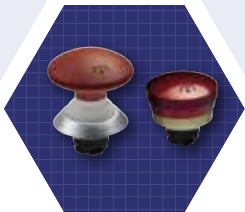


# Controls and Automation Products

GK-A 2019: Product line overview



# Application Finder



1

**Pushbuttons and Indicator Lights**  
N series  
R series  
EX-R series

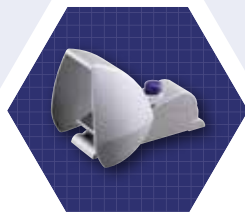
Page 4-8



2

**Joysticks**  
WK & MK  
RK & NK

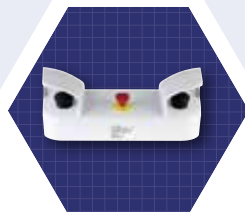
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**Foot Switches**  
NKF  
F 232

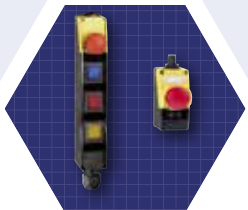
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**Two Hand Controls**  
SEPG  
SEPK  
Stands

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**Control stations**  
BDF100  
BDF200

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**Heavy Duty Position Switches**

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**Special Position Switches**  
Slack wire  
Belt Alignment  
Gear  
Rotating Spindle

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**Pull Wire Switches**

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# Pushbuttons & Indicator Lights:

The devices consist of an operator head and a mounting flange. The modular system allows up to 3 contact blocks and light elements to be attached to the mounting flange, allowing the installer to configure a variety of contact arrangements for each operator element. Both the mechanical systems and the electrical components are of heavy-duty design.

The devices are intended for 22.3 mm diameter holes. The use of an adapter ring makes it possible to easily mount devices in a 30.5 mm installation diameter without needing additional sealing on the front panel of the machine to seal the installation hole.

Schmersal has developed several series of control devices and indicator lights with distinct features:

## Typical pushbutton assembly

N Series Assembly



R Series and EX-R Series Assembly



### N Series

#### IP69K rating and Hygienic design

Series N was originally developed for the specific requirements of Protection class IP69K. This means that even when cleaned on a regular basis using high-pressure, high temperature cleaners they have an extended service life. They were also designed on the basis of the general design concepts for hygienic construction of food processing machinery (EN 1762-2), from food safe materials and designed with smooth surfaces and gradual transitions. Typical applications include food processing, pharmaceutical, petrochemical, and medical industries. Due to their resistance to spray water, they are deployed in outdoor applications such as municipal vehicles, car washes, and in maritime areas. In addition, these devices are clean room approved.

The materials used in construction of these control devices and indicator lights are durable and are heat and chemical resistant; chromium plated ABS plastic fittings, thermoplastic operators, and pliable seals are available in white, black, or blue color.

### R Series

#### Robust metal pushbuttons

When designing control panels on machines that will be working under particularly harsh conditions, it is advisable to use the R product portfolio. The "R" stands for "robust", which represents the main feature of this switchgear. The R series is resistant to mechanical loading and you can also operate it easily when wearing gloves.

Typical application include material handling systems, packaging machinery, chemical processing equipment, robot cells, folding or brake presses, filter presses, punching machines, printing machines, injection molding, palletizers, and other packaging equipment

The materials used in construction of these control devices and indicator lights are durable and are heat and chemical resistant; die cast aluminum fittings, glass or thermoplastic lens covers. Versions are available with protective membranes to prevent scratches in abrasive environments.

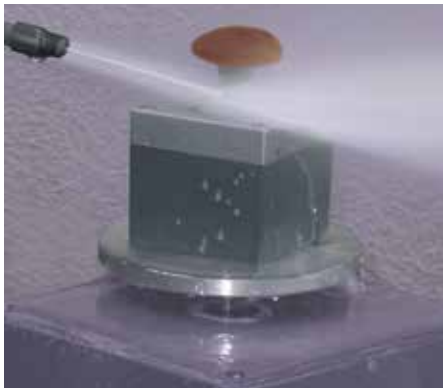
### EX-R Series

#### For explosive atmospheres

When designing control panels on machines that generate or will be exposed to potentially explosive or flammable gaseous or dust born atmospheres, there are requirements to limit ignition sources. Schmersal has developed devices that are intrinsically safe, meaning they are lower voltage and do not generate heat above 135°C; they do not provide suitable energy to ignite most gas environments. They are also IP65 rated, to prevent dust intrusion into the electrical contact area. These pushbuttons are ATEX rated for use in Zone 1 and 2 gas environments and Zone 21 and 22 dust environments.

Typical applications include gas environments of printing machines, paint spray-ing plants, and petrochemical industry, and dust areas of grain mills, powder coating machines, and the textile industry, among others.

The materials used in construction of these control devices and indicator lights are durable and are heat and chemical resistant; chrome plated brass, coated brass buttons, thermoplastic lens covers.



IP69K Test: 175° F Steam at 1450psi

In the ATEX directive 1999/92/EG, the zones are defined in the following way:

Zone 1: "A place in which an explosive atmosphere consisting of a mixture with air or flammable substances in the form of gas, vapor or mist is likely to occur in normal operation occasionally."

Zone 2: "A place in which an explosive atmosphere consisting of a mixture with air or flammable substances in the form of gas, vapor or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only."

Zone 21: "A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation occasionally."

Zone 22: "A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, it does occur, will persist for a short period only."



# Pushbuttons & Indicator Lights: N Series



Series	NDRZ50RT	NDRR50RT	NML/NMLH	NME/NMEF	NDT	NDL
Type	Emergency Stop	Emergency Stop	Indicator light	Indicator light	Pushbutton	Illuminated Pushbutton
Operator Material	Thermoplastic	Thermoplastic	PA (12)	PA (12)	ABS / PA (12)	ABS / PA (12)
Base Material	Chrome plated ABS	Chrome plated ABS	Chrome plated ABS	Chrome plated ABS	Chrome plated ABS	Chrome plated ABS
IP Rating	IP69K	IP69K	IP69K	IP69K	IP69K	IP69K
Colors	■	■	■ ■ ■ ■ □	■ ■ ■ ■ □	■ ■ ■ ■ □ ■ ■	■ ■ ■ ■ □
Bellows Color	□ ■ ■	□ ■ ■	-	-	□ ■ ■	□ ■ ■
Notes	Latching, Pull reset integrated spring element Yellow label required, ordered separately	Latching, Pull reset Separate spring element EFR Yellow label required, ordered separately	L = Flat lens LH = Domed lens Separate illuminant L24/9 bulb or LE24/9WS LED Use EL or ELE voltage block	EF= Flat lens E = Domed lens Integrated LED Use ELE voltage block		Use EL or ELE voltage block with L24/9 bulb or LE24/9WS LED



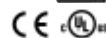
Series	NW	NHS	NWSE	NDAN6
Type	Selector Switch	Main Switch	Step Selector Switch	Potentiometer Knob
Operator Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Base Material	Chrome plated ABS	Stainless steel plate	Chrome plated ABS	Chrome plated ABS
IP Rating	IP69K	IP69K	IP69K	IP69K
Colors	□ ■	■ ■	□ ■	□ ■
Bellows Color	□ ■	-	-	-
Notes	2 or 3 position Momentary or maintained Extended knob (.1)	Integrated LO/TO device NH version for E-Stop	3-12 steps Extended knob (.1)	Potentiometer not included

## Pushbuttons & Indicator Lights: N Series



Series	NDTP	NDLP	NDP50	NDRZ50	NDRR50
Type	Mushroom button	Illum. Mushroom button	Mushroom button	Mushroom button	Mushroom button
Operator Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Base Material	Chrome plated ABS	Chrome plated ABS	Chrome plated ABS	Chrome plated ABS	Chrome plated ABS
IP Rating	IP69K	IP69K	IP69K	IP69K	IP69K
Colors					
Bellows Color					
Notes		Use EL or ELE voltage block with L24/9 bulb or LE24/9WS LED	Momentary	Latching, Pull reset integrated spring element	Latching, Pull reset Separate spring element EFR

## Terminal Blocks



Series	EF	EFK	EL	ELE	ELDE.N	EFR
Type	Contact Element	Contact Element	Light terminal	Light terminal	Light terminal LED	Spring element
Connection	Screw Terminals	Flat Pin	Screw Terminals	Screw Terminals	Screw Terminals	none
Position	1, 2, or 3	1, 2, or 3	3 (center)	3 (center)	3 (center)	3 (center)
Options	220 = 2 NC 303 = 1 NO & 1 NC 10 = 1 NC 03 = 1 NO 033 = 2 NO 103 = 1 NO & 1 NC 301 = 1 NO & 1 NC	220 = 2 NC 303 = 1 NO & 1 NC 10 = 1 NC 03 = 1 NO 033 = 2 NO 103 = 1 NO & 1 NC 301 = 1 NO & 1 NC			ELDE.N RT (red) ELDE.N GB (yellow) ELDE.N GN (green) ELDE.N BL (blue) ELDE.N WS (white) ELDE.N-RD-GN-YE-24VDC (red/green/yellow)	

## Pushbuttons & Indicator Lights: R Series



Series	RDRZ45RT	RM	RDT/RDM	RDL/RDLM	RDP40/RDR45	RW
<b>Type</b>	Emergency Stop	Indicator light	Pushbutton	Illuminated button	Mushroom button	Selector Switch
<b>Operator Material</b>	Aluminum	Glass (Flat) / PA (Domed)	Aluminum	Glass Lens	Aluminum	Thermoplastic
<b>Base Material</b>	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
<b>IP Rating</b>	IP65	IP65	IP65	IP65	IP65	IP65
<b>Colors</b>						
<b>Notes</b>	Latching, Pull reset integrated spring element Yellow label required, ordered separately	LF & EF= Flat lens LH & EH = Domed lens L = Use RL-DEWS24 or RL voltage block with LE24/9WS LED E = Use RL voltage block	M = with membrane	M = with membrane L = Use RL-DEWS24 or RL voltage block with LE24/9WS LED	40 - Momentary 45 - Latching, pull reset	2 or 3 position momentary or maintained extended knob (.1)

## Terminal Blocks



Series	RS	RWSE	RDAN6	Series	RF	RL
<b>Type</b>	Keyed Selector Switch	Step Selector Switch	Potentiometer Knob	<b>Type</b>	Contact Element	Light terminal
<b>Operator Material</b>	Aluminum Key barrel	Thermoplastic	Thermoplastic	<b>Position</b>	1, 2, or 3	3 (center)
<b>Base Material</b>	Aluminum	Aluminum	Aluminum	<b>Options</b>	RF10 = 1 NC RF03 = 1 NO	RL (for bulb) RLDEWS24 (white LED)
<b>IP Rating</b>	IP65	IP65	IP65			
<b>Colors</b>	Metal (silver)					
<b>Notes</b>	2 or 3 position momentary or maintained	2-12 steps Extended knob (.1)	Potentiometer not included			

# Pushbuttons & Indicator Lights: EX-R Series



Series	EX-RDRZ45RT	EX-RMLH	EX-RDT/EX-RDM	EX-RDL/EX-RDLM	EX-RDP40/EX-RDR45
Type	Emergency Stop	Domed Indicator light	Pushbutton	Illuminated button	Mushroom button
Operator Material	Coated brass	Thermoplastic lens	Coated brass	Thermoplastic lens	Coated brass
Base Material	Chrome plated brass	Chrome plated brass	Chrome plated brass	Chrome plated brass	Chrome plated brass
IP Rating	IP65	IP65	IP65	IP65	IP65
Colors	■	■ ■ ■ ■ □	■ ■ ■ ■ □ ■	■ ■ ■ ■ □	■ ■ ■ ■ □ ■
ATEX zones	1, 2, 21, 22	1, 2, 21, 22	1, 2, 21, 22	1, 2, 21, 22	1, 2, 21, 22
Notes	Latching, Pull reset integrated spring element Yellow label required, ordered separately	Use EX-RLDEWS24	M = with membrane	M = with membrane Use EX-RLDEWS24	40 - Momentary 45 - Latching, pull reset

## Terminal Blocks



Series	EX-RW	EX-RS
Type	Selector Switch	Keyed Selector Switch
Operator Material	Thermoplastic	Aluminum Key barrel
Base Material	Chrome plated brass	Chrome plated brass
IP Rating	IP65	IP65
Colors	■	Metal (silver)
ATEX zones	1, 2, 21, 22	1, 2, 21, 22
Notes	2 or 3 position momentary or maintained extended knob (.1)	2 or 3 position momentary or maintained

Series	EX-RF	EX-RLDE
Type	Contact Element	LED Light terminal
Position	1, 2, or 3	3 (center)
Options	EX-RF10 = 1 NC EX-RF10.1 = 1 NC EX-RF03 = 1 NO EX-RF03.1 = 1 NO	EX-RLDEWS24 (white)





# Joysticks

Schmersal offers a series of industrial grade joysticks suitable for 22.5 mm or 30.5 mm diameter mounting.

Models are available with up to four switch positions/actuating directions with up to eight contacts (two contacts actuated in each direction).

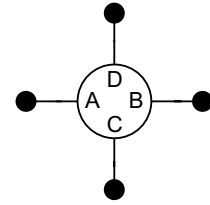
A variety of sealing bellows options make them suitable for especially harsh industrial applications, including outdoor usage with UV resistance and operable temperatures of -25 °C to +80 °C, or hygienic applications requiring IP69K Rating for high temp/high pressure wash downs.

Joysticks are available with two actuation types:

■ Maintained switch, locks into place with return to center (rest/neutral) position by touch.

■ Momentary switch, returns to center rest/neutral position by spring force

Models are available with either one, or can mix the two styles.



Series	MKT	MKS	WKT	WKS	NEW RK	NEW NK
Type	Spring Returned	Maintained	Spring returned	Maintained	Spring returned	Spring returned
Mounting Diameter	22.3 mm	22.3 mm	30.5 mm	30.5 mm	22.3 mm	22.3 mm
Mounting Type	Lock nut	Lock nut	Mounting flange	Mounting flange	Lock nut	Lock nut
Material	Stainless steel shaft duroplast knob	Stainless steel shaft duroplast knob	Stainless steel shaft duroplast knob	Stainless steel shaft duroplast knob	Stainless steel shaft duroplast knob	Stainless steel shaft duroplast knob
Shaft Length	77 mm	77 mm	90 mm	90 mm	85 mm	85 mm
Bellows Options	Rubber WKT-19.4 Rubber WKT-19.3 Silicone WKT-26 Silicone (IP69K)	Rubber WKT-19.4 Rubber WKT-19.3 Silicone WKT-26 Silicone (IP69K)	Rubber WKT-19.4 Rubber WKT-19.3 Silicone WKT-26 Silicone (IP69K)	Rubber WKT-19.4 Rubber WKT-19.3 Silicone WKT-26 Silicone (IP69K)	Silicone (IP69K)	Silicone (IP69K)

## MK & WK Directions and contact variants

A	B	C	D	PN Suffix
1 NO	1 NO			A32
1 NC	1 NC			A32/401
2 NO	2 NO			B32
1 NC & 1 NO	1 NC & 1 NO			B32/1x401
2 NO	2 NO			C32
1 NO	1 NO	1 NO		C42
1 NO	1 NO	1 NO	1 NO	C52
1 NC	1 NC	1 NC	1 NC	C52/2x401
4 NO	4 NO			E32
4 NC	4 NO			E32/404
4 NC	4 NC			E32/800
2 NO	2 NO	2 NO	2 NO	E52
1 NC & 1 NO	1 NC & 1 NO	2 NO	2 NO	E52/206
2 NC	2 NO	2 NO	2 NO	E52/206.1
1 NC & 1 NO	1 NC & 1 NO	1 NC & 1 NO	1 NC & 1 NO	E52/2x401

## RK & NK Directions and contact variants

A	B	C	D	PN Suffix
1 NO	1 NO			21
2 NO	2 NO			22
1 NO	1 NO	1 NO	1 NO	41
2 NO	2 NO	2 NO	2 NO	42

# Foot Switches

Foot switches are used to start and stop operations and production processes on machinery and equipment where operation by hand is not possible. Safety foot switches can also be used as enabling switches when carrying out set-up, retrofit or service processes where the machine will run with safety guards open.

Typical applications include metal forming machines, woodworking machines, and machinery for packaging and textile industries.

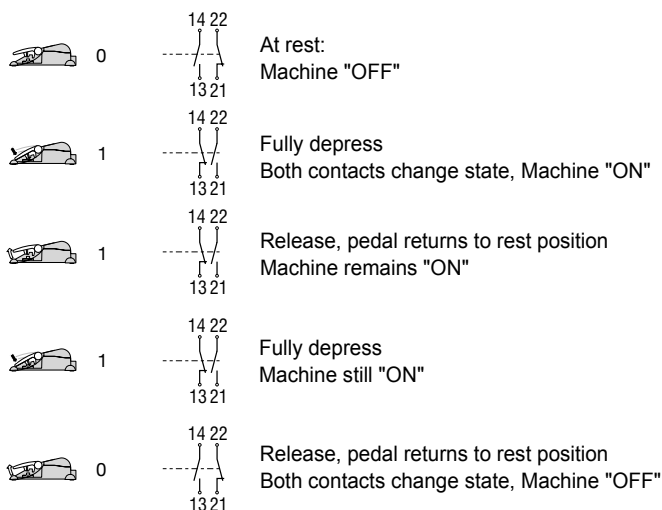
## NKF Series

The NKF foot switch is a compact, low profile design, offering one, two or three pedals. The rugged ABS plastic foot switch is available with snap-action change-over contacts, or NO contacts – up to two contacts per pedal. Standard with two meter pre-wired cable, other custom colors and pedal configurations are available.

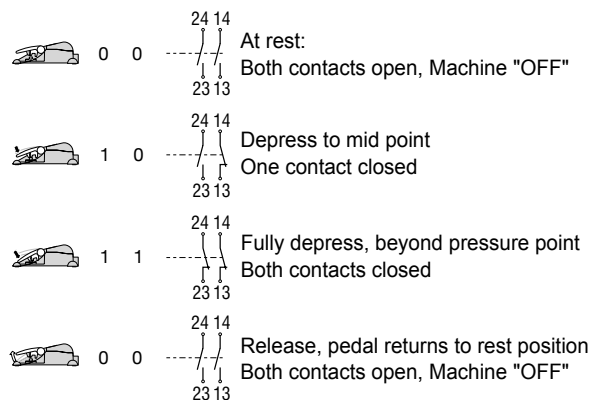
## F 232 Series

Foot switches of the F-232 series are available as single or dual pedal versions. The FH-232 series are available with an optional, ergonomic protective shield to protect against unintentional operation. The powder-coated, robust die-cast enclosures are resistant to high mechanical loads. The 232 series foot switches are available with slow action (T) or snap action (Z) contacts, with 2 or 4 NO/NC contact per pedal. Optional functions include a pressure point (staggered) operation or a bi-stable (start/stop) function. Custom housing colors are also available.

### F-232 options: Start/stop function (F)



### Staggered contacts with 3 position actuation (HD)



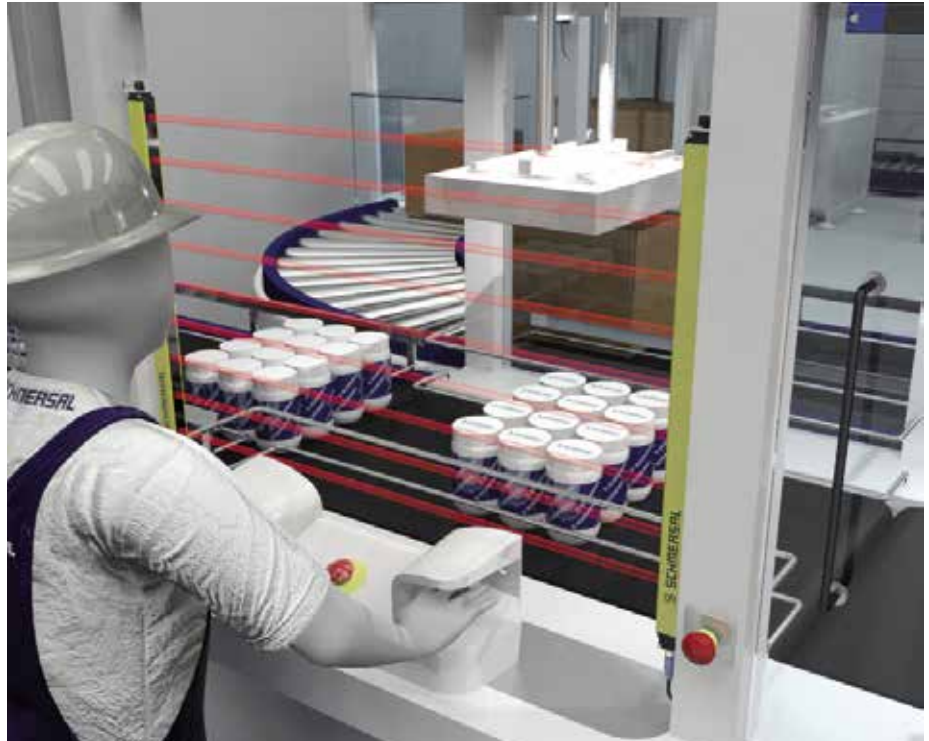
Series	NKF	NKF2	NKF3	F 232	2F 232
Type	Single pedal	Two pedal	Three Pedal	Single pedal	Two pedal
Housing Material	Thermoplastic	Thermoplastic	Thermoplastic	Aluminum die-cast	Aluminum die-cast
Pedal Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Dimensions	77 x 49 x 123 mm	215 x 49 x 138 mm	351 x 49 x 150 mm	170 x 189 x 274 mm	295 x 189 x 274 mm
IP Rating	IP67	IP67	IP67	IP65	IP65
Contacts	1PW (1 Changeover) 2PW (2 Changeover) 10 = 1 NO 20 = 2 NO	1PW (1 Changeover) 2PW (2 Changeover) 10 = 1 NO 20 = 2 NO  (all pedals same)	1PW (1 Changeover) 2PW (2 Changeover) 10 = 1 NO 20 = 2 NO  (all pedals same)	11 = 1 NO & 1 NC 02 = 2 NC 20 = 2 NO 22 = 2 NO & 2 NC 04 = 4 NC 40 = 4 NO	11 = 1 NO & 1 NC 02 = 2 NC 20 = 2 NO 22 = 2 NO & 2 NC 04 = 4 NC 40 = 4 NO
Options	Cable from left, back, or right	Cable from left, back, or right	Cable from left, back, or right	Protective hood (H) HD = Staggered contacts with 3 position actuation F = start/stop function	Protective hood (H) HD = Staggered contacts with 3 position actuation F = start/stop function

## Two Hand Controls

Two-hand control panels are designed as such so the operators need both hands at the same time to start a hazardous movement. This forces operators to keep their hands in the same place which means that they cannot reach into the danger zone while the system is carrying out the hazardous movement.

These two-hand control panels are fitted with an Emergency Stop button that complies with EN ISO 13850. It is also possible to mount up to eight additional command and signaling devices to the center console. Apart from this, there are guard hoods over the operating elements, which prevent people from circumventing the protection function using their hands, elbows, stomach, hips, thighs or knees. It is also not possible to operate from the back of the control panels.

The main areas of application for two-hand controls are presses and stamping units in the metal processing or powder metallurgy industries as well as similar machines and systems that involve manual insertion and removal operations. These include printing and paper processing machines, rubber and plastics processing machines, machines involved in the chemical industry and assembly plants.



Series	SEPK	SEPG
<b>Type</b>	Two hand control with hooded buttons	Two hand control with hooded buttons
<b>Material</b>	Thermoplastic	Die cast alloy
<b>IP Rating</b>	IP64	IP65
<b>E-Stop</b>	ADRR40RT	EDRR40RT
<b>Palm Buttons</b>	50 mm dia, black	50 mm dia, black
<b>Buttons</b>	1 NO & 1 NC	1 NO & 1 NC
<b>Connection</b>	Screw terminals	Screw terminals
<b>Notes</b>	8 knockouts for additional control or signal devices	8 knockouts for additional control or signal devices

## Stands



STP02.1.1



STP02.4.1



STPLC-1

# Control Stations

Ergonomic operation of the main machine functions at the human-machine interface is a key factor in safety. The control units should be mounted as close as possible to the safety doors so that operators have an overview of the process. BDF Series control units meet this requirement. This series has been designed for mounting onto the commercially available aluminum profile systems of machine enclosures and you can quickly attach them and integrate them in the ambient structure. Machine builders can use the BDF range to represent the most common operator functions like Emergency Stop, ON/OFF, Forwards/Backwards, Operating Mode Selection, display of operating status conditions or error messages, etc.



The BDF200 Universal (-2875 variant) is field customizable, with several positions that can be adapted to become pushbuttons, illuminated pushbuttons or indicator lights of various colors. Choices are made by wiring and the application of various colored lens caps. Base models include:

- All 4 positions customizable
- E-Stop and 3 customizable positions
- E-Stop, keyed selector and 2 customizable positions.

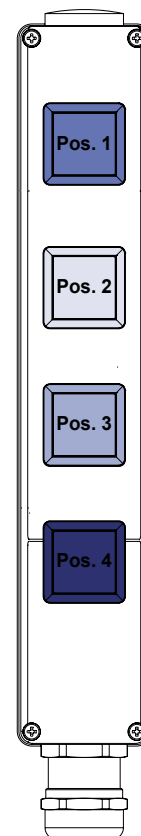
## Operator Options:

	PN	Type	Options	POS
	NH	E-Stop	Red button with yellow	POS1 only
	NHK	E-Stop with collar	Red button with yellow	POS1 only
	DT..	Pushbutton		All
	LT..	Illuminated pushbutton		All
	PT..	Mushroom button		All
	LM..	Signal light		All
	WS..	Selector, maintained	2 or 3 position	POS2, POS3
	WT..	Selector, momentary	2 or 3 position	
	WTS..	Selector, mixed	3 position	
	SW...	Keyed selector switch	2 position, maintained or momentary	POS2, POS3



Series	BDF100	BDF100 Universal	BDF200	BDF200 Universal
Type	Control panel	Control panel	Control panel	Control panel
# of Operators	Single operator	Single operator	4 operators	4 operators
Housing Material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
E-Stop Contacts	1 NO & 2 NC (E-stops)	--	1 NO & 2 NC (E-stops)	1 NO & 2 NC (E-stops)
Operator Contacts	2 NO 1 NO & 1 NC	2 NO 1 NO & 1 NC	2 NO 1 NO & 1 NC 1 NO	2 NO 1 NO & 1 NC 1 NO
Features		Field customizable	Selectable and factory assembled	Field customizable

BDF200



# Heavy Duty Limit Switches

## M330 series

This series is a heavy duty version of standard full size European Norm switches. They are IP65 and thus suitable for low-pressure water spray. In addition they have seawater-proof bodies with stainless steel or surface protected external metal parts. The body and actuator seals are resistant to most oils and gasoline.

## Universal Series U 431,432,433 & 434

This series features slow action 1, 2, 3, and 4 contact models with field convertible NO and or NC contacts. In addition the switching point is field adjustable. Optionally, models are available with low temperature (-30°C) contacts, add -1252 to part number. These switches are



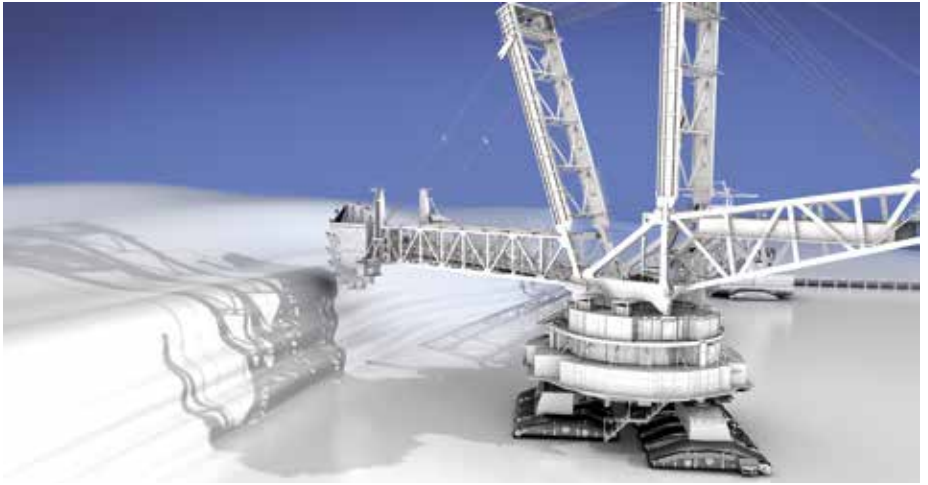
Series	M330	U431	U432	U433	U434
<b>Material</b>	Die cast alloy	Die cast alloy	Die cast alloy	Die cast alloy	Die cast alloy
<b>Dimensions</b>	40 x 76 x 40 mm	58 x 62 x 50 mm	80 x 62 x 50 mm	105 x 62 x 50 mm	127 x 62 x 50 mm
<b>IP Rating</b>	IP65	IP65	IP65	IP65	IP65
<b>Connections</b>	Screw Terminals	Screw Terminals	Screw Terminals	Screw Terminals	Screw Terminals
<b>Actuation</b>	Snap Action	Slow Action	Slow Action	Slow Action	Slow Action
<b>Contacts</b>	1 NO & 1 NC	1 NO 1 NC	2 NO 2 NC 1 NO & 1 NC	3 NO 3 NC 1 NO & 2 NC 2 NO & 1 NC	4 NO 4 NC 1 NO & 3 NC 3 NO & 1 NC 2 NO & 2 NC
<b>Options</b>	LED (G24)	Low temperature (-1252)	Low temperature (-1252)	Low temperature (-1252)	Low temperature (-1252)
<b>Actuators</b>	S plunger 2S telescopic plunger 3S side plunger R roller plunger 3R side roller plunger K offset roller lever 3K angle roller lever AF spring rod 4D forked roller lever H roller lever 2H resin leaf-spring 3H large roller on lever 4H spring rod on shaft 6H steel leaf-spring 7H adj lever with roller 8H roller on short lever 9H steel rod lever 10H adj plastic rod lever	S plunger K offset roller lever H roller lever 2H resin leaf-spring 3H large roller on lever 4H spring rod on shaft 6H steel leaf-spring 7H adj lever with roller 8H roller on short lever 9H steel rod lever 10H adj plastic rod lever	S plunger K offset roller lever H roller lever 2H resin leaf-spring 3H large roller on lever 4H spring rod on shaft 6H steel leaf-spring 7H adj lever with roller 8H roller on short lever 9H steel rod lever 10H adj plastic rod lever	S plunger K offset roller lever H roller lever 2H resin leaf-spring 3H large roller on lever 4H spring rod on shaft 6H steel leaf-spring 7H adj lever with roller 8H roller on short lever 9H steel rod lever 10H adj plastic rod lever	S plunger K offset roller lever H roller lever 2H resin leaf-spring 3H large roller on lever 4H spring rod on shaft 6H steel leaf-spring 7H adj lever with roller 8H roller on short lever 9H steel rod lever 10H adj plastic rod lever



# Heavy Duty Limit Switches

## T/M 015, 016 & 017 Series

This series features snap action and/or slow action contacts in 2, 3 & 4 contact configurations. Slow action models are available with overlapping contacts. As an option, blow out magnets are available for switching up to 1A at 220v DC. These switches are IP65 rated and feature 3 conduit entries for flexibility in installation.



CE



CE cULus



CE



CE



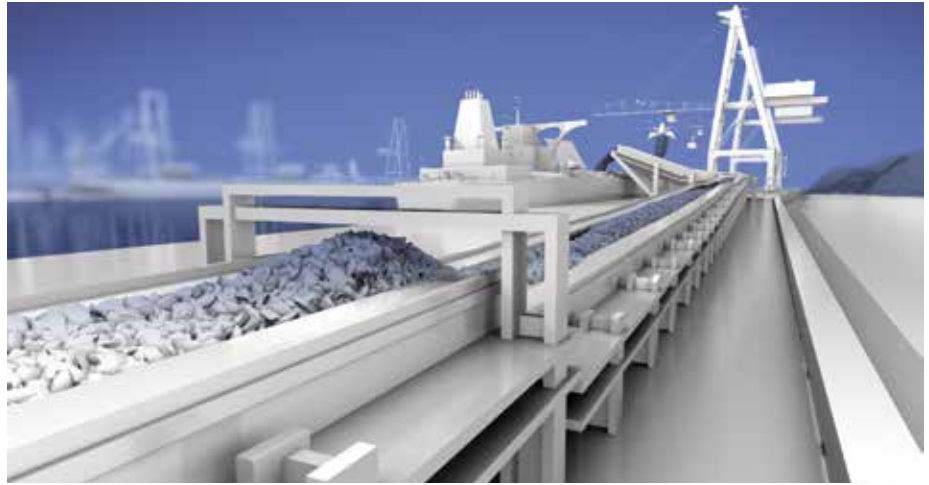
CE

Series	T/M015	T016	T/M017	T422	T/M441
<b>Material</b>	Die cast alloy	Die cast alloy	Die cast alloy	Cast Iron	Cast Iron
<b>Dimensions</b>	75 x 67 x 43 mm	105 x 67 x 43 mm	130 x 67 x 43 mm	71 x 106 x 63 mm	99 x 106 x 63 mm
<b>IP Rating</b>	IP65	IP65	IP65	IP65	IP65
<b>Connections</b>	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
<b>Actuation</b>	Snap Action (M) Slow Action (T)	Slow Action	Snap Action (M) Slow Action (T)	Slow Action	Snap Action (M) Slow Action (T)
<b>Contacts</b>	1 NO & 1 NC 2 NO 2 NC	1 NO & 2 NC 2 NO & 1 NC 3 NO 3 NC	2 NO & 2 NC 1 NO & 3 NC 3 NO & 1 NC	1 NO 1 NC	1 NO & 1 NC
<b>Options</b>	Overlapping slow contacts (U) Staggered slow contacts (H) Magnetic blowout (C)	Overlapping slow contacts (U) Staggered slow contacts (H) Magnetic blowout (C)	Overlapping slow contacts (U) Staggered slow contacts (H) Magnetic blowout (C)	Extreme temp (T)	Extreme temp (T) Overlapping slow contacts (U)
<b>Actuators</b>	S plunger 2S telescopic plunger K offset roller lever 2K rocking offset roller 3K angle roller lever H roller lever 2H resin leaf-spring 3H large roller on lever 4H spring rod on shaft 6H steel leaf-spring 7H adj lever with roller 8H roller on short lever 9H steel rod lever 10H adj plastic rod lever	S plunger 2S telescopic plunger K offset roller lever 2K rocking offset roller 3K angle roller lever H roller lever 2H resin leaf-spring 3H large roller on lever 4H spring rod on shaft 6H steel leaf-spring 7H adj lever with roller 8H roller on short lever 9H steel rod lever 10H adj plastic rod lever	S plunger 2S telescopic plunger K offset roller lever 2K rocking offset roller 3K angle roller lever H roller lever 2H resin leaf-spring 3H large roller on lever 4H spring rod on shaft 6H steel leaf-spring 7H adj lever with roller 8H roller on short lever 9H steel rod lever 10H adj plastic rod lever	S plunger 2S telescopic plunger R roller plunger K offset roller lever J offset large roller lever 2C fork lever L roller lever D roller long lever	S plunger 2S telescopic plunger R roller plunger K offset roller lever J offset large roller lever 2C fork lever L roller lever D roller long lever

# Heavy Duty Limit Switches

T/M 422, 441, 452, 461 & 470

This series features 1, 2, 3, 4, & 6 contact configurations. Models for high/low temperature and tropical environments are optional. In addition, overlapping and staggered contacts are available on selected models. These switches are IP65 rated and have 2 or 4 (470 only) conduit entries.

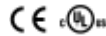
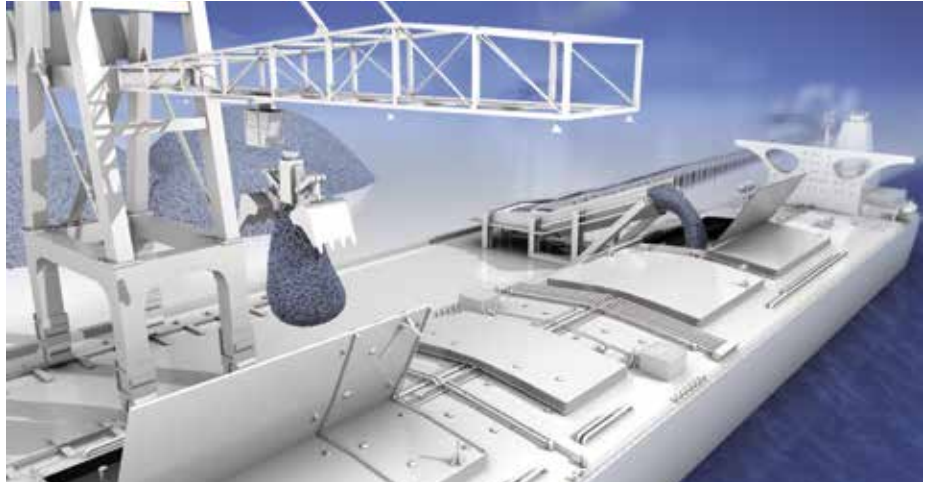


Series	T452	T461	T470	T/M064	T067
<b>Material</b>	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
<b>Dimensions</b>	127 x 118 x 64 mm	155 x 118 x 64 mm	194 x 118 x 64 mm	156 x 111 x 149 mm	155 x 111 x 142 mm
<b>IP Rating</b>	IP65	IP65	IP65	IP65	IP65
<b>Connections</b>	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
<b>Actuation</b>	Slow Action	Slow Action	Slow Action	Snap Action (M) Slow Action (T)	Slow Action
<b>Contacts</b>	1 NO & 2 NC 2 NO & 1 NC 2 NO 2 NC	2 NO & 2 NC 1 NO & 3 NC 3 NO & 1 NC 3 NO 3 NC	3 NO & 3 NC	3 NO, 3 NC 1 NO & 2 NC 2 NO & 1 NC 4 NO, 4 NC 1 NO & 3 NC 2 NO & 2 NC 3 NO & 1 NC	2 NC 1 NO & 1 NC 2 NO 1 NC left & 1 NC right 1 NO left & 1 NO right
<b>Options</b>	Extreme temp (T)	Extreme temp (T)	Extreme temp (T)	Extreme temp (T) Position latching (R)	Overlapping contacts (U) Staggered contacts (H)
<b>Actuators</b>	S plunger 2S telescopic plunger R roller plunger K offset roller lever J offset large roller lever 2C fork lever L roller lever D roller long lever	S plunger 2S telescopic plunger R roller plunger K offset roller lever J offset large roller lever 2C fork lever L roller lever D roller long lever	S plunger 2S telescopic plunger R roller plunger K offset roller lever J offset large roller lever 2C fork lever L roller lever D roller long lever	S plunger J offset roller lever X offset roller long lever	L roller lever V roller long lever C fork lever A roller lever 2A roller long lever Z long pull lever ZZ pull lever 4D forked offset roller

# Heavy Duty Limit Switches

T/M 064, 067, 130, 136, 471, 035 & 250

These switches feature up to 10 contacts rated at 25 or 60 amps. A wide variety of options are available including high/low temperature models, overlapping and staggered contacts, latching contacts, and magnetic blow out contacts. Most are IP65 rated and have up to 4 conduit entries.



Series	T130	T136	T/M471	T/M035	T/M250
<b>Material</b>	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
<b>Dimensions</b>	236 x 135 x 120 mm	236 x 154 x 120 mm	194 x 123 x 130 mm	58 x 142 x 61.5 mm	103 x 180 x 100 mm
<b>IP Rating</b>	IP65	IP65	IP65	IP67	IP67
<b>Connections</b>	Screw terminals	Screw terminals	Screw terminals	Screw terminals	Screw terminals
<b>Actuation</b>	Slow Action	Slow Action	Snap Action (M) Slow Action (T)	Snap Action (M) Slow Action (T)	Snap Action (M) Slow Action (T)
<b>Contacts</b>	3 NO & 3 NC	3 NO 3 NC	2 NC left & 2 NC right 2 NO left & 2 NO right 3 NC left & 3 NC right 1NO/2NC left & 1NO/2NC right 2NO/1NC left & 2NO/1NC right 3 NO left & 3 NO right	1 NO & 1 NC 2 NO 2 NC	1 NO & 1 NC 2 NC 2 NC left & 2 NC right
<b>Options</b>	Overlapping slow contacts (U) Staggered slow contacts (H) Position latching (R )		Overlapping slow contacts (U) Staggered slow contacts (H) Position latching (R )	Overlapping slow contacts (U) Staggered slow contacts (H) Magnetic blowout (C)	Overlapping slow contacts (U) Magnetic blowout (C) Position latching (R ) Extreme temp (T)
<b>Actuators</b>	L roller lever V roller long lever C fork lever A roller lever 2A roller long lever Z long pull lever 2Z pull lever 4D forked offset roller	L roller lever V roller long lever C fork lever A roller lever 2A roller long lever Z long pull lever 2Z pull lever 4D forked offset roller	L roller lever V roller long lever C fork lever A roller lever 2A roller long lever Z long pull lever 2Z pull lever 4D forked offset roller	2L roller lever	D roller lever

## Special Limit Switches

Material handling applications often need special purpose switches for slack wire detection, belt alignment, or rotation applications such as gear or spindle switches. Many feature the heavy duty limit switch housings with uniquely designed actuators for these purposes.

**Slack-wire** switches monitor wire rope tension. With correct tension present, the switch is actuated. The actuator arm contains a heavy duty roller.

**Belt alignment** switches are actuated when the conveyor belt becomes misaligned. Depending on the plant arrangements, this signal can be used to switch the equipment off or to provide automatic correction of the belt alignment. The actuator arm contains a heavy duty roller and can be actuated to either side.

The MSP452 **rotating spindle switch** with snap-action insert is suitable for use in normal to average operating conditions in machine tools, cranes, and conveyors. Actuation of the switch is adjustable and can be set between 4 and 55 spindle revolutions, with a 5 revolution run-out.

**Gear-switches** are suitable for use in the most varied application. In studios and on stages, applications include the control and positioning of carriages, portals and bridges. An important field of application is for the monitoring and control of outriggers, trolleys and lifting movements for cranes. On industrial ovens, gear-switches are used on door and gate control systems. Further applications are to be found on waterways (control of weirs and locks), in environmental protection (sewage plants, flue gas treatment plants), greenhouses and sport stadiums (roof controls). These switches are available with a variety of cam styles which can be offset for timing of particular events.



Series	T/M 441	M 330	T/M250	T/M441	G50	MSP452
<b>Type</b>	Slack wire	Belt Alignment	Belt Alignment	Belt Alignment	Geared	Rotating Spindle
<b>Material</b>	Cast iron	Die cast alloy	Cast iron	Cast iron	Die cast alloy	Cast iron
<b>Dimensions</b>	106 x 181 x 63 mm	40 x 76 x 40 mm	103 x 180 x 70 mm	106 x 99 x 63 mm	200 x 98 x 114 mm	118 x 174 x 64 mm
<b>IP Rating</b>	IP65	IP66	IP65	IP65	IP66	IP65
<b>Connection</b>	Screw Terminals	Screw Terminals	Screw Terminals	Screw Terminals	Screw Terminals	Screw Terminals
<b>Actuation</b>	Snap Action (M) Slow Action (T)	Snap Action	Snap Action (M) Slow Action (T)	Snap Action (M) Slow Action (T)	Snap Action (M, Z) Slow Action (T)	Snap Action
<b>Contacts</b>	1 NO & 1 NC	1 NO & 1 NC	1 NO & 1 NC 2 NO & 2 NC	1 Changover (M) 1 NO & 1 NC	1 to 4 NO 1 to 4 NC	2 NO & 2 NC
<b>Notes</b>		Rod lever with nylon roller	Lever arm with aluminum roller, several roller length available Extreme temp version (T)	Lever arm with aluminum roller, several roller length available Overlapping contacts (U) Extreme temp version (T)	Various cam shapes for varying switch travel. Additional gear ratios available.	Adjustable spindle revolutions

# Pull-Wire Switches

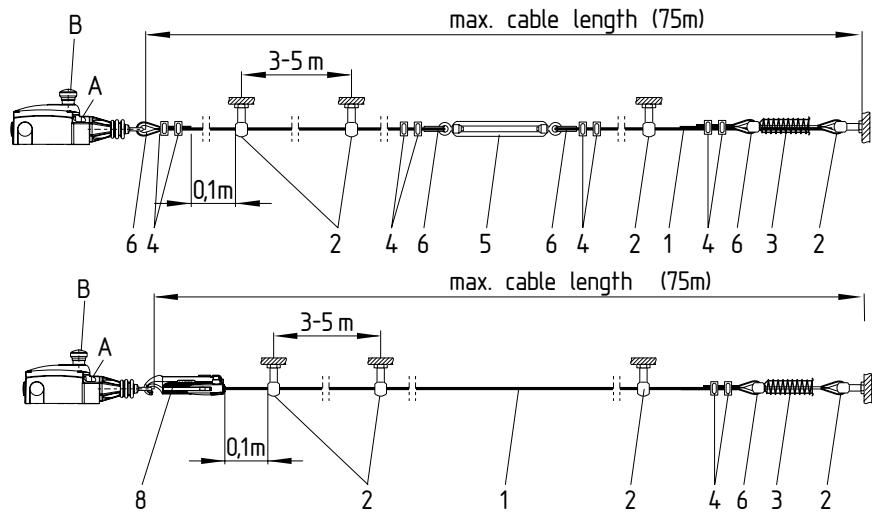
The pull-wire switches are used to give signals to start machines and to open or close electrically driven doors, gates and barriers. These switches are manually operated by pulling the wire.

## TQ200 & TQ700S

### Vertical mounting application



### Typical horizontal mounting application



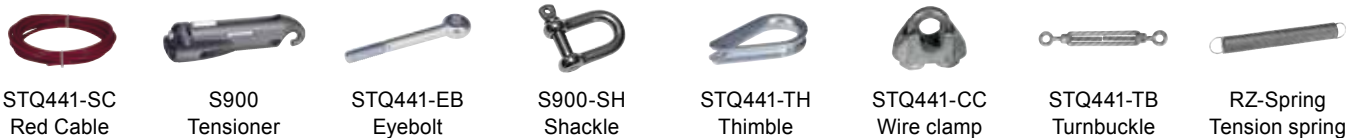
#### Legend

- 1 Wire rope (STQ441-SC)
- 2 Eyebolt (STQ441-EB)
- 3 Spring (RZ-Spring)
- 4 Wire clamp (STQ441-CC)
- 5 Tensioner (STQ441-TB)
- 6 Wire thimble (STQ441-TH)
- 7 Shackle (S900-SH)
- 8 Rope tensioner (S900)
- A Position indicator
- B Reset button



Series	TQ200	TQ700S	TQ700	TQ900	TQ441
<b>Material</b>	Light alloy die-cast	Thermoplastic	Thermoplastic	Zinc Die cast	Die cast alloy
<b>Dimensions</b>	60 x 250 x 32 mm	40.5 x 160 x 42.2 mm	40.5 x 160 x 42.2 mm	71.5 x 220.3 x 69.7 mm	106 x 99 x 63 mm
<b>IP Rating</b>	IP67	IP67	IP67	IP67	IP65
<b>Connection</b>	Screw Terminals	Screw terminals ST quick connect	Screw Terminals	Screw Terminals	Screw Terminals
<b>Actuation</b>	Slow Action	Slow action	Slow Action	Slow Action	Slow Action
<b>Contacts</b>	1 NC 1 NO / 1 NC	2 NO 1 NO / 1 NC 2 NC	2 NO 1 NO & 1 NC 2 NC	1 NO & 1 NC 2 NC 1 NO & 3 NC 2 NO & 2 NC 4 NC	2 NC
<b>Notes</b>	Vertical mount cable up to 3 m	Vertical mount With traction force	Cable up to 10 m	Cable up to 50 m	Cable up to 25 m Pushbutton or key reset

# Pull-Wire Accessories





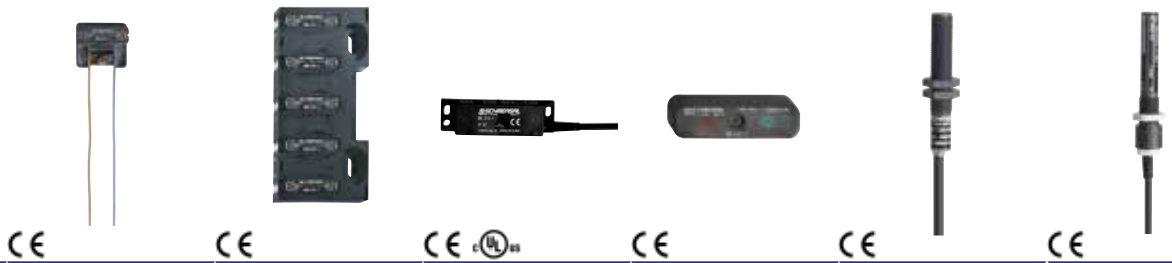
## Magnetic Reed Switches

Schmersal offers a wide variety of magnetic reed switches, which actuate in the presence of a magnetic field. They are available in rectangular or cylindrical profiles, constructed from durable thermoplastics or robust metal housings for harsher environments.

These magnetic reed switches have been successfully applied as position sensors in elevators, suspension railways, amusement park rides, and on AGVs. A wide variety of actuators are available, based on desired sensing distance, housing material, and mounting type.



Series	BN12	BN20	BN32	BN65	BN75	BN80
<b>Body Type</b>	Cylindrical	Rectangular	Rectangular	Cylindrical	Float switch	Rectangular
<b>Dimensions</b>	10.7 mm Dia x 71 mm	104 x 52 x 47 mm	85 x 26 x 24 mm	13 mm Dia x 103 mm	80 x 99.5 x 55 mm	44 x 13 x 9 mm
<b>Material</b>	Metal	Aluminum	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
<b>IP Rating</b>	IP67	IP67	IP67	IP67	IP68	IP67
<b>Connection</b>	Prewired Cable (1M)	Screw terminals	Flat plug connector	Prewired Cable (1M)	Plug connection or Prewired Cable (1M)	Prewired Cable (1M)
<b>Contacts</b>	1 NO 1 NC 1 Bistable	1 NO, 1 NC 2NO, 2 NC, 1 Changeover 1 Bistable, 1 Changeover bistable	1 NO, 1 NC 1 Changeover 1 Bistable, 1 Changeover bistable	1 NO 1 NC 1 Bistable	1 NO 1 NC 1 Changeover	1 NO 1 NC 1 Bistable



Series	BN85	BN85-5	BN310	BN325	BN120	BN650
<b>Body Type</b>	Rectangular	Rectangular	Rectangular	Rectangular	Cylindrical	Cylindrical
<b>Dimensions</b>	40 x 35 x 16.5 mm	65 x 20 x 140 mm	88 x 25 x 13 mm	85 x 26 x 24 mm	10.7 mm Dia x 102 mm	13 mm Dia x 103 mm
<b>Material</b>	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
<b>IP Rating</b>	IP40	IP30	IP67	IP40 (plug)/IP67 (cable)	IP67	IP67
<b>Connection</b>	2 wires	Connector, 10 pole	Prewired Cable (1M)	Flat plug connection or Prewired Cable (1M)	Prewired Cable (1M)	Prewired Cable (1M)
<b>Contacts</b>	1 Bistable	5 Bistable	1 NO 1 NC 1 Bistable	1 Bistable	1 NO 1 NC 1 Bistable	1 NO 1 NC 1 Bistable



## Tec.nicum Engineering Services

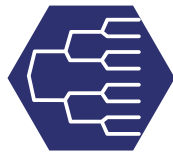
tec.nicum offers product- and manufacturer-neutral consultation on important matters relating to machine safety and work protection. Our TÜV Certified Functional Safety Engineers for Machinery can plan and realize complex solutions for safety around the world in close collaboration with clients.

The range of services offered by tec.nicum cover four segments:



### academy

In the complex area of machine safety, it is important to stay ahead of the game. To do this, we offer a variety of opportunities through our tec.nicum academy: With a comprehensive range of training courses on numerous topics, including General Machine Safety, ISO13849, Safety Circuits and Wiring, and Understanding and Conducting Risk Assessments; with customer specific in-house training seminars; and webinars.



### technical

With regard to technical support, our experts provide safety appraisals and check conformity with applicable legislation and standards of machine safety and work protection. From the results of these investigations, they derive manufacturer-neutral recommendations for action and corrective measures with the aim of configuring the systems in accordance with the relevant directives. All the results of the investigations are fed into a comprehensive final report.



### engineering

tec.nicum engineering supports the client in the development of new machines and systems or the modification of existing machines and systems so that, even from the projection phase, machine safety is implemented as efficiently as possible. Specialists in this area accompany the whole process, from initial planning talks to the definition of requisite safety elements to safety testing and inspection of the overall installation as well as handover of the complete project documentation.



### integration

The experts at tec.nicum have built up extensive experience from projects in industries such as the packaging, food processing, automotive, construction, paper manufacture, metal processing, chemicals and pharmaceuticals. They install safety switchgear and sensors and also take account of special features, such as explosive areas. Furthermore, they can assist in the parametrization, programming and installation of complex components such as optoelectronic safety products and programmable safety controllers.

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excellence in safety

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