LD-LRS1000 to 5100
LD-OEM1000 to 3100
Laser Measurement Systems

SICK
Sensor Intelligence.

Software version described

Software/tool	Function	Status
Device description LD-XXXX	Device specific software module for SOPAS	V 00.01.00 or higher
SOPAS	Configuration software	V 02.18 or higher

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Abbreviations

BCC	Block character check
CAN	Controller Area Network = standardised fieldbus system with message-based protocol for exchanging data
CS	Checksum
DSP	Digital signal processor = digital signal processor for internal data processing using application software
HTML	Hypertext Markup Language = page description language in the Internet
LED	Light emitting diode
LD-LRS	Ladar long range laser scanner = laser scanner with large scanning range, based on so-called Ladar technology (Ladar = laser emitting radar)
RAM	Random Access Memory = volatile memory with direct access
ROM	Read-only Memory = read-only memory (non volatile)
SOPAS	SICK OPEN PORTAL for APPLICATION and SYSTEMS Engineering Tool = configuration software for the configuration of the LD-LRS/LD-OEM
UPF	User protocol frame
USP	User services protocol = protocol for user-programmed evaluation

Tables

Figures

1   About this document

Please read this chapter carefully before working with this documentation and the LD-LRS/LD-OEM laser scanner.

1.1   Function of this document

This document **provides technical personnel** information on the configuration and diagnostics for the LD-LRS/LD-OEM laser scanner using the SOPAS configuration software.

1.2   Target group

The target group for this document are people such as technicians, service technicians and engineers who configure and perform diagnostics on the LD-LRS/LD-OEM.

1.3   Depth of information

This document contains information on the configuration, diagnostics and troubleshooting for the LD-LRS/LD-OEM laser scanner with the aid of the SOPAS configuration software.

Planning and using laser scanners such as the LD-LRS/LD-OEM also require specific technical skills which are not detailed in this documentation.

When operating the LD-LRS/LD-OEM laser scanner, the national, local and statutory rules and regulations must be observed.

1.4   Symbology used

Reference	Text in italics indicates a reference to more detailed information.
Recommendation	Recommendations are designed to give you assistance in the decision-making process with respect to a certain function or a technical measure.
Important	Sections marked "Important" provide information about special features of the device.
Explanation	Explanations provide background knowledge on technical relationships.
MENU COMMAND	This typeface indicates a term in the SOPAS user interface.
Terminal output	This typeface indicates messages that the LD-LRS/LD-OEM outputs via its terminal interface.
➤ Take action ...	Instructions for taking action are shown by an arrow. Read carefully and follow the instructions for action.

This symbol refers to additionally available documentation.

⚠ **WARNING**

Warning!

A warning indicates an actual or potential hazard. They are designed to help you to prevent accidents and to protect the device from being damaged.

Read carefully and follow the warning notices!

Software notes show you where the related setting can be made in SOPAS.

2   For your safety

This chapter deals with your own safety and the safety of the equipment operators.

➢ Please read this chapter carefully before configuring the LD-LRS/LD-OEM.

2.1   Authorised personnel

The LD-LRS/LD-OEM laser scanner must be configured and commissioned only by adequately qualified personnel.

The following qualifications are necessary for the various tasks:

- knowledge on the use and operation of devices in the related application (e.g. conveyors)
- knowledge on the software and hardware environment in the related application (e.g. conveyors)
- basic knowledge of the Windows operating system
- basic knowledge of the usage of an HTML browser (e.g. Internet Explorer)
- basic knowledge of data transmission

2.2   General safety notes and protective measures

⚠ WARNING

Safety notes

Please observe the following items in order to ensure the correct and safe use of the LD-LRS/LD-OEM laser scanner.

- The notices in this online help (e.g. on use, mounting, installation or integration into the existing machine controller) must be observed.
- National/international rules and regulations apply to the installation, commissioning, use and periodic technical inspections of the laser scanner, in particular:
    - work safety regulations/safety rules
    - other relevant health and safety regulations
- Manufacturers and users of the system are responsible for obtaining and observing all applicable safety regulations and rules.
- The tests must be carried out by specialist personnel or specially qualified and authorised personnel and must be recorded and documented to ensure that the tests can be reconstructed and retraced at any time.

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3   Configuration

The LD-LRS/LD-OEM laser scanner is adapted to the on-site measurement situation by means of the configuration. You can configure and test the measurement properties, the analysis behaviour and the output properties of the system as required.

NOTICE

Do not switch off the voltage supply during configuration!

Switching off the voltage supply during configuration causes all parameters already configured to be lost.

Password protection

Software access to the LD-LRS/LD-OEM is password protected. The default factory setting for the password is as follows:

User level	Password
Authorised client	client

Tab. 1:   Passwords

Recommendation   Following completion of the configuration, you should change the default password so that it can perform its protective function.

How to login to the LD-LRS/LD-OEM:

➢   From the TOOLS menu select the LOGIN DEVICE... command.

    The LOGIN dialog box will open.

➢   Choose the USER LEVEL, enter the PASSWORD and click on LOGIN.

    You can now enter parameters on the device pages.

Save parameter permanently

The data are initially saved in the RAM of the LD-LRS/LD-OEM so that you can check the effect immediately. On completion of the configuration, you must save the parameters permanently in the flash memory of the LD-LRS/LD-OEM.

How to save the parameters permanently in the LD-LRS/LD-OEM:

➢   From the LD_XXXX menu, choose the command PARAMETER, SAVE PERMANENTLY.

    In this way the parameters are saved in the flash memory of the LD-LRS/LD-OEM and will also be available after the device is switched off and on again.

Resetting configuration

Recommendation   To reset the LD-LRS/LD-OEM to the default delivery status, you should first export the device data to a file from a device that is in the default delivery status. You can then subsequently load these device data into an already configured device to reset its configuration to the default delivery status.

How to reset the configuration of the LD-LRS/LD-OEM:

➢ In the PROJECT menu, choose the command EXPORT DEVICE.

➢ Save the SOPAS ET device file on a suitable drive, e.g. as BASIC_CONFIGURATION.SDV.

➢ On an already configured device, choose on the EDIT menu, the LOAD DEVICE DATA TO PROJECT command.

➢ Choose the device data saved, e.g. as BASIC_CONFIGURATION.SDV.

The parameters for the **LD-LRS/LD-OEM** are overwritten with the parameters from the default delivery status.

3.1 Preparing the configuration

To configure the LD-LRS/LD-OEM laser scanner you need:

• SOPAS configuration software on CD-ROM

• PC/notebook with standard Intel Pentium or compatible processor, at least Pentium III, 500 MHz; RAM: minimum 256 MB, 512 MB recommended; Operating system: MS Windows 2000, XP or Vista; Monitor: minimum 256 colours, 65 536 colours recommended; Hard disc: minimum 170 MB free memory; CD-ROM drive; HTML browser on PC, e.g. Internet Explorer™: for the online help system for SOPAS; Data interface RS-232, RS-422, Ethernet

• connecting cable between PC and LD-LRS/LD-OEM (see section "Ordering information" in the operating instructions for the LD-LRS/LD-OEM)

How to prepare the configuration:

➢ Make sure that the LD-LRS/LD-OEM laser scanner has been correctly mounted and that the electrical connections are correct and in place.

➢ Plan all the necessary adjustments.

➢ Install the provided SOPAS configuration software from CD-ROM.

➢ Connect the PC/the notebook with the LD-LRS/LD-OEM. The connection of the PC is described in the chapter "Electrical installation" in the operating instructions for the LD-LRS/LD-OEM.

3.2 Field application

With the aid of the integrated field application, the LD-LRS/LD-OEM evaluates up to four evaluation fields within its scan area. Using the field application, you can e.g. implement systems for collision protection, for building surveillance or for access monitoring.

It is indicated whether the field application is active or not in the APPLICATION SELECTION area.

An active application is indicated by a green LED symbol, an application that is not active is indicated by a yellow LED symbol.

The field application is inactive in the default delivery status.

Important   When you activate or deactivate the field application, the LD-LRS/LD-OEM will be deleted from the SOPAS project tree.

➢ Add the LD-LRS/LD-OEM back to the project tree in SOPAS by scanning and adding in the NETWORK SCAN ASSISTANT.

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How to activate the field application of the LD-LRS/LD-OEM:

➢ In the PROJECT TREE, LD_XXXX_AP01, APPLICATION, open the device page APPLICATION SELECTION.

You can activate and deactivate the field application in the APPLICATION SELECTION area.

Configuration mode/application mode

Before you can edit the parameters on the device pages for the field application, you must switch SOPAS to the configuration mode. For the parameters to then become effective, you must switch back to the application mode.

➢ On the toolbar click the symbol shown.

The buttons on the related device pages become active and as a result are displayed in colour. You can now use the configuration function on the FIELD EDITOR device page.

➢ Once configuration is complete, click the symbol shown on the toolbar.

The actual configuration is transferred and saved in the LD-LRS/LD-OEM. The diagnostics function on the FIELD EDITOR device page can now be used.

3.3   Create evaluation fields

The existing fields are displayed on the FIELD EDITOR device page in a table. You will find a preview of the existing evaluation fields to the right of the table.

Note   Before you can edit the parameters on the FIELD EDITOR device page, you must switch SOPAS to the configuration mode (see "Configuration mode/application mode" on page 9).

You can run the following functions using the buttons:

Symbol	Meaning	Comment
	Create evaluation field	Using this button you can create a new evaluation field. The ENTER FIELD PARAMETERS dialog box is opened (see 3.3.1 on page 10).
	Edit evaluation field	You can edit an existing evaluation field using this button. ➢ For this purpose mark one of the evaluation fields in the table and then click the button.
	Delete evaluation field	You can delete an existing evaluation field using this button. ➢ For this purpose mark one of the evaluation fields in the table and then click the button.
	Copy evaluation field	You can copy an existing evaluation field using this button. During this process, all parameters in the existing field are copied to the new field. ➢ For this purpose mark one of the evaluation fields in the table and then click the button.

Tab. 2:   Buttons for managing the evaluation fields

How to configure the fields of the LD-LRS/LD-OEM:

➢ In the PROJECT TREE, LD_XXXX_AP01, APPLICATION, FIELD EVALUATION, open the device page FIELD EDITOR.

In the FIELD CONFIGURATION area you can create, copy, edit or delete fields.

3.3.1 Name and type of the evaluation field

In the first step of the assistant you define the name of the evaluation field and its type. The type determines how you draw the evaluation field in the next step.

- Segmented
  You create the evaluation field in individual segments by setting each individual point of the field. The field can be almost any shape.

- Rectangular
  The evaluation field created is rectangular; the size and angle of rotation of the rectangle can be changed. But it is always of rectangular shape.

3.3.2 Using the field editor
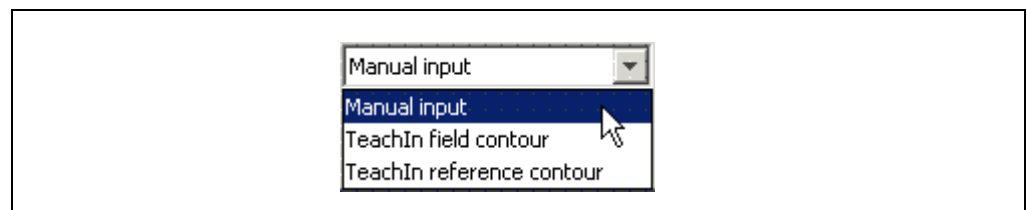
Fig. 1:   Selection of the method for creating evaluation fields

You can …

- adapt the field editor view to your needs or your application (see **section 3.3.3 "Adapting the field editor view" on page 11**).

- create an evaluation field manually using the drawing tools (see **section 3.3.4 "Setting end points for a field" on page 12** and **section 3.3.5 "Creating and editing a rectangular evaluation field" on page 14**).

- teach-in an evaluation field with the aid of the LD-LRS/LD-OEM (see **section 3.3.7 "Teaching-in an evaluation field" on page 17**).

- teach-in the reference contour for an evaluation field (see **section 3.3.8 "Defining the contour as a reference" on page 17**).

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3.3.3   Adapting the field editor view

To be able to work optimally with the field set editor, you can change the screen layout.

Symbol	Meaning	Comment
	Zoom	Using these buttons you can make the following changes to the view: • zoom in • zoom out • zoom in/zoom out on all active points of the field • zoom in/zoom out to default size
0.00°	Rotate	You can rotate the field editor view using the input field or the buttons beside the input field. In this way you can change the view, for example, to suit your application. ➢ Enter the angle of rotation ° in the input field. Or ➢ Change the angle of rotation of the view in steps using the arrow buttons beside the field on the right.
	Views	Using these buttons you can make the following changes to the view: • display measurement contour as a line or as individual points • show the LD-LRS/LD-OEM scan line • Show other fields. You can then see the existing fields as a contour. • change between Cartesian and polar view • Mirror the view on the LD-LRS/LD-OEM, i.e. you no longer see the LD-LRS/LD-OEM from above, but from below.

Tab. 3:   Buttons for changing the field editor view

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3.3.4 Setting end points for a field

First set the end points for an evaluation field. The end points represent the outer limit of the evaluation field. The evaluation field starts at the laser scanner in this step. If the evaluation field is only to start a certain distance from the laser scanner, start points must be set (see **section 3.3.6 "Setting start points for a field" on page 17**).
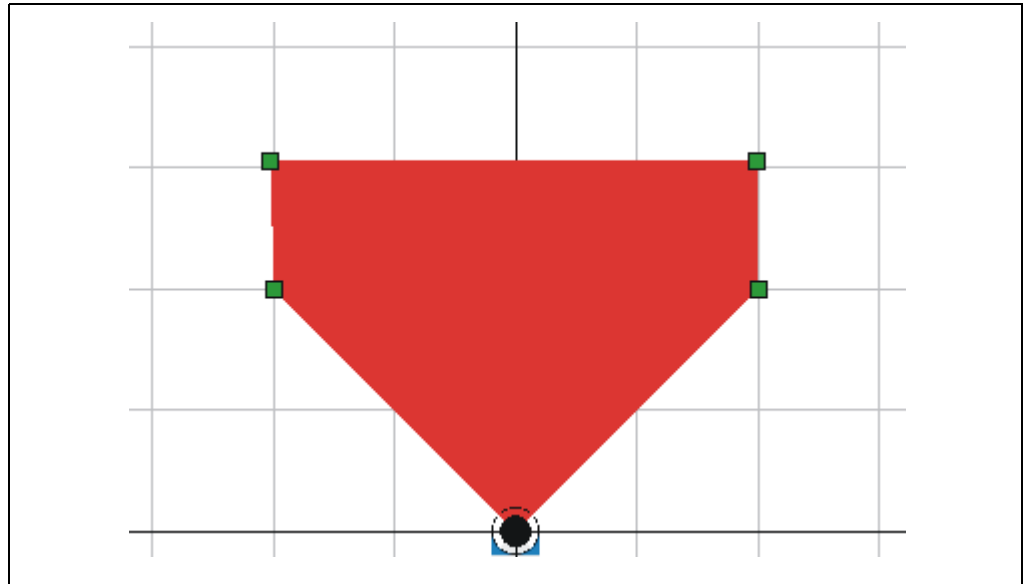

Fig. 2: End points for a field

How to set end points:
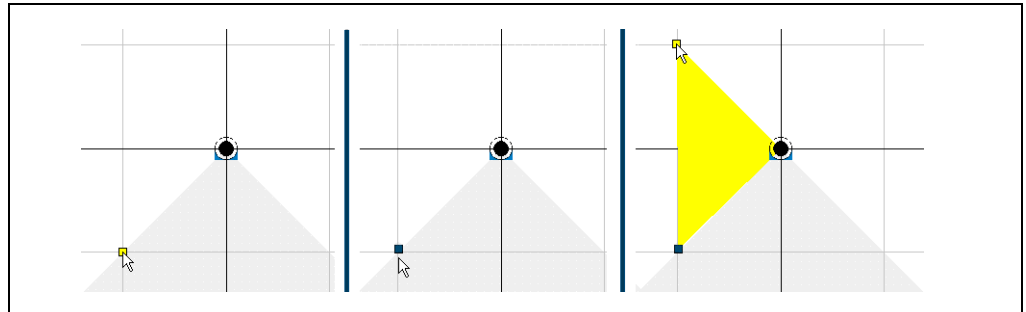
Fig. 3: Setting end points 1

➢ Choose the symbol shown on the toolbar.

➢ Move the mouse pointer over the co-ordinate field in the field editor.
The possible point is displayed as a yellow square.

Important You can only set points in the measurement area of the LD-LRS/LD-OEM.

➢ Click the position where you want to set the point.
The point set is displayed as a green square.

➢ Move the mouse pointer to the next point on the field.
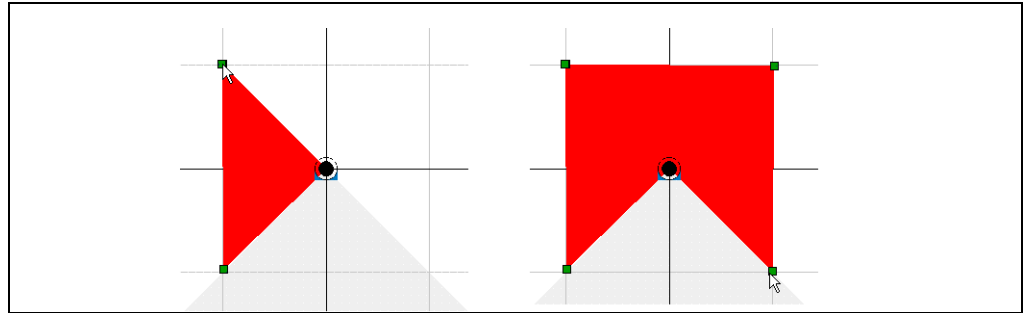The field you are creating is shown in yellow.

Fig. 4:   Setting end points 2

➢   Click the position where you want to set the point.
     The resulting field is shown in red.

➢   Complete the field by setting further points.

Explanation   •   The coordinates of the mouse pointer are shown in the fields in the COORDINATE area.

              •   The coordinates of the points set are shown in the FIELD POINTS area.

How to move end points:

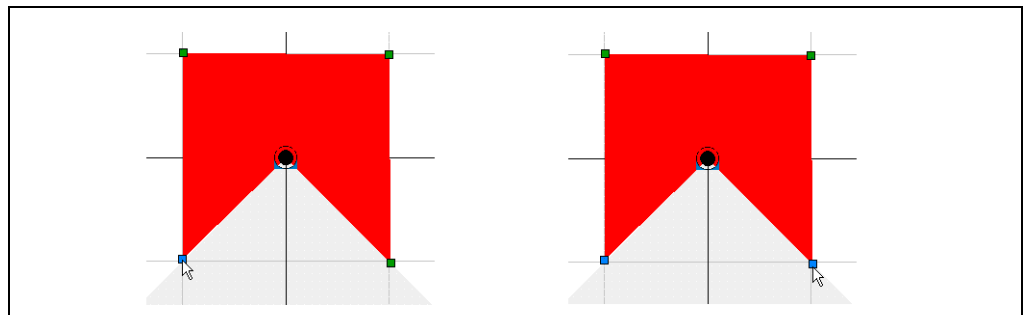You can move one end point individually or several end points at the same time.

Fig. 5:   Moving end points 1

➢   Choose the symbol shown on the toolbar.

➢   Click one of the points for the evaluation field.
     Or:

➢   Keep the `Ctrl` key pressed and click further points for the evaluation field.
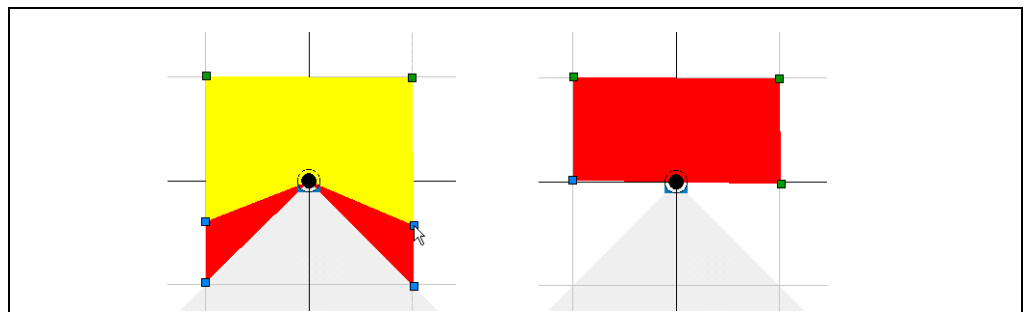   The points clicked are marked in blue.

Fig. 6:   Moving end points 2

➢   Keep the mouse button pressed and move the point or points.
     The field you are creating is shown in yellow.

➢   Release the mouse button at the position where you want to position the points.
     The field now produced is again shown in red.

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How to delete end points:

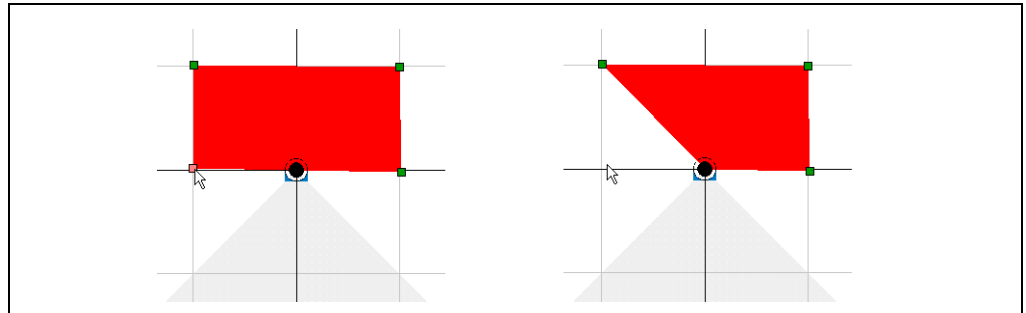You can delete one end point individually or several end points at the same time.

Fig. 7:   Deleting end points 1

➢ Choose the symbol shown on the toolbar.

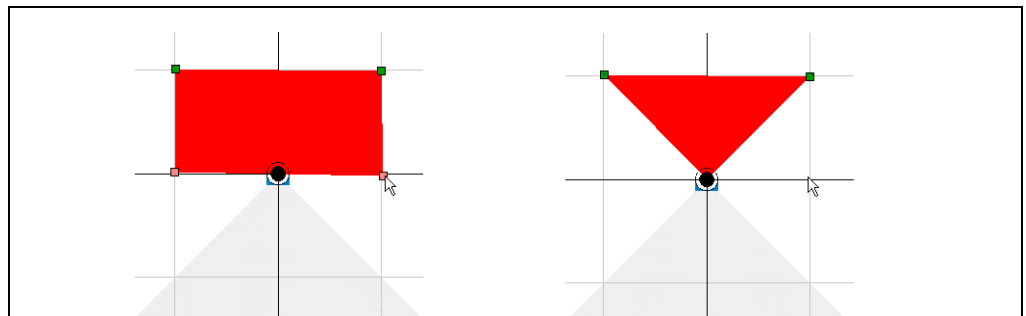➢ Double-click one of the points for the evaluation field.
The point is deleted.

Fig. 8:   Deleting end points 2

Or:

➢ Keep the `Ctrl` key pressed and click further points for the evaluation field.
The points clicked are marked in red.

➢ Press the `Del` key.
The points are deleted.

3.3.5   Creating and editing a rectangular evaluation field

If, during the selection of the basic parameters you selected the RECTANGLE option (see
section 3.3.1 "Name and type of the evaluation field" on page 10), then there is already a
rectangular field in the field editor. You can move, increase or reduce in size, and rotate this
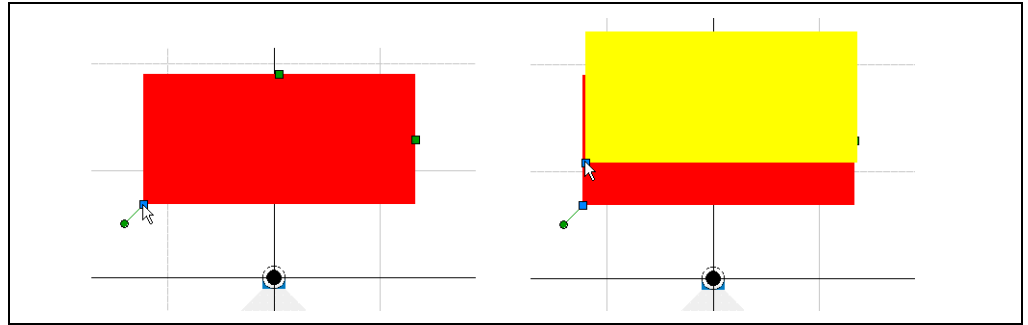field.

How to move a rectangular evaluation field:

Fig. 9:   Moving a rectangular field

➢ Choose the symbol shown on the toolbar.

➢ Click the bottom right point of the field.
The point changes to blue.

➢ Keep the mouse button pressed and move the field.
During the movement the field is shown in yellow. As soon as you release the mouse button, the field is shown in red again.
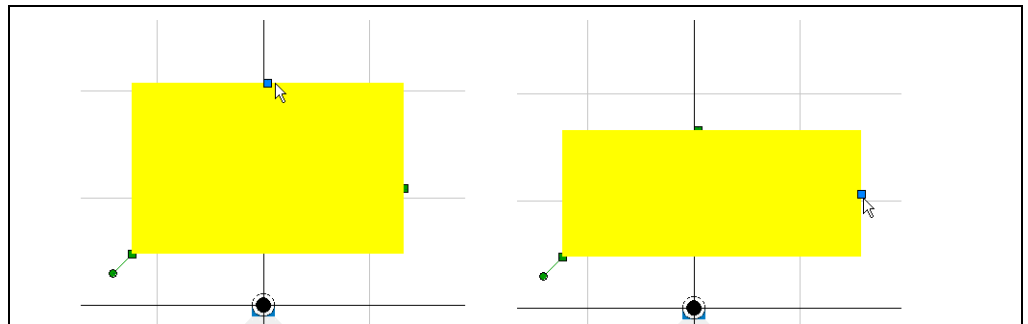
How to increase or reduce the size of a rectangular evaluation field:

Fig. 10:   Increasing or reducing the size of a rectangular field

➢ Choose the symbol shown on the toolbar.

➢ Click the top point or the right point for the field.
The point changes to blue.

➢ Keep the mouse button pressed and drag to increase and reduce the size of the field.
During the movement the future field is shown in yellow. As soon as you release the mouse button, the field is shown in red again.
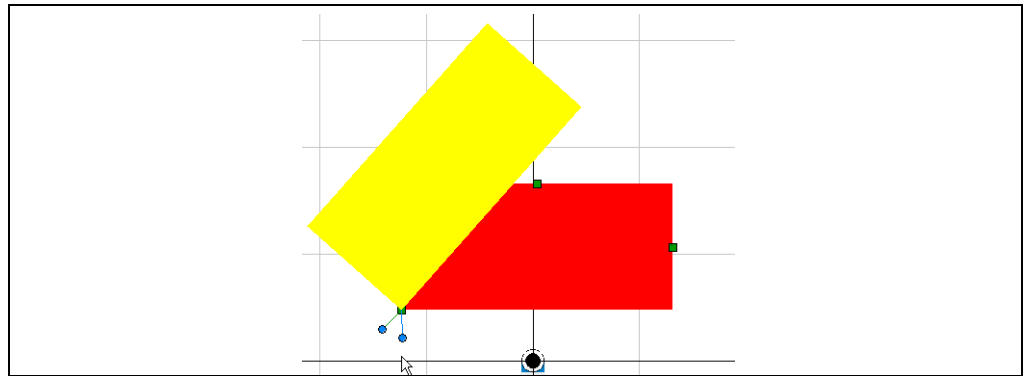
How to rotate a rectangular evaluation field:

Fig. 11:   Rotating a rectangular field

➢   Choose the symbol shown on the toolbar.

➢   Click the round point at the bottom left corner of the field.
    The point changes to blue.

➢   Keep the mouse button pressed and rotate the field about the bottom left point.
    During the movement the future field is shown in yellow. As soon as you release the
    mouse button, the field is shown in red again.

How to change the evaluation field by making entries:

➢   In the FIELD POINTS area click the EDIT button.
    You can now edit the fields in the FIELD POINTS area.

➢   In the BASE POINT area, enter the X and Y coordinates for the bottom left point of the
    evaluation field.

➢   Enter the angle of rotation in ° in the ROTATION field.

➢   Enter the dimensions of the evaluation field in the WIDTH and LENGTH fields.

➢   Click on the PREVIEW button.
    The new evaluation field is displayed in yellow.

➢   In the CONFIRM CHANGES dialog box, click the YES button.
    The changes are applied and the evaluation field is displayed in red

Configuration

3.3.6   Setting start points for a field

By setting start points you can implement fields that only start a certain distance from the laser scanner. Using such fields it is, for instance, possible, to walk or drive through the area between the laser scanner and the evaluation field.
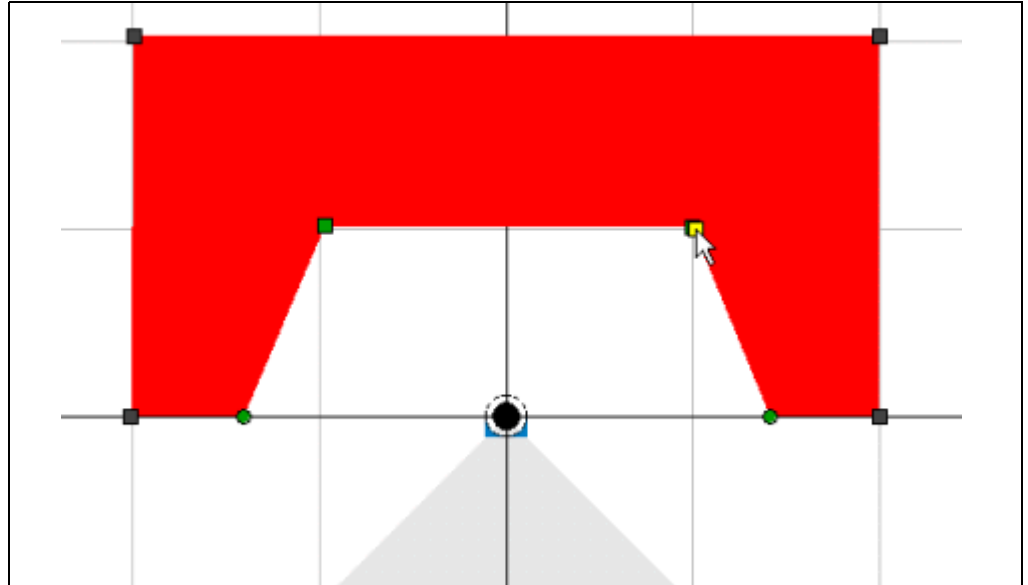

Fig. 12:   Starting points for a field

For information on how to set, move or delete start points, see **section 3.3.4 "Setting end points for a field" on page 12**.

When start points are set, the field editor may set points that are required for physical reasons in certain circumstances. You can move these points like any others, but you cannot delete them.

- The points that you have set using the mouse are shown as squares.
- The points that have been set automatically are shown as circles.

3.3.7   Teaching-in an evaluation field

Instead of drawing an evaluation field using the field editor, you can also use teach-in. The laser scanner scans the visible room contour several times. From the data obtained SOPAS determines the contour of the field. You can edit an evaluation field you have taught-in:

➢ Move the individual points of the field using the mouse until the field is of the required shape and size (see **section 3.3.4 "Setting end points for a field" on page 12**).

3.3.8   Defining the contour as a reference

With the contour as reference function, an evaluation field with start and end points is used as a contour segment. The contour monitoring strategy is allocated to this field using the evaluation case.

Within the contour segment, the contour of an object (e.g. a house wall) must cover the entire width of the segment, i.e. an object must always be present (the scanned contour is used as a reference).

The LD-LRS/LD-OEM reacts if the scanned contour is no longer completely within the tolerance band, e.g. due to a change in the position of the laser scanner (tamper protection).

3.4   Create evaluation cases

Note   Before you can edit the parameters on the EVALUATION CASES device page, you must switch
SOPAS to the configuration mode (see "Configuration mode/application mode" on page 9).

The existing evaluation cases are displayed in a table in the EVALUATION CASES area. You can
run the following functions using the buttons above the table:

Symbol	Meaning	Comment
	Create evaluation case	You can create a new evaluation case using this button.
	Edit evaluation case	You can edit an existing evaluation case using this button. ➢ For this purpose, mark one of the evaluation cases in the table.
	Copy evaluation case	You can copy an existing evaluation case using this button. During this process, all parameters for the existing evaluation case are copied to the new evaluation case. ➢ For this purpose, mark one of the evaluation cases in the table.
	Delete evaluation case	You can delete an existing evaluation case using this button. ➢ For this purpose, mark one of the evaluation cases in the table.

Tab. 4:   Buttons for managing the evaluation cases

How to configure the evaluation cases of the LD-LRS/LD-OEM:

➢   In the PROJECT TREE, LD_XXXX_AP01, APPLICATION, FIELD EVALUATION, open the device page
EVALUATION CASES.

In the EVALUATION CASES area you can create, copy, edit or delete evaluation cases.

Name of the evaluation case

In SOPAS each evaluation case is given a name as well as its number.

➢   Enter a name for the evaluation case directly in the table of evaluation cases.

➢   Use meaningful names that describe the evaluation case (such as forward movement,
slow movement, day configuration, night configuration, etc.).

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3.4.1   Evaluation strategy

Type of evaluation strategy

The type of evaluation strategy defines the effect of an evaluation case:

- Field monitoring with blanking
  The entire area of the field is monitored. If an object enters the field, this result is sent to the related output.
  Using blanking, objects up to a certain size can be blanked, i.e. if such an object enters the evaluation field, it will not be detected as a field infringement.

- Contour monitoring with blanking
  The contour or parts of the contour in a field are monitored. As a result the LD-LRS/LD-OEM can detect, e.g., that a door is opening outwards or that the position of the LD-LRS/LD-OEM is being changed. Also crawling beneath a vertical evaluation field or the deflection of the laser beam by a mirror can be detected.
  Using blanking the lack of part of a contour can be blanked up to a certain size.

- System test
  The status of the LD-LRS/LD-OEM is output on the configured output.

Blanking of objects

The blanking of objects prevents switching of the evaluation field by objects that are not to be detected. In this way, e.g. cables, steel ropes or hoses can be laid through the evaluation field.

You define the size of the objects to be blanked for the blanking.

Important   If blanking is configured, small objects in the near range of the LD-LRS/LD-OEM can cause large shadows. To prevent this situation arising, you can configure the TAMPER PROTECTION option. This tamper protection switches the evaluation field if an object that is smaller or equal in size to the blanked object size is in front of the laser output aperture on the LD-LRS/LD-OEM for an extended period.

With the OBJECT SEPARATION option, overlapping objects within a certain distance are regarded as one object.

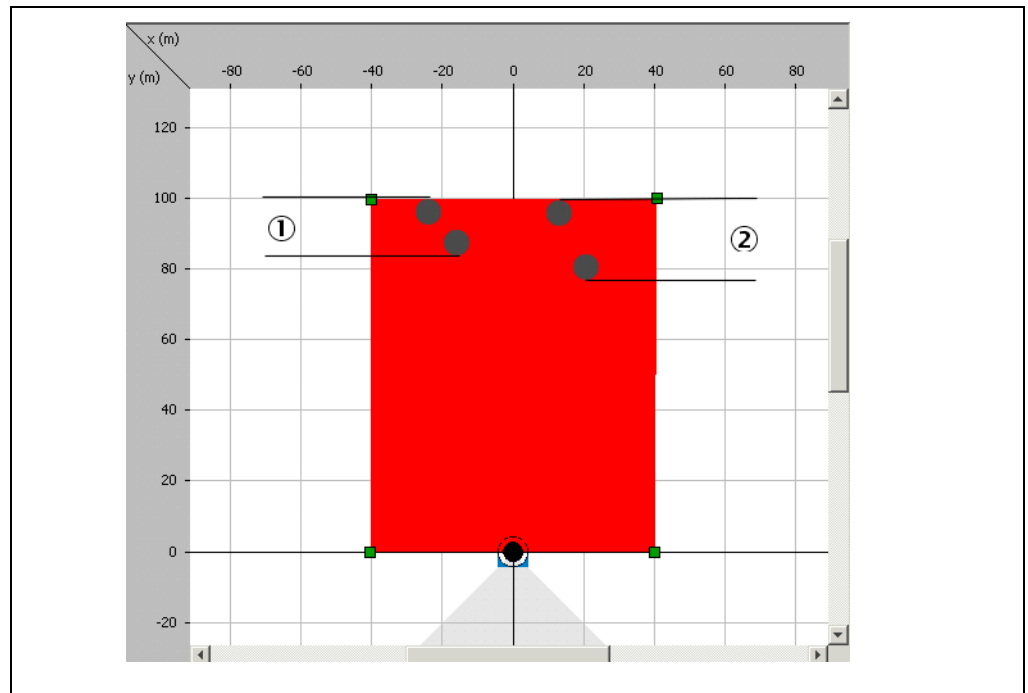The value in the OBJECT SEPARATION field defines the depth within which the two objects are combined.

Fig. 13:   Object separation with blanking of objects

In Fig. 13 the objects in example (1) are so close together (distance ≤ value in the OBJECT SEPARATION field) that they are considered as one object. As a result the objects are not blanked and the evaluation field is considered infringed.

In example (2) the objects are far enough apart (distance > value in the OBJECT SEPARATION field) that they are considered as two separate objects. As a result the objects are blanked and the evaluation field is considered to not be infringed.

Used field

For each evaluation case, you can define which evaluation field is to be used. You can only select evaluation fields if you have first created at least one evaluation field (see section 3.3 "Create evaluation fields" on page 9).

Output

The evaluation field used and the evaluation strategy for the evaluation case produce an evaluation result as soon as the field is interrupted.

➢ Choose the physical output on the LD-LRS/LD-OEM on which the result of the evaluation case is to act.

Response time of the output

The response time for the output means that objects in the evaluation field or the lack of objects in the contour of the evaluation field will not immediately result in the response of the output. Objects must therefore be scanned several times if a response time is configured (for a scanning frequency of 10 Hz and a response time of 1000 ms for example 10 times).

Important   Take into account this response time if you use a downstream system, e.g. for stopping a vehicle or plant. You must then, e.g., increase the stopping distance accordingly.

How to define the strategy of an evaluation case:

➢ In the PROJECT TREE, LD_XXXX_AP01, APPLICATION, FIELD EVALUATION, open the device page EVALUATION CASES.

In the EVALUATION CASE PARAMETERS area you can configure the parameters for the evaluation strategy described above.

3.5   Switching outputs

Name

You can assign a name to each output. The name is transferred, for instance, in the message.

Logical operators

If several evaluation cases act on an output, you can define how the results from the evaluation cases are to be linked together using logical operators. The related results can be linked using an AND or an OR operator.

Connection layout

Using the LOW ACTIVE check box you can define whether the output switches electrically inverted.

Resetting the outputs

In the RESTART field you can choose for each output whether the output is to be reset immediately when the evaluation field is unoccupied or whether the output is to remain active for a time. If the output is to remain active for a time, then in the TIME field configure a time in ms that the output is to remain in this active output state.

You can configure a delay of up to 10 s (e.g. to activate a horn or to send the signal to a PLC).

How to configure the function of the outputs:

➢ In the PROJECT TREE, LD_XXXX_AP01, APPLICATION, FIELD EVALUATION, open the device page SWITCHING OUTPUTS.

In the SWITCHING OUTPUT area you can configure the parameters described above for the outputs.

3.6   Diagnostics of the field evaluation

On the DIAGNOSTICS device page you can use the same tools to configure the view as in the field editor (see section 3.3.3 "Adapting the field editor view" on page 11).

You can monitor whether and how evaluation fields are infringed and how the outputs on the LD-LRS/LD-OEM behave.

➢ In the top right selection field, choose whether you want to monitor the field application based on evaluation cases or based on the outputs.
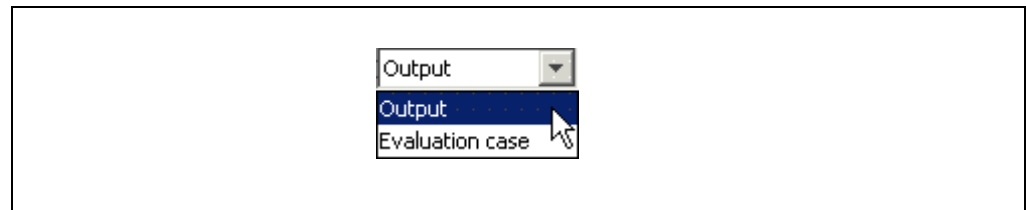
```
Output              ▼
Output
Evaluation case    ⬉
```

Fig. 14:   Selection of the display in the diagnostics

Display of the evaluation cases

➢ In the EVALUATION CASE area, choose the evaluation case to be monitored.

Under the name of the evaluation case, the configured strategy, the field allocated and the status of the field are displayed.

The evaluation field allocated to the evaluation case is displayed in the actual Diagnostics window.

In the OUTPUTS area the states and the number of switching actions since switching on are displayed for outputs 1 to 4.

Display of the outputs

➢ In the EVALUATION OUTPUT area, choose the switching output to be monitored.

Under the name of the output, the name and number of the evaluation cases on which the output acts are displayed.

The evaluation fields allocated to the output are displayed in the actual Diagnostics window.

In the OUTPUTS area the states and the number of switching actions since switching on are displayed for outputs 1 to 4.

How to open the diagnostics on the field evaluation:

➢ In the PROJECT TREE, LD_XXXX_AP01, APPLICATION, FIELD EVALUATION, open the device page DIAGNOSTICS.

In the DIAGNOSTICS area you can see the configured fields for the LD-LRS/LD-OEM in operation.

3.7   Basic parameters

3.7.1   Scan area, angular resolution and scanning frequency

Various combinations are available for the basic parameters. Choose the configuration that matches your application.

How to configure the scanning area, angular resolution and scanning frequency:

➢ In the PROJECT TREE, LD_XXXX_AP01, PARAMETER, open the device page BASIC PARAMETER.

➢ In the SCAN PARAMETER area, define the scanning area, the angular resolution and the scanning frequency for the LD-LRS/LD-OEM.

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3.7.2   Mounting angle offset

The alignment of the LD-LRS/LD-OEM in relation to the fields can be finely adjusted by entering a mounting offset angle. Using this feature, mounting tolerance in a range of +/– 10° can be compensated.

How to configure the mounting angle offset:

➢ In SOPAS, choose on the VIEW menu the HORIZONTALLY SPLIT command.

➢ Drag from the PROJECT TREE, LD_XXXX_AP01, APPLICATION, FIELD EVALUATION the DIAGNOSTICS device page to the top window using "drag and drop".

➢ Drag from the PROJECT TREE, LD_XXXX_AP01, PARAMETER the BASIC PARAMETER device page to the bottom window.

➢ On the DIAGNOSTICS device page, click the SHOW SCAN button and choose the EVALUATION CASE to display a field.

➢ Optimise the display by clicking the ZOOM AUTO button.

➢ On the BASIC PARAMETER device page, define in the MOUNTING ANGLE OFFSET area the mounting angle offset for the LD-LRS/LD-OEM and monitor your settings on the DIAGNOSTICS device page.

3.8   Interfaces

3.8.1   Serial host

On the LD-LRS1000/LD-OEM1000 you can switch between the RS-232 and the RS-422 interface using a DIP switch (see chapter "Electrical installation" in the operating instructions of the LD-LRS1000/LD-OEM1000).

LD-LRS2100/LD-OEM2100 and LD-LRS4100 have an RS-232 interface, LD-LRS3100/ LD-OEM3100 and LD-LRS5100 an RS-422 interface.

Configure the baud rate for the related interface.

How to configure the serial interface:

➢ In the PROJECT TREE, LD_XXXX_AP01, NETWORK/INTERFACE open the device page SERIAL.

➢ In the area SERIAL HOST, select the baud rate.

3.8.2   Ethernet interface

The Ethernet interface has a data transmission rate of 10 MBaud (10BaseT). The interface is a TCP/IP peer to peer interface. Only half duplex is supported. Please ensure that the interface of your application is set to half duplex.

The factory setting for the Ethernet interface is as follows:

• IP address: 192.168.1.10

• Standard gateway: 192.168.1.1

• Subnet mask: 255.255.255.0

The TCP/IP ports are pre-defined and cannot be changed:

- TCP/IP port for SOPAS: 2111
- TCP/IP port for data messages: 49152

Important If your PC/notebook is connected to the LD-LRS/LD-OEM using the Ethernet interface and you change the parameters for the Ethernet interface, the connection to the device will be lost. You must then scan for the LD-LRS/LD-OEM again in SOPAS.

How to configure the Ethernet interface:

➢ In the PROJECT TREE, LD_XXXX_AP01, NETWORK/INTERFACE open the device page ETHERNET.

➢ In the ETHERNET area enter an IP address for the LD-LRS/LD-OEM in the IP ADDRESS field.

➢ If you access the LD-LRS/LD-OEM via a gateway in your network, in the STANDARD GATEWAY field enter the gateway's IP address.

➢ In the SUBNET MASK field enter the number for the network segment to which the application connected belongs.

3.8.3 CAN bus

The LD-LRS/LD-OEM supports the CAN standard 2.0A. The CAN interface supports data transmissions between 10 Bit/s and 1 Mbit/s.

The base value and the mask value for the host CAN identifier define which CAN messages the sensor will accept.

Example Host ID base = 0x180, Host ID mask = 0x007, the LD-LRS/LD-OEM accepts all CAN identifiers in the range from 0x180 to 0x187. In addition, the LD-LRS/LD-OEM accepts the CAN identifiers that are specified by the Broadcast ID parameter. The CAN identifier for the LD-LRS/LD-OEM is formed by a logical OR operator between the sensor ID and the sensor ID base.

How to configure the CAN interface:

➢ In the PROJECT TREE, LD_XXXX_AP01, NETWORK/INTERFACE open the device page CAN.

➢ Enter the parameters for the CAN bus in the CAN area.

3.8.4 Sensor ID

For identification in a bus system, an ID can be assigned to the LD-LRS/LD-OEM. The IDs can be entered either as a decimal value or as a hexadecimal value. The default ID is 16 (in decimal notation).

How to configure a sensor ID:

➢ In the PROJECT TREE, LD_XXXX_AP01, NETWORK/INTERFACE open the device page CAN.

➢ In the SENSOR ID area, enter an ID in decimal in the SENSOR ID (DEC) field.

Or

➢ In the SENSOR ID area, enter an ID in hexadecimal in the SENSOR ID (HEX) field.

4   Service

⚠ **WARNING**

Cease operation if the cause of the malfunction has not been clearly identified!

Stop the machine/system if you cannot clearly identify or allocate the error and if you cannot safely rectify the malfunction.

4.1   Version information

4.1.1   Hardware

If a device is connected and switched online, the following information on the hardware is displayed:

- part number of the connected laser scanner
- designation of the connected laser scanner
- version of the laser scanner
- serial number of the laser scanner

Keep this information at hand if, for example, you have questions for SICK support.

How to display the hardware information:

➢   In the PROJECT TREE, LD_XXXX_AP01, SERVICE, open the device page VERSION INFORMATION.

Information on the laser scanner hardware is displayed in the HARDWARE area if a device is connected and switched online.

4.1.2   Firmware

The following information on the firmware is displayed if a device is connected and switched online:

- part number of the firmware
- designation of the firmware
- version of the firmware

How to display information on the firmware in the laser scanner:

➢   In the PROJECT TREE, LD_XXXX_AP01, SERVICE, open the device page VERSION INFORMATION.

Information on the firmware in the laser scanner is displayed in the FIRMWARE area if a device is connected and switched online.

4.1.3   Application

Information on the application software running on the second Digital Signal Processor (DSP) is displayed if a device is connected and switched online. On devices that are equipped with application software, information appears here on the part number, name and versions of the software.

Important   Without application software or after resetting without an application (see **section 3.2 "Field application" on page 8**), "NO_VALID_APP" appears in all three fields.

How to display information on an application running on the LD-LRS/LD-OEM:

➢ In the PROJECT TREE, LD_XXXX_AP01, SERVICE, open the device page VERSION INFORMATION. The part number, the name and the version of the application are displayed in the APPLICATION area if a device is connected and switched online.

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