.
'Hardware Configuration' opens and the 'Hardware Settings' dialog box appears.
2. Click the {OK} button to close the 'Hardware Settings' dialog.
Using a General Type laser, continue with step 4.
3. If you use a fully supported laser, select 'Production Profile'
 - from the [View](#) menu
 - or in the [File](#) toolbar.When the [Laser Control Window](#) for 'Production Profile' appears, click the {Laser} button to switch the laser on.
The output window shows "Laser on".
4. In the [Hardware](#) menu, select 'Laser Control\Calibration Wizard'.
The 'Calibration Wizard' dialog box appears.



NOTE:

When the calibration routine proceeds, the existing calibration factors will get overwritten.

5. Click the {Next} button to start the calibration procedure.
The page for defining the rectangle for the test marking appears.
6. Enter the values for the width and height (in [mm]) in the corresponding input fields.
The larger the size, the more accurate the calibration.
Click the {Next} button to continue.
The page for starting the marking appears.
7. If you haven't already done so, then position an appropriate test material at the laser focus and close all shields.
8. If you don't want to use pure correction file factors, deactivate the corresponding check box (see note above).
Start marking via the {Start Marking} button.
Click the {Next} button to continue.
The page for entering the measured values appears.
9. Measure the sides of the marked rectangle.
10. Enter the measured values (in [mm]) in the corresponding 'Measured Width' and 'Measured Height' input fields.
Click the {Next} button to continue.
The page with the calculated calibration factors appears.

11. Click the {Finish} button to take over the new calibration factors.
The 'Calibration Wizard' dialog box closes automatically.
The new factors are transferred into the '[Optics](#)' parameters ' Δ Calibration Factor X/Y [%]'.
12. If you use a fully supported laser, switch off the laser by clicking the {Laser} button in the Laser Control Window.
The output window shows "Laser off".
13. To check the parameters, click the 'Hardware Settings' button in the 'File' toolbar to open the corresponding dialog box and select the 'Optics' parameters.
14. Click the {OK} button to close the 'Hardware Settings' dialog.



NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!
To save the settings permanently, select 'Save' from the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar.

15. Select the 'File\Save' menu or click the {Save} button to save the settings permanently.
or
When you close 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

21.5 Manually Restarting the Laser

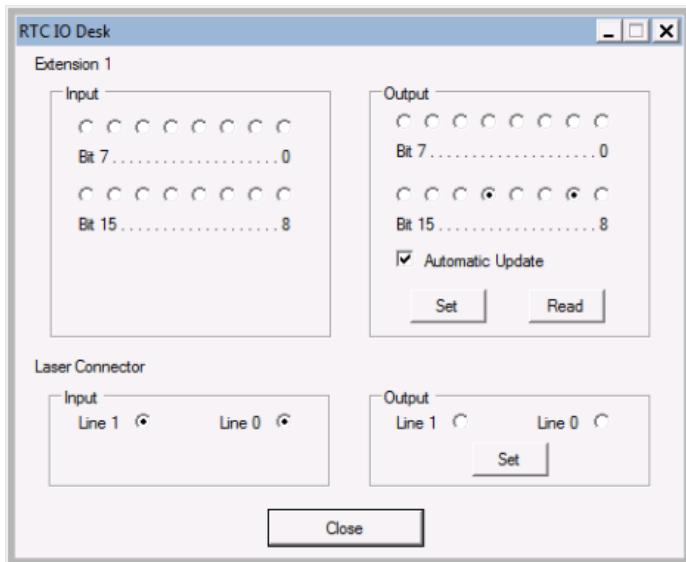
If a malfunction of the laser or RTC control occurs, the laser will be switched off automatically. 'Restart' lets you reset the malfunction and initialize the laser.

To restart the laser manually in case of malfunction, proceed as follows:

1. Select 'Laser Control ▶ Restart' in the '[Hardware](#)' menu.
The laser will be initialized.

21.6 Testing the Signal Transfer via the RTC IOs

To test whether signals from the RTC5 or RTC6 interface board are applied correctly, input bits can be monitored and output bits can be set in an RTC IO desk. The bits are represented by radio buttons and match the pins of the RTC interface board's EXTENSION 1 socket connector and the LASER D-SUB connector.



Extension 1 IOs

Because several pins are predefined for specific use, only the 'Bit 7 ... 0' input and output pins (see figure above) are available during a marking process. But here all pins are supported.

The 'Input' field serves as a "live monitor". Incoming signals are indicated as activated radio buttons (dots inside). The refresh time is 1 s, thus shorter signals may not be detected.

Bits 15 ... 0 of the 'Output' field can be set. But bits 15 ... 8 will be automatically refreshed by the program and override the user values. Thus bits 7 ... 0 should actually be used. The states of the output bits 15 ... 8 will be refreshed together with the input.

The 'Automatic Update' checkbox is only related to Output Bits 15 ... 8. If activated, they will be updated automatically overwriting any user input. If not activated, the user input will not be overwritten and can be applied by pressing the {Set} button. But it is possible that the program may change that setting due to program actions. In this state the GUI and the real output lines may differ. The {Read} button shows the real output line state again.

To set output bits, activate the corresponding radio buttons and apply the setting by clicking the {Set} button. The {Read} button serves to check whether the selected radio buttons are set. If not, these buttons will be deselected.

Laser Connector IOs

The 'Input' lines serve as a "live monitor". Incoming signals are indicated as activated radio buttons (dots inside). The refresh time is 1 s, thus shorter signals may not be detected.

Because the output lines can't be read back the radio buttons are only for user input. The state is not displayed!
 To set output lines, activate the corresponding radio buttons and apply the setting by clicking the {Set} button.

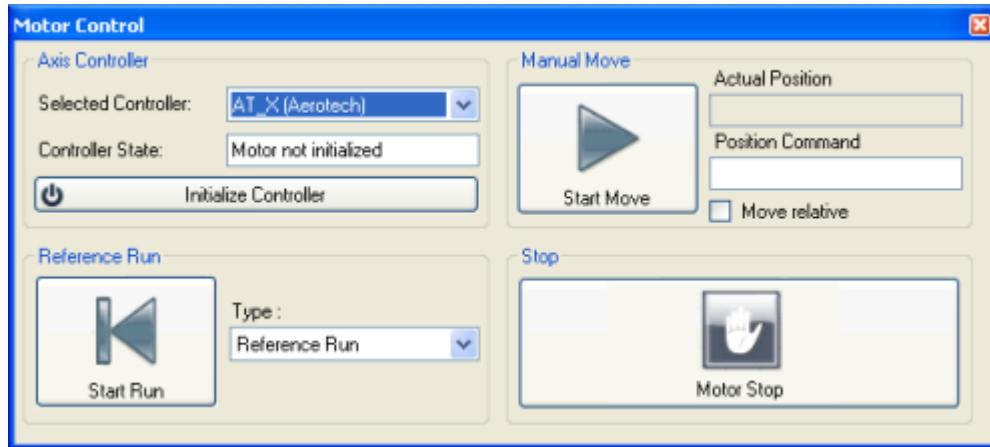
Signal Testing

To test the signal transfer, proceed as follows:

1. Select 'Manual Control ▶ RTC IO-Control' in the '[Hardware](#)' menu.
The 'RTC IO Desk' dialog box appears.
2. To check incoming signals, just monitor 'Bit 15...0' and 'Line 1-0' in the 'Input' fields.
If the signals transfer correctly, the appropriate radio buttons will be temporarily activated.
3. To check outgoing signals activate the appropriate radio button(s) in the 'Extension 1 Output' field.
Select a bit pattern in 'Bit 15 ...0'.
4. If desired, activate the 'Automatic Update' checkbox.
5. If desired, use 'Line1-0' in the 'Laser Connector Output' field for user input.
6. Click the {Set} button/s to set the selection.
The corresponding RTC command will be executed and output of the actual indicated states of bits 15...0 and lines 1-0 occurs.
7. If you want to check, whether all activated radio buttons are set, click the {Read} button.
Radio buttons which are not set will be deactivated.
8. If necessary, select and set the appropriate radio button(s) again.
9. When you've finished testing signal transfer, close the 'RTC IO Desk' dialog box via the {Close} button.

21.7 Testing the Motor Controllers

The 'Motor Control' dialog box serves to test the motion controllers. All defined motion controllers can be initialized, referenced and moved manually.



The 'Motor Control' dialog box offers the following settings and buttons:

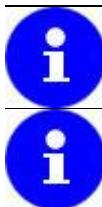
| Field | Description |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Axis Controller | |
| Selected Controller: | Lets you select a controller defined in the Hardware Configuration (see Setting 'Hardware Devices' Parameters Motor Control Axes). Click the  button to select the controller. |
| Controller State: | The output field (not editable) shows the actual state of the selected controller. |
| {Initialize Controller} | Click the button to initialize the selected controller. |
| Reference Run | |
| {Start Run} | Click the button to start the reference run. The reference run will start immediately, the controller state will be indicated in the 'Controller State' output field (see above). |
| Type: | Lets you select the reference run type of the selected controller. You will find the reference run type in the manual of the used controller. Click the  button to select the reference run type. |
| Manual Move | |
| {Start Move} | Click the button to move the motor to the desired position / over the desired distance. The motor will start immediately. |
| Actual Position | Shows the actual motor position. NOTE: This non-editable field is visible only for certain motor types which support position feedback. |
| Position Command | Lets you define the desired position or distance. Enter the value into the input field. NOTE: The unit is defined in the Hardware Configuration by the unit used for the motor's 'Calibration Factor' [steps/user unit] (see 'Setting 'Hardware Devices' Parameters Motor Control Axis '). We recommend using the same user unit as defined in the 'Options' window (see parameter 'Length' in Setting the 'View' Parameters). For speed and acceleration, the same unit must be used as for the calibration factor. |
| Move relative | If the checkbox is activated, the motor moves over the distance defined in 'Position Command' (see above). If the checkbox is deactivated, the motor moves to the absolute position defined in 'Position [mm]'. |
| Stop | |
| {Motor Stop} | This button serves to interrupt the motor's move immediately. The motor will stop at the current position. Depending on the selected controller, it may be necessary to initialize the controller again. |

To control or test the motor controllers, proceed as follows:

1. Select 'Manual Control ▶ Motor Control' from the '[Hardware](#)' menu.
The 'Motor Control' dialog box appears.
2. Select the required controllers.
3. Select and define the corresponding parameters.
4. Execute the desired action(s) by clicking the corresponding button(s).
5. When you have finished testing, click the {X} button to close the 'Motor Control' dialog box.

21.8 Calibrating the Processing-On-the-Fly Mechanism

When using a transportation system with the RTC5 or RTC6 interface board's POF option enabled, you need to determine exact calibration factors for the processing-on-the-fly mechanism. For that purpose, a calibration routine must be performed within the 'Processing on the Fly Calibration Wizard' dialog box.



NOTE:

You can start the scan system's calibration routine only if 'Hardware Configuration' has already been opened.

NOTE:

If using two encoders (one for the x and one for the y direction), you must perform the calibration routine twice: the first time for calibrating in the x direction, the second time for calibrating in the y direction.

To calibrate the processing-on-the-fly mechanism, proceed as follows:

1. Select 'Hardware Configuration' from the '[File](#)\Open' menu.
'Hardware Configuration' opens and the 'Hardware Settings' dialog box appears.
2. Close the 'Hardware Settings' dialog box via the {OK} button.
3. Select 'Adjustment ▶ POF Calibration Wizard' from the '[Hardware](#)' menu.
The 'Processing on the Fly Calibration Wizard' dialog box appears.



NOTE:

When the calibration routine proceeds, the existing calibration factors will get overwritten.

4. Click the {Next} button to start the calibration procedure.
The page for selecting the used encoder type appears.
5. Activate the radio button for the used encoder:
 - 'Encoder in x'
 - or 'Encoder in y'
 - or 'Encoder for Rotation'.Click the {Next} button to continue.
The page with the request for labeling a fixed reference position appears.
6. Label the start position of your transportation system.
Therefore, mark a position on your transportation system and reference it to marked fixed point of the machine.
Click the {Next} button to continue.
The page with the request for moving the transportation system appears.
7. Move the transportation system in the positive direction, then stop it.
The longer the distance the more precise the calibration result.
8. Click the {Next} button to continue.
The page for entering the measured value appears.
9. Measure the distance between the marked fixed point of the machine (start point) and the mark on your transportation system (end point).
10. Enter the measured value in the 'Measured distance in [mm]' input field.
Click the {Next} button to continue.
The page with the calculated calibration factor appears.
11. Click the {Finish} button to take over the new calibration factor.
The 'Processing on the Fly Calibration Wizard' dialog box closes automatically.
The new factor is transferred into the 'Processing-On-The-Fly' parameter 'Calibration Factors'.
12. If you use a transportation system in the x and y directions, repeat the calibration procedure for the remaining direction.

13. To check the 'Calibration Factors',
– open the 'Hardware Settings' dialog box via the corresponding button in the '[File](#)' toolbar,
– then select 'Processing-On-The-Fly' in the left field of the dialog box.
14. Click the {OK} button to close the 'Hardware Settings' dialog.



NOTE:

If you close 'Hardware Configuration' subsequently without saving, the changes will not be applied!
To save the settings permanently, proceed as described below.

15. Select 'Save' in the '[File](#)' menu or click the {Save} button in the '[File](#)' toolbar to save the settings permanently.
or
When you close 'Hardware Configuration' (by opening a job or 'Marking Library' or when exiting laserDESK), the query "Do you want to save your changes?" appears in the 'Save changes?' dialog box.
Confirm with the {OK} button.

21.9 Creating the Variable Polygon Delay Calibration Curve

A variable polygon delay curve allows varying the length of the polygon delay depending on the angle between the two successive marking vectors (see 'Variable Polygon Delay' in the [RTC5 Manual](#)). The standard curve of the RTC5 or RTC6 interface board can be replaced by a customized curve. To do so, you must perform a calibration routine via the 'Variable Polygon Calibration Wizard'.



NOTE:

The variable polygon delay curve can only be created with a connected intelliSCAN scan head.

The created variable polygon delay curve will be saved as a variable polygon delay file (CalVarPolDelay.txt) in the directory 'C:\Programs\Scanlab\LaserDesk' or overwrites an existing file.

Depending on your application (with different process requirements), it might be useful to create several curves/files by entering different parameters (max. polygon delay, max. position deviation, marking speed). The files can be renamed and collected in their own directory. To use the variable polygon delay file, it must be activated and selected within the 'Hardware Settings' dialog box.

To create/calibrate the variable polygon delay curve, proceed as follows:

1. In the '[Hardware](#)' menu select 'Adjustment ▶ Polygon Delay'.
The 'Variable Polygon Delay Calibration' dialog box appears.



NOTE:

When the calibration routine proceeds, any already-existing variable polygon delay file gets overwritten.

2. Click the {Forward} button to start the calibration procedure.
The page for entering the polygon delay appears.
3. Enter the value for the maximum polygon delay (in [μ s]) in the corresponding input field.
Click the {Forward} button to continue.
The page for entering the position deviation appears.
4. Enter the value for the maximum position deviation (in [μ m]) in the corresponding input field.
Click the {Forward} button to continue.
The page for entering the marking speed appears.
5. Enter the value for the marking speed (in [m/s]) in the corresponding input field.
Click the {Forward} button to continue.
The page for starting the evaluation appears.
6. Click the {Start evaluation} button to start creation of a new variable polygon delay curve.
When the evaluation procedure is finished, the {Apply} button will be shown.
7. Click {Apply} to create a new variable polygon delay file or to overwrite the existing file.
The (*Windows*-standard) 'Save As...' dialog box appears.
8. Define the file name and path and confirm with {Save}.
The page for finishing the evaluation procedure appears.
9. Click the {Finish} button.
The 'Variable Polygon Delay Calibration' dialog box closes automatically.
10. Activate and select the file in the '[Optics](#)' Parameters (inside the 'Hardware Settings' dialog box).

21.10 Evaluating the Scan Head's Tracking Error

Galvanometer scanner movements do not occur instantaneously with respect to vector control, but rather after a certain time lag, the tracking error. The tracking error characterizes the reaction properties of the galvanometer scanners and is specified as another key dynamic parameter for each scan head. The tracking error is denoted in the related scan head manual. The laser and scanner delays settings in the Property Window should be modified depending on the scan head's tracking error. For this purpose, the context menu function 'Calculate Delays' is available in the marking parameters (see [Laser Delays](#) und [Scanner Delays](#)).

For further information about tracking error, refer to [RTC5 Manual](#) and the scan head manual.

The Tracking Error Wizard dialog box serves to easily evaluate the tracking error of your scan head. Archive the evaluated value – then you can calculate the [Laser Delays](#) and [Scanner Delays](#) in the Property Window (see [Calculate Delays](#)).



NOTE:

The scan head's tracking error can only be evaluated with a connected intelliSCAN scan head.

To evaluate the tracking error, proceed as follows:

1. In the '[Hardware](#)' menu, select 'Adjustment ▶ Tracking Error'.
The 'Tracking Error Wizard' dialog box appears.
2. Click the {Next} button to start the evaluation procedure.
The page for entering the scan speed and the moving distance appears.
3. Enter the values for the scan speed (in [m/s]) and the moving distance (in [mm]) in the corresponding input fields.
Click the {Next} button to continue.
The page for starting the measurement appears.
4. Click the {Start Measurement} button.
While measuring, a {Stop} button will be displayed, which lets you abort the measurement if desired.
5. When the measurement is finished, click the {Next} button.
The page with the measurement result appears.
The tracking error will be displayed (in [ms]).
6. Archive the displayed value to use it when setting the laser and scanner delays.
7. Click the {Finish} button.
The 'Tracking Error Wizard' dialog box closes automatically.

21.11 Evaluating the Best Parameter Set

To find the most suited parameter set for your application, an evaluation routine can be performed within the 'Parameter Wizard' dialog box. This routine comprises the selection of a parameter set, the setting of the parameter's values, the execution of the test pattern marking, and finally the selection of the most suited parameters.

NOTE:

The marking parameter set need to be defined in the job and will be used as the template or starting parameter set. If the test pattern should be filled, the job Fill Parameter set will be used. Therefore you should define these parameters prior to running the Parameter Wizard.

(Information on editing individual parameters and managing the parameter set is described in [Property Window](#).)

NOTE:

Using a fully supported laser, you can start the evaluating routine only if the laser has already been switched on in the 'Production Profile'.

To evaluate the best parameter set, proceed as follows:

1. If not yet done, open the desired job.
2. If not yet done, define the job's marking and fill parameters.
Using a General Type laser, continue with step 4.
3. If you use a fully supported laser, select 'Production Profile'
 - from the [View](#) menu
 - or in the [File](#) toolbar.

or
open the [Laser Control Window](#) from the 'View' menu.
When the window appears, click the {Laser} button to switch the laser on.
The output window shows "Laser on".
4. In the [Hardware](#) menu, select 'Adjustment\Parameter Wizard'.
The 'Parameter Wizard' dialog box appears.
5. Click the {Next} button to start the evaluation routine.
The 'Symbol Selection' page for selecting and defining the object for the test marking pattern appears.
6. Select the test pattern in the 'Object' selection field (predefined rectangle, circle, triangle, letter A, or a user defined symbol of the [Marking Library](#)).
Enter the desired values to define the object's size and start position in the corresponding input fields.
Note: The value for 'Spacing' defines the empty space between two objects.
Click the {Next} button to continue.
The 'Additional Settings' page appears.
7. If you want the test pattern to be filled, activate the corresponding check box.
Select the desired marking parameter set in the corresponding selection field.
Only the marking parameter sets of the opened job are available.
Click the {Next} button to continue.
The 'Parameter Selection' page appears.
8. Select the parameters which should be variable.
Two different parameters for x and y direction can be selected in the corresponding selection fields.
Possible parameters are: Laser Power, Marking Speed, Jump Speed, Frequency, Pulse Length, all kind of delays, (Filling) Line Distance, and (if activated) the sky writing parameters Timelag and LaserOn-Shift.
To define the start value, the increment and (up to 10) steps, enter the desired values in the corresponding input fields.
Be careful, that all patterns are in the marking area.
Click the {Next} button to continue.
The 'Test Pattern Marking' page appears.

9. If you want the x and y axes to be labeled with the applied variable parameters, activate the 'Add Parameter Labels' check box.
Then click the {Start Marking} button to execute the test marking.
During execution, the {Start Marking} button is deactivated.
If a parameter set is not allowed, e.g. one parameter is out of range, this pattern will not be marked and missing.
An appropriate message appears.
Click the {Next} button to continue.
The 'Result' page appears.
10. For each marked pattern a button is shown. The lower left {A1} button has the defined starting parameter set (it will not be displayed, if one parameter is out of range). The positions of all other buttons correspond to the increments respective to {A1}.
Select the most suited marking by clicking on the corresponding button.
 - If you want to refine the selected parameters, continue with step 11.
 - If you want to store this parameter set, continue with step 12.
11. Click the {Refine} button.
The Parameter Wizard jumps back to the 'Parameter Selection' page.
The selected parameter set will be kept and used as the new starting parameters.
Repeat steps 8 to 10 to define two new (or the same) parameters for variation.
12. Enter a name into the input field.
If you want to keep the test pattern, activate the 'Keep Pattern as a new Job' check box. (Else the pattern will be discarded and your old job will be reloaded again.)
Click the {Save As ...} button. This will save the selected parameter set in the job Marking Library. (If you don't save the job, the parameters will be lost.)
The saved parameter set(s) will be available either in your old job or the new test pattern job.



Note:

To keep this parameters set permanently, you must save the job.

To use this evaluated parameters in different other jobs, export them into the Marking Library (see [Managing Parameter Sets](#)).

13. Click the {Finish} button to complete the evaluation routine.
The 'Parameter Wizard' dialog box closes automatically.
14. If you use a fully supported laser, you may switch off the laser by clicking the {Laser} button in the Laser Control Window.
The output window shows "Laser off".

21.12 Querying Information

To query information about the scan system as well as the runtime, laserDESK offers the 'Information' and the 'Runtime Information' dialog boxes.

In the 'Information' dialog box, you can query the following information:

- The '[Scan System](#)' tab displays features of the software and hardware.
- The '[Marking Statistics](#)' tab displays the number of used objects and vector commands and, as a result, the estimated marking execution time.
- The '[intelliSCAN](#)' tab is only available, when an intelliSCAN scan head is connected.
It displays all status messages when using an intelliSCAN.

In the 'Runtime Information' dialog box, you can query the following information:

- The '[laserDESK State](#)' tab displays features of the software and hardware.
- The '[Laser System](#)' tab is only visible, if a full supported laser is defined in the actual Hardware Configuration.
It displays the current state of the laser.
- The '[Axes Controller](#)' tab is only visible, if at least one axis controller is defined in the actual Hardware Configuration.
It displays all possible information of an axis controller.

To query information proceed as follows:

1. Select 'System Information ▶ Scan System' from the '[Hardware](#)' menu.
The 'Information' dialog box appears.
or
Select 'System Information ▶ Runtime Information' from the '[Hardware](#)' menu.
The 'Runtime Information' dialog box appears.
2. Select the tab with the desired information.

Scan System Information

To query information about the scan system, laserDESK offers within the 'Information' dialog box the 'Scan System' tab with the following information:

| Feature | Content |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scan System | |
| Software | <ul style="list-style-type: none"> – Used DLL file (program library) – Program files (path) – Program versions – Correction file with correction factors |
| Hardware | Serial number of the RTC5 or RTC6 PC interface board Available options of the RTC PC interface board, which are indicated by an activated checkbox. |

To query information, proceed as follows:

1. Select 'System Information ▶ Scan System' from the '[Hardware](#)' menu.
The 'Information' dialog box appears.
2. Select the 'Scan System' tab to query the desired information.

Statistics Information

To query statistics information about the job, laserDESK offers within the 'Information' dialog box the 'Marking Statistics' tab with the following information:

| Feature | Content |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marking Statistics | |
| Objects | Number of used – Marking objects (arcs, circles , ellipses, ...) – Control elements – Groups – Variables |
| Vector Commands | – Number of jumps and marks – Total jump length [mm] – Total mark length [mm] – Skipped Points: the number of points correlates to the corners ignored due to the marking resolution. |
| Total Calculated Execution Time [ms] | Total calculated execution time [ms]. NOTE: Depending on (e.g.) used variables or polygon delays, the displayed value is only an approximation. Even so, this helps in forecasting as well as comparing different parameter settings. |

To query information, proceed as follows:

1. Select 'System Information ▶ Scan System' from the '[Hardware](#)' menu.
The 'Information' dialog box appears.
2. Select the 'Marking Statistics' tab to query the desired information.

intelliSCAN Information

To query information about the intelliSCAN scan head, laserDESK offers within the 'Information' dialog box the 'intelliSCAN' tab with the following information:



NOTE:

The 'intelliSCAN' tab is only available when an intelliSCAN scan head is connected.
It displays all status messages when using an intelliSCAN.

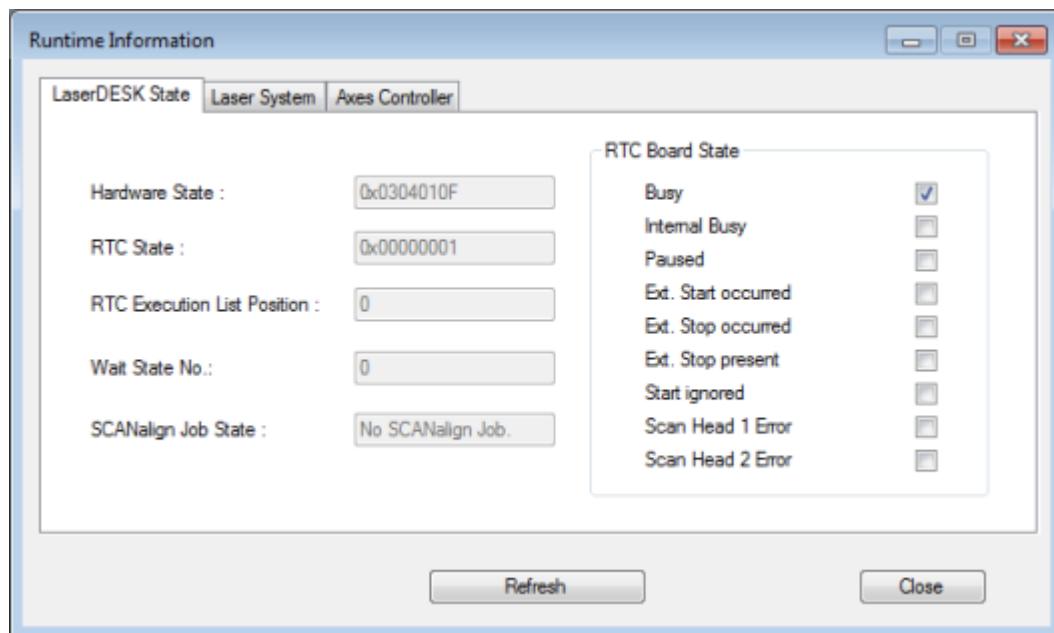
| Feature | Content |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| intelliSCAN | Shows the status messages sent from the scan head: – Head parameters – Scan head state – Power – Temperature – etc. All values are described in the 'Control Commands' chapter of the RTC5 Manual . |

To query information, proceed as follows:

1. Select 'System Information ▶ Scan System' from the '[Hardware](#)' menu.
The 'Information' dialog box appears.
2. Select the 'intelliSCAN' tab to query the desired information.

Runtime Information – laserDESK State

To query runtime information about the laserDESK state, laserDESK offers within the 'Runtime Information' dialog box the 'laserDESK State' tab with the following information:



The **Hardware State** is displayed as a hexadecimal number, each Bit represents an individual state:

| Bit | Meaning (if bit is set) |
|-------------|---------------------------------------------------------------------------------------------------------|
| 0x0000 0001 | program runs |
| 0x0000 0002 | RTC card initialized |
| 0x0000 0004 | laser system is defined correct and initialized |
| 0x0000 0008 | all external controls are initialized |
| 0x0000 000F | all hardware components are initialized (sum of Bit 0-3) |
| 0x0000 0010 | <code>get_head_status</code> returns 'Power OK' |
| 0x0000 0020 | hardware initialization running |
| 0x0000 0040 | switching automatic mode off |
| 0x0000 0080 | unused |
| 0x0000 0100 | RTCHandler worker thread is running (O-Pin 12) |
| 0x0000 0200 | list is in execution (O-Pin 14) |
| 0x0000 0400 | another part of list must be loaded yet |
| 0x0000 0800 | job list has variable parts |
| 0x0000 1000 | list execution is stopped by emergency button |
| 0x0000 2000 | external stop signal |
| 0x0000 4000 | system in automatic mode (O-Pin 13) |
| 0x0000 8000 | list calculation and execution in progress (manual mode execution) |
| 0x0001 0000 | execution error occurred (O-Pin 15) |
| 0x0002 0000 | list is calculated |
| 0x0004 0000 | set, when execution is finished, reset by start command |
| 0x0008 0000 | set, when pilot laser dialog is the active window (pilot laser mode) |
| 0x0010 0000 | auxiliary error flag, used temporarily |
| 0x0020 0000 | job has not been successfully run; abortion by user, stop signal, vision system or serial communication |
| 0x0040 0000 | unused |
| 0x0080 0000 | unused |
| 0x0100 0000 | only for laser systems using RS232: connection established |
| 0x0200 0000 | no laser error |
| 0x0400 0000 | laser is switched on |
| 0x0800 0000 | only for laser systems using RS232: unknown message (format) |
| 0x1000 0000 | laser system signals error state |

| Bit | Meaning (if bit is set) |
|-------------|-------------------------|
| 0x2000 0000 | shutter is open |
| 0x4000 0000 | unused |
| 0x8000 0000 | unused |

The **RTC State** is displayed as a hexadecimal number, each Bit represents an individual state of the RTC.

These bits are individually displayed in the RTC board state panel by checkboxes (see figure above).

| Bit | Meaning (if bit is set) |
|---------------------------------------|------------------------------------------|
| get_status information | |
| 0x0000 0001 | RTC busy |
| 0x0000 0002 | RTC internal busy |
| 0x0000 0004 | RTC paused |
| get_startstop_info information | |
| 0x0000 0008 | external start has occurred |
| 0x0000 0010 | external stop has occurred |
| 0x0000 0020 | external stop signal is present |
| get_marking_info information | |
| 0x0000 0040 | external start was ignored |
| 0x0000 0080 | unused |
| 0x0000 0100 | scan head 1 error (temperature or power) |
| 0x0000 0200 | scan head 2 error (temperature or power) |

The **RTC Execution List Position** displays the actual absolute position in memory of the RTC execution pointer.

The **Wait State No.** displays the ID of the wait state, when the RTC list is paused.

The **SCANalign Job State** shows the actual state of the (last) executed *SCANalign* job.

To query runtime information, proceed as follows:

1. Select 'System Information ▶ Runtime Information' from the '[Hardware](#)' menu.
The 'Runtime Information' dialog box appears.
2. Select the 'LaserDESK State' tab to query the desired information.
3. Press the 'Refresh' button to actualize the current state.
4. Press the 'Close' button to close the dialog box.

Runtime Information – Laser System

To query information about the laser system, laserDESK offers within the 'Runtime Information' dialog box the 'Laser System' tab with the following information:



NOTE:

The 'Laser System' tab is only visible, if a full supported laser system is defined in the Hardware Configuration.

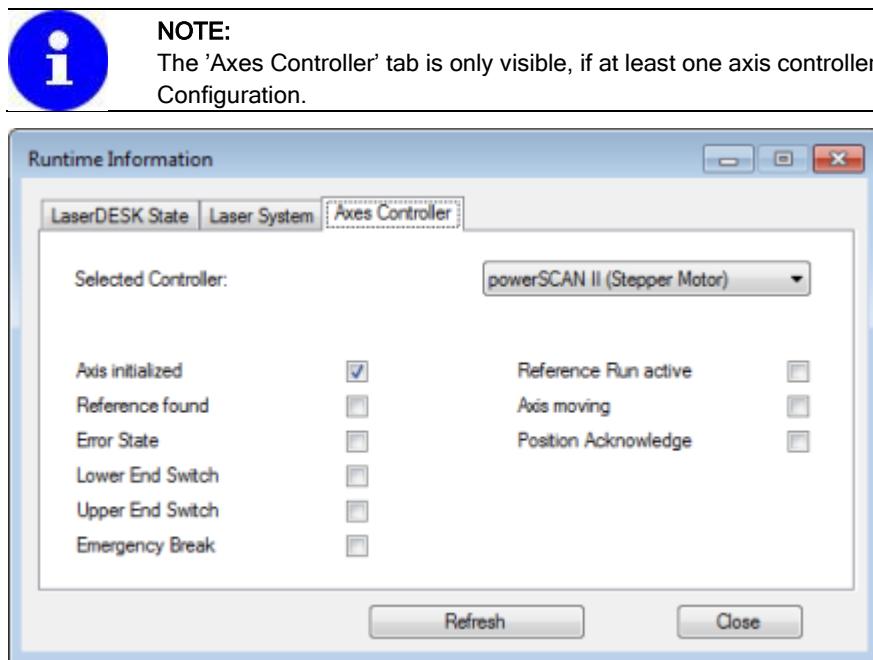
| Feature | Content |
|----------------------|---------------------------------------------------------------------------------------------|
| Defined Laser System | The text box shows the laser system (name) defined in the Hardware Configuration. |
| Current State | The text box shows the current state of the laser system, e.g. "Laser off", "Laser on", ... |

To query runtime information, proceed as follows:

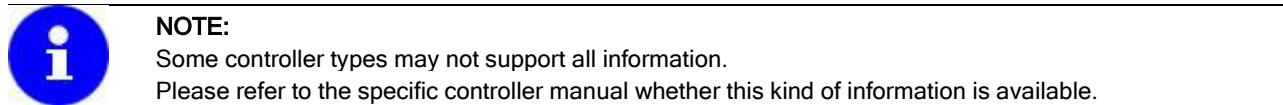
1. Select 'System Information ▶ Runtime Information' from the '[Hardware](#)' menu.
The 'Runtime Information' dialog box appears.
2. Select the 'Laser System' tab to query the desired information.
3. Press the 'Refresh' button to actualize the current state.
4. Press the 'Close' button to close the dialog box.

Runtime Information – Axes Controller

To query information about the axes controller, laserDESK offers within the 'Runtime Information' dialog box the 'Axes Controller' tab with the following information:



The 'Axes Controller' tab displays all possible information of an axis controller.



To query runtime information, proceed as follows:

1. Select 'System Information ▶ Runtime Information' from the '[Hardware](#)' menu.
The 'Runtime Information' dialog box appears.
2. Select the 'Axes Controller' tab.
3. (If there is more than one) select the desired controller in the corresponding selection field to query the desired information.
4. Press the 'Refresh' button to actualize the current state.
5. Press the 'Close' button to close the dialog box.

21.13 Releasing/Regaining the RTC Connection

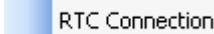
To allow other programs to access the RTC5 or RTC6 interface board (e.g. when installing the *SCANalign* software), it might be necessary to disconnect laserDESK from the RTC interface board. To avoid closing the laserDESK program, the RTC connection can be released (and regained). The RTC connection can be released in two ways: via the 'Hardware' menu or via the status bar.

Releasing/Regaining the RTC Connection via the 'Hardware' Menu

To release the RTC connection, proceed as follows:

1. Select (the active) 'RTC Connection' in the '[Hardware](#)' menu.

The menu item 'RTC Connection' changes to the inactive state:

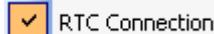


The connection is released.

To regain the RTC connection, proceed as follows:

1. Select (the inactive) 'RTC Connection' in the '[Hardware](#)' menu.

The menu item 'RTC Connection' changes to the active state:



The connection is regained.

Releasing/Regaining the RTC Connection via the Status Bar

To release the RTC connection, proceed as follows:

1. Click on the (green) {Hardware RTC } button in the Status Bar.
"Release RTC Connection" will be indicated.

2. Click on "Release RTC Connection".

The {Hardware RTC } button changes to red:



The connection is released.

To regain the RTC connection, proceed as follows:

1. Click on the (red) {Hardware RTC } button in the Status Bar.
"Regain RTC Connection" will be indicated.

2. Click on "Regain RTC Connection".

The {Hardware RTC } button changes to green:



The connection is regained.

21.14 Initializing the Remote Control

When using the remote control, laserDESK 'serves' the client's queries and executes the desired actions. Thus the PC running laserDESK is the server and the customer program is the client.

If the customer's client program hangs or the connection shuts down, 'Initialize Remote Control' lets you reset the server connection point to make the remote control interface available again.



NOTE:

An active connection will be interrupted by this command!

To initialize the remote control, proceed as follows:

1. Select 'Initialize Remote Control' in the '[Hardware](#)' menu.
The remote control connection will be initialized again.

21.15 Reference Run for all defined Axes

laserDESK lets you execute a reference run of all defined axes with one click.

To do so, the following conditions must be met:

- The 'Automatic Reference Run' of the axes must be activated (tick in the respective checkbox) in the Hardware Configuration (see Setting 'Hardware Devices' Parameters\[Motor Control Axes](#))
- The 'Reference Run Mode' of the axes predefined in the Hardware Configuration (see 'Motor Control Axes') will be used for these reference movements.

To execute a reference run for all defined axes, you can start it with one click via the menu item 'Hardware\Reference Run for Axis' or via the {Reference Run} button in the status bar.



NOTE:

When starting the reference run for all defined axes, the 'Motor Control' dialog box will be opened automatically.

The dialog box serves only to observe the progress of the reference run or eventually to use the {Motor Stop} button for an emergency stop.

To execute a reference run for all defined axes, proceed as follows:

1. Select 'Reference Run for Axis' in the 'Hardware' menu
or
Click the {Reference Run} button in the status bar.
The reference run will start immediately and the 'Motor Control' dialog box appears.
The controller state will be indicated in the corresponding output field of the dialog box.

22 Using the Pilot Laser for Alignment

If your laser scan system is equipped with a pilot laser, this can be used as an easy to handle tool for aligning the job's marking objects to the marking surface (or just for marking simulation). Pilot laser marking will be started continuously. Simultaneously the job's marking objects can be moved via buttons or keys until the objects are aligned correctly to the marking surface. After the pilot laser marking has been stopped, the transformation values can be applied to the job.

Pilot laser alignment can only be executed in the [Pilot Laser Profile](#). In this profile, no job or hardware settings can be changed. The RTC5 or RTC6 PC interface board will be initialized for the pilot laser and the processing laser will be switched off.

A pilot laser alignment can only be performed under the following conditions:

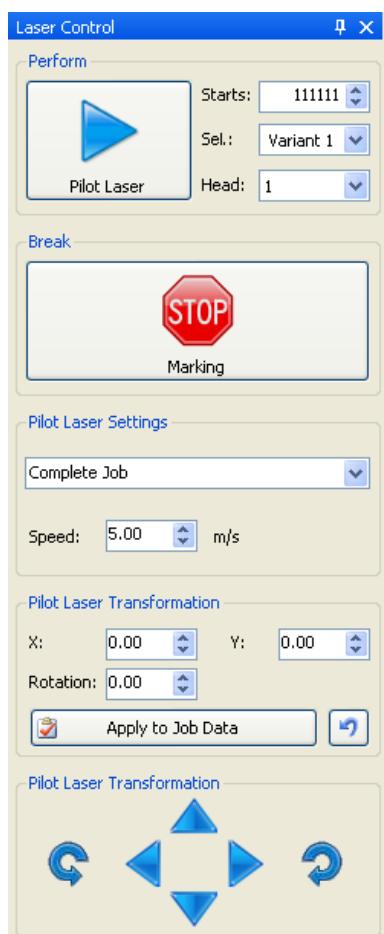
- The job must comprise a marking object.
- The manual mode must be set, i.e. the automatic mode is switched off. (If the automatic mode is switched on, see [Laser Control Window / GUI Profiles](#), the pilot laser profile can't be selected.)
- The remote control will be blocked.
- All control elements (nodes) will be skipped, except protocol nodes, timer nodes and z-focus control.
- The execution is carried out with the job's jump delay.

NOTE:

The pilot laser feature executes only two-dimensional processing in a plane but does not support 3D processing.

Only the z focus control nodes are applied to adjust the focus plane.

When selecting the pilot laser profile, the corresponding 'Laser Control' window appears, which provides the controls for pilot laser alignment:



| Controls | Description |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Perform | |
| {Pilot Laser} | <p>Lets you start the pilot laser for marking.</p> <p>NOTE: If a specified laser is selected (see 'Laser Type' parameter in Setting 'Processing Laser' Parameters) and this laser is switched off, the {Pilot Laser} button is deactivated.</p> |
| Starts: | <p>Lets you define the number of markings. We recommend a high value (> 10,000) to ensure that the adjustment procedure is finished before the pilot laser stops execution. Enter the required value into the input field or use the arrow buttons.</p> |
| Sel.: | <p>Lets you select a variant to be executed within the job, if the job comprises two or more variants. A variant will be selected by the name displayed in the Job Explorer.</p> <ul style="list-style-type: none"> - If two or more variants are created, the selection field's drop-down list shows all variants. The selected variant and all other marking objects, which are not included in a variant, will be executed. - If only one variant has been created, its name will be displayed. - If no variant has been created, the selection field shows "All". All marking objects will be executed. <p>Click the  button to select the required variant or marking object.</p> <p>NOTE: The 'Variant Bit Mask' parameter in the job's graphics parameters and the 'Bit Pattern' parameter in the variants' graphics parameters must be set. Otherwise variants can't be executed.</p> |
| Head: | <p>Lets you select the scan head(s) for executing the job, if scan head [2] has been activated in the Hardware Configuration (see Setting 'Scan Head' Parameters). In this case scan head [1], scan head [2] or scan heads [1]+[2] can be selected. If scan head [2] hasn't been activated, "1" for scan head [1] will be displayed, but the selection field is deactivated.</p> <p>Click the  button to select "1", "2" or "1+2".</p> |
| Break | |
| {STOP Marking} | <p>When you've finished the alignment procedure, this button lets you stop the pilot laser marking. Or you can click the button as an emergency stop.</p> |
| Pilot Laser Settings | |
| Selection Field | <p>Lets you define the scope of execution:</p> <ul style="list-style-type: none"> - Complete Job: all objects inclusive filling will be executed; this setting can cause a long marking time for one execution. - Outlines Only: only the objects' outlines will be executed; this setting is recommended for the most applications. - Job Bounding Box: only the job's bounding box (and not the single objects) will be executed; this setting is helpful if the job includes a huge number of marking objects, but it can lead to restrictions regarding accuracy. <p>Click the  button to select 'Complete Job', 'Outlines Only' or 'Job Bounding Box'.</p> |
| Speed ... m/s | <p>Lets you define the execution speed (in [m/s]). Enter the required value or click the arrow buttons (up/down).</p> |
| Pilot Laser Transformation | |
| X: | <p>Lets you define the transformation values (depending on the increment settings, see 'Move - Rotate' in the Edit' Parameters).</p> |
| Y: | <p>Click the arrow buttons (up/down) - the marking objects will be moved in x or y dimension or rotated simultaneously. Or enter a desired value and press <Enter>.</p> |
| Rotation: | <p>The rotation axis is always the origin of the work area's coordinate system (z axis).</p> |
| {Apply To Job Data} | <p>Applies the transformation values to the job data (see parameters 'Mark Rotation' and 'Mark Translation' in the Graphics Parameters – Job). Only then, the transformation values will be applied to subsequent marking with the processing laser. The transformation values will be applied for the complete job and thus for all variants, regardless of which variant has been used for transformation.</p> <p>NOTE: The transformation values will be applied only, if you click this button before leaving the pilot laser profile. Changing to another profile (design, test, ...) before, the values will get lost.</p> |

| Controls | Description |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The {Undo} button lets you reset the transformation as long as this is temporary. I.e.: – Any transformation which isn't applied to the job data (see above) can be reset. – The transformation applied to the job data at last can be reset. – The transformation applied to the job data penultimate can't be reset. NOTE: After changing to another profile (design, test, production), the transformation can't be reset by this function. |
| Pilot Laser Transformation |  Lets you define the transformation values (depending on the increment settings, see 'Move - Rotate' in the 'Edit' Parameters). Click the buttons (left-turning/right-turning or up/down/left/right) – the marking objects will be moved or rotated simultaneously. The rotation axis is always the origin of the work area's coordinate system (z axis). |

NOTE:

Even though the pilot laser profile's laser control window comprises controls for alignment, the alignment will be operated normally via keyboard. While monitoring the pilot laser's beam at the marking surface, you can align the job (marking objects) easier by pressing the following keys (to use the keys, the graphic view must be the active):

- arrow keys (<↔> <↔> <↑> <↓>) for x/y directions,
- plus and minus key (<+> <->) for rotation.

Pressing the <Shift> key simultaneously, the increment increases by a factor of ten.

NOTE:

Before starting the pilot laser transformation,

- the 'Pilot Laser' parameters must be set in 'Hardware Configuration' (see [Setting 'Pilot Laser' Parameters](#)),
 - the increment settings must be set in the GUI Settings (see 'Move - Rotate' in the ['Edit' Parameters](#)).
-

To transform a laser job, proceed as follows:

1. Ensure, that the automatic mode is switched off.
If opened, the output window shows "Manual Mode".
2. Select 'Pilot Laser Profile'
- from the ['View'](#) menu
- or in the ['File'](#) toolbar.
The corresponding [Laser Control Window](#) appears.
The marking objects' marking vectors are displayed automatically in the work area.
3. Enter the required number of executions into the 'Starts' input field.
4. If the job comprises two or more variants, select the variant to be executed in the 'Sel.' selection field.
5. If a second scan head has been activated, select the required scan head(s) in the 'Head' selection field.
6. Define the scope of execution: select 'Complete Job', 'Outlines Only' or 'Job Bounding Box'.
7. Define the execution speed (in [m/s]).
8. Click the {Manual Marking} button.
The marking procedure starts.

During marking, the button shows a stylized laser beam:



If opened, the output window shows "Laser marking started" and "Repetitions: 1 ...".
The pilot laser marking can be observed at the laser scan system's processing area.

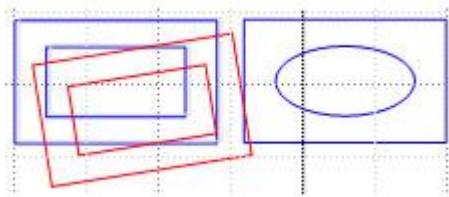
9. To use the keyboard's keys, place the cursor in the work area and click the mouse button.
10. While monitoring the pilot laser marking at the laser scan system's processing area, press the plus, minus and arrow keys to rotate or move the job (objects or bounding box) and thus to adjust it to the marking surface.



NOTE:

If you can't adjust the job exactly, because the increment values are too rough, stop the marking. Modify the increment values in the GUI settings (see 'Move - Rotate' in the ['Edit' Parameters](#)) and start the pilot laser transformation again.

11. When the job is adjusted exactly to the marking surface, click the {STOP Marking} button to stop the pilot laser marking.
On the screen, the transformation is indicated by the marking vectors of the job or the selected variant. The example below shows two variants. Only the (red) marking vectors of the selected variant (2 rectangles) will be shown.



12. Click the {Apply To Job Data} button.
When executing the marking subsequently with the processing laser, these values will be applied.
13. In some cases, e.g. when using a positioning device, it may be advantageous to save the transformation values together with the job permanently.
To do so, save the job after the pilot laser alignment. Otherwise the transformation values will get lost.

23 Executing Laser Jobs

Two modes are available for executing jobs:

- In **manual mode**, you start a job via laserDESK's user interface. This is useful for test purposes during your application's development phase, for example when you want to iteratively determine optimal marking parameters. In manual mode, you can select a specific variant or objects for individual execution.
- In **automatic mode**, the job is started and controlled exclusively by external input signals. The RTC5 or RTC6 start input is the only input line to start a marking, avoiding a delay by the *Windows* cycle time. The automatic mode supports laserDESK's variant concept (see [How to Use Variants](#)) for fast switching between different marking processes. The input lines of the RTC's 'Extension1' connector are used to select variants. Thus the automatic mode is for using the job in actual production.

NOTE:



If variants are defined, an input signal pattern must match a defined bit pattern of one variant when the start signal is sent. Only then this variant is executed. The input signals are the digital input lines 0-7 of the 'Extension 1' connector of the RTC PC interface board:
– pin 3 of the 'Laser' connector is the automatic mode start input,
– pin 11 of the 'Laser' connector is emergency stop input.

(also see [Connecting the Laser to the RTC5 or RTC6 PC Interface Board](#) and chapter 'Laser Connector' in the [RTC5 Manual](#)).

Starting a job manually or switching it to automatic mode is only possible in the [Laser Control Window](#).

A job can only be started under the following conditions:

- The supplied dongle must be inserted into any USB port of the PC.
- The job must be opened in laserDESK.
- The PC must contain an SCANLAB RTC5 or RTC6 PC interface board.
- Some functions (e.g. Processing-On-the-Fly and 3D operation) require activation on the RTC board.
- If motors for moving or rotating parts are used in the job, a reference run must be executed before manually (see [Testing the Motor Controllers](#)).

NOTE:



For all intelliSCAN systems an automatic power control and monitoring is applied.

During job execution it is checked, whether an intelliSCAN or varioSCAN_{de} i system is connected and the power state is checked.

If a power failure is detected, the job execution will be aborted and an error is signaled.

This feature is applied even if no power state checking is activated in the Hardware Configuration.

23.1 Manual Mode

To start a job manually, proceed as follows:

1. Ensure, that the automatic mode is switched off.
If opened, the output window shows "Manual Mode."

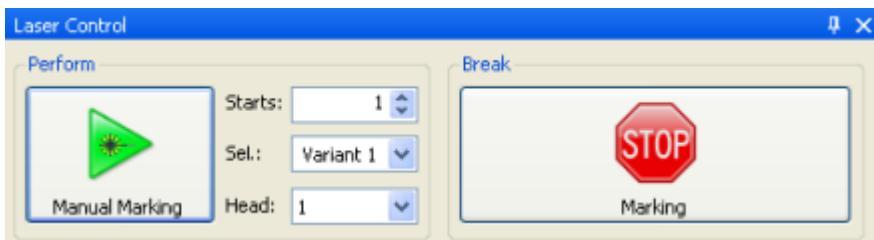


NOTE:

Using a **fully supported laser**, you need to have switched on the laser.
If not, select the 'Production Profile' and switch on the laser (see steps 1 and 2 in the next section "To switch to automatic mode ..." below).

2. Select 'Test Profile'
– from the [View](#) menu
– or in the [File](#) toolbar.

The corresponding [Laser Control Window](#) appears.



3. Enter the required number of executions into the 'Starts' input field or use the arrow buttons.
4. Select the desired variant or marking object to be executed within the job in the 'Sel.' selection field:
– Select a desired "VariantName" for the variant to be executed. All other marking objects, which are not included in a variant, will also be executed.
or
– Select "Selection" and subsequently select one or more desired marking objects in the Job Explorer or work area (see [Selecting Marking Objects for Editing](#)). Additional, the protocol nodes can be selected. Only the marking object(s) and no variant will be executed.
or (but only if no variant has been created)
– Select "All". All marking objects will be executed.
5. If the second scan head is activated (and thus the 'Head' selection field is available), select scan head(s) "1", "2" or "1+2".
6. Click the {Manual Marking} button.
The marking procedure starts.
During marking, the button shows a stylized laser beam:



If opened, the output window shows "Laser marking started" and "Repetitions: 1 ...".

If parameters must be adapted to the current used hardware, the output window shows a message like "The frequency is out of range and has been adapted".

If significant deviations occur, the job will be canceled - a respective message will be shown in the output window.

If the expected execution time will last for longer than 10 seconds, the status bar displays a progress bar.

When marking has finished, the output window will show "Laser marking finished" and the status bar displays the actual marking time (in [s]).

7. To execute an emergency stop, click the {STOP Marking} button.

23.2 Automatic Mode

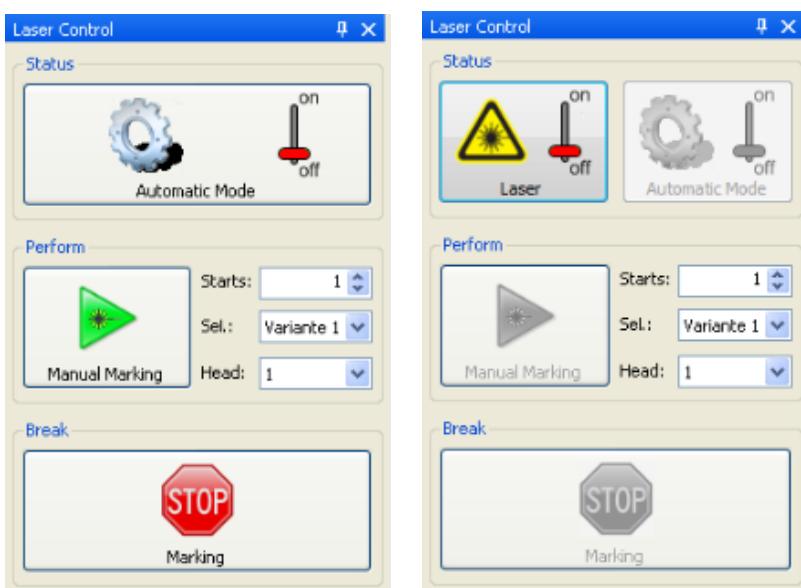
To switch to automatic mode, proceed as follows:

1. Select 'Production Profile'

- from the '[View](#)' menu
- or in the '[File](#)' toolbar.

The corresponding [Laser Control Window](#) for 'Production Profile' appears.

(left: General Type laser; right: fully supported laser)

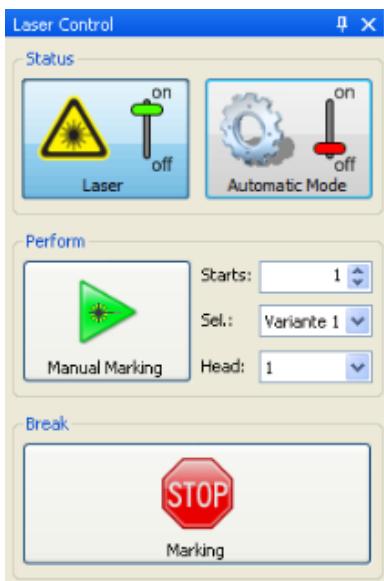


Using a General Type laser, continue with step 3.

2. Using a fully supported laser, click the {Laser} button.

If the laser system is switched on successfully, the output window shows "Laser on".

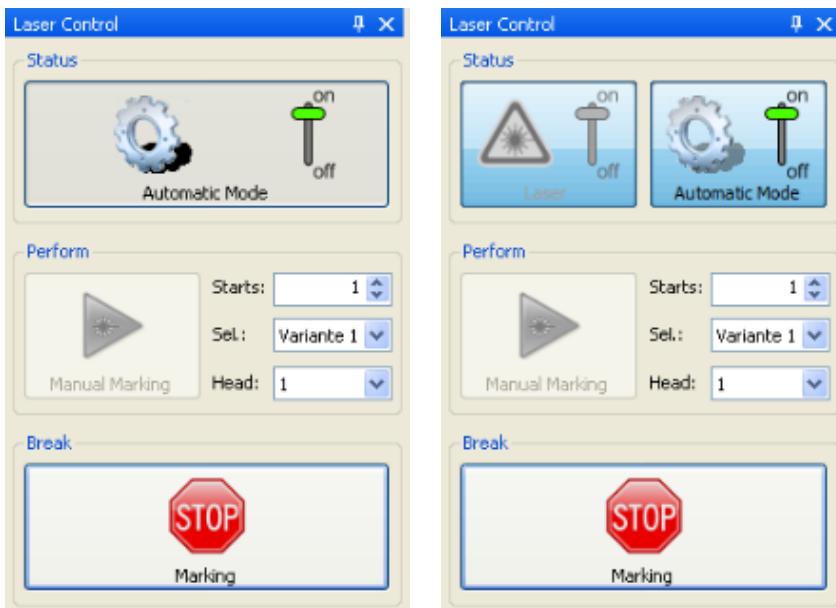
The button changes from 'off'/red to 'on'/green, the other buttons ({Automatic Mode}, {Manual Marking}, {STOP Marking}) will be activated.



Now, the laser system error checking is activated. If an error occurs, the laser is switched off again and an error message is displayed in the output window.

3. Click the {Automatic Mode} button.

The button changes from 'off'/red to 'on'/green, the {Manual Marking} button and the selection fields in the 'Perform' field get disabled.



If opened, the output window shows "Automatic Mode".

Most program functions get deactivated, except such functions as viewing or changing the view.

Now, jobs can only be started and controlled exclusively via external input signals.



NOTE:

If the executed job has no variable data and needs no list reloading and no part count checking, there is the possibility to realize very short dead times between execution starts.

Please refer to 'Miscellaneous\Automatic Mode' in the Hardware Configuration.



NOTE:

The parameter 'Scan Head Monitoring' in the Hardware Configuration lets you enable scan head monitoring, separate for temperature and power. Activating the monitoring function, laserDESK will evaluate these errors, stop the job execution and switch off the automatic mode. But take care - not every hardware supports these functions. Please refer to '[Scan Head](#)' parameters.

23.3 Signal Lines

At the RTC5 or RTC6 PC interface board's Extension 1 connector different signals (in particular status signals) can be provided during job execution:

| RTC5/6 Extension 1 Connector | | | Signal Status | | |
|------------------------------|---------------|-----------------------------------------------|---------------|-------------|--------------|
| Name | Pin No. | General Use | Job completed | Job aborted | System Error |
| Digital In 0-7 | 2, 4, ..., 16 | Variant selection bit 0 ... bit 7 | | | |
| Digital In 8 | 18 | Reserved | | | |
| Digital In 9 | 20 | Reserved | | | |
| Digital In 10 | 22 | Reserved | | | |
| Digital In 11 | 24 | Reserved | | | |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | | | |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | | | |
| Digital In 14 | 30 | Reserved | | | |
| Digital In 15 | 32 | SSEI camera 'GO' – next position | | | |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | | | |
| Digital Out 8 ³⁾ | 17 | System status: Job execution not aborted | High | Low | (-) |
| Digital Out 9 | 19 | SSEI camera trigger | | | |
| Digital Out 10 | 21 | Pilot laser (1 = on) | | | |
| Digital Out 11 | 23 | Shutter switch (1 = open) | | | |
| Digital Out 12 | 25 | System status: Ready | High | High | (-) |
| Digital Out 13 | 27 | System status: Automatic mode | High | High | Low |
| Digital Out 14 | 29 | System status: Job in execution | Low | Low | Low |
| Digital Out 15 | 31 | System status: Error | Low | Low | High |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

³⁾ This signal should only be checked after a job execution.

(-) Please, ignore these signals in case of a system error.

At **Digital Out 8 on pin 17** the status signal 'Job execution not aborted' is given.

This signal is reset when a job is started and set again when the job has successfully finished.

It will not be set when the job finishes under following conditions:

- The job is aborted by an external stop signal
- The user presses the STOP button of laserDESK
- The job is aborted by a vision job which has not run successful (no result)
- The job is aborted by a cancel condition of a serial communication



NOTE:

This signal is only valid if the system is fully operational but an event has aborted the job. You can immediately restart the job. The automatic mode will not be switched off if it is active.

The signal will be set if a running job is aborted because a system or hardware error occurred. In that case the error output is set and this signal should be ignored.

This state is also available in the remote mode status. There the status flag RM_STATE_JOB_ABORTED = 0x00800000 is defined and returned by the status query (command #4). This flag should only be evaluated when the job has finished (RM_STATE_EXEC_DONE is set). This is the inverted status of the output line.

24 Upgrading the laserDESK Software

Upgrading laserDESK can be necessary in the following cases:

- You want to use laserDESK program features which are not yet activated on the appropriate dongle (see [Editions / Functional Range](#)).
The dongle must be upgraded.
- SCANLAB releases a new laserDESK program version (update – indicated by an increase of the third digit of the version number: "Version Nr. n.n.n"). An update doesn't require a dongle upgrade.
If you want to use such a laserDESK software release, this merely needs to be installed.
- SCANLAB offers a new laserDESK program version with new options (upgrade – indicated by an increase of the first or second digit of the version number: "Version Nr. n.n.n"). A software upgrade requires a dongle upgrade too.
If you want to use the new laserDESK software, this must be installed and the dongle must be upgraded.

24.1 Upgrading the Dongle

Upgrading the appropriate dongle is very easy via the 'Licensing' dialog box. The {Store Upgrade Request File} button lets you create a license upgrade request file (xml-file) with all important data of your software edition (application data, dongle data, options). Together with your update query, you need to send this file to SCANLAB. Then you will get a license upgrade file in return. The {Load Upgrade License File} button in the 'Licensing' dialog box serves to execute the upgrade using the returned file. Then the appropriate dongle will be actualized to enable the laserDESK software to use the new features.

NOTE:

An upgrade is specific to one dongle only. The creation of the license upgrade request file and the upgrade execution must be performed with the same dongle.

The upgrade can only be performed by users with laserDESK "Administrator" access authorization.

Creating the Upgrade Request File

To create the request file, proceed as follows:

1. Insert the dongle in any USB connector of your PC.has been installed,
2. Start laserDESK (see [Starting laserDESK](#)).
3. Select 'Licensing...' in the '[Help](#)' menu.
The 'Licensing' dialog box appears.
4. Click the {Store Upgrade Request File} button.
The (*Windows* -standard) 'Save As...' dialog box appears.
5. Define the file name ([Name].xml) and path.
6. Click on {Save}.
The file will be created immediately.
A success message with the file path appears.
7. Send the license upgrade request file to SCANLAB.

Upgrading the Dongle

To upgrade the dongle, proceed as follows:

1. Insert the dongle in any USB connector of your PC.
2. Start laserDESK (see [Starting laserDESK](#)).
3. Copy the upgrade license file you got from SCANLAB into any directory of your PC or network.
4. Select 'Licensing...' in the '[Help](#)' menu.
The 'Licensing' dialog box appears.
5. Click the '{Load Upgrade License File}' button.
The (*Windows*-standard) 'Open' dialog box appears.
6. Select the upgrade license file and confirm with '{Open}'.
The dongle will be written immediately.
A success message with the request to restart the application appears.
7. Click the '{Yes}' button to restart laserDESK.
After restart, laserDESK gives access to the unlocked options.

24.2 Installing the new laserDESK Software

The new laserDESK software (update or upgrade) can be downloaded and installed from the laserDESK website (see [www.laserdesk.info](#)).

NOTE:

 If your current laserDESK version is **0.n.n** (Beta release), you must uninstall it before downloading and installing the new laserDESK software.
If your current laserDESK version is **1.n.n** or higher, during installation the query "Delete old version?" appears.
Accept the query to get the old version uninstalled.

If you've installed a software upgrade, the appropriate dongle too must be upgraded, to let you use the new laserDESK program version (see Upgrading the laserDESK Software).

25 Connecting the Laser to the RTC5 or RTC6 PC Interface Board

For proper function, the used laser must be connected correctly to the RTC5 or RTC6 PC interface board. The RTC5 or RTC6 board offers three different ports (connectors):

- Laser Connector – 2 inputs, 2 outputs, 2 analog outputs
- Extension 1 Connector – 16 inputs, 16 outputs
- Extension 2 Connector – 0 inputs, 8+1 outputs

(Descriptions of the connectors, also see chapter 'Layout and Interfaces' in the [RTC5 Manual](#); this description also applies to the RTC6 board)

Definition of the Connections

| RTC5/6 Laser Connector | | |
|------------------------|-----------|----------------------------|
| Name | Pin No. | General Use |
| Digital In 1 | 13 | Reserved |
| Digital In 2 | 6 | Reserved |
| Digital Out 1 | 12 | Switch laser on/off |
| Digital Out 2 | 5 | Reserved |
| Analog Out 1 | 8 | Laser power |
| <i>Analog Out 2</i> | <i>15</i> | <i>Defined by user</i> |
| LaserOn | 2 | Laser process control |
| Laser1 | 1 | Laser process control |
| Laser2 | 9 | Laser process control |
| /Start | 3 | Automatic mode start input |
| /Stop | 11 | Stop input |

| RTC5/6 Extension 1 Connector | | |
|------------------------------|----------------------|-----------------------------------------------|
| Name | Pin No. | General Use |
| <i>Digital In 0-7</i> | <i>2, 4, ..., 16</i> | <i>Variant selection bit 0 ... bit 7</i> |
| Digital In 8 | 18 | Reserved |
| Digital In 9 | 20 | Reserved |
| Digital In 10 | 22 | Reserved |
| Digital In 11 | 24 | Reserved |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} |
| Digital In 14 | 30 | Reserved |
| Digital In 15 | 32 | SSEI camera 'GO' – next position |
| <i>Digital Out 0-7</i> | <i>1, 3, ..., 15</i> | <i>Defined by user</i> |
| Digital Out 8 | 17 | System status: Job execution not aborted |
| Digital Out 9 | 19 | SSEI camera trigger |
| Digital Out 10 | 21 | Pilot laser (1 = on) |
| Digital Out 11 | 23 | Shutter switch (1 = open) |
| Digital Out 12 | 25 | System status: Ready |
| Digital Out 13 | 27 | System status: Automatic mode |
| Digital Out 14 | 29 | System status: Job in execution |
| Digital Out 15 | 31 | System status: Error |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

RTC5/6 Extension 2 Connector

| Name | Pin No. | General Use |
|-------|---------|-------------------|
| Data0 | 1 | Laser power bit 0 |
| Data1 | 3 | Laser power bit 1 |
| Data2 | 5 | Laser power bit 2 |
| Data3 | 7 | Laser power bit 3 |
| Data4 | 9 | Laser power bit 4 |
| Data5 | 11 | Laser power bit 5 |
| Data6 | 13 | Laser power bit 6 |
| Data7 | 15 | Laser power bit 7 |
| Latch | 17 | Power latch-bit |

In principle, all ports can be activated from laserDESK. Because some connections are pre-defined for special use, only certain connections are available by the user. Only the connections in *italic* (see tables below), can be selected in the control nodes (see [Control Elements](#)). Generally, all laser types must be connected to the RTC5 or RTC6 board's 'Laser' connector. Depending on the laser type, most lasers must be connected additionally to the RTC5 or RTC6 board's 'Extension 1' and/or 'Extension 2' connectors.

Laser-dependent Connections

In the topics below you will find diagrams and tables with the pin assignment of the RTC5 or RTC6 board's connectors. This will also help you, when setting the control nodes in the job.

25.1 Connecting a General Type Laser

If you use a General Type laser, it must be connected to the RTC5 or RTC6 PC interface board as follows:

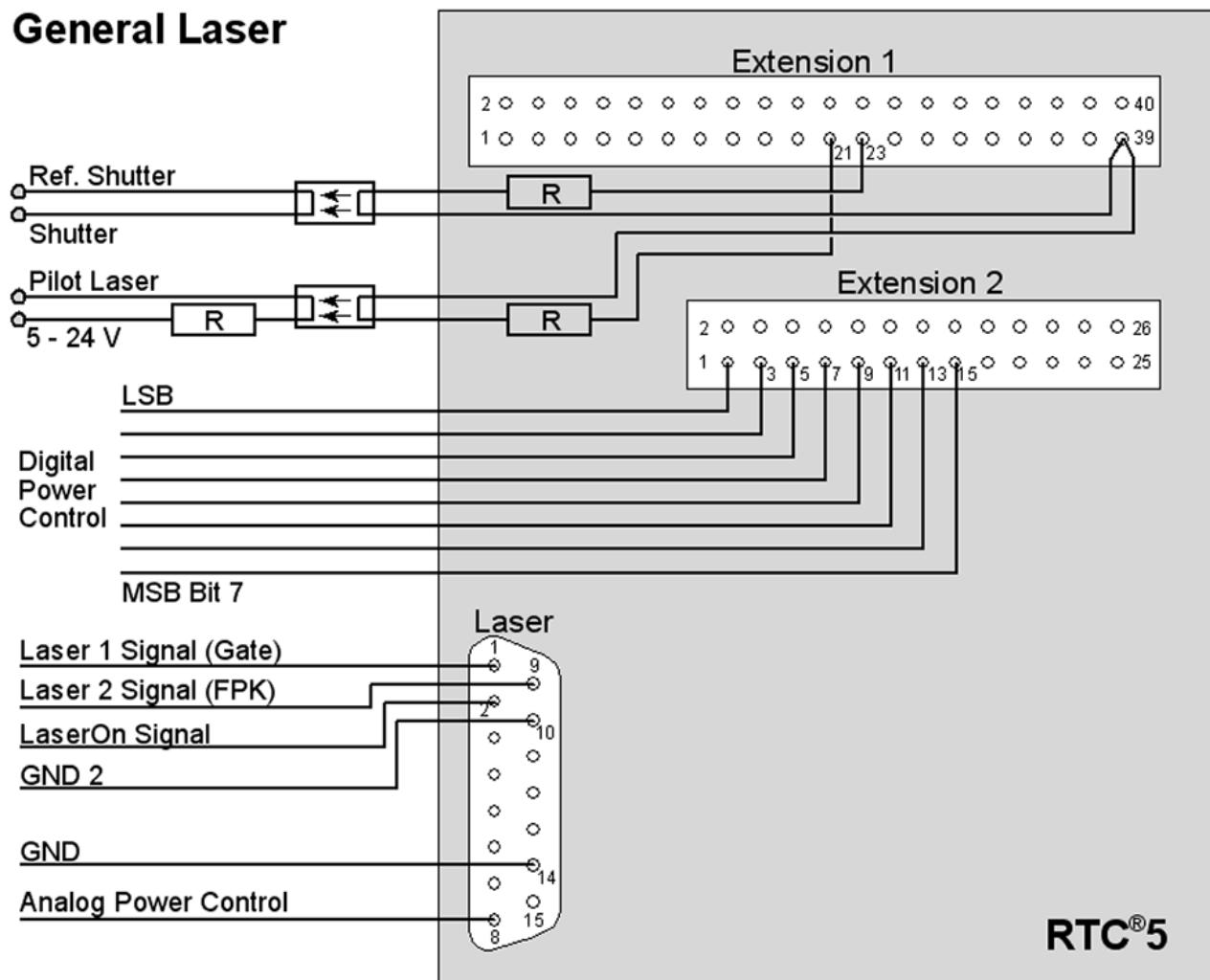
NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).

General Laser



NOTE:

Depending on the used laser type, the RTC board's jumpers JP2 – JP8 must be configured if necessary (see chapters 'Jumper Settings and Type Identification' and 'EXTENSION 2 Connector' in the [RTC5 Manual](#)).

The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | General Type Laser |
|------------------------|---------|-----------------------|---------------------------------------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | not used |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | not used |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser power | Power |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | GND |
| Laser1 | 1 | Laser process control | dependent on selected laser mode (see RTC5 Manual) |
| Laser2 | 9 | Laser process control | dependent on selected laser mode (see RTC5 Manual) |
| LaserOn | 2 | Laser process control | dependent on selected laser mode (see RTC5 Manual) |
| 5V | 7 | Output voltage (5 V) | |
| GND2 | 10 | Ground | GND |

| RTC5/6 Extension 1 Connector | | | General Type Laser |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Guide laser on (optional) |
| Digital Out 11 | 23 | Shutter triggering (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | |
| GND | 39 | Ground (PC ground) | Ref. ground for guide laser and shutter |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | General Type Laser |
|------------------------------|---------|-----------------------------|----------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | Power bit 0 |
| Data1 | 3 | Laser power bit 1 | Power bit 1 |
| Data2 | 5 | Laser power bit 2 | Power bit 2 |
| Data3 | 7 | Laser power bit 3 | Power bit 3 |
| Data4 | 9 | Laser power bit 4 | Power bit 4 |
| Data5 | 11 | Laser power bit 5 | Power bit 5 |
| Data6 | 13 | Laser power bit 6 | Power bit 6 |
| Data7 (see NOTE above) | 15 | Laser power bit 7 | Power bit 7 |
| Latch (see NOTE above) | 17 | Latch-bit for power setting | Latch-bit (optional) |
| GND | 2 | Ground (PC ground) | |

25.2 Connecting a General Plus Type Laser

If you use a General Plus Type laser, it must be connected to the RTC5 or RTC6 PC interface board as follows:

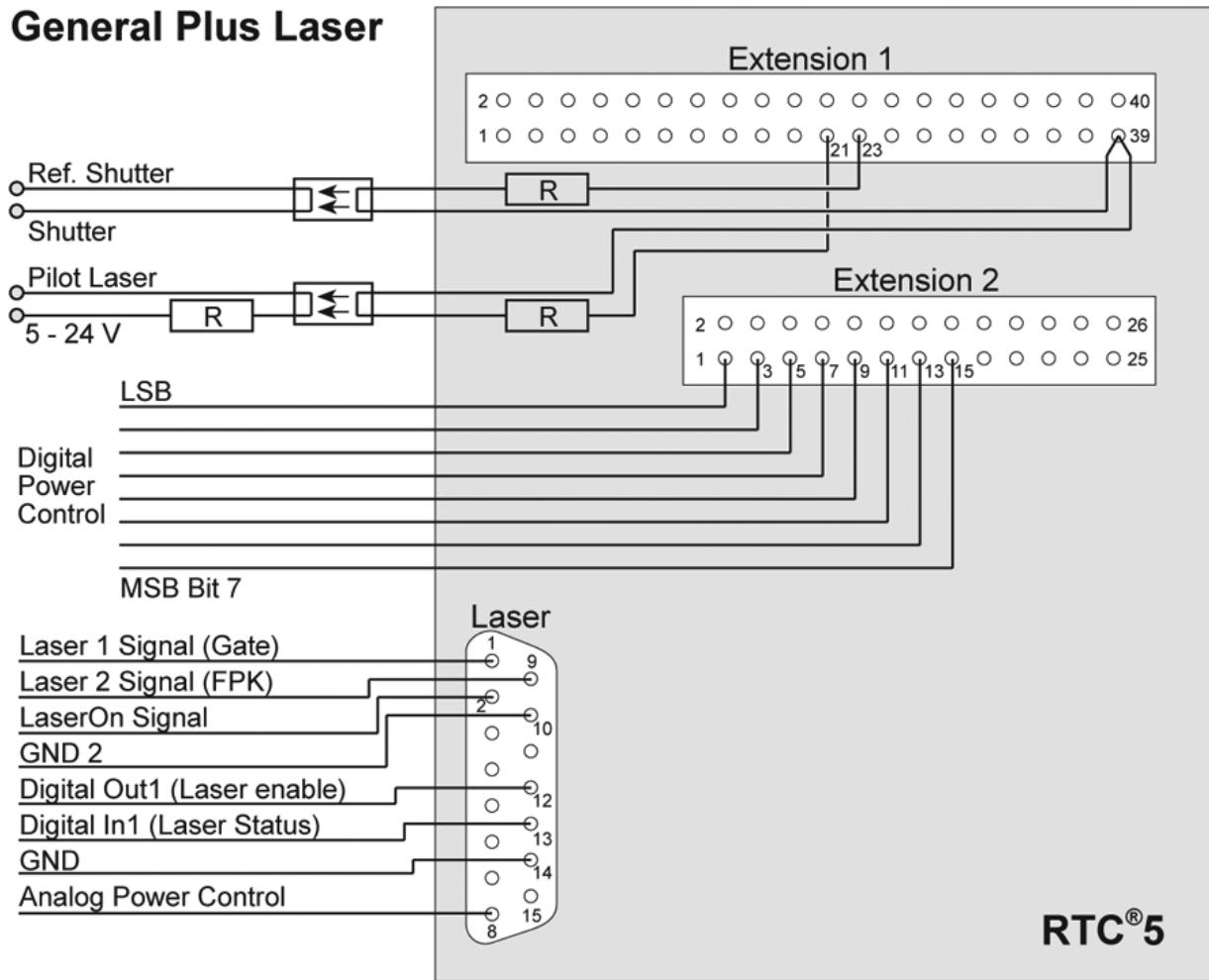
NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).

General Plus Laser



NOTE:

Depending on the used laser type, the RTC board's jumpers JP2 – JP8 must be configured if necessary (see chapters 'Jumper Settings and Type Identification' and 'EXTENSION 2 Connector' in the [RTC5 Manual](#)).

The tables below shows the pin-configuration of the RTC5 PC interface board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | |
|------------------------|---------|-----------------------|----------------------------------------------------------------------------|
| Name | Pin No. | General Use | General Plus Type Laser |
| Digital In 1 | 13 | Laser state | Laser ok = active low; error = active high |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | set/reset by 'Laser On' button; dependent on the connected laser system |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser power | Power |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | GND |
| Laser1 | 1 | Laser process control | dependent on selected laser mode (see RTC5 Manual) |
| Laser2 | 9 | Laser process control | dependent on selected laser mode (see RTC5 Manual) |
| LaserOn | 2 | Laser process control | dependent on selected laser mode (see RTC5 Manual) |
| 5V | 7 | Output voltage (5 V) | |
| GND2 | 10 | Ground | GND |

| RTC5/6 Extension 1 Connector | | | |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | General Type Laser |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Guide laser on (optional) |
| Digital Out 11 | 23 | Shutter triggering (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | |
| GND | 39 | Ground (PC ground) | Ref. ground for guide laser and shutter |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | |
|------------------------------|---------|-----------------------------|----------------------|
| Name | Pin No. | General Use | General Type Laser |
| Data0 | 1 | Laser power bit 0 | Power bit 0 |
| Data1 | 3 | Laser power bit 1 | Power bit 1 |
| Data2 | 5 | Laser power bit 2 | Power bit 2 |
| Data3 | 7 | Laser power bit 3 | Power bit 3 |
| Data4 | 9 | Laser power bit 4 | Power bit 4 |
| Data5 | 11 | Laser power bit 5 | Power bit 5 |
| Data6 | 13 | Laser power bit 6 | Power bit 6 |
| Data7 (see NOTE above) | 15 | Laser power bit 7 | Power bit 7 |
| Latch (see NOTE above) | 17 | Latch-bit for power setting | Latch-bit (optional) |
| GND | 2 | Ground (PC ground) | |

25.3 Connecting a General CO₂ Lasertype

If you use a general CO₂ laser type, it must be connected to the RTC5 or RTC6 PC interface board as follows:

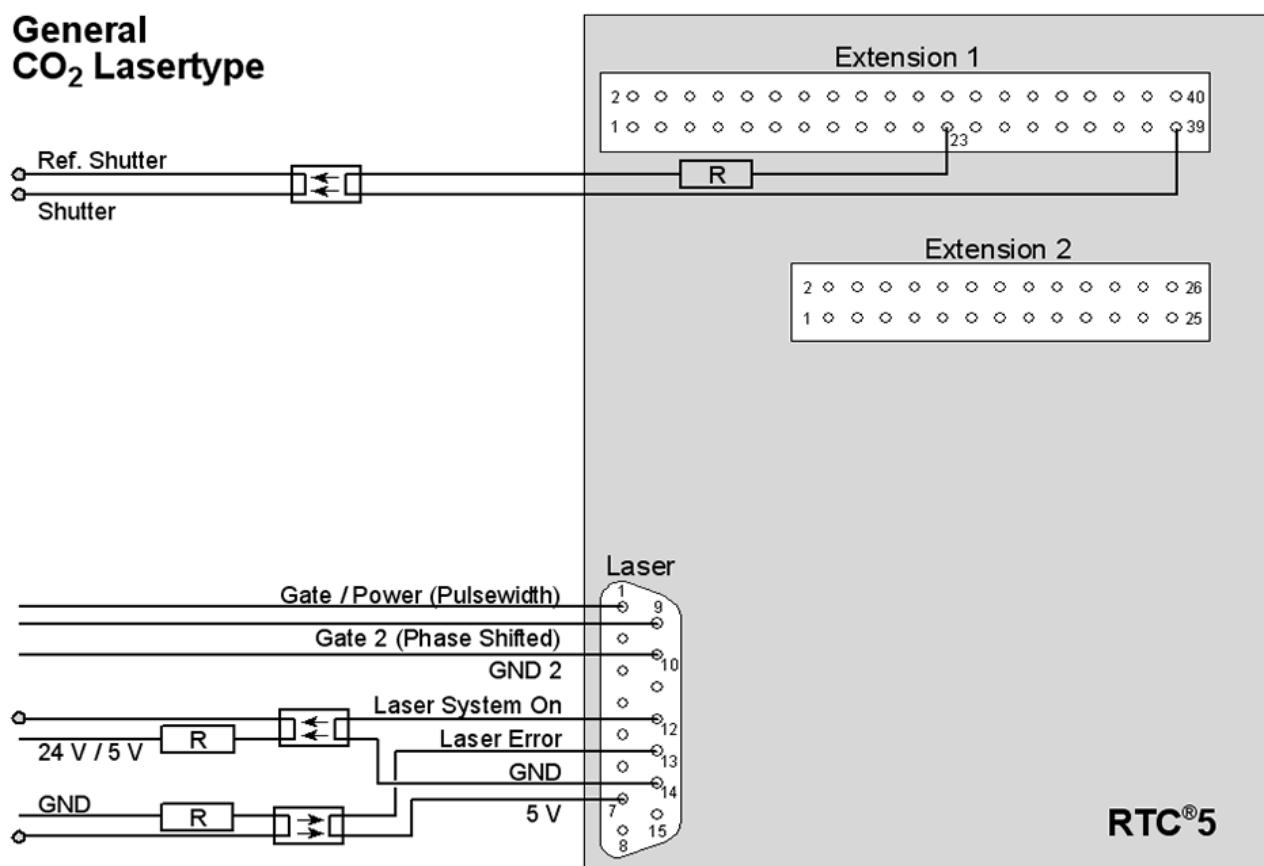
NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).

General CO₂ Lasertype



The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | CO ₂ Type Laser |
|------------------------|---------|-----------------------|----------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | Status: 1 = Error |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | 1 = Laser system on |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser power | not used |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | Ground |
| Laser1 | 1 | Laser process control | Pulse + Power |
| Laser2 | 9 | Laser process control | Pulse + Power |
| LaserOn | 2 | Laser process control | not used |
| 5V | 7 | Output voltage | 5 V |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | CO ₂ Type Laser |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Guide laser on (optional) |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | |
| GND | 39 | Ground (PC ground) | Ref. ground for guide laser and shutter |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | CO ₂ Type Laser |
|------------------------------|---------|--------------------|----------------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | not used |
| Data1 | 3 | Laser power bit 1 | not used |
| Data2 | 5 | Laser power bit 2 | not used |
| Data3 | 7 | Laser power bit 3 | not used |
| Data4 | 9 | Laser power bit 4 | not used |
| Data5 | 11 | Laser power bit 5 | not used |
| Data6 | 13 | Laser power bit 6 | not used |
| Data7 | 15 | Laser power bit 7 | not used |
| Latch | 17 | Power latch-bit | not used |
| GND | 2 | Ground (PC ground) | |

25.4 Connecting a DPSS Laser

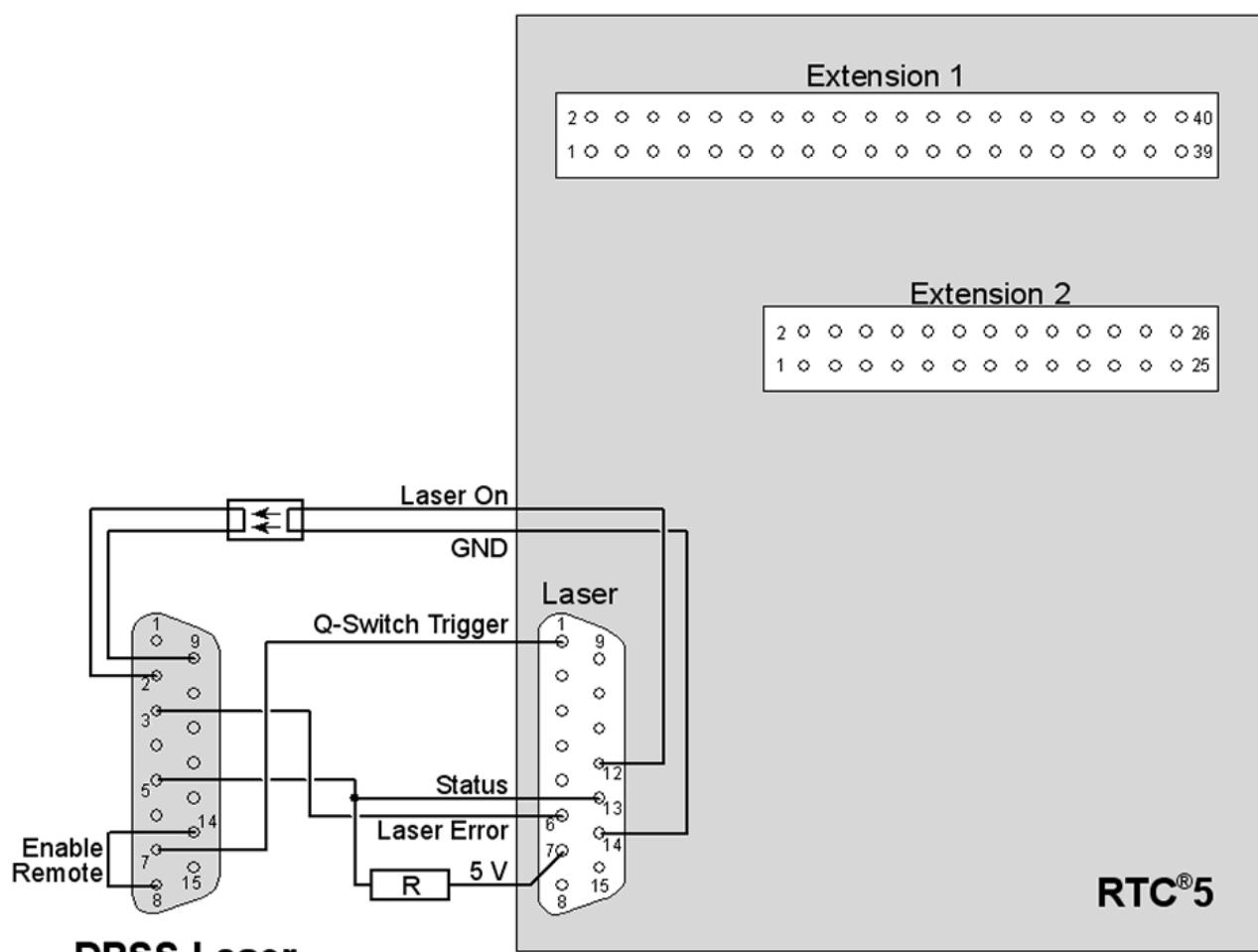
If you use a DPSS laser, it must be connected to the RTC5 or RTC6 PC interface board as follows:

NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).



The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | DPSS Laser |
|------------------------|---------|-----------------------|------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | Status: 0 = Laser on |
| Digital In 2 | 6 | Laser state | 1 = Laser error |
| Digital Out 1 | 12 | Laser control | 1 = Switch laser on |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser power | not used |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | Ground |
| Laser1 | 1 | Laser process control | Frequency (Q-switch trigger) |
| Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | not used |
| 5V | 7 | Output voltage | 5 V |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | DPSS Laser |
|------------------------------|---------------|-----------------------------------------------|------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | not used |
| Digital Out 11 | 23 | Shutter switch (1 = open) | not used |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | |
| GND | 39 | Ground (PC ground) | |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | DPSS Laser |
|------------------------------|---------|--------------------|------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power Bit 0 | not used |
| Data1 | 3 | Laser power Bit 1 | not used |
| Data2 | 5 | Laser power Bit 2 | not used |
| Data3 | 7 | Laser power Bit 3 | not used |
| Data4 | 9 | Laser power Bit 4 | not used |
| Data5 | 11 | Laser power Bit 5 | not used |
| Data6 | 13 | Laser power Bit 6 | not used |
| Data7 | 15 | Laser power Bit 7 | not used |
| Latch | 17 | Power latch-bit | not used |
| GND | 2 | Ground (PC ground) | |

25.5 Connecting a Foba Laser

If you use a Foba laser, it must be connected to the RTC5 or RTC6 PC interface board as follows:

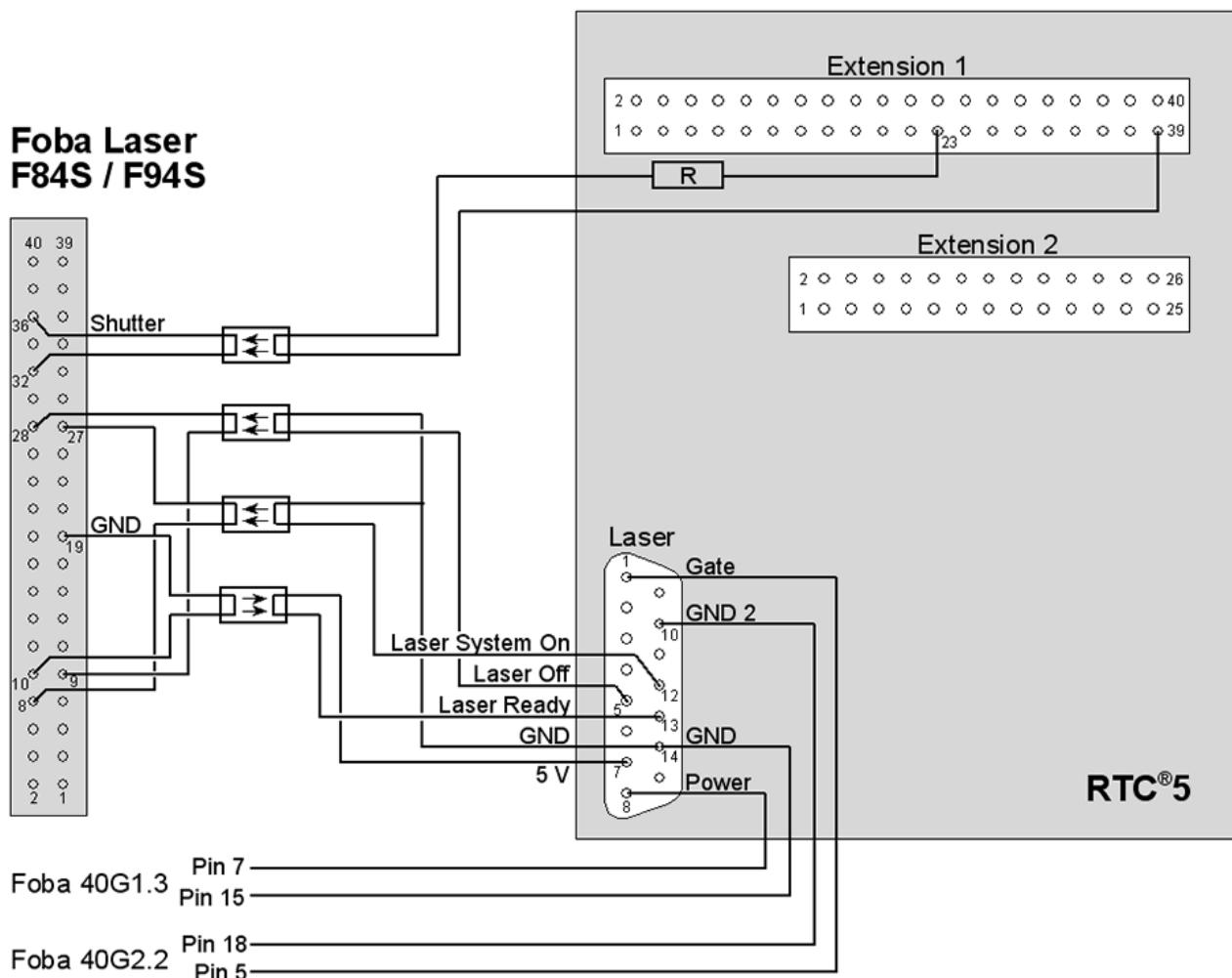


NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

The connections of the RTC board are described detailed in the [RTC5 Manual](#) (see chapter 'Interfaces for the Laser and Peripheral Equipment').

Please refer to the manual of the laser manufacturer for all further necessary connections and possible changes. SCANLAB cannot guarantee the correctness of the connections.



The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | Foba Laser |
|------------------------|---------|-----------------------|---------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | Status: 1 = Laser on |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | 1 = Switch on laser system |
| Digital Out 2 | 5 | Laser control | 1 = Laser enable; 0 = Laser off |
| Analog Out 1 | 8 | Laser power | Power |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | Ground |
| Laser1 | 1 | Laser process control | Frequency (Gate) |
| Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | not used |
| 5V | 7 | Output voltage (5 V) | 5 V |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | Foba Laser |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Guide laser on (optional) |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | - |
| 5 V | 37 | 5 V out | |
| GND | 39 | Ground (PC ground) | Ref. ground for guide laser and shutter |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | Foba Laser |
|------------------------------|---------|--------------------|------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power Bit 0 | not used |
| Data1 | 3 | Laser power Bit 1 | not used |
| Data2 | 5 | Laser power Bit 2 | not used |
| Data3 | 7 | Laser power Bit 3 | not used |
| Data4 | 9 | Laser power Bit 4 | not used |
| Data5 | 11 | Laser power Bit 5 | not used |
| Data6 | 13 | Laser power Bit 6 | not used |
| Data7 | 15 | Laser power Bit 7 | not used |
| Latch | 17 | Power latch-bit | not used |
| GND | 2 | Ground (PC ground) | |

25.6 Connecting an IPG Laser with Type B or Type B2 Interface

If you use an IPG laser with type B or type B2 control interface, it must be connected to the RTC5 or RTC6 PC interface board as follows:



NOTE-

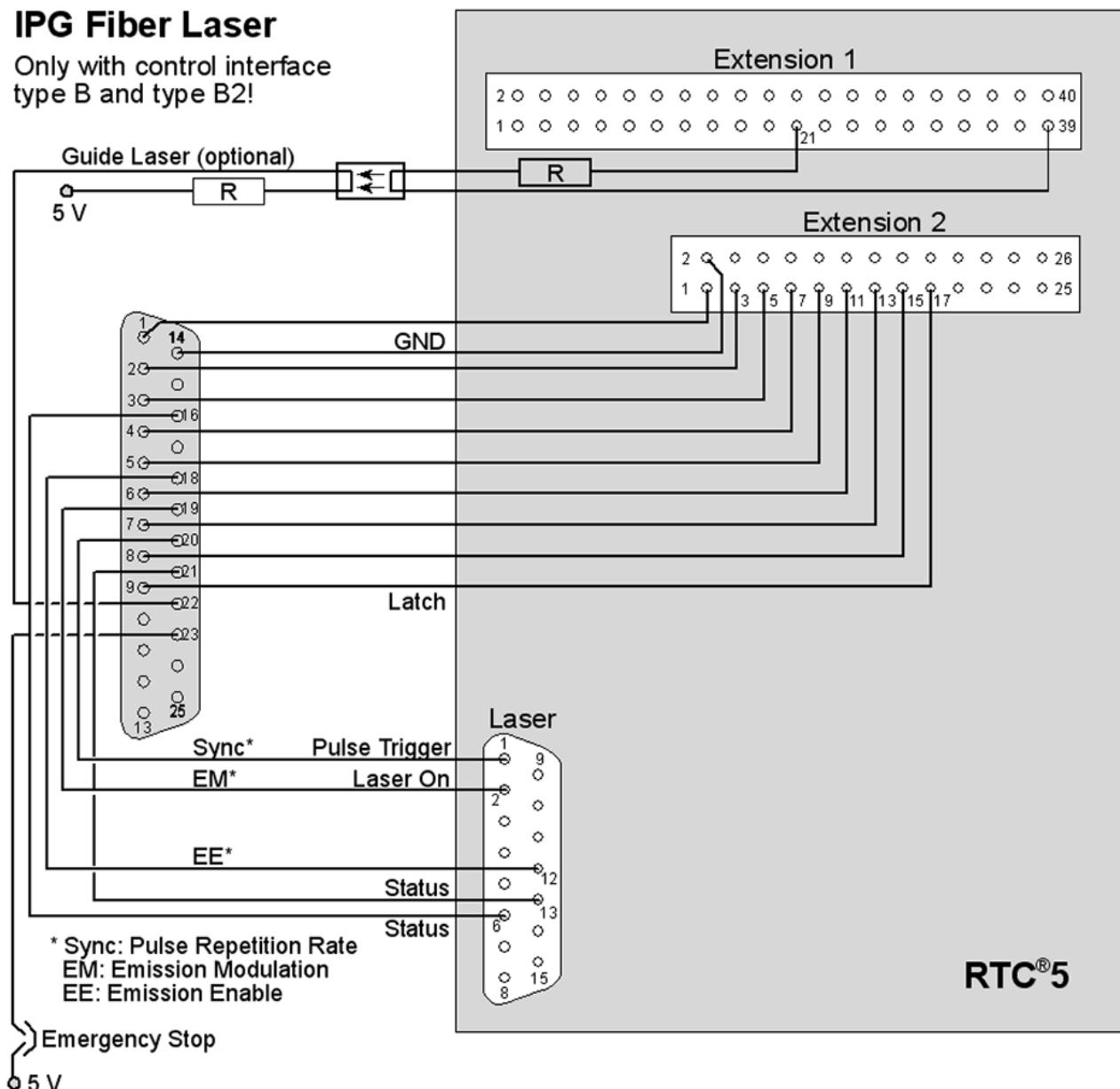
The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).

IPG Fiber Laser

Only with control interface type B and type B2!



NOTE:

NOTE: The following jumpers of the RTC board must be closed:

JP3: Pin 15 = Data7 (Digital Out)

- IP8: Pin 17 = Latch Signal

(See chapters 'Jumper Settings and Type Identification' and 'EXTENSION 2 Connector' in the [RTC5 Manual](#).)

The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | IPG Laser - Type B/B2 |
|------------------------|---------|-----------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | Status Bit 0 |
| Digital In 2 | 6 | Laser state | Status Bit 1 |
| Digital Out 1 | 12 | Laser control | 1 = Laser on (MO) (Emission enable) |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser power | not used |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | |
| Laser1 | 1 | Laser process control | Pulse repetition rate (Frequency) |
| Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | Laser beam on/off (Emission modulation) |
| 5V | 7 | Output voltage (5 V) | |
| GND2 | 10 | Ground | |

| RTC5/6 Extension 1 Connector | | | IPG Laser - Type B/B2 |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Guide laser on (optional) |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | |
| GND | 39 | Ground (PC ground) | Ref. ground for guide laser and shutter |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | IPG Laser - Type B/B2 |
|------------------------------|---------|--------------------|-----------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | Power bit 0 |
| Data1 | 3 | Laser power bit 1 | Power bit 1 |
| Data2 | 5 | Laser power bit 2 | Power bit 2 |
| Data3 | 7 | Laser power bit 3 | Power bit 3 |
| Data4 | 9 | Laser power bit 4 | Power bit 4 |
| Data5 | 11 | Laser power bit 5 | Power bit 5 |
| Data6 | 13 | Laser power bit 6 | Power bit 6 |
| Data7 (see NOTE above) | 15 | Laser power bit 7 | Power bit 7 |
| Latch (see NOTE above) | 17 | Power latch-bit | Latch-bit |
| GND | 2 | Ground (PC ground) | Ground |

25.7 Connecting an IPG Laser with Type D Interface

If you use an IPG laser with a type D control interface, it must be connected to the RTC5 or RTC6 PC interface board as follows:

NOTE:

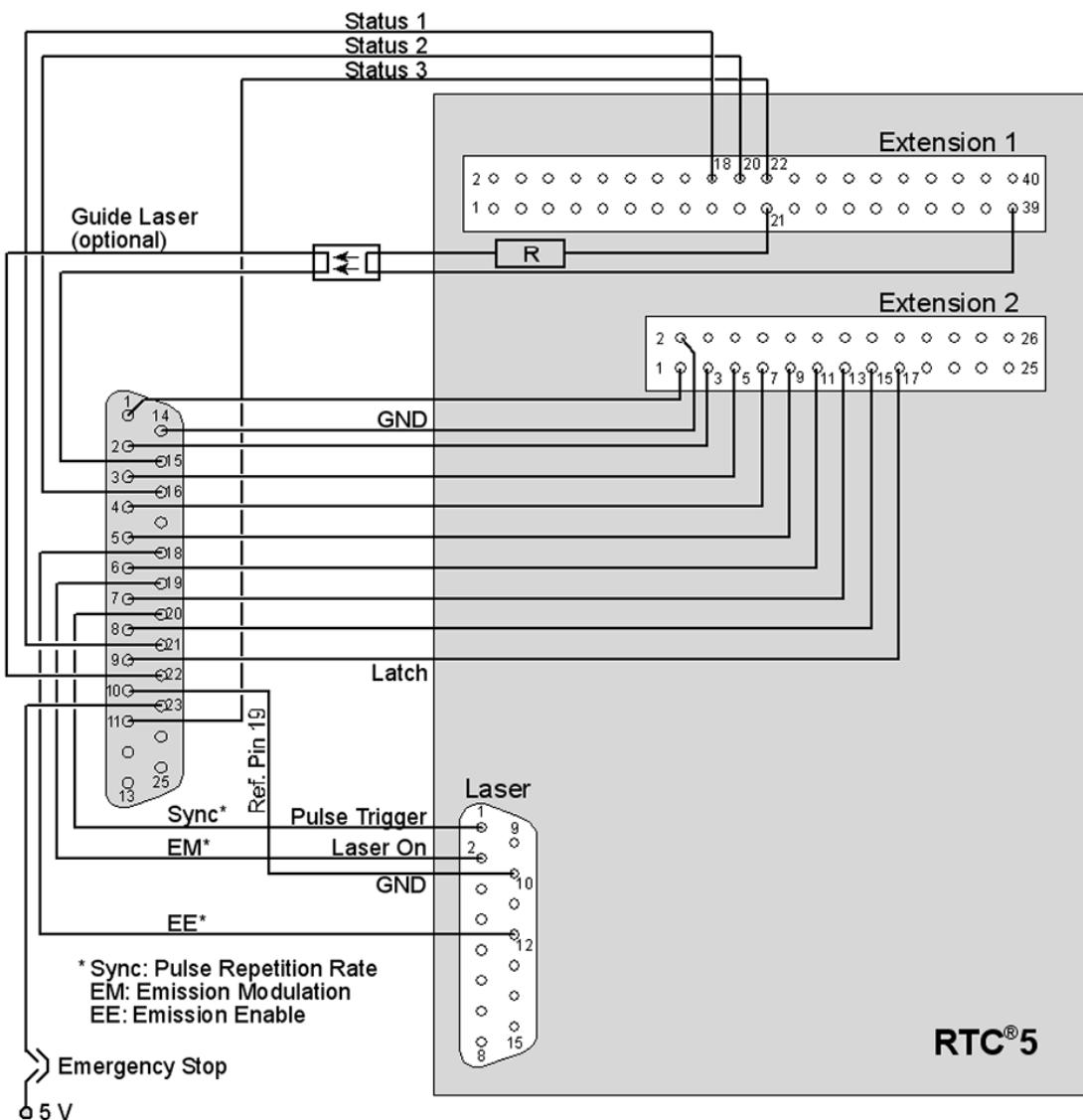
The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).

IPG Fiber Laser

Only with control interface type D!



NOTE:

The following jumpers of the RTC board must be closed:

JP3: Pin 15 = Data7 (Digital Out)

JP8: Pin 17 = Latch Signal

(See chapters 'Jumper Settings and Type Identification' and 'EXTENSION 2 Connector' in the [RTC5 Manual](#).)

The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | IPG Laser - Type D |
|------------------------|---------|-----------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | not used |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | 1 = Laser on (MO) (Emission enable) |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser power | not used |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | |
| Laser1 | 1 | Laser process control | Pulse repetition rate (Frequency) |
| Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | Laser beam on/off (Emission modulation) |
| 5V | 7 | Output voltage (5 V) | |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | IPG Laser - Type D |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | Status 1 |
| Digital In 9 | 20 | Reserved | Status 2 |
| Digital In 10 | 22 | Reserved | Status 3 |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Guide laser on (optional) |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | |
| GND | 39 | Ground (PC ground) | Ref. ground for guide laser and shutter |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | IPG Laser - Type D |
|------------------------------|---------|--------------------|--------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | Power bit 0 |
| Data1 | 3 | Laser power bit 1 | Power bit 1 |
| Data2 | 5 | Laser power bit 2 | Power bit 2 |
| Data3 | 7 | Laser power bit 3 | Power bit 3 |
| Data4 | 9 | Laser power bit 4 | Power bit 4 |
| Data5 | 11 | Laser power bit 5 | Power bit 5 |
| Data6 | 13 | Laser power bit 6 | Power bit 6 |
| Data7 (see NOTE above) | 15 | Laser power bit 7 | Power bit 7 |
| Latch (see NOTE above) | 17 | Power latch-bit | Latch-bit |
| GND | 2 | Ground (PC ground) | Ground |

25.8 Connecting an IPG Laser with Type EG Interface

If you use an IPG laser with a type EG control interface, it must be connected to the RTC5 or RTC6 PC interface board as follows:

NOTE:

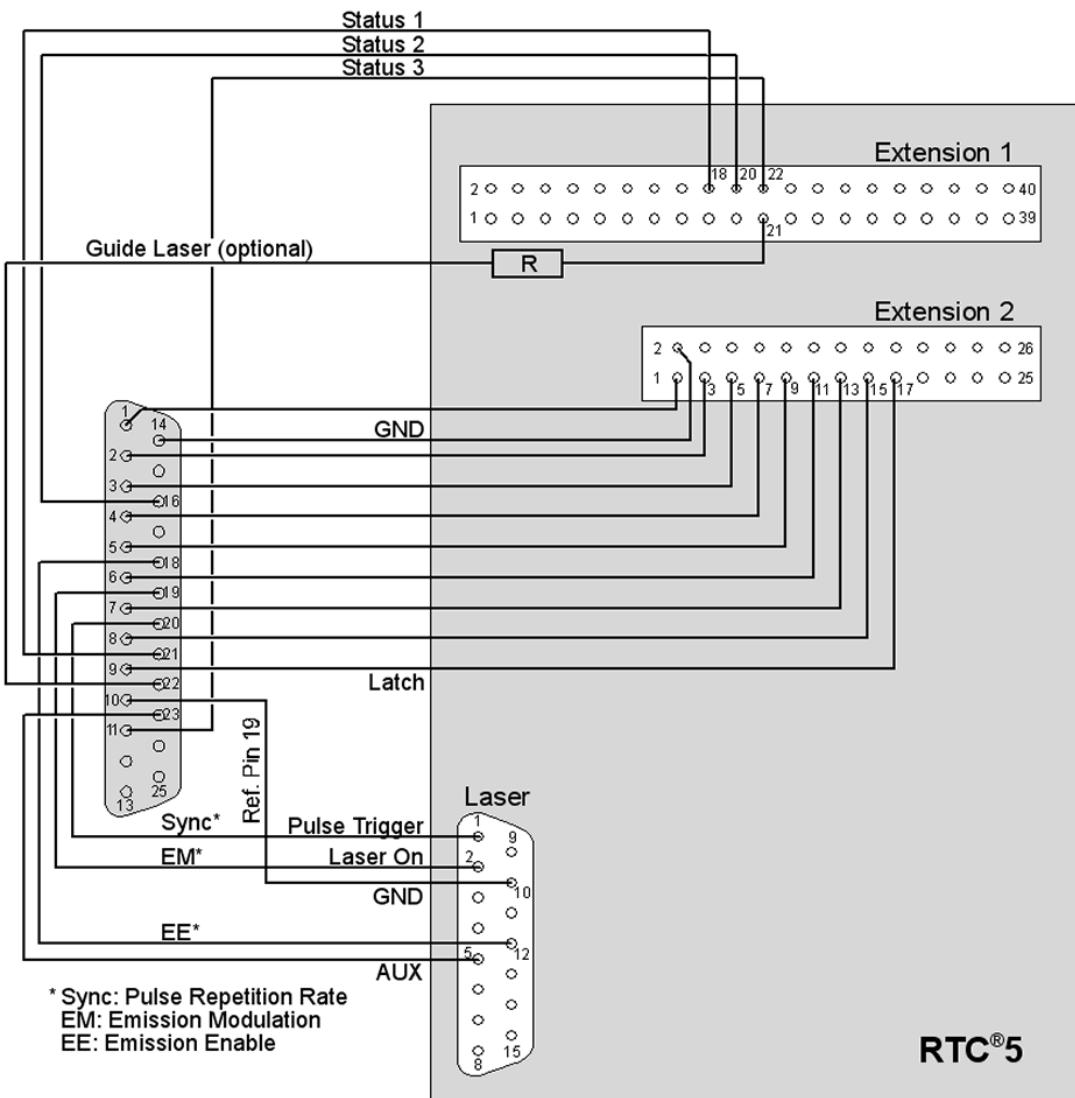
The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).

IPG Fiber Laser

Only with control interface type EG!



NOTE:

The following jumpers of the RTC board must be closed:

JP3: Pin 15 = Data7 (Digital Out)

JP8: Pin 17 = Latch Signal

(See chapters 'Jumper Settings and Type Identification' and 'EXTENSION 2 Connector' in the [RTC5 Manual](#).)

The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | IPG Laser |
|------------------------|---------|-----------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | not used |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | 1 = Laser on (MO) (Emission enable) |
| Digital Out 2 | 5 | Laser control | 1 = AUXOFF set |
| Analog Out 1 | 8 | Laser power | not used |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | |
| Laser1 | 1 | Laser process control | Pulse repetition rate (Frequency) |
| Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | Laser beam on/off (Emission modulation) |
| 5V | 7 | Output voltage (5 V) | |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | IPG Laser |
|------------------------------|---------------|-----------------------------------------------|-------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | Status 1 |
| Digital In 9 | 20 | Reserved | Status 2 |
| Digital In 10 | 22 | Reserved | Status 3 |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Guide laser on (optional) |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | |
| GND | 39 | Ground (PC ground) | |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | IPG Laser |
|------------------------------|---------|--------------------|-------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | Power bit 0 |
| Data1 | 3 | Laser power bit 1 | Power bit 1 |
| Data2 | 5 | Laser power bit 2 | Power bit 2 |
| Data3 | 7 | Laser power bit 3 | Power bit 3 |
| Data4 | 9 | Laser power bit 4 | Power bit 4 |
| Data5 | 11 | Laser power bit 5 | Power bit 5 |
| Data6 | 13 | Laser power bit 6 | Power bit 6 |
| Data7 (see NOTE above) | 15 | Laser power bit 7 | Power bit 7 |
| Latch (see NOTE above) | 17 | Power latch-bit | Latch-bit |
| GND | 2 | Ground (PC ground) | Ground |

25.9 Connecting a Spectra-Physics Hippo Laser

If you use a Spectra-Physics Hippo laser, it must be connected to the RTC5 or RTC6 PC interface board as follows:



NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

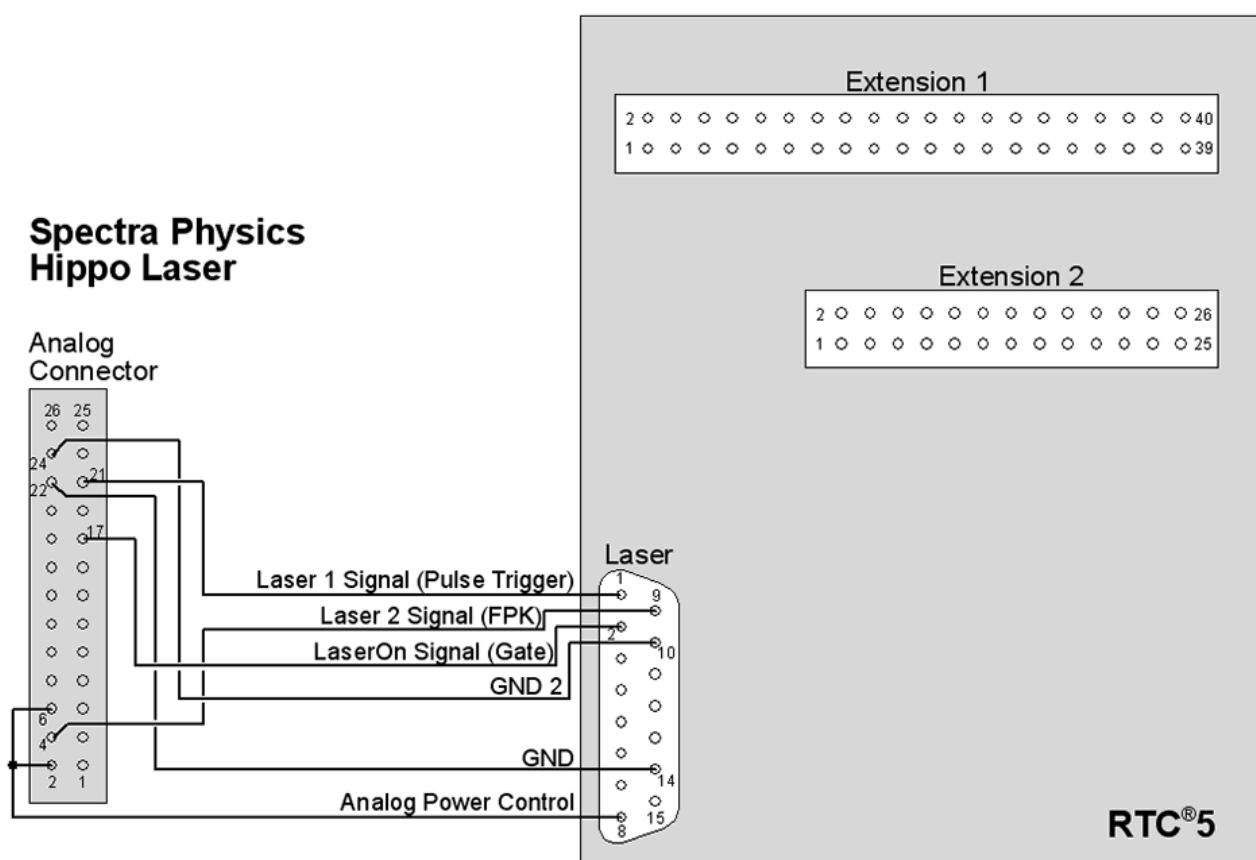
The connections of the RTC board are described detailed in the [RTC5 Manual](#).



NOTE-

NOTE: Using the Spectra-Physics Hippo laser, the serial connection must be used. Additional to the connection to the RTC board described here, the serial connection parameters must be defined in laserDESK's 'Hardware Settings' and related to the Hippo laser.

- previously define the serial connection in the **'PC Interfaces' Parameters**,
 - then select the defined serial connection in the Setting 'Processing Laser' Parameters.



The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | Spectra-Physics Hippo Laser |
|------------------------|---------|-----------------------|-----------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | not used |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | not used |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser power | Power |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | Ground |
| Laser1 | 1 | Laser process control | Pulse repetition rate (Frequency) |
| Laser2 | 9 | Laser process control | FPK |
| LaserOn | 2 | Laser process control | Laser beam on/off (Gate) |
| 5V | 7 | Output voltage | |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | Spectra-Physics Hippo Laser |
|------------------------------|---------------|-----------------------------------------------|--------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Guide laser on (optional) |
| Digital Out 11 | 23 | Shutter switch (1 = open) | not used |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | |
| GND | 39,40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | Spectra-Physics Hippo Laser |
|------------------------------|---------|--------------------|--------------------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power Bit 0 | not used |
| Data1 | 3 | Laser power Bit 1 | not used |
| Data2 | 5 | Laser power Bit 2 | not used |
| Data3 | 7 | Laser power Bit 3 | not used |
| Data4 | 9 | Laser power Bit 4 | not used |
| Data5 | 11 | Laser power Bit 5 | not used |
| Data6 | 13 | Laser power Bit 6 | not used |
| Data7 | 15 | Laser power Bit 7 | not used |
| Latch | 17 | Power latch-bit | not used |
| GND | 2 | Ground (PC ground) | |

25.10 Connecting an SPI Laser with Type G3 Interface (HS Series)

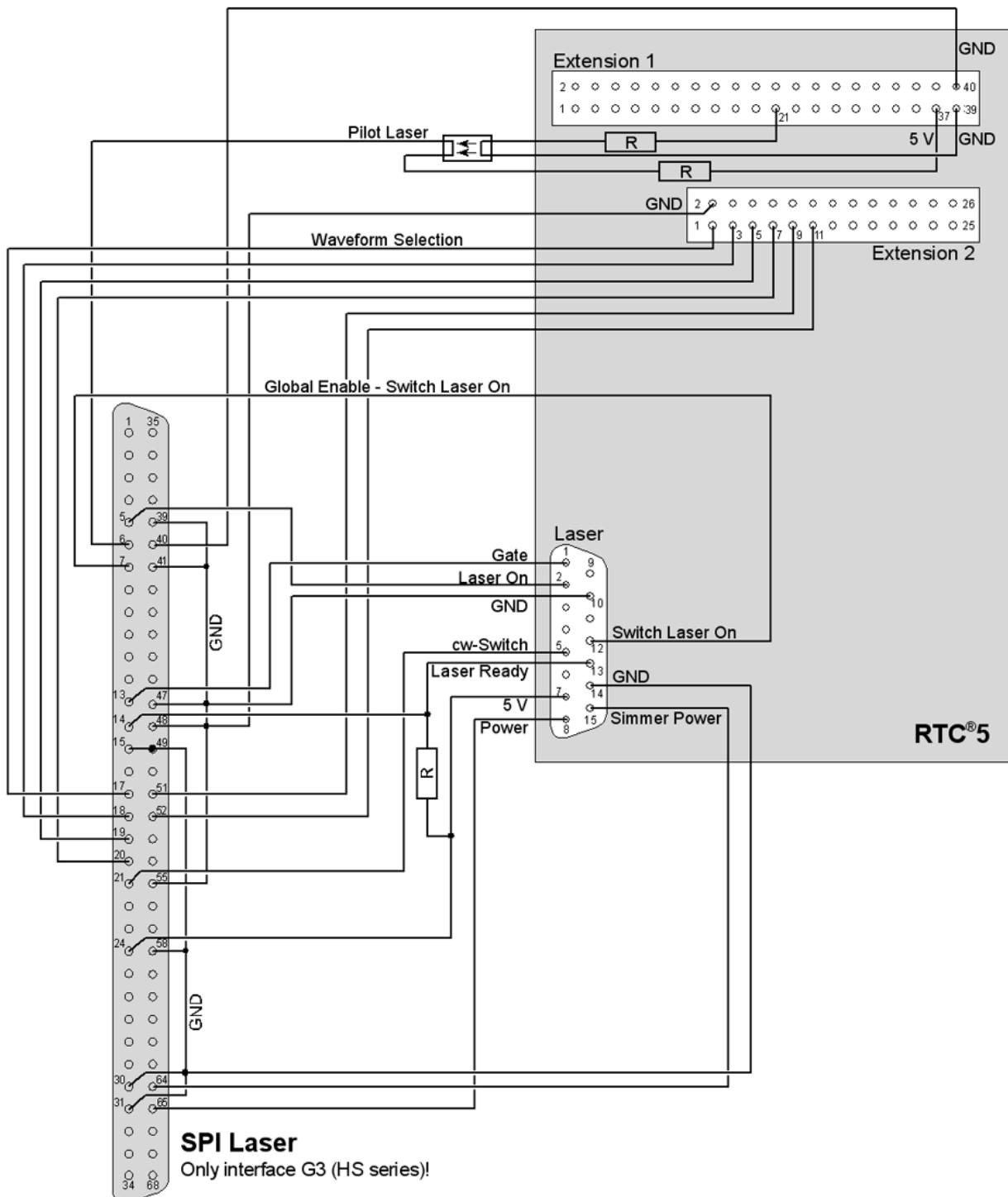
If you use an SPI laser of the HS series with a type G3 control interface, it must be connected to the RTC5 or RTC6 PC interface board as follows:

NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).



The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | SPI Laser Type G3 (HS series) |
|------------------------|---------|-----------------------|--------------------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | Laser ready (High = ok) |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | 1 = Laser on (Global enable) |
| Digital Out 2 | 5 | Laser control | Switch between cw and pulsed mode 1 = cw mode |
| Analog Out 1 | 8 | Laser Power | Laser power |
| Analog Out 2 | 15 | Defined by user | Simmer current |
| GND | 14 | Ground (PC ground) | Ground |
| Laser1 | 1 | Laser process control | Frequency (Pulse trigger) |
| Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | Laser emission gate |
| 5V | 7 | Output voltage (5 V) | 5 V |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | SPI Laser Type G3 (HS series) |
|------------------------------|---------------|-------------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ^{1,2)} | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Pilot laser on |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | 5 V |
| GND | 39 | Ground (PC ground) | Ref. ground for pilot laser and shutter |
| GND | 40 | Ground (PC ground) | Ground |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | SPI Laser Type G3 (HS series) |
|------------------------------|---------|--------------------|----------------------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | Waveform selection bit 0 |
| Data1 | 3 | Laser power bit 1 | Waveform selection bit 1 |
| Data2 | 5 | Laser power bit 2 | Waveform selection bit 2 |
| Data3 | 7 | Laser power bit 3 | Waveform selection bit 3 |
| Data4 | 9 | Laser power bit 4 | Waveform selection bit 4 |
| Data5 | 11 | Laser power bit 5 | Waveform selection bit 5 |
| Data6 | 13 | Laser power bit 6 | not used |
| Data7 | 15 | Laser power bit 7 | not used |
| Latch | 17 | Power latch-bit | not used |
| GND | 2 | Ground (PC ground) | Ground |

25.11 Connecting an SPI Laser with Type G3 Interface (RM Series)

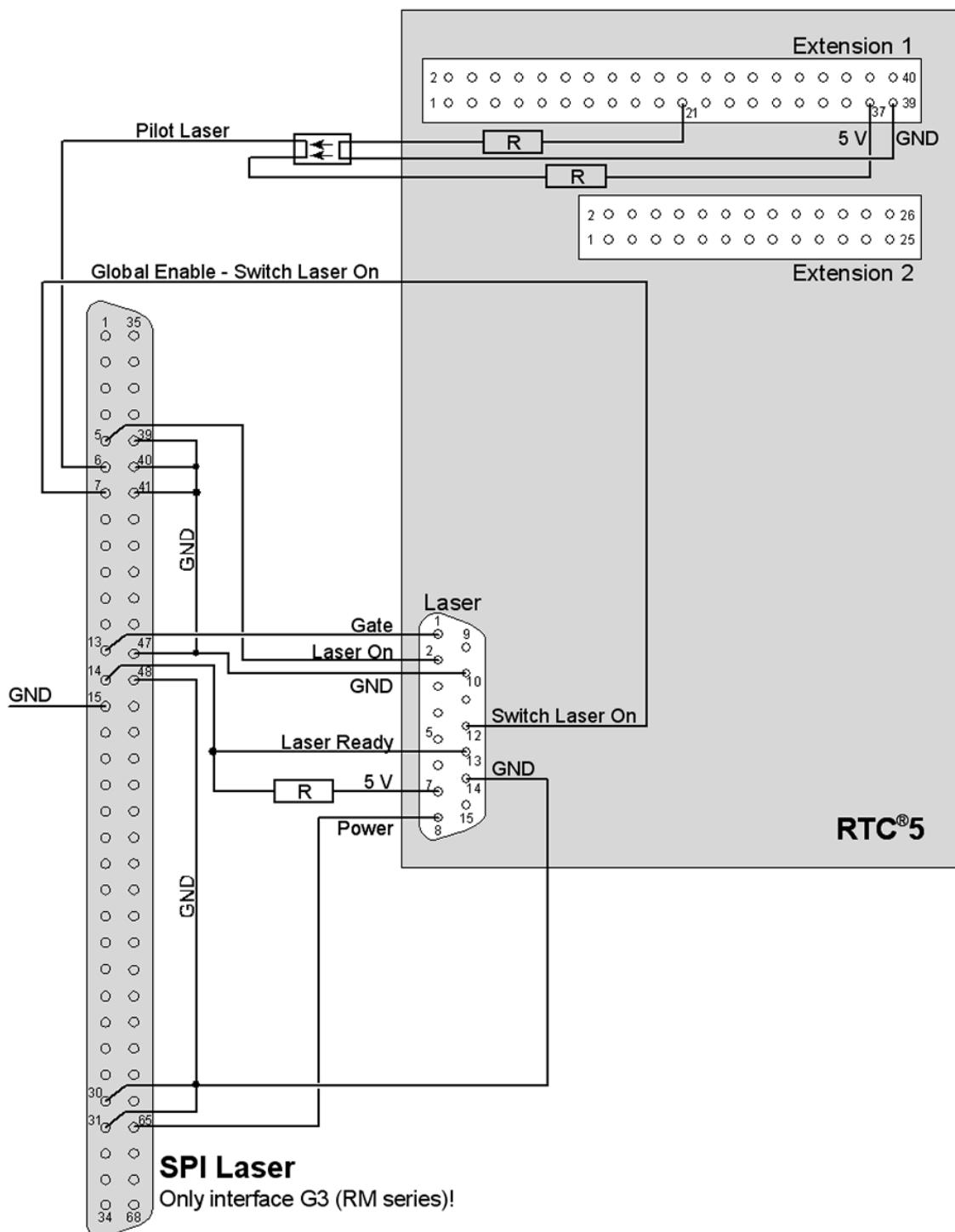
If you use an SPI laser of the RM series with a type G3 control interface, it must be connected to the RTC5 or RTC6 PC interface board as follows:

NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).



The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | SPI Laser Type G3 (RM series) |
|------------------------|---------|-----------------------|----------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | Laser ready (High = ok) |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | 1 = Laser on (Global Enable) |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser Power | Laser power |
| Analog Out 2 | 15 | Defined by user | |
| GND | 14 | Ground (PC ground) | Ground |
| Laser1 | 1 | Laser process control | Frequency (Pulse trigger) |
|)Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | Laser emission gate |
| 5V | 7 | Output voltage (5 V) | 5 V |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | SPI Laser Type G3 (RM series) |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | - |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Pilot laser on |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | 5 V |
| GND | 39 | Ground (PC ground) | Ref. ground for pilot laser and shutter |
| GND | 40 | Ground (PC ground) | |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | SPI Laser Type G3 (RM series) |
|------------------------------|---------|--------------------|----------------------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | not used |
| Data1 | 3 | Laser power bit 1 | not used |
| Data2 | 5 | Laser power bit 2 | not used |
| Data3 | 7 | Laser power bit 3 | not used |
| Data4 | 9 | Laser power bit 4 | not used |
| Data5 | 11 | Laser power bit 5 | not used |
| Data6 | 13 | Laser power bit 6 | not used |
| Data7 | 15 | Laser power bit 7 | not used |
| Latch | 17 | Power latch-bit | not used |
| GND | 2 | Ground (PC ground) | |

25.12 Connecting an SPI Laser with Type G4 Interface (HS/EP Series)

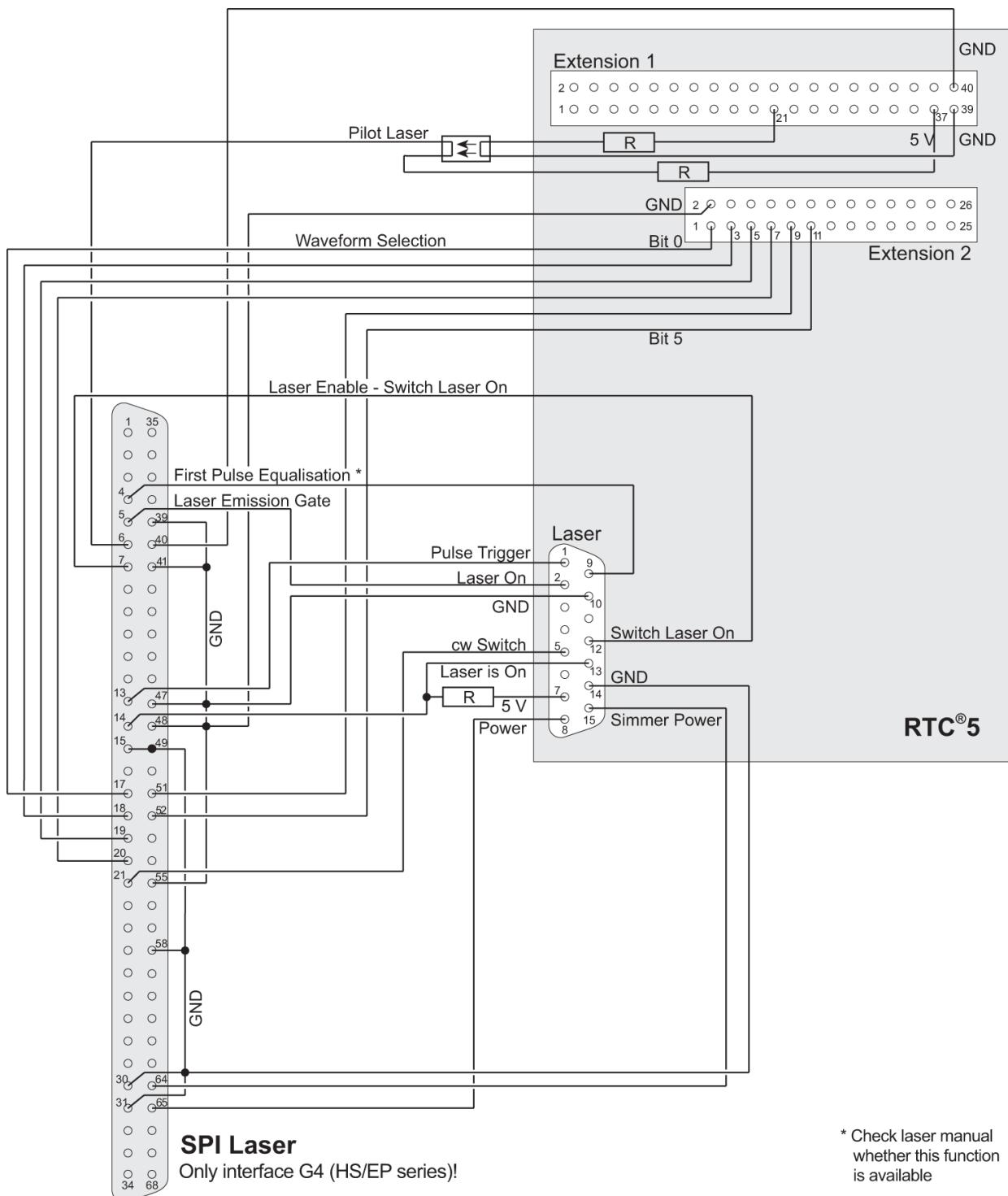
If you use an SPI laser of the HS/EP series with a type G4 control interface, it must be connected to the RTC5 or RTC6 PC interface board as follows:

NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).



The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | SPI Laser Type G4 (HS/EP series) |
|------------------------|---------|-----------------------|---------------------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | Laser ready (High = ok) |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | 1 = Laser on (Global enable) |
| Digital Out 2 | 5 | Laser control | Switch between cw- and pulsed mode 1 = cw-mode |
| Analog Out 1 | 8 | Laser Power | Laser power |
| Analog Out 2 | 15 | Defined by user | Simmer current |
| GND | 14 | Ground (PC ground) | Ground |
| Laser1 | 1 | Laser process control | Frequency (Pulse trigger) |
| Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | Laser emission gate |
| 5V | 7 | Output voltage (5 V) | |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | SPI Laser Type G4 (HS/EP series) |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Pilot laser on |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | 5 V |
| GND | 39 | Ground (PC ground) | Ref. ground for pilot laser and shutter |
| GND | 40 | Ground (PC ground) | Ground |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | SPI Laser Type G4 (HS/EP series) |
|------------------------------|---------|--------------------|-------------------------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | Waveform selection bit 0 |
| Data1 | 3 | Laser power bit 1 | Waveform selection bit 1 |
| Data2 | 5 | Laser power bit 2 | Waveform selection bit 2 |
| Data3 | 7 | Laser power bit 3 | Waveform selection bit 3 |
| Data4 | 9 | Laser power bit 4 | Waveform selection bit 4 |
| Data5 | 11 | Laser power bit 5 | Waveform selection bit 5 |
| Data6 | 13 | Laser power bit 6 | not used |
| Data7 | 15 | Laser power bit 7 | not used |
| Latch | 17 | Power latch-bit | not used |
| GND | 2 | Ground (PC ground) | Ground |

25.13 Connecting an SPI Laser with Type G4 Interface (RM Series)

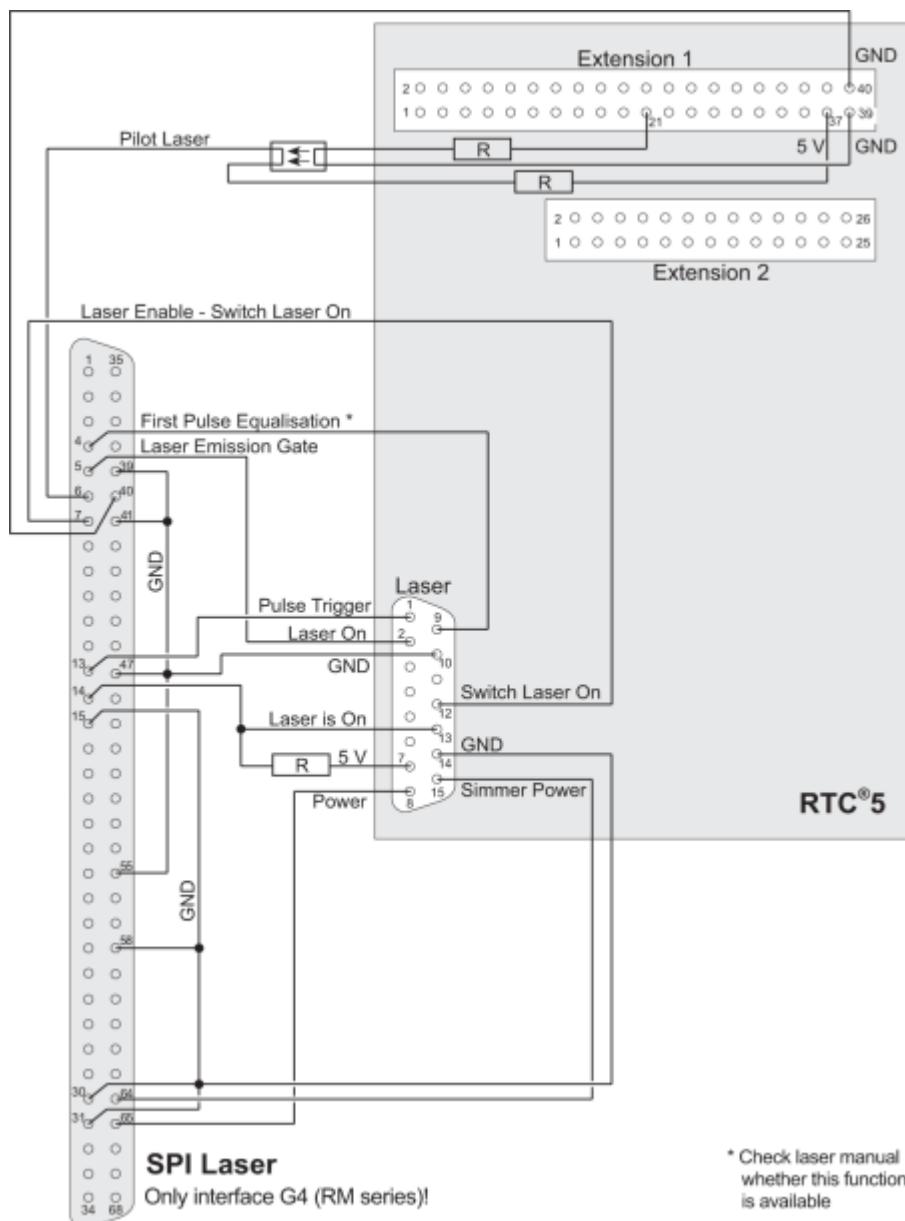
If you use an SPI laser of the RM series with a type G4 control interface, it must be connected to the RTC5 or RTC6 PC interface board as follows:

NOTE:

The described connections are only representing the connections needed by laserDESK to control the laser.

Please refer to the manual of the laser manufacturer for all further necessary connections.

The connections of the RTC board are described detailed in the [RTC5 Manual](#).



The tables below shows the pin-configuration of the RTC board's 'Laser' connector (D-SUB 15-pin female), the 'Extension 1' connector (40-pin socket) and the 'Extension 2' connector (26-pin socket) (see figure above):

| RTC5/6 Laser Connector | | | SPI Laser Type G4 (RM series) |
|------------------------|---------|-----------------------|----------------------------------|
| Name | Pin No. | General Use | |
| Digital In 1 | 13 | Laser state | Laser ready (High = ok) |
| Digital In 2 | 6 | Laser state | not used |
| Digital Out 1 | 12 | Laser control | 1 = Laser on (Global Enable) |
| Digital Out 2 | 5 | Laser control | not used |
| Analog Out 1 | 8 | Laser Power | Laser power |
| Analog Out 2 | 15 | Defined by user | Simmer current |
| GND | 14 | Ground (PC ground) | Ground |
| Laser1 | 1 | Laser process control | Frequency (Pulse trigger) |
| Laser2 | 9 | Laser process control | not used |
| LaserOn | 2 | Laser process control | Laser emission gate |
| 5V | 7 | Output voltage (5 V) | |
| GND2 | 10 | Ground | Ground |

| RTC5/6 Extension 1 Connector | | | SPI Laser Type G4 (RM series) |
|------------------------------|---------------|-----------------------------------------------|-----------------------------------------|
| Name | Pin No. | General Use | |
| Digital In 0-7 | 2, 4, ..., 16 | Defined by user | |
| Digital In 8 | 18 | Reserved | - |
| Digital In 9 | 20 | Reserved | - |
| Digital In 10 | 22 | Reserved | - |
| Digital In 11 | 24 | Reserved | - |
| Digital In 12 | 26 | Switching automatic mode on/off ¹⁾ | - |
| Digital In 13 | 28 | Switching laser on/off ^{1,2)} | - |
| Digital In 14 | 30 | Reserved | - |
| Digital In 15 | 32 | Reserved | - |
| Digital Out 0-7 | 1, 3, ..., 15 | Defined by user | - |
| Digital Out 8 | 17 | System status: Job execution not aborted | - |
| Digital Out 9 | 19 | Reserved | - |
| Digital Out 10 | 21 | Pilot laser | 1 = Pilot laser on |
| Digital Out 11 | 23 | Shutter switch (1 = open) | 1 = Shutter open (optional) |
| Digital Out 12 | 25 | System status: Ready | |
| Digital Out 13 | 27 | System status: Automatic mode | |
| Digital Out 14 | 29 | System status: Job in execution | |
| Digital Out 15 | 31 | System status: Error | |
| 5 V | 37 | 5 V out | 5 V |
| GND | 39 | Ground (PC ground) | Ref. ground for pilot laser and shutter |
| GND | 40 | Ground (PC ground) | Ground |

¹⁾ Function has to be activated in the Hardware Configuration.

²⁾ Only for full supported laser types.

| RTC5/6 Extension 2 Connector | | | SPI Laser Type G4 (RM series) |
|------------------------------|---------|--------------------|----------------------------------|
| Name | Pin No. | General Use | |
| Data0 | 1 | Laser power bit 0 | not used |
| Data1 | 3 | Laser power bit 1 | not used |
| Data2 | 5 | Laser power bit 2 | not used |
| Data3 | 7 | Laser power bit 3 | not used |
| Data4 | 9 | Laser power bit 4 | not used |
| Data5 | 11 | Laser power bit 5 | not used |
| Data6 | 13 | Laser power bit 6 | not used |
| Data7 | 15 | Laser power bit 7 | not used |
| Latch | 17 | Power latch-bit | not used |
| GND | 2 | Ground (PC ground) | |

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|---------------------------------------------------|---------|-----------------------------------------|---------|---------------------------------------------------|-----|------------------------------------|---------|---------------------------------------------------|-----|--------------------------------------|---------|---------------------------------------------------|-----|----------------------------------------|---------|-----------------------------------|-----|------------------------------|---------|------------------------------------|-----|---------------------------------|---------|-------------------------------------|-----|---------------------------------|---------|------------------------------------|-----|---------------------------------|---------|-------------------------------------|-----|---------------------------------|---------|------------------------------|-----|-----------------------------------------|-----|--------------------------------|-----|-----------------------------------------|-----|--------------------------------|-----|----------------------------------------|-----|------------------------|-----|---------------------------------|-----|------------------------|-----|--------------------------------|-----|------------------------------|-----|---------------------------------|-----|------------------------------|-----|---------------------------------|-----|-------------------------|-----|-----------------------------------------|--------|----------------------------------|-----|----------------------------------------|--------|----------------------------------|-----|--------------------|-----|-------------------------------------------|-----|--------------------------|-----|-------------------------------------------|-----|-------------------------|----|---------------------------------------------------|-----|-----------------------|-----|---------------------------------------------------|-----|---------------------|----|-------------------------|-----|--------------------|--------|----------------------------------|-----|------------------|-----|----------------------|-----|------------------------------|-----|-------------------------------------------|-----|------------------------------|---------|----------------------|-----|-----------------------------|---------|---------------------------------------------------|-----|-----------------------|-----|----------------------------|-----|---------------|-----|----------------------------|-----|------------------|-----|------------------------|-----|--------------|-----|------------------------|-----|------------------------------|-----|--------------------|-----|-----------------------------|---------|-------------|-----|-----------------------|-----|------------|----|---------------|-----|----------------------------|-----|---------------|-----|----------------|-----|--------------|-----|------------------------|----|
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