rotoScan ROD4... plus — Laser scanner

2024/10/21 50108253-01

CE · cULus LISTED · CDRH · IP 65

0 … 65 m

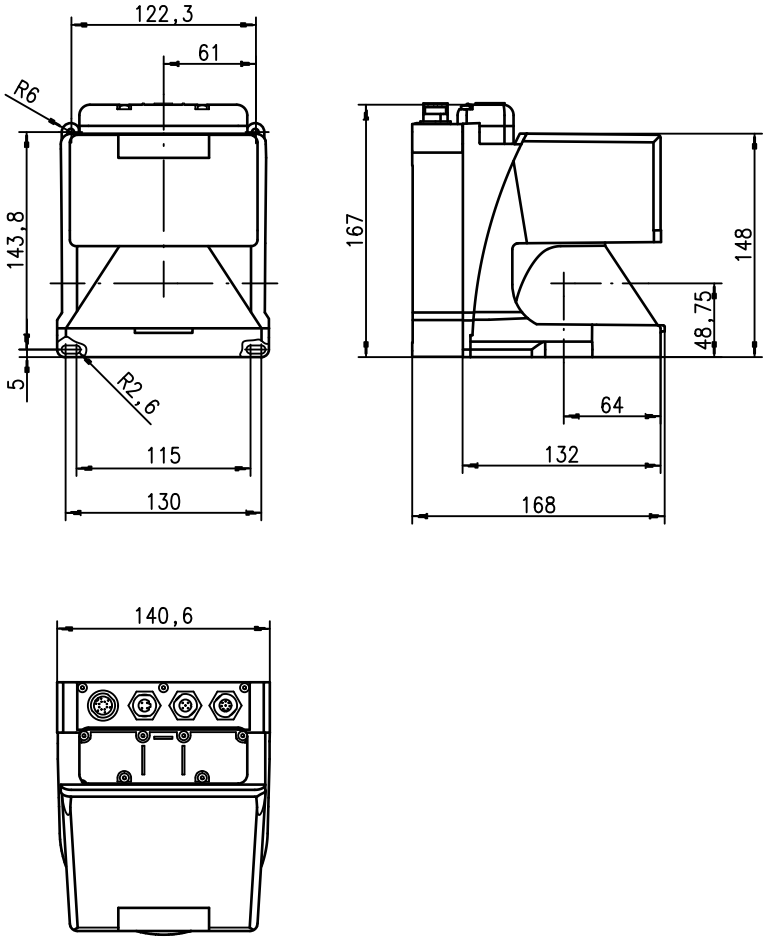
- Measurement data transfer over Fast Ethernet 100 MBit/s
- Measurement data transfer via serial interface RS 232/422
- Measurement data reduction, measurement data processing, measurement data filtering and determination of extreme values in interface box
- Multiple device versions:
  - with/without heating, dust-insensitive design
  - Scanning rate 50 Hz, for object measurement
  - Scanning rate 25 Hz, for object detection and object measurement
  - Measuring range 25 m or 65 m
- Service interface for configuration
- **ROD4 plus and ROD4-08 plus**: 7 storable and switchable detection fields for object recognition
- Software:
  RODplussoft: Measurement technology configuration
  RODsoft: Detection fields configuration

Accessories:

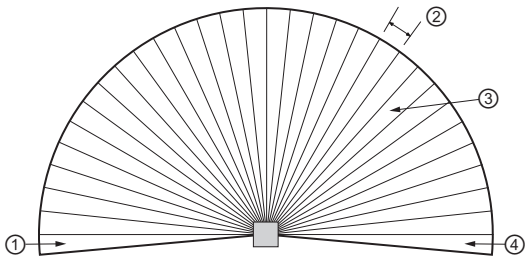
(available separately)

- Mounting system
- RODplussoft and RODsoft configuration software (free download at www.leuze.de)
- various connection cables

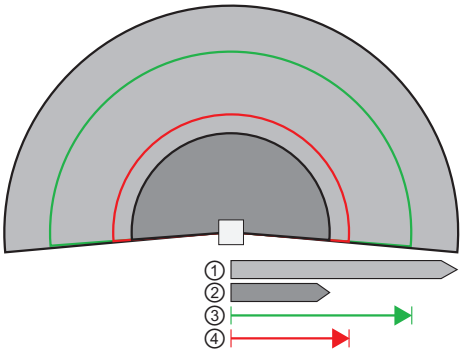
Dimensioned drawing



Measurement principle



1 Angular segment 0
2 0.36° angular resolution
3 190° working range
4 Angular segment 528



1 ROD4 plus, ROD4-50 plus, ROD4-56 plus measurement range: max. 65 m
2 ROD4-08 plus, ROD4-58 plus measurement range: max. 25 m
3 Far detection field radius: max. 50 m
4 Near detection field radius: max. 30 m

Technical data

Optical data

Measurement range	ROD4 plus, ROD4-50 plus, ROD4-56 plus: 0 … 65m ROD4-08 plus, ROD4-58 plus: 0 ... 25 m
Detection field radius [1]	Near: 0 … 30m Far: 0 ... 50m
Scanning angle	max. 190°
Angular resolution	0.36°
Scan rate	ROD4-5x plus: 50 scans/s or 20ms/scan ROD4 plus, ROD4-08 plus: 25scans/s or 40ms/scan
Transmitter	Infrared laser diode
Wavelength	905nm
Laser class	1 in accordance with IEC 60825-1:2014 / EN 60825-1:2014+A11:2021
Impulse duration	3ns
Max. output power (peak)	15W

Object measurement

Reflectivity	from min. 1.8% (matt black) ROD4-x8 plus from 6% (dark grey)
Object size	> 20mm at 4m distance > 100mm at 15m distance
Response time	ROD4-5x plus: at least 20ms (equivalent to 1scan) ROD4 plus, ROD4-08 plus: at least 40ms (equivalent to 1scan)
Switching inputs	4x +24VDC (FPS1 … 4 to Y1 for detection field switchover) additional restart input on Y1 and interface box
Switching outputs	4x PNP transistor outputs, 24V/250mA (Alarm, Warning, NearField1, NearField2)
Measurement value resolution per sector	5mm
Repeatability [2]	ROD4 plus, ROD4-50 plus, ROD4-56 plus: ± 15mm ROD4-08 plus, ROD4-58 plus: ± 20mm

Object detection (ROD4 plus, ROD4-08 plus)

Reflectivity	from min. 1.8% (matt black) ROD4-08 plus from 6% (dark grey)
Object size	> 20mm at 4m distance > 100mm at 15m distance
Response time	at least 40ms (equivalent to 1 scan)
Number of detection field pairs	7 (switchable via switching inputs)
Switching inputs	4x +24VDC (FPS1 … 4 to Y1 for detection field switchover) additional restart input on Y1 and interface box
Switching outputs	4x PNP transistor outputs, 24V/250mA (Alarm, Warning, NearField1, NearField2)

Electrical data

Voltage supply [3]	+24VDC +20% / -30%
Overcurrent protection	Via 2.5A (4A with heating) semi time-lag fuse in the switch cabinet
Current consumption	approx. 1A (use NT with 2.5A), approx. 4A with heating
Power consumption	< 75W at 24V including outputs
Overvoltage protection	overvoltage protection with protected limit stop

Mechanical data

Housing	Diecast aluminum, plastic
Weight	2.3kg
Connection type	4 connectors (can be plugged in from above)

Environmental data

Ambient temp. (operation/storage)	-0°C … +50°C/-20°C … +50°C -20°C … +50°C/-20°C … +50°C (with heating)
VDE protection class	III, protective extra-low voltage
Protection class	IP 65
Standards applied	IEC 60947-5-2
Approvals	UL 508, C22.2 No.14-13 3)

1) only applies to ROD4 plus, ROD4-08 plus
2) 10 ... 90% diffuse reflection, at 4m operating range
3) Protective Extra Low Voltage (PELV).
For UL applications: Use is permitted exclusively in Class 2 circuits according to NEC.

Order guide

	Designation	Part no.
for object detection/measurement, scanning rate 25scans/s		
	ROD4 plus	50106481
with heating/dust-insensitive	ROD4-08 plus	50106480
for object measurement, scanning rate 50scans/s,		
	ROD4-50 plus	50113226
With heating	ROD4-56 plus	50129795
with heating/dust-insensitive	ROD4-58 plus	50113225

Notes

Intended use:
The laser scanners are opto-electronic sensors for optical, contactless detection of objects.

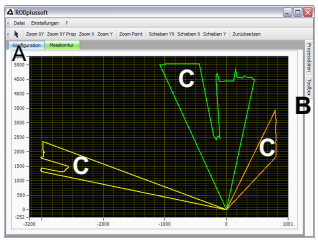
NOTES

Observe intended use!
- This product is not a safety sensor and is not intended as personnel protection.
- The product may only be put into operation by competent persons.
- Only use the product in accordance with its intended use.

“RODplussoft” configuration software

The configuration software runs on Windows 2000/XP and offers the following options:

- Configuration of Ethernet and serial interface
- Configuration of up to 12 measurement segments
- Visualization of measured values



A Configuration of data transmission in the “Configuration” tab

B Definition of measurement segments in the “Toolbox”

C Graphical representation of the measurement segments’ measurement values in different colors

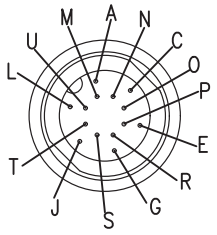
- Transmission of measured values in XY coordinates or polar coordinates.

Configuration software “RODsoft”
(only for ROD4(-08) plus

- Definition of detection fields
- Configuration of the scanner parameters
- Visualization of detection fields and measured values
- Presentation of status/diagnostic information
- Support for different languages

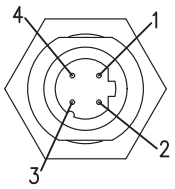
Electrical connection – connector assignment

Y1 logic



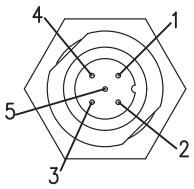
Pin	Function	Color
A	$+U_B$	rd (red)
C	GND_IN	bl (blue)
E	FPS1	pk (pink)
G	FPS2	gr (gray)
J	FPS3	yw (yellow)
L	FPS4	gn (green)
M	Restart_IN	br (brown)
N	Near field 1	wh (white)
O	Near field 2	vi (violet)
P	Warning2	bk (black)
R	Warning1	whgn (white-green)
S	NC	rdbl (red-blue)
T	NC	brgn (brown-green)
U	NC	grpk (grey-pink)

Y2 Ethernet



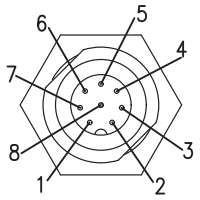
Pin	Function	Color
1	Tx+	yw
2	Rx+	wh
3	Tx-	or (orange)
4	Rx-	bl

Y3 Service



Pin	Function	Color
1	NC	br
2	TxD	wh
3	GND	bl
4	RxD	bk
5	NC	gr

Y4 RS 232/422



Pin	Function	Color
1	TX+ / TxD	wh
2	Tx-	br
3	Rx-	gn
4	Rx+ / RxD	yw
5	GND/shield	gr
6	RS 422 detection	pk
7	NC	bl
8	NC	RD

Installing the RODplussoft software

The **RODplussoft** configuration software is used to configure the interfaces and metrological functions of all ROD4... plus.

The **RODplussoft** configuration software can be found on the included CD. To install, follow the instructions in the relevant readme files, which can also be found on the included CD.

You can also download the latest version of **RODplussoft** at www.leuze.com.

Unpack the ZIP file provided in a suitable folder on your hard disk.

- Start the installation by double-clicking on the **setup.exe** file.
- Follow the installation routine instructions.

NOTE

Before installing **RODplussoft**, you should ensure that the Microsoft® .NET Framework 2.0 SP1 or higher is installed on your computer.

Installing RODsoft software (only for ROD4 plus and ROD4-08 plus)

You only need to install the **RODsoft** software if you want to define detection fields for ROD4 plus or ROD4-08 plus laser scanners.

NOTE

With **ROD4-5… plus** laser scanners, status and diagnostic information can be called up with **RODsoft**.

The **RODsoft** configuration software can be found on the included CD. To install, follow the instructions in the relevant readme files, which can also be found on the included CD.

You can also download the latest version of **RODsoft** at www.leuze.com.

Unpack the ZIP file provided in a suitable folder on your hard disk.

- Start the installation by double-clicking on the **setup.exe** file.
- Follow the installation routine instructions.

Establish connection to PC

The ROD4… plus is configured via a PC using the **RODplussoft** program before it is integrated into the process control.

In order to be able to establish TCP communication with the PC, the IP address of your PC and the IP address of the ROD4… plus must lie in the same address range. The ROD4… plus has no built-in DHCP client, so that you need to set the address manually. This is done the easiest way via the PC.

The ROD4...plus is set as follows at the factory:

IP address: 192.168.060.003
Subnet mask: 255.255.255.0

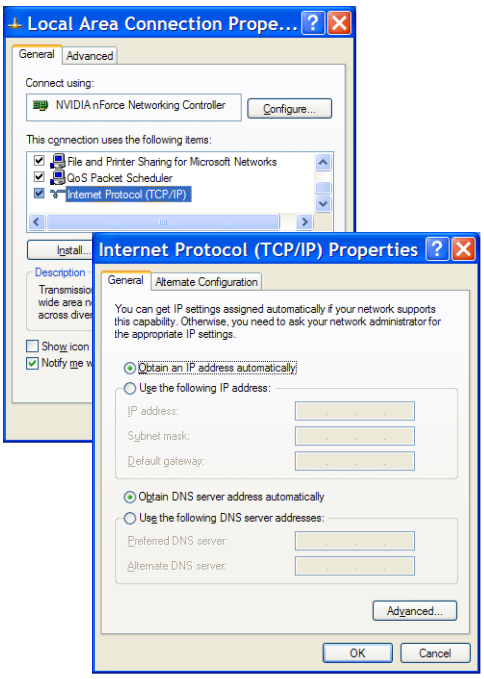
NOTE
If you use a desktop firewall, please make certain that the PC can communicate with the ROD4… plus via the Ethernet interface by means of TCP on ports 9008. Furthermore, the firewall must allow ICMP echo messages to pass through for the connection test (ping).

If the PC is usually connected to a network using DHCP address allocation, the easiest way to access the ROD4… plus is by applying an alternative configuration in the TCP/IP settings of the PC and connecting the ROD4… plus to the PC.

According to the default setting 255.255.255.0 for the subnet mask, the IP address of the PC must therefore be in the range of 192.168.060.0 to 192.168.060.255 (e.g. 192.168.060.110, but not 192.168.060.003!) so that the ROD4... plus and PC can communicate with each other. If the ROD4… plus and PC have the same IP address, they cannot communicate with each other.

Setting the IP address on the PC

- Log in to your PC as administrator.
- Go via **Start -> Control Panel** to the **Network Connections** menu (Windows XP) or the **Network and Sharing Center** (Windows 7).
- Select the **LAN connection** there and call up the corresponding properties page by right-clicking it.
- Select the **Internet protocol (TCP/IP)** (by scrolling down, if necessary) and click on **Properties**.
- In the **Internet protocol (TCP/IP) Properties** window select the **Alternate configuration** tab.
- Set the **IP address**of the PC in the ROD4... plus address range.
  Attention: Not the same as the ROD4... plus!
- Set the PC **subnet mask** to the same value as on the ROD4… plus.
- Close the configuration dialog by confirming all windows using **OK**.
- Connect the interface Y2 of the ROD4… plus directly to the LAN port of your PC. Use a **KB ET-…-SA-RJ45** cable for the connection.



Laser safety notices – laser class 1

ATTENTION

LASER RADIATION – CLASS 1 LASER PRODUCT

The device satisfies the requirements of IEC 60825-1:2014 / EN 60825-1:2014+A11:2021 safety regulations for a product of **laser class 1** and complies with 21 CFR 1040.10 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

- Observe the applicable statutory and local laser protection regulations.
- The device must not be tampered with and must not be changed in any way.
  There are no user-serviceable parts inside the device.
  CAUTION! Opening the device may result in hazardous radiation exposure!
  Repairs must only be performed by Leuze electronic GmbH + Co. KG.

Commissioning

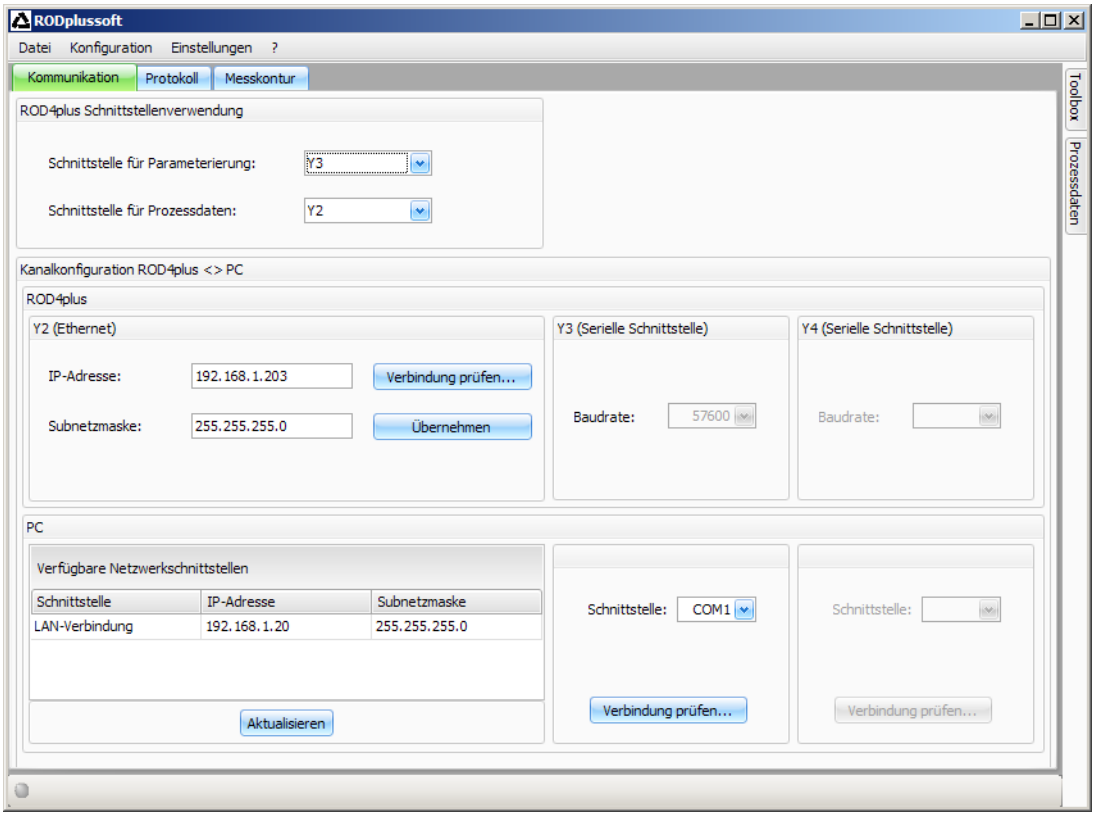
- Switch on the ROD4… plus supply voltage.
- Start the **RODplussoft** software.

The PC first attempts to establish a network connection via Ethernet using the automatic configuration. This takes a few seconds, after which the alternate configuration, which you just set, is activated. The PC can then communicate with the ROD4… plus via Ethernet.

Further information on using the **RODplussoft** software to configure the ROD4… plus can be found in the technical description and the software and protocol description.

The following steps are necessary for commissioning and integrating the laser scanner into the process control:

1. Configuring the ROD4… plus – see chapter 6 of the technical description.
2. If necessary, configure detection fields with the **RODsoft** configuration software (menu **Configuration** -> **Start RODsoft…**) (**only for ROD4 plus and ROD4-08 plus!**).
   See section “Configuring detection fields (for ROD4 plus and ROD4-08 plus only)” on page 6.
3. Program the process control.
   or
4. Connect switching inputs and outputs accordingly – see chapter 5 of the technical description.
5. Adjust the IP configuration of the ROD4… plus so that it can communicate with the process control. This is done in **RODplussoft** in the **Communication** tab. Here you can change the network address and associated netmask via which the ROD4... plus communicates with the process control.



6. You can save the changed settings in ROD4... plus with the menu item **Configuration** -> **Transfer to ROD4plus**.
7. Connect the ROD4… plus to the process control via the Y2 Ethernet interface.

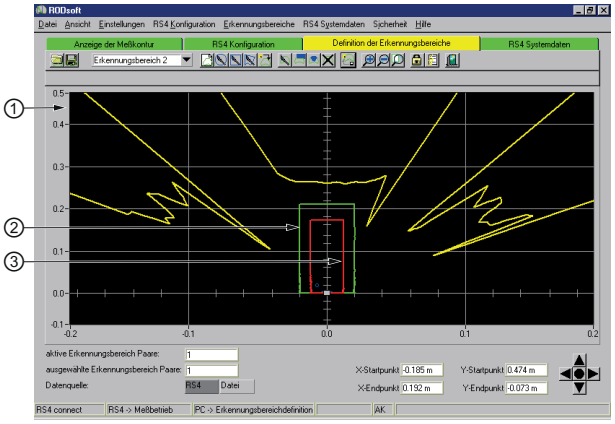
Configuring detection fields (for ROD4 plus and ROD4-08 plus only)

Commissioning procedure:

- Connect the PC to the ROD4(-08) plus via the **KB-ROD4plus…** cable at the **Y3 – Service** connection.
- Call up the **RODsoft** configuration software from **RODplussoft** via the **Start RODsoft...** menu item.
- Enter the password “**ROD4LE**” in the “Authorized customer” level

The detection field can be displayed under “Display of the measurement contour”. The response times, detection field switchovers etc. are defined under “ROD4 configuration”. To configure detection fields, select the “Definition of detection areas” field. Error codes can be called up in “ROD4 system data”.

A detailed description can be found in the **RODsoft** configuration software user manual.



1 Current measured values (yellow line)
2 **Far** detection field (green line)
3 **Near** detection field (red line)