Leuze electronic

the sensor people

ROBUST
22 - 22.1 - 22.2, 23, 24

Multiple Light Beam
Safety Device Type 2

600841 - 2010/08
Subject to change
without prior notice

CONNECTING AND OPERATING INSTRUCTIONS

Original Instructions

Notes on using these connection and operating instructions

This manual contains information regarding the proper and effective use of the ROBUST safety light grid. It is included with the delivery of every ROBUST safety light grid.

Safety precautions and warnings are designated by the symbol 

Leuze electronic GmbH + Co. KG is not liable for damage resulting from improper use of its equipment. Familiarity with these instructions constitutes part of the knowledge required for proper use.

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1 System Overview and Range of Applications

1.1 System Overview

ROBUST is a product family of testable safety light grids. In combination with a safety interface component, such as MSI-... or the test monitoring unit TNT 35 from Leuze electronic, they qualify as an active optoelectronic protective device (AOPD), Type 2, in accordance with IEC 61496-1, -2 or EN 61496-1, -2, Cat. 2 and PL d in accordance with ISO 13849-1. ROBUST safety light grids are available in 2, 3, and 4-beam versions with the following features:

- Compact aluminum profile with mounting slots and positionable M6 sliding brackets
- Connected using M12 plug-in connections (RRT 22) among others
- Large connection space for devices with terminal connections (RRT 22.1, among others)
- Flexible expansion of functions (such as muting) by adding safety interface components
- Heated glass optics
- Optic spacing bolts for holding a laser alignment aid to allow for easy adjustment
- Integrated muting light signal (RRT 22.2)

1.2 Approvals and Certifications

EG type approval testing performed by:
TÜV NORD CERT GmbH
Zertifizierungsstelle für Produktsicherheit
Benannte Stelle 0044
Langemarckstr. 20
45141 Essen

1.3 Device Types and Range of Applications

ROBUST safety light grids, Type 2, are available in a variety of versions. All of the versions are equipped with the same transmitter and receiver modules.

RRT 22, a 2-beam transceiver with an optics distance of 500 mm, has one integrated transmitter module and one integrated receiver module. In combination with a passive deflecting mirror PM2-500 or PM2-500V, or with an active deflecting mirror AMI 42 for active beam deflection, it constitutes a functional unit.
For specification sheets on PM2-500, PM2-500V and AMI 42, see the appendix.

RRT 24 is a 4-beam transceiver with an optics distance of 300 mm. It constitutes a functional unit when combined with a deflecting mirror PM4-300 or PM4-300V.

RT 23 (transmitter) and **RR 23** (receiver) combine to form a 3-beam safety light grid with an optics distance of 400 mm.

Warning!

The ROBUST safety light grids, Type 2, are suited to provide vertical access or area safeguarding at machines with low to medium risk (see Chapter 2, "Safety Precautions"). The number of light beams and the distance between them are dependent on the evaluation of the machine's risk level. Alternatively, this is specified in machinery-specific regulations (C-Standards).

2 Safety

Before using the safety sensor, a risk evaluation must be performed according to valid standards (e.g. EN ISO 14121, EN ISO 12100-1, ISO 13849-1, IEC 61508, EN 62061). The result of the risk assessment determines the required safety level of the safety sensor (see Table 2.1-1). For mounting, operating and testing, document "ROBUST 22 - 22.1 - 22.2, 23, 24, type 2 Multiple Light Beam Safety Device" as well as all applicable national and international standards, regulations, rules and directives must be observed. Relevant and supplied documents must be observed, printed out and handed to the affected personnel.

Before working with the safety sensor, completely read and understand the documents applicable to your task.

In particular, the following national and international legal regulations apply for the start-up, technical inspections and work with safety sensors:

- Machinery directive 2006/42/EC
- Low voltage directive 2006/95/EC
- Electromagnetic compatibility directive 2004/108/EC
- Use of Work Equipment Directive 89/655/EEC supplemented by Directive 95/63 EC
- OSHA 1910 Subpart 0
- Safety regulations
- Accident-prevention regulations and safety rules
- Ordinance on Industrial Safety and Health and Labor Protection Act
- Device Safety Act

Notice!

For safety-related information you may also contact the local authorities (e.g., industrial inspectorate, employer's liability insurance association, labor inspectorate, occupational safety and health authority).

2.1 Approved purpose and foreseeable improper operation

Warning!

A running machine can cause severe injuries!
Make certain that, during all conversions, maintenance work and inspections, the system is securely shut down and protected against being restarted again.

2.1.1 Proper use

- The safety sensor must only be used after it has been selected in accordance with the respectively applicable instructions and relevant standards, rules and regulations regarding labor protection and occupational safety, and after it has been installed on the machine, connected, commissioned, and checked by a **competent person**.
- When selecting the safety sensor it must be ensured that its safety-related capability meets or exceeds the required performance level PL_r ascertained in the risk assessment.

The following table shows the safety-related characteristic parameters of the ROBUST 22 - 22.1 - 22.2, 23, 24 series.

Type in accordance with IEC/EN 61496	Type 2
Performance Level (PL) in accordance with ISO 13849-1 in combination with a TNT 35	PL d
Category in accordance with ISO 13849 in combination with a TNT 35	Cat. 2
Mean time to dangerous failure ($MTTF_d$)	RRT22 with passive mirror: $MTTF_d$ = 500 years RRT22 with AMI42 : $MTTF_d$ = 325 years Robust 23: $MTTF_d$ = 170 years Robust 24: $MTTF_d$ = 250 years
Service life (T_M)	20 years

Table 2.1-1: Safety-related characteristic parameters of the type 2 Multiple Light Beam Safety Device ROBUST

- The safety sensor protects persons at access points or at points of operation of machines and plants.
- The safety sensor only detects persons upon entry to the danger zone; it does not detect persons who are located within the danger zone. For this reason, a start/restart interlock is mandatory.
- The construction of the safety sensor must not be altered. When manipulating the safety sensor, the protective function is no longer guaranteed. Manipulating the safety sensor also voids all warranty claims against the manufacturer of the safety sensor.
- The safety sensor must be tested regularly by competent personnel.
- The safety sensor must be exchanged after a maximum of 20 years. Repairs or the exchange of parts subject to wear and tear do not extend the service life.

2.1.2 Foreseeable misuse

In principle, the safety sensor is not suitable as a protective device in case of:

- danger of objects being expelled or hot or dangerous liquids spurting from the danger zone
- applications in explosive or easily flammable atmospheres
- reachability of the points of operation by hand from the mounting location of the safety sensor
- detection of the presence of persons in danger areas

2.2 Competent personnel

Prerequisites for competent personnel:

- he has a suitable technical education
- he knows the rules and regulations for occupational safety, safety at work and safety technology and can assess the safety of the machine
- he knows the instructions for the safety sensor and the machine
- he has been instructed by the responsible person on the mounting and operation of the machine and of the safety sensor

2.3 Responsibility for safety

Manufacturer and operating company must ensure that the machine and implemented safety sensor function properly and that all affected persons are adequately informed and trained.

The type and content of all imparted information must not lead to unsafe actions by users.

The manufacturer of the machine is responsible for:

- safe machine construction
- safe implementation of the safety sensor
- imparting all relevant information to the operating company
- adhering to all regulations and directives for the safe starting-up of the machine

The company operating the machine is responsible for:

- instructing the operating personnel
- maintaining the safe operation of the machine
- adhering to all regulations and directives for occupational safety and safety at work
- regular testing by competent personnel

2.4 Exemption of liability

Leuze electronic GmbH + Co. KG is not liable in the following cases:

- safety sensor is not used as intended
- safety notices are not adhered to
- reasonably foreseeable misuse is not taken into account
- mounting and electrical connection are not properly performed
- proper function is not tested
- changes (e.g., constructional) are made to the safety sensor

2.5 Special safety notices for applications with type 2 active opto-electronic protective devices

Attention!

Type 2 protective devices are to be used if a machine-specific C standard or a risk evaluation acc. to EN ISO 14121 or ISO 13849 permits such use.

Attention!

For type 2 protective devices, the protective function is checked during periodic testing. Between the test periods, a fault may lead to a temporary loss of the protective function which will not be discovered until the next test.

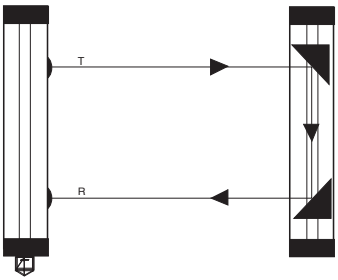
The availability of the protective function is higher the shorter the test periods are. Support is available here through the organizations responsible for machine safety, such as the technical expert committees of the employer's liability insurance associations.

Optimum type 2 functional reliability is attained with the intelligent, modular MSI-s IR Safety Interface System, among others, from Leuze electronic. The MSI performs a complete function test of the ROBUST light barrier every 200 ms.

3 Configuration and Function

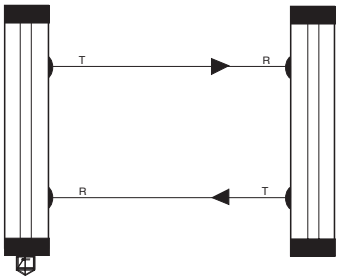
3.1 System Configuration and Display Elements: 2-beam Safety Light Grid

ROBUST 2-beam
with passive deflecting mirror



RRT 22... PM2-500 or PM2-500V

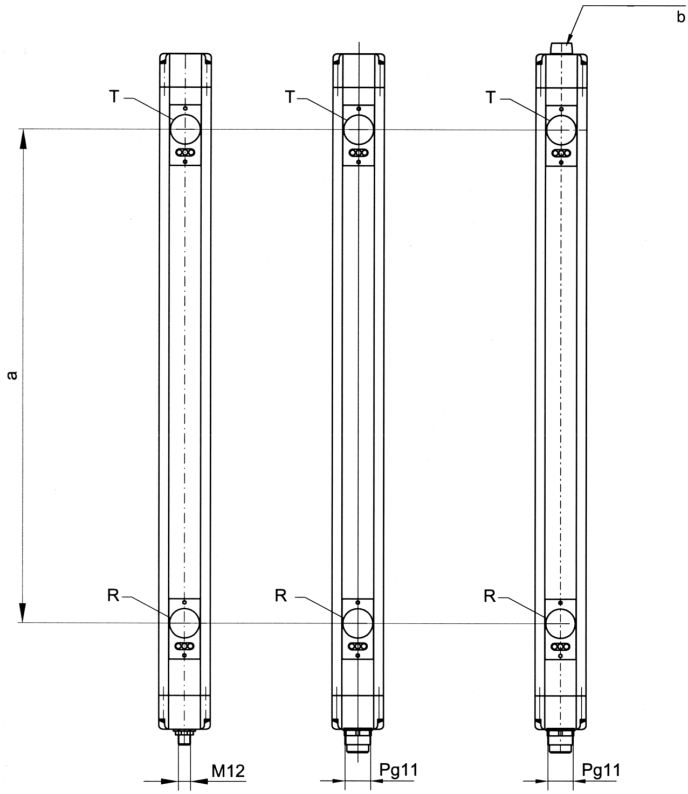
ROBUST 2-beam
with active deflecting mirror



RRT 22... AMI 42

Display elements RRT 22

- **Transmitter module (T)**
  LED yellow: transmitter active
- **Receiver module (R)**
  LED red: light path interrupted
  LED green: light path unobstructed, function reserve available
  LED green blinking: light path unobstructed, no function reserve



Transceiver RRT 22

Transceiver RRT 22.1
with terminal connection

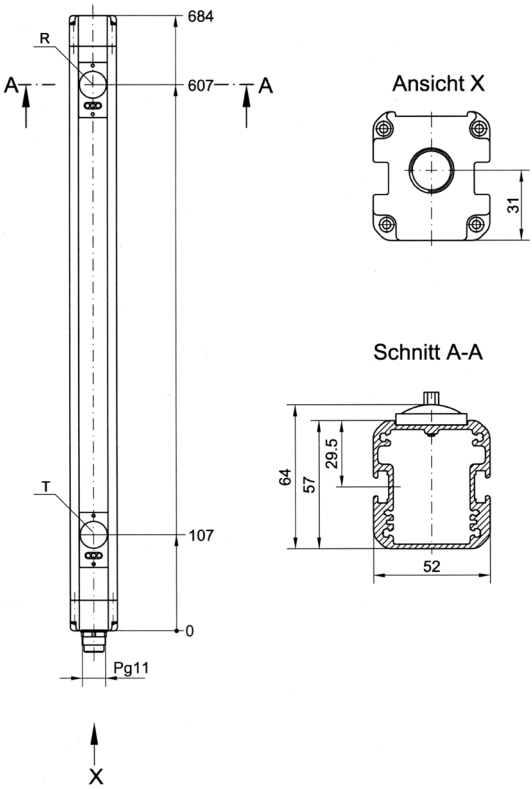
Transceiver RRT 22.2
with muting indicator light

a = distance between light axes: 500 mm
b = muting indicator light
T = transmitter module
R = receiver module

Display elements - active deflecting mirror AMI 42

- **Receiver module (R)**
  LED yellow: Operating voltage +24V DC on
  LED off: Operating voltage off

- **Transmitter module (T)**
  LED yellow, dimly lit: light is being transmitted, but at low power! Possible causes: alignment is not optimal or the limit of the functional range has been met
  LED yellow, brightly lit: light is being transmitted at optimal power

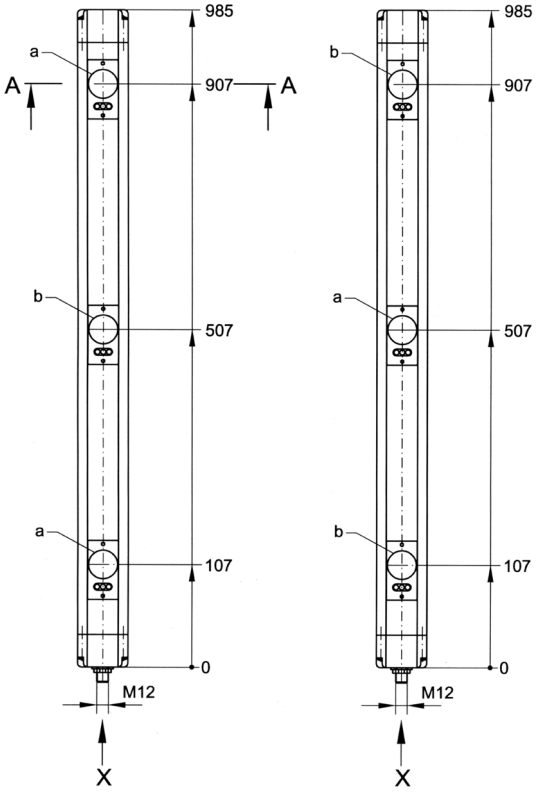


AMI 42 with terminal connection (with M12 connector as an accessory)

a = distance between light axes: 500 mm
T = transmitter module
R = receiver module

3.2 System Configuration and Display Elements: 3-beam Safety Light Grid

- **Transmitter module (T)**
  LED yellow: transmitter active
- **Receiver module (R)**
  LED red: light path interrupted
  LED green: light path unobstructed, function reserve available
  LED green blinking: light path unobstructed, no function reserve

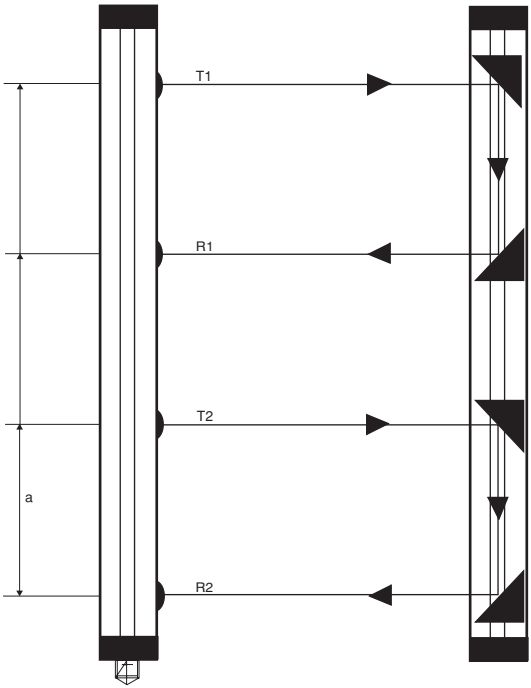


transmitter RT 23 receiver RR 23

a = distance between light axes: 400 mm
T = transmitter module
R = receiver module

3.3 System Configuration and Display Elements: 4-beam Safety Light Grid

- **Transmitter module (T1)**
  LED yellow: transmitter active
- **Receiver module (R1)**
  LED yellow: light reception
  LED off: no light reception
- **Receiver module (R2)**
  LED red: light path interrupted
  LED green: light path unobstructed
- **Transmitter module (T2)**
  LED yellow, dimly lit: weak transmitter signal at T2, no function reserve. Possible causes: alignment not optimal.
  LED yellow, brightly lit: strong transmitter signal at T2, high function reserve!

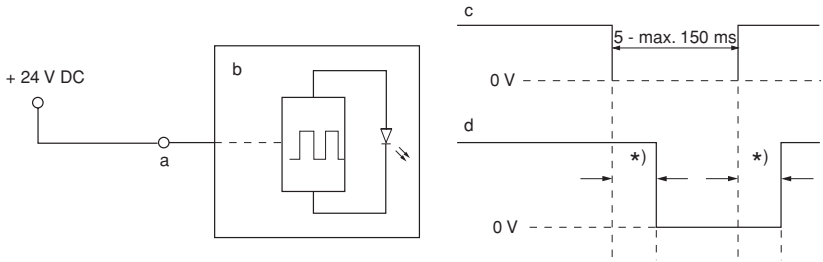


Transceiver RRT 24 PM4-300 or PM4-300V

a = distance between light axes: 300 mm
T = transmitter module
R = receiver module

3.4 Test Input

The ROBUST transceiver and the RT 23 (transmitter) are equipped with a test input for the periodic functional test.



a = activation
b = ROBUST transmitter or transceiver
c = test input + 24 V DC
d = OSSD output (pnp)
*) < 6 ms for RRT 22, 22.1, 22.2
< 9 ms for RR 23
< 12 ms for RRT 24

3.5 OSSD Switch Output

The short-circuit-proof 24 V pnp switch output on the receiver is able to switch earthed loads of up to 0.1 A. Contactors or relays must be wired parallel to the coil with suitable components for suppressing interference.

3.6 Series Connection of Multiple ROBUST Safety Light Grids

With the activation input (test input) of the ROBUST transceiver or RT 23 and the pnp switching OSSD output, it is possible to connect multiple safety light grids in series to **one** test monitoring unit or safety interface component. The number of systems that can be connected in series is limited by the response times of the transmitter and receiver modules. The table below gives an overview of the systems that can be switched in series.

Number of systems that can be switched in series

	RRT 22	RR/RT 23	RRT 24
TNT 33	6	4	2
MSI-s, -i, m, -mi	2 *)	2 *)	2 *)
MSI-sx, -ix, mx, -mix	4 *)	4 *)	4 *)

*) No series connections necessary, connection via separate terminals

4 Installation

4.1 General Installation Procedures

Pay close attention to the safety precautions described in Chapter 2.

Warning!

In general, all units must be installed so that the danger point can be reached only by passing through the sensing zone and that sufficient safety distance is maintained between the danger point and the sensing zone.

The terminal connections allow a connection cross-section of up to 2.5 mm^2.

4.2 Safety Distance

Warning!

There is a delay between the interruption of a light barrier and the standstill of the machine. The light grid must be mounted such that the danger zone cannot be reached during this delay time.

The minimum safety distance is calculated as follows:

S = (1.6 mm/ms x T) + 850 mm

where:

S is the minimum safety distance between the sensing zone and the danger point in mm

T is machine lag time + response time of the optoelectronic protective device (AOPD) in ms

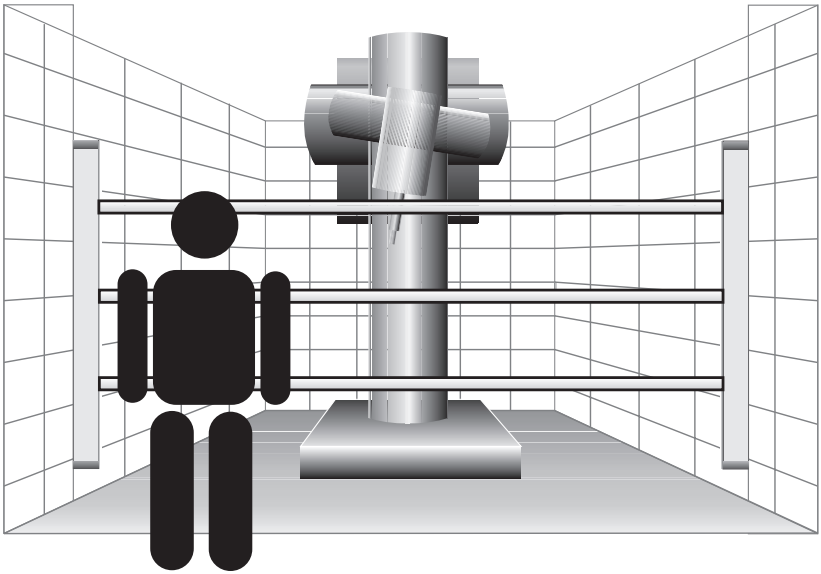


Fig. 1 Safety distance for vertical access safeguarding

4.3 Distance from Reflective Surfaces

Warning!

Reflective surfaces within the 8° transmission and reception light cone can cause reflections that result in a bypass of the lightbeam so that body parts may not be detected. For this reason, a minimum distance (a) must be maintained between the optical axis of the ROBUST and reflective objects, such as shiny machine parts or material containers. The larger the distance between transmitter and receiver, the larger the distance (a) that must be maintained. This distance is calculated from the opening angle (± 4°), the distance between the transmitter and the reflective surface, and the sensing zone width. The following illustration shows the correct installation and the distance (a) as a function of the width of the sensing zone.

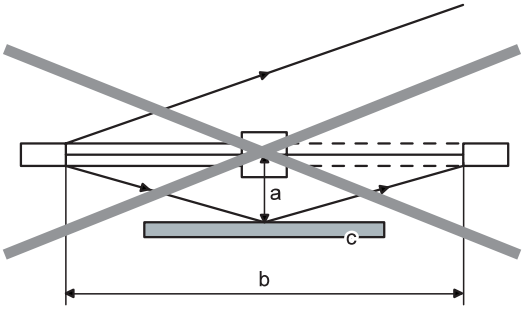


Fig. 2 **Incorrect:** Danger caused by reflection

a = distance to the reflective surface
b = sensing zone width
c = reflective surface

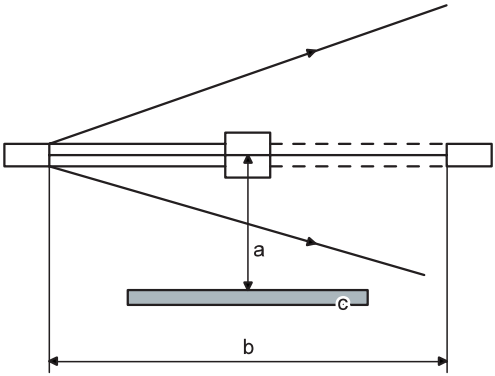


Fig. 3 **Correct:** No danger caused by reflection

a = distance to the reflective surface
b = sensing zone width
c = reflective surface

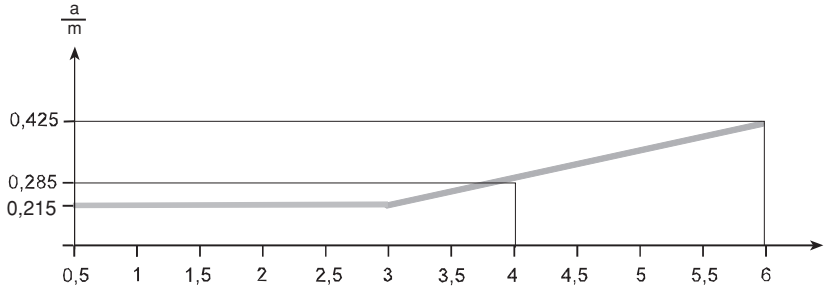


Fig. 4 Sufficient large distance (a) from reflective surfaces must be assured. a(m) = 0.07 x portection zone width (m) + 0.005 m.

4.4 Preventing Mutual Interference

In order to prevent mutual interference between adjacent devices, a dividing wall or screen must be put into place to provide optical shielding.

4.5 Installation Specifications for ROBUST multiple light beam safety devices for Vertical Access Control

In the case of installation of ROBUST multiple light beam safety devices as access control or area security, it may not be possible to reach dangerous positions by crawling beneath, climbing over or reaching over the light axes. The number and spacing of the light axes depends upon the risk evaluation and the particular specifications for machine.

The EN 999 recommends the following security levels:

Number of Beams	Height Above Reference Level, e.g. Ground (mm)	ROBUST Series
4	300, 600, 900, 1200	RRT 24
3	300, 700, 1100	RR 23/R 23
2	400, 900	RR 22

4.6 Mechanical Mounting Using Mounting Brackets

To mount the transceiver, transmitter, receiver and deflecting mirror, use the M6 sliding brackets provided with the light grid. The sliding brackets can be freely positioned at any position in the mounting slots of the profile. The standard mounting brackets (a set of 2) are also provided with the light grid.

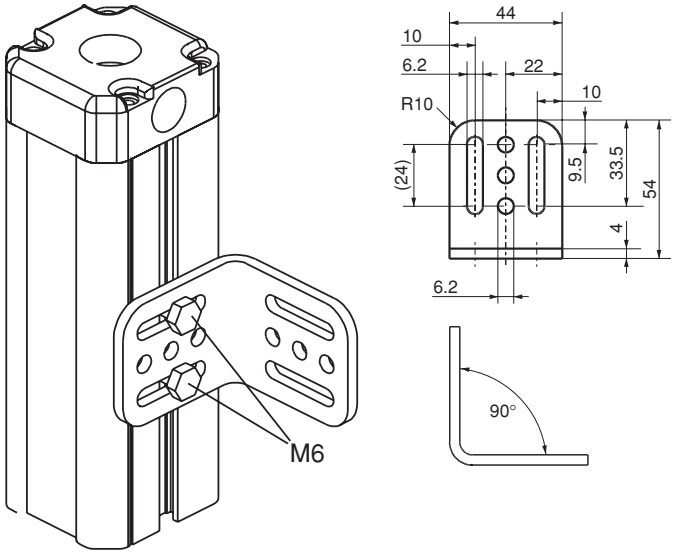


Fig. 5 Standard mounting bracket

When attaching the mounting brackets to the profile, be sure to use the screws provided with the light grid. The maximum screw-in depth is 5 mm!

4.7 Mechanical Mounting Using the Swivelling Mounting Support with Vibration Damping

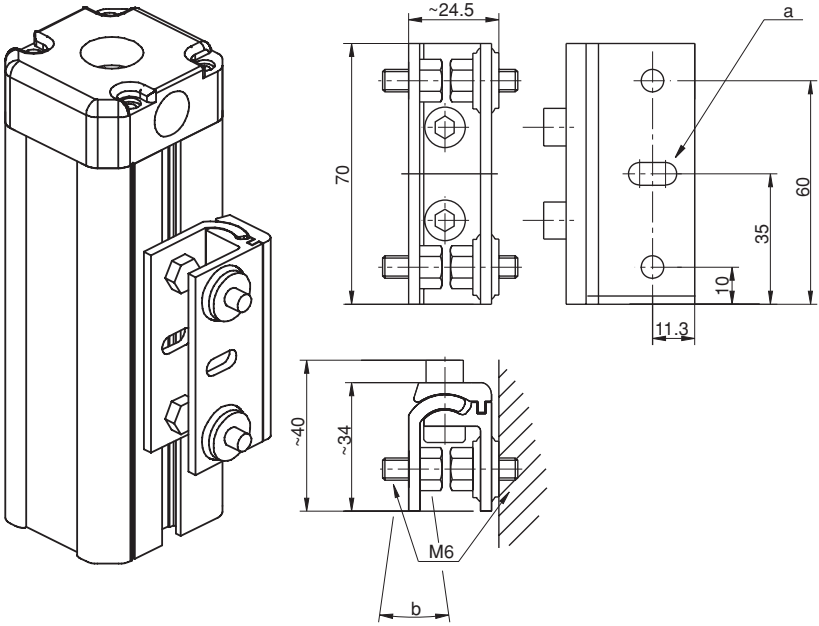


Fig. 6 Swivelling mounting support with vibration damping

a = slot 13 x 6
b = swivelling area

The swivelling mounting support with vibration damping also permits rotation of the unit around its lengthwise axis and reduces the effects of vibration and shocks.

4.8 Mounting and Attachment Using Mounting Column UDC

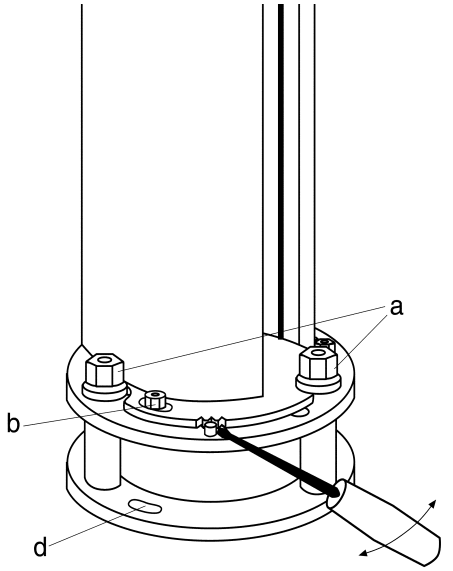
Mounting columns that enable free-standing floor mounting are available in a variety of heights. The column heights are adapted to accommodate the various ROBUST safety light grids and deflecting mirrors.

Example:

Mounting the ROBUST safety light grid RR/RT 23 in mounting column UDC-1300 (total height 1360 mm)

Advantage:

Simple alignment due to 3-point floor mounting and formable spring elements. The pivoting mounting plate of the mounting column enables the axial alignment to be optimally adjusted.



a = adjustment screws with formable spring elements
b = set-screws
c = Drill holes for mounting screws
d = 3-point floor mounting

5 Electrical Connection

5.1 Installation Procedures

Warning!

Pay close attention to the safety precautions and operating conditions described in Chapter 2. The electrical installation must be performed by experienced and qualified personnel. A ROBUST unit only qualifies as a Type 2 protective device in accordance with IEC-, EN 61496-1 if combined with a test monitoring unit. The test monitoring unit triggers a functional test of transmitter and receiver via the test input of the transmitter, and it checks the switch-off function of the receiver output. If the receiver output does not respond to the test signal within the system response time, the output of the test monitoring unit assumes the "off" status. (For suitable Leuze electronic test monitoring units, see the connection examples).

5.2 Power Supply

Warning!

The transmitter and receiver must be supplied with 24 V DC +/- 15 % (for maximum power consumption, see Technical Data). The power supply must exhibit a safe mains separation in accordance with IEC 60742 and be able to bridge short-term mains failures of up to 20 ms.

5.3 Connection with the Test Monitoring Unit MSI-s/R

At 200 ms intervals the MSI-s/R performs a function test on the ROBUST connected, without impairing the production process on the machine protected.

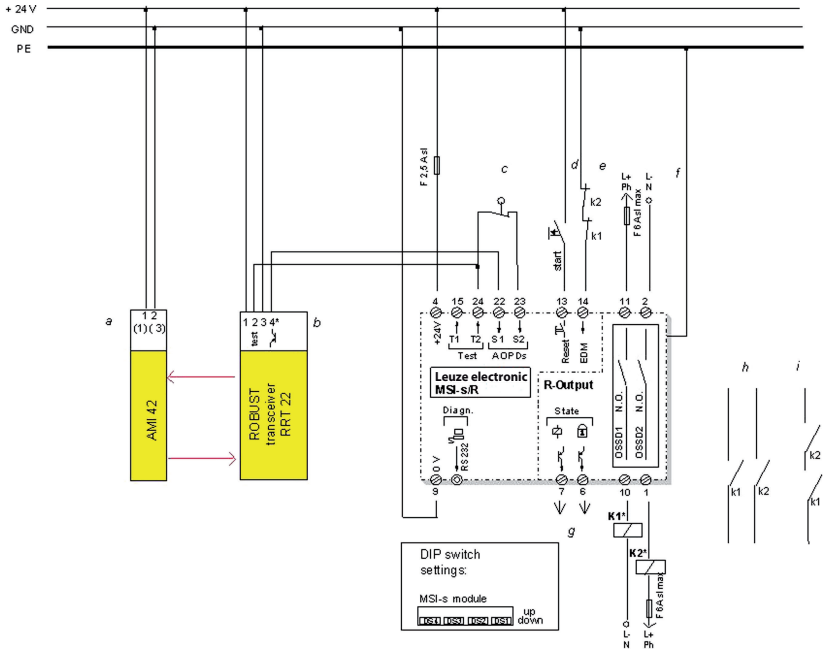


Fig. 7 Application example ROBUST 22, Type 2; MSI-s/R

a = using screw-type terminal(using M12 connector)
b = connection-M12
c = safety switch(category 1)or bridge
d = start/restart interlock
e = external device monitoring
f = connection via mounting bracket to the rail
g = indicating outputs
h = release two channel
i = release one channel

Use both contacts for release!
K1 and K2 with positively driven contacts
* suitable sparksuppression needed

5.4 Connection Example: Testing with a Standard PLC as the Test Monitoring Unit

In general, the test monitoring function can also be performed by a standard PLC. The following suggested connection is taken from the BIA report 6/97.

When a light beam in the light barrier S1/E1 (S1 = ROBUST transmitter, E1 = ROBUST receiver) is interrupted, the hazardous movement is redundantly switched off by the PLC output Q1.1 and the relay K2.

The safety function of the light barrier is tested after the start button is pressed. For this test, the software issues a command via the PLC output Q1.2 to switch off the light barrier transmitter. The receiver response is then monitored by the PLC inputs I1.1 and I1.2.

An PLC programming example corresponding to this switching sequence can be obtained from the „Berufsgenossenschaftliches Institut for Arbeitssicherheit“ (BIA) in Sankt Augustin, Germany.

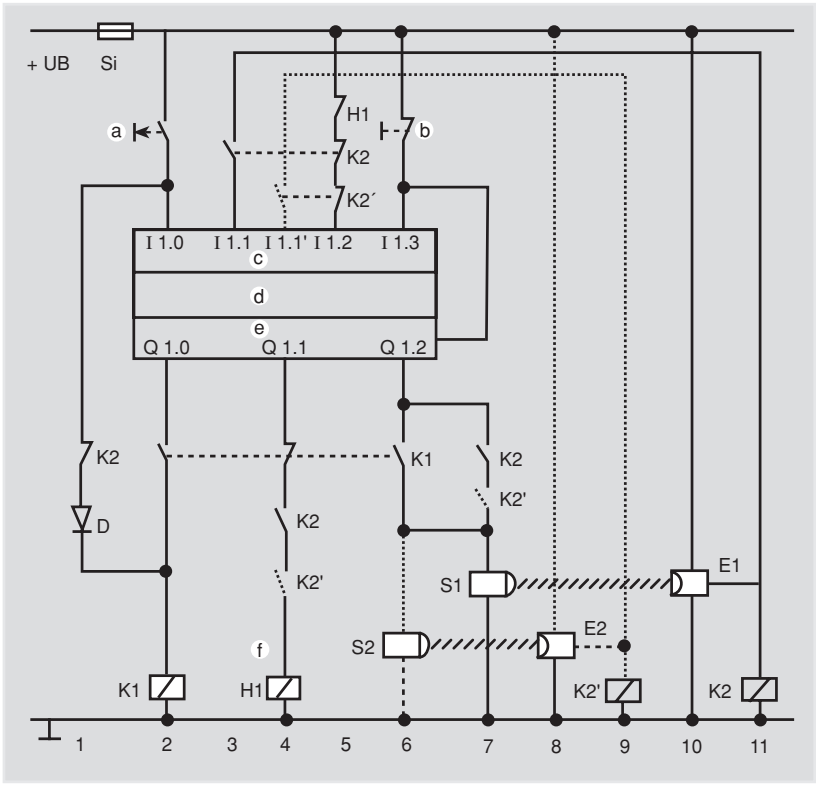
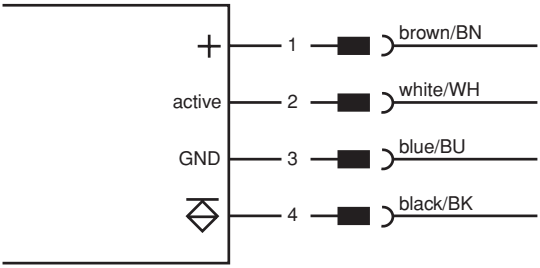


Fig. 8 Computer control in accordance with ISO 13849 – Category 2 safety light barrier achieved by means of a standard PLC. Source: BIA Report 6/97

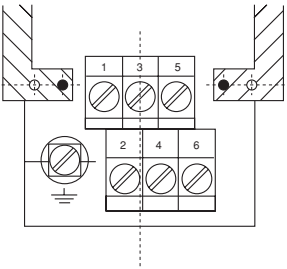
a = start
b = stop/off
c = input
d = PLC
e = output
f = release

5.5 Electrical Connections

RRT 22 with M12 plug-in connection

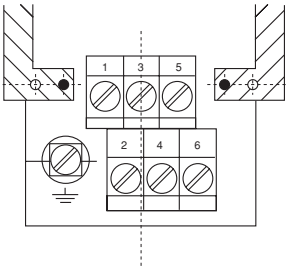


RRT 22.1 and RRT 24 with terminal connection



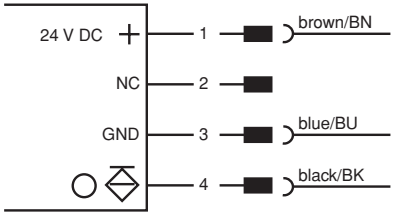
1 = +24 VDC
2 = GND
3 = activation (high active)
4 = ⏚ (bright switching)
5 = NC (not connected)
6 = NC (not connected)

RRT 22.2 with terminal connection

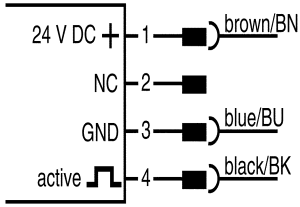


1 = +24 VDC
2 = GND
3 = activation (high active)
4 = ⏚ (bright switching)
5 = ⊗ muting light signal
6 = 24-30 V

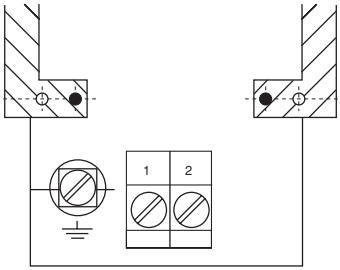
RR 23 (receiver)
with M12 plug-in connection



RT 23 (transmitter)
with M12 plug-in connection



AMI 42 (active deflecting mirror)



1 = +24 VDC
2 = GND

6 Equipment Start-up

- Before the unit is switched on for the first time, check the supply voltage (24 V DC ± 15%)!
- Switch on the supply voltage and check whether the test monitoring unit is supplying the test input with + 24 V DC. Then check the transmitter module: LED - yellow, transmitter active!
- Receiver module LED is green when the system is aligned.
- Receiver module LED is red when the system is not aligned or when the light path is interrupted.

6.1 Alignment and Laser Alignment Aid

Notes on alignment: For attaching the optics, all safety light grid modules have spacing bolts for holding a laser alignment aid. With the help of the visible laser beam, the system can quickly and easily be brought into optimum alignment. The laser alignment aid is a recommended accessory, particularly for large operating distances and when deflecting mirrors are being used.

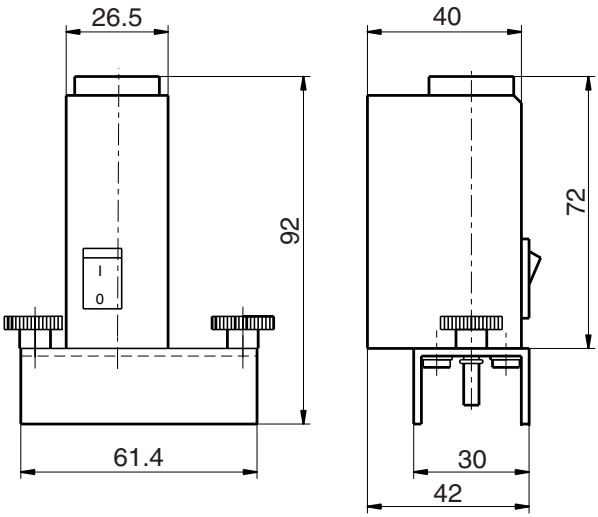


Fig. 9 Laser alignment aid LA 78

7 Cleaning and Care

The lenses in the safety light grid (glass) and the front screens of the passive deflecting mirror (plastic) should be cleaned regularly depending on the amount of dirt that has accumulated. Use a solvent-free cleansing agent.

8 Technical Data and Dimensional Drawings

8.1 Safety-related characteristic parameters

Type in accordance with IEC/EN 61496	Type 2
Performance Level (PL) in accordance with ISO 13849-1 in combination with a TNT 35	PL d
Category in accordance with ISO 13849 in combination with a TNT 35	Cat. 2
Mean time to dangerous failure ($MTTF_d$)	RRT22 with passive mirror: $MTTF_d$ = 500 years RRT22 with AMI42 : $MTTF_d$ = 325 years Robust 23: $MTTF_d$ = 170 years Robust 24: $MTTF_d$ = 250 years
Service life (T_M)	20 years

8.2 General Data

Operating range [1)]	RRT 22/ RRT 22.1/ RRT 22.2:	with PM2-500: 0,5 m - 2,5 m with PM2-500V: 1,5 m - 8,0 m with AMI 42: 50 m
	RRT 24:	with PM4-300: 0,5 m - 2,5 m with PM4-300V: 1,5 m - 8,0 m
	RT 23/RR 23:	50 m
Distance between beams	RRT 22/ RRT 22.1/ RRT 22.2:	500 mm
	RT 23/RR 23:	400 mm
	RRT 24:	300 mm
Response time	RRT 22/ RRT 22.1/ RRT 22.2:	8 ms
	RT 23/RR 23:	9 ms
	RRT 24:	12 ms
Test activation T_A (high active)		Transmitter active $\geq$ 3 mA
Test delay time		Transmitter inactive: $\leq$ 1 mA Input resistance: 5 kΩ Response time: $\leq$ 0,5 ms
Enclosure rating		IP 67

VDE protection class		III, operation only with safe extra-low voltage in acc. with DIN VDE 0100, Section 410
Ambient temperature (operation/storage)		-25 °C ...+55 °C / -30 °C ... +70 °C
Operating voltage U_B		24 V DC ± 15 %
Residual ripple		≤ 15 % von U_B
Current consumption	RRT 22/ RRT 22.1/ RRT 22.2:	approx. 80 mA (without load) RRT 22.2 (without muting lamp)
	RT 23:	150 mA
	RR 23:	130 mA
	RRT 24:	160 mA
Safety-related switch output (OSSD) [2]		pnp transistor (short circuit-proof)
Output current		max. 200 mA
Leakage current		300 µA
Max. voltage in off state		1,6 V
Max. load capacity		4 µF
Max. load inductivity		2,0 H
Transmitter Class Wave length Pulse duration Pulse pause Output		Light-emitting diodes as defined by EN 60825-1: 1994 + A1:2002 + A2:2001 1 880 nm 2,4 µs 8 µs 17 µW
Type of connection	RRT 22/RT 23/ RR 23	M 12 round plug-in connection, 4(5)-pin, B-coded
	RRT 22.1/ RRT 22.2/ RRT 24	PG screw connection with cable strain relief Screw terminals, max. 2.5 mm²
Weight	RRT 22:	900 g
	RT 23	2100 g
	RR 23:	2200 g
	RRT 24:	1800 g
Receiver display LED red LED green blinking LED green		 Light path interrupted Light path unobstructed, no function reserve Light path unobstructed, with function reserve

Transmitter display LED yellow		Transmitter activated
Muting lamp white/without color	only RRT 22.2	In accordance with EN-/IEC 61496-1, light bulb, 24-30 V, 2-watt (BA 9s)
Optics		Glass Ø 30 mm (with optic heating, optional)
Housing		Aluminium extrusion profilel
Color		RAL 1021, yellow, RoHS-compliant
Installation position		As desired
Mounting		With M6 sliding brackets, positionable

1) Operating range: recommended range with function reserve

2) 1 = transient protection, 2 = pole reversal protection, 3 = short-circuit protection

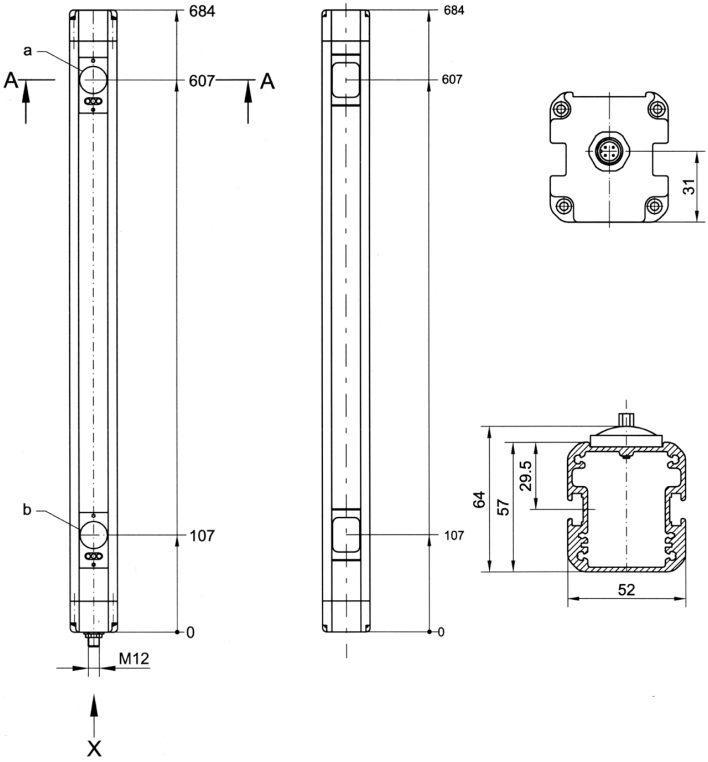
Active deflecting mirror AMI 42

Operating range	50 m
Enclosure rating	IP 67
VDE protection class	I (with M12, protection class 3, operation only with safe extra-low voltage in accordance with DIN VDE 0100, Section 410)
Ambient temperature (operation/storage)	-25 °C ... +55 °C/-30 °C ... +70 °C
Operating voltage UB	24 V DC ± 15 %
Residual ripple	≤ 15 % of U_B
Current consumption	ca. 80 mA
Light source, transmitter module	LED, infrared
Transmitter Class Wave length Pulse duration Pulse pause Output	Light-emitting diodes as defined by EN 60825-1: 1994 + A1:2002 + A2:2001 1 880 nm 2,4 µs 8 µs 17 µW
Cable connection	with PG screw-in connection (PG 11) for cable connection
Weight	900 g
Receiver module: LED yellow	On with U_B
Transmitter module: LED yellow	Transmitter active (transmitter)
Optics	Glass Ø 30 mm, with lens heating system
Housing	Aluminium extrusion profile
Color	RAL 1021, yellow (lead- and cadmium-free)

Transceiver RRT 22

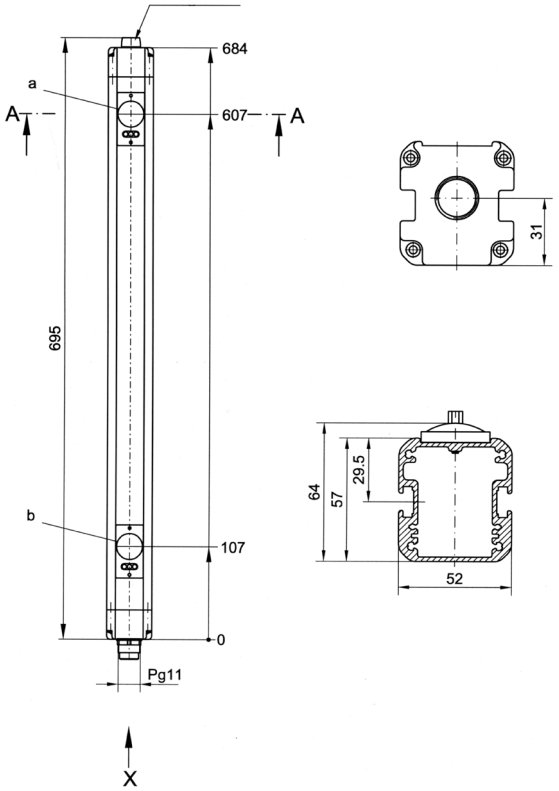
Passive deflecting mirror PM2-500/PM2-500V (accessories)

Profile RRT 22, RR 23, RT 23



a = transmitter
b = receiver
c = prepared for PG 9 (at the front and the back)

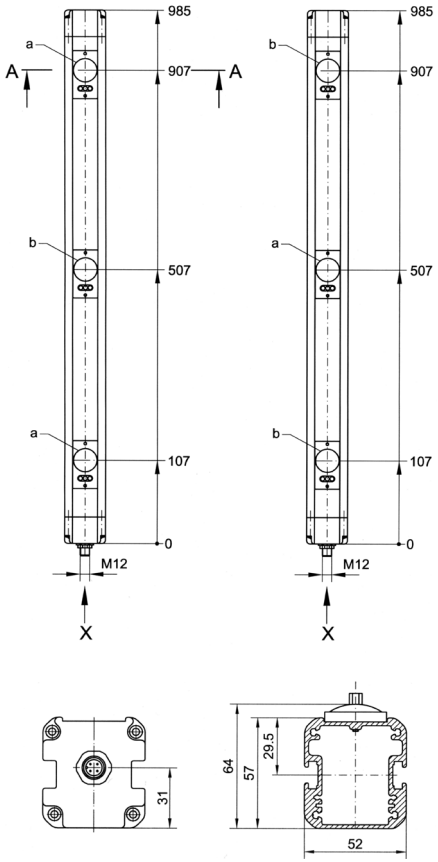
Transceiver RRT 22.1/RRT 22.2 Profile RRT 22.1, RRT 22.2, RRT 24



a = transmitter
b = receiver
c = prepared for PG 9 (at the front and the back)
d = muting lamp (only RRT 22.2)

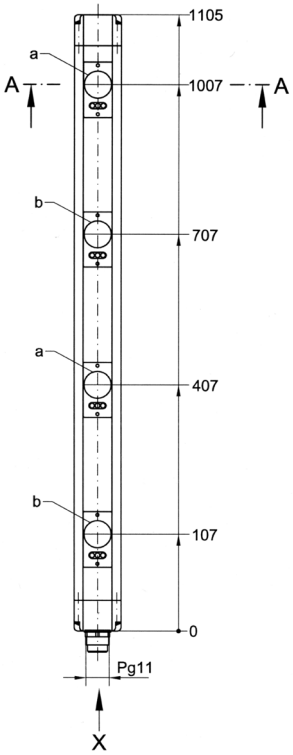
1

transmitter RT 23 receiver RR 23

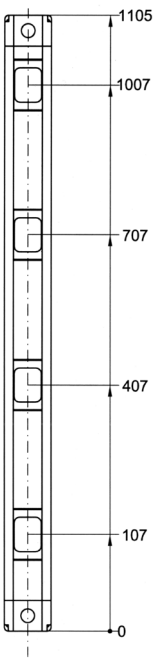


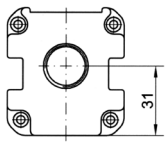
a = transmitter
b = receiver
c = prepared for PG 9 (at the front and the back)

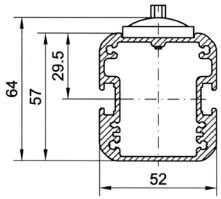
Transceiver RRT 24



Passive deflecting mirror PM4-300/V (accessories)

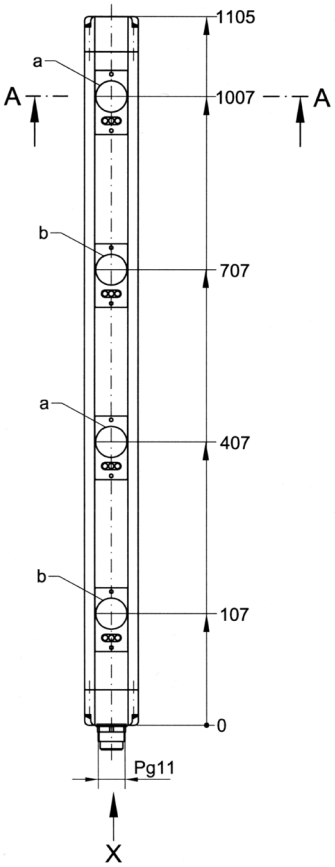


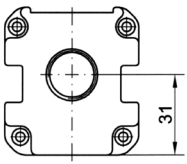


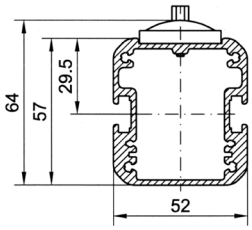


a = transmitter
b = receiver
c = prepared for PG 9 (at the front and the back)

Active deflecting mirror AMI 42







a = transmitter module
b = receiver module
c = prepared for PG 9 (at the front and the back)

9 Ordering Information

9.1 Scope of Supply

RRT 22
- 1 Transceiver RRT 22 *)
- 2 Mounting Brackets
- 1 Set of Connection and Operating Instructions

RRT 22.1
- 1 Transceiver RRT 22.1 *)
- 2 Mounting Brackets
- 1 Set of Connection and Operating Instructions

RRT 22.2
- 1 Transceiver RRT 22.2 *)
- 2 Mounting Brackets
- 1 Set of Connection and Operating Instructions

RR/RT 23
- 1 Transmitter RT 23
- 1 Receiver RR 23
- 4 Mounting Brackets
- 1 Set of Connection and Operating Instructions

RRT 24
- 1 Transceiver RRT 24 **)
- 2 Mounting Brackets
- 1 Set of Connection and Operating Instructions

*) Note: Deflecting mirror PM2-500, PM2-500V or AMI 42 required for the function
**) Note: Deflecting mirror PM4-300 or PM4-300V required for the function

9.2 Order Numbers

Type	Order No.
Transceiver RRT 22	50029081
Transceiver RRT 22, plug-in version, with M12 socket, 5-pin, for RRT 22	50020501
Transceiver RRT 22.1	50029759
Transceiver RRT 22.2	50029760
Transmitter RT 23	50029496
Receiver RR 23	50029497
Transceiver RRT 24	50030016

ROBUST-Accessories

Type	Order No.
Test monitoring unit TNT 35	50033058
Test monitoring unit with integrated muting function and continuous cyclical testing TMC 66	50082121
Mounting brackets with accessories [1)]	560120
Swivelling mounting support with vibration damping [2)]	560300
Mounting column UDC-1000	549810
Mounting column UDC-1300	549813
Laser alignment aid LA 78	549000
Laser alignment aid LA 78/CR-UDC (for mounting columns UDC)	520004
Passive deflecting mirror PM2-500	50029088
Passive deflecting mirror PM2-500V	909661
Passive deflecting mirror PM4-300	50029570
Passive deflecting mirror PM4-300V	909663
Active deflecting mirror AMI 42 (2 light axes, distance 500 mm)	50029087
Mirror column UMC 1002	549702
Mirror column UMC 1303	549703
Mirror column UMC 1304	549704
MSI-s/R	549900
MSI-s/T	549920
MSI-sx/Rx	549901
MSI-sx/Tx	549921
MSI-m/R	549904
MSI-m/T	549924
MSI-mx/Rx	549905
MSI-mx/Tx	549925

1) standard mounting bracket, included in the scope of delivery (sold in sets of 2)
2) pieces each required for transceiver, transmitter and receiver

Leuze electronic

the sensor people

EG-KONFORMITÄTS-ERKLÄRUNG	EC DECLARATION OF CONFORMITY	DECLARATION CE DE CONFORMITE
Der Hersteller	The Manufacturer	Le constructeur
	Leuze electronic GmbH + Co. KG In der Braike 1, PO Box 1111 73277 Owen, Germany	
erklärt, dass die nachfolgend aufgeführten Produkte den einschlägigen Anforderungen der genannten EG-Richtlinien und Normen entsprechen.	declares that the following listed products fulfil the relevant provisions of the mentioned EC Directives and standards.	déclare que les produits identifiés suivants sont conformes aux directives CE et normes mentionnées.
Produktbeschreibung:	Description of product:	Description de produit:
Mehrstrahl-Sicherheits-Lichtschranke, Berührungslos wirkende Schutzeinrichtung, Sicherheitsbauteil nach 2006/42/EG Anhang IV ROBUST 22, 23, 24 Seriennr. 10 01 50000 - 99 12 99999	**Multiple Light Beam Safety Device, Active opto-electronic protective device, safety component in acc. with 2006/42/EC annex IV ROBUST 22, 23, 24 Part No. 10 01 50000 - 99 12 99999**	**Barrage immatériel multifaisceau de sécurité, Équipement de protection électro-sensible, Élément de sécurité selon 2006/42/CE annexe IV ROBUST 22, 23, 24 Art. n° 10 01 50000 - 99 12 99999**
Angewandte EG-Richtlinie(n):	Applied EC Directive(s):	Directive(s) CE appliquées:
2006/42/EG 2004/108/EG	**2006/42/EC 2004/108/EC**	**2006/42/CE 2004/108/CE**
Angewandte Normen:	Applied standards:	Normes appliquées:
EN 61496-1: 2009; IEC 61496-2:2006; EN ISO 13849-1: 2008 (Kat 2 PLd); EN 60825-1:2007		
Benannte Stelle / Baumusterprüfbescheinigung:	Notified Body / Certificate of Type Examination:	Organisme notifié / Attestation d'examen CE de type:
TÜV NORD CERT GmbH Zertifizierungsstelle für Produktsicherheit Benannte Stelle 0044 Langemarckstr. 20 45141 Essen	/	**44 205 10 371786-001**
Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:	Authorized person to compile the technical file:	Personne autorisée à constituer le dossier technique:
Robert Sammer; Leuze electronic GmbH + Co. KG, business unit safety systems Liebigstr. 4; 82256 Fuerstenfeldbruck; Germany		

Owen, 5.8.10

Datum / Date / Date

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