



**SAFEMASTER  
Three-Stage  
Enabling Switch  
RE 6909**

**Translation  
of the original instructions**

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**0278644**



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Before installing, operating or maintaining this device, these instructions must be carefully read and understood.



Keep instructions for future reference



The installation must only be done by a qualified electrician!



Do not dispose of household garbage!  
The device must be disposed of in compliance with nationally applicable rules and requirements.

To help you understand and find specific text passages and notes in the operating instructions, we have important information and information marked with symbols.

### Symbol and Notes Statement



**DANGER:**  
Indicates that death or severe personal injury will result if proper precautions are not taken.



**WARNING:**  
Indicates that death or severe personal injury can result if proper precautions are not taken.



**CAUTION:**  
Indicates that a minor personal injury can result if proper precautions are not taken.



**INFO:**  
Referred information to help you make best use of the product.



**ATTENTION:**  
Warns against actions that can cause damage or malfunction of the device, the device environment or the hardware / software result.

### General Notes

The product hereby described was developed to perform safety functions as a part of a whole installation or machine. A complete safety system normally includes sensors, evaluation units, signals and logical modules for safe disconnections. The manufacturer of the installation or machine is responsible for ensuring proper functioning of the whole system. DOLD cannot guarantee all the specifications of an installation or machine that was not designed by DOLD. The total concept of the control system into which the device is integrated must be validated by the user. DOLD also takes over no liability for recommendations which are given or implied in the following description. The following description implies no modification of the general DOLD terms of delivery, warranty or liability claims.

### Designated Use

Enabling switches are manually operated control devices that are used in conjunction with a start-up control and allow a machine function when continuously actuated.

They are used directly in the hazardous area of a machine and/or around a machine where a person may be exposed to a hazard.

This is the case, for example, during maintenance, setup or repair work. A machine that is designed and constructed for several control or operating modes with different protective measures must, according to the Machinery Directive Annex 1 or EN 60204-1, be equipped with an lockable operating mode selector switch that can be locked in any position (e.g. key switch). With the enabling device the person can take counter-measures in case of dangerous situations. When the enabling switch is released or pushed through the hazardous area is protected and the drives or the installation go to the safe state.

The present enabling switch serves as enabling device acc. EN 60204-1 and meets the requirements for enabling devices with three positions as determined in EN 60947-5-8.

### Safety Notes



#### Danger due to improper use!

- The enabling switch may only be used for the applications specified in the applicable data sheet/operating instructions. All specifications, safety instructions and ambient conditions must be observed.
- The enabling switch including emergency stop must be linked to the machine control system in such a way that the requirements for circuits serving safety purposes are met in accordance with EN ISO 13849-1, EN ISO 13850, EN ISO 10218-1, EN ISO 11161 and EN 60204-1.
- Observe the VDE and local regulations regarding protective measures. All applicable safety and accident prevention regulations, such as guidelines employers' liability insurance associations and safety-related requirements of the VDI (EN ISO 10218-1, VDI 2854, EN 60204, EN ISO 12100, EN ISO 13849, EN ISO 13850, EN 62061, DIN VDE 0106 part 100) must be observed.
- The manufacturer of the machine or system is responsible for the correct and safe overall function. Note that a validation in accordance with EN ISO 13849-2 must always be performed for the complete system.
- Only control units with cross-circuit monitoring must be used.
- In the overall concept of the control system, at least one switching element with forced opening must be used in the safety circuit.
- When emergency stop devices are connected in series, the Performance Level according to EN ISO 13849-1 may be decreased to due reduced fault detection.
- The enabling switch alone must not be used to initiate commands for dangerous conditions.
- The enabling switch must not be used as a substitute for other safety measures.
- Components, such as push-buttons, key switches, etc. must not be used for safety-related functions.
- Ensure that the cables are securely routed or laid. The connection cable must not be subjected to excessive stresses due to tension, pressure, abrasion, twisting or kinking. The connection cable must not come into contact with hot surfaces or in their immediate proximity.
- The operator must evaluate and document the remaining risks.



#### Risk of electrocution!

##### Danger to life or risk of serious injuries.

- Disconnect the system and enabling switch from the power supply and ensure they remain disconnected during electrical installation.
- The enabling switch may only be installed and put into operation by competent persons who are familiar with this technical documentation and the valid regulations concerning work safety and accident prevention.



#### Danger by manipulation!

- The safety function of enabling switches must not be bypassed, manipulated or made ineffective in any other way.
- The enabling signal must not be simulated, neither electrically nor mechanically.
- The enabling switch must be protected against outwitting by the operator.
- The user must take into account the requirements of EN 60204-1 regarding actions against circumvention.



#### Danger by operating error!

- Enabling switches may only be operated by authorized persons who are able to recognize hazardous conditions in time and take immediate counter-measures.
- Each person working in the hazardous area must carry an enabling switch of their own.

### Attention!

- Check the safety function after each putting into operation, each exchange of components, longer standstills and each fault.
- In case of malfunctions or damaging the enabling switch must be replaced. The device may only be repaired by the manufacturer.
- The equipment must be checked, maintained and replaced depending on the intensity of operation.
- The equipment must be regularly checked and maintained by a trained staff. Observe the applicable regulations for this purpose. The check includes the complete subsystem and not only individual components, at least all functionalities that are actually involved in the safety function.
- Dirt must be removed regularly. Use a wet cloth for this purpose. Avoid contact with abrasive cleaning products or other aggressive chemicals.
- Do not expose the device to strong water jets or high-pressure/stream jets. Avoid temporary or permanent immersion. The IP protection class applies to water, avoid contact with other liquids.
- Do not disassemble or modify the enabling switch.

You, as the installer of the machine or plant, must make clear reference to these safety instructions in the relevant operating manual.

### SAFEMASTER Three-Stage Enabling Switch RE 6909



#### Your Advantages

- Safe working in hazardous areas
- Ergonomic design and fatigue-free working
- Expandable and applicable in many ways
- Safe during set-up-mode
- Safety during maintenance of machines and installations

#### Features

- Modular set-up
- Enabling switch
- E-Stop button (optional)
- Operating unit
- Additional function keys, expandable e.g. for control functions (optional)
- Universal attachment of holders via M4 and/or UNC #4-40 thread

#### Product Description

The enabling switch serves as an enabling device acc. EN 60204-1 and meets the requirements for enabling devices with three positions as determined in EN 60947-5-8.

The enabling switch features two normally open contacts controlling the safety function. When the enabling switch is activated both contacts are closed and the plant is released. If the enabling switch is pushed through resp. released the safety function is triggered and both contacts open up.

Only evaluation units with cross-circuit monitoring may be used.

#### Approvals and Markings



#### Safety Function

The enabling switch fulfills the following safety function:

- If the enabling switch is not pressed (position 1) the contacts are open.
- If the enabling switch is fully pushed through (position 3) the contacts are open.

Optionally, the enabling switch can be equipped with further functions, e.g. buttons, LEDs, etc.

These must not be used for safety functions.

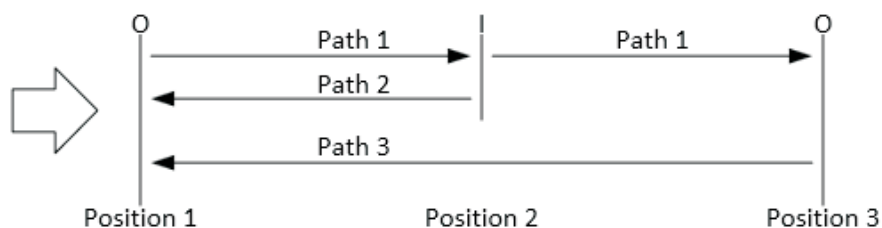
## Functions

Function of enabling switch:

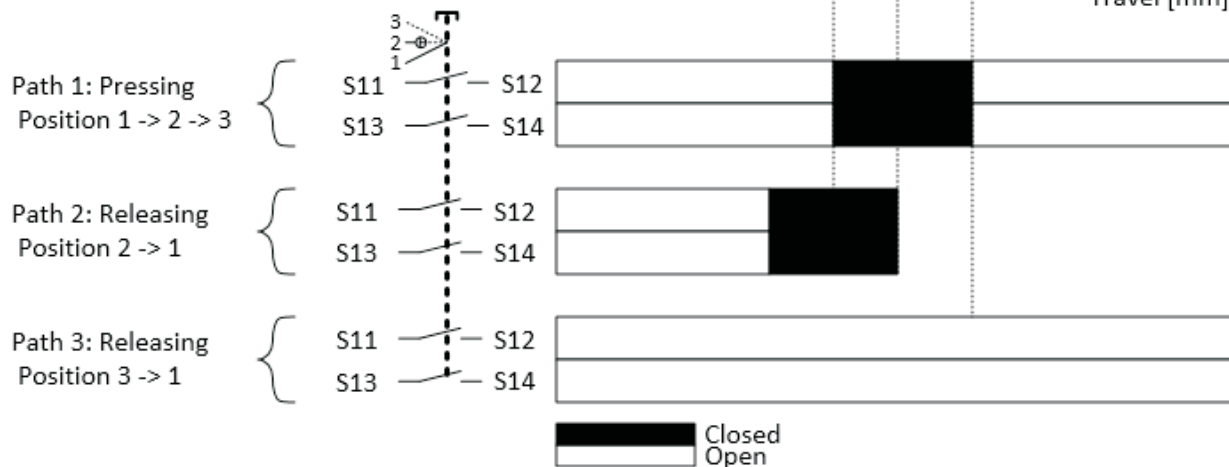
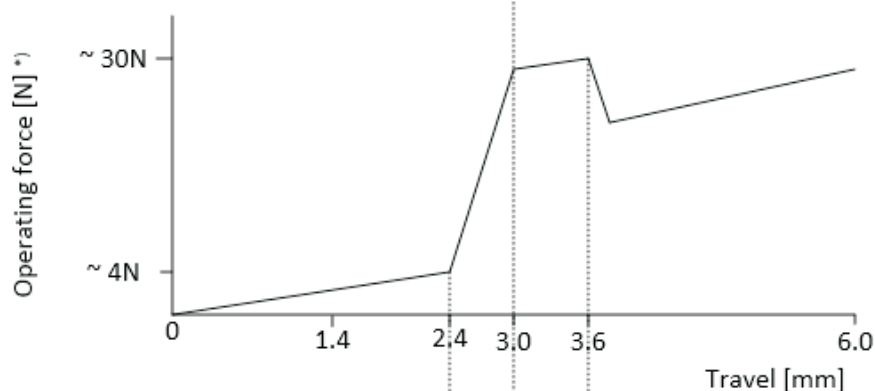
- Position 1: Not actuated
  - Enabling switch not pressed
  - Safety function
  - Contacts open
- Position 2: Enable
  - Enabling switch pressed to middle position
  - Enable or release function
  - Contacts closed,
- Position 3: Panic
  - Enabling switch pushed through
  - Safety function
  - Contacts open

By releasing or pushing through the enabling switch the release control is overridden. The restart protection prevents the release function during transition from position 3 to position 1.

### Switching function



### Switching path diagram



\*The operating force will change by using rubber boot and depends on the operating temperature.

M12122

**Technical Data****General Data**

<b>Regulations:</b>	EN 60947-5-1 EN 60947-5-5 EN 60947-5-8
<b>Temperature range</b>	
Operation:	- 25 ... + 55 °C (no icing)
Storage:	- 40 ... + 80 °C (no icing)
<b>Relative air humidity:</b>	45 ... 85 % (no condensation)
<b>Altitude:</b>	≤ 2000 m
<b>Pollution degree:</b>	3 (inside housing 2)
<b>Degree of protection:</b>	IP 65

**Electrical**

<b>shock protection class:</b>	II
<b>Nominal voltage:</b>	DC 24 V
<b>Voltage range:</b>	DC 9.6 ... 26.4 V
<b>Overvoltage category:</b>	III
<b>Rated insulation voltage:</b>	50 V
<b>Rated impulse voltage:</b>	1500 V
<b>Vibration resistance:</b>	Amplitude, constant 0.35 mm Frequency 10 ... 59.5 Hz Acceleration, constant 5 g Frequency 59.5 ... 150 Hz

**Shock resistance**

Acceleration:	30 g
Impulse length:	11 ms
<b>Material:</b>	PA66-GF

**Contact details: Three-stage enabling switch****Switching capacity**

Resistive load (DC-12):	1 A
Inductive load (DC-13):	0.7 A
<b>Impulse dielectric strength:</b>	2.5 kV

**Conditional**

<b>short-circuit current:</b>	50 A
<b>Short-Circuit protective device:</b>	10 A
<b>Electrical life:</b>	10 <sup>5</sup> switching cycles at nominal load
<b>B<sub>100d</sub>:</b>	10 <sup>5</sup> (EN ISO 13849 appendix C Table C.1)
<b>Mechanical life:</b>	Pos. 1→2→1: 10 <sup>6</sup> switching cycles Pos. 1→2→3→1: 10 <sup>5</sup> switching cycles

<b>Switching capacity:</b>	1200 switching cycles / h
<b>Force for positive opening:</b>	60 N min.
<b>Path for positive opening:</b>	4.7 mm
<b>Actuation power:</b>	200 N max.
<b>Material handle cover:</b>	NBR/PVC, silicone-free

**Contact details: E-Stop****Switching capacity**

Resistive load (DC-12):	2.5 A
Inductive load (DC-13):	2 A
<b>Short-circuit current:</b>	500 A
<b>Short-circuit protective device:</b>	6 A
<b>Electrical life:</b>	5 x 10 <sup>5</sup> switching cycles at nominal load
<b>B<sub>100d</sub>:</b>	2.5 x 10 <sup>5</sup>
<b>Mechanical life:</b>	5 x 10 <sup>5</sup> switching cycles
<b>NO contact:</b>	Forced opening acc. to EN 60947-5-1, Appendix K
<b>Bouncing time:</b>	< 10 ms

**Contact details: Key Switch****Switching capacity**

Resistive load (DC-12):	3 A
Inductive load (DC-13):	1 A
<b>Insulation resistance:</b>	100 MΩ (500 V DC)
<b>Electrical life:</b>	10 <sup>5</sup> switching cycles at nominal load
<b>Mechanical life:</b>	2,5 x 10 <sup>5</sup> switching cycles
<b>Operating force:</b>	10 Nm max.
<b>Switching capacity:</b>	600 cycles/h
<b>Actuation stroke:</b>	90°
<b>Coding:</b>	7 different coding options (on request)

**Technical Data****Contact details: Button****Switching capacity**

Resistive load (DC):	0.1 A
<b>Contact resistance:</b>	50 mΩ
<b>Insulation resistance</b>	1 GΩ (500 V DC)
<b>Insulation class:</b>	1 kV
<b>Electrical life:</b>	5 x 10 <sup>5</sup> switching cycles at nominal load
<b>Mechanical life</b>	10 <sup>6</sup> switching cycles
<b>Actuation power:</b>	4 N ± 3 N
<b>Actuation stroke:</b>	1.7 mm

**Connection details: LED**

<b>Cut-off voltage:</b>	5 V
<b>Nominal current:</b>	20 mA
<b>Insulation resistance:</b>	4 GΩ (500 V DC)
<b>Electrical life:</b>	10 <sup>5</sup> h
<b>Color, luminous intensity:</b>	White, ≈ 1200 mcd (DC 24 V) (others on request)

**Cable details**

<b>Conductor:</b>	Copper, acc. to VDE 0295 6 x 0.25 mm <sup>2</sup> 12 x 0.25 mm <sup>2</sup> 18 x 0.25 mm <sup>2</sup>
<b>Core colour:</b>	Acc. to DIN 47100
<b>Core arrangement:</b>	Concentrically wrapped in layers
<b>Shielding:</b>	Copper wrapped, cover appr. 90%
<b>Outer sheath:</b>	PUR
<b>Test voltage</b>	
Core / core:	1200 V
Core / shield:	1000 V
<b>Conductor resistance:</b>	Acc. to VDE 0295 Class 5 or 6
<b>Insulation resistance:</b>	> 20 MΩ x km
<b>Resistance to oil:</b>	Acc. to DIN VDE 0472 part 803 test type B

### Standard Type

RE6909/00000/1A05/00

Article number: 0068910

- Enabling switch
- Front button (e. g. for start function, jog mode, etc.)
- 5 m cable with 6 x 0.25 mm<sup>2</sup> copper wires

### Variants

RE6909/20000/1C05/00

Article number: 0068911

- Enabling switch
- E-Stop
- Front button (e. g. for start function, jog mode, etc.)
- 5 m cable with 12 x 0.25 mm<sup>2</sup> copper wires

RE6909/20C0D/1D05/00 (on demand)

Article number: 0068912

- Enabling switch
- E-Stop
- Front button (e. g. for start function, jog mode, etc.)
- Key switch
- 2 potential-free push-buttons
- 5 m cable with 18 x 0.25 mm<sup>2</sup> copper wires

RE6909/200DD/1D05/00

Article number: 0068913

- Enabling switch
- E-Stop
- Front button (e. g. for start function, jog mode, etc.)
- 4 potential-free push-buttons
- 5 m cable with 18 x 0.25 mm<sup>2</sup> copper wires

Further variants see "Overview of variants (extract)" or on request

### Maintenance and repairs

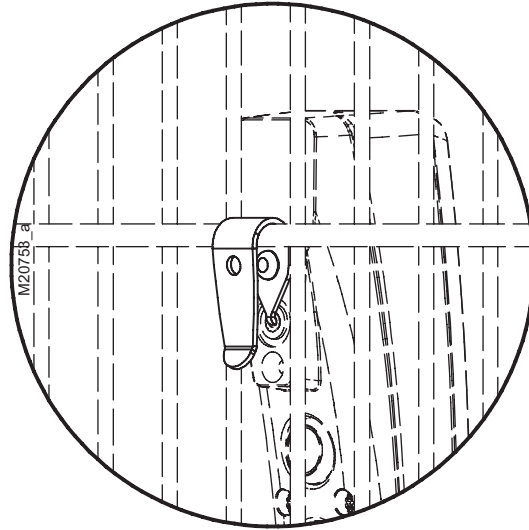
- The device contains no parts that require maintenance.
- In case of failure, do not open the device but send it to manufacturer for repair.

### Standard Type

Bracket ZB 6909/101

Article number: 0069606

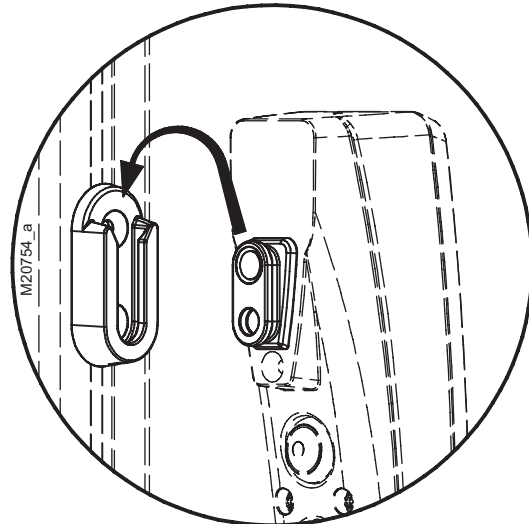
- For hanging e.g. in the rungs of a protective grid (up to 8 mm diameter)
- Screw for mounting on RE 6909 included (M4x10 lens head, T20)



Bracket ZB 6909/102

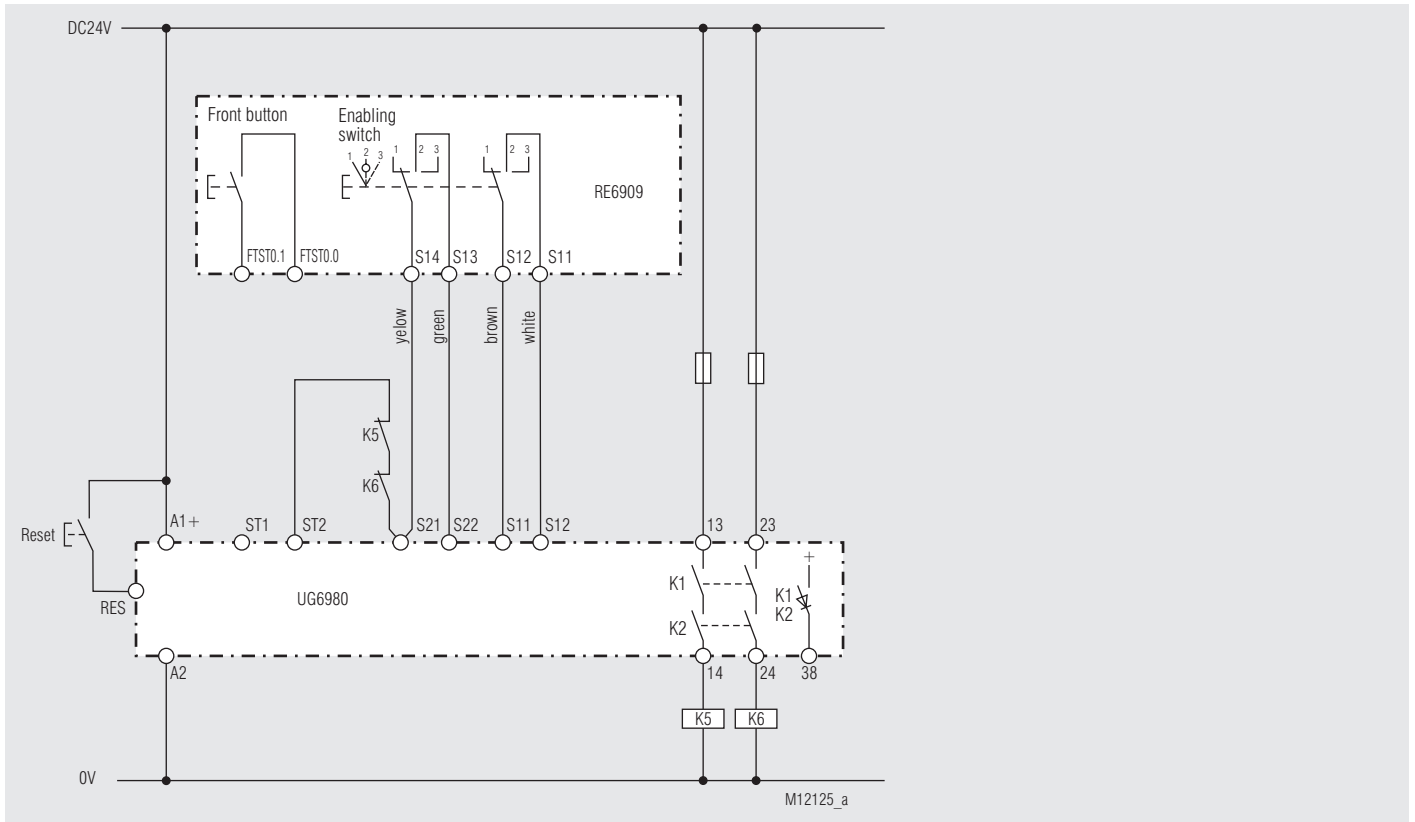
Article number: 0069607

- With mount for screwing to vertical surfaces
- Screw for mounting on RE 6909 included (M4x16 countersunk head, hexagon socket 2.5)
- Screws for mounting on vertical surfaces not included (2 pieces M4 countersunk head)





## Application Example



The multifunctional safety module UG 6980 is configured via a selector switch and must detect cross-faults in the supply line of the enabling switch in its configuration.

Operating potentiometer of the multifunctional safety module UG 6980:  
Potentiometer "Fkt." = 1 (Safety function = Emergency stop)

If the enabling switch is pressed into middle position, the safety circuit K1-K2 closes. If the enabling switch is either pushed through or released the safety function the safety circuit K1-K2 is opened.

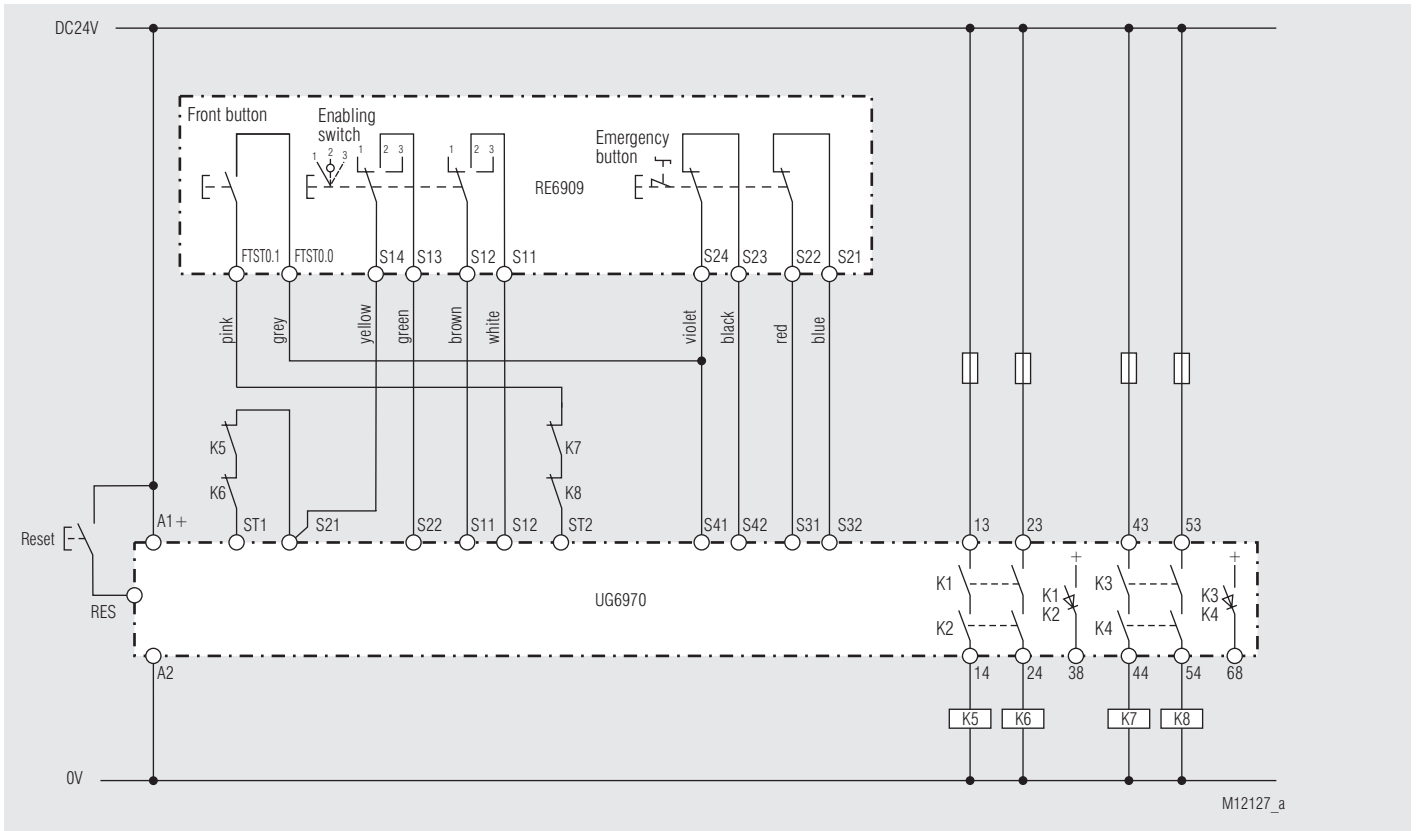
Suitable for applications up to category 4.

**Note:** The resulting performance level must be calculated for the complete system.

**Attention:** According to EN 60664-1, the maximum permissible voltages at the contacts K1 and K2 of the UG 6980 are reduced due to the safe electrical separation and overvoltage category III.  
External contactors can be used for contact reinforcement. The function of the external contactors must be monitored by looping the NC contacts into the start circuit (terminals S21-ST2)

**Attention:** Contacts K1-K2 close automatically in this configuration as soon as the enabling switch is pressed in the center position.  
According to EN 60204-1, no automatic start may be made after shutdown in an emergency.

## Application Example



The multifunctional safety module UG 6970 is configured via a selector switch and must detect cross-faults in the supply line of the enabling switch resp. emergency stop in its configuration. In the present diagram the two separate safety circuits of the UG 6970 are controlled by means of enabling switch and emergency stop.

Operating potentiometer of the multifunctional safety module UG 6970:

Potentiometer "Start" = 3 (Fkt. 1 = AUTO; Fkt. 2 = Manual)

Potentiometer "Fkt.1" = 1 (Safety function = Emergency stop)

Potentiometer "Fkt.2" = 1 (Safety function = Emergency stop)

If the enabling switch is pressed into middle position, the safety circuit K1-K2 is closed. If the enabling switch is either pushed through or released the safety circuit K1-K2 is opened.

If the front button is pressed when the emergency stop is deactivated, the safety circuit K3-K4 is closed.

When the emergency stop is pressed, the safety circuit K3-K4 is opened

Suitable for applications up to category 4.

**Note:** The resulting performance level must be calculated for the complete system.

**Attention:** According to EN 60664-1, the maximum permissible voltages at the contacts K1 to K4 of the UG 6970 are reduced due to the safe electrical separation and overvoltage category III.

External contactors can be used for contact reinforcement. The function of the external contactors must be monitored by looping the NC contacts into the start circuit (Fkt.1: Terminals S21-ST1, Fkt.2: Terminals S41-ST2)

**Attention:** Contacts K1-K2 close automatically in this configuration as soon as the enabling switch is pressed in the center position.

According to EN 60204-1, no automatic start may be made after shutdown in an emergency.

**Attention:** Contacts K3-K4 do not close in this configuration until the emergency stop is reset and then the front button is pressed.

Further assignments see appendix