Safety in System:
Protection for man and machine

HEAVY INDUSTRY
SYSTEMS AND SOLUTIONS

SCHMERSAL
THE DNA OF SAFETY

INTRODUCTION

Heinz and Philip Schmersal,
Managing Directors of the Schmersal Group

New solutions to improve production efficiency and machine safety

The Schmersal Group is known worldwide for its comprehensive program of switchgear and safey switchgear. Safety – or machinery safety to be more precise – has been our core competence for decades. We apply this concept worldwide – in more than 60 nations. The high amount of customer-specific series and variations demonstrates how seriously we are taking our mission to provide the optimal solution for each application.

As a medium-sized, owner-managed company we are sufficiently flexible to put this ambition into practice - day after day - in the most difficult applications. We provide safe solutions for your industry!

In order to enable us to provide you as soon as possible with customised solutions world wide, we have set up a production network featuring seven production plants located on three continents. Anywhere where needed, our service and consultancy services are at your disposal.

We have more than six decades of experience within the heavy industry, as the Schmersal Group was originally a manufacturer of high-grade switchgear.

Today, our products are used wherever there are specific requirements in difficult and harsh operating conditions.

- Surface mining
- Loading and unloading
- Cranes, hoists and conveyors
- Mixing and preparation systems
- Energy generation and processing
- Recycling
- Refineries and offshore technology

This brochure gives a first impression of our product range and its various application possibilities. Many switchgears that are presented in this brochure, are characterised by a very long life, even when used under extreme operational conditions. Whether in opencast mining or on the high seas, in freezing temperatures or in hot plants, in potentially explosive areas, in wet conditions, vibrations or harsh handling, our switchgears have been developed from scratch to serve the needs of the heavy industry.

We look forward to working with you!

CONTENT

Online catalogue

Already familiar with our new online catalogue? You can find the details and data for our products here:

products.schmersal.com

ENTIRE PROCESS CHAIN

The heavy industry division provides safety systems and solutions worldwide for all levels of the raw materials process chain - including raw materials extraction to conveyance and processing.

The range of services includes solutions for machine and personal protection as well as solutions for process and quality monitoring as well as for plant and investment protection.

SERVICES

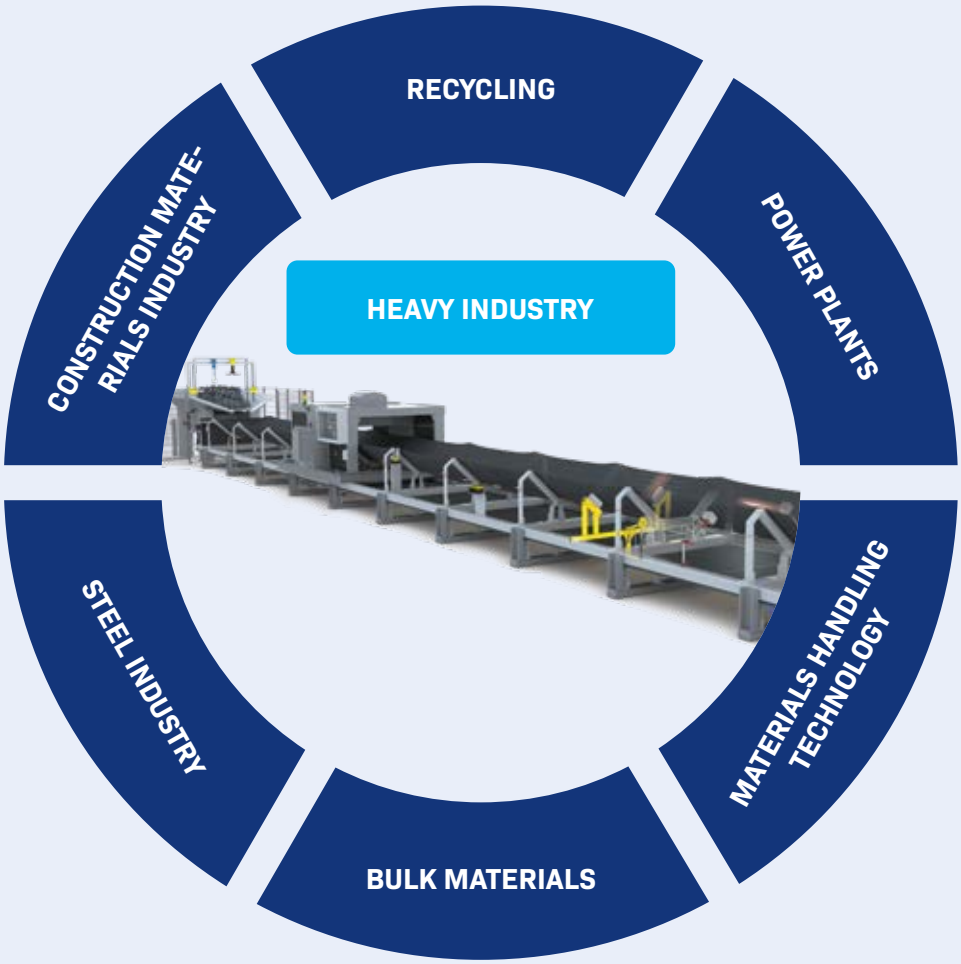
The comprehensive range includes industry-specific training and consultancy services.

The range is complemented by services from the tec.nicum division relating to machine safety and occupational health and safety. These include risk assessments of new and existing material handling plants.

www.schmersal.com

MARKETS AND SOLUTIONS

Every industry has unique requirements on products, systems and solutions for effective and efficient operation in the respective environment. Schmersal focuses on solutions for raw materials transport in the process chain, from raw materials extraction to processing, with products for defined target markets.



MACHINES AND PERSONAL SAFETY:
SAFE SWITCHING DEVICES AND NETWORKS

1 **ACCESS CONTROL**

For service, maintenance or cleaning access, on drive and/or reversing drums, transfer points or loading facilities. Depending on the safety requirements, access is granted only when the drive is stationary or, in service/maintenance operation, when the material handling plant is operating at low speed.

8 **QUALITY CONTROL**

The basic composition of bulky goods can be determined online based on a PGNAA analysis, and on the conveyor belt in real time during ongoing operation.
This measurement process supports the coal, cement, minerals and steel industries in sustainably improving their processes and overall quality assurance.

2 **LEVEL CONTROL**

On belt transfer stations or in silo installations, the level of bulk goods such as granulates, powder or seeds often needs to be monitored. Schmersal has developed a level switch for heavy-duty applications for this application.

3 **COMMAND CONTROL**

Dust, greatly varying temperatures and often "harsh" handling: command devices installed on transport and material handling plants must be able to permanently withstand harsh conditions. Our robust command devices and indicator lights, joystick switches and surface-mounted enclosures have been especially developed for such applications and provide for a safe switching.

4 **SIGNAL CONTROL**

In the "Safe Signal Processing" you find safety relay modules and networks for a variety of tasks for safety technology (such as for emergency stop systems), as well as centralised and distributed microprocessor-based systems. These include for example, configurable and programmable safety controllers and safety networks, which are characterised by a high degree of flexibility.

5 **BELT CONTROL**

Belt alignment switches monitor the straight running of conveyor plants. If the conveyor belt moves off-centre from the drive and pulleys the switching devices trigger. A pre-warning occurs via staggered switching, e.g. from a 10 degree deflections, and the conveyor belt is then switched off, e.g. from 25 degrees. Individual staggered switching is available upon request.

PLANT AND INVESTMENT PROTECTION:
BELT RUPTURE AND BELT SPLIT MONITORING

9 SPEED CONTROL

Speed monitoring and belt slip detection. Standstill detection as well as detection of speed undercuts in the event of overload.

11 RIP CONTROL

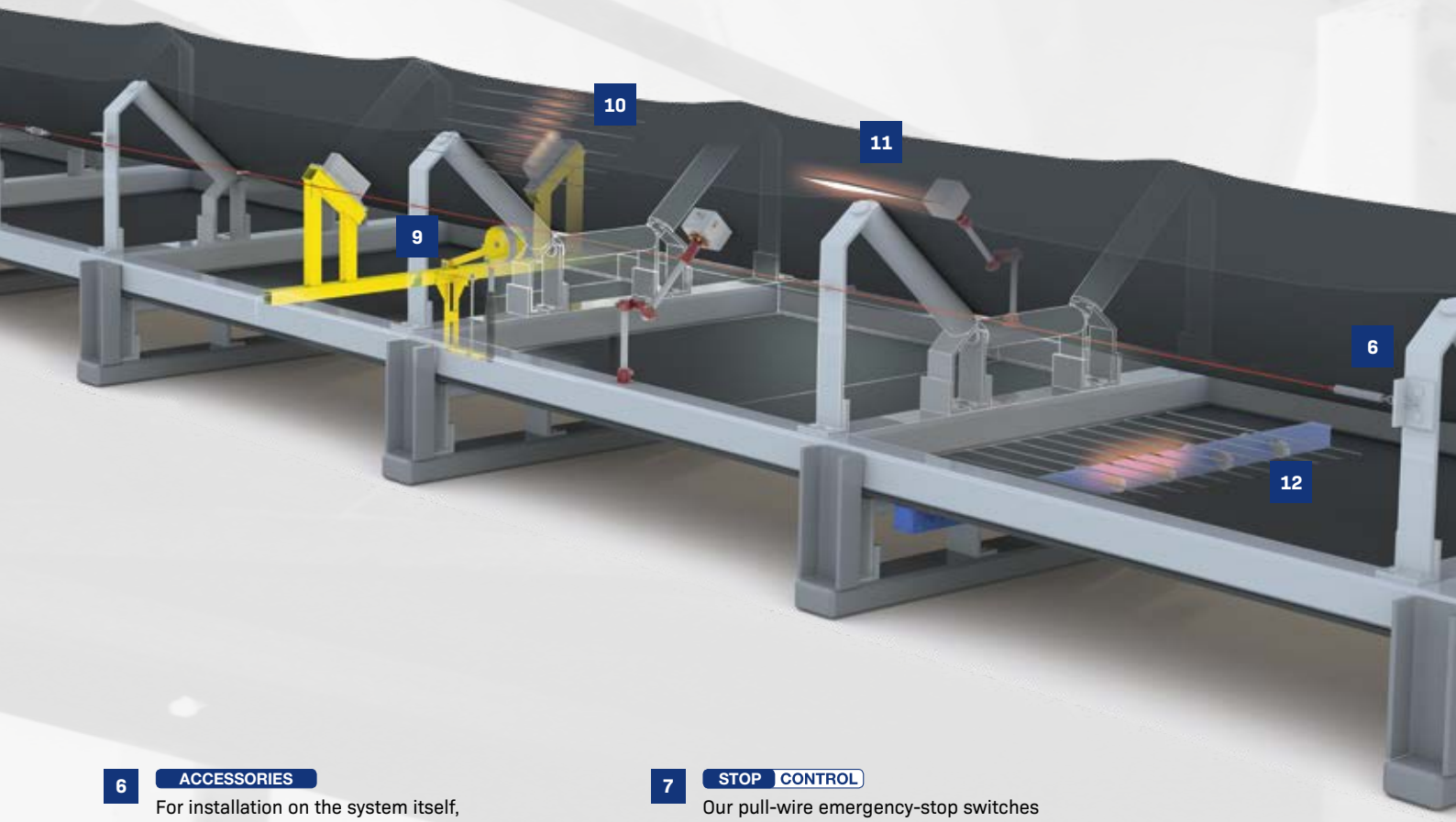
Rip Control is a monitoring system for early detection of longitudinal splits in your conveyor belt. It monitors the danger points where the feed and discharge of the belt takes place, which is where the chance of splitting is greatest.

10 SPLICE CONTROL

Splice Control is a measuring system for the monitoring of conveyor belt connections. It carries out precise measurements of every belt connection and signals any deviations in the length of the connection.

12 CORD CONTROL

Cord Control is a tensile support monitoring system and allows precise diagnosis of the condition of the utensil support in your steel cable conveyor belt system. It signals any changes in the steel cable and the tensile strength of the connected conveyor belt system promptly.

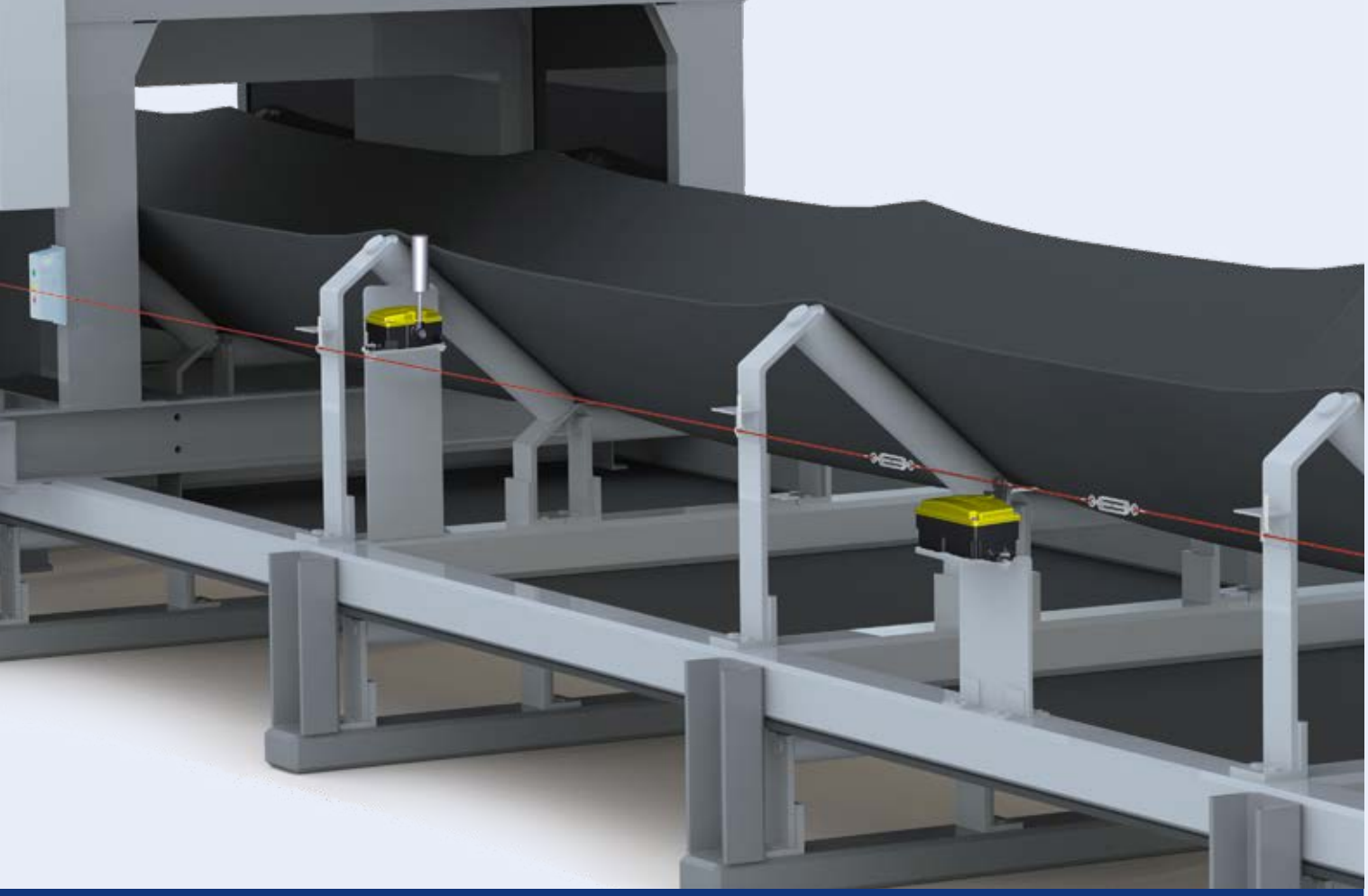


6 ACCESSORIES

For installation on the system itself, we offer a well-considered concept comprising a system of accessory parts for different switchgear devices.

7 STOP CONTROL

Our pull-wire emergency-stop switches guarantee a reliable emergency stop function with wire breakage monitoring on material handling plants with single-sided effectiveness up to 75 m or double-sided effectiveness up to 200 m.



EMERGENCY STOP APPLICATIONS

Material handling plants systems or general machines and systems must be provided with an emergency-stop device in accordance with the Machinery Directive so that they can be shut down immediately and safely in the event of danger.
Both emergency-stop buttons and pull-wire emergency stop switches are used. All emergency-stop devices in the Schmersal Group's range are designed in accordance with the relevant standards. EN ISO 13850 and IEC 60947-5-5.

Pull-wire stop switches are the ideal safety solution for medium-sized and long conveyor systems, as the switching function can be triggered from any point along the conveyor line.
You can choose between the single-acting ZQ 900 product series with optional emergency-stop button and the double-acting RS655/RS656 product series.

Emergency-stop buttons are available in different versions and different enclosures, optionally with protective collars. In conjunction with an appropriate safety evaluation or a secure bus system, the emergency-stop devices listed can be used up to Performance Level PL e in accordance with ISO 13849-1.

DESIGN AND OPERATING PRINCIPLE

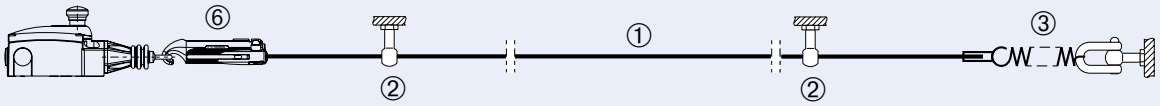
All pull-wire emergency switches from the Schmersal Group are in accordance with the guidelines of the IEC 60947-5-5, ISO 13850 and EN 620. A wire and wire-breakage monitoring is standard equipment.

The pull-wire emergency switch is set in the operating condition by pre-tensioning the rope. In this switching condition, the NC contacts are closed and the NO contacts are open. On pulling or breakage of the wire, the NC contacts are positively opened and the NO contacts are closed. The pull-wire emergency stop switch can only be manually set back into an operational state with manual release via the Reset button.

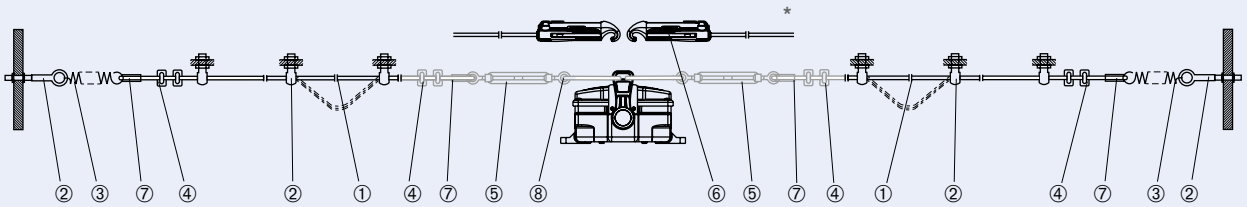
A distinction is made between one-sided and two-sided acting pull-wire emergency switches. While one-sided series are installed on one side of the system, the assembly of the two-sided pull-wire emergency switch is centrally located. In addition to the assembly possibilities, the rope length and the number of available contacts is important with the selection.

MOUNTING INSTRUCTIONS

One-side acting pull-wire emergency switch (example ZQ 900)
The pull-wire emergency switch with one-sided action is installed at either the start or the end of the hazardous area. The rope is fastened accordingly to the opposite end.



Two-side acting pull-wire emergency switch (example RS655, RS656)
The pull-wire emergency switch with two-side actuation is mounted mid-way, so that the rope can be clamped on both sides. Depending on the pulling direction, the actuating lever is swung to the left or right, thus triggering the EMERGENCY STOP command.



* The greyed out components are not required if using the rope tensioner S 900.

Key

① Wire rope
② Eyebolt / Anchoring hook
③ Tension spring
④ Wire clamp
⑤ Tensioning jack
⑥ Rope tensioner
⑦ Wire thimble

PULL-WIRE EMERGENCY STOP SWITCHES
ONE-SIDE OPERATION

ONE-SIDE OPERATION

Pull-wire emergency stop switches in the ZQ 900 range are intended for installation with a pull wire up to 75 m on one side and enable safe shutdown at any point on the wire rope.

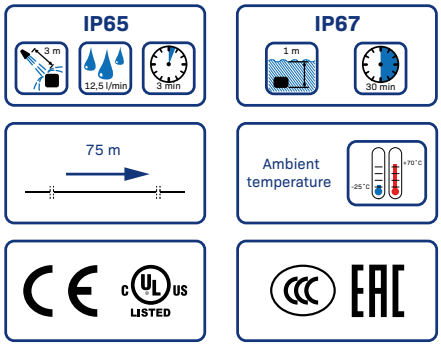
They are designed for use on conveyor systems and processing machines. All switches are pre-tensioned and fitted with pull-wire and wire-breakage monitoring. If actuated, they lock into the emergency-stop position and can only be unlocked again by manually releasing the blue reset button.

OVERVIEW

ZQ 900
- Length of wire up to 75 m, with integrated pull-wire and wire-breakage monitoring
- Can be used up to Performance Level PL e
- Up to 4 contacts in NO/NC combination
- Die-cast zinc housing with plastic cover
- Optionally with integrated emergency stop button
- Indicator lamp optional

ADVANTAGES

- The emergency stop function can be triggered at any point on the wire rope
- Contact combinations for safe shutdown and quick and easy diagnosis
- With integrated emergency-stop button: ideal for use on driver rollers and at transfer points



Precise product information can be found in our online catalogue at **products.schmersal.com**.

PULL-WIRE EMERGENCY STOP SWITCHES
TWO-SIDE OPERATION

TWO-SIDE OPERATION

Pull-wire emergency stop switches in the RS655/RS656 range are designed for installation with up 100 m long pull wire on two sides.

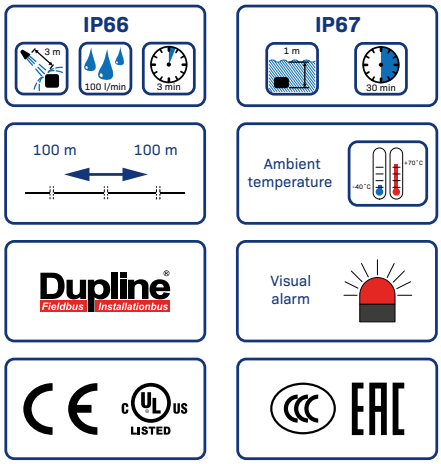
Pull-wire emergency stop switches with pull-wire and wire-breakage monitoring that can be actuated on both sides ensure a reliable emergency-stop function on long material handling plants. If actuated, the switches latch in the emergency-stop position and can only be unlocked when the blue reset button is pulled out.

As a status display, the pull-wire emergency stop switch is equipped with a mechanical status indicator that is visible when triggered.

OVERVIEW

RS655/RS656
- Length of wire up to 2x 100 m, with integrated pull-wire and wire-breakage monitoring
- Can be used up to Performance Level PL e
- 2 NO and 2 NC contacts

- Pressure-setting plastic or grey cast iron enclosure
- Central connection terminal
- Mechanical switching position indication
- Optionally available with 2-wire field bus interface
- Indicator lamp optional



ADVANTAGES

- The emergency stop function can be triggered at any point on the wire rope
- The maximum length of wire of 2x 100 m reduces the number of pull-wire emergency stop switches, and therefore minimises costs
- Reduced installation costs thanks to central connection terminal
- Pressure-setting plastic or grey cast iron enclosure for various application environments
- Includes DuplineSafe® interface: fail-safe series wiring including diagnostics with minimal wiring effort
- Mounting holes compatible with competitor products

Precise product information can be found in our online catalogue at **products.schmersal.com**.

PULL-WIRE EMERGENCY STOP SWITCHES FOR HAZARDOUS AREAS
ONE-SIDE OPERATION

ONE-SIDE OPERATION

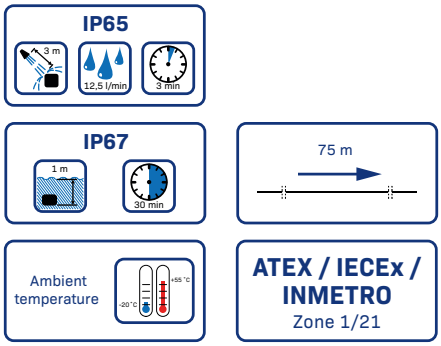
The certified variants can be operated in dusty environments of Zone 21 with ignition protection Ex tb "Protection by enclosure" or in gas atmospheres of Zone 1 with ignition protection Ex ib "Intrinsic safety".

OVERVIEW

EX-ZQ 900
- Zinc die-cast enclosure
- EX zone 1, 21 – Ignition protection type Ex ib, Ex tb
- Length of wire up to 75 m, with integrated pull-wire and wire-breakage monitoring
- Up to 4 contacts in NO/NC combination

ADVANTAGES

- The emergency stop function can be triggered at any point on the wire rope
- Contact combinations for fail-safe shutdown and quick and easy diagnostics
- Can be used in both dust and gas zones



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PULL-WIRE EMERGENCY STOP SWITCHES FOR HAZARDOUS AREAS
TWO-SIDE OPERATION

TWO-SIDE OPERATION

The certified variants can be operated in dusty environments of Zone 21 with ignition protection Ex tb "Protection by enclosure" or in gas atmospheres of Zone 1 with ignition protection Ex ib "Intrinsic safety".

OVERVIEW

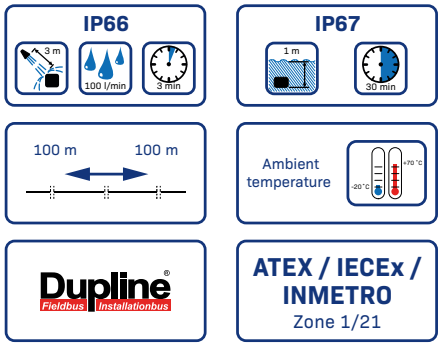
EX-RS655

- Grey cast iron enclosure
- EX zone 1, 21 – Ignition protection type Ex ib, Ex tb
- Length of wire up to 2x 100 m, with integrated pull-wire and wire-breakage monitoring
- 2 NO and 2 NC contacts

- Central connection terminal
- Mechanical switching position indication
- Optionally available with 2-wire field bus interface

ADVANTAGES

- The emergency stop function can be triggered at any point on the wire rope
- The maximum length of wire of 2x 100 m reduces the number of pull-wire emergency stop switches, and therefore minimises costs
- Reduced installation costs thanks to central connection terminal
- Includes DuplineSafe interface: fail-safe series wiring including diagnostics with minimal wiring effort (Zone 21 only)
- Can be used in both dust and gas zones



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PULL-WIRE EMERGENCY STOP SWITCHES
ACCESSORIES

Eyebolt

Galvanised steel
- BM 10 x 40 **101084928**

Stainless steel
- BM 8 x 70 **101193046**

Included in delivery:
Eyebolt with nut

Anchoring hook

Galvanised steel
- ACC-EBLT-M8-5PCS **103031495**
- ACC-EBLT-M10-5PCS **103031498**

Included in delivery:
Anchoring hooks incl. 2 nuts and washers, packaging unit: 5x

Anchoring hook

Stainless steel
- ACC-EBLT-M8-RVA-5PCS **103031496**
- ACC-EBLT-M10-RVA-5PCS **103031499**

Included in delivery:
Anchoring hooks incl. 2 nuts and washers, packaging unit: 5x

Wire clamp

Stainless steel
- 3 mm stainless steel **101203477**

Duplex wire clamp

Stainless steel
- 3 mm **101190917**

Egg-shaped wire clamp

Stainless steel
- 3 mm **101196043**

For detailed information on selection, visit **products.schmersal.com**.

Wire thimbles

Stainless steel
- 3 mm **101203472**

Pulley

Galvanised steel
- Pulley **101192433**

Pulley

Stainless steel
- ACC-PWR-PLY **103037516**

S 900 wire tensioner

Plastic / stainless steel
- Rope tensioner S 900 **101186704**
- Smooth and time-saving adjustment

Tensioning Jack

Galvanised steel M6
- Tensioner M6 **101087930**
- Setting range 145 ... 225 mm

Stainless steel M8
- ACC-TBLE-RVA **103031494**
- Setting range 180 ... 250 mm

Stainless steel tension spring with elongation limiter

Stainless steel
- ACC-RS65X-TS **103032772**

PULL-WIRE EMERGENCY STOP SWITCHES
ACCESSORIES

Wire rope

Steel rope, 3 mm
- Pull-wire PWR-xxM **on request**
- With red PVC sheath
- Ø total 5 mm
- Ø of the steel core 3 mm

Wire unit complete

Steel rope, 3 mm
- Wire unit **on request**
- Ready-to-fit

Included in delivery:
1x wire rope, assembled on one side with eyebolt including nut, plus
1x wire thimble; 2x wire clamps

Wire rope mounting set

- ACC-RK-RS65X **103036965**

Included in delivery:
2x eyebolt with 2 nuts, 2x tension spring,
4x wire thimble, 8x rope clamp, 4x shackle,
2x turnbuckle M8

- ACC-RK-RS65X-QR **103036963**

Included in delivery:
2x eyebolt with 2 nuts, 2x tension spring,
2x wire thimble, 4x rope clamp,
2x rope tensioner

Wire rope mounting set

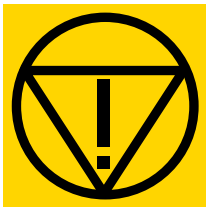
- ACC-RK-RS65X **103036965**

Included in delivery:
1x eyebolt with 2 nuts,
1x tension spring, 1x wire thimble 3 mm,
2x shackle, 1x turnbuckle M8

- ACC-RK-RS900-QR **103036961**

Included in delivery:
1x eyebolt with 2 nuts, 1x tension spring,
1x wire thimble 3 mm, 1x rope clamp,
1x rope tensioner

Marking label



- ACC-PWR-ESLB-50PCS **103032469**
- Sticker for emergency-stop release cord
- According to ISO 13850
- Packaging unit: 50x on a roll

EMERGENCY STOP LATCHING PUSHBUTTON
MBG

EMERGENCY STOP PUSHBUTTON

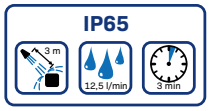
The robust button is used to deliberately halt a movement or process in an emergency. Each version is equipped with a protective collar to prevent accidental actuation.

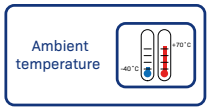
OVERVIEW

MBG
- Aluminium enclosure with protective collar
- Release by pulling on the push button
- Up to 4 contacts
- Optionally available with 2-wire field bus interface

ADVANTAGES

- Robust, making it suitable for harsh ambient conditions
- Individually adaptable to the respective application
- With DuplineSafe interface: fail-safe series wiring including diagnostics with minimal wiring effort





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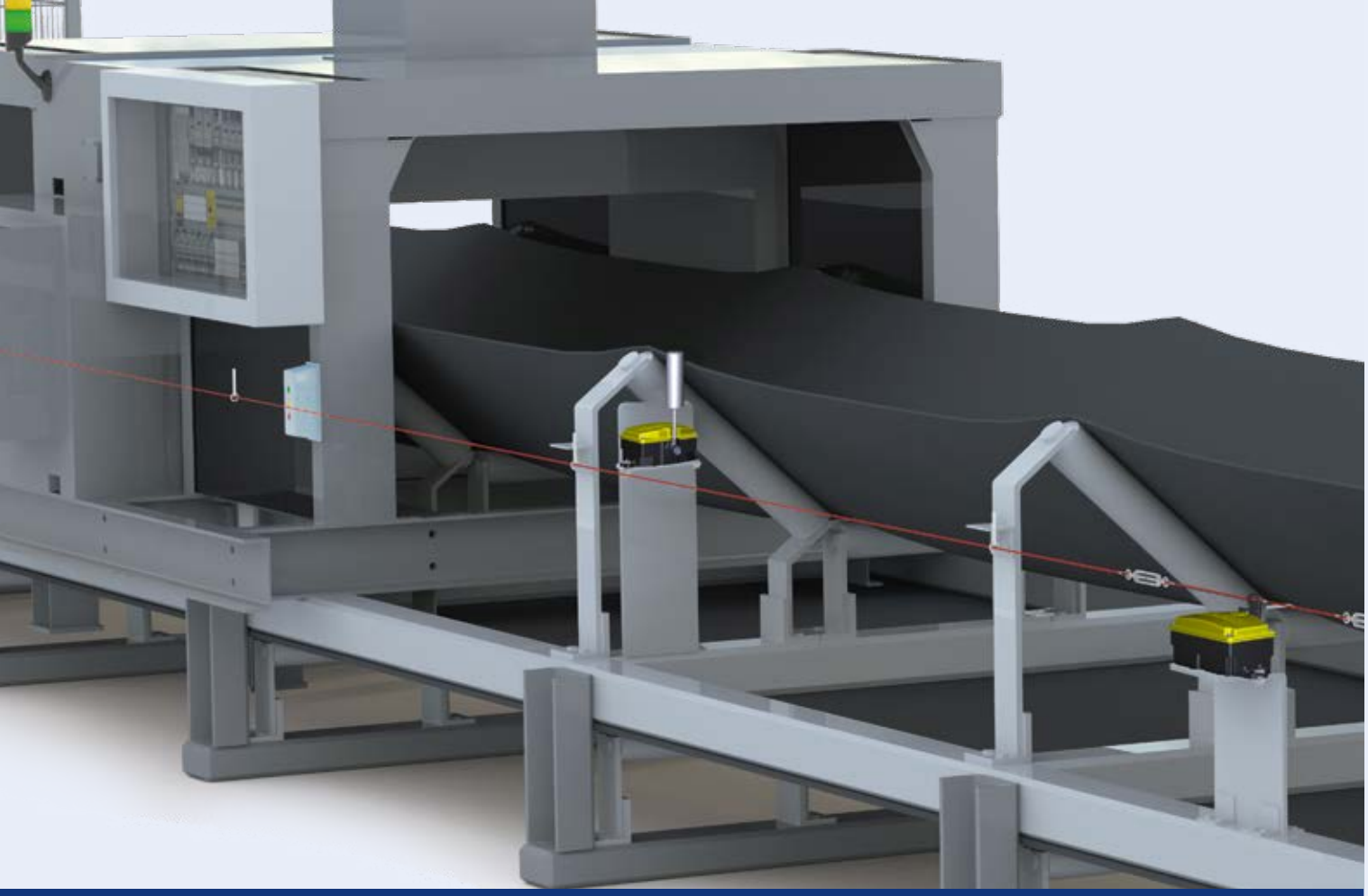
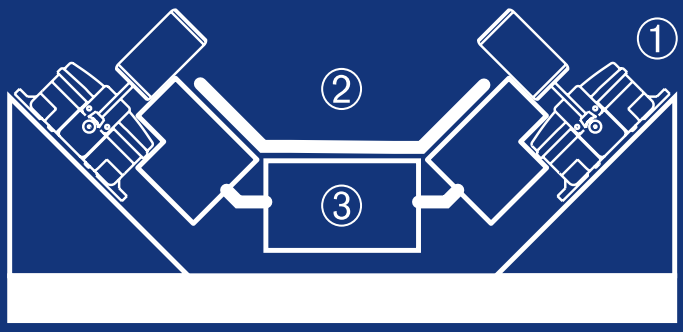


BELT ALIGNMENT MONITORING

Belt alignment switches monitor belt alignment in material handling plants and are arranged in pairs on either side of the transported material, close to the drive rollers and pulleys.

Uneven loading can result in position deviations, which in extreme cases can lead to damage and material overflows. To prevent this from happening, belt misalignment switches are used, which generate a single or a staggered signal in the event of deviations in the position of the conveyor belt.

While the pre-warning signal is used to correct the belt, the stop signal is used to switch the material handling plant off.



① Belt alignment switch
② Conveyor belt
③ Idler roller

DESIGN AND OPERATING PRINCIPLE

Belt alignment switches are installed on both sides at a distance of 10 to 20 mm from the conveyor belt. All versions have positive-break NC contacts. The contacts are used for belt correction or to shut down the material handling plant. After successful belt correction, the belt alignment lever automatically returns to its original position.

Castors with differing dimensions should be selected according to the belt speed.
The rotation speeds in the green fields indicate the maximum permissible speed in each case.
Combinations in the yellow fields should be avoided.

Diameter of the actuator [mm]	1 m/s	3 m/s	6 m/s	10 m/s	12 m/s
30	637 R/min	1910 R/min	3820 R/min	6366 R/min	7639 R/min
50	382 R/min	1146 R/min	2292 R/min	3820 R/min	4584 R/min
90	212 R/min	637 R/min	1273 R/min	2122 R/min	2547 R/min

When asked which belt misalignment switch has been activated, 2-wire bus systems (see "System solutions") with two digital inputs can optionally be used, which transmit status information on the pre-warning or cut-off signal in addition to the node address.

BELT ALIGNMENT MONITORING
ECONOMY SERIES

ECONOMY SERIES

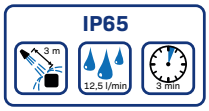
Suitable for small conveyor systems with textile belts and a belt speed of up to 1 m/s.

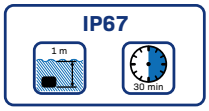
OVERVIEW

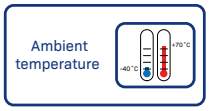
Z 335
- Aluminium die cast enclosure
- Nylon roller, Ø 22 mm, running surface 95 mm
- Belt speed up to 1 m/s
- 1 NO contact / 1 NC contact at 24° deflection

ADVANTAGES

- Economically-efficient solution based on standard position switches
- Positive-break NC contact for fail-safe switching







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BELT ALIGNMENT MONITORING
STANDARD SERIES

STANDARD SERIES

Designed for medium-sized conveyor systems and belt speeds up to 6 m/s.
The switches in the T. 454 series have staggered contacts, which generate a shutdown signal at a switching angle of 10 degrees and a switching angle of 25 degrees.

OVERVIEW

T. 454
- Grey cast iron enclosure, 2K paint
- Exterior parts made of stainless steel
- Staggered contacts (10°/25°)
- Belt speed up to 6 m/s
- Optionally with 2-wire field bus interface

ADVANTAGES

- Different roller diameters can be used, according to the belt speed
- Staggered contacts to generate pre-warning and shutdown signals
- With Dupline field bus interface: diagnostics function with minimal wiring effort

IP66 | IP67 | Ambient temperature | Dupline® Fieldbus Installationbus

Precise product information can be found in our online catalogue at **products.schmersal.com**.

BELT ALIGNMENT MONITORING
PERFORMANCE SERIES

PERFORMANCE SERIES

Product platform comprising a basic switch and actuating element, modular and flexibly adaptable to the respective conveyor system with different roller diameters and adjustable switching angles.

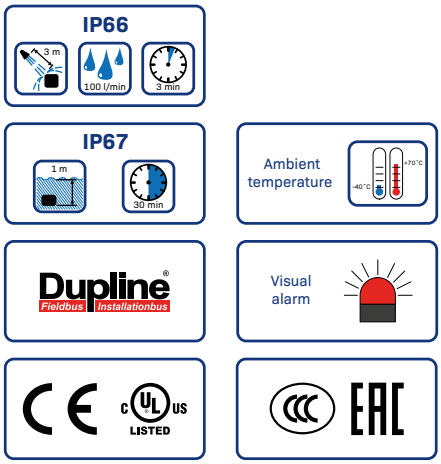
OVERVIEW

BS655/BS656

- Toothed shaft for form-fit connection
- Central connection terminal (2 NO contacts/2 NC contacts)
- Adjustable switching points
- Pressure-setting plastic or grey cast iron enclosure
- Optionally with 2-wire field bus interface

ADVANTAGES

- Product platform, can be combined with different roller diameters
- Reduced installation costs thanks to central connection terminal (2 NO contacts/2 NC contacts)
- Pressure-setting plastic or grey cast iron enclosure for various application environments
- With Dupline field bus interface: diagnostics functions with minimal wiring effort



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BELT ALIGNMENT MONITORING FOR HAZARDOUS AREAS
STANDARD/PERFORMANCE SERIES

STANDARD/PERFORMANCE SERIES

The certified variants can be operated in dusty environments of Zone 21 with ignition protection Ex tb "Protection by enclosure" or in gas atmospheres of Zone 1 with ignition protection Ex ib "Intrinsic safety".

OVERVIEW

EX-T. 454/EX-BS655

- Grey cast iron enclosure
- EX zone 1, 21 – Ignition protection type Ex ib, Ex tb
- Contact staggering, 1 NO contact/1 NC contact at 10° or 25°
- Optionally with 2-wire field bus interface

ADVANTAGES

- Contact staggering for generation of a pre-warning/shutdown signal
- With Dupline field bus interface: diagnostics function with minimal wiring effort (Zone 21 only)

IP66

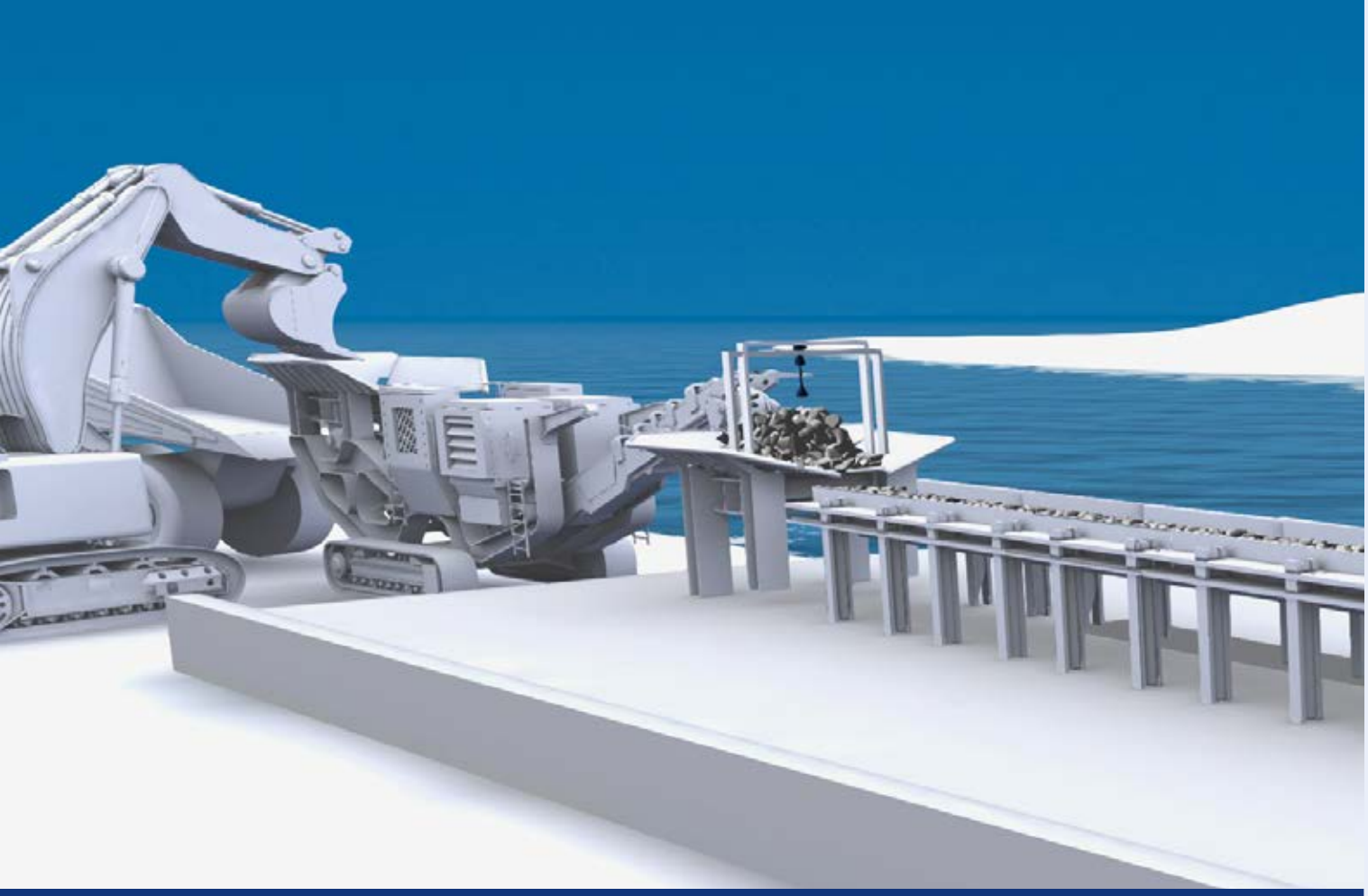
IP67

Ambient temperature

Dupline® Fieldbus Installationbus

ATEX / IECEx / INMETRO
Zone 1/21

Precise product information can be found in our online catalogue at **products.schmersal.com**.



POSITION MONITORING

Position switches are used to detect the position of and to monitor moving parts on machinery and plants. This also includes position monitoring of moving protection equipment in accordance with DIN EN ISO 14119.

Schmersal position switches perform safely and reliably, even under the harshest application and ambient conditions. The wide range of different contact elements and actuating elements ensures flexible solutions for all requisite presence, position or limit queries.

www.schmersal.com

DESIGN AND OPERATING PRINCIPLE

When position switches are used, mechanical movements are converted to electrical signals.
For position detection, they must be installed so that the moving machine part deflects the actuator to the extent that the contacts open or close fully.

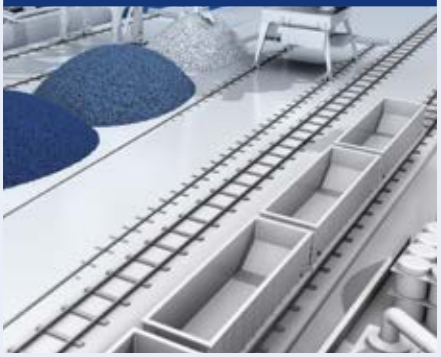
In safety applications, it must be ensured that the positive-break mode of action is implemented structurally, from the movable safety guard to the actuator and the NC contacts of the switch.

APPLICATIONS

- Loading hatch monitoring and positioning
- Limit and position detection on mobile mining equipment
- Monitoring of valve positions in the oil and gas industry
- Position detection under extreme environmental conditions

Application 1

Application 2



Application 3

Application 4

POSITION MONITORING
ECONOMY SERIES

ECONOMY SERIES

Typical areas of application for standard switches in accordance with the EN 50047 and EN 50041 standards are securing loading hatches and bunker covers as well as monitoring positions and limit positions.

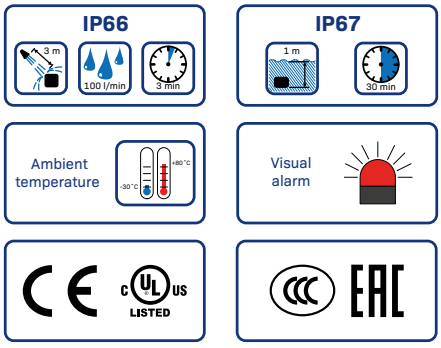
OVERVIEW

PS215/PS315

- Galvanised cast iron enclosure
- Available in modular form or as a complete switch
- Up to 3 contacts in NC/NO combination
- Range of different actuators
- Alteration of the actuators in 45° steps

ADVANTAGES

- Modular concept for reduced warehousing costs
- Redundant switching with additional signalling contact
- Flexibly adaptable thanks to a range of actuating elements
- Protection classes IP65/IP67 enable safe operation, even under harsh ambient conditions



Precise product information can be found in our online catalogue at **products.schmersal.com**.

POSITION MONITORING
STANDARD SERIES

STANDARD SERIES

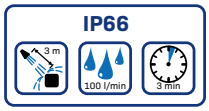
The switchgear series T. 454 is used in the entire steel processing industry – amongst others for the positioning of revolving towers, distributor trucks, shuttles, flame cutters / welding torches, stamping machinery or chain conveyors.

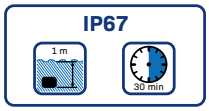
OVERVIEW

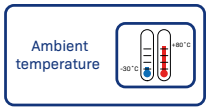
T. 454
- Grey cast iron enclosure, 2K paint
- Exterior parts made of stainless steel
- Staggered contacts (e. g. 10°/25°)
- Smooth or toothed shaft
- Optionally with 2-wire field bus interface

ADVANTAGES

- Flexibly adaptable thanks to a range of actuating elements
- Staggered contacts for different position queries
- Continuously or incremental adjustment possible, depending on the shaft type
- With Dupline field bus interface: diagnostics function with minimal wiring effort







Precise product information can be found in our online catalogue at **products.schmersal.com**.

POSITION MONITORING
PERFORMANCE SERIES

PERFORMANCE SERIES

Product platform comprising a basic switch and actuating element, modular or flexibly adaptable to the respective position monitoring with adjustable switching angle. Typical applications are position monitoring on rail-bound cranes and positioning monitoring on mobile machinery.

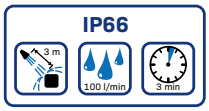
OVERVIEW

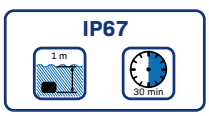
BS655/BS656

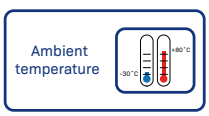
- Toothed shaft for form-fit connection
- Central connection terminal (2 NO contacts/2 NC contacts)
- Adjustable switching points
- Pressure-setting plastic or grey cast iron enclosure
- Optionally with 2-wire field bus interface

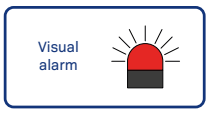
ADVANTAGES

- Product platform, can be combined with different function units (actuating elements)
- Reduced installation costs thanks to central connection terminal (2 NO contacts/2 NC contacts)
- Pressure-setting plastic or grey cast iron enclosure for various application environments
- With Dupline field bus interface: diagnostics functions with minimal wiring effort









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POSITION MONITORING
FOR AREAS AT RISK OF EXPLOSION
STANDARD/PERFORMANCE SERIES

STANDARD/PERFORMANCE SERIES

The certified variants can be operated in dusty environments of Zone 21 with ignition protection Ex tb "Protection by enclosure" or in gas atmospheres of Zone 1 with ignition protection "Intrinsic safety".

OVERVIEW

EX-T. 454/EX-BS655

- Grey cast iron enclosure
- EX zone 1, 21 – Ignition protection type Ex ib, Ex tb
- Contact staggering, 1 NO contact/1 NC contact at 10° or 25°
- Optionally with 2-wire field bus interface

ADVANTAGES

- Can be used in both dust and gas zones
- Contact staggering for generation of a pre-warning/cut-off signal
- With Dupline field bus interface: diagnostics function with minimal wiring effort (Zone 21 only)

IP66

IP67

Ambient temperature

Dupline® Fieldbus Installationbus

ATEX / IECEx / INMETRO
Zone 1/21

Precise product information can be found in our online catalogue at **products.schmersal.com**.

LEVEL MONITORING
MAF/S 441-11Y

LEVEL MONITORING

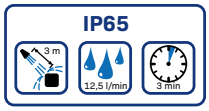
Contact level and fill level monitoring at all transfer points such as funnels or chutes for flowable bulky goods such as sand, gravel or crushed stone.

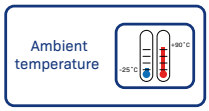
OVERVIEW

MAF/S 441-11Y
- Aluminium enclosure with spring-mounted GRP detection cone
- Actuating speed: max. 1 m/s

ADVANTAGES

- Switches in the event of deflection in all directions or due to pressure from below
- Can be used with all flowable bulky goods up to a grain size of 100 mm





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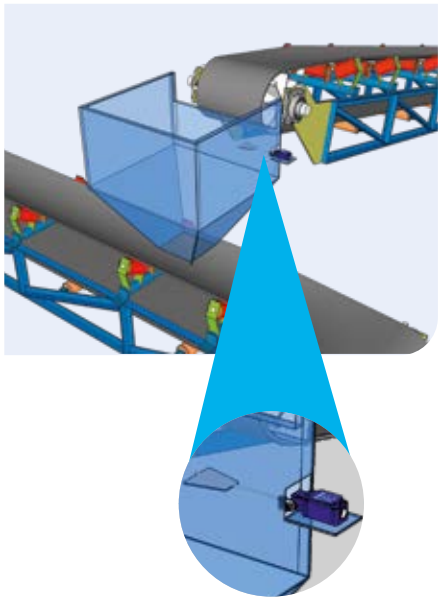
LEVEL MONITORING
T 335-01/01



LEVEL MONITORING

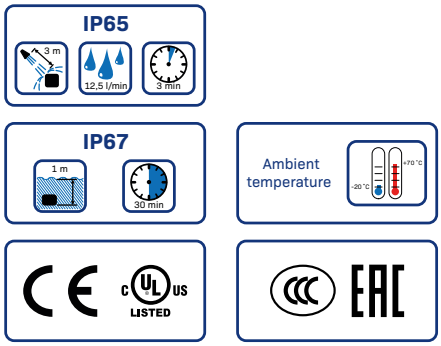
Can be used for fill level control in transfer hoppers. Suitable for fine-grain materials such as sand and grain up to a size of 50 mm.

OVERVIEW

T 335-01/01
- Aluminium die cast enclosure
- Aluminium actuator with trapezoidal aluminium plate
- 1 independent NC contact for deflection upwards/downwards

ADVANTAGES

- Economically efficient solution based on standard position switches
- Positive-break NC contacts for fail-safe switching
- Independent switching commands for deflection upwards/downwards



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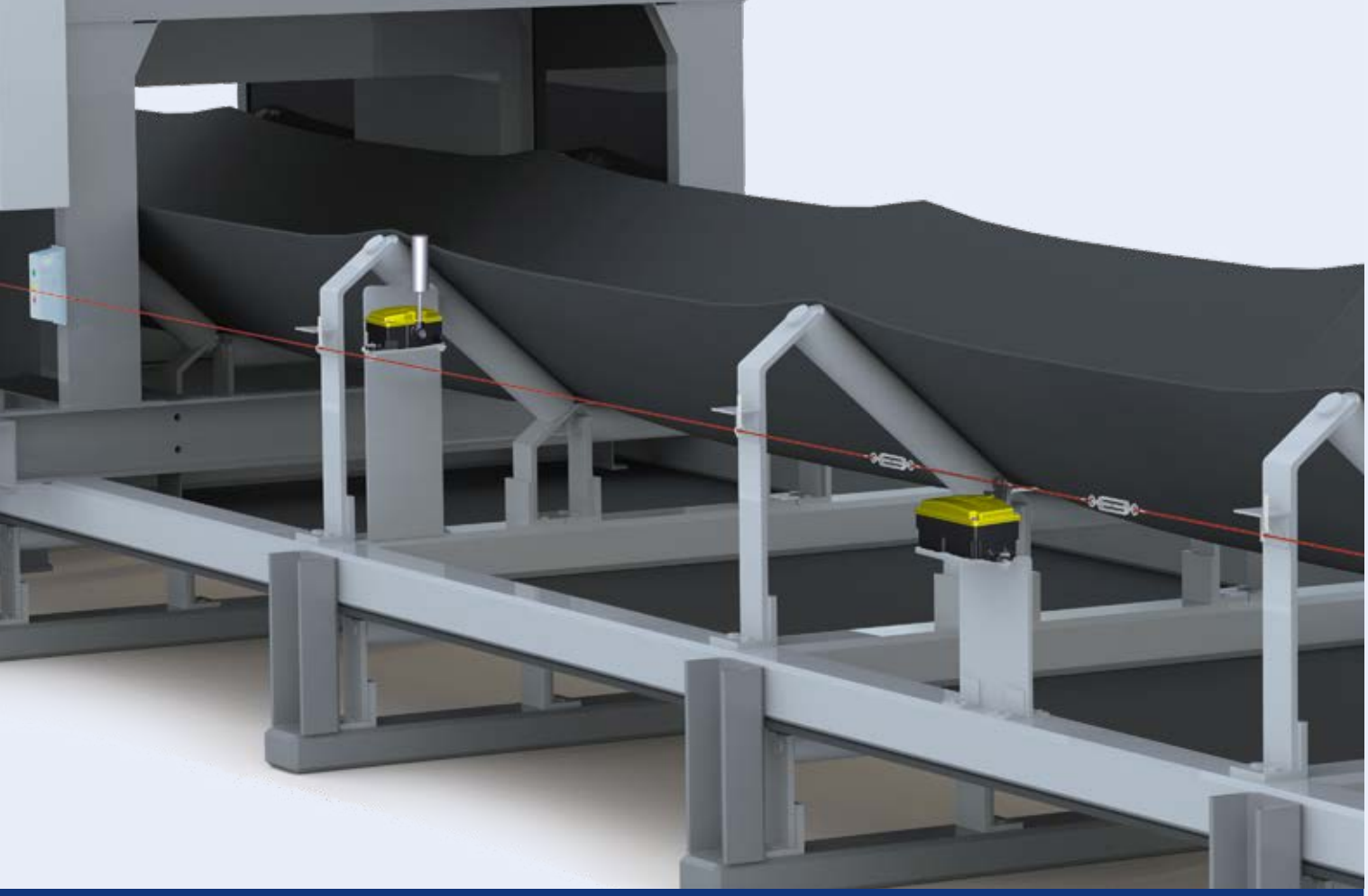

NETWORK AND SYSTEM SOLUTIONS

Schmersal offers DuplineSafe or Dupline as a field bus solution for networking switchgear over large distances. Integrated into our pull-wire emergency stop switches and emergency-stop buttons, the TÜV-approved DuplineSafe system ensures precise diagnostics and safe shutdown.

Belt misalignment or position switches can optionally be equipped with a Dupline interface which, in addition to the individual node address, also transmits the status information of the connected floating contacts. The improved diagnostics help to prevent expensive downtime.

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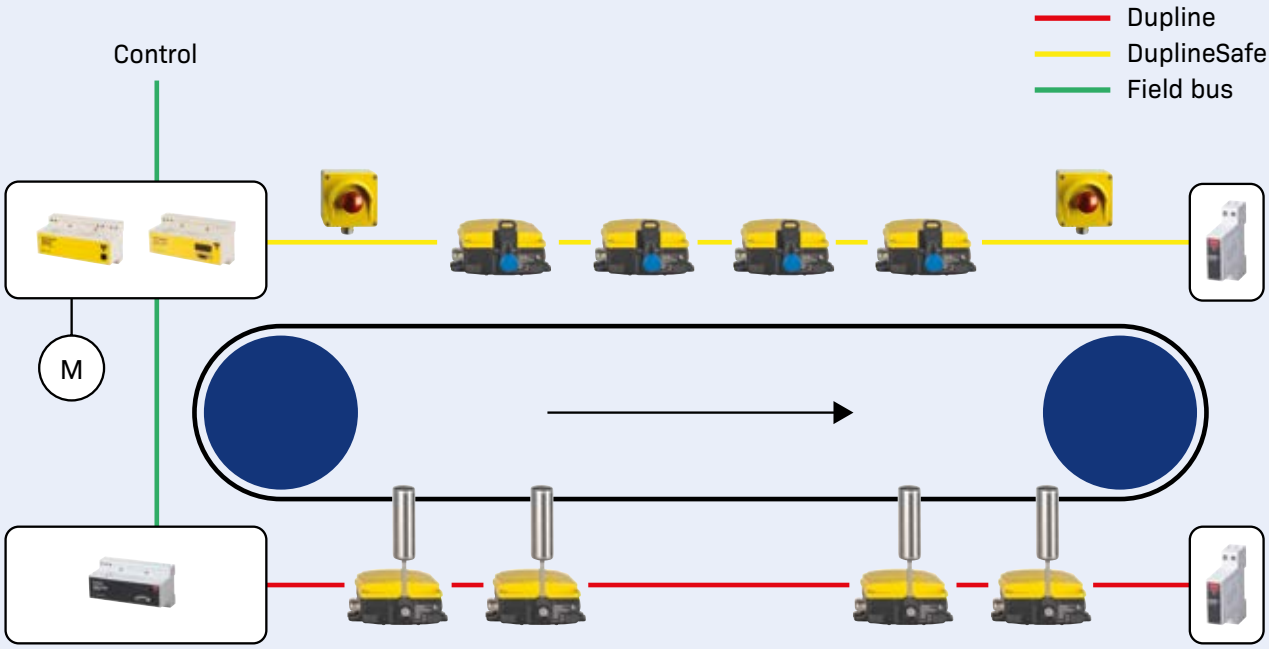
PRINCIPLE



Circuit diagram for networking of pull-wire emergency stop switches with DuplineSafe or belt misalignment switches. Data exchange with the higher-level control takes place via a standard field bus (Profibus DP, etc.).

DUPLINE

Dupline is used for signal transmission of large distances along conveyor lines. Status information from connected devices, e.g. from belt alignment switches, can be transferred to the central control for processing via corresponding gateways.

OVERVIEW

- Globally accepted 2-wire field bus system for large distances, up to 5 km without the need for repeaters
- Up to 128 I/Os
- Freely selectable topologies
- Gateways for standard field bus protocols

ADVANTAGES

- Easy to use and install
- Diagnostic signals can be transferred to standard field bus protocols via gateways
- Bus-supplied input modules
- Range up to 5 km without external power supply
- Integrated solutions for belt misalignment/position monitoring (BS65X, T.-454 series)

DUPLINE – SYSTEM COMPONENTS

■ Programming unit	GAP1605	103010199
■ Test unit	GTU8	103013800
■ Programming cable between programming unit and Dupline input module	ACC-PRGC-DN	103033601
■ Channel generator	SD2DUG24	103033128
■ Terminating resistor	DT01	103010203

128
No. of I/Os

Dupline® Fieldbus Installationbus

Precise product information can be found in our online catalogue at **products.schmersal.com**.

DUPLINESAFE

DuplineSafe is used for fail-safe signal evaluation for emergency-stop devices. Pull-wire emergency stop switches or emergency-stop buttons along a conveyor line can be monitored safely and easily with integrated DuplineSafe input modules.

OVERVIEW

- Globally accepted 2-wire field bus system for large distances, up to 5 km without the need for repeaters
- Fail-safe signal evaluation of up to 63 I/Os
- Gateways for standard field bus protocols

ADVANTAGES

- Easy to use and install
- Fail-safe signal evaluation of floating contacts
- Diagnostic signals can be transferred to standard field bus protocols via gateways
- Bus-supplied input modules
- Range up to 5 km without external power supply
- Integrated solutions for emergency-stop applications (pull-wire emergency stop switches RS65X, emergency-stop button MBG)

DUPLINESAFE – SYSTEM COMPONENTS

■ Configuration and testing unit	GS73800080	103010115
■ Channel generator	SD2DUG24	103033128
■ Safety relay	GS38300143 230	103010174
■ Terminating resistor	DT01	103010203

63
No. of I/Os

Dupline® Fieldbus Installationbus

PL e
ISO 13849-1

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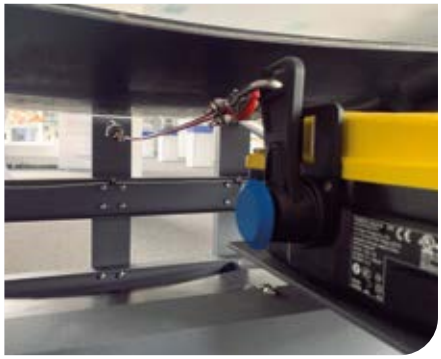
SYSTEM SOLUTIONS
BELT CRACK MONITORING



BELT CRACK MONITORING

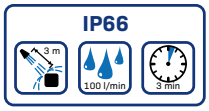
The belt crack switch is used to detect conveyor belt damage in order to prevent serious consequential damage. Various types of damage, such as loose rubber parts, protruding steel cables or foreign bodies as well as defective connection points, can be detected.

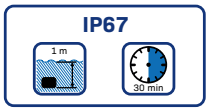
OVERVIEW

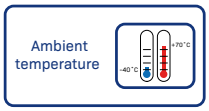
- Installation set comprising pull-wire emergency stop switch, wire rope with separating element and mounting accessories

ADVANTAGES

- Economically-efficient solution for detection of conveyor belt damage
- Individually adaptable to different belt widths







Precise product information can be found in our online catalogue at **products.schmersal.com**.

SYSTEM SOLUTIONS
BELT SPEED MONITORING

BELT SPEED MONITORING

The conveyor belt speed switch switches when the adjustable belt speed is exceeded or not reached. Can be used to detect underspeed and overspeed.

DESIGN AND OPERATING PRINCIPLE

The conveyor belt speed switch is designed to be mounted under the conveyor belt. The castor is driven directly by the conveyor belt; accordingly, the switch must be installed so the castor runs exactly parallel to the direction of the belt. The spring-loaded arm ensures the requisite contact pressure on the conveyor belt. The floating changeover contacts switch if the setpoint value is exceeded or not reached.

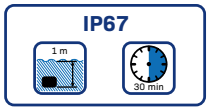
OVERVIEW

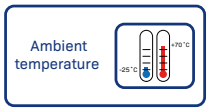
FW3-V

- Floating relay with changeover contact for detection of speed undercuts and direction of rotation
- Grey cast iron or anodised aluminium enclosure (electronics)
- Setpoint adjustable in 0.31 m/s increments
- No external power supply required
- Spring-loaded 500 mm arm with 100 mm diameter castor

ADVANTAGES

- Spring-loaded arm compensates for unevenness on the conveyor belt
- No external power supply needed – power is generated internally by the rotation of the castor
- One floating changeover contact per direction of rotation for detection of excess speeds and undercuts





Precise product information can be found in our online catalogue at **products.schmersal.com**.

FAIL-SAFE STANDSTILL/ UNDERSPEED MONITORING

Fail-safe standstill monitors can be used in combination with non-contact inductive proximity switches for standstill monitoring or conveyor belt underspeed monitoring. An additional standstill signal, e.g. from a frequency inverter, can be optionally monitored. In the event that the set cut-off frequency is not met, e.g. due to an overload or drive failure, the fail-safe outputs are controlled.

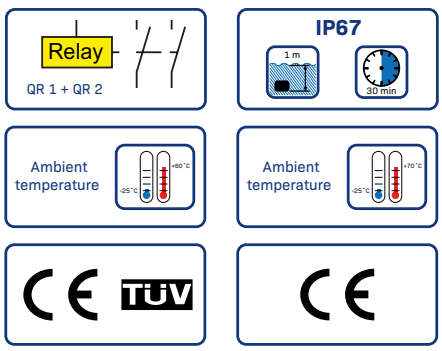
OVERVIEW

SRB-E-302FWS-TS/IFL 8-18-10STP

- Standstill monitor SRB-E-302FWS-TS
- Inductive proximity switch IFL 8-18-10STP
- Cut-off frequency adjustable between 0.5 and 10 Hz
- One-channel and two-channel signal processing
- Switching distance 8 mm

ADVANTAGES

- Standstill detection with 1 or 2 impulse sensors (alternatively, an external standstill signal)
- 2 fail-safe relay outputs/1 fail-safe semiconductor output



Precise product information can be found in our online catalogue at **products.schmersal.com**.

SAFE SIGNAL EVALUATION

The multifunctional safety relay modules can be used flexibly in different applications. Consequently, all conventional safety sensors and electromechanical safety equipment can be monitored.

OVERVIEW

SRB-E-301MC

- Suitable for applications up to Cat. 4 / PL e and up to SIL 3
- 1 or 2 channel signal evaluation
- Start / feedback loop monitoring
- Optional short circuit recognition
- 3 safety contacts stop category 0
- 1 signalling contact
- Slot-in termination with coding

ADVANTAGES

- Universal signal evaluation for emergency-stop devices and protective equipment
- Application or desired function easy to select with rotary switch
- Selected application can be locked using seal

Ambient temperature

PL e

Precise product information can be found in our online catalogue at **products.schmersal.com**.

SYSTEM SOLUTIONS
FAIL-SAFE SIGNAL EVALUATION FOR POTENTIALLY EXPLOSIVE AREAS

FAIL-SAFE SIGNAL EVALUATION FOR POTENTIALLY EXPLOSIVE AREAS

As an accompanying, intrinsically safe device, the safety relay module can evaluate sensors located in zones 2/22, 1/21 and must be installed outside of the EX area in a suitable control box or control cabinet.

OVERVIEW

SRB200EXI-1R/SRB200EXI-1A

- Suitable for applications up to Cat. 4 / PL e and up to SIL 3
- 1 or 2 channel signal evaluation
- Start / feedback loop monitoring
- Optional short circuit recognition
- 2 safety contacts stop category 0

ADVANTAGES

- Associated, intrinsically safe equipment for zones 1, 21
- Universal signal evaluation for emergency-stop devices and protective equipment

Ambient temperature

ATEX / IECEx / INMETRO
Zone 1/21

Precise product information can be found in our online catalogue at **products.schmersal.com**.

COMMAND AND SIGNALLING DEVICES
ASSEMBLY HOUSING

ASSEMBLY HOUSING

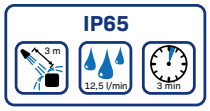
The assembly housings, which are designed for harsh ambient conditions, can be flexibly equipped with the command and signalling devices required for the application.

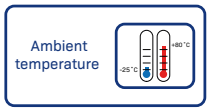
OVERVIEW

MBGAC
- Aluminium enclosure, RAL 7001
- Up to 4 command and signalling points

ADVANTAGES

- 4 command and signalling points freely configurable





CE

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COMMAND AND SIGNALLING DEVICES
"R" PROGRAM

"R" PROGRAM

The "R" stands for "robust", which is the main feature of these command signalling devices.

Both the mechanical systems and the electrical components are of heavy-duty design. The R series is resistant to mechanical loading and you can also operate it easily when wearing gloves. Users can choose from a wide range of different command devices and indicator lights.

An ATEX-compliant version of the R series is also available.

OVERVIEW

- Ø 22.3 mm
- Aluminium front ring

ADVANTAGES

- Modular system for individual configuration and combination with the MBGAC assembly housings

IP65

Ambient temperature

Precise product information can be found in our online catalogue at **products.schmersal.com**.

PLANT AND INVESTMENT PROTECTION
CONVEYOR BELT MONITORING SYSTEMS

CONVEYOR BELT MONITORING SYSTEMS

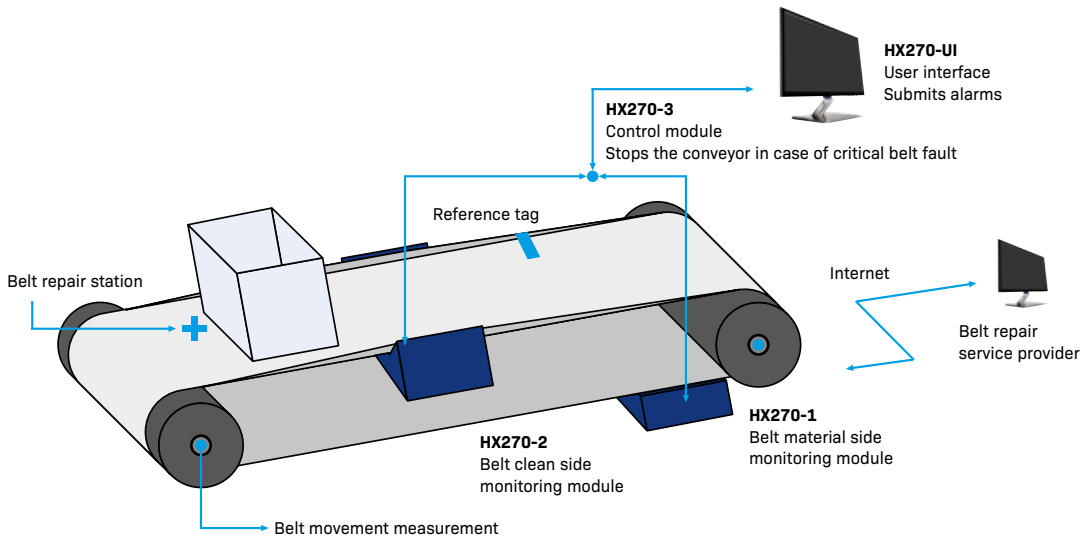
Conveyor belt monitoring systems monitor conveyor belts with the aim of detecting damage promptly and preventing lengthy downtime. At the same time, this helps to increase the safety and service life of the conveyor equipment. This in turn boosts system availability and the reliability of the overall plant.

RIP/SPLICE/CORD CONTROL

- Immediate stop on detection of longitudinal splits or damage to belt connections or wire-rope inserts
- Minimises standstills and downtime
- Enables early planning of maintenance and repairs
- Increases safety for people, prevents unexpected downtime

ONLINE BELT MONITORING SYSTEM

- Detects all significant damage to wire-rope or textile conveyors
- Stops the conveyor belt immediately if significant damage is detected, thus minimising downtime
- Optionally available with conveyor belt thickness measurement
- The user interface informs of preventive maintenance measures and thus increases service life
- 24/7 online conveyor belt monitoring including automatic start-up of defined repair stations



PROCESS AND QUALITY MONITORING
ONLINE MATERIAL ANALYSIS

ONLINE MATERIAL ANALYSIS

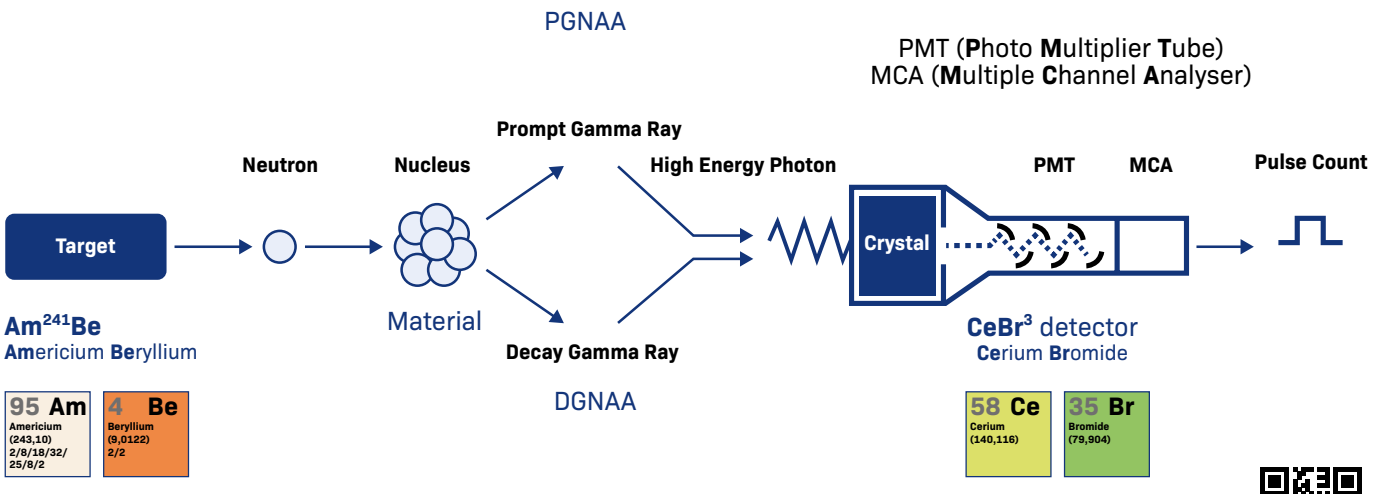
The basic composition of bulky goods can be determined online based on a PGNAA analysis, and on the conveyor belt in real time during ongoing operation. This measurement process supports the coal, cement, minerals and steel industries in sustainably improving processes and overall quality assurance.

ONLINE REAL-TIME MATERIAL ANALYSIS ON AN ELEMENT BASIS FOR

- Active process control
- Quality control
- Contract fulfilment

SOLUTIONS

- Online material analysis
- Process efficiency optimisation
- Maximum resource utilisation
- Quality improvement



tec.nicum

YOUR PARTNER FOR MACHINE SAFETY AND WORKPLACE PROTECTION

tec.nicum is the service division of the Schmersal Group. It offers machine manufacturers, machine operators and distributors competent advice with product and manufacturer neutrality.

tec.nicum supports its clients in the reliable design of machines and workplaces.
The tec.nicum team drafts and realises safety solutions across all lifecycle stages of the machine.

The range of services:

tec.nicum academy
Seminars and training

tec.nicum consulting
Consultancy services

tec.nicum engineering
Design, planning and PLC programming

tec.nicum integration
Execution and installation

FOR DETAILED INFORMATION, CHECK OUT
WWW.TECNICUM.COM

ACCESSORIES

Locking screw M25 x 1.5

Plastic
- ACC-BPL-M25-2PCS **103032753**
- Tightening torque 10 Nm
- Packaging unit: 2x

Nickel plated brass
- ACC-BPL-M25-MS **103006010**
- Tightening torque 8 Nm
- Packaging unit: 1x

Cable gland M25 x 1.5

Nickel plated brass
- ACC-CGLD-M25-MS **103006012**
- Authorised cable diameter 9 ... 16 mm
- Tightening torque 8 Nm
- Packaging unit: 1x

Cable gland M25 x 1.5

Thermoplastic
- ACC-CGLD-M25-2PCS **103032752**
- Authorised cable diameter 9 ... 17 mm
- Tightening torque 10 Nm
- Packaging unit: 2x

Cable gland M25 x 1.5

Thermoplastic with pressure compensation element
- ACC-CGLD-P-M25-2PCS **103031491**

Brass, nickel-plated with pressure compensation element
- ACC-CGLD-P-M25-MS-2PCS **103031489**

- Authorised cable diameter 9 ... 17 mm
- Tightening torque 8 Nm
- Packaging unit: 2x

Locking screw M20 x 1.5

Plastic
- Locking screw M20 x 1.5 **103031491**

Nickel plated brass
- ACC-BPL-M20-MS **103006009**

- Tightening torque 8 Nm
- Packaging unit: 1x

Cable gland M20 x 1.5

Nickel plated brass
- ACC-CGLD-M20-MS **103006011**

- Authorised cable diameter 6 ... 12 mm
- Tightening torque: 8 Nm
- Packaging unit: 1x

Cable gland M20 x 1.5	Cable gland M20 x 1.5	
		
Plastic ■ ACC-CGLD-M20-P **103006013** ■ Authorised cable diameter 6 ... 12 mm ■ Tightening torque: 8 Nm ■ Packaging unit: 1x	**Brass, nickel-plated with pressure compensation element** ■ Cable gland pressure compensation M20 x 1.5 **103007570** ■ Authorised cable diameter 6 ... 12 mm ■ Tightening torque: 3 Nm ■ Packaging unit: 1x	

THE SCHMERSAL GROUP
PROTECTION FOR MAN AND MACHINE

In the demanding field of machine safety, the owner-managed Schmersal Group is one of the international market leaders. The company, which was founded in 1945, has a workforce of about 2000 people and seven manufacturing sites on three continents along with its own companies and sales partners in more than 60 countries.

Customers of the Schmersal Group include global players from the area of mechanical engineering and plant manufacturing as well as operators of machinery. They profit from the company's extensive expertise as a provider of systems and solutions for machine safety. Furthermore, Schmersal specialises in various areas including food & beverage, packaging, machine tools, lift switchgear, heavy industry and automotive.

A major contribution to the systems and solutions offered by the Schmersal Group is made by tec.nicum with its comprehensive range of services: certified Functional Safety Engineers advise machinery manufacturers and machinery operators in all aspects relating to machinery and occupational safety – and do so with product and manufacturer neutrality. Furthermore, they design and realise complex solutions for safety around the world in close collaboration with the clients.

SAFETY PRODUCTS

- Safety switches and sensors, solenoid interlocks
- Safety controllers and safety relay modules, safety bus systems
- Optoelectronic and tactile safety devices
- Automation technology: position switches, proximity switches

SAFETY SYSTEMS

- Complete solutions for safeguarding hazard areas
- Individual parametrisation and programming of safety controllers
- Tailor-made safety technology – be it for individual machines or a complex production line
- Industry-specific safety solutions

SAFETY SERVICES

- tec.nicum academy – Seminars and training
- tec.nicum consulting – Consultancy services
- tec.nicum engineering – Design and technical planning
- tec.nicum integration – Execution and installation

x.000 / L+W / 01.2021 / Teile-Nr. 103039283 / EN / Ausgabe 01

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