Import and export of different file formats

Version 1.2

ROFIN-SINAR LASER

THE MARK OF EXCELLENCE

CONTENTS

1 General Information

The VisualLaserMarker is provided with a number of commands for the import and export of different file formats. The following file formats can be used to importing and exporting:

Import	File format	Description
	PL0	Proprietary format (RofinSinar) which is used with the marking software LaserWorkBench (LWB).
	Logo	Proprietary format (RofinSinar) which is used with the marking software LaserWorkBench (LWB).
	DXF (R13)	AutoCAD format, release 13
	XML	Proprietary format (RofinSinar) for describing information on the layout.
	PS	**P**ost**S**cript is a page description language which is developed by Adobe.
	AI	**A**dobe **I**llustrator is a vector graphics editor developed by Adobe Systems.
	PDF	**P**ortable **D**ocument **F**ormat is a platform-independent file format by the Adobe company. PDF is a vector-based page description language which allows free scalability of the visual display.

Export	File format	Description
	PL0	Proprietary format (RofinSinar) which is used with the marking software LaserWorkBench (LWB).
	Logo	Proprietary format (RofinSinar) which is used with the marking software LaserWorkBench (LWB).
	DXF (R13)	AutoCAD format, release 13
	VIS	Proprietary format (RofinSinar) which is used with a vision system. A detailed description according to the format is available on request.

The default directories for importing and exporting different file formats may be adapted in the **Options /Editor settings...** menu, on the dialog field pages **Path settings** for logo files, **Import/Export** for DXF, PL0 and AI/PDF/PS files.

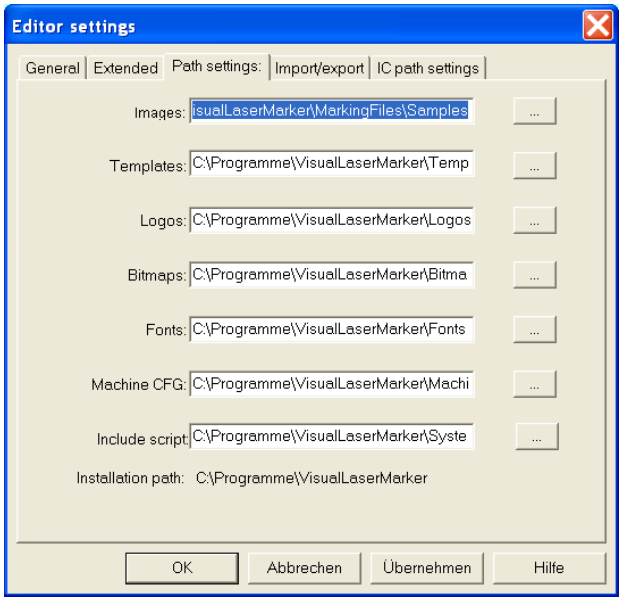


Figure 1

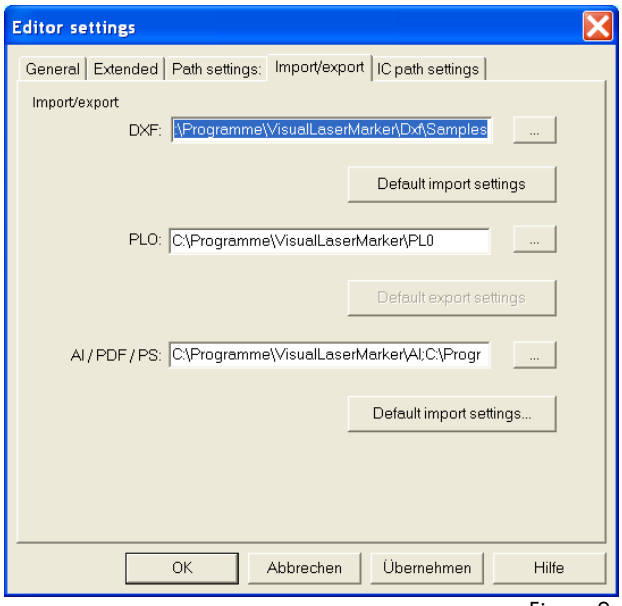


Figure 2

The default search paths for importing and exporting VIS and XML files can be set in the dialog field page **IC path settings**.

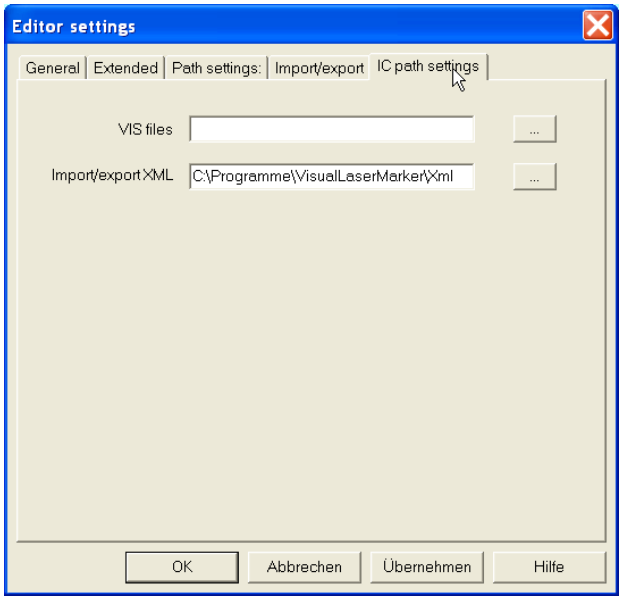


Figure 3

2 Importing PL0 files

The PL0 import function enables the import of the lettering files (PL0 files) – created and runnable in **L**aser**W**ork**B**ench, an OS/2 system. The import operation cannot, however, import all the properties of the PL0 files, due to the different principles on which the two systems run (the **L**aser**W**ork**B**ench is a programming system, the VisualLaserMarker is a graphics system). In general, the graphical properties are accepted. On the other hand, due to the M functions, the dynamic aspects such as execution time decisions cannot be accepted. The import operation can roughly be compared with the layout functions in the LWB. A static copy including all variable values, M function values, date information, etc. valid at this time is created.
You can find a detailed list of all properties which cannot be imported below. Commands up to and including LWB version 3.50 are supported.

☞ **How to import a PL0-file:**

- Create a new document.
- Select the option **Import / PL0** in the **File** menu.
  The file selection dialog box for the PL0 files pops up.
- Select the PL0 file to be imported and click the [**Open**] button.

ℹ It is advisable to import the PL0 files not directly from the directory where they are used in the LWB but from a copy. This prevents a confusion of the emerging IMG files which are different for both systems.

After successful importing, the drawing generated is adjusted in size and displayed in the drawing view or in the view of the marking area (PL0 file).

The shown dialog **Options Import PL0** contains the following options:

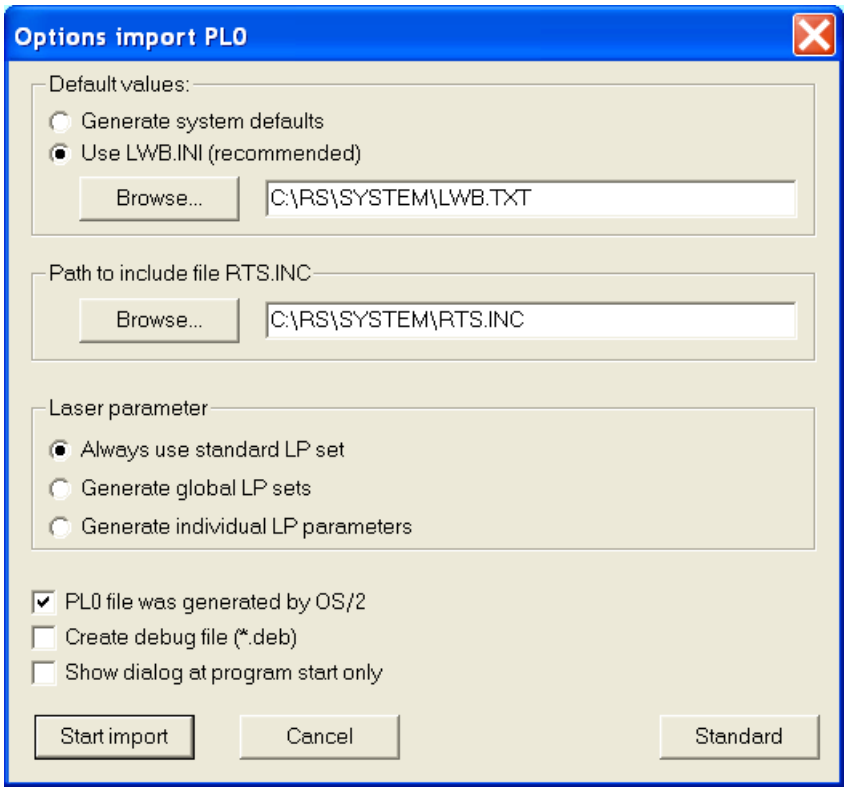


Figure 4

Default values:	PL0 programs use default values which are read from the initialisation file LWB.INI. If you want to include this values during the import operation, they have to become acquainted.
Generate system defaults	Only use this option if you do not have any LWB.TXT files available. The default values generated are listed in the table below.
Use LWB.INI	As LWB.INI cannot be read directly in Windows, the LWB.TXT file is used. This can be generated from LWB.INI in OS/2 with the RSINIED editor.

The following initialization values are read or generated from LWB.TXT:

Application	Key	Generated default value	Meaning
RSPET	INCLUDE	RTS.INC	The name of the Include file which should be used as standard
RTS_LASER	BMP_Switch	0	Normal or inverted output of a bitmap.
	DefFont	Standard	Default character set
	DefLampCurrent	15A	Default laser current
	DefQSFrequency	5000 Hz	Default QS frequency
	DefSpeed	200 mm/s	Default speed
	DelayAfterBeamOn	0 ms	Beam on delay
	DelayBeamOn_OTF	0.3 ms	On-the-fly / start
	DelayBeamOff_OTF	0.3 ms	On-the-fly / end
	DelayCorner	0 ms	Corner delay
	FieldSize	120 mm	Field size
	FP2StandbyCurrent	15 A	Standby current of the RSM 103/106 D
	FP2SuppressionTime	50 µs	Suppression time of the RSM 103/106D
	FPLimitCW	100	Level of the der first pulse suppression for CW-operation
	FPLimitPulse	100	Level of the der first pulse suppression for QS-operation
	FPStepCW	5	Step of the der first pulse suppression for CW-operation
	FPStepPulse	5	Step of the der first pulse suppression for QS-operation
	LaserType	PL	Laser type
	MaxDelayPos	2	Maximum delay with galvo jump.
	MinDelayPos	0.5	Minimum delay with galvo jump.
	MinDelaySpeed	0.3	Minimum delay at the end of a path

Additional PL0 import options:

Path to include file RTS.INC	Specify the directory where the RTS.INC file can be found. When LWB is installed, the RTS.INC file can be found in \RS\SYSTEM\. If you can't access the LWB's original file, a copy can be found in installation of VLM, under \VisualLaserMarker\system.
Laser parameters	
Always use standard LP set	The global laser parameter set **Standard** is assigned to all generated drawing objects.

Generate global LP set	The parameter set name of the PL0 command QP is accepted and is assigned to the generated drawing objects as name of a global laser parameter set.
	Restriction: The values deriving from the global laser parameter set table of the LWB will not be accepted.
	The following constructions cannot be mapped:
	`QP("ALU BLACK");`
	`LCU(16);` ← Value is ignored.
	`ML("ABC");`
	`END.`

Generate individual laser parameter	An individual parameter set is given to all generated drawing objects. This way, laser parameter settings can be taken on from PL0 by means of commands such as LCU, QS, FP etc. On the other hand, the values from the global laser parameter set table are not accepted.
PL0 file was generated by OS/2	OS/2 and Windows use different character set tables (code pages) to code the characters, which is noticeable with characters with an ASCII code of more than 128 (e.g. for Umlaut characters). Activate the check box when the file to be imported has been created on the OS/2 system.
Create debug file	This option is available for service purposes.
Show dialog only at program start	The option dialog is usually shown each time an import is carried out. Selecting this option then only shows the options dialog during the first import operation after starting the VLM.

The PL0 file to be imported must be compiled. Compliation errors are displayed analog to the LWB in a listing. The compiler listing is displayed with the aid of the notepad editor. For example:

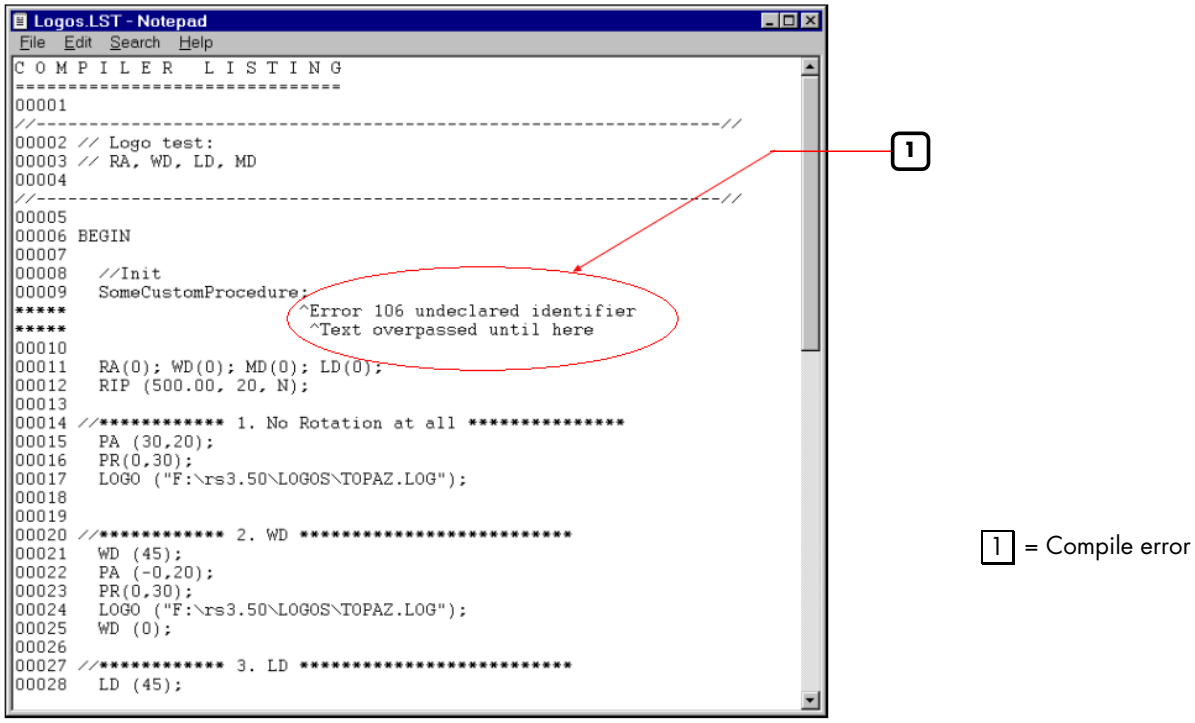


Figure 5

- Close the notepad editor and correct the cause of the compiler error.

Supported and unsupported PL0 commands

Unsupported PL0 commands will be displayed at the end of an import in a seperate window: The number shows how often certain commands were used in the PL0 file.
The following PL0 commands are completely supported:

ANA	ANR	ARC	ARCTANGENT	BC	BEEP	BMP	CCW	CIRCLE	COSINE	CP	CURDAY			
CURTIME	CURWEEK	CURWEEKDAY	CW	DIA	ELL	ES	EXIT	FILLBUFFER	FO	FP	FP2			
FRAME	FRAME2	GETRTSCALLER	HM	INDATE	LCU	LD	LINE	LINEMIRX	LINEMIRY					
LOGO	LOL	LOR	MC	MD	ML	MONAME	MR	MS	NFC	NOLINEMIR	NOCODE	PA	PR	
PWR	QS	QP	RA	PRINTSTATUS	RAD	RIO	RIP	RP	RPO1	SC	SI	SINE	SQROOT	SL
SLEEP	STRCMP	TANGENT	TAXY	TAX	TAY	TRX	TRY	TB	TC	TF	TR	TG	VE	VM	WD

The following commands are not supported, but deliver back preset initial parameters to achieve defined program runs:

Command	Value of the initial parameter
CHECKDIGIT	Empty string ending in zero
GETPIECECOUNT	PieceCount = 1, RemainingPieces = 1
MFIB	0
MFIW	0
MFI3B	0
READBYTEFROMFILE	Empty string ending in zero
S5IW	0
S5DB	0
READ	0
READDATA	LineFeed (Hex.A)
READBINDATA	BytesRead = 0

All PL0 commands which are not listed above are not supported and will be ignored during the import.

In order to generate named marking objects with the import of PL0 files, the PL0 command "**MONAME**" has been introduced. This command is not included in the LWB. Using the PL0 language, VLM files which contain named marking objects can be created. Customer applications then have access to them.

Declaration of the PL0 command:

```
PROCEDURE      MONAME      (Name:CHAR[];RTS;
```

Use of the command:

```
:
:
MONAME("Text1");
ML("ABC");
```

The specified name will be applied only once to the following marking object. To every marking object that should be named, the command "MONAME" has to be added again.

The following properties of the PL0 system are not directly supported by the import operation and have to be simulated in a different way.

PL0 property	Explanation and possible measures in the VLM
Variable	The variable information is lost. Variables have to be added manually with the VLM. PL0 statements of the form ML ("%s", variable) generate an empty text object on being imported with the related PL0 attributes which have been taken on, such as position, character set, and height. Different coloring and bordering highlights a text object. PL0 statements of the form ML ("abc%s", variable) ignore the variable on importing; a table with the content "abc" is created.
Serial numbers	The serial number information is lost. Serial numbers have to be added manually with the VLM. The definition of both the serial number and serial number rule are not imported.
FO2	Switching the character set within a text object is not supported.
BC, MC	The definitions of bar codes (type, number of lines altogether, etc), which are stored in the *.BAR files are not taken on. Only a bar code object is generated with default parameters in the right position. The bar codes are colored to emphasize them. The same applies for the matrix codes.
File paths	For complete paths for logos, bitmaps etc., (e.g. C:\RS\Logos\ rofin.log), the path section is left out, in order to achieve better flexibility for search paths. The paths in the editor have to be changed accordingly. » *VisualLaserMarker, section 10.2 "Path settings".*
IMAGEMIRX **IMAGEMIRY**	Drawings have to be manually re-edited.
VM command	The vertical mode of the VLM is not exactly compatible with that of the LWB.
TAZ, TRZ	Layers have to be added manually and attributed with the corresponding Z axes positions. Also the layers have to be assigned to the drawing objects.
Scaling and Offsets from LWB.INI: **TwinGalvoScale** **TwinGalovOffset** **OffsetPhi,** **OffsetX** **OffsetY**	Corresponding values have to be entered in the machine configuration, or the drawing has to be newly placed in the field.
Scaling and Offset from the job files (JBD)	The drawing has to be newly placed in the field.

PL0 property	Explanation and possible measures in the VLM
M functions	M-functions are not directly supported in the VLM at present. However, sequences can be reproduced with the aid of the VLM's programming module by using VBScript or VisualBasic. » ***LmosActX***, ***LmosAutomationDocumentation*** *description in the start menu, under VisualLaserMarker / Documentation / Programming.*
Indate, CurWeek etc.	The time controlled nature of the functions is lost, only the current value at the time of the import is taken on. A corresponding date object should be created in the VLM (date objects are not yet supported in the current version).
Input functions like READ, READDATA etc.	This functions only provide a constant return value, to enable defined program sequences. Corresponding runs can however be simulated with the aid of the VLM's programming module under VisualBasic. » ***LmosActX***, ***LmosAutomationDocumentation*** *description in the start menu, under VisualLaserMarker / Documentation / Programming.*

3 Importing logo files

Logo files have a proprietary vector format defined by Rofin Sinar, which contains primitives such as lines and ellipses.
When importing a logo, the primitives contained in the logo file are converted into drawing objects and inserted into the drawing as a group object which can be edited following ungrouping.

☞ **How to import a logo:**

- Select the option **Import / Logo** in the menu **File**.
  The file selection dialog box for the logo files pops up.
- Select the logo to be imported and click the [**Open**] button.

The content of the logo file is converted to the VLM format and inserted as a group.

4 Importing DXF files

A DXF file (Drawing Exchange) is an ASCII description of an AutoCad drawing. These files created under AutoCad can be imported into the VLM graphic editor. Information about layers, layer names, fonts and blocks remains unchanged in the process. For example, texts are imported not as curves, but rather as text objects that can also be subsequently processed as text objects. TrueType fonts are brought in during the import process and AutoCad-internal SHX fonts are replaced by Laser fonts (*.FNT), but the same file name is retained. Following the import, the drawing is completely accessible for changes and can be saved as a VLM file.

☞ How to import a DXF file:

- Select the option **Import / DXF (R13)** in the menu **File**. The file selection dialog for the DXF files pops up.
- Select the DXF file to be imported and click the [**Open**] button.

  The content of the DXF file is converted to the VLM format and inserted as a group.

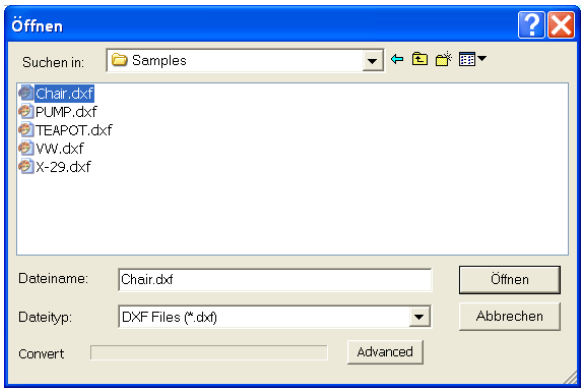


Figure 6

The dialog page **DXF** contains advanced import options This page is displayed, when you press the [**Advanced**] button in the file select dialog for DXF files and when you press the [**Default import settings**] button in the menu **Options / Editor settings...** on the dialog field page **Import/Export** under **Import/Export / DXF** » *Fig. 2*.

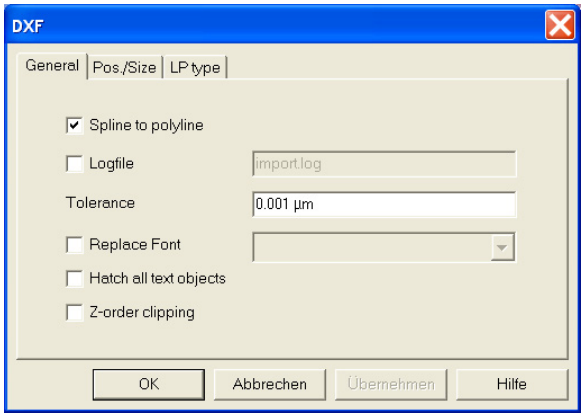


Figure 7

The **General** dialog field page contains the following options:

Spline to polylinie	If this check box is set active (☑), all splines in the DXF file will be imported as polylines. If this check box is not set active (☐), all splines in the DXF file will be imported as bezier curves.
Log file	By clicking on the check box (☑), you can enable/disable the creation of a logfile. The name of the log file can be inserted in the entry field.
Tolerance	The value for the minimum valid object size is inserted here. All elements below the defined value will be filtered out.
Replace Font	If this check box is set active (☑), the font of the imported texts will be replaced by the fontface selected here.
Hatch all text objects	If this check box is set active (☑), all characters will be hatched.
Z-order clipping	This option is not available for DXF files.

The dialog field page **Pos/Size** contains the following options:

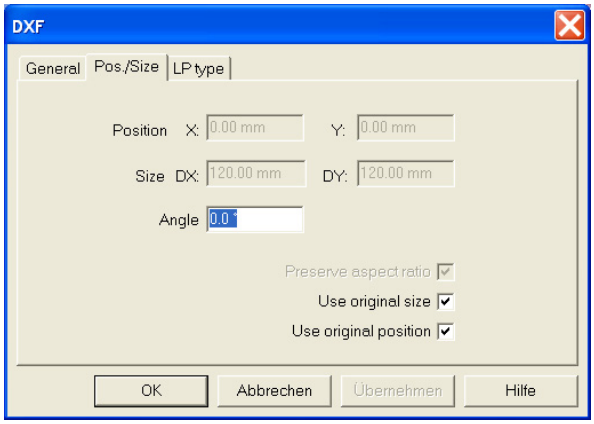


Figure 8

Position X/Y	Position X/Y [mm] of the reference point in the drawing.
Size DX/DY	Width (DX) or height (DY) of the imported DXF file [mm].
Angle	Rotational angle of the layout in degrees.
Preserve aspect ratio	By clicking on the check box (☑), the ratio between width and height of the imported DXF file remains unchanged. This function ensures that after changing the value in the input field **Size: DX**, the value in the input field **Size: DY** is recalculated to maintain the ratio between width and height.
Original size	By clicking on the check box (☑), the imported DXF drawing is inserted in the original size (without scaling).
Original position	By clicking on the check box (☑), the imported DXF drawing is inserted on its original position defined in the AutoCAD coordinate system.

The dialog field page **LP type** contains the following options:

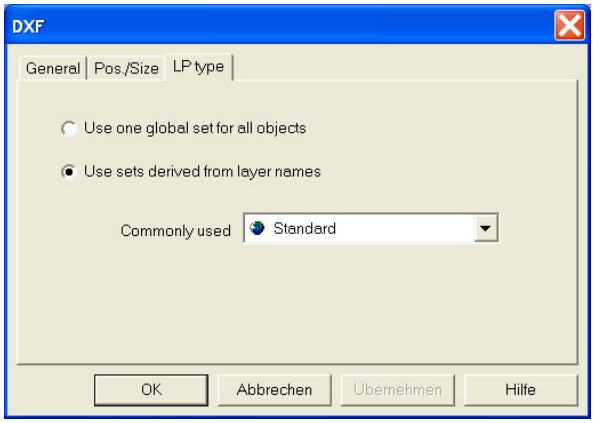


Figure 9

Use one global LP set for all layers	If this option is selected, one global laser parameter set is assigned to all objects on a layer of the imported DXF drawing. You can select the name in the drop-down list box **Reference set**. The global LP tabel contains global laser parameter sets corresponding with the type of your laser system. It is possible to create new LP sets or to edit available LP sets.
	» *VisualLaserMarker, section 9 "Working with laser parameter sets".*
Use sets derived from layer names	If this option is selected, new laser parameter sets with identical file names are created for all DXF layers included in the imported DXF drawing. The laser parameter settings defined in the selected LP set (**reference set**) will be taken over. It is then possible to configure the new created LP sets, to suit the requirements.

Supported DXF elements (R12-R14)

HEADER Section		not supported	R12
CLASSES Section		not supported	R13
TABLES Section	APPID	not supported	R12
	BLOCK_RECORD	not supported	R13
	DIMSTYLE	not supported	R12
	LAYER	supported	R12
	LTYPE	not supported	R12
	STYLE	supported	R12
	UCS	not supported	R12
	VIEW	not supported	R12
	VPORT	not supported	R12
BLOCKS Section		supported	R12
ENTITIES Section	3DFACE	supported	R12
	3DSOLID	not supported	R13
	ACAD_PROXY_ENTITY	not supported	R14
	ARC	supported	R12
	ATTDEF	partially supported	R12
	ATTRIB	not supported	R12
	BODY	not supported	R13
	CIRCLE	supported	R12
	Dimension	not supported	R12
	ELLIPSE	supported	R12
	HATCH	not supported	R14
	IMAGE	not supported	R14
	INSERT	supported	R12
	LEADER	not supported	R13
	LINE	supported	R12
	LWPOLYLINE	supported	R14
	MLINE	not supported	R13
	MTEXT	supported	R12
	OLEFRAME	not supported	R13
	OLE2FRAME	not supported	R14
	POINT	supported	R12
	POLYLINE	supported	R12
	RAY	not supported	R13
	REGION	not supported	R13
	SHAPE	not supported	R12
	SOLID	supported	R12
	SPLINE	partially supported	R13
	Text ...	supported	R12
	TOLERANCE	not supported	R13
	TRACE	supported	R12
	VERTEX	supported	R12
	VIEWPORT	not supported	R12
	XLINE	not supported	R13
OBJECTS Section		not supported	R13

5 Importing XML files

The XML format describes VLM drawings in a structured text format. The following objects are currently supported:

- Polyline
- Text
- Data matrix (including QRcode)
- Matrix
- Barcode (including PDF 417)
- Arc
- Logo
- Bitmap
- Group
- Burst

» *A detailed description according to the supported objects can be found on the VLM installation CD, under Documents/English/XML-Import.pdf.*

☞ How to import a XML file:

- Select the **Import / XML** option in the **File** menu.
  The file selection dialog for the XML files pops up.
- Select the XML file to be imported and click the [**Open**] button.

The content of the XML file is converted to the VLM format and inserted.

6 Importing PS, AI and PDF files

As of VisualLaserMarker 4.6 there is now the option to import vector-based page description languages and graphics data in the PS/AI/PDF formats. Texts are imported as curves that cannot be subsequently processed as text objects in VLM.

☞ How to import a PS (AI / PDF) file:

- Select the **Import / PS/AI/PDF...** option in the **File** menu.
  The file selection dialog for the PS, AI and PDF files pops up.
- Select the PS, AI and PDF file to be imported and click the **[Open]** button.

The content of the PS, AI and PDF file is converted to the VLM format and inserted.

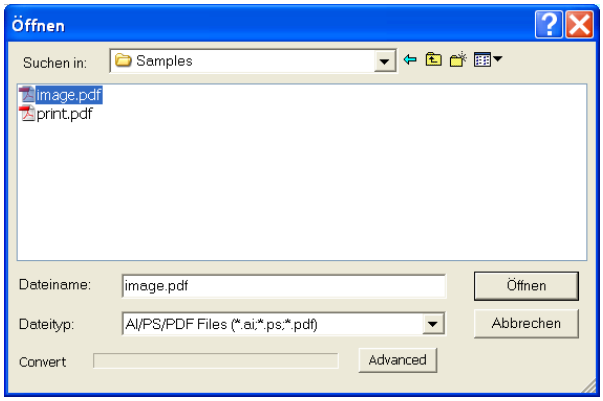


Figure 10

All graphic elements are transferred into the following atomic elements:

ENTITIES	EC	unsupported
	Page	supported
	Clip	supported
	Color	supported
	Overprint	unsupported
	Transparency	unsupported
	SpotColor	unsupported
	Linewidth	unsupported
	Linecap	unsupported
	Linejoin	unsupported
	Mitrelimit	unsupported
	Flatness	unsupported
	DashArray	unsupported
	Path	supported
	MoveTo	supported
	LineTo	supported
	CurveTo	supported
	ClosePath	supported
	Stroke	limited supported
	Filter	supported
	EOFill	limited supported
	TextEncoding	supported
	Font	supported
	Show	supported
	ImageObject	supported
	PageMatrix	supported
	ExtraJobInfo	limited supported
	Pdfmark	supported

ℹ Definition of terms see: PostScript Language Reference, third edition

The dialog page **PS** contains advanced import options This page is displayed, when you press the [**Advanced**] button in the file select dialog for PS, AI and PDF files and when you press the [**Default import settings**] button in the menu **Options / Editor settings...** on the dialog field page **Import/Export** under **Import/Export / PS/AI/PDF** » *Fig. 2*.

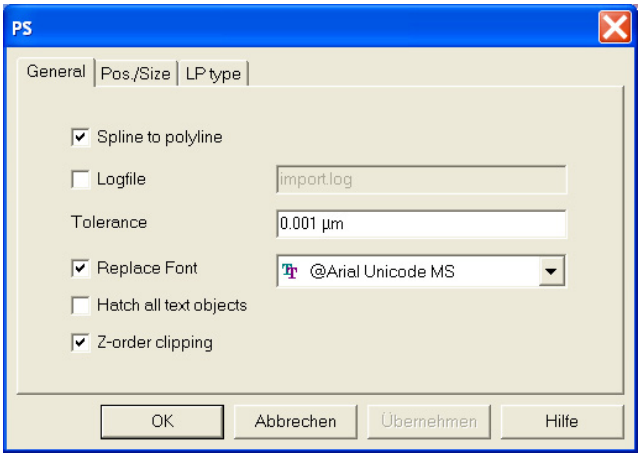
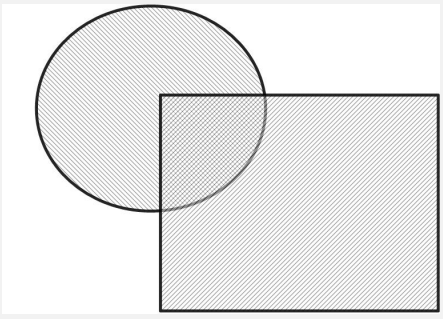
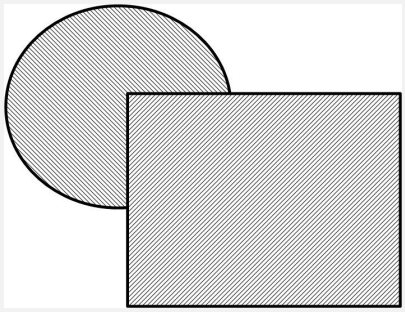


Figure 11

The **General** dialog field page contains the following options:

Spline to polylinie	If this check box is set active (☑), all splines in the PS, AI or PDF file will be imported as polylines. If this check box is not set active (☐), all splines in the PS, AI or PDF file will be imported as bezier curves.
Log file	By clicking on the check box (☑), you can enable the creation of a logfile. The name of the log file can be inserted in the entry field.
Tolerance	The value for the minimum valid object size is inserted here. All elements below the defined value will be filtered out.
Replace Font	This option is not available for PS, AI and PDF files.
Hatch all text objects	This option is not available for PS, AI and PDF files.
Z-order clipping	If this check box is set active (☑) overlapping surfaces are cut off (= clipping). The Z-order specifies which object appears upon the other.
	Example clipping not activated:  Example clipping activated: 

The **Pos./size** dialog field page (» *Fig. 8*) contains the following options:

Position X/Y	Position X/Y [mm] of the reference point in the drawing.
Size DX/DY	Width (DX) or height (DY) of the imported PS, AI or PDF file [mm].
Angle	Rotational angle of the layout in degrees.
Preserve aspect ratio	By clicking on the check box (☑), the ratio between width and height of the imported PS, AI or PDF file remains unchanged. This function ensures that after changing the value in the input field **Size: DX**, the value in the input field **Size: DY** is recalculated to maintain the ratio between width and height.
Original size	By clicking on the check box (☑), the imported PS, AI or PDF drawing is inserted in the original size (without scaling).
Original position	By clicking on the check box (☑), the imported PS, AI or PDF drawing is inserted on its original position defined in the AutoCAD coordinate system.

The **LP type** dialog field page (» *Fig. 9*) contains the following options:

Use one global LP set for all layers	If this option is selected, one global laser parameter set is assigned to all objects on a layer of the imported PS, AI or PDF drawing. You can select the name in the drop-down list box **Reference** set. The global LP tabel contains global laser parameter sets corresponding with the type of your laser system. It is possible to create new LP sets or to edit available LP sets.
	» *VisualLaserMarker, section 9 "Working with laser parameter sets".*
Use sets derived from layer names	If this option is selected, new laser parameter sets with identical file names are created for all PS, AI or PDF layers included in the imported PS, AI or PDF drawing. The laser parameter settings defined in the selected LP set (**reference set**) will be taken over. It is then possible to configure the new created LP sets, to suit the requirements.

7 Exporting PL0 files

Exporting a VLM drawing into a PL0 file allows drawings which were created with the VLM graphic editor to be exported as a PL0 file. These can be executed in the OS2 system **L**aser**W**ork**B**ench (a Rofin Sinar marking system). When exporting, parameters such as scaling, laser parameters, etc. remain unchanged.
To export a VLM file into a PL0 file click on the option **Export / PL0** in the **File** menu.

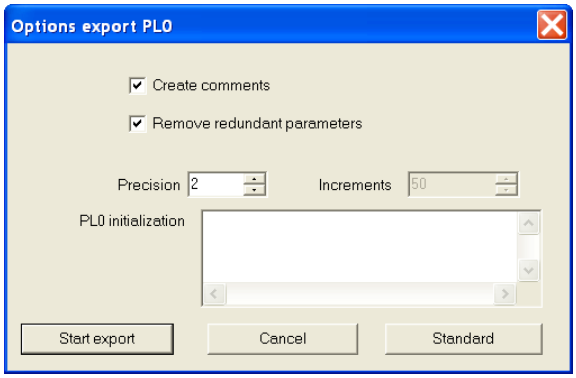


Figure 12

The PL0 export dialog contains the following options:

Create comments	If selected (☑), the name, the ID and the class of the object are generated automatically and will be transmitted in the PL0 file.
Remove redundant parameters	If selected (☑), repetitive, unchanged parameters are removed, when exported.
Precision	The precision of the numbers exported into the PL0 file is determined here.
Increments	(Without any function).
PL0 initializations	It is possible to enter PL0 commands in this field. They will be exported into the PL0 file.

8 Exporting logo files

During export, a file with a freely selectable name (***.log) is generated. The logo generated in this way can then be integrated into the VLM drawing.

When exporting, there is the option to switch ellipses to a freely selectable resolution in polylines. This is only of use if the generated logo is to be executed with a laser operated with the OS2 system **L**aser**W**ork**B**ench whose **LWB** version is older than Version 3.0.

☞ How to export a logo:

- Select the option **Export / Logo** in the **File** menu.
- Overwrite the original file with the edited logo or save the edited logo under a different name.

The export dialog for logo files pops up:

- Click the [**Start Export**] button.

If the ellipse is to be exported as a polyline, click on the check box **Export ellipses as polylines** ☑, enter the Number of increments of a full ellipse in the appropriate input field and click on the [**Start Export**] button.

The logo is exported.

Figure 13

9 Exporting DXF files

A DXF file (Drawing Exchange) is an ASCII description of an AutoCad drawing.
The following drawing objects which are created in the VLM graphic editor are allowed to be exported in a DXF format (version AC1009): polyline, rectangle (right angled), ellipse and arc. Information about layers remains unchanged in the process.

ℹ The export of the layers is controlled by the attribute "Exportable". I.e. only objects with the attribute 'exportable' will be exported. The color information is not supported, so that all objects are exported black colored.

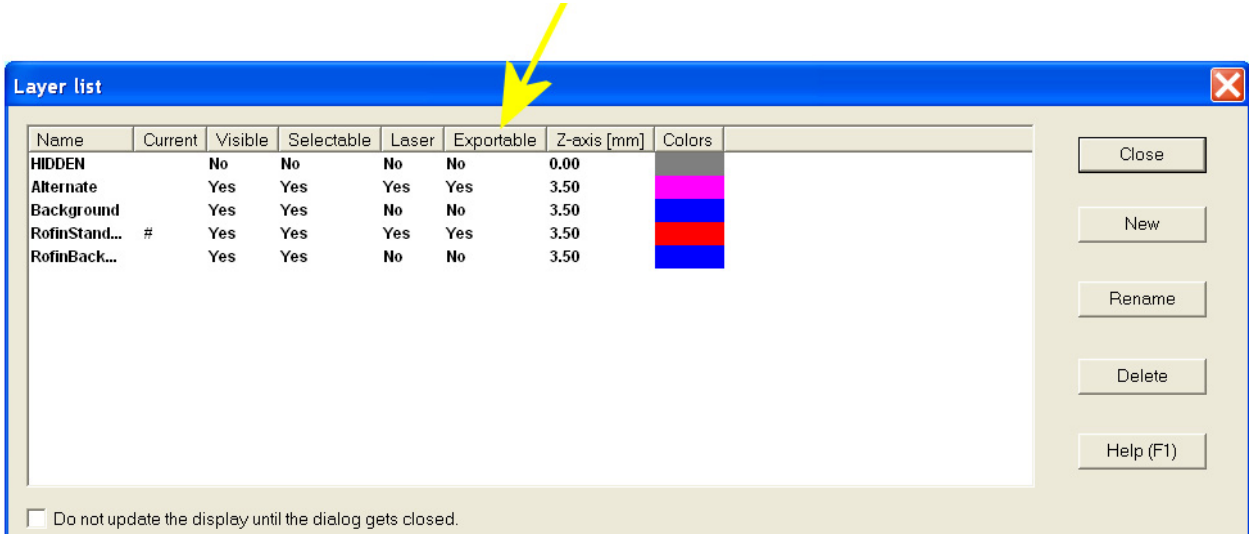


Figure 14

ℹ Groups can be exported as plain lists of the objects mentioned above. The group hierarchy is thus lost.

☞ How to export a DXF file:

- Select the option **Export / DXF** in the **File** menu.
- Save the DXF file with a selected name.

10 Exporting VIS files

This proprietary Rofin-Sinar format which is used with a vision system. A detailed description according to the format is available on request.

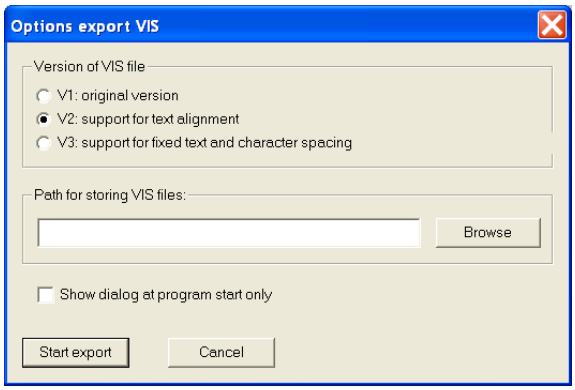


Figure 15

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