



Area Scanning Distance Sensor rotoScan ROD-4

"RODsoft" Configuration Software for Windows 95/98/NT/2000



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1 General Information

1.1 About the "RODsoft" program

The software described here is intended for the configuration of the rotoScan ROD-4 with the use of a PC.

This version of the ROD-4 configuration software has been developed for Microsoft® Windows 95/98/NT/2000.

With this software, it is possible to follow the scanning of the ROD-4 along a measurement-value curve and to immediately identify any violations of the zones which may have occurred. The zones can be created with the program and adjusted to conform to the environment.

By means of a simple parameterisation, the ROD-4 can be configured for a wide range of application areas.

1.2 Explanation of symbols

The symbols used in this manual are explained below.



Attention!

This symbol appears before text passages which must absolutely be observed. Failure to heed this information may lead to injuries to personnel or damage to the equipment.



Notice!

This symbol indicates text passages containing important information.

1.3 Contact address

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2 Installation of Hardware and Software

2.1 Hardware

2.1.1 Connecting the rotoScan ROD-4

To configure the scanner, connect control cable (X1) to the power supply (safety transformer 24V, 2.5A, 1.25A semi-time-lag fuse) and the interface cable (X2) to the PC or laptop. Before commissioning the system, please check the pin assignments, the wiring, the supply voltage and the safeguarding. In spite of the scanner's robust housing and fittings, which include various internal safety mechanisms, damages resulting from misconnection remain possible.



Notice!

The connection of the ROD-4 is described here only briefly. Further information can be found in the "rotoScan ROD-4" technical description.

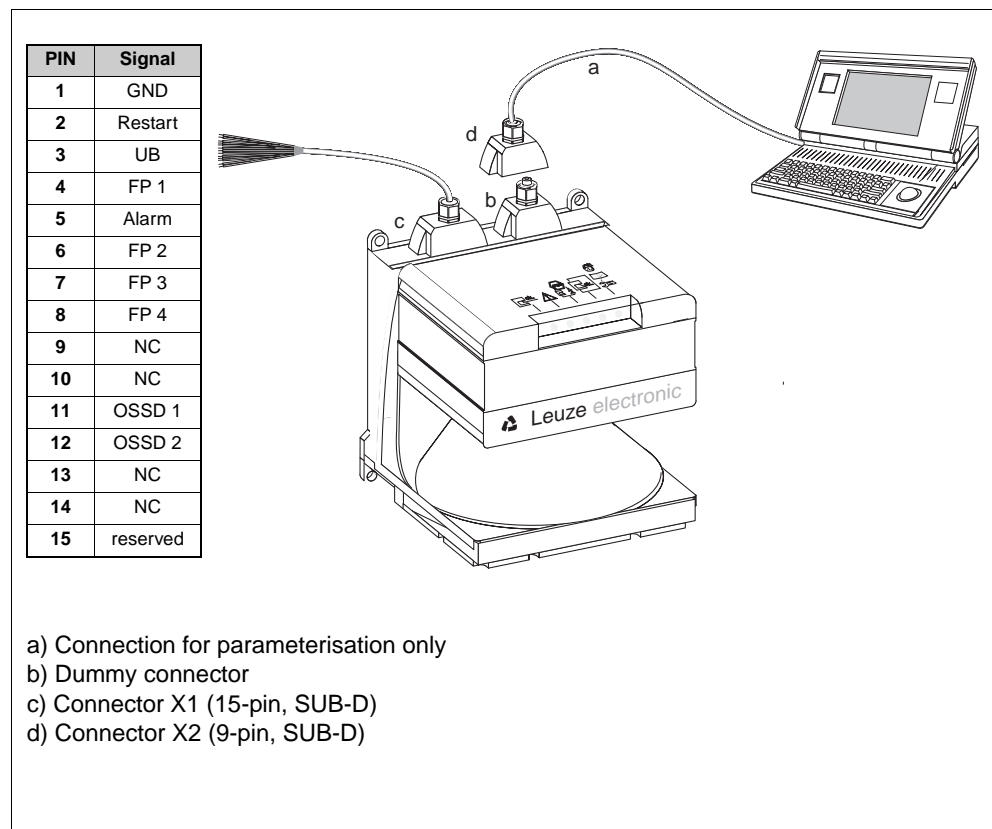


Figure 2.1: Connecting the rotoScan ROD-4

2.1.2 Interface assignment X1 and X2

Interfaces of the rotoScan ROD-4

Interface No.	Interface type	Interface function
X1	SUB-D15	Connections for: <ul style="list-style-type: none"> • Power supply • Switching and signal lines
X2	SUB-D9	rotoScan ROD-4 - PC interface <ul style="list-style-type: none"> • Parameter configuration • Detection zone definition • Data transmission • Diagnostics

Table 2.1: Interfaces X1 and X2

2.1.3 Connector assignments for interface X1

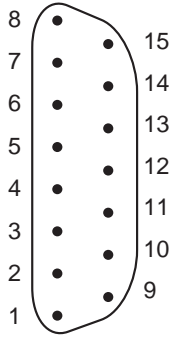
	PIN	Signal	Description
	1	GND	Supply voltage ground
	2	Restart	Safe input "restart-disable", reset the scanner and connection of the restart button
	3	UB	Supply voltage +24 V DC
	4	FP 1	Changeover to detection zone pair 1
	5	Alarm	Output upon violation of inner detection zone and for warning messages such as "window lightly soiled" or error messages such as "window heavily soiled" (both functions can be parameterised)
	6	FP 2	Changeover to detection zone pair 2
	7	FP 3	Changeover to detection zone pair 3
	8	FP 4	Changeover to detection zone pair 4
	9	NC	not used
	10	NC	not used
	11	OSSD 1	Semiconductor output, shutdown upon violation of the outer detection zone, channel 1
	12	OSSD 2	Semiconductor output, shutdown upon violation of the outer detection zone, channel 2
	13	NC	not used
	14	NC	not used
	15	reserved	Reserved for test purposes, not wired

Table 2.2: SUB-D15 pin assignments for interface X1

2.1.4 Connector assignments for interface X2 (RS 232)

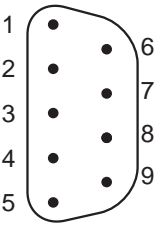
	PIN	Signal	Description
	1	NC	not used
	2	TxD	Data communication, transmission
	3	RxD	Data communication, reception
	4	NC	not used
	5	GND/shield	Ground/shielding (to be connected only on the cabinet side with PE)
	6	RS 232	not used
	7	NC	not used
	8	NC	not used
	9	reserved	Reserved for test purposes, not wired

Table 2.3: SUB-D9 - pin assignments for the interface X2 as RS 232 port

2.1.5 Connector assignments for interface X2 (RS 422)

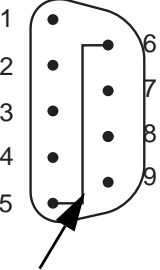
	PIN	Signal	Description
	1	TxD-	RS 232/ RS 422 transmitted data
	2	TxD+	
	3	RxD+	RS 232/ RS 422 received data
	4	RxD-	
	5	GND/shield	Ground/shielding (to be connected only on the cabinet side with PE)
	6	RS 422	Select as interface RS 422 by bridging on PIN 5
	7	NC	not used
	8	NC	not used
	9	reserved	Reserved for test purposes, not wired

Table 2.4: SUB-D9 - pin assignments for the interface X2 as RS 422 port

2.2 Software

2.2.6 System requirements

- Intel® processor at Pentium® level or faster (or compatible models, e.g. AMD®)
- At least 16 MB RAM
- 3½" floppy drive
- Hard disk with at least 8 MB available memory.
If the detection area or configuration values are to be stored, additional disk space is required.
- Free RS 232 interface (serial) or alternatively RS 422
- Microsoft® Windows 95/98/NT/2000

2.2.7 Installation

To install the ROD-4 configuration software, you need the 4 supplied installation floppy disks.

The set-up program is provided on the first diskette. This program launches a self-explanatory installation routine.

After the installation, the program is ready to be started.

3 First Steps

3.1 General remarks



Attention!

Make certain that the connectors for interfaces X1 and X2 have been correctly fabricated. Serious, partially irreparable device errors may result if the X1 interface of the rotoScan ROD-4 is incorrectly wired. If the connector for the X2 interface is wired incorrectly, the configuration data may either not be transferred at all or only in part.



Notice!

Switch on the power supply before starting the ROD-4 configuration software. Data cannot otherwise be received by the device. However, even if the ROD-4 is not connected to the PC, you may still define parameters and save them on the hard disk or interpret previously stored data.

3.2 Launching the program

To start the ROD-4 configuration software, select from the menu **Start** → **Program** → **Leuze electronic** → **RODsoft**, the item **RODsoft**.

Retrieving configuration data from the ROD-4

After starting, your computer – together with the program – establishes a connection to the rotoScan ROD-4 and transfers the current configuration data from the ROD-4 to the program.

During this process, the following window appears on the screen:

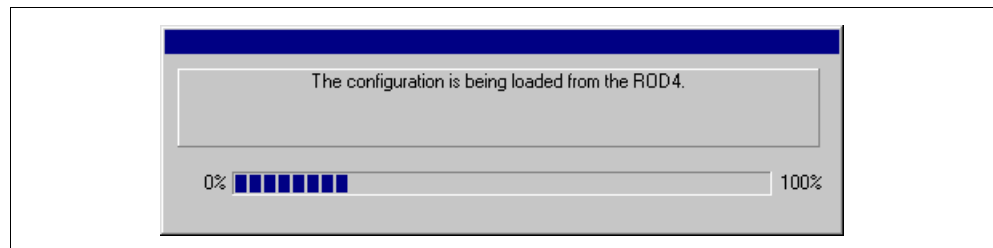


Figure 3.1: Transmission of the current configuration data



Notice!

If this process is not completed successfully, the device is not ready for operation or the connection cable is connected incorrectly.

Defining the authority level

In the next step, you are prompted by the program to identify your authorisation status by selecting an authority level and entering a password which has been defined for this level.

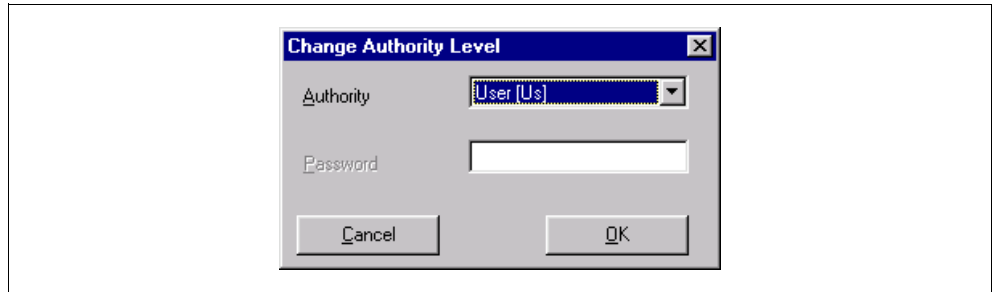


Figure 3.2: Changing the authority level

For the authority level default setting, "Operator", no password is required. As operator, certain parameters can be changed and stored data analysed (see chapter 3.5 "Authority levels").

ROD-4 status information

If your access authorisation is accepted, the ROD-4 system information is read in and displayed in a window.

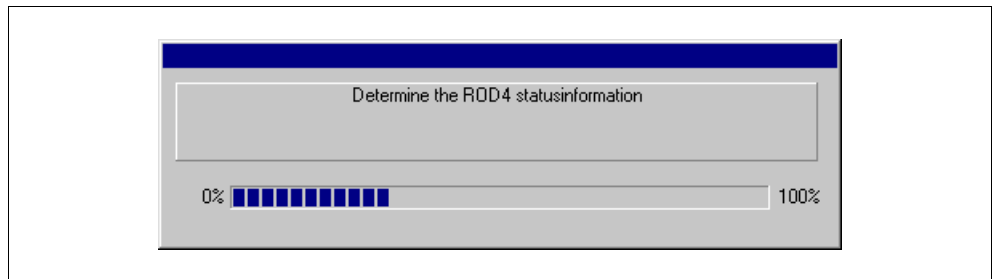


Figure 3.3: Reading in the status information

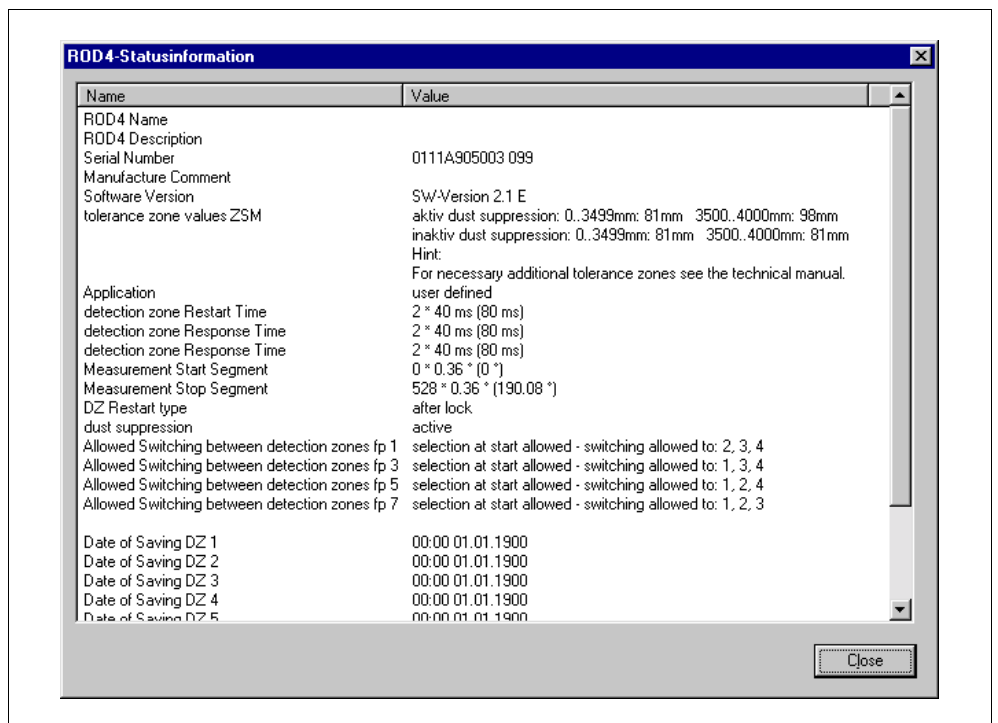


Figure 3.4: ROD-4 status information

User interface of the program When you close the information window, the user interface of the configuration program appears in the foreground:

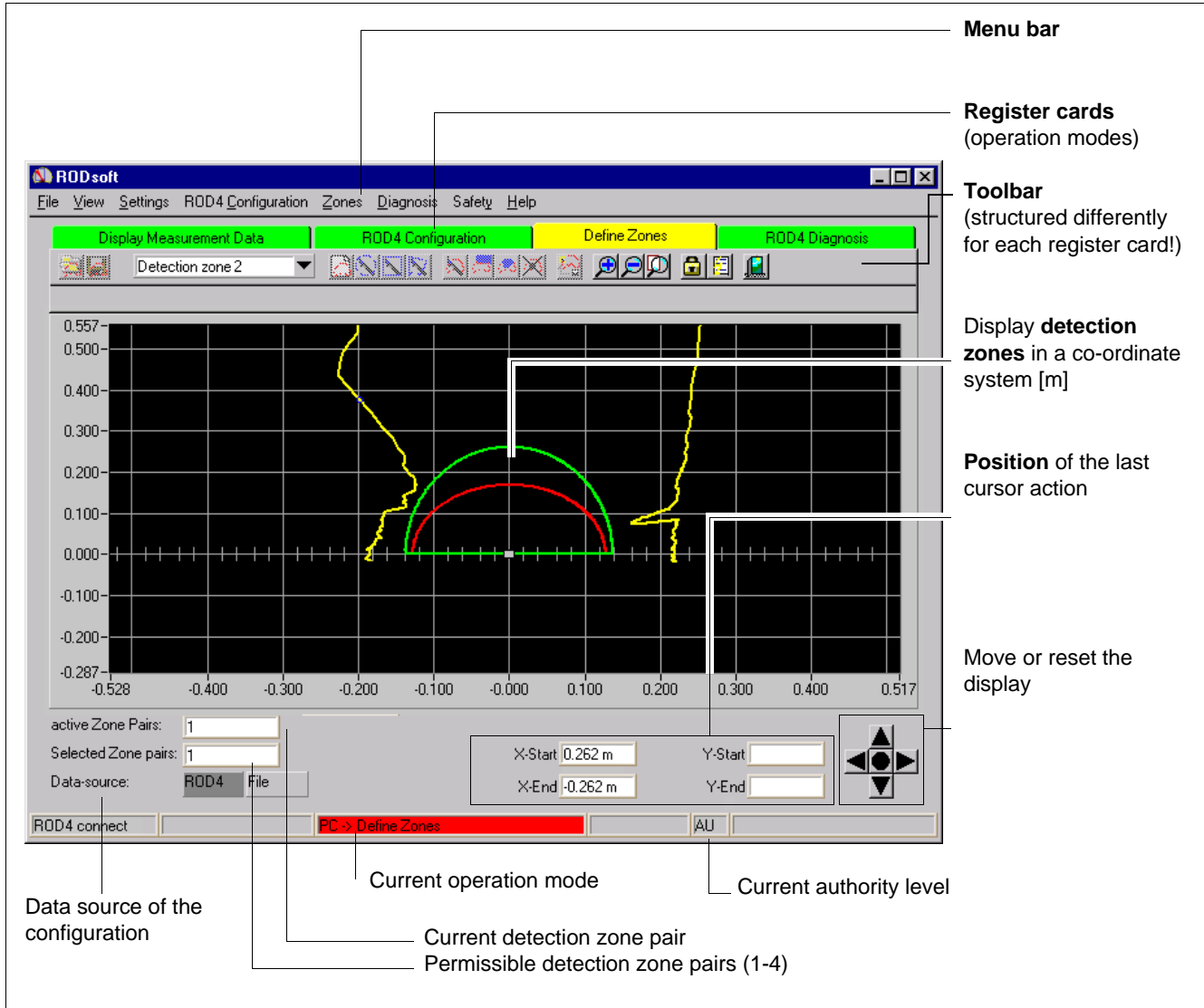


Figure 3.5: RODsoft user interface

Operation modes **Display Measurement Values**

The measurement mode is activated; the environment is scanned and the outlines of objects present in the measurement range are displayed in yellow. The current detection zones are shown here in red or green.

ROD-4 Configuration

All functions necessary for configuring the scanner are available here.

Define Zones

Application-specific definition of the detection zone pairs is possible in this area by means of the mouse or numerical entry.

ROD-4 Diagnosis

This area contains data relating to device identification and troubleshooting.

3.3 Description of the user interface

3.3.1 The menu bar

All program commands are located in various menus.

You can consider the names of the menus as headings for the commands contained in each respective menu.



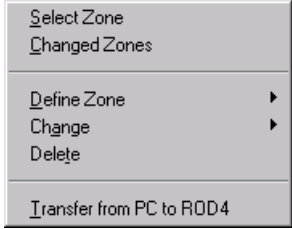
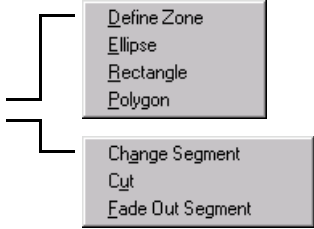
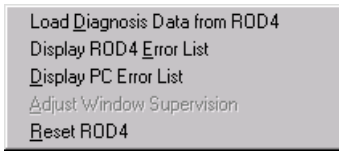
Notice!

Many commands can be selected only when you are located on the corresponding register card.

How the individual commands are used is described in detail in the following chapters. The commands located in the menus are described briefly in the following overview.

	Command	Function
Menu File		
	Load Zone from File	Load stored detection zones
	Save Zone to File	Save active detection zone definition
	Load Configuration from File	Load stored configuration
	Save Configuration to File	Save active configuration
	Exit Program	Exit RODsoft
Menu View		
	Zoom	Enlarge view
	Unzoom	Reduce view
	Total	View to 100%
	Save Diagram to File	Save active view as bitmap

Command		Function							
Menu Settings	<div style="border: 1px solid black; padding: 5px;"> O^{peration} Mode ▶ PC-C^{onfiguration} ▶ <hr/> D^{etection} zones ✓ D^{isplay} M^{essages} </div>	<div style="border: 1px solid black; padding: 5px;"> D^{isplay} M^{easurement} V^{alues} R^{OD4} C^{onfiguration} D^{efine} Z^{ones} R^{OD4} D^{iagnosis} </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> I^{nterface} <hr/> L^{anguage} <hr/> S^{witch} D^{iagram}-C^{olor} u^{se} 190° d^{etection} z^{ones} </div>							
	Operation Mode								
	<table border="1"> <tr> <td>Display Measurement Values</td> <td rowspan="4">Switch between the four operation modes (register cards)</td> </tr> <tr> <td>ROD-4 Configuration</td> </tr> <tr> <td>Define Zones</td> </tr> <tr> <td>ROD-4 Diagnosis</td> </tr> </table>	Display Measurement Values	Switch between the four operation modes (register cards)	ROD-4 Configuration	Define Zones	ROD-4 Diagnosis			
Display Measurement Values	Switch between the four operation modes (register cards)								
ROD-4 Configuration									
Define Zones									
ROD-4 Diagnosis									
PC-Configuration									
	<table border="1"> <tr> <td>Interface</td> <td>Selection and parameterisation of the serial interface</td> </tr> <tr> <td>Language</td> <td>Selection of the language version (German / English) → expandable</td> </tr> <tr> <td>Switch Diagram Colour</td> <td>Selection of the background colour (black/white)</td> </tr> <tr> <td>use 190° detection zones</td> <td>If this function is activated, a detection zone expanded by 10° is enabled, i.e. from 180° to 190°. This does not affect the measurement value acquisition.</td> </tr> </table>	Interface	Selection and parameterisation of the serial interface	Language	Selection of the language version (German / English) → expandable	Switch Diagram Colour	Selection of the background colour (black/white)	use 190° detection zones	If this function is activated, a detection zone expanded by 10° is enabled, i.e. from 180° to 190°. This does not affect the measurement value acquisition.
Interface	Selection and parameterisation of the serial interface								
Language	Selection of the language version (German / English) → expandable								
Switch Diagram Colour	Selection of the background colour (black/white)								
use 190° detection zones	If this function is activated, a detection zone expanded by 10° is enabled, i.e. from 180° to 190°. This does not affect the measurement value acquisition.								
Detection Zones		Selection of the visible detection zone pairs (1/2/3/4)							
Display Messages		Display ROD-4 messages with date and time in a separate window							
Menu ROD-4 Configuration	<div style="border: 1px solid black; padding: 5px;"> G^{et} from R^{OD4} T^{ransfer} from PC to R^{OD4} C^{hange} s^{et} D^{efault} V^{alues} </div>								
	Get from ROD-4	Load configuration from ROD-4							
	Transfer from PC to ROD-4	Transfer new configuration to the ROD-4							
	Change	Change the configuration parameters							
	set Default Values	ROD-4 is reset to the state upon delivery (standard configuration)							

		Command	Function
Menu Zones			
		Select Zone	Select the detection zone to be edited
		Changed Zones	Displays the areas which have been changed but not yet transferred to the ROD-4
		Define Zone	
		Define Zone	Edit a detection zone using corner points, ellipses, rectangles, polygons and environment outlines
		Ellipse	
		Rectangle	
		Polygon	
		Change	
		Change Segment	Reshape selected zone
	Cut	Cut sides of the selected detection zone	
	Fade Out Segment	Remove individual segments of the select detection zone	
	Delete	Delete selected detection zone	
	Transfer from PC to ROD-4	Transfer newly defined detection zones to the ROD-4	
Menu Diagnosis			
		Load Diagnosis Data from ROD-4	Display ROD-4 diagnosis data (device parameters)
		Display ROD-4 Error List	Display the last ROD-4 device errors
		Display PC Error List	Display the last program errors
		Adjust Window Supervision	This function is available in authority levels "Service" and above when used with the service diskette. The device-internal adjustment of the windows supervision must be performed, for example, after replacing the scanner window.
		Reset ROD-4	This command transmits a reset command to the scanner via the PC (e.g. when no RESTART button is provided and a device fault has occurred).

	Command	Function
Menu Safety	Change Authority Level Change Password reset Password	
	Change Authority Level	Change Authority Level
	Change Password	Change password for the authority level
	reset Password	If the "password is forgotten": display the password as an encrypted number to be sent to LEUZE customer service for reactivation.
Menu Help	Info	
	Info	Information about the ROD-4 configuration software RODsoft

Table 3.1: Overview of the menu commands

3.3.2 Register cards and toolbar

To simplify work with the ROD-4 configuration program, the work area is divided into various categories.

These categories correspond to the four operation modes in the menu **Settings** → **Operation Mode** and are displayed as register cards. Each register card or operation mode has a toolbar of its own. How the detection zone values are displayed is dependent on the selected operation mode.

You can select the operation mode either by clicking the respective register card or via menu item **Settings** → **Operation Mode**.



Notice!

Depending on the adjustments made previously in a given operation mode, you may be prompted to use ROD-4 to update the data before switching to another operation mode.

The icons in the toolbar serve as a shortcut to commands which can also be selected from the menu bar.

The structure of the toolbars is divided into **general** and **specific** icons, where the general icons are found in each of the four toolbars.

General icons The following figure shows all of the general icons, which are always displayed on the right-hand side of a given toolbar:

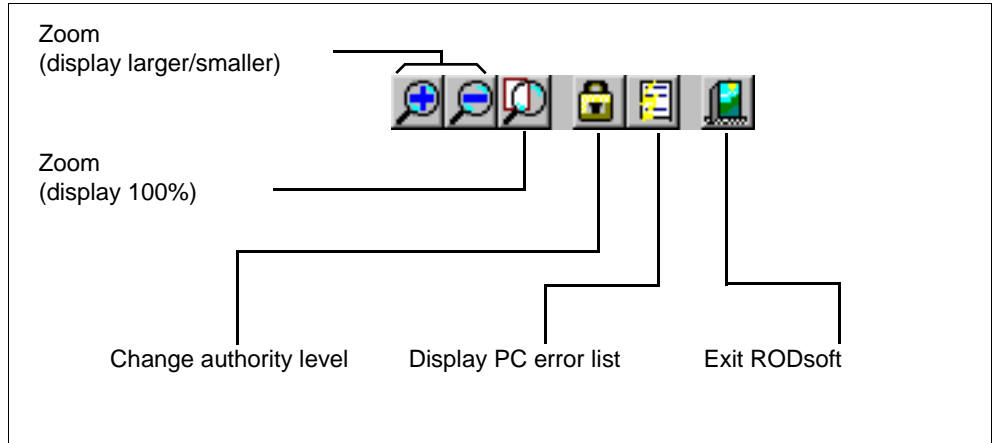


Figure 3.6: General icons

Specific icons Even though some of the specific icons are similar in appearance, they do have different meanings, e.g. there are two different variants of both the "Save" and "Load" icons:

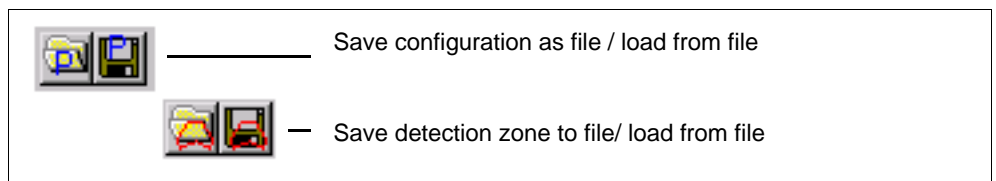


Figure 3.7: Specific icons

All other icons are described in brief in the following figures according to operation mode:

Specific icon in the operation mode "Display Measurement Values"

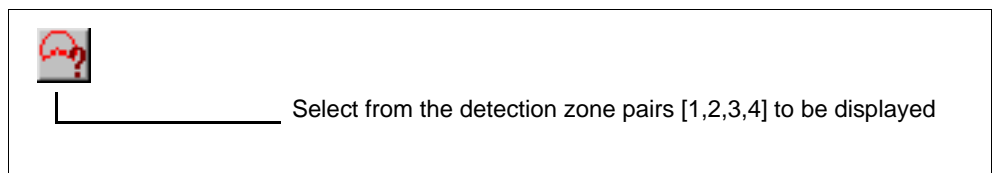


Figure 3.8: Specific icon in the operation mode "Display Measurement Values"

Specific icons in the operation mode "ROD-4 Configuration"

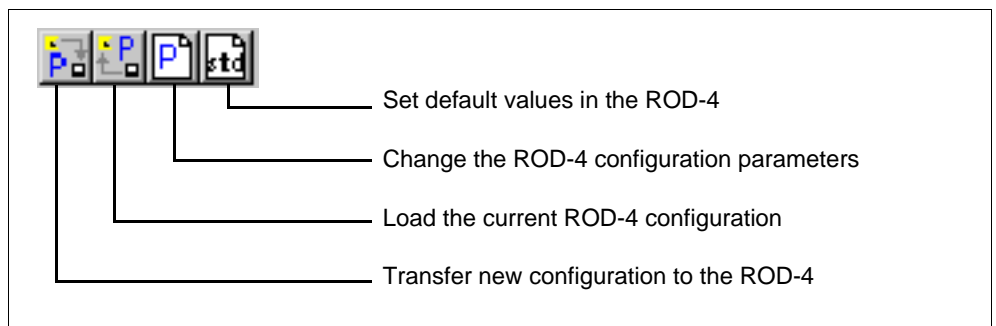


Figure 3.9: Specific icons in the operation mode "ROD-4 Configuration"

Specific icons in the operation mode "Define Zones"

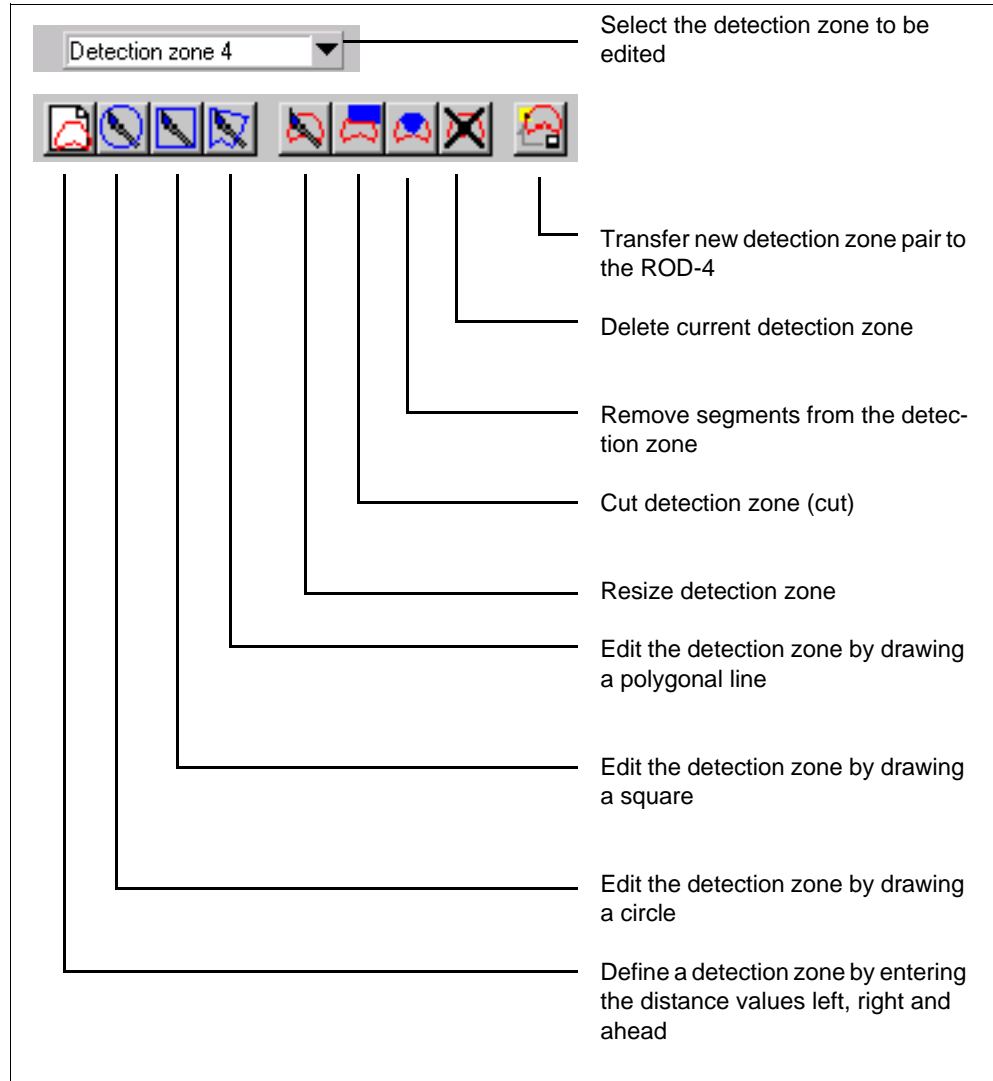


Figure 3.10: Specific icons in the operation mode "Define Zones"

Specific icons in the operation mode "ROD-4 Diagnosis"

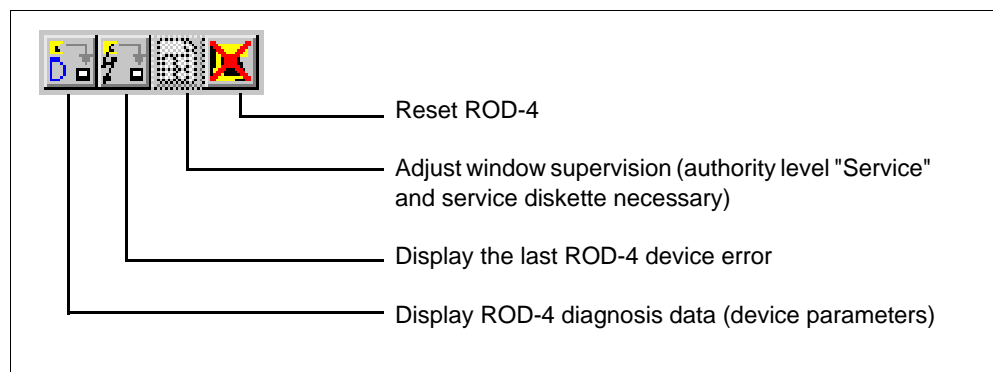


Figure 3.11: Specific icons in the operation mode "ROD-4 Diagnosis"

3.3.3 Displaying the detection zone values (work area)

Various components comprise the actual work area of the program. The work area serves primarily for reading the measurement values and defining the detection zones.

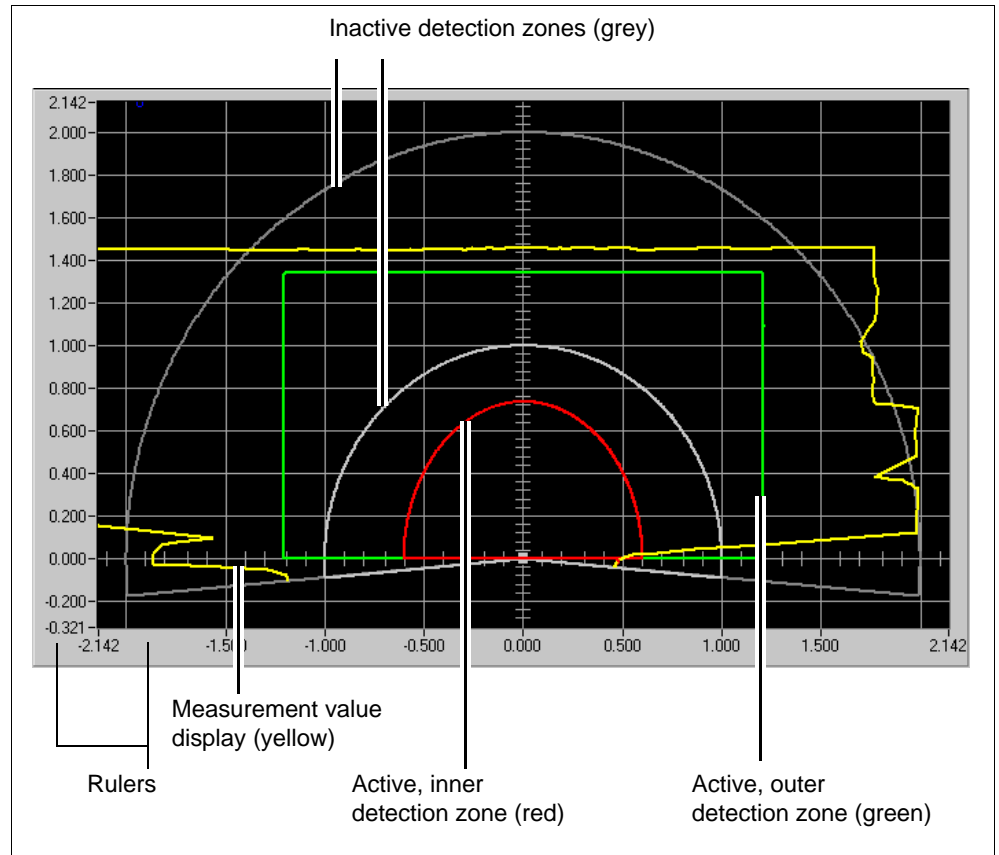


Figure 3.12: Objects on the work surface

Rulers "Meter" is the unit of measurement used for the ruler. When you zoom, the gradations on the ruler change appropriately for the given zoom level.

Display measurement values In the register card "Display Measurement Values", you can view the current measurement value of the ROD-4 as a yellow curve. The laser in the device scans the environment at a scanning rate of 40ms. If an object enters the scanning area, it is therefore detected by the laser within no more than 40ms. In the display, the object is displayed simultaneously with the detection by the laser.



Notice! The display of the measurement values on the screen corresponds to the alignment of the ROD-4. If a person or object in the view direction of the ROD-4 enters the scanning area from the right, for example, the measurement line changes at the right.

In the operation modes "ROD-4 Configuration", "Define Zones" and "ROD-4 Diagnosis", the last measurement outline measured prior to switching to the given operation mode is frozen on the screen.

Detection zones Four programmable detection zone pairs make possible an optimal adaptation to the applications. A detection zone pair is considered to be the combination of both an internal and an external detection zone.

Inner and outer detection zones each have a different colour display and corresponding abbreviation in the detection zone display of the status bar.

Detection zone pair	Inner detection zone (red)	Outer detection zone (green)
1	1	2
2	3	4
3	5	6
4	7	8

Table 3.2: Detection zone pairs and associated detection zones



Notice!

Only the active detection zone pairs are displayed in colour (max. two detection zone pairs may be active). Inactive detection zone pairs are displayed in grey. The detection zone pairs are activated through the application of 24V on PIN 4, 6, 7 or 8 interface X1

All detection zones (1-8) can be programmed to a radius of max. 15m.

In "Display Measurement Values" you can see when an object is approaching the given detection zone or has violated the detection zone. A given detection zone is violated when the yellow measurement curve enters the green or red area:

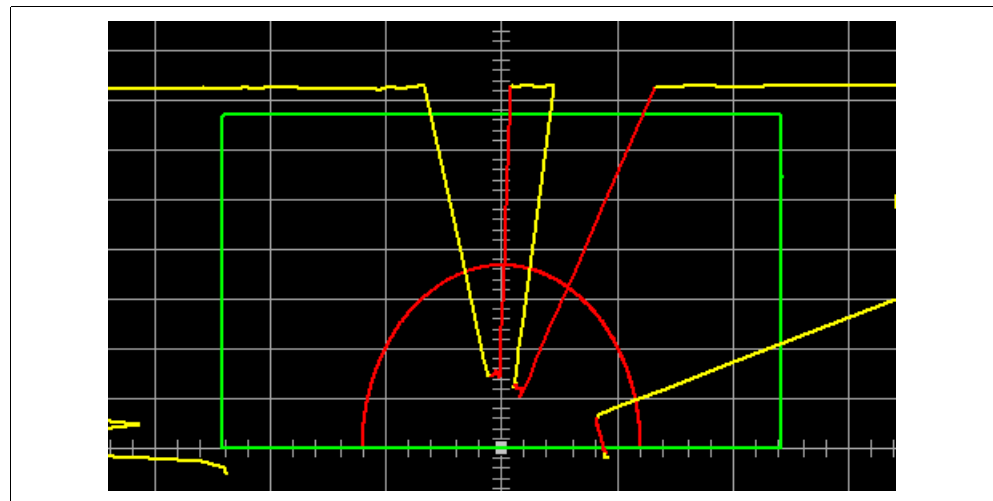



Figure 3.13: Violation of the detection zone

If you would like to monitor only one detection zone pair on the screen, you can fade out the other detection zone pairs via the menu **Settings** → **Detection Zones** or the icon  in the operation mode "Display Measurement Values".

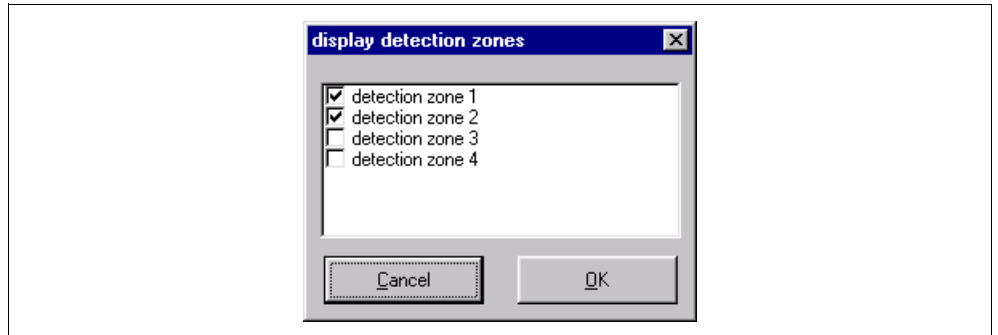


Figure 3.14: Displaying detection zone pairs



Notice!

Fading out a detection zone does not affect its monitoring function! If the detection zone which has been faded out is violated, the outputs are switched as usual.

To adapt the detection zones to your application, you may edit them in the operation mode "Define Zones" (see chapter 5 "Working with Detection Zones").

3.3.4 Displaying status information

Data-source

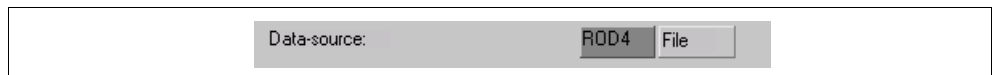


Figure 3.15:

These fields indicate from where the current configuration data were loaded or to where they were last written.

- Field "ROD4" active (dark):
Data were loaded from the ROD-4 or saved in the ROD-4.
- Field "File" active (dark):
The data were taken over from a file or were written to a file.
- No field active:
Configuration values were not yet loaded or saved, e.g. when the ROD-4 is not ready and the program is started.



Notice!

If only parts of the configuration data are loaded or saved (e.g. only the detection zone), the display also changes.

Status display The status display provides you with important information about the current states of the hardware and software. Among other information, you are provided with information regarding the current states of the inputs and outputs, the current operating state, the current authority level etc.

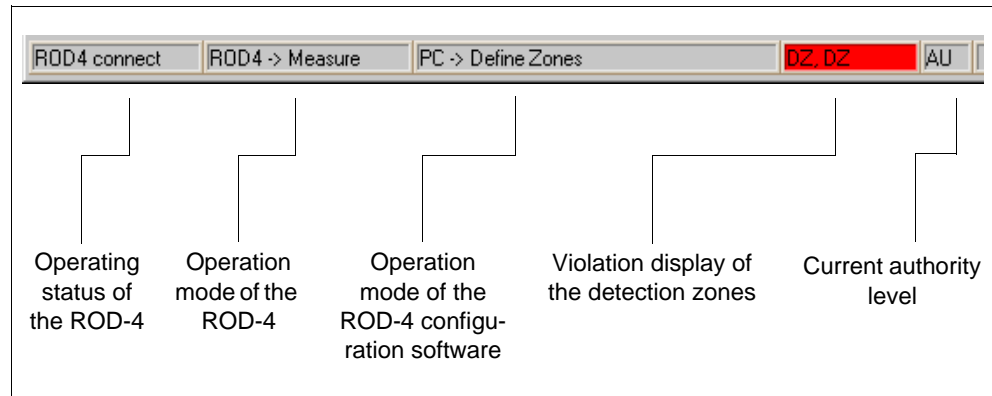


Figure 3.16: Status display

The first field contains the operating state of the ROD-4. Following successful synchronisation of PC and scanner, the text of the info field changes from "ROD-4 sync" to "ROD-4 connect". The following field displays the operation mode (measurement operation) and any possible error messages. The next field contains the active operation mode of the PC program. The fourth field is reserved for the violation display of the detection zones. If this field is displayed in green, a violation of the outer detection zone has occurred. If the field is displayed in red, the inner detection zone has been violated. In the last field, the current authority level (see chapter 3.5) is displayed:

- **Us** = User
- **Ma** = Maintenance
- **AU** = Authorised User
- **Se** = Service
- **Pr** = Production
- **De** = Development

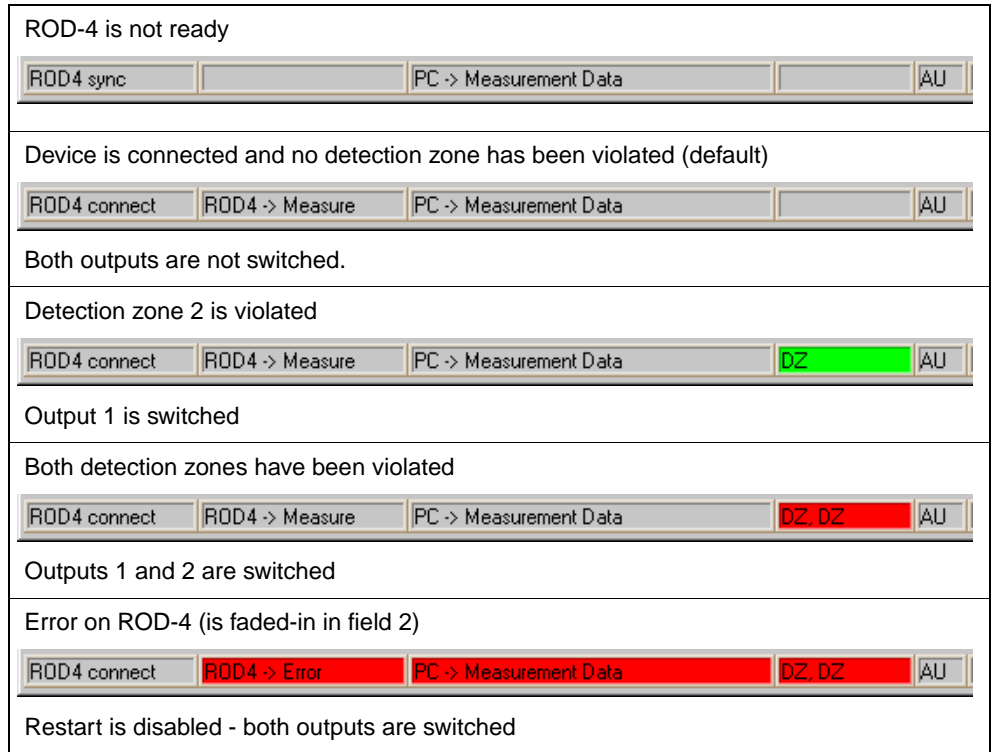


Figure 3.17: Various status displays

3.4 Configuration of the PC

3.4.5 Parameterisation of the serial interface

In the menu **Settings** → **PC-Configuration** → **Interface**, you can set the "serial interface" (COM1-COM4) to be used and the desired transmission rate (adjustable between 4800-115200 baud).

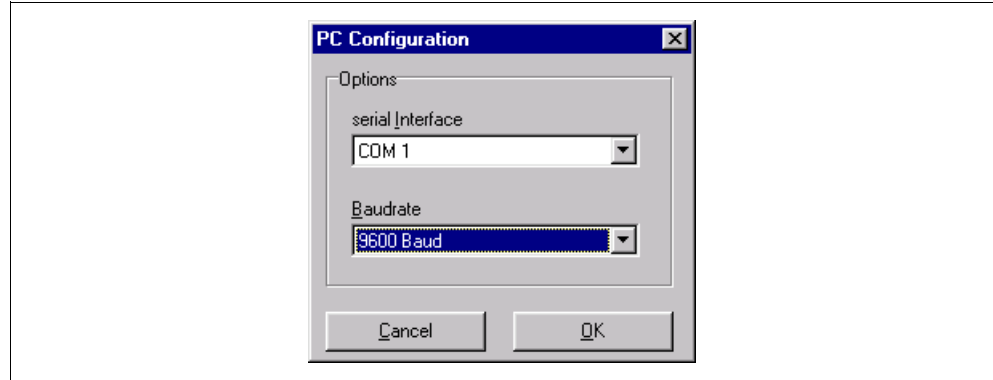


Figure 3.18: Parameterising the serial interface

3.4.6 Setting the program language

In the menu **Settings** → **PC-Configuration** → **Language**, select the program language. You may select between the languages German and English.

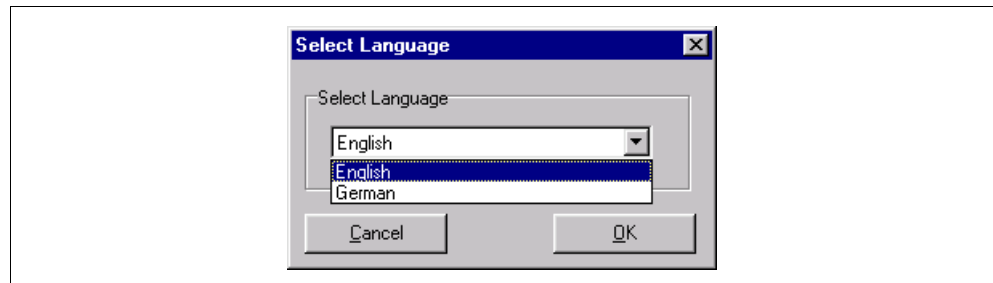


Figure 3.19: Setting the program language



Notice!

A change of the language selection does take effect until the program is restarted.

3.4.7 Selecting the background

In order to better recognise the measurement curves (yellow), it is recommended that the background colour be set to black (default). On the other hand, when creating the detection zones, white is better suited. In order to switch between these two colours, simply click **Settings** → **PC-Configuration** → **Switch Diagram-Colour**.

3.5 Authority levels

In order to ensure that the device is configured only by trained and authorised persons, RODsoft provides different functionality for different access rights in the dialogue "Change Authority Level".

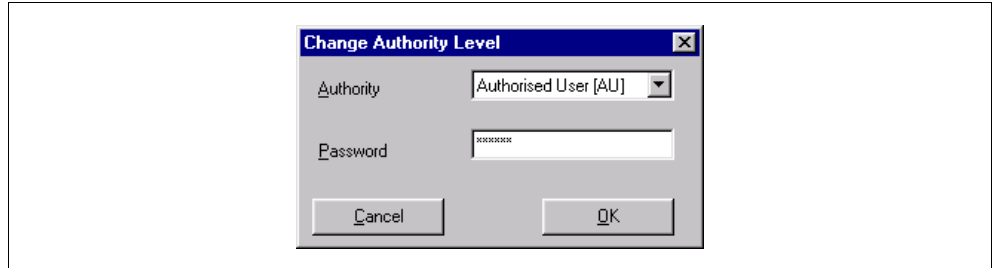


Figure 3.20: Change authority level

Authority levels and access rights

Registration is by means of predefined authority levels, each of which is protected against unauthorised access by means of a password. In the authority level "Authorised User", it is possible to create detection zones "off-line" as well, i.e. without a connected ROD-4. These detection zones can then, for example, be stored on diskette.

The following authority levels are available:

Level (abbr.)	Password	Access
User (Us)	No password	General settings, display and analysis of measurement values, loading the current ROD-4 configuration data to the PC. Changes cannot be made to the configuration data!
Maintenance (Ma)	ROD4/GOY	Device configurations can be loaded from a diskette and stored in the ROD-4. Changes cannot be made to the configuration data!
Authorised User (AU)	ROD4LE	Full access to all functions
Service (Se)		Access by instructed persons to the window calibration of the scanner (only with service diskette)
Production (Pr)		Manufacturer-specific access (only with service diskette)
Development (De)		Manufacturer-specific access (only with service diskette)

Table 3.3: Authority levels and passwords

Passwords may be entered in either upper- or lower-case letters. No changes can be made to the device configuration in the authority level "User". This level is, therefore, not password protected. All functions which are not permitted in the given authority levels are faded out in grey. The current authority level is displayed in the status display (see section "Status display").



Notice!

The password set at the factory for the authorised safety officer (AU) is "ROD4LE". New passwords are to be set during the initial configuration of the rotoScan ROD-4 for (Ma) and (AU) and the information carrier stored under lock and key.



Change password

To change the password, select from the menu **Safety** the command **Change Password**. In the following dialogue field, enter a 6-character password. Repeat the entry to ensure correctness and confirm the entry with **OK**.



Figure 3.21: Change password



Attention!

If the password is no longer known, select menu item **Safety** → **Reset Password**.

Reset password

After actuating the button **Generate**, a safety password is generated and displayed in red text.

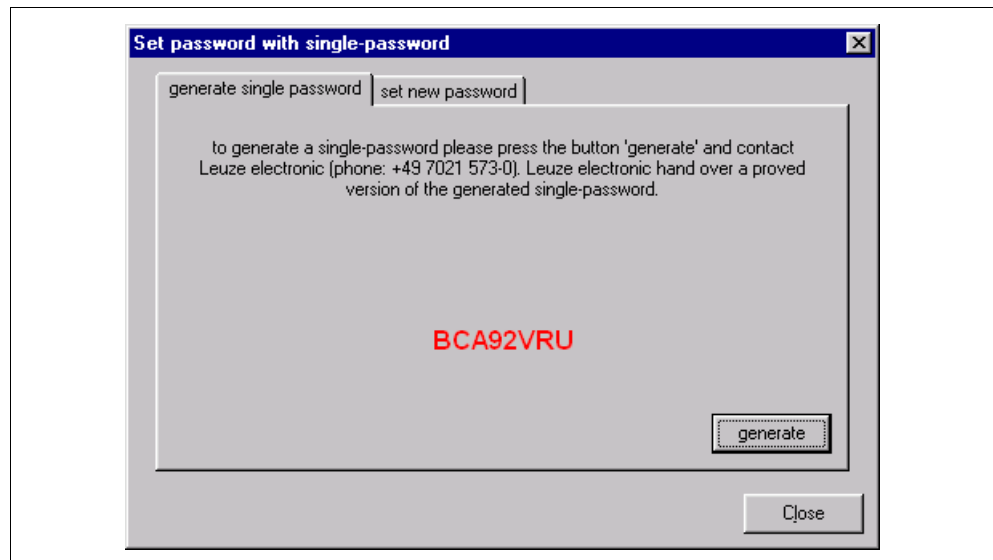


Figure 3.22: Reset password

This is to be sent by either fax or mail to Leuze electronic together with the complete address of the company, the user name and the scanner serial number. You will immediately receive a proven single password which is to be entered in the dialogue "Set New Password".

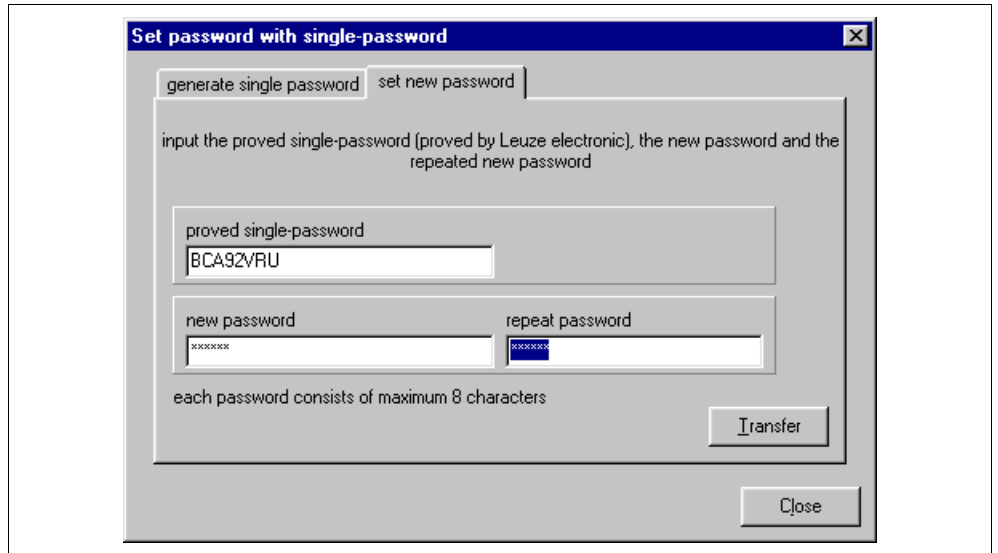



Figure 3.23: Prove single password

After the new password has been entered in both fields, access is restored to the scanner in the level "Authorised User (AU)".

If the proved single password is entered incorrectly, the rotoScan ROD-4 indicates an error message by means of LED No. 5. Furthermore, a corresponding error message is displayed on the screen after approx. 2 min. Please note that during this period, RODsoft is disabled and no entry is possible.

Change authority level

If, during operation, you would like to change your authority level, select the menu item **Safety** → **Change Authority Level** or click the icon , which is found in each of the four toolbars. In the following dialogue window, change to the desired level, enter the required password and confirm the process with **OK**.

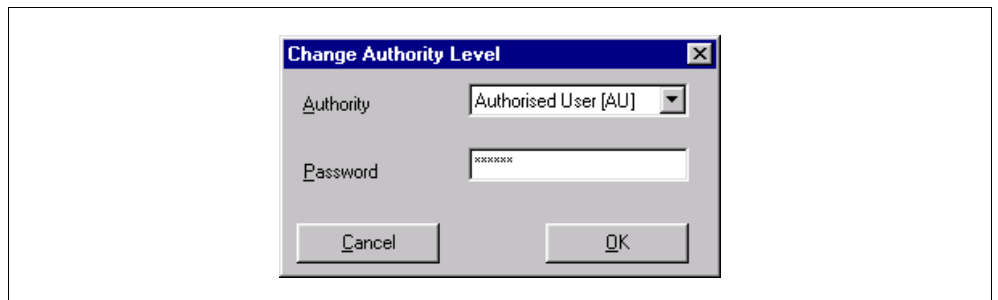



Figure 3.24: Change authority level

4 Configuring Device Parameters

4.1 Current ROD-4 configuration

Get configuration If the ROD-4 is connected to the PC on program start, the current parameters are automatically transferred from the device to the PC. This also occurs when the device was temporarily not connected to the PC (e.g. exchanging the device) and is detected by the program as again being present on the serial interface.

If you have made changes to the configuration and have not transferred the previous configuration to the device, you have the option of manually loading the configuration stored in the ROD-4.

To do this, select in the menu bar **ROD-4 Configuration** → **Get from ROD-4** or click in the register card "ROD-4 Configuration" on the icon . The current device configuration will then be read back in.



Attention!

Before making changes, store the current configurations! If data are entered incorrectly, you can then restore the original settings. Detailed information on storing configurations can be found in chapter 4.3 "Storing/loading configuration".

4.2 Changing ROD-4 configuration parameters


4.2.1 General information



Notice!

The device configuration can only be viewed and edited in authority level "Authorised User" and above.

In order to edit the ROD-4 configuration parameters, open the same-named dialogue window as follows:

- Select the register card "ROD-4 Configuration" and then select the menu item **ROD-4 Configuration** → **Change** or
- click on the icon  in the toolbar of the register card "ROD-4 Configuration".

A dialogue window consisting of three parts appears as illustrated in the following figure:

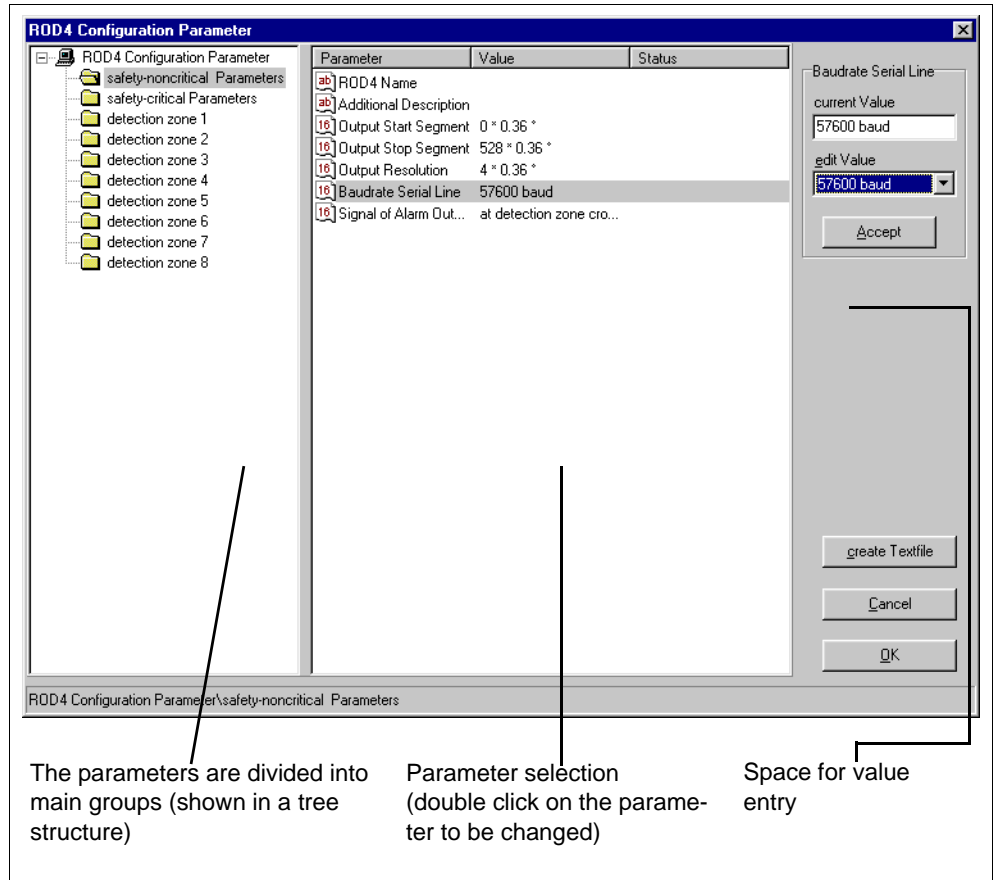


Figure 4.1: ROD-4 configuration parameters

In order to change a parameter, find the desired structure level on the left-hand side and select on the right-hand side the parameter by double clicking.

There are two ways to edit a parameter.

First, a parameter may contain many different values. In this case, when the parameter is selected an appropriate dialogue field is activated in which the values can be entered.

Second, parameters may also contain only one editable value. In this case, the selection is controlled by the space for the value entry. Here, you can select in the lower field the new values or enter a new value.

4.2.2 Safety-critical parameters

The folder "Safety-Critical Parameters"

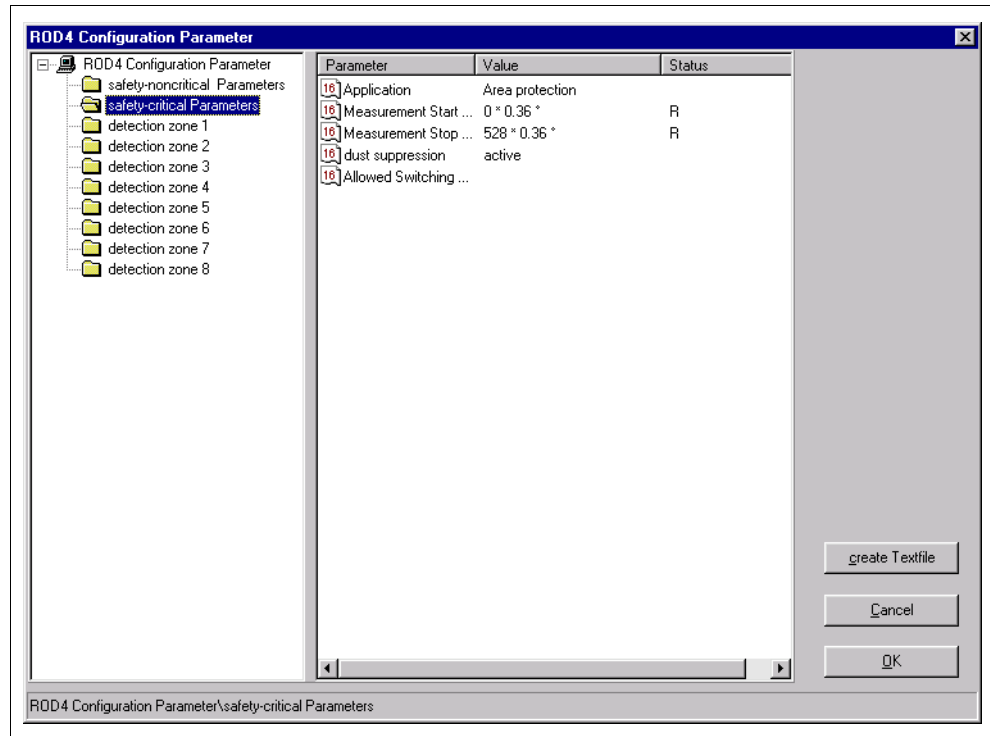


Figure 4.2: The folder "Safety-Critical Parameters"



Notice!

In the status field, R means read only, all other parameters may be changed

Parameter	Function/Setting	Status	Input possibility
Application	Set the restart-disable, the response time and the scanner starting characteristics		Restart time of 80ms to 10160ms or manual restart possible. Response time of 80ms to 640ms possible. After lock and after crossed or immediate
Measurement start segment	Detection of the first outline segment by measurement equipment	R	
Stop segment measurement	Detection of the last outline segment by measurement equipment	R	
Dust suppression	Optimisation of the interference immunity		Activate or deactivate
Allowed switching between detection zone-pairs	Assignment of the switching order as well as the starting detection zone pairs		A dialogue offers two input fields. The assignment is made by clicking the desired field.

Table 4.1: Description "Safety-critical parameters"

Supplemental information

Application In a dialogue, standardised parameter settings are offered for area protection and driverless vehicle protection.

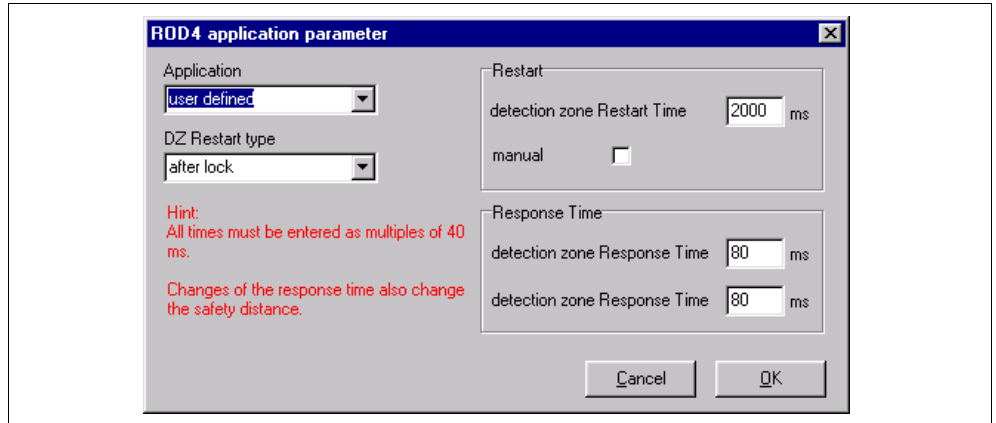


Figure 4.3: Parameter "Application"

Application	Parameter	Selection	Ex works
Area safeguarding	DZ restart type	After lock	x
		After crossed	
		immediate	
	Restart	Manual	x
	SF/WF response time	80ms	x
640ms			
FTP DZ restart type	DZ restart type	After lock	x
		After crossed	
		immediate	
	Restart	2s	x
	SF/WF response time	80ms	x
640ms			

- **When the after lock is active**, the outputs (OSSD 1/OSSD 2) of the ROD-4 are not released or switched to "active high" when the current detection zone is clear until the restart button is actuated (24V on PIN 2 of interface X1, for 2s to 4s) .
- **When the after crossed is active**, the outputs (OSSD 1/OSSD 2) of the ROD-4 are not released or switched to "active high" when the current detection zone is clear after the scanner is switched on until the detection zone is briefly violated once.
- **When restart-disable is active**, the outputs (OSSD 1/ OSSD 2) of the ROD-4 are not released or switched to "active high" when the current detection zone is clear until the restart button is actuated (24V on PIN 2 of interface X1, for 2s to 4s). This function is active after each detection zone violation.

Dust suppression The **dust suppression** function of the rotoScan ROD-4 is a software function for increasing the availability of the laser scanner with regard to soiling and small particles in the air such as insects. When the suppression of small particles is active, a somewhat larger tolerance zone is to be taken into account for the detection zone outline.

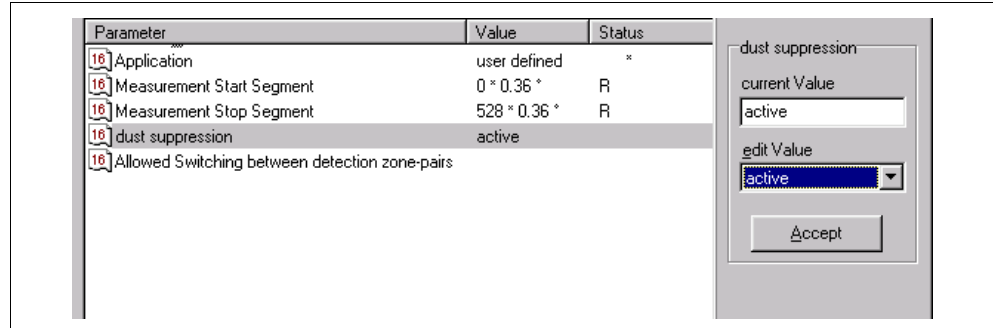


Figure 4.4: Parameter "Dust suppression"

Allowed switching between detection zone-pairs

With its four programmable detection zones, the rotoScan ROD-4 offers a high degree of application flexibility. Through the assignment of the permissible switching order in the dialogue "**Allowed switching between detection zone-pairs**", the detection zone selection is monitored for plausibility. Unpermissible switching orders are detected and result in the switching off of the OSSD outputs. Moreover, each detection zone can also be defined as a **system start detection zone**.

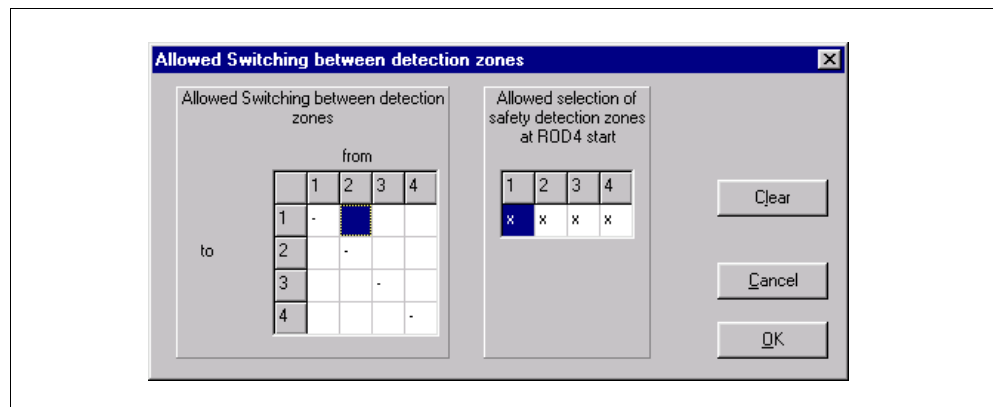


Figure 4.5: Parameter "Allowed switching between detection zone-pairs"

These function characteristics find application, for example, on **driverless transport vehicles** for the detection zone switching for straight-ahead and curved paths as well as vehicle starts in a straight line.

4.2.3 Non-safety-critical parameters

"Non-safety-critical parameters" are all of those parameters which have no effect on the detection zone functionality.

The folder "Non-safety-critical parameters"

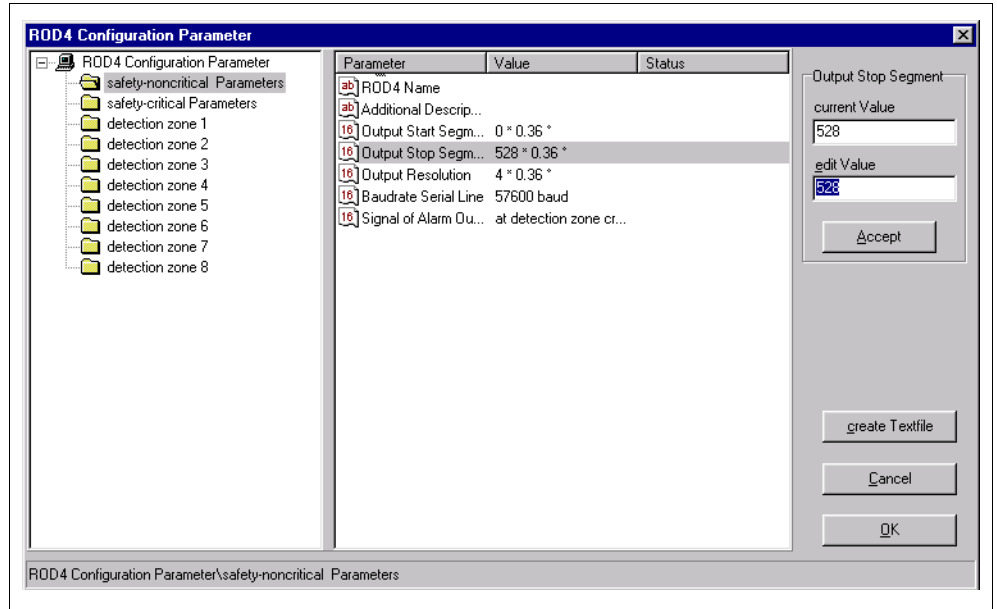


Figure 4.6: The folder "Non-safety-critical parameters"

Parameter	Function/Setting	Status	Input possibility
ROD-4 name	Scanner name		any
Additional description	Application description		any
Output start segment	Screen display of the first out-line segment		0 to 528 segments 0 to 528 segments corresponds to 190° 14 to 514 segments corresponds to 180°
Output stop segment	Screen display of the last out-line segment		0 to 528 segments 0 to 528 segments corresponds to 190° 14 to 514 segments corresponds to 180°
Output resolution	Number of measurement values per display section. The minimum value of each is displayed.		1 to 50 successive measurements
Serial interface	Change of the baud rate		4800 to 115200baud
Signal of alarm output	Switching off of the alarm output		Optionally in the event of an error message and/or detection zone violation

Table 4.2: Description "Non-safety-critical parameters"

Supplemental information

Start and stop segments

The output setting of the start and stop segments is, for example used for outline measurement (e.g. 20° sections). A limited display of partial sections is thus individually possible. A modification of the values changes only the outline display on the screen, not the number of measurements. The amount of data and the transmission time are in this way reduced.

Output resolution

Independent of the number of measurements, a display averaging can be selected. If, for example, "15" is entered, the smallest value of 15 measurement points is linked to a straight line. A quieter outline display is achieved. For a detailed display, use the setting "1".

4.2.4 Detection zone parameters

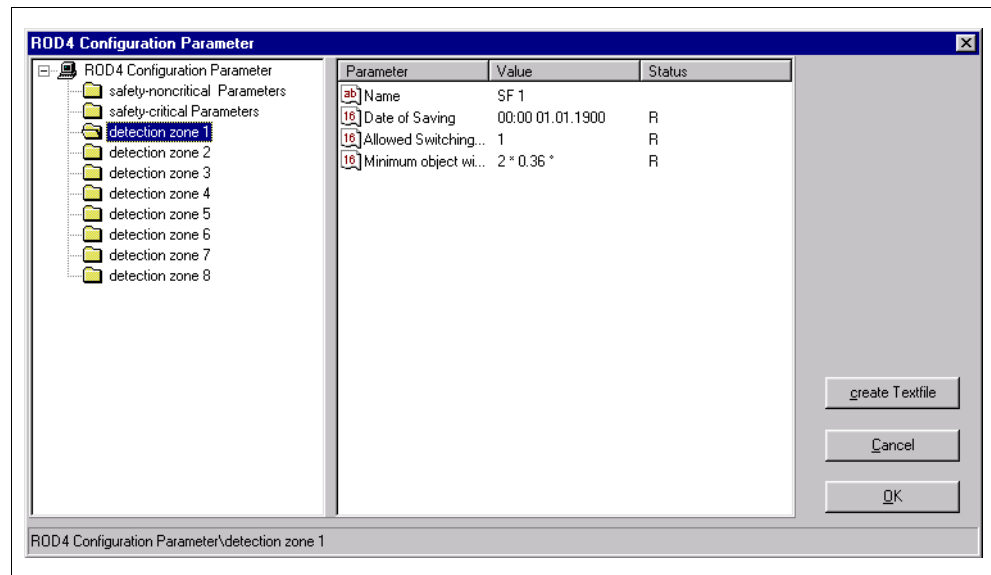



Figure 4.7: The folder "Detection zones [1-8]"


Parameter	Function/Setting	Status	Input possibility
Name	Detection zone name		any
Date of saving		R	
Allowed switching between detection zones		R	
Minimum object width	The lateral width in millimetres is dependent on the maximum radius of the field outline.	R	

Table 4.3: Description "Detection zones [1-8]"

4.3 Storing/loading configuration

To store the changed parameters, select the menu item **File** → **Save Configuration to File** or click the icon  in the "ROD-4 Configuration" register card.

Here, as is standard in MS Windows, you can assign the file a name and select a folder in which you would like to save the file.

To reload a configuration, select the menu item **File** → **Load Configuration from File** or click the icon  in the "ROD-4 Configuration" register card. Here, search for the folder and file, then click "Load".

The parameters stored in this file are now read back into the program.


4.4 Transferring a new configuration to the ROD-4

The changed configuration parameters are initially stored temporarily in your PC's main memory.



Attention!

Store the modified configuration so that in the event of transmission errors or program crashes the changed settings can be reloaded.

In order for the modified data to be stored in the ROD-4, you must transfer them to the device. The transfer of the data can be performed either via the menu bar (**ROD-4 Configuration** → **Transfer from PC to ROD-4**) or via the toolbar in the "ROD-4 Configuration" register card (icon ).

Before the transfer is performed, the safety-critical parameters of the application selection (see chapter 4.2.2) are displayed again in a dialogue window.

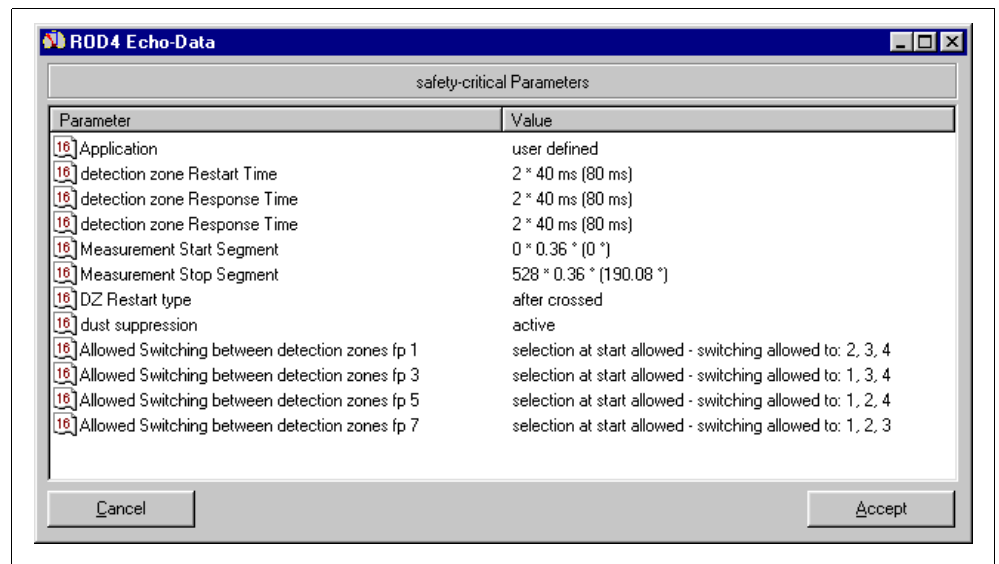


Figure 4.8: ROD-4 echo data

In this window, you can compare the input values with the nominal values. If some of the values do not match the specified values, you can click **Cancel** to interrupt the program at this point and change the values in the program. If all values are entered correctly, click **Accept**.

Following the confirmation, the data of the detection zone to be transferred are displayed:

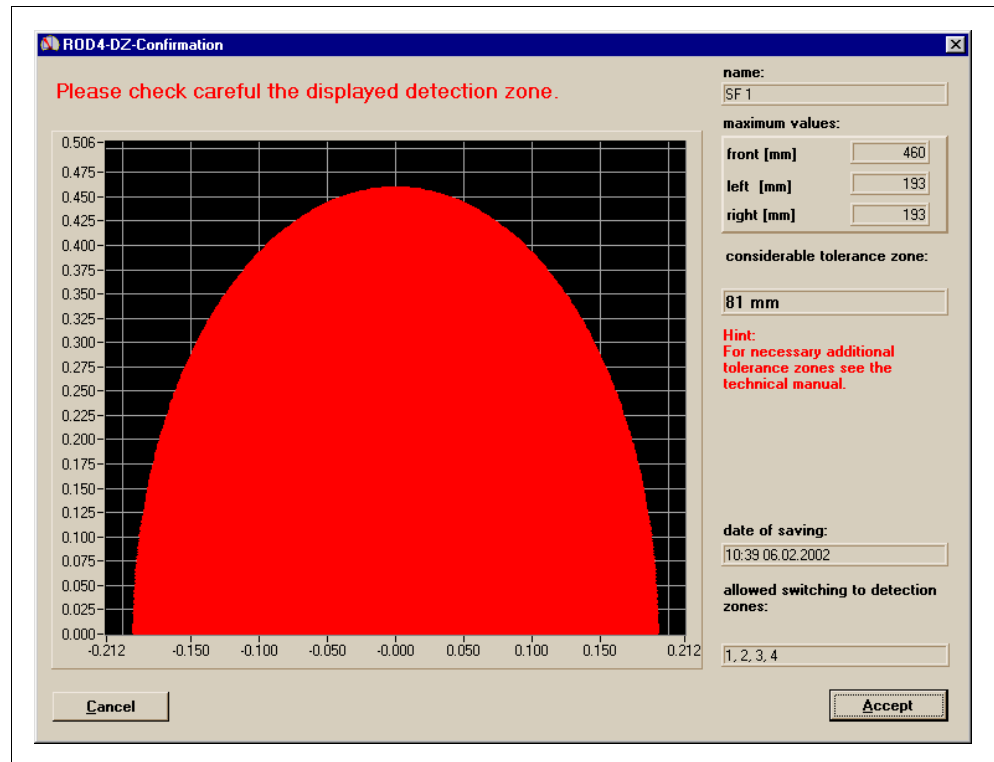


Figure 4.9: ROD-4 detection zone echo data

Check the data here again to ensure that the values are entered correctly, then click **Transfer**. The configuration data are now stored in the ROD-4.

If errors occur during the transmission, check in the "PC error list" (menu **Diagnosis**→ **Display PC Error List**) to determine the type of error and attempt to correct the error (see chapter 6.2 "PC error list").

4.5 Resetting the ROD-4 to factory settings

Using the command **Diagnosis** → **Reset ROD-4**, the ex works configuration (delivery state) of the ROD-4 can be restored. As an alternative to this menu command, a reset can be performed by pressing the RESTART button (on connector X1, press PINs 2 and 3) before switching on the scanner. Release the button after approx. 2s; the LEDs 2, 3 and 5 illuminate in the scanner display. The scanner is now reset. Refer to the following table for the default settings which are restored following execution of the reset:

Parameter	Value
Range, inner detection zones	1 m
Inner detection zone display	190°
Response time (inner detection zones)	80ms
Detection zone pair switching	No switching
Start detection zone pairs	1, 2, 3, 4
Detection zone name	- - -
Range, outer detection zones	2m
Outer detection zone display	190°
Response time (outer detection zones)	80ms
Signal of alarm output	Warning field violated
Application	Area protection
Restart	Manual
Restart on reset	Activated restart-disable
DZ restart type	None
Dust algorithm	Active
Start segment output	0
Stop segment output	528
Baud rate	57600 baud
Name of the scanner	- - -
Description of the scanner	- - -

Table 4.4: ROD-4 factory setting



Attention!

When executing the function described above, note that the process must not be repeated within a period of 2 min.

5 Working with Detection Zones

5.1 General information

5.1.1 Position determination

Optical position display

In order to be able to exactly read the position on the screen, four different fields have been provided in the status bar for displaying the cursor position.

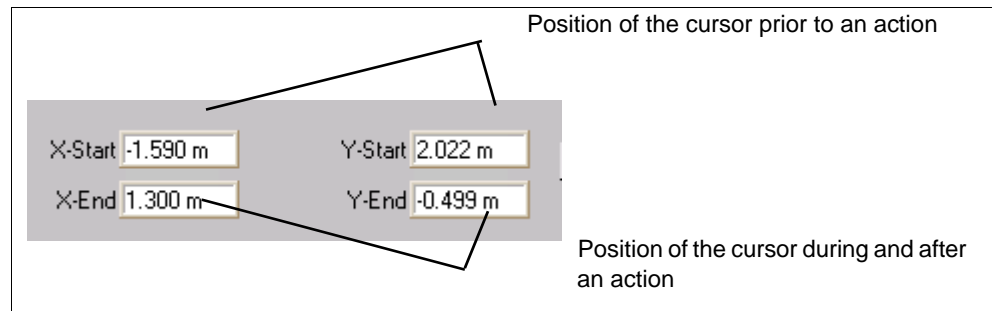



Figure 5.1: Optical position display

If you click the mouse on a given point in the working range, this position is displayed in the fields "X-Start" and "Y-Start". In addition, the click location is indicated by a blue circle  (position indicator). In this way it is possible to read exact values from measurement curves.

The two lower values are used for exact positioning when manually setting up detection zones.

Rulers The rulers offer another way to determine positions. They are scaled in meters.



5.1.2 Enlarging or reducing the work area

The zoom functions offered by the program allow you to modify the size of the work area.

The program contains two variants of the "Zoom" function:

- the automatic, incremental zoom and
- the manual, stepless zoom.

Automatic zoom

By clicking the icons  and  (or menu item **View** → **Zoom/Unzoom**), you can enlarge or reduce the working range step by step. There are 26 steps, whereby each step enlarges or reduces the work area by 10%.

Manual zoom

This zoom variant facilitates the direct area enlargement of an area which was selected manually. You may only perform enlargements here! Perform reductions using the automatic zoom.

In order to enlarge a specific area of the surface, proceed as described below:

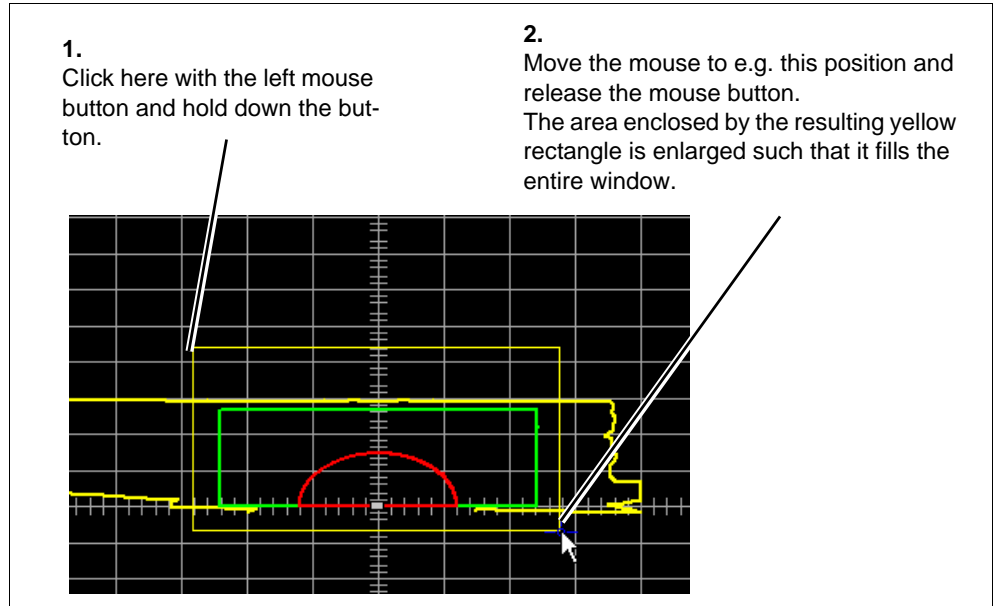

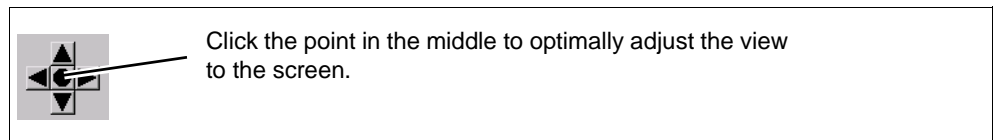


Figure 5.2: Manual zoom

Restoring the total view

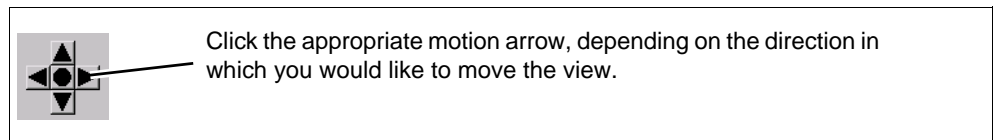
To return to the total view from any zoom level, select the menu item **View** → **Total** or click  in the toolbar.

In the motion cross (lower right), click the point in the middle to adjust the size of the measurement value display.



5.1.3 Moving the display

The motion cross can be used to move the display in the horizontal and vertical directions.



If you press the **F1** key, a mode is activated in which you can move the displayed view with the mouse. To do this, click the middle of the view and, while holding down the left mouse button, move the mouse in the direction in which you would like to move the area. The length of the line displayed during this process corresponds to the length of the move. The position indicator is displayed in "red" during this process.

5.2 Defining detection zones

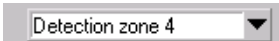
The ROD-4 scans the surroundings and displays on the work area the measured area outline as a measurement line. In addition, it constantly compares the measured outline with the detection zone definitions stored in the device. These detection zones can be created with the aid of the ROD-4 configuration software or the hand-held terminal. For information on making the setting using the hand-held terminal, please refer to the handbook "Technical description" of the ROD-4.

To define detection zones using the software, select the register card "Define Area".



Notice!

The four inner and outer detection zones are, due to the factory settings, superimposed upon one another; each pair is therefore visible as a single outline. One detection zone pair is always activated.

In the toolbar field , you can select the detection zone you would like to adjust. This selection can also be made in the menu bar via **Zones → Select Zone**.



Notice!

You may edit the detection zones only if you possess the required authorisation!

Store the original detection zone definitions prior to creating the new definition!

The icons in the toolbar are thematically ordered and are identical to the commands in the menu **Zones**.

5.2.4 Drawing detection zones

You can adjust the appearance of the detection zones individually for your specific requirements. The following functions are available for this purpose:





Designation	Icon	Menu
Define detection zone		Zones → Define Zone → Define Zone
Ellipse		Zones → Define Zone → Ellipse
Rectangle		Zones → Define Zone → Rectangle
Polygon		Zones → Define Zone → Polygon

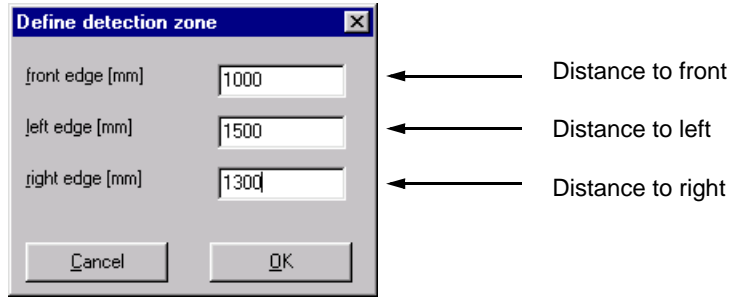
Table 5.1: Tools for drawing detection zones

In the following sections, all tools are described and information is provided for possible applications.

Define detection zone The scanning area of the ROD-4 is usually the same size on the left and right sides. It is, however, possible, that one of the two sides is smaller or larger than the other side. In such situations, the detection zone definition "Define detection zone" is used.

When creating the definition, proceed as follows:

- Select the detection zone to be adjusted (**Zones** → **Select Zone**).
- Select the function "Define Zone" from the menu or toolbar. The following window appears:

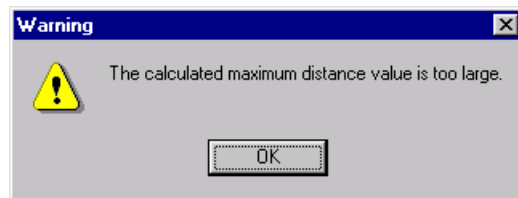


- In the dialogue mask, enter the required dimensions (in mm) and confirm the entries with **OK**.
- The resulting detection zone has a rectangular shape with all of the characteristics of the detection zone shape "Rectangle".



Notice!

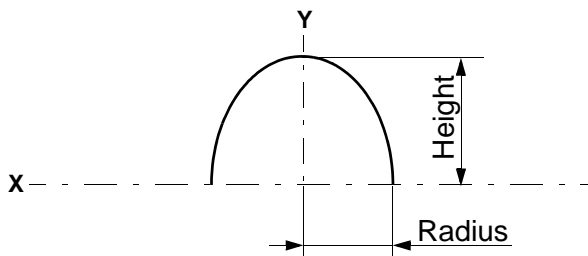
If one of the dimensions has been selected too large, an error message appears informing you of this. In this case, confirm with **OK** and correct the values.



Ellipse The "Ellipse" is well suited for many areas of application.

How to create an ellipse-shaped detection zone:

- To create an ellipse, the height (Y-value) and the radius (X-value) of the circle are required.



- Select the detection zone to be adjusted (**Zones** → **Select Zone**).

- Find the two values on the work area (in the example, these are the values $X = 3.0\text{m}$ and $Y = 3.0\text{m}$) and click the point for quick orientation later. The position indicator (blue circle) is set at this point. You can see the current co-ordinates of this point in the optical position indicator.
- Select the function **Ellipse** from the menu or toolbar.
- Click on the point marked earlier and, for exact positioning, keep the mouse button depressed.

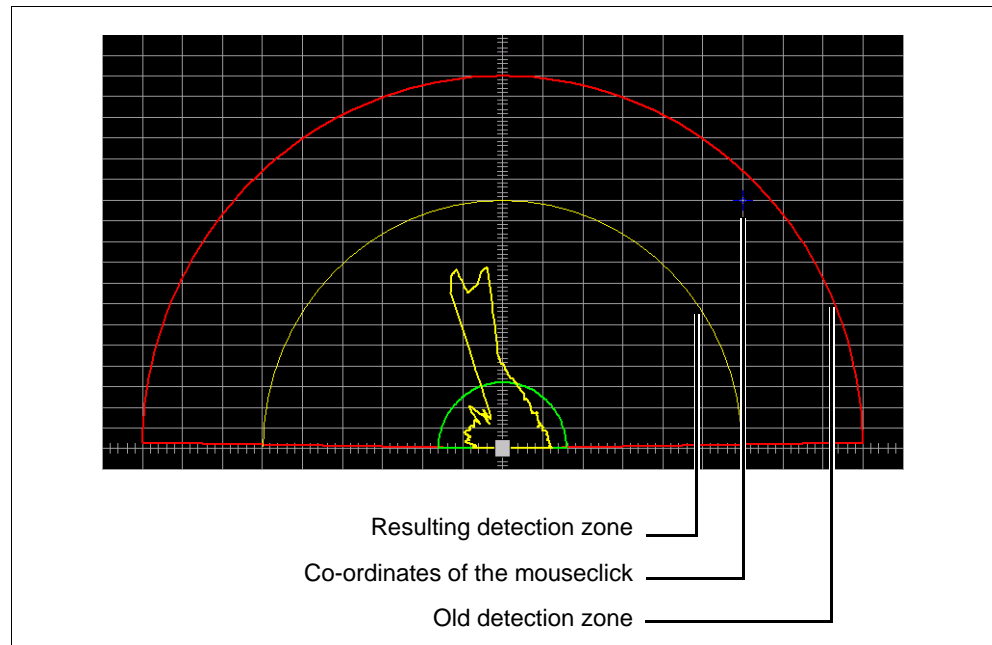


Figure 5.3: Positioning the detection zone "Ellipse"

- Orient yourself using the optical position indicator.
- Only after the mouse button is released is the old detection zone erased from the screen and the new detection zone displayed.

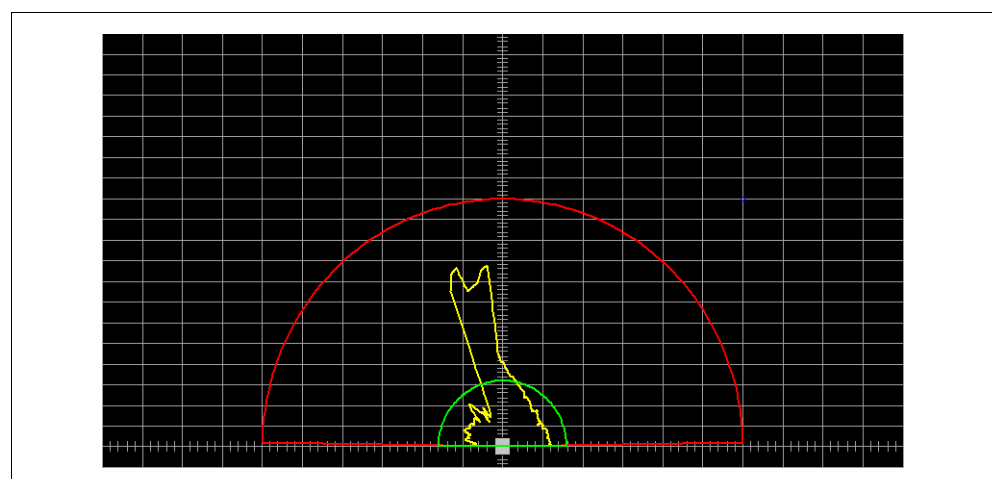
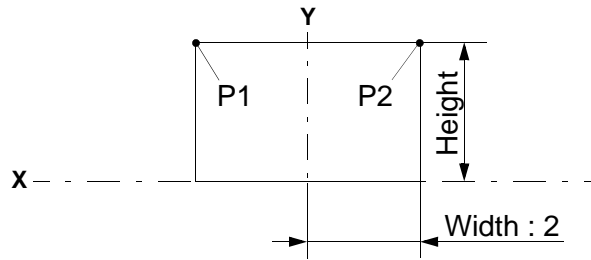


Figure 5.4: New detection zone "Ellipse"

Rectangle As with the ellipse-shaped detection zones, there are two values here which play a roll: the height and width. The width must be halved during the positioning as this is set on only one side of the X axis.



- Select the function **Rectangle** from the menu or the toolbar.
- The remaining steps in the creation of the rectangular detection zone functions as with "Ellipse". Please refer to the previous section for the required steps

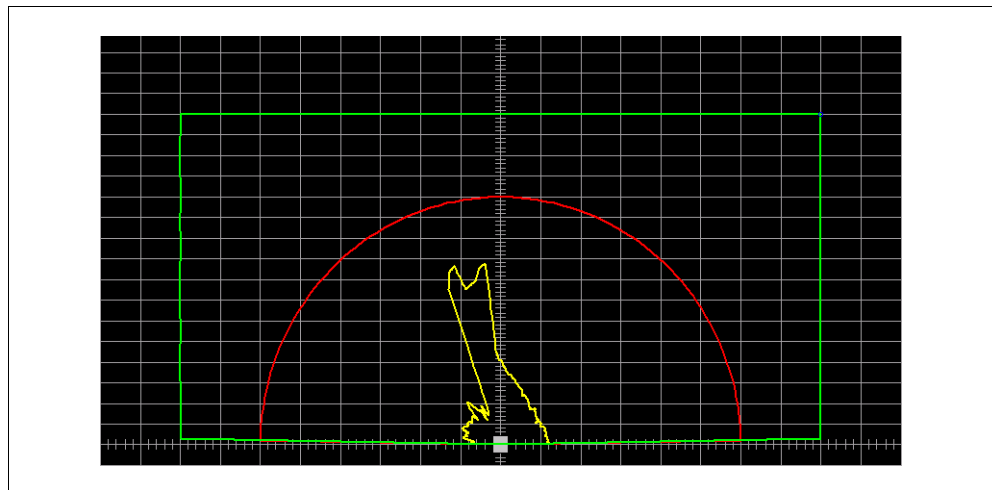


Figure 5.5: Detection zone "Rectangle"

Polygon With the detection zone shape "Polygon", you set the corner points of the detection zone directly. It is, therefore, possible to exclude certain objects which are permanently in the scanning area (e.g. columns).



Notice!

Before you define the define detection zone, measure the area to be scanned and note the positions of the corner points.

When defining a polygonal detection zone, proceed as follows:

- Select the detection zone to be adjusted (**Zones** → **Select Zone**).
- Select the function **Polygon** from the menu or toolbar.
- Click the work area on the first corner point of the detection zone.
- If you hold the mouse button pressed, you can use the optical position indicator to precisely position the points.

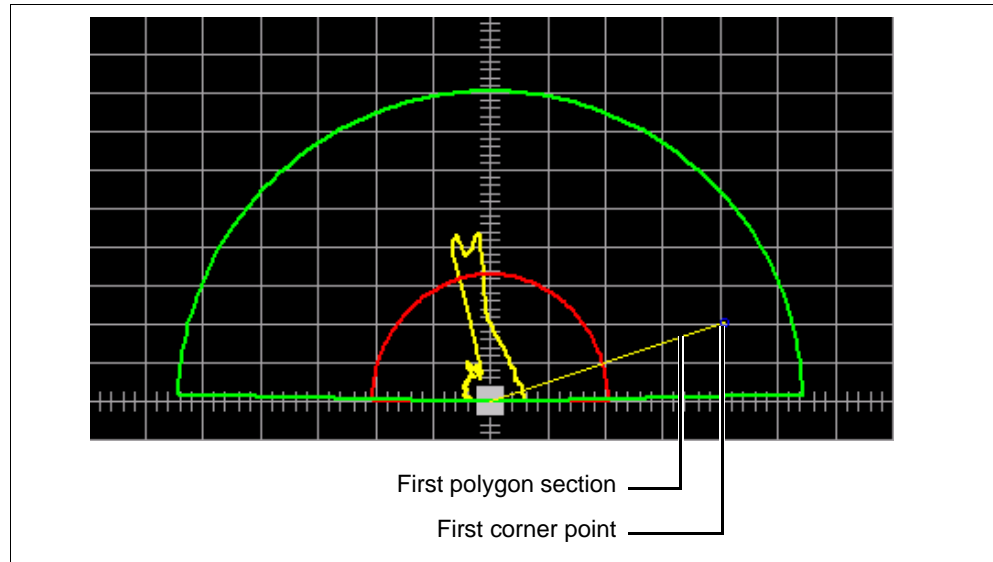


Figure 5.6: First corner point for the detection zone "Polygon"

- Click the next corner point.

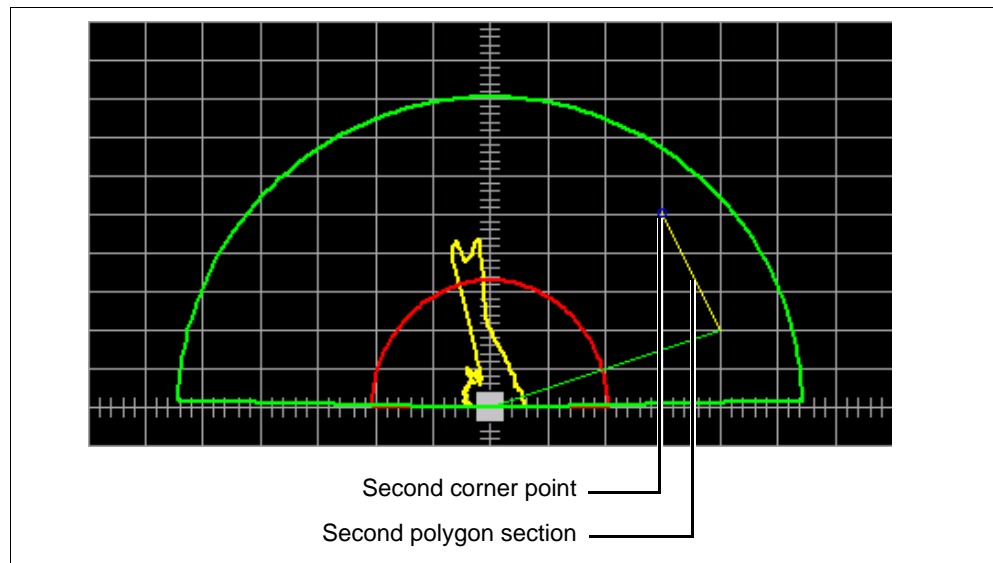
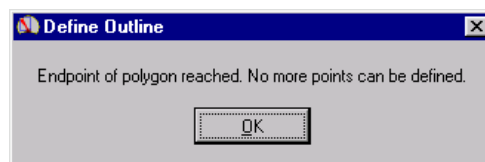


Figure 5.7: Further corner points for the detection zone "Polygon"

- Set all other corner points in the same way.
- After you have set the last corner point, click the **right** mouse button on the working range and the polygon closes.
- If you set the last corner point slightly below the zero line of the X axis, the polygon closes automatically and the following message appears on the screen:



5.2.5 Changing detection zones

If you would like to change existing detection zones, you can use the following functions:

Designation	Icon	Menu
Change segment		Zones → Change → Change Segment
Cut		Zones → Change → Cut
Fade out segment		Zones → Change → Fade Out Segment

Table 5.2: Tools for changing detection zones

The use of the tools is described in the following sections.

Change segments

When creating detection zones with the functions "Define Zone", "Ellipse" and "Rectangle", only the geometric shapes are created. In order to adapt these shapes to the environmental conditions, you can use the function "Change Segment".

The following scenario is used as an example:

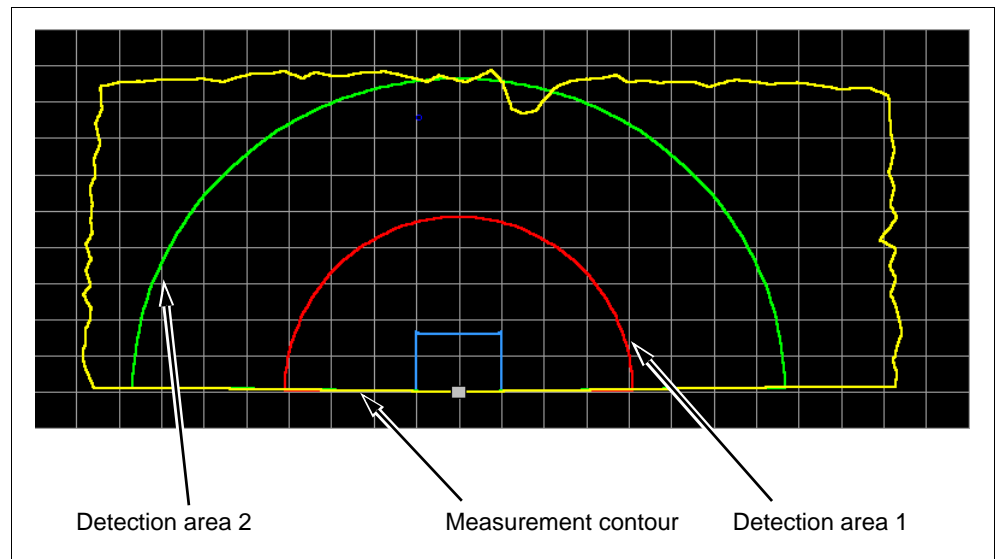


Figure 5.8: Change segments - initial situation

When making the change, proceed as follows:

- Select the detection zone to be adjusted (**Zones** → **Select Zone**).
- Select the function **Change Segment** from the menu or the toolbar.
- Four-corner control points are now displayed on the detection zone line. Depending on the size of the detection zone, the distances between the points may vary.

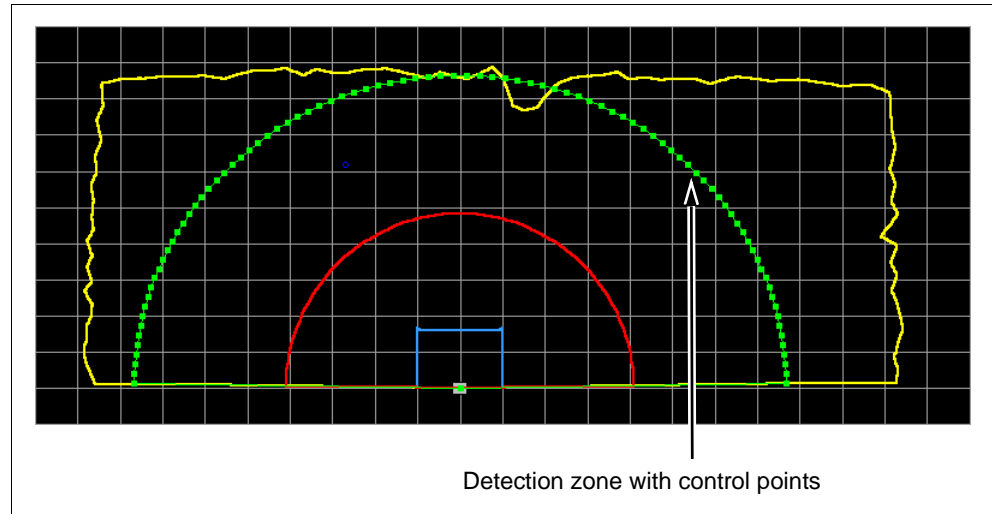


Figure 5.9: Change segments - control points

- Find the points on the curve which enclose the segment to be changed.
- Click the first point and hold down the mouse button. A yellow line appears. The ends of this line define the new location of the point. You can change this line until the mouse button is released.

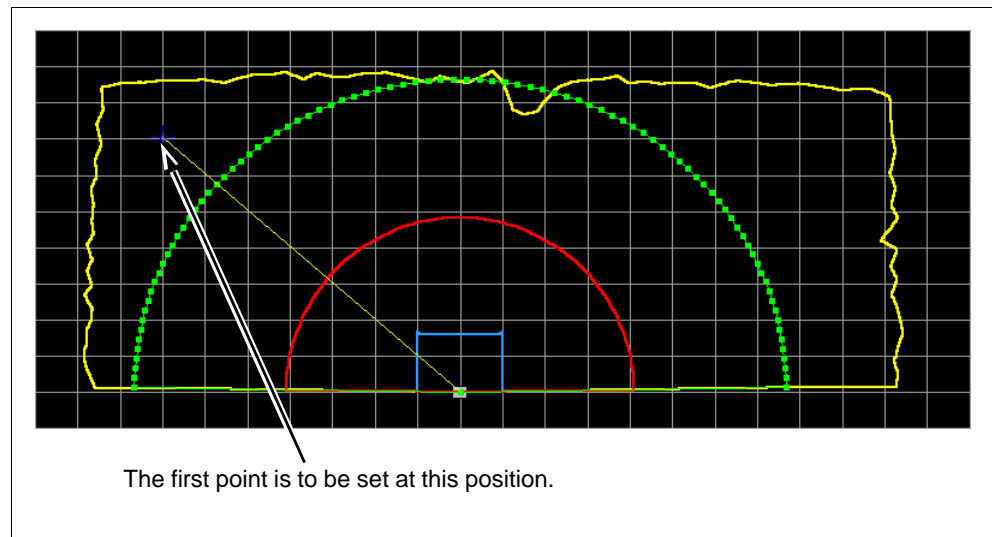


Figure 5.10: Change segments - moving the 1st control point

- Click the last point and hold down the mouse button.
- A second line is created. This line is connected to the first line. The end of the line describes the new location of this point.
- You can change the line until the mouse button is released.

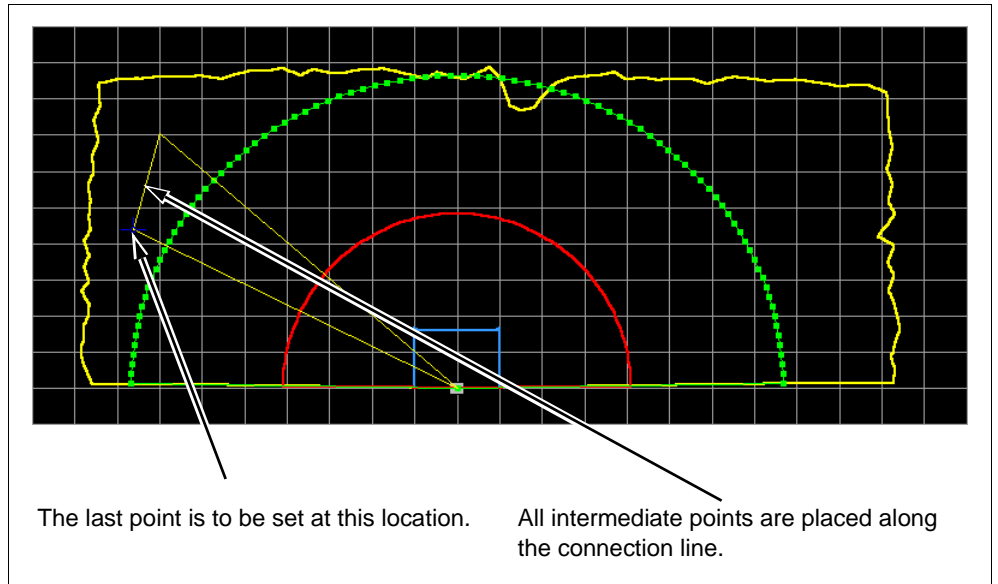


Figure 5.11: Change segments - moving the 2nd control point

- All control points between the two selected points are placed along the created connection line and the detection zone changed accordingly.

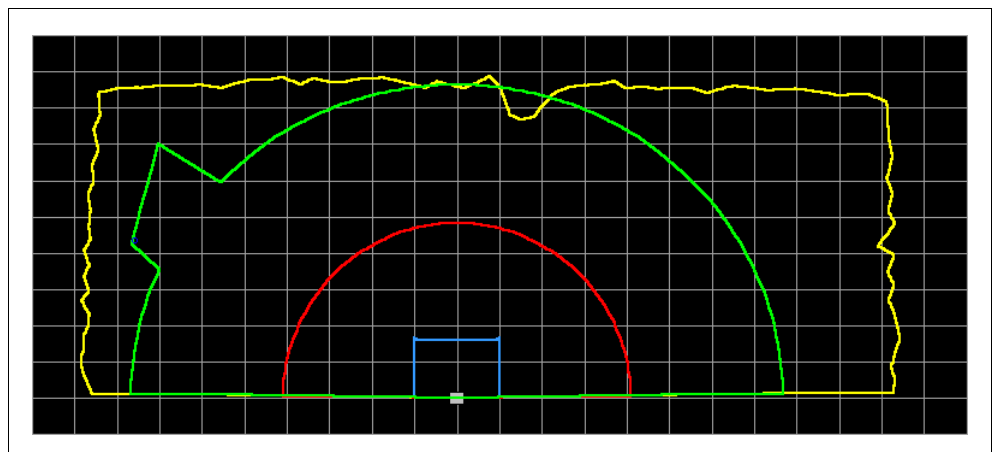


Figure 5.12: Change segments - completion

Cut detection zones With the function "Cut", it is possible to cut an already defined detection zone to the left, right or to the front.

The following sequence explains the procedure using an example:

The following scenario is used as an example:

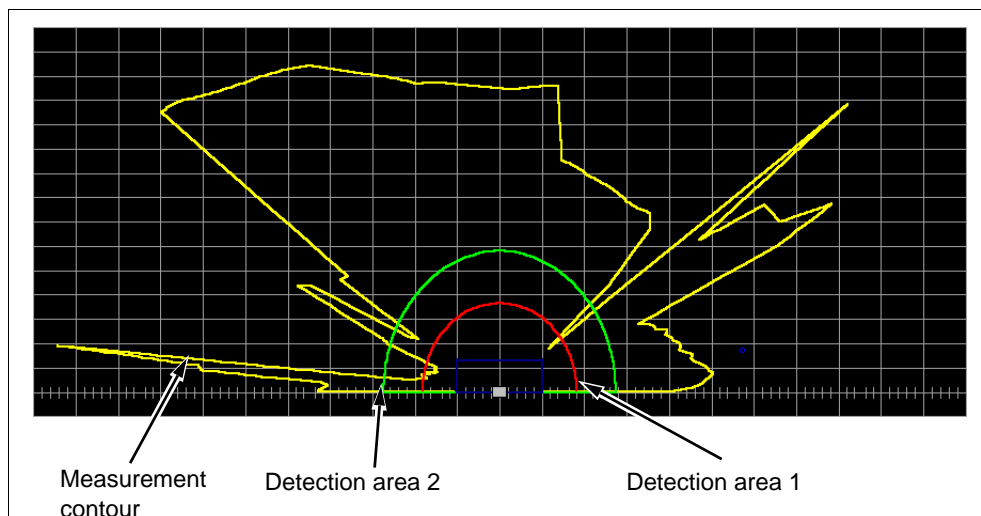
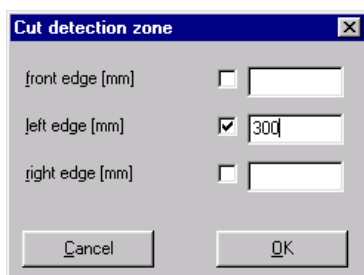


Figure 5.13: Cut detection zones - initial situation

When making the change, proceed as follows:

- Select the detection zone to be adjusted (**Zones** → **Select Zone**).
- Select the function **Cut** from the menu or toolbar.
- In the following input mask, indicate which values you would like to cut and enter the required dimensions. In the example, the left edge is to be cut to 300mm.



- Confirm the entry with **OK** and the detection zone is cut to the specified dimension.



Figure 5.14: Cut detection zones - completion

Fade out segment With the function "Polygon" it was possible to directly fade out objects in the scanning area when creating a detection zone. The function "Fade Out Segment" serves to remove segments from already existing detection zones. A segment intersects the detection zone at two points.

The following scenario is used as an example:

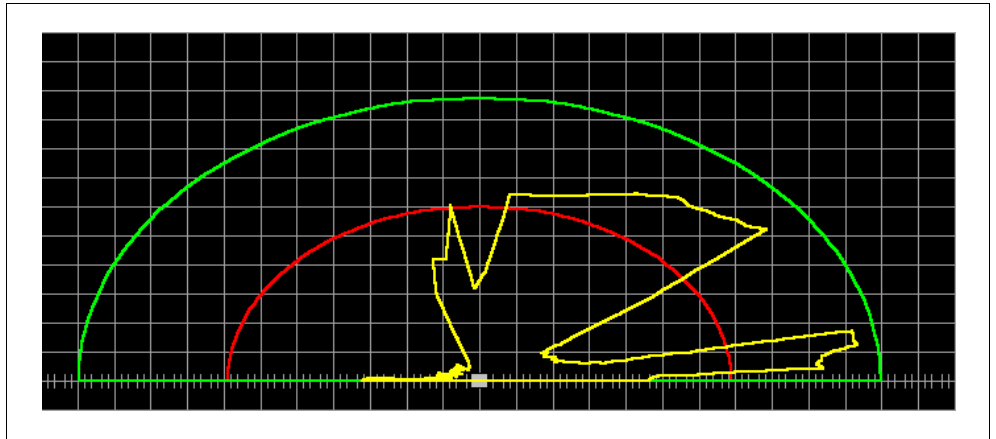


Figure 5.15: Fade out segment - initial situation

When making the change, proceed as follows:

- Select the detection zone to be adjusted (**Zones** → **Select Zone**).
- Select the function **Fade Out Segment** from the menu or toolbar.
- To select the segment to be faded out, click the lower intersection point using the optical position controls.

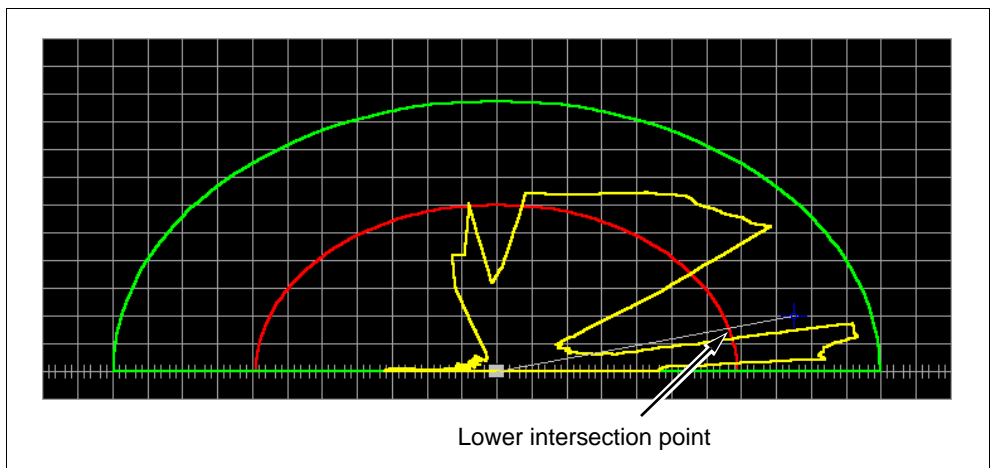


Figure 5.16: Fade out segment - 1st intersection point

- Then click the upper intersection point. The segment is displayed in grey as long as the mouse button is depressed.

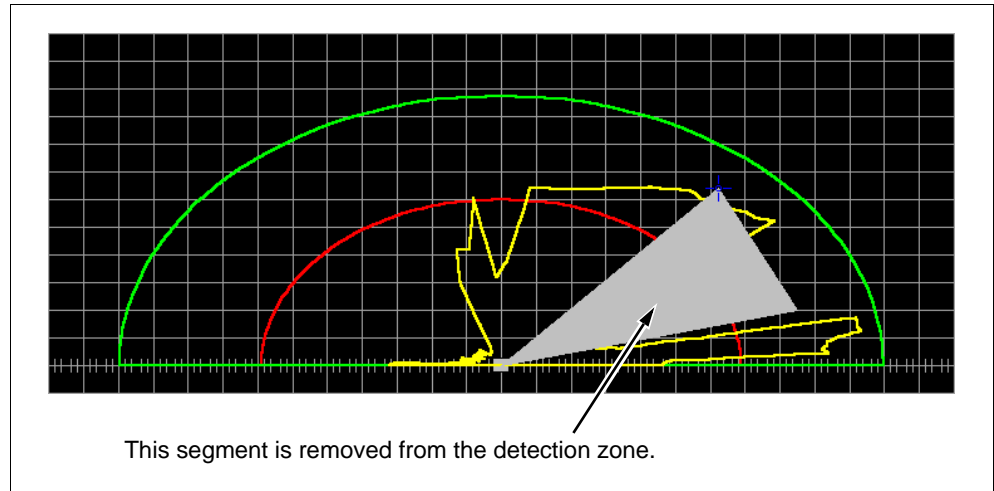


Figure 5.17: Fade out segment - 2nd intersection point

- When the mouse button is released, the selected segment is faded out of the detection zone.

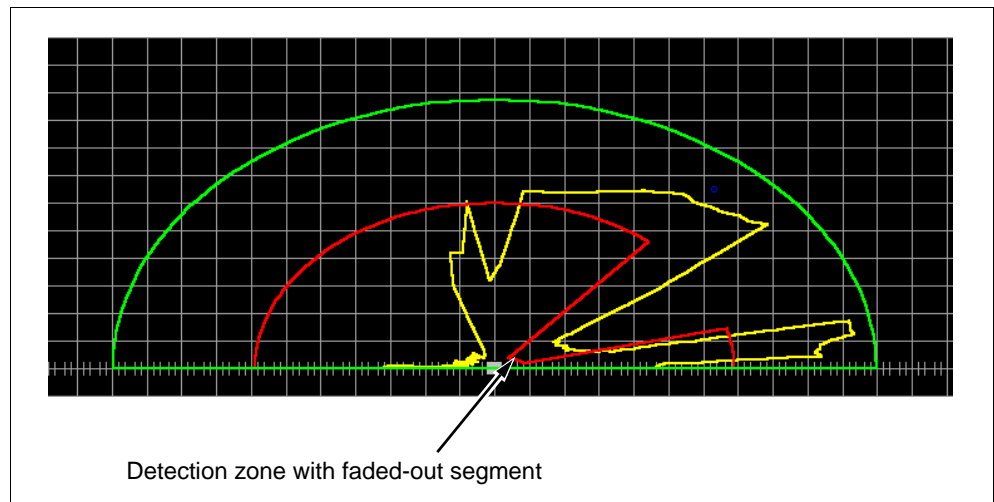




Figure 5.18: Fade out segment - completion

5.3 Saving and loading detection zones

To save the modified detection zones on the hard disk, select **File** → **Save Zone to File** or click the  icon in the "Define Zones" register card.

Here, you can enter the name of the file and select the folder in which you would like to store the file.

Loading detection zones

To reload a stored detection zone definition, select **File** → **Load Zone from File** or click the  icon in the "Define Zones" register card. In the following dialogue, find the desired file and then click **Open**.

The detection zones stored in this file are now read back into the program and can be edited and transferred to the ROD-4.


5.4 Transferring detection zones

The changed detection zones are initially stored temporarily in your PC's main memory.



Attention!

Store the modified detection zones so that in the event of transmission errors or program crashes the changed settings can be reloaded.

In order for the modified detection zones to be stored in the ROD-4, you must transfer them to the device. Data can be transferred either via the menu bar (**Zones** → **Transfer from PC to ROD-4**) or via the toolbar of the "Define Zones" register card by clicking the  icon.

Selecting the detection zone

First, a window appears in which all changed detection zones (since the last data update with the ROD-4) are listed.

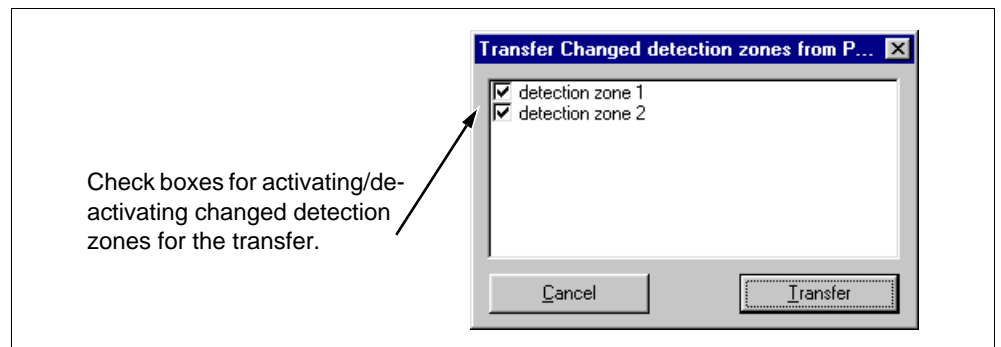


Figure 5.19: Selecting the detection zones

After selecting the detection zones, confirm with **Transfer**.

Echo data

The detection zones are transferred to the ROD-4. Before the changed detection zones are stored in the ROD-4, the device sends an echo (request) back to the program for safety reasons.

The following dialogue appears on the screen:



Figure 5.20: Echo data

In this window you can again compare the entered values with the nominal values. If some of the values do not match the specified values, you can click **Cancel** to interrupt the program at this point and change the values in the program. If all values are entered correctly, click **Accept** and the detection zones are stored in the ROD-4.

If errors occur during the transmission, check in the "PC error list" (menu **Diagnosis**→ **Display PC Error List**) to determine the type of error and attempt to correct the error.

6 System Information and Error Handling

6.1 ROD-4 Diagnosis

In the menu **Diagnosis** or in the register card "ROD-4 Diagnosis", you can determine the current settings for

- software version (firmware),
- designation, name,
- additional description,
- serial number and
- current authority level

To display the diagnosis data, click  in the toolbar or select menu item **Diagnosis** → **Load Diagnosis Data from ROD-4**.

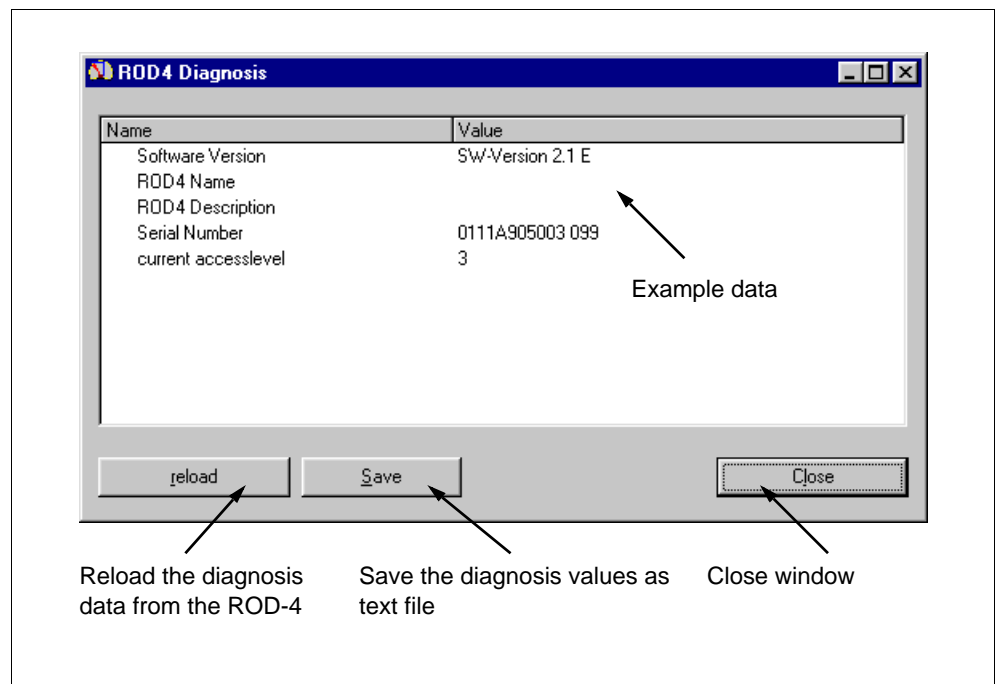


Figure 6.1: ROD-4 diagnosis data


These data can be archived in the PC as a text file.

6.2 PC error list

An error list is maintained on your PC which individually lists all problems with the RODsoft configuration software. To display the list, click or select menu item **Diagnosis** → **Display PC Error List**.

In the event of errors, contact LEUZE customer service.

6.3 ROD-4 error list

All errors which occur in the ROD-4 during operation are stored in an error list in the device. To display this list, click  in the toolbar or select from the menu **Diagnosis** → **Display ROD-4 Error List**.

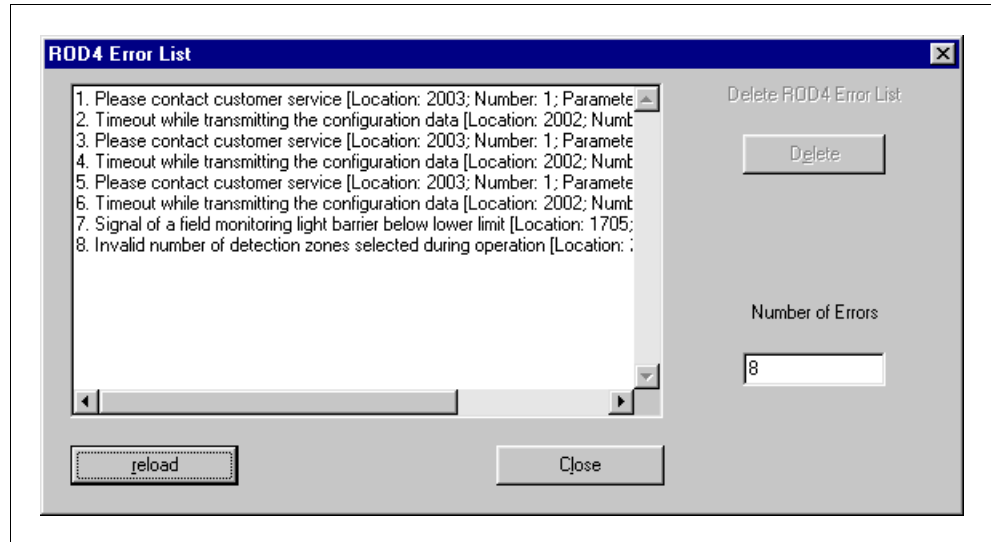


Figure 6.2: ROD-4 error list

The error messages resulting from the last 8 incidents are documented. The first item in the memory contains the most recent error message. You can also view the number of all generated error messages. The information in the list allows you to make very good deductions about the possible causes of errors.

In the status display (see section "Status display"), the error message is displayed instead of the operation mode.



Figure 6.3: Status display with error message

In the following table, all errors are listed along with hints for error rectification:

Location	Description	No.	Error description
102	Command processing, message processing	2	Invalid command received
103	Command processing control	2	Invalid command received
104	Command processing, configuration processing	2	Invalid command received
105	Command processing, generation of output messages	6	Command not permitted in current authority level
201	Processing of the reception protocol	4	Data overflow, message overwritten by new message
302	Processing of the transmission protocol	2	Time-out while waiting for acknowledgement of the transmitted message
306	Output of measurement values	5	Previous message not output completely
801	Error processing	2	Error memory cannot be read
805	Processing the command to the error memory	6	Error memory cannot be transferred
1002	Motor control during initialisation	1	Motor does not achieve nominal rotational speed
1002	Motor control during initialisation	2	Motor speed not constant
1110	Test of the switching outputs	4	Switching outputs have a state different from that expected according to internal markers
1110	Test of the switching outputs	5	Switching output cannot be switched off
1110	Test of the switching outputs	6	Switching output cannot be switched on
1111	Short-circuit test of the switching outputs	7	Short-circuit of a switching output with ground
1111	Short-circuit test of the switching outputs	8	Short-circuit of a switching output with Vcc
1606	Rotational speed monitoring	4	Rotational speed error, zero pulse not correctly detected
1607	Monitoring of the duration of a scan	5	Rotational speed error, motor not at nominal rotational speed
1705	Processing the data of the window-supervision photoelectric sensor	1	Signal of a window-supervision photoelectric sensor below lower limit
1705	Processing the data of the window-supervision photoelectric sensor	2	Signal of a window-supervision photoelectric sensor above upper limit
1906	Test of the external watchdog	1	Error in the internal watchdog
1906	Test of the external watchdog	2	Error in the internal watchdog
1906	Test of the external watchdog	5	Error in the internal watchdog
1906	Test of the external watchdog	6	Error in the internal watchdog

Location	Description	No.	Error description
1907	Test of the external watchdog	4	Error detected by the watchdog; watchdog switched off (rotary speed error)
1907	Test of the external watchdog	7	Error detected by the watchdog; watchdog switched off (rotary speed error)
2002	Processing of the parameter command	12	Time-out while transferring the configuration data
2007	Check of received parameter data	18	Date of the currently transferred detection zone is older than the date of the detection zone found in the scanner
2201	Area monitoring	5	Number of measurements in the scan is too small due to rotational speed error of the motor or the watchdog has switched off
2401	Reference measurement on the dark reference element	10	No distance value for reference measurement can be calculated; glare caused by other light sources or rotational speed error
2402	Reference measurement on the light reference element	10	No distance value for reference measurement can be calculated; glare caused by other light sources or rotational speed error
2701	Processing of messages for system diagnosis	1	Invalid diagnosis command received
2702	Processing of requirements of diagnosis data	3	Invalid diagnosis values requested
2800	Processing of the inputs for detection zone switching	2	2 Detection zones active for longer than 1s
2800	Processing of the inputs for detection zone switching	3	Switching to a new detection zone not allowed for parameterisation
2800	Processing of the inputs for detection zone switching	4	Invalid number of detection zones selected during operation
2800	Processing of the inputs for detection zone switching	6	No valid detection zone could be found in the data from the input lines
2801	Test of the inputs for detection zone switching	1	Error while testing the inputs for detection zone switching
2802	Initialisation of detection zone switching	3	Selected detection zone not allowed when starting after parameterisation
2802	Initialisation of detection zone switching	4	Invalid number of detection zones selected during power-on
2802	Initialisation of detection zone switching	6	No valid detection zone info could be found in the data from the input lines
3016	Monitoring of access authorisation with single password	11	Proven single password entered incorrectly

Figure 6.4: ROD-4 error description

6.4 Adjust window supervision

The device-internal adjustment of the windows supervision must be performed, for example, after replacing the scanner window.



Attention!

Please note that both replacing the outlet window as well as the adjustment must only be performed by trained, competent personnel. This function is available in authority levels "Service" and above when used with the service diskette.

To call up the function, select in the menu bar **Diagnosis** → **Adjust Window Supervision**.

6.5 Reset ROD-4 (RESET)

By calling up **Diagnosis** → **Reset ROD-4** a reset command is sent to the scanner via the PC. This function could be used, for example, when no RESTART button is provided and an error message has been displayed due to a soiled scanner window. After cleaning the window and resetting the error message, the scanner resumes its normal operation.

7 Supplemental Information and Summary

7.1 Initial configuration

- Carefully study the guidelines and standards which apply to your application. For information, refer to the "Safety Information" chapter in the rotoScan ROD-4 technical description.
- Start your PC with all necessary peripheral devices - without connecting the scanner.
- Install RODsoft.
- When unpacking the rotoScan ROD-4 avoid touching the outlet window and diffusing screens.
- Connect the rotoScan ROD-4 via connector X1 accordance with the instructions.
- Connect the rotoScan ROD-4 to the PC via connector X2 in accordance with the instructions.
- After applying the operating voltage, the scanner indicates communication readiness after approx. 20s. This is indicated by the message "ROD-4 connect" on the screen.
- The four inner and outer detection zones are, due to the factory settings, superimposed upon one another; each pair is therefore visible as a single outline. One detection zone pair is always activated.
- Due to the activated restart-disable, the OSSDs can be enabled only after 24V is applied to PIN 2 of connector X1. Please observe the specifications for the voltage supply in the rotoScan ROD-4 technical description.
- Note any detection zone violations caused by the maximum set detection zone.

7.2 Changing a configuration or detection zones

- Note, that before making changes, error-free data communication must be possible. This is indicated on the screen by the message "ROD4 connect".
- Changes are possible in authority level "Authorised User" and above.
- In addition, changes are only possible when a configuration is also loaded in the PC. This can be performed via the hard disk or via the rotoScan ROD-4.
- Changes to a configuration are accepted by RODsoft only following successful acknowledgement (**Accept** or **OK** button).

- Changes take effect only after successful data transmission to the scanner.
- If detection zones are loaded as a file, e.g. from the hard disk, the plausibility of the scanner configuration is to be checked.
- The safety notices in the rotoScan ROD-4 technical description must be observed.

7.3 Creating a configuration without a connected scanner

- After calling up RODsoft, the authority level "Authorised User" is to be selected.
- The measurement field is first displayed without measurement outlines.
- Enter the password for the respective user level.
- A configuration file can be loaded into the PC from the hard disk. The file extension is ***.rs**.
- Please note that the configuration files contain scanner configurations and detection zone definitions.
- A detection zone file can be loaded from the hard disk into the PC. The file extension is ***.sf**.
- Note that detection zone files do not contain scanner configurations.
- Stored files can be loaded into the ROD-4.

7.4 Replacing devices

- When replacing a scanner, the configuration is first loaded after connecting to the PC and the status information displayed on the screen where it can be checked.
- Identical configurations can, among other ways, be identified by outputting the date and time of field storage.
- If the scanner is new, it can be quickly programmed by transmitting the previous configuration file, provided it remains applicable to the application.
- When replacing a device, make certain that the scanner configuration and complete detection zone definitions are correctly transferred.
- Compare the data from the previous scanner with the echo data of the new scanner.
- Pay particular attention here to the "Safety Information" chapter in the rotoScan ROD-4 technical description.



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