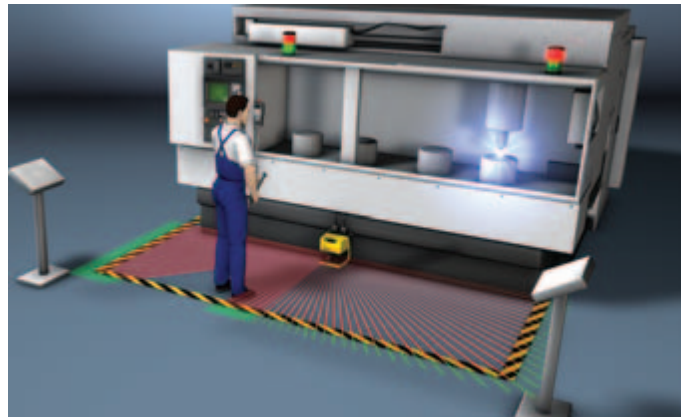


SAFETY LASER SCANNERS

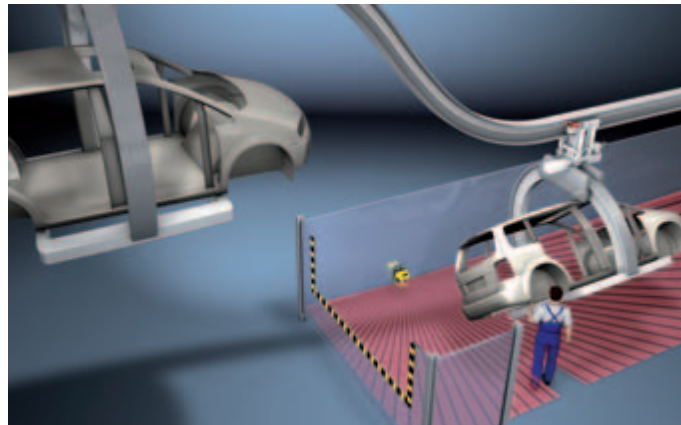
OVERVIEW

ROTOSCAN selection table

Selection table



Danger zone guarding at stationary machinery: Switchover of process-dependent protective/warning field combinations for smooth production process



Large area danger zone guarding on overhead electric conveyor systems: Material flow-dependent field pair changeover and activation for efficient production cycles

Safety Laser Scanners offer extremely flexible and universal workplace protection, which can be individually adjusted to any requirement and can be very easily integrated into every production process. With a compact construction, the provision of the safety function in just one device and with integrated interfaces for safety bus systems, complex customer requirements quickly become easily performed tasks. Whether it is hand protection, arm protection or full personnel protection, certified in accordance with IEC/EN 61508-SIL 2, the ROTOSCAN RS4 Safety Laser Scanner is flexible and versatile in adapting to every situation.

Similar to a radar, the Safety Laser Scanners constantly scan the complete working area two-dimensionally in an angle range of 190° and a radius of several meters. Independent protective and warning fields can be programmed via PC software and can be switched over at any time during the operation. If a person enters the protective and warning fields, they are detected and a switch-off and alarm command is generated for the machine.

The immense flexibility of the RS4 Safety Laser Scanner is a result of the independent protective/warning field pairs, which can assume any field contours as well as the ability to change over between these pairs. Using a PC configuration software, the shape of the field contours is graphically adjusted to the local conditions and required safety distances. In the same way, all other parameters can also be quickly and effectively adjusted to the requirements of the production process.

Because of its compact construction, the ROTOSCAN RS4 Safety Laser Scanner enables a flexible installation position and use in mobile applications. In addition to the classic areas of application with danger zone guarding at stationary machines, the extended version ROTOSCAN RS4-4E also has the necessary approvals for vertical access and point of operation guarding. The ROTOSCAN RS4-4M is specially designed for transfer carriages. It uses the MotionMonitoring function to ensure safe vehicle movement sequences.

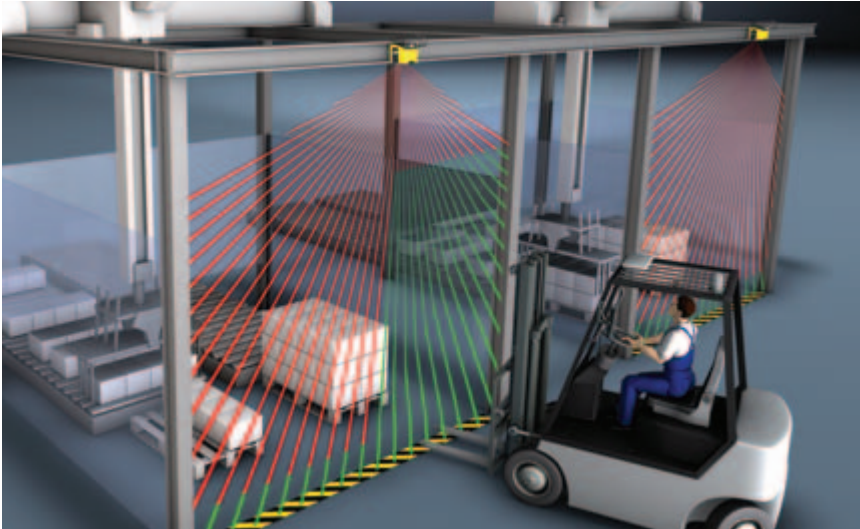


The RS4soft configuration and diagnostics software allows the Laser Scanner to be easily adjusted to local conditions – both direct and via the PROFIBUS DP

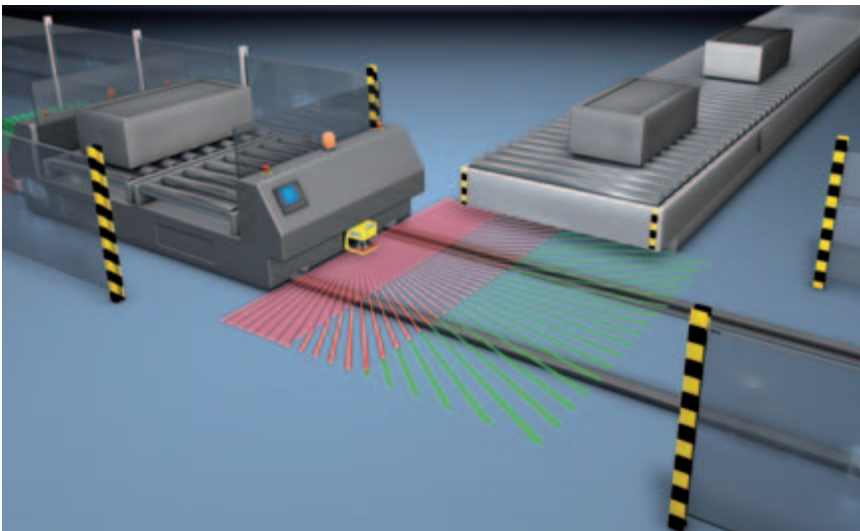
Type in accordance with IEC/EN 61496	Performance Level (PL) in accordance with EN ISO 13849-1	SIL	Protective field range in m	Warning field range in m	Resolution 70 mm	Resolution 150 mm	Variable resolution from 30 to 150 mm	Features, type-dependent										Series	Page		
								Number of field pairs that can change over	Number of signal outputs	Danger zone guarding	Point of operation guarding	Access guarding	RES, selectable	Integr. AS-i Safety Interface	Integr. PROFIsafe Interface	Reliable distance measurement	MotionMonitoring				
3	d	2	2.15	15				4	2									RS4-2E	72		
				15				8	2										RS4-2M	72	
			4	15				4	2											RS4-4	72
				15				8	2											RS4-4E	72
			6.25	15				8	2											RS4-4M	72
				15				8	2											RS4-6E	72
			15				8	2											RS4-6M	72	

SAFETY LASER SCANNERS

ROTOSCAN RS4



Fast material flow with field pair switchovers, for example with vertically mounted RS4 Safety Laser Scanners



Danger zone guarding on transfer carriages: Switchovers of status- and speed-dependent field pairs for rapidly adjusting the material transport with carriage movement monitoring using the MotionMonitoring function

Point of operation and access guarding are classic application examples of Safety Light Curtains and Multiple Light Beam Safety Devices. If it is necessary to flexibly adjust protective fields to the danger zones, or if there are space, power supply or flexibility restrictions, the Safety Laser Scanner is the better alternative. Depending on the application, the resolution can be configured so that the device safely detects a person, an arm or a person's hand.

Safety Laser Scanners are a cost-effective and flexible protective devices alternative for danger zone guarding of large areas in the vicinity of these machines. Switching between any kind of monitoring areas is possible with up to 6.25 radius, process-conditional according to the application. All configuration data, such as the definition of the zones, the resolution or the response times, is defined with the RS4soft configuration and diagnostics software.

Compactness, protective/warning field combination and field changeover are the essential features of Safety Laser Scanners for guarding corridor supply vehicles. The protection area of the traveling direction and speed of the vehicle is adjusted using staggered protective fields and their situation-conditional activation.

The Safety Laser Scanner also offers very significant advantages for portal processing systems. On one hand the vehicle can be monitored during the movement, while on the other hand, in standstill the Laser Scanner assumes a danger zone guarding of the tools integrated in the portal.

Typical areas of application

- Obstruction-free zone guarding on machine and plant systems
- Flexible guarding of corridor supply vehicles
- Variable access guarding at processing centers
- Individual point of operation guarding on machinery

ROTOSCAN RS4

Important technical data, overview

Type in accordance with IEC/EN 61496	3
SIL in accordance with IEC 61508 and SILCL in accordance with IEC/EN 62061	2
Performance Level (PL) in accordance with EN ISO 13849-1	d
Category in accordance with EN ISO 13849	3
Resolution (adjustable)	30 mm 40 mm 50 mm 70 mm 150 mm
Dimensions (W x H x D)	140 mm x 155 mm x 135 mm
Safety-related switching outputs (OSSDs)	2 pnp transistor outputs AS-i Safety Interface, PROFIsafe Interface
Connection system	Sub-D15, Sub-D9 for configuration M12 plug, IR interface for configuration (safety bus systems)

Functions	Function package		
	Basic	Extended	MotionMonitoring
Start/restart interlock (RES), selectable	●	●	●
Monitored field pair changeover	●	●	●
Warning field monitoring	●	●	●
Resolution, selectable	●	●	●
Horizontal danger zone guarding	●	●	●
Vertical point of operation guarding		●	●
Vertical access guarding		●	●
Reference boundary monitoring		●	●
Transfer carriage movement monitoring			●
Reliable distance measurement for positioning			●
Additional alarm output	●	●	●
Start test	●	●	●

Function extension					
With Safety Relay	Relay output	RES	EDM	Muting	Further details
MSI-SR4	●	*	●		p. 456
MSI-SR5	●	*	●		p. 462

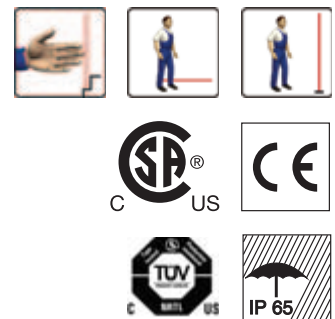
*) Already included in the device

Special features

- Automatic configuration with device exchange with intelligent ConfigPlug
- Guarding large danger zones
- Any kind of protective/warning field contours and configurations
- AS-i Safety at Work and PROFIsafe Laser Scanners



Features



Further information Page

- Ordering information 76
- Electrical connection 77
- Technical data 79
- Dimensional drawings 81
- Dimensional drawings: Accessories 82
- Accessories ordering information 83

www.leuze.com/rotoscan/

Machine Safety

Machine Safety Services

Safety Engineering Software

Safety Laser Scanners

Safety Light Curtains

Multiple Light Beam Safety Devices

Safety Sensor Sets

Single Light Beam Safety Devices

AS-Interface Safety at Work

PROFIsafe Sensors

SAFETY LASER SCANNERS

Ordering information

ROTOSCAN RS4

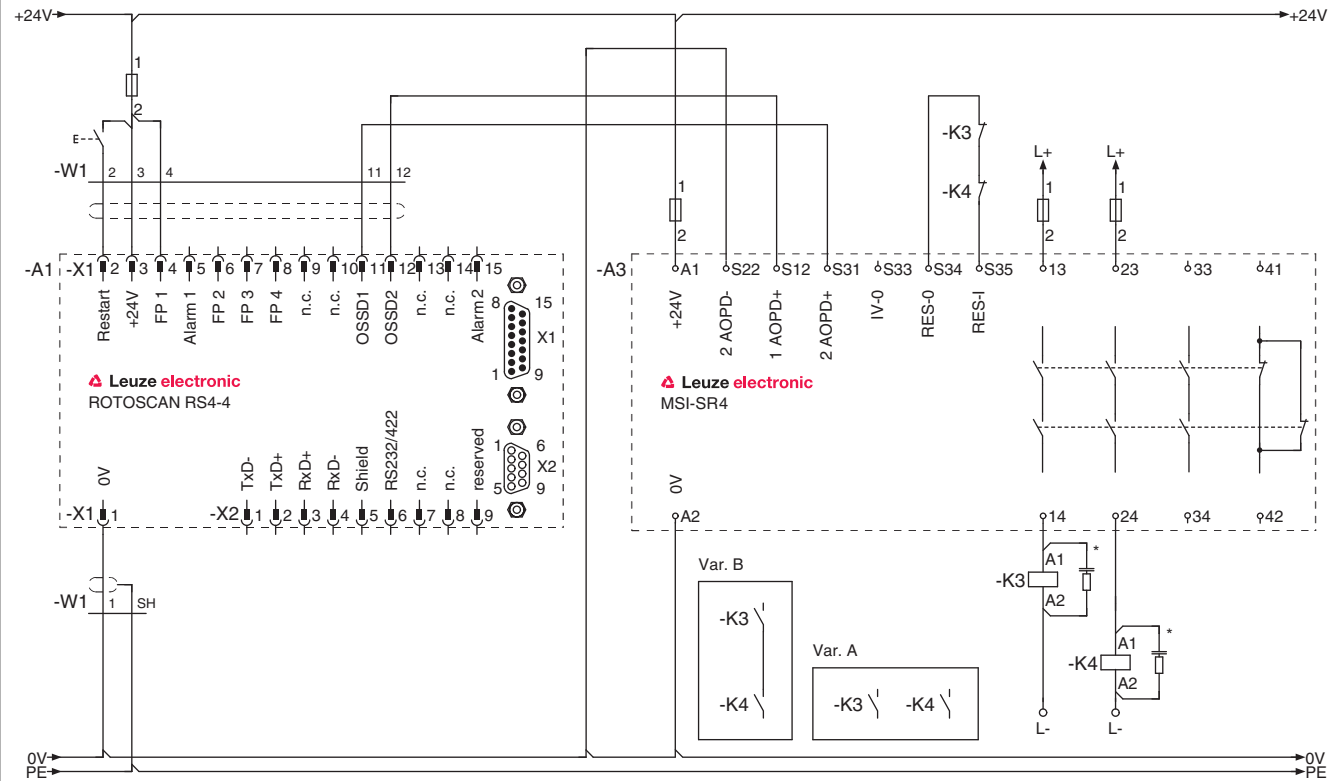
Included in delivery: RS4-MG-X1-Set and RS4-MG-X2-Set plugs, connecting and operating instructions (PDF file on CD-ROM), RS4soft configuration and diagnostics software.

Functions: Depending on function package – Basic, Extended, MotionMonitoring

Art. no.	Article	Description	
ROTOSCAN RS4			
520082	RS4-2E	ROTOSCAN RS4-2E Laser Scanner with Basic function package	
520098	RS4-2M	ROTOSCAN RS4-2M Laser Scanner with MotionMonitoring function package	
50034195	RS4-4	ROTOSCAN RS4-4 Laser Scanner with Basic function package	
520085	RS4-4E	ROTOSCAN RS4-4E Laser Scanner with Extended function package	
520099	RS4-4M	ROTOSCAN RS4-4M Laser Scanner with MotionMonitoring function package	
520044	RS4-6E	ROTOSCAN RS4-6E Laser Scanner with Extended function package	
520045	RS4-6M	ROTOSCAN RS4-6M Laser Scanner with MotionMonitoring function package	
Included in delivery: RS4soft and RS4-MG-X1-Set, RS4-MG-X2-Set plugs			
ROTOSCAN RS4/AS-i Safety			Safety-related switching outputs (OSSDs)
580014	RS4-4/A1	ROTOSCAN RS4-4/AS-i Laser Scanner with Basic function package	Integrated AS-i Safety Interface
520086	RS4-4E/A1	ROTOSCAN RS4-4E/AS-i Laser Scanner with Extended function package	Integrated AS-i Safety Interface
520042	RS4-4M/A1	ROTOSCAN RS4-4M/AS-i Laser Scanner with MotionMonitoring function package	Integrated AS-i Safety Interface
520046	RS4-6E/A1	ROTOSCAN RS4-6E/AS-i Laser Scanner with Extended function package	Integrated AS-i Safety Interface
520047	RS4-6M/A1	ROTOSCAN RS4-6M/AS-i Laser Scanner with MotionMonitoring function package	Integrated AS-i Safety Interface
ROTOSCAN RS4/PROFIsafe			
580012	RS4-4/P1	ROTOSCAN RS4-4/PROFIBUS Laser Scanner with Basic function package	Integrated PROFIBUS DP interface
520087	RS4-4E/P1	ROTOSCAN RS4-4E/PROFIBUS Laser Scanner with Extended function package	Integrated PROFIBUS DP interface
520043	RS4-4M/P1	ROTOSCAN RS4-4M/PROFIBUS Laser Scanner with MotionMonitoring function package	Integrated PROFIBUS DP interface
520048	RS4-6E/P1	ROTOSCAN RS4-6E/PROFIBUS Laser Scanner with Extended function package	Integrated PROFIBUS DP interface
520049	RS4-6M/P1	ROTOSCAN RS4-6M/PROFIBUS Laser Scanner with MotionMonitoring function package	Integrated PROFIBUS DP interface

Electrical connection

ROTOSCAN RS4 connection example



) Spark extinction circuit, supply suitable spark extinction

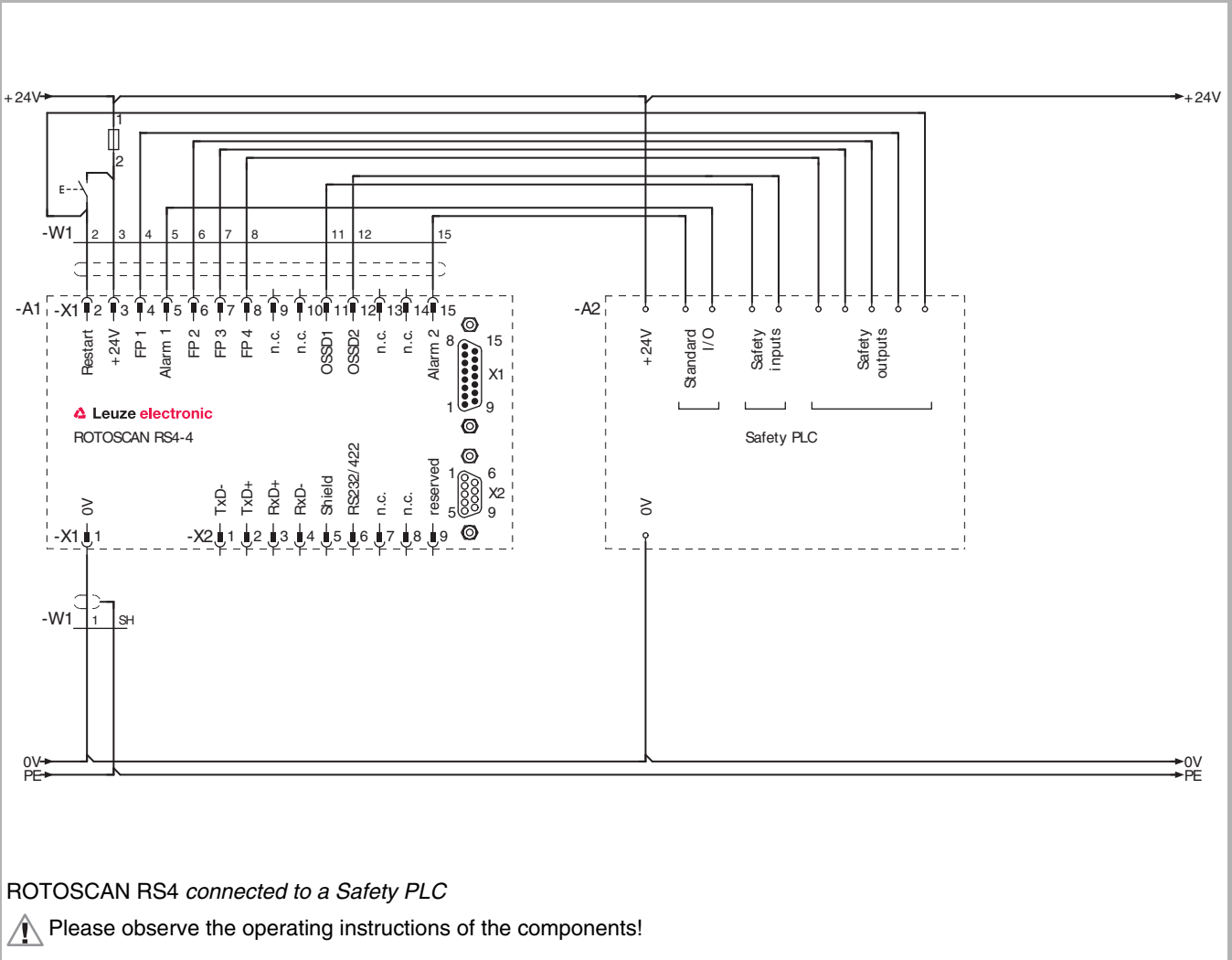
ROTOSCAN RS4 with MSI-SR4 Safety Relay

⚠ Please observe the operating instructions of the components!

SAFETY LASER SCANNERS

Electrical connection

ROTOSCAN RS4 connection example*



*) For further connection examples see chapter PROFIBUS DP, page 358

Technical data

General system data					
Type in accordance with IEC/EN 61496	3				
SIL in accordance with IEC 61508 and SILCL in accordance with IEC/EN 62061	2				
Performance Level (PL) in accordance with EN ISO 13849-1	d				
Probability of a failure to danger per hour (PFH _d)	1.50 x 10 ⁻⁷ 1/h				
Service life (T _M) in accordance with EN ISO 13849-1	20 years				
Category in accordance with EN ISO 13849	3				
Supply voltage	24 V DC, -30 % to +20 % Supply in accordance with IEC 742; must be fused with 1.6 A, melting fuse				
Current consumption	Approx. 420 mA (use power supply with 2.5 A)				
Connection system	Sub-D15, Sub-D9 for configuration				
Laser protection class in accordance with EN 60825	1				
Wavelength	905 nm				
Protection rating	IP 65				
Ambient temperature, operation	0...+50 °C				
Ambient temperature, storage	-20...+60 °C				
Dimensions (W x H x D)	140 mm x 155 mm x 135 mm				
Weight	Approx. 2.0 kg				
Protective field					
Resolution (adjustable)	30 mm	40 mm	50 mm	70 mm	150 mm
RS4-2E/RS4-2M range				2.15 m	2.15 m
RS4-4 range				4.00 m	4.00 m
RS4-4E/RS4-4M range	1.6 m	2.20 m	2.80 m	4.00 m	4.00 m
RS4-6E/RS4-6M range	1.6 m	2.20 m	2.80 m	6.25 m	6.25 m
Scanning angle	max. 190°				
Diffuse reflectance	Min. 1.8 %				
Response time	Min. 80 ms, can be set up to 640 ms (16-piece multiscan)				
Number of protective fields	4/8 (can be switched via switch outputs)				
Safety-related switching outputs (OSSDs)	2 pnp transistor outputs (short circuit-proof, cross-circuit monitored)				
Switching voltage high active	U _V -3.2 V				
Switching voltage low	Max. +2.0 V				
Switching current	Max. 250 mA				

www.leuze.com/rotoSCAN/

SAFETY LASER SCANNERS

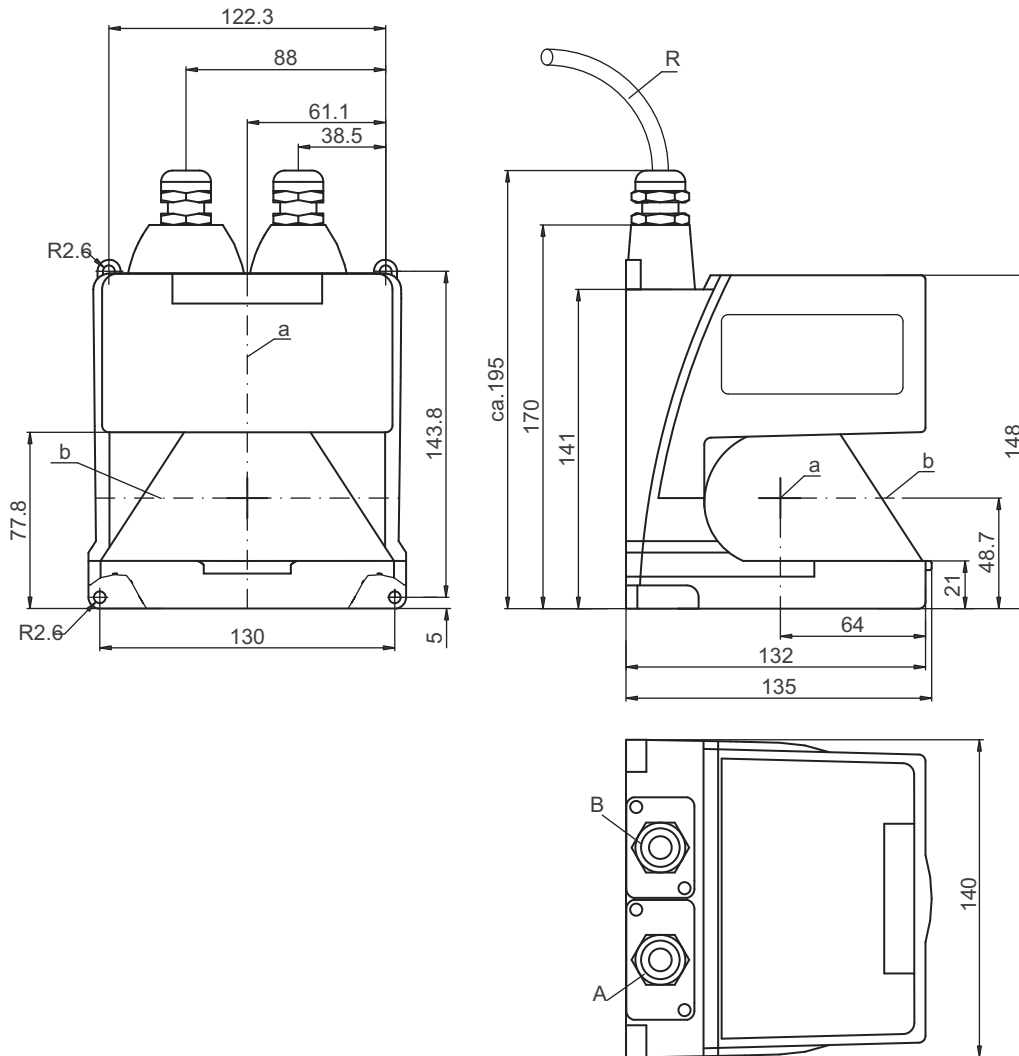
Technical data

Warning field	
Range	0...15 m
Scanning angle	max. 190°
Angle resolution	0.36°
Number of warning fields	4/8 (can be switched via switch outputs)
Switching outputs	2 pnp transistor outputs, per 100 mA (warning field/dirt/fault)
Measurement zone	
Measurement range	0...50 m
Radial resolution	5 mm
Lateral resolution	0.36°
Data output	Serial interface, RS232 and RS422

Please note the additional information in the RS4 connecting and operating instructions at www.leuze.com/rotoscan.

Dimensional drawings

ROTOSCAN RS4 Safety Laser Scanners



R = Smallest bending radius = 50 mm
 a = Rotating mirror axis
 b = Scan level

A = Interface X1 with RS4 control cable with ConfigPlug
 B = Interface X2 with protection cap

Dimensions in mm

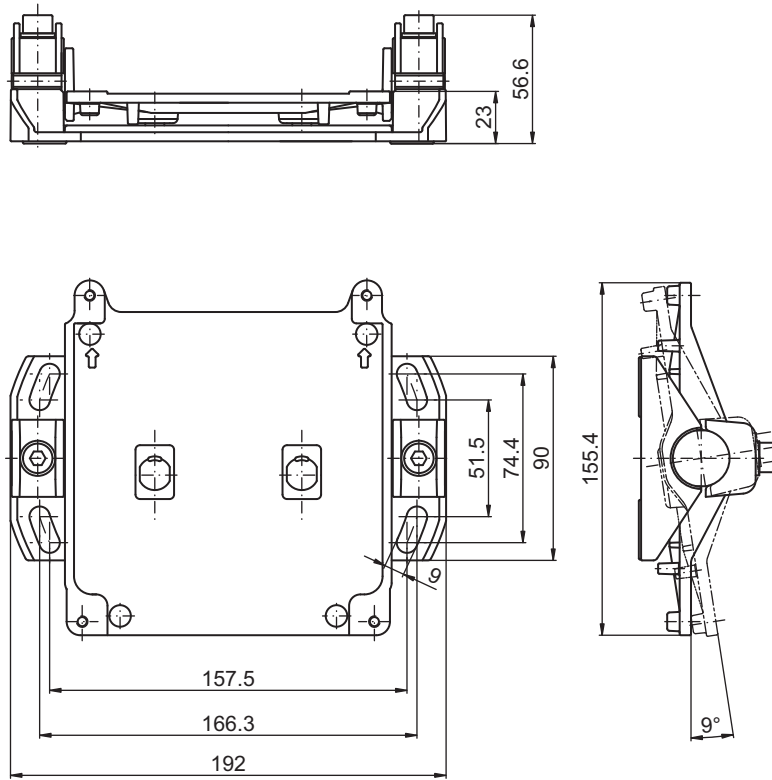
Our 3D CAD models can be found at: www.leuze.com/3d-cad-models.

www.leuze.com/rotoSCAN/

SAFETY LASER SCANNERS

Dimensional drawings: Accessories

RS4 mounting system



Dimensions in mm

Accessories ordering information

Art. no.	Article	Description	Length, design
Installation accessories			
50033346	RS4-MS	RS4 mounting system	
50035814	RS4-Adap-P	RS4 scanner adapter plate	
Start-up			
97005003	RS4-COB-24	RS4 configuration and test device, 24 V DC	
Connection system			
548520	CB-D15E-5000S-11GF	RS4 connecting cable with ConfigPlug, scanner-side preformed	5 m, straight/open end
548521	CB-D15E-10000S-11GF	RS4 connecting cable with ConfigPlug, scanner-side preformed	10 m, straight/open end
548522	CB-D15E-25000S-11GF	RS4 connecting cable with ConfigPlug, scanner-side preformed	25 m, straight/open end
548523	CB-D15E-50000S-11GF	RS4 connecting cable with ConfigPlug, scanner-side preformed	50 m, straight/open end
548530	CB-D15E-10000S-11WF	RS4 connecting cable with ConfigPlug, scanner-side preformed	10 m, angled/open end
50035863	CB-D9-3000-5GF/GM	RS4 connecting cable, RS232, preformed at both sides	3 m
50035865	CB-D9-5000-5GF/GM	RS4 connecting cable, RS232, preformed at both sides	5 m
50035867	CB-D9-10000-5GF/GM	RS4 connecting cable, RS232, preformed at both sides	10 m
520083	AC-D15E-GF	ConfigPlug for all RS4, straight, without cable, for automatic configuration with device swap-out	
50035735	RS4-MG-X1-Set	RS4 plug, sock., 15 pins, for X1 interface	
50035768	RS4-MG-X2-Set	RS4 plug, sock., 9 pins, for X2 interface	
426266	RS4-MGS-X1-Set	RS4 plug, 15 pins, for X1 interface, cable routing to the rear	
426265	RS4-MGS-X2-Set	RS4 plug, 9 pins, for X2 interface, cable routing to the rear	
Cleaning fluid			
430400	RS4-clean-Set1	RS4 cleaning fluid for plastic, 250 ml, cleaning cloths, 25 pieces, soft, fuzz-free	
430410	RS4-clean-Set2	RS4 cleaning fluid for plastic, 1,000 ml, cleaning cloths, 100 pieces, soft, fuzz-free	

www.leuze.com/rotoSCAN/

SAFETY LASER SCANNERS

Accessories ordering information

ROTOSCAN RS4/AS-i accessories ordering information

Art. no.	Article	Description	Length, design
580005	AC-M12-15M	M12 plug for protective field 1 activation, pins 1-5 bridged	
580004	AC-PDA1/A	AS-i adapter for bus connection and power supply for COMPACT <i>plus</i> receiver/transceiver & RS4/A1, M12, 5-pin	
548361	CB-M12-1000-5GF/GM	Connection cable, adapter device, plug and socket, 1:1, M12, 5-pin	1 m, straight
548362	CB-M12-2000-5GF/GM	Connection cable, adapter device, plug and socket, 1:1, M12, 5-pin	2 m, straight
520072	CB-PCO-3000	Connecting cable, RS232 - IR adapter	3 m
548363	CB-M12-2000-4GMB	RS4 test operation connecting cable	2 m

For more information see chapter AS-Interface Safety at Work, page 322

ROTOSCAN RS4/PROFIBUS accessories ordering information

Art. no.	Article	Description	Length, design
147500	AC-M12-PBT1	PROFIBUS M12 terminal resistor	
548100	CB-M12-25000S-4GF/GM	Connection cable for supply or reset button, shielded	25 m, straight
520072	CB-PCO-3000	Connecting cable, RS232 - IR adapter	3 m

For more information see chapter PROFIsafe Sensors, page 354