

# PSR-MXF1 / PSR-MXF3

## Line emergency switch and safety door monitoring with the PSR-MXF multifunctional safety relay up to PL e/SIL 3

Application note  
106130\_en\_00

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### 1 Description

Implement a line emergency stop as well as safety door monitoring in your production line with the PSR-MXF1 or PSR-MXF3 multifunctional safety relay.

#### Advantages and customer benefits

- Easy wiring
- No programming necessary
- Easy to expand

#### Scenario

Emergency stop linking may be required for a production line based on the risk assessment. This means that pressing any emergency stop button must result in a safety-related stop of all machine parts in the line.

#### Production line

A product is manufactured in a production line. The production line consists of several items of partly completed machinery, each with a separate control cabinet.

#### Partly completed machinery

A different production step can be completed in every item of partly completed machinery. Every item of partly completed machinery has a maintenance door and an emergency stop button.

#### Maintenance door

Through the maintenance door it is possible to perform visual inspections, operational material tests, maintenance work, and cleaning.

The maintenance door is equipped with two mechanical position switches.

#### Safety-related components

- Emergency stop button:  
Every item of partly completed machinery has an emergency stop button. Pressing an emergency stop button brings the entire production line to an immediate stop.
- Position switches:  
When the maintenance door is opened, the position switches bring the partly completed machinery to an immediate stop. The other items of partly completed machinery are not affected by this.



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This application note is valid for all products listed on the following pages.

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## 2 Component list



For the application described, you will require three PSR-MXF1 multifunctional safety relays in your choice of connection version.

Alternatively, the PSR-MXF3 multifunctional safety relay can be used.

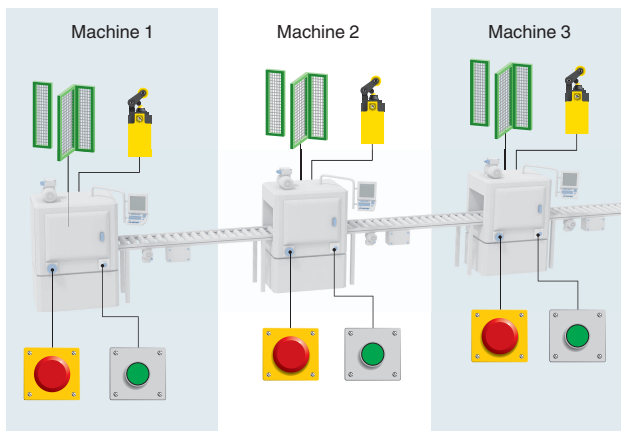
### Ordering data for PSR-MXF1

Order No.	Module	Connection method	Quantity
2902725	PSR-SCP-24DC/MXF1/4x1/2x2/B	Screw connection	3
or			
2902726	PSR-SPP-24DC/MXF1/4x1/2x2/B	Spring connection	3
or			
2903253	PSR-PIP-24DC/MXF1/4x1/2x2/B	Push-in connection	3

### Alternatively: ordering data for PSR-MXF3

Order No.	Module	Connection method	Quantity
2903257	PSR-SCP-24DC/MXF3/4x1/2x2/B	Screw connection	3
or			
2903258	PSR-SPP-24DC/MXF3/4x1/2x2/B	Spring connection	3
or			
2903259	PSR-PIP-24DC/MXF3/4x1/2x2/B	Push-in connection	3

### 3 Production line application



The production line described in this application consists of three items of partly completed machinery.

Each item of partly completed machinery is equipped with an emergency stop button and a manual, monitored reset button.

In addition, there is a maintenance door (safety door) with position switches at each item of partly completed machinery.

The safety functions required for the production line are implemented as two-channel emergency stop linking with safety door monitoring by the PSR-MXF multifunctional safety relay.

Figure 1 Production line

#### 3.1 Schematic circuit diagram

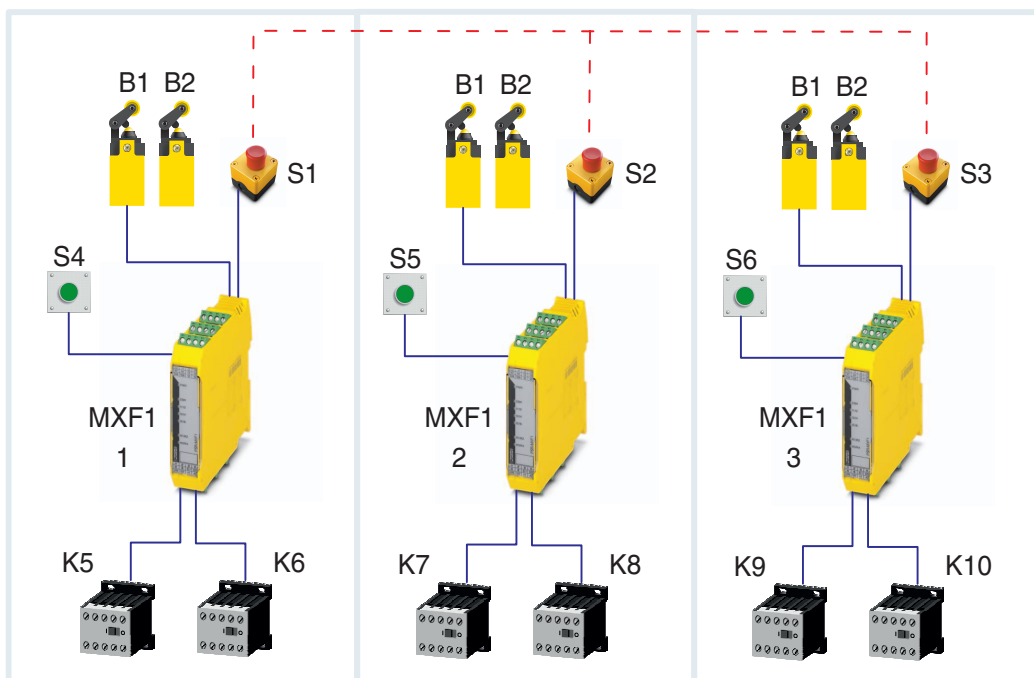


Figure 2 Schematic circuit diagram of the production line

**Key:**

- B1 ... B2** Position switches
- S1 ... S3** Emergency stop buttons
- S4 ... S6** Reset buttons
- K5 ... K10** Motor contactors

### 3.2 Circuit diagram

#### Two-channel emergency stop linking and safety door monitoring

- Up to PL e, SILCL 3

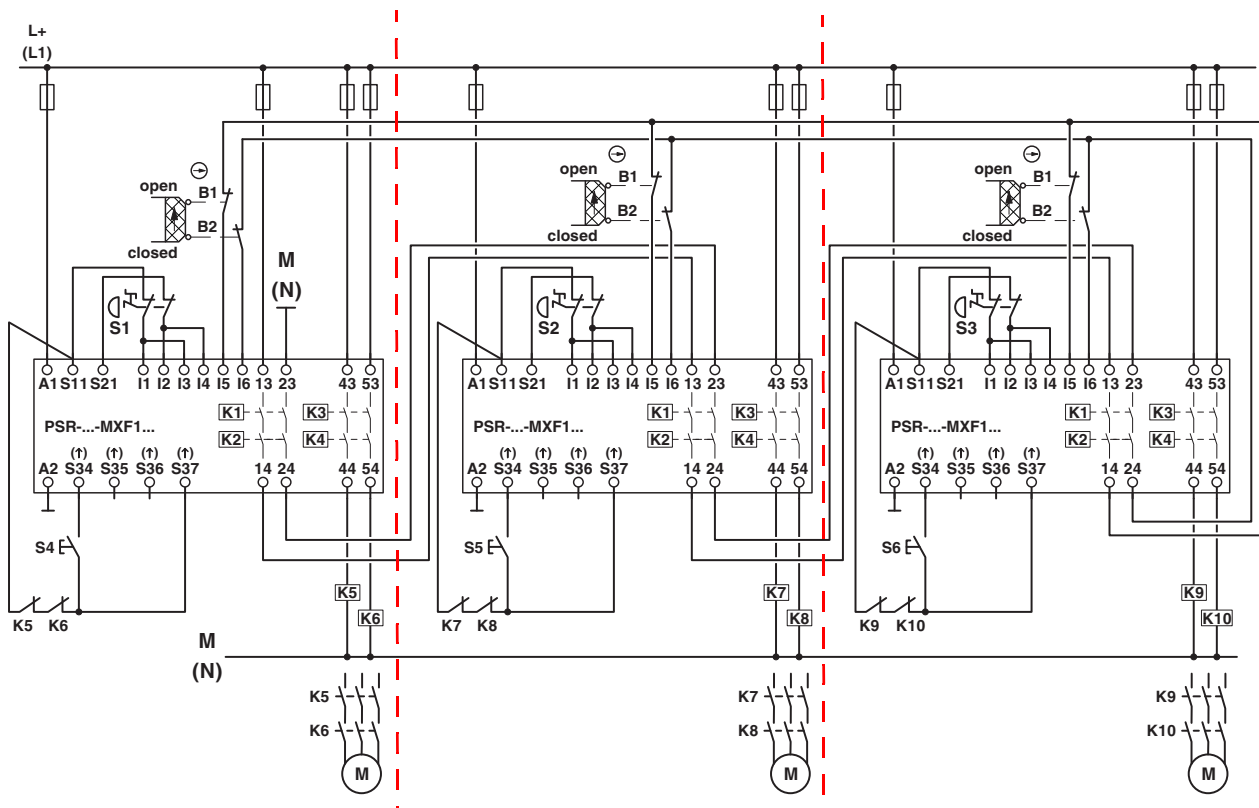


Figure 3 Circuit diagram

### 3.3 Safety function 1

#### Emergency stop monitoring with manual, monitored reset

- Two-channel emergency stop monitoring (S1)
- Cross-circuit detection (partial)
- Manual, monitored reset (S4)
- Feedback of contactor contacts (K9 and K10)
- Stop category 0




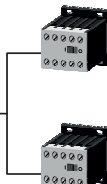
	Emergency stop S1 	PSR-MXF1 1 	PSR-MXF1 3 	Contactors K9 & K10 
Max. SIL 3* according to EN 62061	SILCL 3	SILCL 3	SILCL 3	SILCL 3
Max. PL e* according to EN ISO 13849	PL e	PL e	PL e	PL e

Figure 4 Safety function 1

**Note:**

\*) Depending on the load and switching frequency

**3.4 Safety function 2**

**Safety door monitoring with automatic reset**

- Two-channel safety door monitoring with two position switches (B1 and B2)
- Automatic reset
- Feedback of contactor contacts (K5 and K6)
- Stop category 0

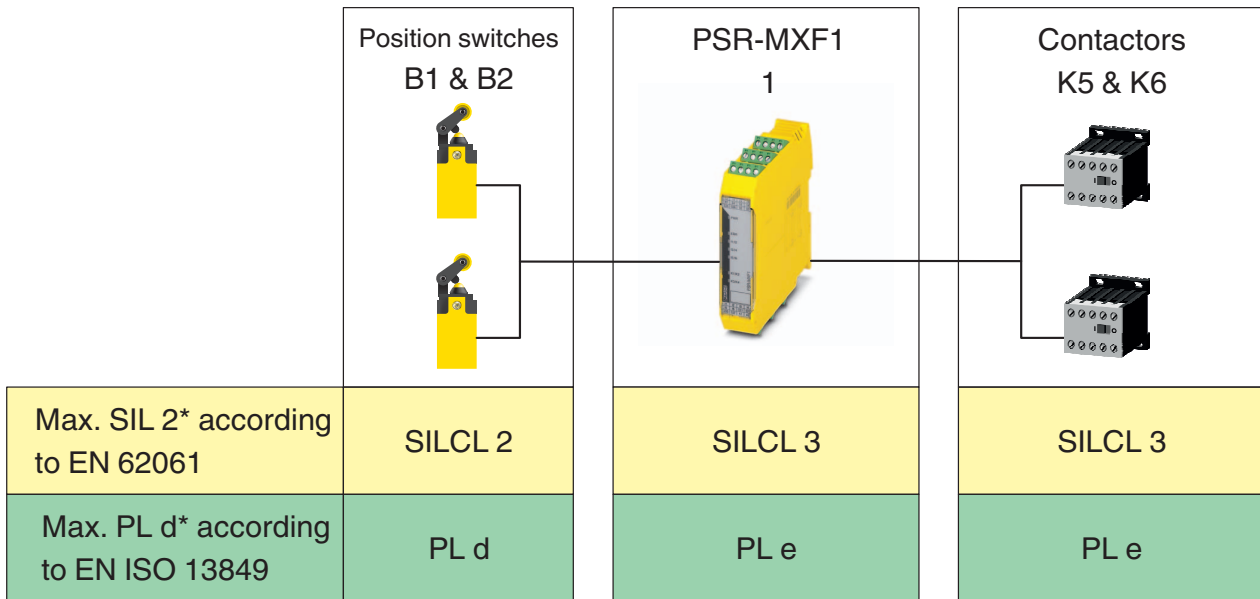
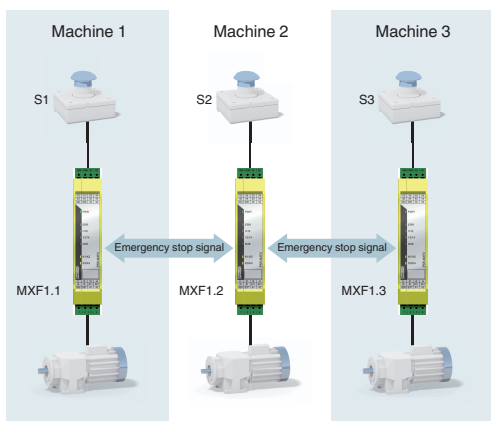


Figure 5 Safety function 2

**Note:**

\*) If a cross-circuit may occur

## 4 Circuit versions without safety door monitoring



Alternatively, you can also implement single-channel emergency stop linking without safety door monitoring using the PSR-MXF multifunctional relay.

The following two circuit versions are recommended for this.

Figure 6 Emergency stop linking without safety door monitoring

### 4.1 Circuit diagram version 1

#### Single-channel emergency stop linking with manual start via PLC

- Up to PL c, SILCL 1

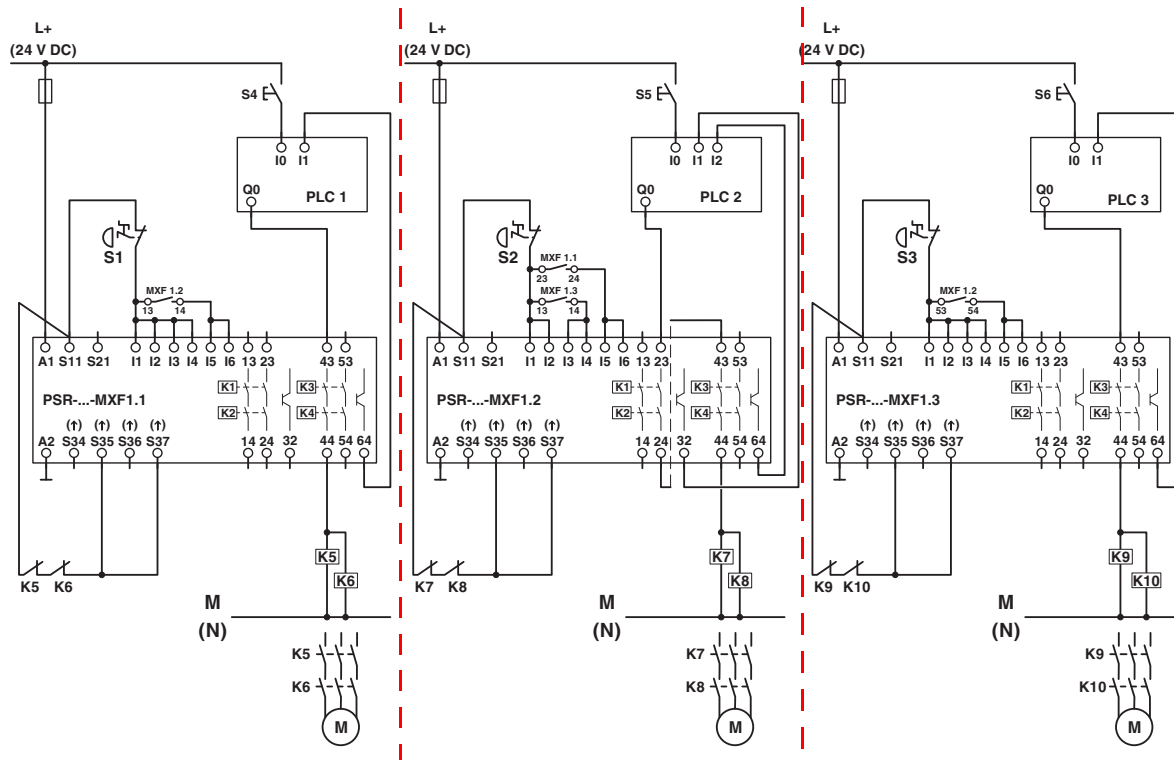


Figure 7 Circuit diagram version 1

4.2 Circuit diagram version 2

Single-channel emergency stop linking with manual, monitored start

- Up to PL c, SILCL 1
- With equipotential bonding

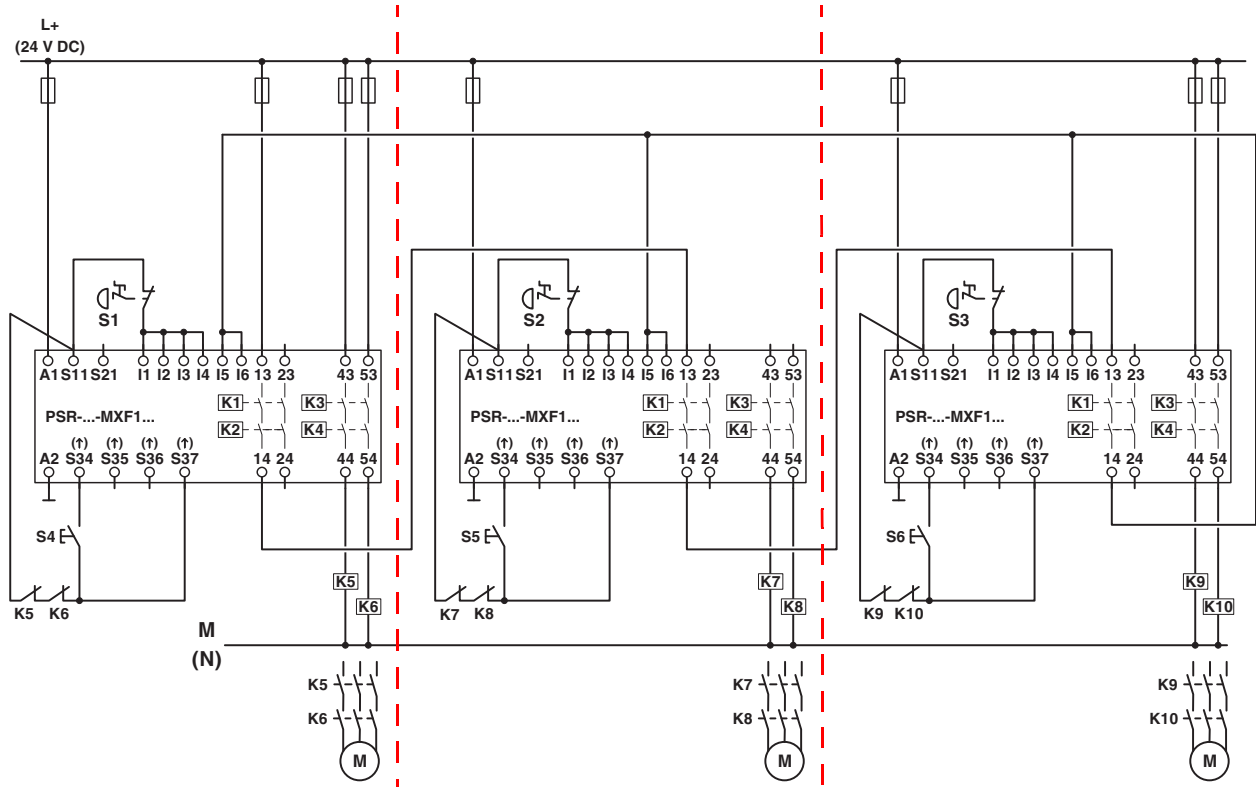


Figure 8 Circuit diagram version 2



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