



## Safety relays

C57x and C67xx range

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# Safety relays

## C57x range

### Selection table, Approvals and marks



2CDC 265 012 F0604

Type		C571	C573	C571-AC	C576	C577	C572	C574	C575	C579
Function	EMERGENCY STOP	■ <sup>5)</sup>	■ <sup>5)</sup>	■ <sup>5)</sup>	■ <sup>5)</sup>	■	■	■ <sup>5)</sup>	-	-
	Safety gate monitoring	■	■	■	■	■ <sup>6)</sup>	■	■ <sup>6)</sup>	-	-
	Press control	-	-	-	-	-	-	-	■	-
	Cross circuit detection	-	-	■	■	■	■	■	■	-
Safety categorie acc. to EN 954-1 <sup>1)</sup>	B	■	■	■	■	■	■	■	■	■ <sup>4)</sup>
	1	■	■	■	■	■	■	■	■	■ <sup>4)</sup>
	2	■	■	■	■	■	■	■	■	■ <sup>4)</sup>
	3	■	■	■	■	■	■	■	■	■ <sup>4)</sup>
	4	■ <sup>1)</sup>	■ <sup>1)</sup>	■	■	■	■	■ <sup>3)</sup>	■ <sup>7)</sup>	■ <sup>4)</sup>
Connection	single channel	■	■	■	-	-	■	■	-	-
	two channel	■	■	■	■	■	■	■	■	-
	Enabling circuits undelayed	2 n/o	3 n/o	2 n/o	2 n/o	2 n/o	3 n/o	2 n/o	2 n/o	4 n/o
	Enabling circuits delayed	-	-	-	-	-	-	2 n/o	-	-
	Signaling circuits	-	1 n/c	-	-	-	2 n/c	1 n/c	2 n/c	-
Start	automatic <sup>8)</sup>	■	■	■	■	-	■	■, -	-	-
	monitored	-	-	-	-	■	■	-, ■	-	-

■ existing  
□ pending

Approvals										
	UL 508, CAN/CSA C22.2 No.14	■	■		■	■	■	■	■	■
	Baumusterbescheinigung E 6794							■		
	Baumusterbescheinigung E 6795								■	
	BG Prüfzertifikat	■	■		□	□	■	■	■	■
Marks										
	CE	■	■	■	■	■	■	■	■	■
	C-Tick	■	■	■	■		■	■	■	■

- 1) Possible with additional external measures. The figures apply only if the cables and sensors are laid safely and protected mechanically. See also user manual and application manual.
- 2) The maximum safety category acc. EN 954-1, which can be reached, depends essentially on the external wiring, the choice of the sensors and the position of the machine. The nominal regulations for the safety at machines have to be observed.
- 3) Possible with undelayed enable contact.
- 4) The safety category acc. to EN 954-1 corresponds to those of the basic unit.
- 5) The ON-button is not monitored. Valid only for C574 devices with auto-start.
- 6) With monitored ON-button possible. Valid only for C574 devices with monitored start.
- 7) Acc. to EN 574, type III C.
- 8) Automatic restarting (as per EN 60204-1) must be prevented by the higher-level control system in the event of EMERGENCY STOP.

# Safety relays with solid-state outputs

## C67xx range

### Selection table, Approvals and marks

2CDC 265 031 F0004

3

Type		C6700	C6701	C6702
Function	EMERGENCY-STOP	■	■	■
	Safety gate monitoring	■	■	■
	Press control	-	-	-
	Tread mats	-	■	■
	Electronic sensors	-	■	■
	Cascade input 24 V DC	-	1	1
	Cross short-circuit detection	■	■	■
Safety categorie acc. to EN 954-1	B	■	■	■
	1	■	■	■
	2	■	■	■
	3	■	■	■
	4	-	■	■
Connection	single channel	■	■	■
	two channel	■	■	■
	Enabling circuits Stop-Cat. 0	2 <sup>1)</sup>	2 <sup>2)</sup>	1
	Enabling circuits Stop-Cat. 1	-	-	1 <sup>3)</sup>
	Signaling circuits	-	<sup>4)</sup>	-
Start	automatic	■	■	■
	monitored	■	■	■

- existing
- pending

Approvals				
	UL 508, CAN/CSA C22.2 No.14	■	■	■
TÜV	TÜV	■	■	■
Marks				
CE	CE	■	■	■
	C-Tick	■	■	■

<sup>1)</sup> The outputs are only safe in connection with an external contactor.  
<sup>2)</sup> Can be used as electrical sensor input  
<sup>3)</sup> OFF-delay adjustable: 0.05-3 s or 0.5-30 s  
<sup>4)</sup> One safety circuit can be used as signaling circuit.

# Safety relays

## Safety for man and machine

### General information

## Safety for man and machine

### Machinery Directive 98/37/EEC

The Machinery Directive 98/37/EEC is valid throughout Europe. This Directive obliges the machine manufacturer to guarantee, by attaching the CE mark, that all European Standards relevant to this machine type have been observed. The CE mark is attached by the manufacturer at his responsibility. No machine may be put into circulation or marketed without this CE mark.

### Safety circuits must meet the following requirements depending on the safety categorie acc, to EN 954-1:

- Coping with an individual fault including all sequential faults in the control circuit (single-fault tolerance).
- Prevention of automatic restart of the machine when the EMERGENCY STOP facility is reset.
- Setting up a redundant circuit by at least two contactor relays.
- Creating diversity, e. g. by combining n/c and n/o contacts of the auxiliary contactors.
- Cyclic monitoring of the safety circuit with each ON-OFF cycle.

The ABB safety switching devices comply with all requirements of EN 60204, part 1, and are approved by the German Employers' Liability Insurance Associations (BG) and/or TÜV (German Technical Inspection Authority).

### Fields of application:

- EMERGENCY STOP circuits
- Safety gate monitoring
- Two-hand controls
- Safety tread mats

Practical experience has shown that, in a few applications, it is necessary to also monitor the sensing elements (EMERGENCY STOP buttons, limit switches of the safety gates etc.).

A **two-channel** and/or **cross circuit safe** configuration is advisable in systems with a high level of contamination. In case of the two-channel control configuration, the contact part of the command unit has a **redundant** design. The supply leads can also be monitored for cross circuits.

In case of a fault, the system reverts to safe state after the safety contacts (**enabling circuits**) are opened. Enabling circuits are safety contacts which reliably switch off the hazardous drives or machines. (n/o contacts which reliably open in case of faults).

Depending on the device type, there are additional **signalling contacts** (n/c contacts which close in the event of a fault or semiconductor outputs). Of course, it is possible to also use enabling contacts as signaling contacts.

Unique and clear terminal identification permits simple, reliable and rapid wiring. The risk of a wiring fault is appreciably reduced.

### Standards for the safety of machinery

<b>EN 60204-1</b>	"Functional safety of electrical/electronic/programmable electronic safety-related systems"
<b>EN 418</b>	"Safety of machinery; emergency stop equipment"
<b>EN 574</b>	"Two-hand control devices"
<b>EN 954-1</b>	"Safety-related parts of control systems"
<b>EN 1050</b>	"Principles for risk assessment"
<b>EN 1088</b>	"Interlocking devices associated with guards"
<b>IEC 61508</b>	"Functional safety of electrical/programmable electronic safety related system"

### Important notice:

The products described here in are designed to be components of a customized machinery safety-oriented control system. A complete safety-oriented system may include safety sensors, evaluators, actuators and signaling components. It is the responsibility of each company to conduct its own evaluation of the effectiveness of the safety system by trained individuals.

ABB AG, its subsidiaries and affiliates (collectively "ABB") are not in a position to evaluate all of the characteristics of a given system or product or machine not designed by ABB.

ABB accepts no liability for any recommendation that may be implied or stated here in. The warranty contained in the contract of sale by ABB is the sole warranty of ABB. Any statements contained here in do not create new warranties or modify existing ones.

### Further Information:

#### User manual

A user manual with a device description, connection diagrams and application information in several languages is enclosed with every safety switching device of C570 and C67xx range.

#### Safety handbook

You can find further information in the "Safety Engineering" application manual. It provides you with the required information on the relevant safety standards and project planning information.

The entire range of components used for safety applications is explained in this Manual, from the sensor (emergency stop command devices and position switches), through evaluation units (safety switching devices C57x and fail-safe control AC 31 S) to the actuator (e. g. contactor for switching motors). All these components must be selected correctly in order to meet the requirements applicable to modern safety facilities.

The Safety handbook can be downloaded on our homepage.



# Safety relays

## Safety for man and machine

### Standards, functions, applications

#### Stop categories acc. to EN 60204

**Standard EN 60204** demands that every machine must feature the stop function of category 0. Stop functions of categories 1 and/or 2 must be provided if necessary for technical safety and/or functional requirements of the machine. Category 0 and category 1 stops must be operable independent of the operating mode, and a category 0 stop must have priority.

There are three categories of stop functions:

##### **Category 0:**

Shut-down by immediate switch-off of the energy supply to the machine drives.

##### **Category 1:**

Controlled shut-down, where the energy supply to the machine drives is retained in order to achieve shut-down and where the energy supply is only interrupted after standstill has been reached.

##### **Category 2:**

A controlled shut-down where the energy supply to the machine drives is retained.

#### Scope of application

Potential risks and hazards posed by a machine must be eliminated as fast as possible in the event of danger. For dangerous movements, the safe state is generally a standstill. All safety switching devices of C 570 range switch to de-energized state, i.e. standstill for drives, in the event of danger or fault.

##### **EMERGENCY STOP**

EMERGENCY STOP devices must have priority over all other functions.

The energy supplied to the machine drives which may cause dangerous states must be switched off as fast as possible without further risks or dangers. Resetting the drives may not trigger a restart.

The EMERGENCY STOP must act either as a stop of category 0 or as a stop of category 1.

According to EN 418 "EMERGENCY STOP equipment, functional aspects, principles for design" the resetting of the control device may only be possible as a result of an action by hand at the control device. Resetting the control device may not release a restart instruction. A restart of the machine may only be possible when all concerned operating elements have been reset individually and consciously by hand.

The basic devices of the C57x range of safety switching devices can be used for EMERGENCY STOP applications up to category 4 acc. to EN 954-1. Depending on external wiring and cable routing of the sensors, category 3 or 4 acc. to EN 954-1 can be reached.

##### **Safety gate monitoring**

According to EN 1088, a distinction is made between interlocking guards and interlocking guards with guard locking.

Here as well, the safety switching devices are used for EMERGENCY STOP applications. Controls up to category 4 to EN 954-1 are possible.

##### **Presses and punches**

Two-hand control is intended for devices on which the operator must use both hands simultaneously, thus protecting him against risks and dangers.

#### Safety functions

##### **Auto-start**

When the sensor circuit is closed the device is active.

If an ON-button is installed in the feedback circuit, a cross circuit of the feedback circuit is not monitored. Safety categories B, 1, 2, and 3 do not dictate a cross-circuit detection.

If a device with the function "auto-start" shall be used for safety categories 4 and EMERGENCY STOP, the user has to guarantee a fault exclusion in the ON-button circuit, e. g. by a safe laying of the ON-button line.

##### **Monitored start**

After a supply voltage failure or a safety-related switch-off, the device will be started only by actuation of the ON-button.

Especially for presses type III C to DIN 574 is possible.

Safety category 4 to EN 954-1 is possible if the feed and the feedback circuit are monitored for cross circuits.

After closing the sensor line the ON-button has to be actuated.

##### **Cross circuit safety**

Cross circuit safety denotes the ability of monitoring modules to detect faults (caused by pinched cable, earth-leakage, ect.) that can occur in the application being monitored and to prevent the release of the safety circuits until external faults have been removed.

#### Device outputs

##### **Safety outputs**

The safety-related function must be controlled via safe output contacts, the so-called safety outputs. Safety outputs are always normally open contacts and switch off without delay.

##### **Signalling outputs**

For the signalling outputs, normally open contacts and normally closed contacts which may not perform safety-related functions are used. Safety outputs also be used as signalling outputs.

##### **Delayed safety outputs**

Drives which have a long overtravel must be decelerated in the event of danger. For this purpose, the energy supply must be maintained for electrical braking (stop category 1 acc. to EN 60 204-1).

##### **Contact expansion**

If the safety outputs of the basic device do not suffice, positively driven contactors (e. g. B6, B7) may be used for contact expansion.

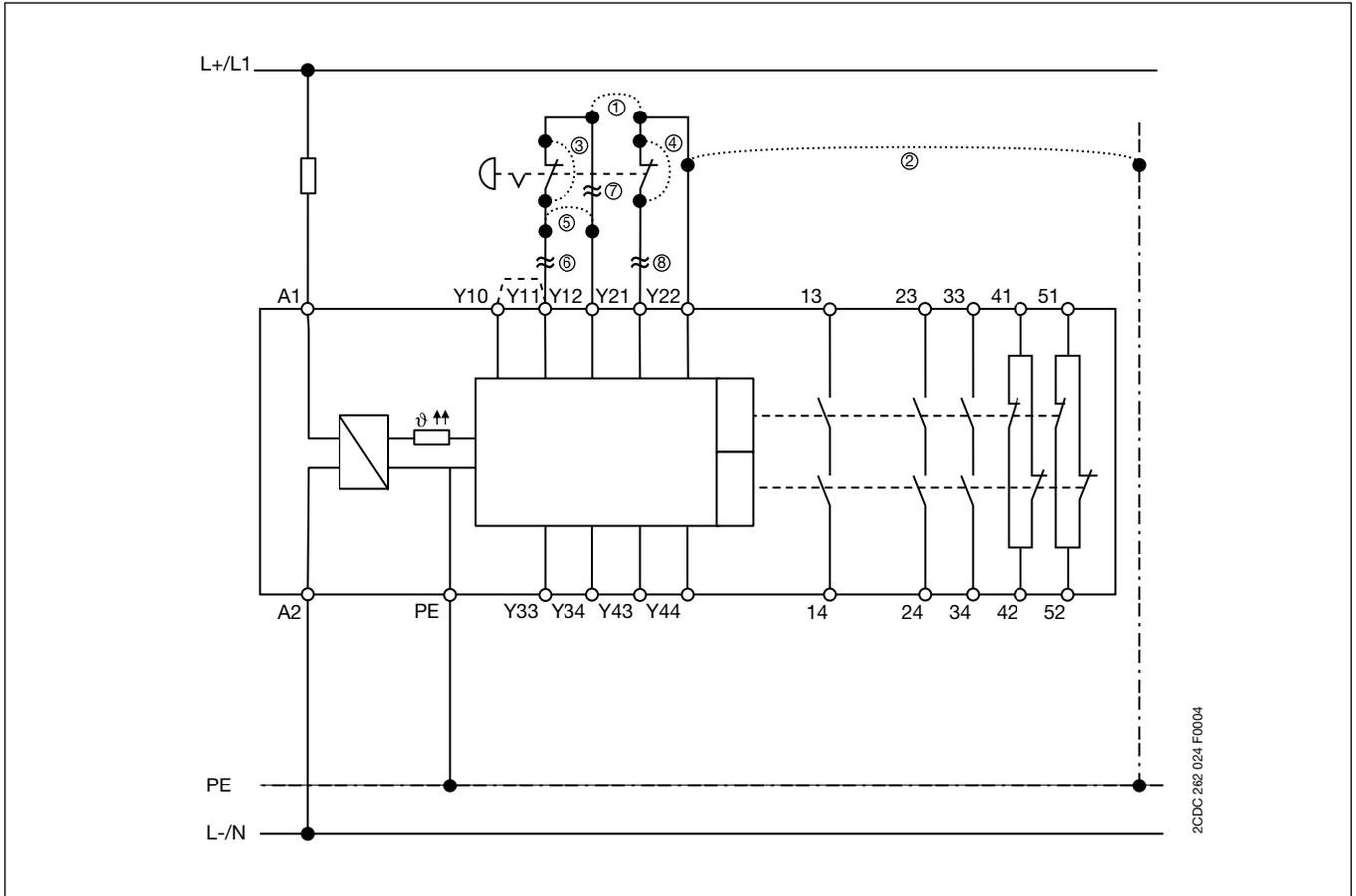
# Safety relays

## Safety for man and machine

### Cross circuit safety

#### Cross circuit safety

On ABB Safety relays C57x and C67xx, which are designed to monitor EMERGENCY STOP, two-hand control units and safety gates, cross circuit safety is achieved by two channel (redundant) wiring of EMERGENCY STOP control devices (see diagram below). The two EMERGENCY STOP channels are operated at different voltages; thus the units will detect excessive current flow between the two points and disconnect the enabling circuits.



#### Type of fault

- ① + ⑤ Connection (cross circuit) between Y12 and Y21
  - ▶ The fault will be detected as a short-circuit (excessive current flow). The unit will disconnect the enabling circuits.
- ② Earthing of Y21
  - ▶ The fault will be detected as a short-circuit (excessive current flow). The unit will disconnect the enabling circuits.
- ③ + ④ Next operation of EMERGENCY STOP button will detect the fault as no voltage change will occur on Y12.
  - ▶ The unit will prevent restarting until the fault has been removed and the EMERGENCY STOP module reset.
- ⑥ - ⑧ Immediate detection of the line interruption (voltage change on Y12) and opening of the enabling circuits
  - ▶ The unit will prevent restarting until the fault has been removed and the EMERGENCY STOP module reset.
  - ▶ The units incorporate internal electrical short-circuit protection which will trip when a fault occurs (short-circuit, cross circuit, ...) and disconnect the enabling circuits. After a fault has been removed, the safety relay will recognize this and again be ready for operation. Neither the unit nor any internal fuses will need to be exchanged.

# Safety relays C571 and C571-AC

## Ordering details

2CDC 261 032 F0004

### C571

- Auto-start
- Supply voltage  $V_c$  at EMERGENCY STOP button or limit switch
- Feedback loop for monitoring of external contactors
- Safety outputs: 2 n/o contacts, positively guided
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4<sup>1)</sup>

### EMERGENCY STOP monitor and safety gate monitor C571 and C571-AC

#### Application

The safety relays C571 and C571-AC can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to VDE 0113 Part 1 (11.98) and/or EN 60 204-1 (11.98), e. g. with movable covers and guard doors. Depending on the external connections, safety categories B, 1, 2, 3 or 4<sup>1)</sup> according to DIN EN 954-1 are achievable.

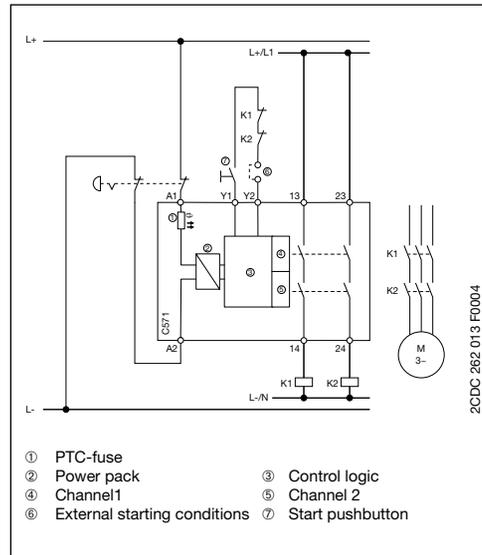
When the safety combination is used in "automatic start" mode, automatic restarting (according to EN 60 204-1, sections 9.2.5.4.2 and 10.8.3) must be prevented by the higher-level control system in the event of EMERGENCY STOP.

#### Functions

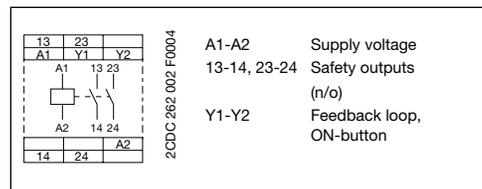
The safety relays C571 and C571-AC have two enabling (safe) circuits which are configured as n/o contacts. The number of enabling circuits can be increased by adding one or more C579 extension units. Three LEDs (Power, Channel 1, Channel 2) indicate the operating state and function.

When the EMERGENCY STOP button or the limit switch is unlocked and when the ON-button is pressed, the internal circuits of the safety relays and the external contactors are checked for proper functioning.

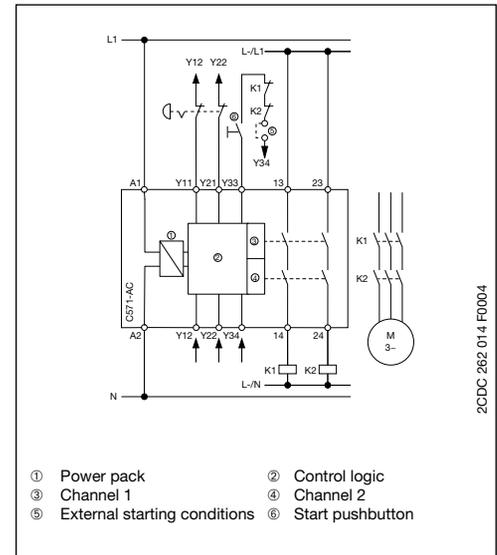
#### Block diagram C571



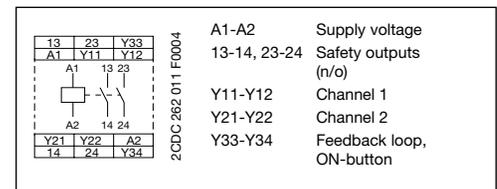
#### Connection diagram C571



#### Block diagram C571-AC



#### Connection diagram C571-AC



Type	Supply voltage $U_c$	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
<b>C571</b>	24 V DC	<b>1SAR 501 020 R0003</b>	1		0.26 / 0.57
<b>C571</b>	24 V AC/DC	<b>1SAR 501 020 R0001</b>	1		0.26 / 0.57
<b>C571-AC</b>	115 V AC	<b>1SAR 501 020 R0004</b>	1		0.29 / 0.64
<b>C571-AC</b>	230 V AC	<b>1SAR 501 020 R0005</b>	1		0.29 / 0.64

<sup>1)</sup> Possible in combination with additional external measures. Information given in brackets only apply if cables and sensors are installed safely and mechanically protected.

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# Safety relays C573

## Ordering details

1SAR 501 031 F0001

### C573

- Auto-start
- Supply voltage  $V_c$  at EMERGENCY STOP button or limit switch
- Single- or two-channel connection
- Feedback loop for monitoring of external contactors
- Safety outputs: 3 n/o contacts, positively guided
- Signalling contacts: 1 n/c contact, positively guided
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4<sup>1)</sup>

### EMERGENCY STOP monitor and safety gate monitor C573

#### Application

The safety relay C573 can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to VDE 0113 Part 1 (11.98) and/or EN 60 204-1 (11.98), e.g. with movable covers and guard doors. Depending on the external connections, safety categories B, 1, 2, 3 or 4<sup>1)</sup> according to DIN EN 954-1 are achievable.

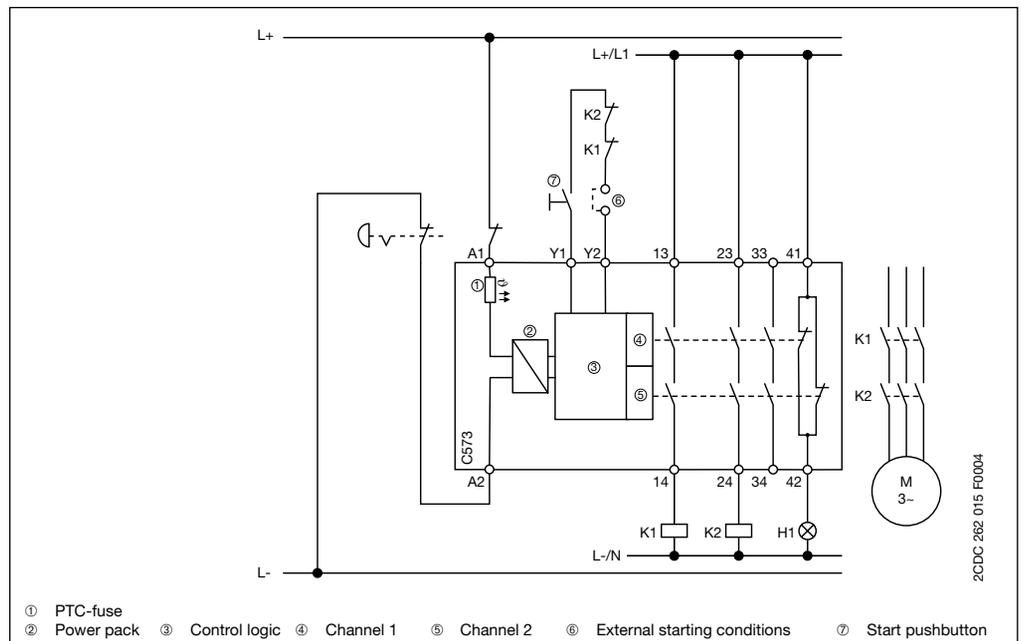
#### Functions

The safety relay C573 has three enabling circuits (safety outputs) which are configured as n/o contacts and a signal circuit configured as a n/c contact. The number of enabling circuits can be increased by adding one or more C579 extension units.

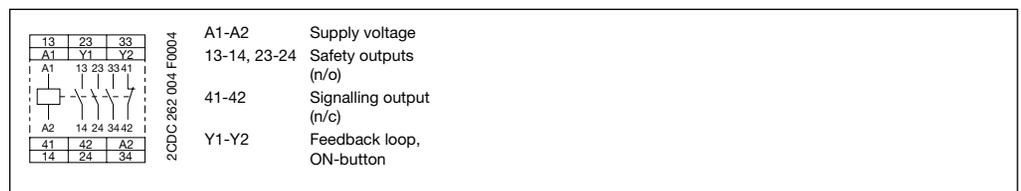
Three LEDs (Power, Channel 1, Channel 2) indicate the operating state and function.

When the EMERGENCY STOP button or the limit switch is unlocked and when the ON-button is pressed, the internal circuits of the safety relays and the external contactors are checked for proper functioning.

#### Block diagram C573



#### Connection diagram C573



Type	Supply voltage $U_c$	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C573	24 V DC/AC	1SAR 501 031 R0001	1		0.28 / 0.62

<sup>1)</sup> Possible in combination with additional external measures. Information given in brackets only apply if cables and sensors are installed safely and mechanically protected.

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# Safety relays C576 and C577

## Ordering details

1SAR 501 120 F0001

**C576**

1SAR 501 220 F0001

**C577**

**C576:**

- Auto-Start

**C577:**

- Monitored Start

**C567 and C577:**

- Cross circuit detection at EMERGENCY STOP button or limit switch
- 24 V DC at the EMERGENCY STOP button
- Two-channel connection
- Feedback loop for monitoring of external contactors
- Safety outputs: 2 n/o contacts, positively guided
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4

### EMERGENCY STOP monitor and safety gate monitor C576 and C577

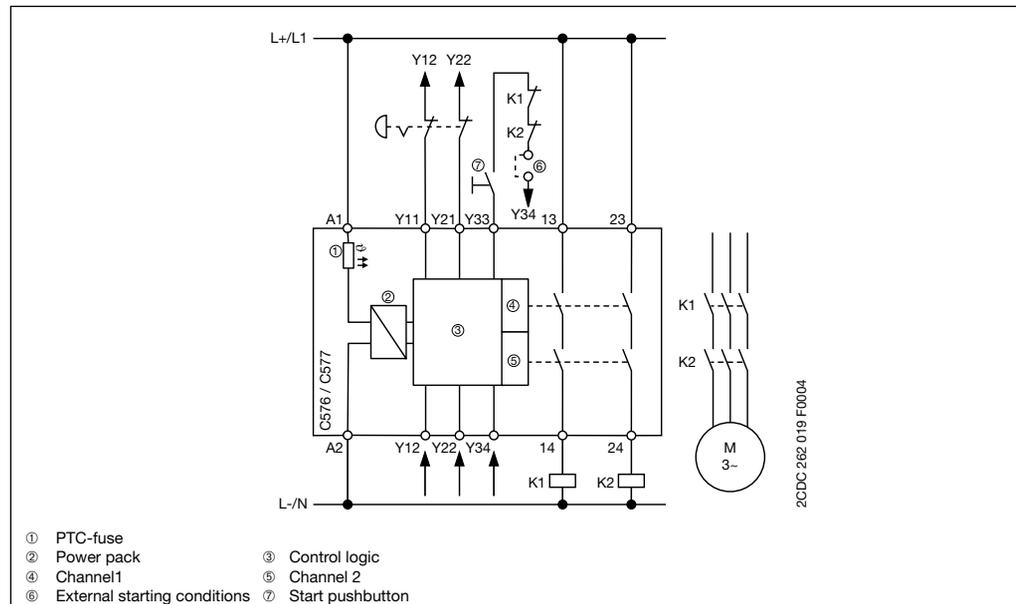
#### Application

The safety relays C576 and C577 can be used in safety circuits according to VDE 0113 Part 1 (11.98) or EN 60 204-1 (11.98), e. g. with movable covers and safety gates, the C577 in EMERGENCY STOP circuits according to EN 418. Depending on external connections, safety categories B, 1, 2, 3 or 4 according to DIN EN 954-1 are achievable.

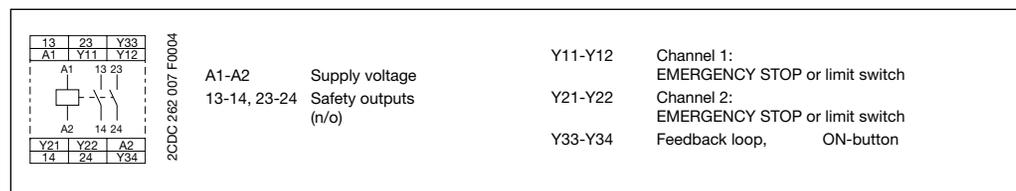
#### Functions

The safety relays C576 and C577 have two enabling circuits (safety outputs) configured as n/o contacts. The number of enabling circuits can be increased by adding one or more C579 extension units. Three LEDs (Power, Channel 1, Channel 2) indicate operating state and function. When the EMERGENCY STOP button or the limit switch is unlocked and when the ON-button is pressed, the internal circuit of the safety relay and the external contactors are checked for proper functioning. On the C577, the ON circuit Y33-Y34 is checked for short circuit. This means that a fault is detected when Y33-Y34 is closed before the EMERGENCY STOP button is closed.

#### Block diagram C576 and C577



#### Connection diagram C576 and C577



Type	Supply voltage U <sub>c</sub>	Start	Order code	Pack unit piece	Price 1 piece	Weight 1 piece kg / lb
<b>C576</b>	24 V AC/DC	auto	<b>1SAR 501 120 R0001</b>	1		0.27 / 0.60
<b>C577</b>	24 V AC/DC	monitored	<b>1SAR 501 220 R0001</b>	1		0.28 / 0.62

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2CDC 261 050 F0007

**C572**



2CDC 262 003 F0004



3

# Safety relays C574

## Ordering details

2CDC 261 051 F0007

### C574

- Auto-start or monitored start (depending on device)
- Short circuit protection
- Single- or two-channel connection
- Feedback loop for monitoring of external contactors
- Off-delay  $T_v$  continuously adjustable
- Safety outputs: 2 n/o contacts (stop cat. 0), 2 n/o contacts (stop cat. 1), time delayed, pos. guided
- Signalling output: 1 n/c contact, positively guided
- 5 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4<sup>1)</sup>

## EMERGENCY STOP monitor and safety gate monitor with time delay C574

### Application

The safety relay C574 can be used in EMERGENCY STOP devices according to EN 418, in safety circuits according to VDE 0113 Part 1 (06.93) and/or EN 60 204-1 (12.97), such as for monitoring safety gates, or in circuits with controlled stand-still requirement (STOP Category 1). Depending on the external circuitry, this device can be used to realize safety categories B, 1, 2, 3 or 4<sup>1)</sup> for undelayed enabling circuits according to DIN EN 954-1.

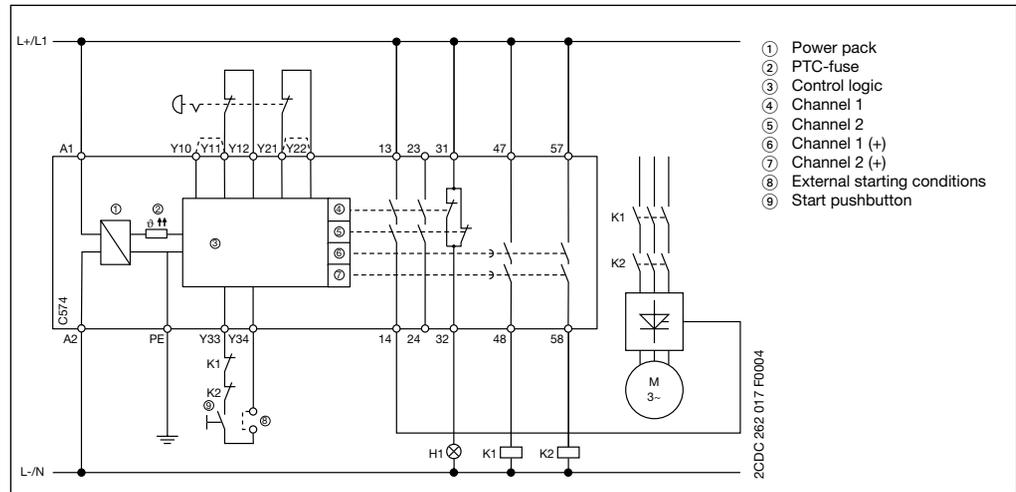
### Functions

The C574 safety relay possesses two delayed and two undelayed enabling circuits (safety outputs) as n/o contacts and one undelayed signal output as n/c contact.

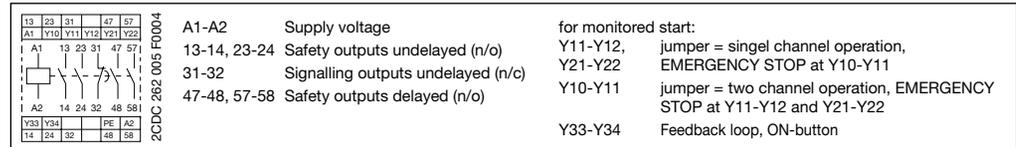
Five LEDs (Power, Channel 1, Channel 2, delayed channel 1, delayed channel 2) indicate the operating status and the functions.

The redundant safety relays, the electronics and the operated motor contactors are tested for proper functioning when the EMERGENCY STOP button or the limit switch button is unlatched, and when ON circuit Y33-Y34 is closed. On the C574 (monitored start), the ON circuit Y33-Y34 is checked for short circuit. This means that a fault is detected when Y33-Y34 is closed before the EMERGENCY STOP button is closed.

### Block diagram C574



### Connection diagram C574



Type	Supply voltage $U_c$	Off-delay $T_v$	Start	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
<b>C574</b>	24 V DC	0,5-30 s	monitored	<b>1SAR 503 041 R0003</b>	1		0.50 / 1.10
	24 V AC			<b>1SAR 503 041 R0002</b>	1		0.50 / 1.10
	115 V AC			<b>1SAR 503 041 R0004</b>	1		0.65 / 1.43
	230 V AC			<b>1SAR 503 041 R0005</b>	1		0.65 / 1.43
<b>C574</b>	24 V DC	0,5-30 s	auto	<b>1SAR 503 141 R0003</b>	1		0.50 / 1.10
	24 V AC			<b>1SAR 503 141 R0002</b>	1		0.50 / 1.10
	115 V AC			<b>1SAR 503 141 R0004</b>	1		0.65 / 1.43
	230 V AC			<b>1SAR 503 141 R0005</b>	1		0.65 / 1.43
<b>C574</b>	24 V DC	0,05-3 s	monitored	<b>1SAR 533 241 R0003</b>	1		0.50 / 1.10
	24 V AC			<b>1SAR 533 241 R0002</b>	1		0.50 / 1.10
	115 V AC			<b>1SAR 533 241 R0004</b>	1		0.65 / 1.43
	230 V AC			<b>1SAR 533 241 R0005</b>	1		0.65 / 1.43
<b>C574</b>	24 V DC	0,05-3 s	auto	<b>1SAR 533 141 R0003</b>	1		0.50 / 1.10
	24 V AC			<b>1SAR 533 141 R0002</b>	1		0.50 / 1.10
	115 V AC			<b>1SAR 533 141 R0004</b>	1		0.65 / 1.43
	230 V AC			<b>1SAR 533 141 R0005</b>	1		0.65 / 1.43

<sup>1)</sup> For undelayed enabling circuits only.

# Safety relays C575

## Ordering details

2CDC 261 052 F0007

### C575

- Two-Hand control acc. to EN 574 Type III C
- 24 V DC at the two-hand control switches
- Simultaneity monitoring: 0.5 s
- Cross circuit detection
- Feedback loop for monitoring of external contactors
- Safety outputs: 2 n/o contacts, positively guided
- Signaling contacts: 2 n/c contacts, positively guided
- 5 LEDs for status indication
- Safety category acc. to EN type III C: B4

### TWO-HAND control C575

#### Application

C575 is suitable for installation in controls for presses: Hydraulic presses DIN EN 693, eccentric and related presses EN 692, screw presses EN 692.

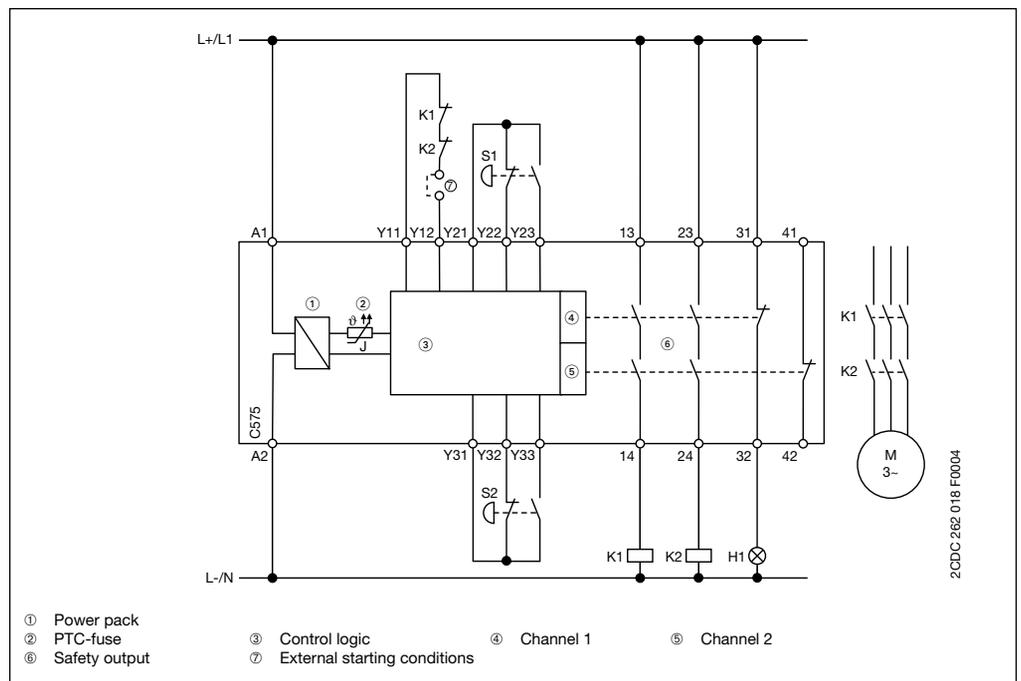
#### Functions

The two-hand control unit C575 possesses two enabling circuits (safety outputs) configured as n/o contacts and two signal outputs configured as n/c contacts.

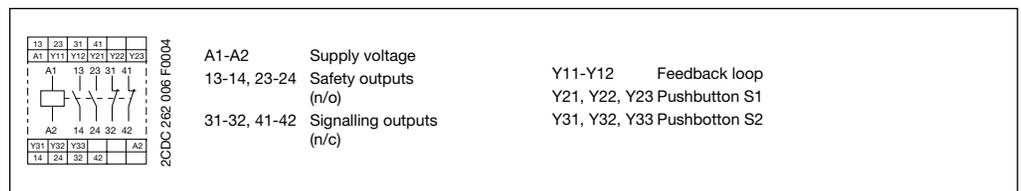
Five LEDs (Power, S1 ON, S1 OFF, S2 ON, S2 OFF) indicate the operating status and the functions.

The safety outputs are closed by simultaneous operation (< 0.5 s) of the pushbuttons S1 and S2. If one pushbutton is no longer pressed, the outputs open. They do not close again until both pushbuttons are no longer pressed and then simultaneously pressed again.

### Block diagram C575



### Connection diagram C575



Type	Supply voltage $U_c$	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
<b>C575</b>	24 V DC	<b>1SAR 504 022 R0003</b>	1		0.42 / 0.93
	24 V AC	<b>1SAR 504 022 R0002</b>	1		0.42 / 0.93
	115 V AC	<b>1SAR 504 022 R0004</b>	1		0.52 / 1.15
	230 V AC	<b>1SAR 504 022 R0005</b>	1		0.52 / 1.15

<sup>1)</sup> According to EN 574, Type III C

• Approvals .....	144	• Technical data .....	160
• Dimensional drawings .....	161		

# Safety relays - Contact expansion

## C579

### Ordering details

1SAR 502 140 F0001

#### C579

- 1 safety output contact of the basic device is required for connection to the extension unit.
- Safety outputs: 4 n/o contacts, positively guided
- 2 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4 depending on the external connection

#### Extension unit C579 for contact expansion

##### Applications

The C579 extension unit can be used in combination with all C57x basic units. It extends the number of enabling circuits. Depending on the external connection, safety categories B, 1, 2, 3 or 4 according to DIN EN 954-1 are achievable with this device.

##### Functions

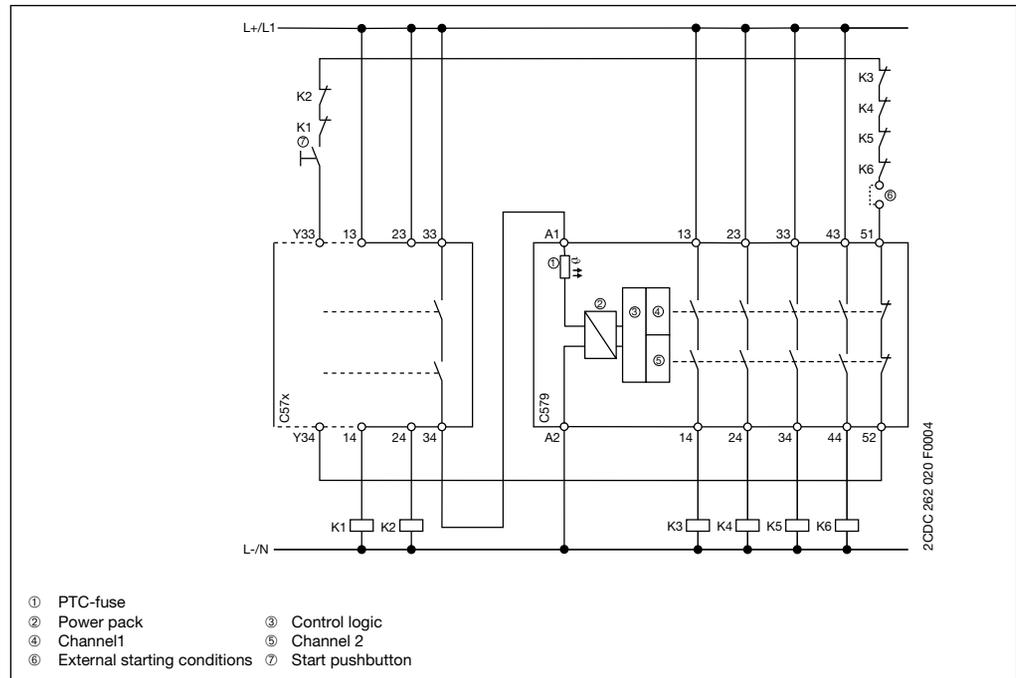
The C579 extension unit has four enabling circuits (safety circuits) configured as n/o circuits.

Two LEDs (channel 1, channel 2) indicate operating state and function.

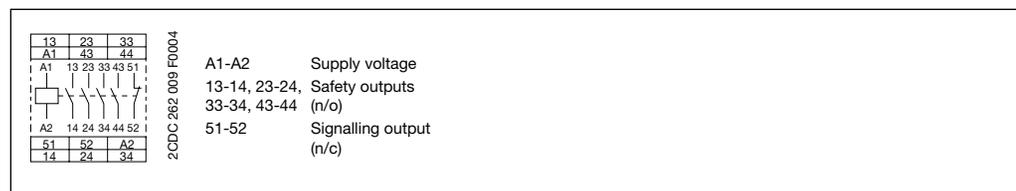
The device is controlled via one enabling circuit of the safety relays C57x.

When the EMERGENCY STOP pushbutton or the limit switch is unlocked and the ON-button is pressed, the internal circuit of the safety relay and the external contactors are checked for correct functioning.

#### Block diagram C579



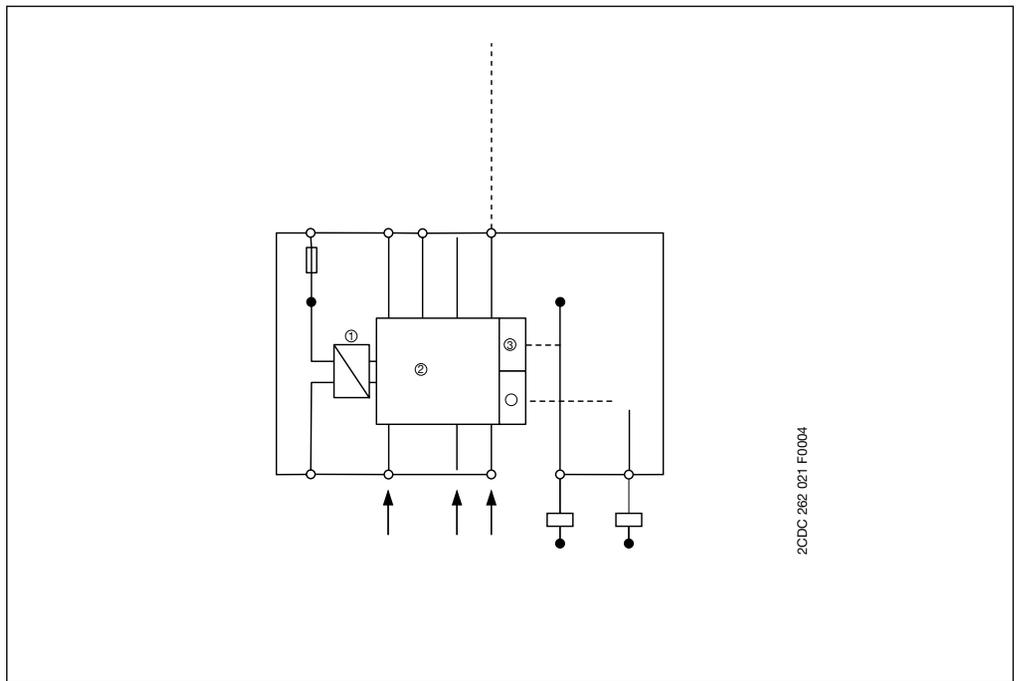
#### Connection diagram C579



Type	Supply voltage $U_c$	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
<b>C579</b>	24 V AC/DC	<b>1SAR 502 040 R 0001</b>	1		0.28 / 0.62
<b>C579-AC</b>	115 V AC	<b>1SAR 502 040 R 0004</b>	1		0.31 / 0.68
<b>C579-AC</b>	230 V AC	<b>1SAR 502 040 R 0005</b>	1		0.31 / 0.68

• Approvals .....	144	• Technical data .....	160
• Dimensional drawings .....	161		

C6700



# Safety relay with solid-state outputs C6701

## Ordering details

2CDC 261 027 F0004

### C6701

- Auto-start / monitored start
- Cross circuit detection configurable
- Feedback loop for monitoring of external contactors
- 2 solid-state components à 1,5 A
- Cascading input
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4
- Safety integrity level acc. to IEC 61508: SIL 1, SIL 2, SIL 3

### Electronic safety relay with solid-state output C6701

#### Application

The C6701 safety relay can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to EN 60 204-1 (11.98), e.g. in movable guards and safety gates. Depending on the external circuit elements, safety categories B, 1, 2, 3 or 4 according to DIN EN 954-1 or SIL 1, SIL 2 or SIL 3 according to IEC 61508 can be achieved.

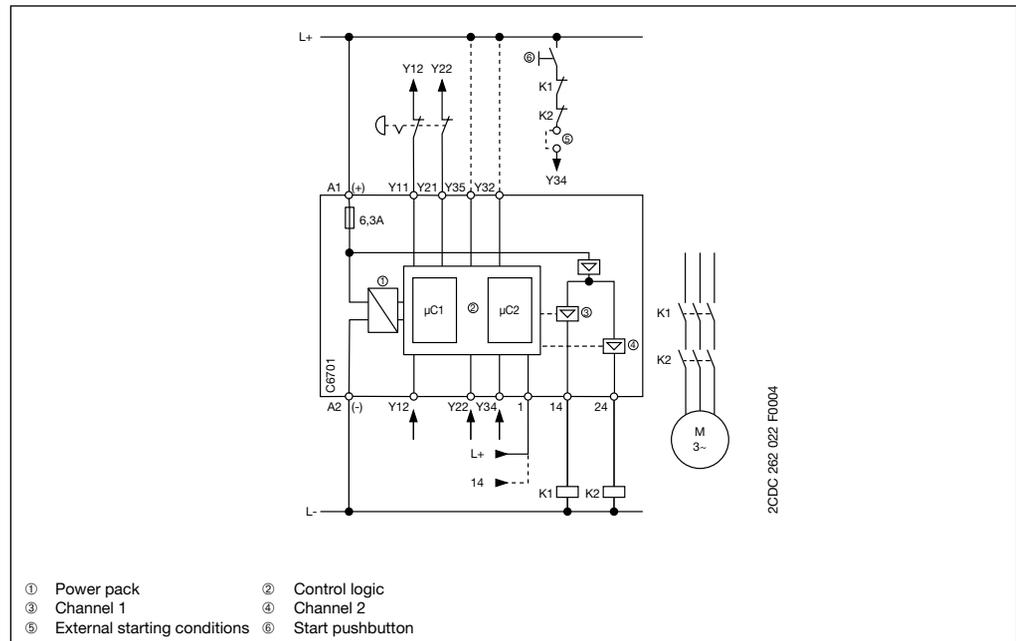
#### Functions

The C6701 safety relay has two reliable solid-state outputs.

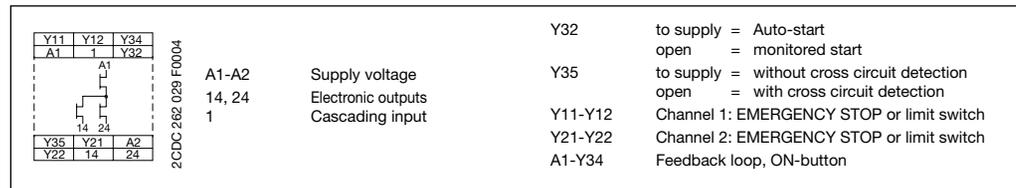
Three LEDs (Power, Run, Fail) indicate the operating state and the function.

When the device is put into operation it runs through a self-test to test the correct functioning of the internal electronics. All internal circuit components are monitored for faults cyclically during operation. External actuators or loads can be switched via safe outputs 14 and 24.

#### Block diagram C6701



#### Connection diagram C6701



Type	Supply voltage $U_c$	Release time after EMERG. STOP	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
<b>C6701</b>	24 V DC	30 ms min.	<b>1SAR 511 320 R0003</b>	1		0.17 / 0.37

• Approvals .....	145	• Technical data .....	162
• Dimensional drawings .....	163		

# Safety relays with solid-state outputs C6702

## Ordering details

2CDC261 028 F0004

### C6702

- Auto-start / monitored start
- Cross circuit detection configurable
- Feedback loop for monitoring of external contactors
- 2 Safety outputs à 1,5 A:  
1 solid-state component undelayed: stop category 0  
1 solid-state component delayed (delay time adjustable from 0,05-3 s or 0,5-30 s): stop category 1
- Cascading input
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4
- Safety integrity level acc. to IEC 61508: SIL 1, SIL 2, SIL 3

### Electronic safety relays with solid-state output C6702

#### Application

The C6702 safety relays can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to EN 60 204-1 (11.98), e.g. in movable guards and safety gates. Depending on the external circuit elements, safety categories B, 1, 2, 3 or 4 according to DIN EN 954-1 or SIL 1, SIL 2 or SIL 3 according to IEC 61508 can be achieved.

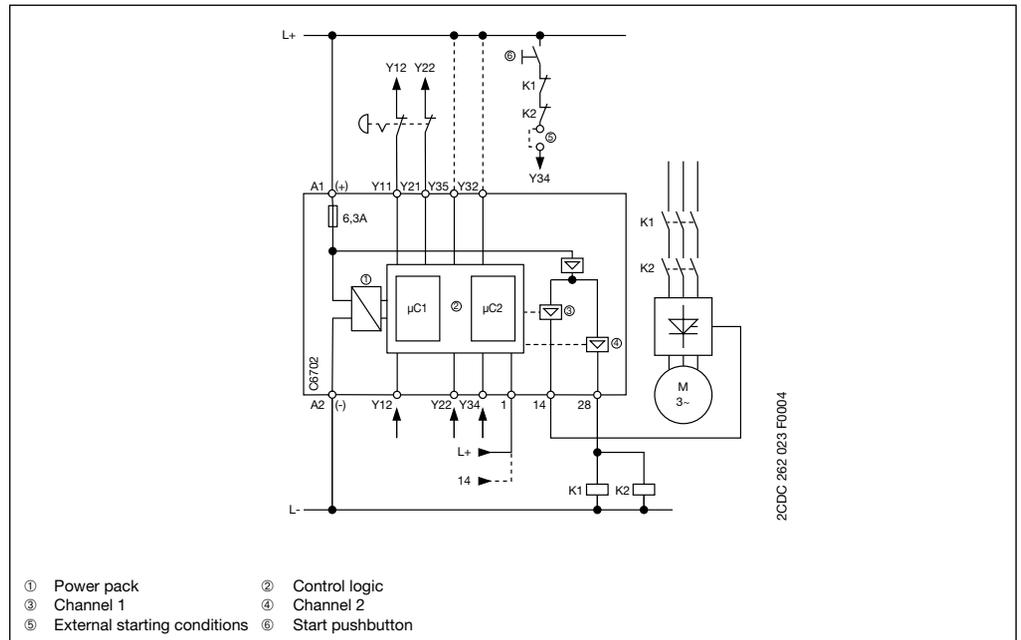
#### Functions

The C6702 solid-state safety relays have one safe solid-state output and one time-delayed safe solid-state output.

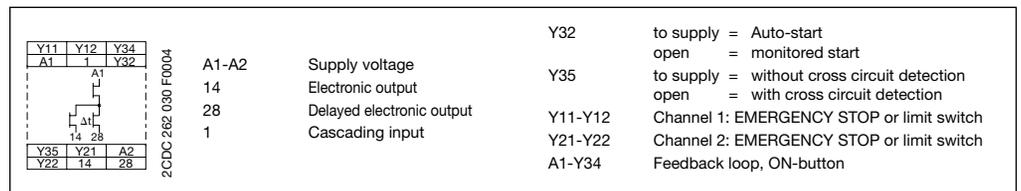
Three LEDs (Power, Run, Fail) indicate the operating state and the function.

When the device is put into operation it runs through a self-test to test the correct functioning of the internal electronics. All internal circuit components are monitored for faults cyclically during operation. External actuators or loads can be switched via safe outputs 14 and 28.

#### Block diagram C6702



#### Connection diagram C6702



Type	Supply voltage $U_c$	Release time after EMERG. STOP	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
<b>C6702</b>	24 V DC	0.05-3 s	<b>1SAR 543 320 R0003</b>	1		0.17 / 0.37
<b>C6702</b>	24 V DC	0.5-30 s	<b>1SAR 513 320 R0003</b>	1		0.17 / 0.37

• Approvals ..... 145      • Technical data ..... 162  
• Dimensional drawings ..... 163

# Safety relays

## C57x range

### Technical data

Type	C571(-AC)	C573	C576	C577	C579(-AC)	C572	C574	C575	
<b>Input circuit</b>	<b>A1-A2</b>								
Supply voltage	see ordering details								
Supply voltage tolerance	AC	-15 % ... +10 %							
	DC	-15 % ... +20 %				-15 % ... +10 %			
Power consumption	1.5 W / VA					3 W / VA	4 W / VA	3 W / VA	
Duty time	100 %								
Mains buffering	60 ms	60 ms	30 ms	80 ms	35 ms	100 ms	30 ms	40 ms	
<b>Time response - Control circuit</b>									
Response time					≤ 30 ms <sup>1)</sup>			≤ 100 ms	
monitored start	-	-	-	≤ 30 ms	-	≤ 25 ms	≤ 80 ms	-	
auto-start	≤ 200 ms <sup>2),3)</sup>	≤ 200 ms <sup>2)</sup>	-	-	-	≤ 150 ms	≤ 80 ms	-	
Release time								≤ 20 ms	
at EMERGENCY STOP	≤ 200 ms	≤ 200 ms	≤ 80 ms	≤ 20 ms	-	≤ 25 ms	≤ 25 ms	-	
at power failure	≤ 200 ms	≤ 200 ms	≤ 100 ms	≤ 150 ms	≤ 25 ms <sup>4)</sup>	≤ 350 ms	≤ 100 ms	-	
Recovery time								≥ 250 ms	
at EMERGENCY STOP	≥ 200 ms	≥ 200 ms	≥ 200 ms	≥ 400 ms	-	≥ 200 ms	after time lapse	-	
at power failure	≥ 200 ms	≥ 200 ms	≥ 200 ms	≥ 600 ms	≥ 100 ms	≥ 500 ms	≥ 1 s	-	
Minimum control pulse length / time	EMERGENCY STOP	≥ 200 ms <sup>3)</sup>	≥ 200 ms	≥ 25 ms	≥ 25 ms	-	≥ 25 ms	≥ 25 ms	-
	ON-button	≥ 150 ms <sup>3)</sup>	≥ 150 ms	≥ 40 ms	≥ 25 ms	-	≥ 25 ms	≥ 25 ms	-
Simultaneity	unlimited							500 ms	
<b>Output circuits</b>									
Kind of output	2 n/o	3 n/o + 1 n/c	2 n/o	2 n/o	4 n/o	3 n/o + 2 n/c	4 n/o <sup>8)</sup> + 1 n/c	2 n/o + 2 n/c	
Contact material									
Rated switching current (IEC 60947-5-1)	AC15 1150 V	5 A				6 A	5 A / 2 A <sup>5)</sup>	6 A	
	AC15 230 V	5 A				6 A	5 A / 2 A <sup>5)</sup>	6 A	
	DC13 24 V	5 A				6 A	5 A / 2 A <sup>5)</sup>	6 A	
Rated thermal current	5 A				6 A	5 A	6 A		
for 2-4 release circuits at T <sub>a</sub> = 70 °C	2 RC: 4 A		3 RC: 3.5 A		4 RC: 3 A		5 A	4 A	5 A
at T <sub>a</sub> = 60 °C	2 RC: 4.5 A		3 RC: 4 A		4 RC: 3.5 A		6 A	5 A	6 A
at T <sub>a</sub> = 50 °C	2 RC: 5 A		3 RC: 4.5 A		4 RC: 4 A		6 A	5 A	6 A
Mechanical lifetime	1x10 <sup>7</sup> switching cycles								
Electrical lifetime	1x10 <sup>5</sup> switching cycles								
Operating frequency	1000/h at load with rated switching current								
Short-circuit proof I <sub>kn</sub> = 1 kA <sup>6)</sup> , max. fuse rating	6 A slow, 10 A fast <sup>7)</sup>								
<b>General data</b>									
Dimensions (W x H x D)	22.5 x 102 x 120 mm (0.89 x 4.02 x 4.72 inch)					45 x 102 x 120 mm (1.77 x 4.02 x 4.72 inch)			
Mounting position	any								
Degree of protection enclosure / terminals	IP40 / IP20					IP20 / IP20			
Ambient temperature range	operation		-25...+60 °C						
	storage		-40...+80 °C						
Mounting	DIN rail (EN 50022)								

<sup>1)</sup> at 115 V AC, 230 V AC: max. 200 ms

<sup>2)</sup> at 24 V AC: max. 300 ms

<sup>3)</sup> at 115 V AC, 230 V AC: max. 300 ms

<sup>4)</sup> at 115 V AC, 230 V AC: max. 80 ms

<sup>5)</sup> undelayed / delayed release circuits

<sup>6)</sup> other fuses on request

<sup>7)</sup> signal circuit of C573 = 6 A

<sup>8)</sup> 2 undelayed and 2 delayed n/o contacts

# Safety relays

## C57x range

Technical data (continued), dimensional drawings

Type	C571(-AC)	C573	C576	C577	C579	C572	C574	C575
<b>Electrical connection</b>								
Wire size rigid	2 x 2.5 mm <sup>2</sup> / 1 x 4 mm <sup>2</sup> (1 x 12 AWG / 2 x 14 AWG)							
fine-strand with wire end ferrules	2 x 1.5 mm <sup>2</sup> / 1 x 2.5 mm <sup>2</sup> (2 x 16 AWG / 2 x 14 AWG)							
<b>Standards</b>								
Standards	EN 60204-1 (VDE 0113-1), EN 292, EN 954-1							
RoHs Directive	2002/95/EC							
Safety category (EN 954-1)	4 <sup>1)</sup>	4 <sup>1)</sup>	4	4	as basic device	4	4 <sup>2)</sup>	4
(EN 574)	-	-	-	-		-	-	-
Type-proof-test	10 a							
PFH	3 x 10 <sup>-7</sup> [1/h] <sup>3)</sup>		3 x 10 <sup>-8</sup> [1/h] <sup>3)</sup>		3 x 10 <sup>-9</sup> [1/h] <sup>3)</sup>	3 x 10 <sup>-8</sup> [1/h] <sup>3)</sup>		
Mechanical resistance (EN 60068)	8 g, 10 ms							
<b>Isolation data</b>								
Rated insulation voltage (VDE 0110, IEC 947-1)	300 V							
Rated impulse withstand voltage (VDE 0110, IEC 664)	4 kV							
Pollution degree (VDE 0110, IEC 664, IEC 255-5)	3							
Overvoltage category (VDE 0110)	III							

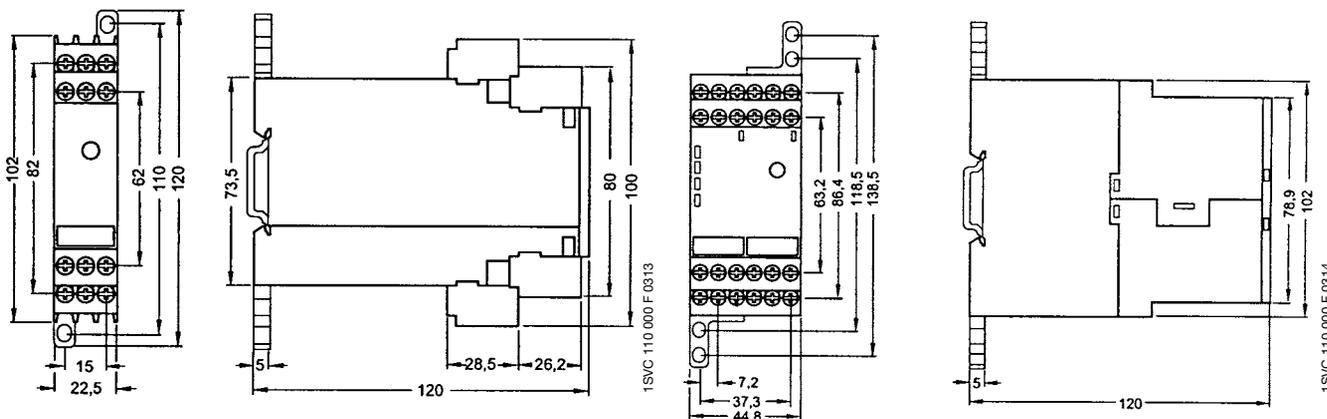


### Dimensional drawings

Dimensions in mm

C571, C573, C576, C577, C579

C572, C574, C575



<sup>1)</sup> Possible with additional external measures. The figures apply only if the cables and sensors are laid safely and protected mechanically. See also user manual and application manual.  
<sup>2)</sup> Possible with undelayed enable contact.  
<sup>3)</sup> according to target of IEC 61508-1 Tab 3



# Safety relays with solid-state outputs C67xx range

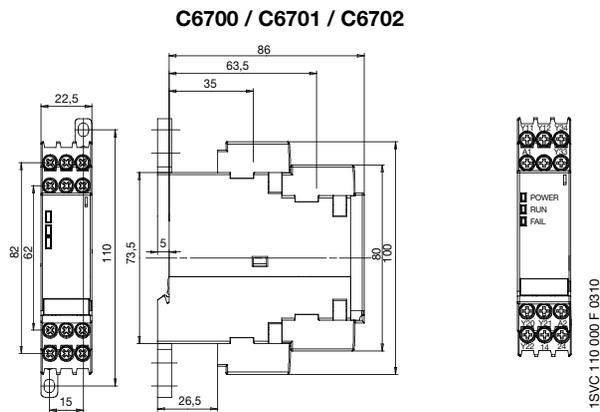
Technical data (continued), dimensional drawing

Type	C6700	C6701	C6702
<b>Standards</b>			
Standards	EN 60204-1 (VDE 0113-1), EN 292, EN 954-1, IEC 61508, DIN EN 0116 <sup>1)</sup>		
Safety category (EN 954-1)	3	4	4
Safety integrity level (IEC 61508)	2	3	3
Type-proof-test	10 a		
PFD	$9,18 \times 10^{-4}$	$2,347 \times 10^{-6}$	
PFH	$3 \times 10^{-7}$ [1/h] <sup>2)</sup>	$5,358 \times 10^{-11}$ [1/h] <sup>2)</sup>	
Mechanical resistance (EN 60068)	8 g / 10 ms, 15 g / 5 ms		
<b>Insulation data</b>			
Rated insulation voltage (VDE 0110, IEC 947-1)	50 V		
Rated impulse withstand voltage (VDE 0110, IEC 664)	500 V		
Pollution degree (VDE 0110, IEC 664, IEC 255-5)			
Overtoltage category (VDE 0110)			

3

## Dimensional drawing

Dimensions in mm



<sup>1)</sup> Electrical equipment of furnaces. VDE-Certificat for C6701 and C6702 available.

<sup>2)</sup> according to target of IEC 61508-1 Tab 3

