



Description

Classification of a machine in categories acc. to EN 954-1

European machinery directive 98/37/EG stipulates that every machine must comply with the applicable guidelines and standards. Measures must be taken to keep the risk to persons as low as possible.

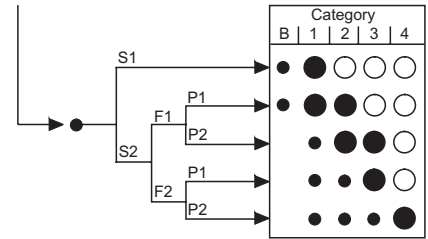
In the first step taken, a risk analysis is conducted by the project engineer in accordance with EN 1050. This takes into account, for example, the ambient conditions of the machine. Then any overall risk must be evaluated. Risk evaluation must be performed in such a manner that the procedure and conclusions can be retraced. The dangers and possible technical measures for reducing risk must also be specified.

Once the extent of the risks has been determined, the category according to which the safety circuits will be designed and implemented is specified with the aid of EN 954-1, "Safety-related parts of control systems".

This category defines the technical requirements for the configuration of the safety equipment. There are five categories (B, 1, 2, 3 and 4), B (standing for basic category) being the category with the lowest risk and the one which also defines the minimum demands made on the control system.

Possible selection of the categories according to EN 954-1

Starting point for risk assessment of the safety-related part of the control



- S Severity of the injury
 - S1 Slight (normally reversible) injury
 - S2 Serious (normally irreversible) injury, including death
- F Frequency and/or duration of the exposure to danger
 - F1 Rarely to occasionally and/or short exposure
 - F2 Frequently to continuously and/or long exposure
- P Ability to avert the danger
 - P1 Possible under certain conditions
 - P2 Hardly possible

Selection of the category

B, 1 to 4: Categories for parts of controllers with relevance for safety

- Preferred categories for reference points
- Possible categories, which demand additional measures
- Measures that may be excessive with respect to the particular risk

Summary of the requirements for categories acc. to EN 954-1

| Category ¹⁾ | Summary of requirements | System response ²⁾ | Principles for achieving safety |
|------------------------|--|---|---|
| B | The parts of controllers with relevance for safety and/or their protective devices as well as their components must be designed, constructed, selected, assembled and combined in accordance with the applicable standards in such a way that they can resist the expected external influences. | The occurrence of a fault can result in loss of the safety function. | Mainly characterised by the selection of components |
| 1 | The requirements of B must be met. Well-proven components and well-proven safety principles must be implemented. | The occurrence of a fault can result in loss of the safety function but the probability of it occurring is less than for Category B. | |
| 2 | The requirements of B must be met and well-proven safety principles must be implemented. The safety functions must be tested at regular intervals by the machine controller. | <ul style="list-style-type: none"> • The occurrence of a fault can result in loss of the safety function between tests. • The loss of the safety function will be detected by the test. | Mainly characterised by the structure |
| 3 | The requirements of B must be met and well-proven safety principles must be implemented. Parts with relevance for safety must be implemented such that: <ul style="list-style-type: none"> • A single fault in any of these components does not result in loss of the safety function. • Whenever reasonably possible, the individual fault is detected. | <ul style="list-style-type: none"> • When the single fault occurs, the safety function is always maintained. • Some but not all faults are detected. • An accumulation of undetected faults may lead to loss of the safety function. | |
| 4 | The requirements of B must be met and well-proven safety principles must be implemented. Parts with relevance for safety must be implemented such that: <ul style="list-style-type: none"> • A single fault in any of these components does not result in loss of the safety function. • The individual fault is detected during or before the next activation of the safety function or, if this is not possible, an accumulation of faults will not result in loss of the safety function. | <ul style="list-style-type: none"> • When faults occur, the safety function is always maintained. • The faults are detected early to prevent loss of the safety function. | |

1) The categories are not intended to be applied in a specific sequence or hierarchy with reference to the safety requirements.

2) The risk assessment will establish whether complete or partial loss of the safety function(s) due to faults is acceptable.



3TK28 SIGUARD Safety Combinations

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Description

Application

Potential dangers posed by a machine must be eliminated as quickly as possible in the event of a hazard.

As a rule, the "danger-free status" with respect to hazardous motions is standstill. All SIGUARD combinations are de-energized in the event of danger or a fault, i.e. operating mechanisms are switched to standstill.

The EN 60 204 standard requires that every machine must be equipped with the Stop function of Category 0. Stop functions of Categories 1 and/ or 2 must be implemented when this is necessary for the safety and/or functional requirements of the machine. Category 0 and Category 1 stops must function independently of the operating mode and a Category 0 stop must take priority.

There are 3 categories of Stop functions:

- **STOP Category 0:** Shutdown by immediate switch-off of the energy infeed to the machine drives.
- **STOP Category 1:** Controlled shutdown, whereby the energy infeed to the machine drives is maintained during shutdown and is only switched off when standstill has been achieved.
- **STOP Category 2:** Controlled shutdown, whereby the energy infeed to the machine drives is maintained.

The devices support autostart or monitored start depending on their versions.

Autostart

The device is active when the sensor circuit is closed.

Monitored start

The device is activated as follows:

- On connecting the sensor circuit, the "ON/feedback circuit" must be disconnected.
- The "ON" button is operated to start.

EMERGENCY-STOP

EMERGENCY-STOP devices must have priority over all other functions.

The energy infeed to the machine drives that can cause dangerous situations must be switched off as quickly as possible without causing any further danger.

Resetting of the drives must not result in restarting of the equipment. EMERGENCY-STOP must either function as a Stop of Category 0 or Category 1.

The basic units of the SIGUARD combinations can be implemented for EMERGENCY-STOP applications up to Category 4 of EN 954-1. Category 3 or 4 of EN 954-1 can be achieved depending on the external circuit and routing of the sensor leads.

Protective door monitoring

EN 1088 distinguishes between interlocked, isolating protective devices and interlocked, isolating protective devices with locking.

SIGUARD combinations are also used in this case for EMERGENCY-STOP applications. Control systems for up to category 4 of EN 954-1 are possible.

Pressing and stamping

The two-hand control unit is a device that requires both hands of the operator to be used simultaneously as a means of protecting the operator from danger (coincidence ≤ 500 ms).

The overtravel test unit is implemented for linear-driven presses (e. g. hydraulic, pneumatic and spindle presses) according to VBG7 n5.2. It only tests once on the test stroke for:

- Correct connection of the operation elements
- External cable interruption
- Any failure of the cyclically monitored components

The overtravel test unit can only be implemented in conjunction with a two-hand control unit.

The press control units and the overtravel test units are suitable for installation in control systems for eccentric, hydraulic and screw presses. They can be used up to Category 4 of EN 954-1. Type III C acc. to EN 574 is possible specifically for presses.

Unit configuration

The 3TK28 01 to 3TK28 07 **SIGUARD Contactor Combinations**, the 3TK28 1. press control units and the 3TK29 expansion units operate internally with a number of contactor relays. The contacts of the contactors comply with the requirement for positively driven operation laid down in ZH1/457, Edition 2, 1978. That is, NO and NC contacts are not allowed to be closed at the same time.

In a redundant circuit, operation of the internal contactors is monitored. If a contactor fails, the SIGUARD Safety Combination will always switch to the de-energized and consequently safe state. The fault is detected and the SIGUARD Security Combination can no longer be switched on. The use of NO and NC contacts for this same function satisfies the demand for diversity.

In the newly developed product series **SIGUARD safety combinations** 3TK28 21 to 3TK28 28 and 3TK28 30 and in the 3TK28 34 and 3TK28 35 press control units, safety relays with positively-driven contacts are used. This product series is characterised by its space-saving width (22.5 mm + 45 mm). The usual BG, SUVA, UL and CSA approvals and test certificates have been awarded.

Enabling contacts

Safety-related operation must be performed by safe output contacts, known as enabling contacts. Enabling contacts are always NO contacts and switch off without delay.

Signalling contacts

An NC or NO contact is used as the signalling contact, provided that a function with relevance for safety is not performed. An enabling contact can also be used as a signalling contact.

Delayed enabling contacts

Operating mechanisms that overtravel a long time must be braked in the event of danger. For this purpose, the power supply for electrical braking can be maintained (Stop Category 1 acc. to EN 60 204-1).

The SIGUARD basic units have delayed enabling contacts in addition to instantaneous enabling contacts. Depending on the version, delays of between 0.5 and 3 seconds or 0.5 and 300 seconds are available.

A 3RP19 02 sealable covering cap (see **Accessories**) can be fitted to protect against unauthorised adjustment of the set delay time.

Contact expansion

If the enabling contact of the basic unit is inadequate, expansion units can be used. These provide either 7 or 4 enabling contacts depending on the version.

Expansion units

Expansion units are not allowed to be operated separately in safety-related switching circuits; they must be combined with a basic unit of the SIGUARD 3TK28 combination. An enabling contact of the basic unit is required for connecting an expansion unit. The category of a control system with expansion unit to EN 954-1 corresponds to that of the basic unit.

Installation

For snap-on mounting on a standard mounting rail acc. to EN 50 022. Screw fixing is also possible for the devices by means of 2 additional 3RP19 03 plug-in tabs.

The SIGUARD safety combinations with relays are available for both screw and Cage Clamp connection.

Application manual

If you would like more information, please read the application manual "Safety Integrated: The Product Range for the Industries of the World", Order No. E20001-P285-A773-X-7600. Information on safety standards and regulations is provided here. You can select the right systems and products for use in modern safety installations from the complete, totally integrated safety concept "Safety Integrated", ranging from

- SIGUARD Safety Integrated (command and signalling devices, magnetic switches, light barriers, safety combinations, distributed load feeders)
- The failsafe SIMATIC mini PLC
- SINUMERIK Safety Integrated or SIMODRIVE through to
- Applications
- Circuit examples
- Failsafe communication via standard fieldbuses.

3TK28 SIGUARD Safety Combinations for Monitoring of EMERGENCY-STOP, Protective Doors and Presses



The SIGUARD safety pilot

| Type | 1-channel connection | 2-channel connection | Crossover protection | Category acc. to EN 954-1 | | | | | Contactors | Safety relay | Enabling contacts | Signalling contacts | Autostart | Monitored start |
|---|----------------------|----------------------|----------------------|---------------------------|---|---|-----------------|--------------------|------------|--------------|---------------------------|---------------------|-----------|-----------------|
| | | | | B | 1 | 2 | 3 | 4 | | | | | | |
| Basic units for 3TK28 0. | | | | | | | | | | | | | | |
| 3TK28 01 | x | – | x ¹⁾ | x | x | x | x ²⁾ | x ²⁾ | x | – | 1 NO | 1 NO | x | – |
| 3TK28 02 | x | – | x ¹⁾ | x | x | x | x ²⁾ | x ²⁾ | x | – | 1 NO | 1 NC | x | – |
| 3TK28 03 | x | – | x ¹⁾ | x | x | x | x ²⁾ | x ²⁾ | x | – | 2 NO | – | x | – |
| 3TK28 04 | x | – | x ¹⁾ | x | x | x | x ²⁾ | x ²⁾ | x | – | 4 NO | 1 NO + 1 NC | x | – |
| 3TK28 06 | x | x | x | x | x | x | x ²⁾ | x ²⁾ | x | – | 5 NO | 1 NC | x | – |
| 3TK28 07 | x | x | – | x | x | x | x ²⁾ | x ²⁾ 3) | x | – | 5 NO 3 NO off delay | – | x | – |
| Basic units for 3TK28 2. | | | | | | | | | | | | | | |
| 3TK28 21 | x | x | x ²⁾ | x | x | x | x | x ²⁾ | – | x | 3 NO | 1 NC | x | – |
| 3TK28 22 | – | x | x | x | x | x | x | x | – | x | 2 NO | – | x | – |
| 3TK28 23 | – | x | x | x | x | x | x | x | – | x | 2 NO | – | – | x |
| 3TK28 24 | x | x | x ²⁾ | x | x | x | x | x ²⁾ | – | x | 2 NO | – | x | – |
| 3TK28 25 | x | x | x | x | x | x | x | x | – | x | 3 NO | 2 NC | x | x |
| 3TK28 27 | x | x | x | x | x | x | x | x ³⁾ | – | x | 2 NO 2 NO off delay | 1 NC | – | x |
| 3TK28 28 | x | x | x | x | x | x | x | x ³⁾ | – | x | 2 NO 2 NO off delay | 1 NC | x | – |
| Expansion units⁴⁾ | | | | | | | | | | | | | | |
| 3TK29 07 | – | – | – | x | x | x | x | x | x | – | 7 NO | – | – | – |
| 3TK29 23 | – | – | – | x | x | x | x | x | x | – | 3 NO off delay | – | – | – |
| 3TK29 43 | – | – | – | x | x | x | x | x | x | – | 3 NO off delay | – | – | – |
| 3TK29 83 | – | – | – | x | x | x | x | x | x | – | 3 NO off delay | – | – | – |
| 3TK28 30 | – | – | – | x | x | x | x | x | – | x | 4 NO | – | – | – |
| Press control units⁵⁾ | | | | | | | | | | | | | | |
| 3TK28 11 | – | x | x | – | – | – | – | x | x | – | 2 NO + 2 NC | – | – | – |
| 3TK28 15 | – | – | – | – | – | – | – | x | x | – | 3 NO | – | – | – |
| 3TK28 34 | – | x | x | – | – | – | – | x | – | x | 2 NO | 2 NC | – | – |
| 3TK28 35 | – | – | – | – | – | – | – | x | – | x | 3 NO | 1 NC | – | – |

1) The contacts of the EMERGENCY-STOP sensor are not monitored.

2) Possible if external measures are implemented. This information is applicable provided that the wires and sensors are reliably connected and mechanically protected. See operating instructions and applications manual.

3) Only applicable to the instantaneous enabling contacts.





4) The category acc. to EN 954-1 is identical to that of the basic unit.

5) The 3TK28 15 and 3TK28 35 overtravel test units can only be used in conjunction with the 3TK28 11 and 3TK28 34 two-hand control units.



3TK28, 3TK29 SIGUARD Contactor Safety Combinations for Monitoring of EMERGENCY-STOP, Protective Doors and Presses

Selection and ordering data

| | Enabling contacts ¹⁾ | Signal contacts | Achievable category ²⁾ acc. to EN 954-1 | 24 V DC operation | | | AC operation | | |
|---|--|-----------------|--|-------------------|-----------------|-------------------|------------------|--------|-------------------|
| | | | | Order No. | Price | Weight approx. kg | Order No. | Price | Weight approx. kg |
| | | | | ▶ Preferred type | 1 unit | | ▶ Preferred type | 1 unit | |
| Basic units for EMERGENCY-STOP and protective doors | | | | | | | | | |
| 3TK28 03, 3TK28 04, 3TK28 06  3TK28 07  | one-channel | | | ▶ 3TK28 01-0BB4 | 0.71 | ▶ 3TK28 01-0A.. | 0.71 | | |
| | 1 NO | 1 NO | B, 1, 2, 3 ⁴⁾ , 4 ⁴⁾ | ▶ 3TK28 02-0BB4 | 0.71 | ▶ 3TK28 02-0A.. | 0.71 | | |
| | 1 NO | 1 NC | B, 1, 2, 3 ⁴⁾ , 4 ⁴⁾ | ▶ 3TK28 03-0BB4 | 0.74 | ▶ 3TK28 03-0A.. | 0.74 | | |
| | 2 NO | – | B, 1, 2, 3 ⁴⁾ , 4 ⁴⁾ | ▶ 3TK28 04-0BB4 | 0.96 | ▶ 3TK28 04-0A.. | 0.96 | | |
| | 4 NO | 1 NO + 1 NC | B, 1, 2, 3 ⁴⁾ , 4 ⁴⁾ | | | | | | |
| one or two-channel | | | | | | | | | |
| | 5 NO | 1 NC | B, 1, 2, 3 ⁴⁾ , 4 ⁴⁾ | ▶ 3TK28 06-0BB4 | 0.96 | ▶ 3TK28 06-0A.. | 0.96 | | |
| | 5 NO | 1 NC | B, 1, 2, 3 ⁴⁾ , 4 ⁴⁾ ⁵⁾ | ▶ 3TK28 07-0BB4 | 1.75 | ▶ 3TK28 07-0A.. | 1.75 | | |
| | 3 NO off delay | – | B, 1, 2, 3 | | | | | | |
| | 0.5 to 300 s | | | | | | | | |
| Expansion units | | | | | | | | | |
| 3TK29 07 | (for connecting to all basic units 1 enabling contact of the basic unit is required for connection) | | | | | | | | |
|  | 7 NO | – | as basic unit | ▶ 3TK29 07-0BB4 | 0.74 | ▶ 3TK29 07-0A.. | 0.74 | | |
| | 3 NO off delay | – | as basic unit | ▶ 3TK29 23-0BB4 | 0.74 | ▶ 3TK29 23-0A.. | 0.74 | | |
| | 0.5 to 2 s | | | | | | | | |
| | 3 NO off delay | – | as basic unit | ▶ 3TK29 43-0BB4 | 0.74 | ▶ 3TK29 43-0A.. | 0.74 | | |
| | 1 to 4 s | | | | | | | | |
| | 3 NO off delay | – | as basic unit | ▶ 3TK29 83-0BB4 | 0.74 | ▶ 3TK29 83-0A.. | 0.74 | | |
| | 2 to 8 s | | | | | | | | |
| Press control units | | | | | | | | | |
| 3TK28 11 | for use in presses and stamping machines | | | | | | | | |
|  | Two-hand control unit | | | | | | | | |
| | one or two-channel | | | | | | | | |
| | 2 NO + 2 NC | – | 4 | ▶ 3TK28 11-0BB4 | 0.93 | ▶ 3TK28 11-0A.. | 1.11 | | |
| Overtravel test unit³⁾ | | | | | | | | | |
| 3 NO | – | 4 | ▶ 3TK28 15-0BB4 | 1.16 | ▶ 3TK28 15-0A.. | 1.16 | | | |
| Order No. supplement | | | | | | | | | |
| Rated control supply voltage U_s AC 50/60 Hz 24 V 110 V 230 V | | | | | | | C2 G2 L2 | | |







1) Enabling contacts are contacts of relevance to safety, which can also be used for signalling purposes.
2) The maximum achievable category acc. to EN 954-1 is the category of the basic unit. The category also depends on the external circuit, the command device selected and their location on the machine. Compliance with the standards and regulations for safety at the machine is essential.

3) Only for use in conjunction with 3TK28 11.
4) Possible if external measures are implemented. This information is applicable provided that the wires and sensors are reliably connected and mechanically protected. See operating instructions and applications manual.
5) Only applicable to the instantaneous enabling contacts

3TK28 SIGUARD Safety Combinations for Monitoring of EMERGENCY-STOP, Protective Doors and Presses



Selection and ordering data

| | Enabling-contacts ¹⁾ | Signalling contacts | Achievable category ²⁾ acc. to EN 954-1 | Rated control supply voltage U_s | With screw terminals | | With Cage Clamp terminals NEW | | Weight appr. kg | |
|--|---|--|--|--|----------------------|------------------|--|------------------|-----------------|------|
| | | | | | Order No. | Price | Order No. | Price | | |
| Basic units for EMERGENCY-STOP and protective doors | | | | | ▶ Preferred type | 1 unit | ▶ Preferred type | 1 unit | | |
| <i>one or two-channel</i> | | | | | | | | | | |
| 3TK28 21 to 3TK28 24 screw terminals  | Autostart | | B, 1, 2, 3, 4 ³⁾ B, 1, 2, 3, 4 | AC/DC 24 V AC/DC 24 V | ▶ 3TK28 21-1CB30 | | ▶ 3TK28 21-2CB30 | | 0.24 | |
| | 3 NO | 1 NC | | | ▶ 3TK28 22-1CB30 | | ▶ 3TK28 22-2CB30 | | | |
| | 2 NO | – | | | | | | | | |
| 3TK28 25 screw terminals  | Monitored start | | B, 1, 2, 3, 4 | AC/DC 24 V | ▶ 3TK28 23-1CB30 | | ▶ 3TK28 23-2CB30 | | 0.24 | |
| | 2 NO | – | | | | | | | | |
| | | | | | | | | | | |
| 3TK28 25 screw terminals  | Autostart | | B, 1, 2, 3, 4 ³⁾ B, 1, 2, 3, 4 ³⁾ | AC/DC 24 V DC 24 V | ▶ 3TK28 24-1CB30 | | ▶ 3TK28 24-2CB30 | | 0.24 | |
| | 2 NO | – | | | ▶ 3TK28 24-1BB40 | | ▶ 3TK28 24-2BB40 | | | |
| | Autostart/monitored start | | B, 1, 2, 3, 4 B, 1, 2, 3, 4 B, 1, 2, 3, 4 B, 1, 2, 3, 4 | DC 24 V AC 24 V AC 115 V AC 230 V | ▶ 3TK28 25-1BB40 | | ▶ 3TK28 25-2BB40 | | 0.36 | |
| | 3 NO | 2 NC | | | ▶ 3TK28 25-1AB20 | | ▶ 3TK28 25-2AB20 | | | |
| | 3 NO | 2 NC | | | ▶ 3TK28 25-1AJ20 | | ▶ 3TK28 25-2AJ20 | | | |
| | 3 NO | 2 NC | | | ▶ 3TK28 25-1AL20 | | ▶ 3TK28 25-2AL20 | | | |
| | 3TK28 27 and 3TK28 28 screw terminals  | Monitored start | | B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ | DC 24 V AC 24 V | ▶ 3TK28 27-1BB40 | | ▶ 3TK28 27-2BB40 | | 0.43 |
| | | 2 NO + 2 NO | 1 NC | | | ▶ 3TK28 27-1AB20 | | ▶ 3TK28 27-2AB20 | | |
| | | 2 NO + 2 NO | 1 NC | B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ | AC 115 V AC 230 V | ▶ 3TK28 27-1AJ20 | | ▶ 3TK28 27-2AJ20 | | 0.6 |
| | | 2 NO + 2 NO | 1 NC | ▶ 3TK28 27-1AL20 | | ▶ 3TK28 27-2AL20 | | | | |
| Monitored start | | B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ | DC 24 V AC 24 V AC 115 V AC 230 V | ▶ 3TK28 27-1BB41 | | ▶ 3TK28 27-2BB41 | | 0.43 | | |
| 2 NO + 2 NO | | | | 1 NC | ▶ 3TK28 27-1AB21 | | ▶ 3TK28 27-2AB21 | | | |
| 2 NO + 2 NO | 1 NC | | | ▶ 3TK28 27-1AJ21 | | ▶ 3TK28 27-2AJ21 | | | | |
| 2 NO + 2 NO | 1 NC | | | ▶ 3TK28 27-1AL21 | | ▶ 3TK28 27-2AL21 | | | | |
| 3TK28 21 Cage Clamp terminals  | Autostart | | B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ | DC 24 V AC 24 V | ▶ 3TK28 28-1BB40 | | ▶ 3TK28 28-2BB40 | | 0.43 | |
| | 2 NO + 2 NO | 1 NC | | | ▶ 3TK28 28-1AB20 | | ▶ 3TK28 28-2AB20 | | | |
| | 2 NO + 2 NO | 1 NC | B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ | AC 115 V AC 230 V | ▶ 3TK28 28-1AJ20 | | ▶ 3TK28 28-2AJ20 | | 0.6 | |
| | 2 NO + 2 NO | 1 NC | ▶ 3TK28 28-1AL20 | | ▶ 3TK28 28-2AL20 | | | | | |
| | Autostart | | B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ B, 1, 2, 3, 4 ⁴⁾ | DC 24 V AC 24 V AC 115 V AC 230 V | ▶ 3TK28 28-1BB41 | | ▶ 3TK28 28-2BB41 | | 0.43 | |
| | 2 NO + 2 NO | 1 NC | | | ▶ 3TK28 28-1AB21 | | ▶ 3TK28 28-2AB21 | | | |
| | 2 NO + 2 NO | 1 NC | | | ▶ 3TK28 28-1AJ21 | | ▶ 3TK28 28-2AJ21 | | | |
| | 2 NO + 2 NO | 1 NC | | | ▶ 3TK28 28-1AL21 | | ▶ 3TK28 28-2AL21 | | | |
| | Expansion unit | | | | | | | | | |
| | 3TK28 30  | To increase the number of contacts for the safety combinations (for connecting to all basic units 1 enabling contact of the basic unit is required) | | | AC/DC 24 V | ▶ 3TK28 30-1CB30 | | ▶ 3TK28 30-2CB30 | | 0.24 |
| 4 NO | | – | as basic unit | | | | | | | |


1) Enabling contacts are contacts of relevance to safety, which can also be used for signalling purposes.
 2) The maximum achievable category acc. to EN 954-1 is the category of the basic unit. The category also depends on the external circuit, the command device selected and their location on the machine. Compliance with the standards and regulations for safety at the machine is essential.

3) Possible if external measures are implemented. This information is applicable provided that the wires and sensors are reliably connected and mechanically protected. See operating instructions and applications manual.
 4) Only applicable to the instantaneous enabling contacts.



3TK28 SIGUARD Safety Combinations for Monitoring of EMERGENCY-STOP, Protective Doors and Presses

Selection and ordering data

| | Enabling contacts ¹⁾ | Signalling contacts | Achievable category ²⁾ acc. to EN 954-1 | Rated control supply voltage U_s | With screw terminals | | With Cage Clamp terminals ^{NEW} | | Weight appr. kg |
|---|---------------------------------|---------------------|---|------------------------------------|----------------------|-------|--|-------|-----------------|
| | | | | | Order No. | Price | Order No. | Price | |
| Press control units | | | | | | | | | |
| 3TK28 34, 3TK28 35 screw terminals | | | | | | | | | |
|  | | | | | | | | | |
| | | | for use in presses and stamping machines | | | | | | |
| | | | Two-hand control unit, two-channel | | | | | | |
| | 2 NO | 2 NC | 4 | DC 24 V | ▶ 3TK28 34-1BB40 | | ▶ 3TK28 34-2BB40 | | 0.35 |
| | 2 NO | 2 NC | 4 | AC 24 V | ▶ 3TK28 34-1A B20 | | ▶ 3TK28 34-2A B20 | | |
| | 2 NO | 2 NC | 4 | AC 115 V | ▶ 3TK28 34-1A J20 | | ▶ 3TK28 34-2A J20 | | 0.45 |
| | 2 NO | 2 NC | 4 | AC 230 V | ▶ 3TK28 34-1A L20 | | ▶ 3TK28 34-2A L20 | | |
| | | | Overtravel test unit ¹⁾ | | | | | | |
| | 3 NO | 1 NC | 4 | DC 24 V | ▶ 3TK28 35-1BB40 | | ▶ 3TK28 35-2BB40 | | 0.4 |
| | 3 NO | 1 NC | 4 | AC 24 V | ▶ 3TK28 35-1A B20 | | ▶ 3TK28 35-2A B20 | | |
| | 3 NO | 1 NC | 4 | AC 115 V | ▶ 3TK28 35-1A J20 | | ▶ 3TK28 35-2A J20 | | 0.5 |
| | 3 NO | 1 NC | 4 | AC 230 V | ▶ 3TK28 35-1A L20 | | ▶ 3TK28 35-2A L20 | | |

Accessories

| | Order No. | Price | Weight approx. kg | Packing |
|--|-----------|-----------|-------------------|---------|
| Sealable cover for protection against unauthorized adjustment | | 1 packing | | |
| for 3TK28 27 and 3TK28 28 units | 3RP19 02 | | 0.02 | 5 units |
| Plug-in tab for screw fixing | | | | |
| for 3TK28 21 to 3TK28 35 (1 set = 2 units) | 3RP19 03 | | 0.02 | 5 sets |

1) The 3TK28 35 overtravel test unit can only be used in conjunction with the 3TK28 34 two-hand control unit.

2) The maximum achievable category acc. to EN 954-1 is the category of the basic unit. The category also depends on the external circuit, the command device selected and their location on the machine. Compliance with the standards and regulations for safety at the machine is essential.

3TK28, 3TK29 SIGUARD Contactor Safety Combinations



Technical data

| Type | 3TK28 01, 3TK28 02 | 3TK28 03 | 3TK28 04 | 3TK28 06 | 3TK28 07 | 3TK28 11 | 3TK28 15 | 3TK29 07 | 3TK29 .3 | |
|---|--|--|--|-----------------|--|--|--|---------------|--------------|--------------|
| Specifications | EN 60 204-1 (VDE 0113 Part 1), EN 292, EN 954-1 | | | | | | | | | |
| Category acc. to EN 954-1 | 4 ²⁾ | 4 ²⁾ | 4 ²⁾ | 4 ²⁾ | 4 ²⁾³⁾ | Category 4 acc. to EN 954-1 Type III C acc. to EN 574 | | as basic unit | | |
| Test certificates | BIA, SUVA | | | | | | | | | |
| Mechanical endurance | 30 million operating cycles | | | | | | | | | |
| Insulation rating U_i for control circuit for output contacts at pollution degree | (Insulation coordination acc. to DIN VDE 0110) 250 V 400 V 3 | | | | | | | | | |
| Rated impulse strength U_{imp} for control circuit for output contacts | 4 kV 4 kV | 1,5 kV 4 kV | | | | | | | | |
| Permissible ambient temperature in operation when stored | -25 to +55 °C -25 to +80 °C | | | | -10 to +55 °C -25 to +55 °C -25 to +85 °C -25 to +80 °C | | | | | |
| Degree of protection acc. to DIN 40 050 and IEC 60 947-1 | IP 20 | | | | | | | | | |
| Shock hazard protection acc. to DIN VDE 0106 Part 100 | safe from touch | | | | | | | | | |
| Coil ratings DC-/AC-operation at $1.0 \times U_s$ | 4 W | 6 W | 6 W | 6 W | 9 W | 9 W | 7 W | 6 W | 6 W | |
| Coil voltage tolerance Application of an AC device with pulsating direct voltage Application of an AC device with filtered direct voltage | 0.8 to $1.25 \times U_s$ 0.8 to $1.25 \times U_s$ 0.72 to $1.125 \times U_s$ | 0.8 to $1.1 \times U_s$ 0.8 to $1.1 \times U_s$ 0.72 to $1.0 \times U_s$ | | | 0.8 to $1.1 \times U_s$ – | 0.85 to $1.1 \times U_s$ – | 0.8 to $1.1 \times U_s$ 0.8 to $1.1 \times U_s$ 0.72 to $1.0 \times U_s$ | | | |
| Operating frequency z¹⁾ in operating cycles/hour at rated operation | 500/h at AC-15 or DC-13 | | | | | | | | | |
| Shock resistance rectangular pulse sine pulse | 10/5 and 6/10 g/ms 13/5 and 8/10 g/ms | | | | | | | | | |
| Short-circuit protection F2 fuses for enabling and signalling circuits NH, NEOZED and DIAZED utilization category gL/gG quick response F1 protection of the SIGUARD combination G-fuse quick/slow, circuit breaker terminal 8WA1 011, miniature circuit breaker A, B, C characteristic | (weld-free protection at $I_k > 1$ kA) 6 A 10 A max. 6 A, min. 0.5 A | | | | | | | | | |
| Rated operational currents/rated operational power acc. to IEC 60 947 I_e /AC-1 I_e /AC-3 I_e /AC-15 I_e /DC-13 | 6 A – – to 230 V to 24 V | 6 A 0.55 kW 1.1 kW 4 A 6 A | 6 A 0.55 kW 1.1 kW 4 A 6 A | | | 6 A – – 4 A 2 A | 6 A 0.55 kW 1.1 kW 4 A 6 A | | | |
| acc. to IEC 60 255 conventional AC 400 V thermal current I_{th} | at 40 °C at 55 °C | 8 A 6 A | 8 A 6 A | 8 A 6 A | 10 A 8 A | 10 A 8 A | 6 A 6 A | 8 A 6 A | 8 A 6 A | 8 A 6 A |
| mak./break. cap. AC 230 V, DC 24 V (p.f. = 0.7 - 1) | at 40 °C at 55 °C | 8 A 6 A | 8 A 6 A | 8 A 6 A | 10 A 8 A | 10 A 8 A | 2 A 7.5 A | 8 A 6 A | 8 A 6 A | 8 A 6 A |
| max. residual currents I_{th} of all output contacts | at 40 °C at 55 °C | 8 A 6 A | 16 A 12 A | 30 A 24 A | 30 A 24 A | 30 A + 24 A 24 A + 18 A | 12 A 12 A | 16 A 12 A | 30 A 24 A | 24 A 18 A |
| Conductor cross-sections finely stranded with end sleeve solid | 2 × (0.75 ... 1.5) mm ² 2 × (1 ... 2.5) mm ² | | | | | | | | | |
| Permissible mounting position | any | | | | | | | | | |
| Ⓢ- and Ⓛ-ratings | | | | | | | | | | |
| Rated control supply voltage U_s | AC 230 V, AC 110 V, AC 24 V, DC 24 V | | | | | | | | | |
| Conventional thermal current | 6 A at 300 V | | | | | | | | | |
| Making and breaking capacity | B 300/Q 300 | | | | | | | | | |

1) Dependency of the operating frequency z on the rated operational current and rated operational voltage.

$$z' = z \cdot \frac{I_e}{I'} \cdot \left(\frac{U_e}{U'} \right)^{1,5} \quad 1/h$$

2) Possible if external measures are implemented (see selection and ordering data).

3) Only applicable to the instantaneous enabling contacts (see selection and ordering data).



3TK28 SIGUARD Safety Combinations

Technical data

| Type | 3TK28 21 | 3TK28 22 | 3TK28 23 | 3TK28 24 | 3TK28 30 | 3TK28 25 | 3TK28 27, 3TK28 28 | 3TK28 34 | 3TK28 35 | |
|--|--|---|----------|-----------------|---------------|----------|--------------------------|--|--------------------------|--|
| Specifications | EN 60 204-1 (VDE 0113 Part 1), EN 292, EN 954-1 | | | | | | | | | |
| Test certificates | BG, SUVA, UL, CSA | | | | | | | | | |
| Category acc. to EN 954-1 | 4 ¹⁾ | 4 | 4 | 4 ¹⁾ | as basic unit | 4 | 4 ²⁾ | 4 | 4 | |
| Mechanical endurance | 10 million operating cycles | | | | | | | | | |
| Electrical endurance at I_e | 100 000 operating cycles | | | | | | | | | |
| Insulation rating U_i Pollution degree 3 Overvoltage category III acc. to DIN VDE 0110 | 300 V | | | | | | | | | |
| Rated impulse strength U_{imp} | 4 kV | | | | | | | | | |
| Permissible ambient temperatures | in operation: -25 °C to +60 °C (suitable for butt-mounting; 70 °C possible with restrictions) when stored: -40 °C to +80 °C | | | | | | | | | |
| Degree of protection acc. to EN 60 529 | IP 40 enclosure, IP 20 terminals | | | | | IP 20 | | | | |
| Shock hazard protection acc. to VDE 0106 | safe from touch | | | | | | | | | |
| Rated power DC-/AC operation at $1.0 \times U_s$ | W | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 3 | 4 | 3 | 3 |
| Operating range | AC operation | 0.85 to $1.1 \times U_s$ | | | | | 0.85 to $1.1 \times U_s$ | | | |
| | DC operation | 0.85 to $1.2 \times U_s$ | | | | | 0.85 to $1.1 \times U_s$ | | | |
| Operating frequency | 1000/h at current I_e | | | | | | | | | |
| Shock resistance semi-sinusoidal acc. to IEC 60 068 | 8 g/10 ms | | | | | | | | | |
| Short-circuit protection (weld-free protection at $I_k = 1$ kA) | Fusible links NH Type 3NA, DIAZED Type 5SB, NEOZED Type 5SE: 6 A Operational class gL/gG 6 A (slow), quick 10 A ³⁾ | | | | | | | | | |
| Rated operational currents acc. to IEC 60 947-5-1 Continuous thermal current I_{th} I_e / AC-15 I_e / DC-13 | | 5 A 115 V 5 A 230 V 5 A 24 V | | | | | 6 A 6 A 6 A 6 A | 5 A 5 A/2 A ⁴⁾ 5 A/2 A ⁴⁾ 5 A/2 A ⁴⁾ | 6 A 6 A 6 A 6 A | 5 A 5 A/2 A ⁵⁾ 5 A/2 A ⁵⁾ 5 A/2 A ⁵⁾ |
| Continuous thermal current I_{th} for enabling contacts | | 2 | 3 | 4 | | | | | | |
| | and UT 70 °C | 4 A | 3,5 A | 3 A | | | 5 A | 4 A | 5 A | 4 A |
| | and UT 60 °C | 4,5 A | 4 A | 3,5 A | | | 6 A | 5 A | 6 A | 5 A |
| | and UT 50 °C | 5 A | 4,5 A | 4 A | | | 6 A | 5 A | 6 A | 5 A |
| Response time | | | | | | ≤ 30 ms | | | ≤ 100 ms | ≤ 50 ms |
| | monitored start | – | – | ≤ 30 ms | – | – | ≤ 25 ms | ≤ 80 ms | – | – |
| | autostart | ≤ 200 ms | ≤ 80 ms | – | ≤ 200 ms | – | ≤ 150 ms | ≤ 80 ms | – | – |
| Release time | | | | | | | | | ≤ 20 ms | ≤ 50 ms |
| | for EMERGENCY-STOP | ≤ 150 ms | ≤ 20 ms | ≤ 20 ms | ≤ 150 ms | – | ≤ 25 ms | ≤ 25 ms | – | – |
| | for supply failure | ≤ 150 ms | ≤ 100 ms | ≤ 150 ms | ≤ 150 ms | ≤ 200 ms | ≤ 350 ms | ≤ 100 ms | – | – |
| Recovery time | | | | | | | | | ≥ 250 ms | ≥ 250 ms |
| | for EMERGENCY-STOP | ≥ 200 ms | ≥ 200 ms | ≥ 400 ms | ≥ 200 ms | – | ≥ 200 ms | after delay | – | – |
| | for supply failure | ≥ 200 ms | ≥ 400 ms | ≥ 600 ms | ≥ 200 ms | ≥ 200 ms | ≥ 500 ms | ≥ 1 s | – | – |
| Bridging of supply failures | | 40 ms | 30 ms | 80 ms | 40 ms | 100 ms | 100 ms | 30 ms | 40 ms | 40 ms |
| Minimum command duration | EMERGENCY-STOP | ≥ 100 ms | ≥ 25 ms | ≥ 25 ms | ≥ 100 ms | – | ≥ 25 ms | ≥ 25 ms | – | – |
| | ON button | ≥ 150 ms | ≥ 40 ms | ≥ 25 ms | ≥ 150 ms | – | ≥ 25 ms | ≥ 25 ms | – | – |
| Conductor cross-sections | finely stranded with end sleeve | 2 × (0.5 ... 1.5) mm ² , 1 × (0.5 ... 2.5) mm ² | | | | | | | | |
| | solid | 2 × (0.5 ... 2.5) mm ² , 1 × (0.5 ... 4) mm ² | | | | | | | | |
| Tightening torque, M 3.5 screw | 0.8 to 1.2 Nm | | | | | | | | | |
| Cage Clamp terminals (1 or 2 wires) | solid | 2 × (0.25 ... 1.5) mm ² | | | | | | | | |
| | finely stranded with end-sleeve | 2 × 1 mm ² | | | | | | | | |
| | finely stranded without end-sleeve | 2 × 1.5 mm ² | | | | | | | | |
| | AWG wires, solid or stranded | 2 × AWG 24–16 | | | | | | | | |
| Permissible mounting protection | any | | | | | | | | | |

1) Possible if external measures are implemented. This information is applicable provided that the wires and sensors are reliably connected and mechanically protected. See operating instructions and applications manual.

2) Only applicable to the instantaneous enabling contacts. Category 3 applies for time-delayed enabling contacts.
3) Signalling circuit for 3TK28 21 = 6 A.
4) Instantaneous/time-delayed enabling contacts.
5) 2 A for enabling contacts 13/14.

8WD4 SIGUARD Signalling Columns



Description



Application

8WD4 signalling columns are used in machines or in automatic processes for monitoring complex procedures or as visual or acoustic warning devices in emergency situations, for example for indicating individual production phases.

Construction

8WD4 signalling columns can be combined as required as modular components and are available in two diameters: 50 mm und 70 mm.

The separate signalling elements are mechanically joined with a bayonet mechanism for electrical reliability and vibration resistance. Tools are not required. Up to 5 signalling elements (4 in the case of 8WD42) can be connected to one connecting element. The bracket for two-sided mounting permits, in the case of the 8WD43 signalling columns, the installation of two connection elements and therefore up to ten signalling elements in a single location. Signal elements are available in the following versions:

- steady-light element (bulb; LED)
- repeated-flash light element (bulb, LED)
- single-flash light element
- rotating-beacon element (LED)
- buzzer element
- siren element

The tone of the buzzer element can be altered as desired between a pulsating and a continuous tone by means of a jumper in the buzzer element.

The amplification of the siren element can be selected in the 100 dB version via an integrated potentiometer. It is possible to set 8 sounds via a DIP switch.

The signalling elements are wired via the screw terminals in the connection element.

Installation

Floor mounting

The 8WD42 signalling columns are mounted on the floor with a 8WD42 08-0DE plastic foot.

The 8WD43 signalling columns can be directly screwed onto the connection element for floor mounting.

Pipe mounting

Pipes are available in various lengths from 150 mm to 1000 mm. A special moulded foot is recommended for pipes of more than 500 mm in length to improve stability.

Angle mounting

The adapter for mounting at an angle of 90°, e. g. on walls, is fixed to the connection element. A special connection element for angle mounting is required for the 8WD43 signalling columns.

Single-hole mounting

The 8WD42 signalling columns can be fixed using a drilled hole using the adapter for single-hole mounting. It is screwed in place from below.

Cable outlet

The connecting cable can either be guided downwards or sideways through a Pg cable gland via an adapter that can be screwed under the foot. This makes wiring easier if there is no access from below.

Magnetic fixing

The adapter with the sideways cable outlet can also be ordered with magnetic fixing as a special version. This offers easy, flexible mounting on metal plates or panels which is also extremely resistant to shocks.

Connectivity/ AS-Interface connection

The 8WD4 signalling columns can be directly connected to the AS-Interface bus system via an adapter element that can be integrated. This reduces wiring effort. The two-wire cable is fixed to the screw terminals in the connection element.

The adapter element must be the first module to be positioned on the connection element. A maximum of 4 further signal elements can then be used.



8WD4 SIGUARD Signalling Columns

Technical data acc. to DIN VDE 0660
and IEC 60 947-5-7-5-1

SIGUARD signalling columns

| Type | 8WD42 | 8WD43 |
|---|---|--|
| Enclosure | Thermoplastic (polyamide), impact-resistant, black | Thermoplastic (polyamide), impact-resistant, black |
| Light elements | Thermoplastic (polycarbonate) | Thermoplastic (polycarbonate) |
| Fixing | <ul style="list-style-type: none"> horizontal (floor mounting, foot with 25-mm Ø pipe) horizontal (Einlochmontage) vertical with bracket | <ul style="list-style-type: none"> horizontal (floor mounting, foot with 25-mm Ø pipe) vertical with bracket |
| Temperature | -20 °C to +50 °C | -30 °C to +50 °C |
| Connection | M 3 screw connection $\leq 2.5 \text{ mm}^2 \leq 0.5 \text{ Nm}$ | M 3 screw connection $\leq 2.5 \text{ mm}^2 \leq 0.5 \text{ Nm}$ |
| Degree of protection | | |
| Light elements | IP 54 | IP 54 (gasket premounted as standard with every module) |
| Acoustic elements | IP 54 | IP 54 |
| Operational voltage, current consumption | | |
| Bulb | | |
| • Steady-light | UC 12 V/24 V/115 V/230 V | UC 12 V/24 V/115 V/230 V |
| • Repeated-flash light | UC 24 V/125 mA; 115 V/20 mA; 230 V/15 mA | UC 24 V/100 mA; AC 230 V/10 mA |
| • Single-flash light | - | UC 24 V/125 mA; AC 230 V/15 mA |
| LED-version | | |
| • Steady-light | UC 24 V/60 mA | UC 24 V/60 mA |
| • Repeated-flash light | - | UC 24 V/40 mA |
| • Rotating beacon | - | UC 24 V/70 mA |
| LED light output | | |
| • yellow | 500 mcd (millicandela) | 500 mcd (millicandela) |
| • red | 400 mcd | 400 mcd |
| • green | 1000 mcd | 1000 mcd |
| Acoustic elements | | |
| • Buzzer element (Tone: pulsating or continuous, 85 dB) | UC 24 V/25 mA; 115 V/25 mA; AC 230 V/25 mA | UC 24 V/25 mA; AC 230 V/25 mA |
| • Siren element (8 tones + amplification can be set, 100 dB) | - | UC 24 V/80 mA; AC 115 V/30 mA; 230 V/30 mA |
| • Siren element (108 dB) | - | DC 24 V/100 mA |
| Power consumption | | |
| Bulbs | Lamp base BA 15d, max. 5 W | Lamp base BA 15d, 5 W |
| Single-flash light | - | 3.5 W |

AS-Interface adapter element






| Type | 8WD42 with external auxiliary voltage | 8WD43 without external auxiliary voltage | 8WD43 with external auxiliary voltage |
|---|---|---|--|
| IO code/ID code | 8/F | 8/F | 8/F |
| Supply | via bus cable | via bus cable | via bus cable |
| Operational voltage | 18.5 V to 31.6 V | 18.5 V to 31.6 V | 18.5 V to 31.6 V |
| Current consumption I_{max} | 50 mA | 210 mA | 75 mA |
| Watchdog | integrated | integrated | integrated |
| Short-circuit/overload protection | upstream fuse M 1.6 A | integrated | upstream fuse M 1.6 A |
| Polarity reversal protection | integrated | integrated | integrated |
| Induction protection | not applicable | integrated | not applicable |
| Load voltage | external auxiliary voltage DC 0 V to 30 V AC 0 V to 230 V | via bus cable | external auxiliary voltage DC 10 V to 120 V AC 10 V to 230 V |
| Outputs | 4 units, relay | 4 units, electronical | 4 unit, relay |
| Current carrying capacity ΣI_{max} | 1.5 A | 200 mA | 1.5 A |
| Operating temperature | -20 °C to +50 °C | -20 °C to +50 °C | -20 °C to +50 °C |
| Degree of protection | IP 54 | IP 54 | IP 54 |





8WD42 SIGUARD Signalling Columns



Selection and ordering data

Diameter 50 mm, thermoplastic enclosure, degree of protection IP 54

| Version | Colour | 8WD42 signal. columns with rated voltage UC 24 V | | 8WD42 signal. columns with rated voltage AC 115 V | | 8WD42 signal. columns with rated voltage AC 230 V | | Weight approx. kg | |
|---|--|---|------------------------------|--|-----------------|--|-----------------|-------------------------|-----|
| | | Order No. | Price 1 unit | Order No. | Price 1 unit | Order No. | Price 1 unit | | |
| 8WD42 00-1A.  | <ul style="list-style-type: none"> Steady-light element | red green yellow clear blue | rated voltage UC 12 to 230 V | | | | | | 0.1 |
| | | | 8WD42 00-1AB | | | | | | |
| | | | 8WD42 00-1AC | | | | | | |
| | | | 8WD42 00-1AD | | | | | | |
| | | | 8WD42 00-1AE | | | | | | |
| 8WD42 20-5AB  | <ul style="list-style-type: none"> Repeated-flash light element | red green yellow clear blue | 8WD42 20-1BB | | 8WD42 40-1BB | | 8WD42 50-1BB | 0.1 | |
| | | | 8WD42 20-1BC | | 8WD42 40-1BC | | 8WD42 50-1BC | | |
| | | | 8WD42 20-1BD | | 8WD42 40-1BD | | 8WD42 50-1BD | | |
| | | | 8WD42 20-1BE | | 8WD42 40-1BE | | 8WD42 50-1BE | | |
| | | | 8WD42 20-1BF | | 8WD42 40-1BF | | 8WD42 50-1BF | | |
| 8WD42 20-5AB  | <ul style="list-style-type: none"> Steady-light element LED | red green yellow | 8WD42 20-5AB | | – | | – | 0.1 | |
| | | | 8WD42 20-5AC | | – | | – | | |
| | | | 8WD42 20-5AD | | – | | – | | |
| 8WD42 08-0AA  | <ul style="list-style-type: none"> Acoustic elements buzzer element 80 dB Tone: pulsating or continuous | | rated voltage UC 115 V | | | | | | |
| | | | 8WD42 20-0FA | | 8WD42 40-0FA | | 8WD42 50-0FA | | 0.1 |
| 8WD42 08-0AA  | <ul style="list-style-type: none"> Connection element incl. cover for mounting on pipes, brackets or floor Adapter for single-hole mounting | | 8WD42 08-0AA | | – | | – | 0.1 | |
| | | | 8WD42 08-0EH | | – | | – | 0.1 | |





| Version | Rated voltage | Order No. | Price 1 unit | Weight app. kg | Packing Unit | |
|---|--|--|-----------------|----------------------|-----------------|-----|
| Accessories | | | | | | |
| 8WD43 08-0DD  | <ul style="list-style-type: none"> Foot, single plastic for mounting on pipes plastic for mounting on floor | 8WD43 08-0DB | | 0.05 | 1 | |
| | | 8WD42 08-0DE | | | | |
| | | 8WD43 08-0DD | | 0.2 | | |
| 8WD42 08-0CA  | <ul style="list-style-type: none"> Socket for foot side cable outlet side cable outlet with magnetic fixing | 8WD43 08-0DE | | 0.4 | | |
| | | 8WD42 08-0EF | | 0.05 | | |
| | | 8WD42 08-0EA | | 0.1 | | |
| 8WD42 08-0CA  | <ul style="list-style-type: none"> Pipe, single 100 mm 250 mm | 8WD42 08-0CA | | 0.2 | | |
| | | AS-Interface adapter element with external auxiliary voltage | 24 V | 8WD42 28-0BB | | 0.1 |
| 8WD43 58-1XX  | <ul style="list-style-type: none"> Bulbs lamp base BA 15d, 5 W | | | 10 units | | |
| | | 24 V | 8WD43 28-1XX | | 0.01 | 10 |
| | | 115 V | 8WD43 48-1XX | | | |
| | 230 V | 8WD43 58-1XX | | | | |



8WD43 SIGUARD Signalling Columns

Selection and ordering data





Diameter 70 mm, thermoplastic enclosure, degree of protection IP 54

| Version | Colour | 8WD43 signal. columns with rated voltage UC 24 V | | 8WD43 signal. columns with rated voltage AC 115 V | | 8WD43 signal. columns with rated voltage AC 230 V | | Weight approx kg | |
|--|--|---|------------------------------|--|-----------------|--|-----------------|------------------------|-----|
| | | Order No. | Price 1 unit | Order No. | Price 1 unit | Order No. | Price 1 unit | | |
| Bulb: lamp base BA 15d, 5 W, 24 V/115 V/230 V (not included in scope of supply) | | | | | | | | | |
| 8WD43 00-1A.  | <ul style="list-style-type: none"> Steady-light element | red green yellow clear blue | rated voltage UC 12 to 230 V | | | | | 0.1 | |
| | | | 8WD43 00-1AB | | | | | | |
| | | | 8WD43 00-1AC | | | | | | |
| | | | 8WD43 00-1AD | | | | | | |
| | | | 8WD43 00-1AE | | | | | | |
| | <ul style="list-style-type: none"> Repeated-flash light element | red green yellow clear blue | 8WD43 20-1BB | | 8WD43 40-1BB | | 8WD43 50-1BB | | 0.1 |
| | | | 8WD43 20-1BC | | 8WD43 40-1BC | | 8WD43 50-1BC | | |
| | | | 8WD43 20-1BD | | 8WD43 40-1BD | | 8WD43 50-1BD | | |
| | <ul style="list-style-type: none"> Single-flash light element with built-in flash electronics (glow lamp not necessary) | red green yellow clear blue | 8WD43 20-1BE | | 8WD43 40-1BE | | 8WD43 50-1BE | | 0.1 |
| | | | 8WD43 20-1BF | | 8WD43 40-1BF | | 8WD43 50-1BF | | |
| 8WD43 20-0CB | | | | 8WD43 40-0CB | | 8WD43 50-0CB | | | |
| 8WD43 20-0CC | | | | 8WD43 40-0CC | | 8WD43 50-0CC | | | |
| <ul style="list-style-type: none"> Single-flash light element with built-in flash electronics (glow lamp not necessary) | red green yellow clear blue | 8WD43 20-0CD | | 8WD43 40-0CD | | 8WD43 50-0CD | | 0.1 | |
| | | 8WD43 20-0CE | | 8WD43 40-0CE | | 8WD43 50-0CE | | | |
| | | 8WD43 20-0CF | | 8WD43 40-0CF | | 8WD43 50-0CF | | | |
| | | 8WD43 20-0CF | | 8WD43 40-0CF | | 8WD43 50-0CF | | | |
| 8WD43 20-5AB  | <ul style="list-style-type: none"> Steady-light element LED | red green yellow clear blue | 8WD43 20-5AB | | – | | – | 0.1 | |
| | | | 8WD43 20-5AC | | | | | | |
| | | | 8WD43 20-5AD | | | | | | |
| | | | 8WD43 20-5AE | | | | | | |
| | | | 8WD43 20-5AF | | | | | | |
| | <ul style="list-style-type: none"> Repeated-flash light element LED | red green yellow | 8WD43 20-5BB | | | | | | |
| | | | 8WD43 20-5BC | | | | | | |
| | <ul style="list-style-type: none"> Rotating-beacon element LED | red green yellow | 8WD43 20-5DB | | | | | | |
| | | | 8WD43 20-5DC | | | | | | |
| | 8WD43 20-0FA  | <ul style="list-style-type: none"> Buzzer element 85 dB Tone (adjustable): pulsating or continuous | 8WD43 20-0FA | | 8WD43 40-0FA | | 8WD43 50-0FA | | 0.1 |
| <ul style="list-style-type: none"> Siren element 108 dB, IP 40 | | | 8WD43 20-0EA | | – | | – | 0.1 | |
| | | | 8WD43 20-0EA2 | | 8WD43 40-0EA2 | | 8WD43 50-0EA2 | | 0.1 |
| | | | 8WD43 20-0EA2 | | 8WD43 40-0EA2 | | 8WD43 50-0EA2 | | 0.1 |
| <ul style="list-style-type: none"> Multi-tone sirens, 100 dB 8 tones and amplification can be set | | | 8WD43 20-0EA2 | | 8WD43 40-0EA2 | | 8WD43 50-0EA2 | | 0.1 |
| | 8WD43 20-0EA2 | | 8WD43 40-0EA2 | | 8WD43 50-0EA2 | | 0.1 | | |
| 8WD43 08-0AA  | <ul style="list-style-type: none"> for mounting on pipes for mounting on bracket or floor | 8WD43 08-0AA | | – | | – | 0.1 | | |
| | | 8WD43 08-0AB | | | | | | | |

8WD43 SIGUARD Signalling Columns



Selection and ordering data

| Version | Rated voltage | Order No. | Price 1 unit | Weight approx. kg | Packing Unit |
|---|--|---|--|---------------------------|-----------------|
| Accessories | | | | | |
| 8WD43 08-0DA  | Foot with pipe (100 mm) | 8WD43 08-0DA | | 0.1 | 1 |
| | Foot, single | Plastic for mounting on pipes cast-iron foot for pipe lengths > 500 mm | 8WD43 08-0DB 8WD43 08-0DC | 0.05 0.3 | |
| | Socket for foot | side cable outlet side cable outlet with magnetic fixing | 8WD43 08-0DD | 0.2 | |
| | Pipe, single | 150 mm 250 mm 400 mm 1000 mm | 8WD43 08-0DE | 0.4 | |
| | | | 8WD43 08-0EE 8WD43 08-0EA 8WD43 08-0EB 8WD43 08-0ED | 0.05 0.1 0.2 0.4 | |
| 8WD43 08-0CA  | Bracket for wall mounting for single-sided mounting for double-sided mounting | 8WD43 08-0CA 8WD43 08-0CB | | 0.1 | |
| | AS-Interface adapter element without ext. auxiliary voltage with ext. auxiliary voltage |  24 V 24 V | 8WD43 28-0BA 8WD43 28-0BB | 0.1 | |
| 8WD43 58-1XX  | Bulbs lamp base BA 15d, 5 W | 24 V 115 V 230 V | 8WD43 28-1XX 8WD43 48-1XX 8WD43 58-1XX | 10 units 0.01 | 10 |



8WD53 SIGUARD Built-In Signal Lamps

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Application

8WD53 SIGUARD built-in signal lamps can be mounted directly at any point of the machine for the purpose of giving visual signals. They are mounted by means of a Pg 29 screw base with nut.


The special shape of the SIGUARD built-in signal lamps means that the light is emitted optimally in every direction (to the sides and upwards).

All SIGUARD built-in signal lamps have a high degree of protection (IP 65) and are made of a material highly resistant to impact. Steady lights (bulb version) and single-flash lights are available in the following colours: red, green, yellow, clear and blue.

The LED versions of the built-in signal lamps offer a considerably longer service life with the same luminosity. LED lights are available as a steady light, repeated-flash light and rotating beacon.

Selection and ordering data

Diameter 70 mm · Thermoplastic enclosure · Degree of protection IP 65

| Version | Colour | 8WD53 built-in lamps | | 8WD53 built-in lamps | | 8WD53 built-in lamps | | Weight approx. kg |
|---|---|--------------------------|--------------|------------------------------|--------------|---------------------------|--------|-------------------|
| | | rated voltage AC/DC 24 V | Price | rated voltage AC/DC 115 V | Price | rated voltage AC/DC 230 V | Price | |
| | | Order No. | 1 unit | Order No. | 1 unit | Order No. | 1 unit | |
| Bulb: lamp base BA 15d, 5 W, 24 V/115 V/230 V (not included in scope of delivery) | | | | | | | | |
|  8WD53 00-1A. | • Steady light | | | rated voltage UC 12 to 230 V | | | | 0.1 |
| | | red | 8WD53 00-1AB | | | | | |
| | | green | 8WD53 00-1AC | | | | | |
| | | yellow | 8WD53 00-1AD | | | | | |
| | | clear | 8WD53 00-1AE | | | | | |
| | | blue | 8WD53 00-1AF | | | | | |
| | • Single-light flash (with built-in flashlight electronics) | red | 8WD53 20-0CB | 8WD53 40-0CB | 8WD53 50-0CB | | | 0.1 |
| | | green | 8WD53 20-0CC | 8WD53 40-0CC | 8WD53 50-0CC | | | |
| | | yellow | 8WD53 20-0CD | 8WD53 40-0CD | 8WD53 50-0CD | | | |
| | | clear | 8WD53 20-0CE | 8WD53 40-0CE | 8WD53 50-0CE | | | |
| | blue | 8WD53 20-0CF | 8WD53 40-0CF | 8WD53 50-0CF | | | | |
| LED version | | | | | | | | |
| • Steady light LED | red | 8WD53 20-5AB | – | – | | | 0.1 | |
| | green | 8WD53 20-5AC | | | | | | |
| | yellow | 8WD53 20-5AD | | | | | | |
| • Repeated-flash light LED | red | 8WD53 20-5BB | | | | | | |
| | green | 8WD53 20-5BC | | | | | | |
| | yellow | 8WD53 20-5BD | | | | | | |
| • Rotating-beacon LED | red | 8WD53 20-5DB | | | | | | |
| | green | 8WD53 20-5DC | | | | | | |
| | yellow | 8WD53 20-5DD | | | | | | |

Accessories: see page 8/80 for bulbs.

Technical data

| | | | |
|-----------------------------|---|----------------------------|--|
| Enclosure | PC/ABS composite impact-resistant, black | Operational voltage | Steady light UC 12 V/24 V/115 V/230 V Single-flash lamp UC 24 V/125 mA; 115 V/20 mA; 230 V/15 mA LED lamp UC 24 V/70 mA |
| Spherical cap | Thermoplastic (polycarbonate), impact-resistant to 20 J | Single-flash power | 2 Ws/approx. 1 Hz |
| Fixing | Ø 37 mm hole (Pg 29) | LED lamps | Repeated flash lamp Flash frequency approx. 1 Hz Rotation beacon Rotating frequency approx. 120 min ⁻¹ |
| Outgoing cable unit | Radial or. axial | Inrush current | LED lamp < 0.5 A Single-flash lamp 24 V/115 V < 0.5 A; 230 V < 0.25 A |
| Temperature | –20 °C to +60 °C | | |
| Degree of protection | IP 65 | | |

6KC33 Pressure Switches

Description



The 6KC33 1 pressure switches are reliable, endurance-tested units for installation in automated water systems. The switches can be used both on water pumps and in pump systems.

Their simple design allows them to be used by untrained staff, too.

The 6KC33 2 pressure switches for air systems are used for regulating tank pressures between two set values on small (up to 12 bar), electrically driven air compressors.

They can be supplied together with a pressure relief valve which prevents compressors from starting under load, and with an ON-OFF switch which acts directly on the compressor. A 4-way flange, which makes it simple to mount valves and pressure gauges, is also available.

The robust 6KC33 3 pressure switches have been developed to meet the high demands of large high-capacity compressors (up to 17 bar). The robust, painted steel enclosure stands up to the rough conditions in industrial applications. This version can likewise be supplied together with a pressure relief valve which prevents compressors from starting under load.

Versions

| Type | Pressure switches 6KC33 1 for water systems | Pressure switches 6KC33 2 for air systems | Pressure switches 6KC33 3 for air systems |
|---|---|---|---|
| Non-corroding plastic enclosure | ● | ● | ● |
| Visible contacts | ● | ● | ● |
| No variation in the set pressures | ● | ● | ● |
| Captive enclosure screw | ● | ● | |
| Spacious terminal compartment | ● | ● | ● |
| Earthing screws (2) | ● | ● | ● |
| Simple to adjust | ● | ● | ● |
| UL Listed | ● | ● | ● |
| CE Certified | ● | ● | ● |
| Automatic pressure relief valve available | | ● | ● |
| Pressure peak damping as standard | | ● | ● |
| Captive enclosure nut | | | ● |
| Maximum pressure range up to 17 bar | | | ● |

● Version can be supplied for respective type.

6KC33 Pressure Switches

Selection and ordering data

| Min. initial setting | Max. end setting | Switching hysteresis | Setting on delivery | Operating capacity for utilization category | | | | Order No. | Price |
|----------------------|------------------|----------------------|---------------------|---|-------------------------|-------------------------|-------------------|-----------|--------|
| bar | bar | bar | ON-OFF bar | 1~ (AC3) 120 V kW | 1~ (AC3) 240 V kW | 3~ (AC3) 240 V kW | DC 240 V kW | | 1 unit |

Pressure switches for water systems

| | | | | | | | | |
|-----|-----|-----------|-----------|-----|-----|-----|------|-----------------------|
| 0.3 | 4.5 | 1.0 – 2.1 | 2.1 – 3.5 | 1.1 | 1.5 | 2.3 | 0.18 | 6KC33 11-6AK00 |
| 0.3 | 5.5 | 1.0 – 2.1 | 2.1 – 3.5 | 1.5 | 2.3 | 3.7 | 0.37 | 6KC33 12-6AK00 |
| 0.2 | 2.4 | 0.4 – 1.0 | 0.3 – 0.7 | 1.5 | 2.3 | 3.7 | 0.37 | 6KC33 12-2AK00 |

All types listed have 1/4" BSP female thread

The following types are available on request:

Pressure pipe connection

1/4" BSP male thread
1/4" NPT male thread
1/4" NPT female thread
1/8" NPT male thread
3/8" NPT female thread

Miscellaneous

1/4" push-on connection
1/4" hose nozzle connection, straight
1/4" hose nozzle connection, 90° offset
2 rubber brushings
ON-OFF switch
Pressure relief valve

| Min. initial setting | Max. end setting | Switching hysteresis | Setting on delivery | Operating capacity for utilization category | | | | Order No. | Price |
|----------------------|------------------|----------------------|---------------------|---|-------------------------|-------------------------|-------------------|-----------|--------|
| bar | bar | bar | ON-OFF bar | 1~ (AC3) 120 V kW | 1~ (AC5) 240 V kW | 3~ (AC3) 240 V kW | DC 240 V kW | | 1 unit |

Pressure switches for air systems

| | | | | | | | | |
|-----|------|-----------|------------|-----|-----|-----|------|-----------------------|
| 1.7 | 6.9 | 1.4 – 2.8 | 5.5 – 6.9 | 1.1 | 1.5 | 2.3 | 0.18 | 6KC33 21-8AK01 |
| 2.8 | 10.3 | 2.1 – 2.8 | 6.6 – 8.6 | 1.1 | 1.5 | 2.3 | 0.18 | 6KC33 21-1BK01 |
| 3.4 | 12.0 | 2.4 – 3.8 | 7.9 – 10.3 | 1.1 | 1.5 | 2.3 | 0.18 | 6KC33 21-3BK01 |
| 2.8 | 17.2 | 2.4 – 4.1 | 7.9 – 10.3 | 1.5 | 2.3 | 3.7 | 1.5 | 6KC33 33-3BK01 |

All types listed have 1/4" BSP female thread

The following types are available on request:

Pressure pipe connection

1/4" BSP male thread
1/4" NPT male thread
1/4" NPT female thread
1/8" NPT male thread
3/8" NPT female thread
1/4" BSP 4-way flange

Miscellaneous

1/4" push-on connection
1/4" hose nozzle connection, straight
1/4" hose nozzle connection, 90° offset
2 rubber brushings
ON-OFF switch
Pressure relief valve