



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	■ ⁵⁾	■ ⁵⁾	■ ⁵⁾	■ ⁵⁾	■	■	■ ⁵⁾	-	-
	Safety gate monitoring	■	■	■	■	■ ⁶⁾	■	■ ⁶⁾	-	-
	Press control	-	-	-	-	-	-	-	■	-
	Cross circuit detection	-	-	■	■	■	■	■	■	-
Safety categorie acc. to EN 954-1 ¹⁾	B	■	■	■	■	■	■	■	■	■ ⁴⁾
	1	■	■	■	■	■	■	■	■	■ ⁴⁾
	2	■	■	■	■	■	■	■	■	■ ⁴⁾
	3	■	■	■	■	■	■	■	■	■ ⁴⁾
	4	■ ¹⁾	■ ¹⁾	■	■	■	■	■ ³⁾	■ ⁷⁾	■ ⁴⁾
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 ⁸⁾	■	■	■	■	-	■	■, -	-	-
	monitored	-	-	-	-	■	■	-, ■	-	-

■ existing
□ pending

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

- 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.
- 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.
- Possible with undelayed enable contact.
- The safety category acc. to EN 954-1 corresponds to those of the basic unit.
- The ON-button is not monitored. Valid only for C574 devices with auto-start.
- With monitored ON-button possible. Valid only for C574 devices with monitored start.
- Acc. to EN 574, type III C.
- 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 ¹⁾	2 ²⁾	1
	Enabling circuits Stop-Cat. 1	-	-	1 ³⁾
	Signaling circuits	-	⁴⁾	-
Start	automatic	■	■	■
	monitored	■	■	■

- existing
- pending

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

¹⁾ The outputs are only safe in connection with an external contactor.
²⁾ Can be used as electrical sensor input
³⁾ OFF-delay adjustable: 0.05-3 s or 0.5-30 s
⁴⁾ 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

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

Safety category according to EN 954-1

Classification of a machine into categories according to EN 954-1

Pursuant to the **Machinery Directive 98/37/EEC**, every machine must comply with the relevant directives and standards. Measures must be taken to keep the risk to persons below a tolerable extent.

This mandatory classification runs like a red thread from selection of the smallest limit switch through to the overall concept of the entire machine, always raising a permanent conflict between what is technically feasible and what is permitted on the basis of "pure theory".

In the first step, the project planner performs a risk evaluation acc. to **EN 1050 "Risk Assessment"**. This must take into account the machine's ambient conditions for instance. Then, any overall risk must be assessed. This risk assessment has to be conducted in a form that allows documentation of the procedure and the results achieved. The risks, dangers and possible technical measures to reduce risks and dangers must be stipulated in this risk assessment.

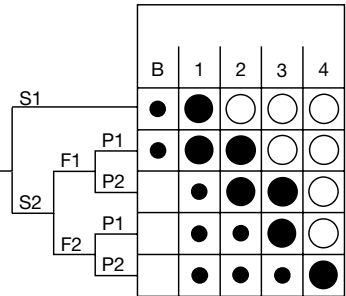
After stipulating the extent of the risk, the category on the basis of which the safety circuits are to be designed is determined with the aid of **EN 954-1 "Safety-Related Components of Controls"**.

The category determined this way defines the technical requirements applicable to the design of the safety equipment. There are five categories (B, 1, 2, 3 and 4), where B (standing for basic category) defines the lowest risk and thus also the minimum requirements applicable to the controller.

Thus: Depending on the application, not every technically feasible safety category is also permitted. For instance, in case of contactless protection devices (light barriers etc.) only categories 2 or 4 are permitted. In contrast, in case of tread mats, categories B to 4 can be used depending on risk assessment, provided that these categories can be reached at all owing to the design.

Possible selection of categories according to EN 954-1

Starting point for the risk assessment of the safety-related component of the controller.



2CDC262 001 F0004

S- Serious injuries

- S1** Slight (and normally reversible) injuries.
- S2** Serious (normally irreversible) injuries, including death.

F- Frequency and/or duration of the risk exposure

- F1** Rare to frequent and/or short duration of exposure.
- F2** Frequent to sustained and/or long duration of exposure.

P- Options for risk avoidance

- (generally referred to the speed and frequency at which the dangerous component moves and to the clearance from the dangerous component)
- P1** Possible under certain conditions.
- P2** Hardly possible.

B, 1, 2, 3 and 4: Categories for safety-related components of controls

- Preferred category.
- Possible category requiring additional measures.
- Disproportionately extensive measures by comparison with the risk.

Summary of the requirements for categories according to EN 954-1

Safety category ¹⁾	Summary of requirements	System behavior ²⁾	Principles for achieving safety
B	The safety-related components of controls and/or their protection devices and their components must be designed, constructed, selected, assembled and combined in compliance with the applicable standards, such that they can withstand the anticipated influences.	The occurrence of a fault may lead to loss of the safety function.	Predominantly characterized by selection of components!
1	The requirements of B must be complied with. Time-proven components and time-proven safety principles have to be applied.	The occurrence of a fault may lead to loss of the safety function but the probability of occurrence is less than in category B.	
2	The requirements of B and the use of the time-proven safety principles must be complied with. The safety function has to be checked at appropriate intervals by the machine control.	<ul style="list-style-type: none"> ■ The occurrence of a fault may lead to loss of the safety function between the inspection intervals. ■ The loss of the safety function is detected by the check/inspection. 	Predominantly characterized by the structure
3	The requirements of B and the use of the time-proven safety principles must be complied with. Safety related components must be designed in a way that: <ul style="list-style-type: none"> ■ a single fault in any of these components does not lead to loss of the safety function and ■ the individual fault is detected, whenever feasible in an appropriate manner. 	<ul style="list-style-type: none"> ■ If the single fault occurs, the safety function is always maintained. ■ Certain faults but not all faults are detected. ■ An accumulation of undetected faults may lead to loss of the safety function. 	
4	The requirements of B and the use of the time-proven safety principles must be complied with. Safety related components must be designed in a way that: <ul style="list-style-type: none"> ■ a single fault in any of these components does not lead to loss of the safety function and ■ the individual fault is detected at or before the next requirement applicable to the safety function or, if this is not possible, that an accumulation of faults may not lead to loss of the safety function. 	<ul style="list-style-type: none"> ■ If the faults occur, the safety function is always maintained. ■ The faults are detected in good time to prevent loss of the safety function. 	

¹⁾ The categories are not intended to be applied in any specific order or hierarchical arrangements with respect to the technical-safety requirements.

²⁾ The risk assessment will indicate whether full or partial loss of the safety function(s) as the result of fault is acceptable.

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.

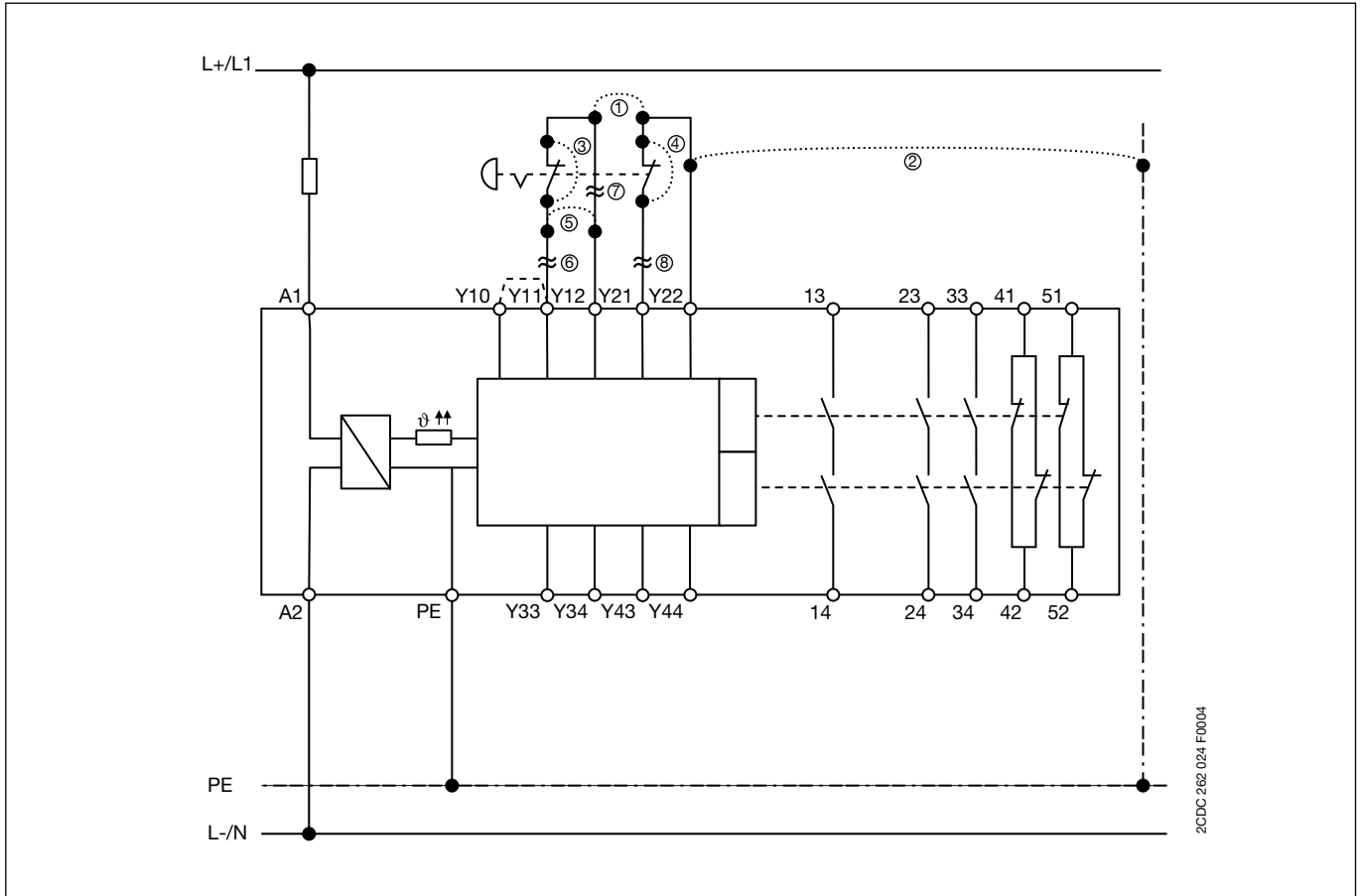
Safety relays

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



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, 4¹⁾

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 4¹⁾ according to DIN EN 954-1 are achievable.

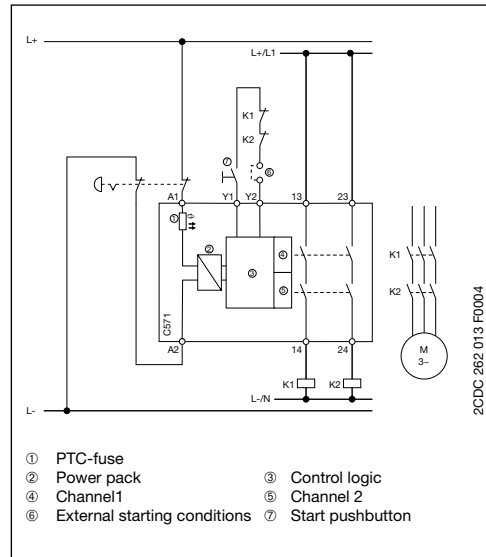
When the safety combination is used in "automatic start" mode, automatic restarting (according to EN 60 204-1, sections 9.2.5.4.2 and 10.8.3) must be prevented by the higher-level control system in the event of EMERGENCY STOP.

Functions

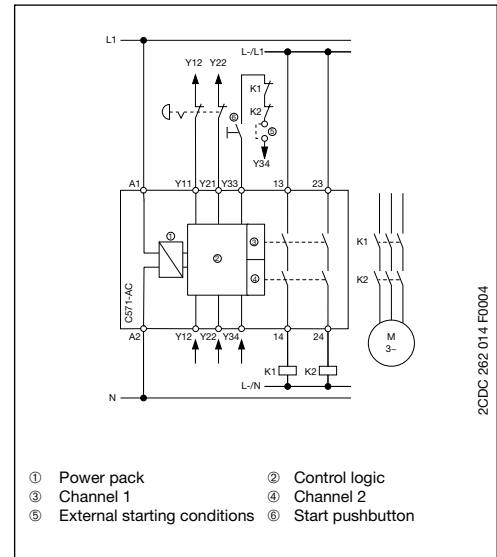
The safety relays C571 and C571-AC have two enabling (safe) circuits which are configured as n/o contacts. The number of enabling circuits can be increased by adding one or more C579 extension units. Three LEDs (Power, Channel 1, Channel 2) indicate the operating state and function.

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.

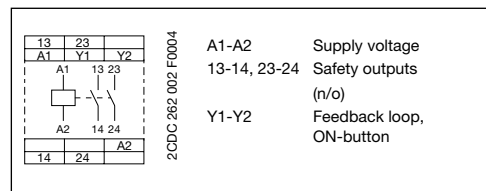
Block diagram C571



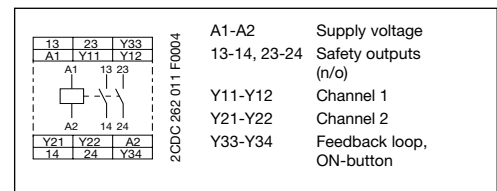
Block diagram C571-AC



Connection diagram C571



Connection diagram C571-AC



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

¹⁾ 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



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, 4¹⁾

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 4¹⁾ according to DIN EN 954-1 are achievable.

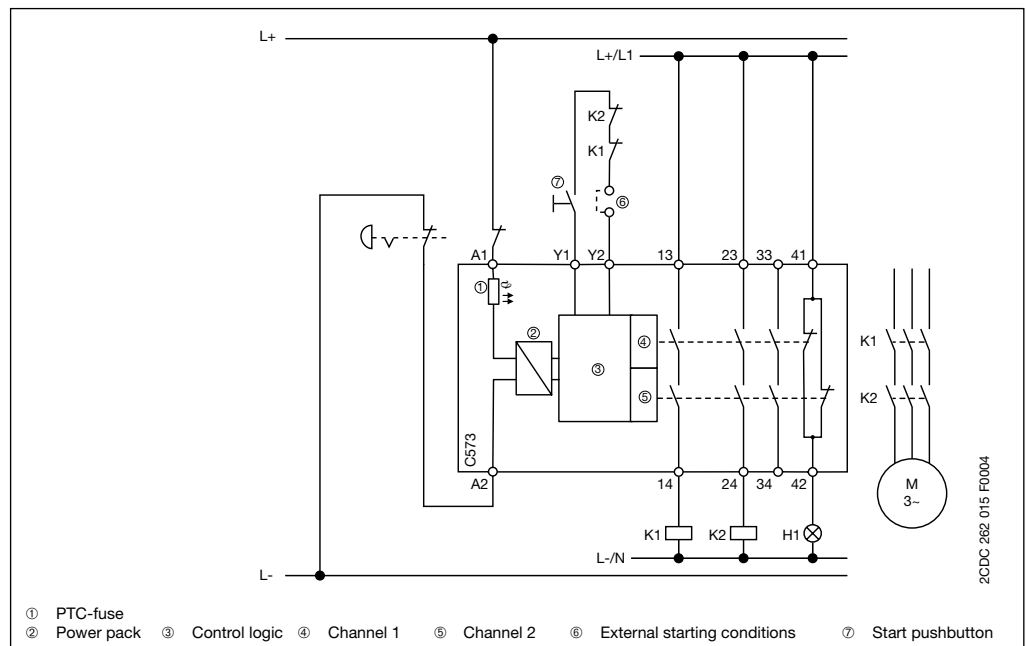
Functions

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.

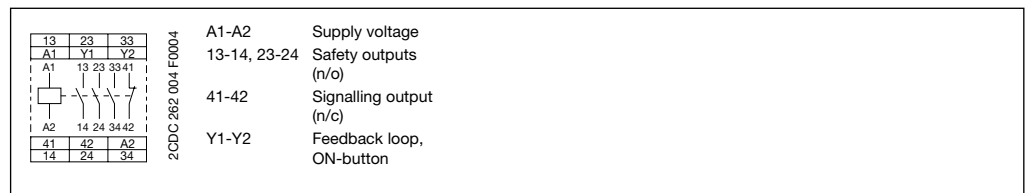
Three LEDs (Power, Channel 1, Channel 2) indicate the operating state and function.

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

¹⁾ 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



C576



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.

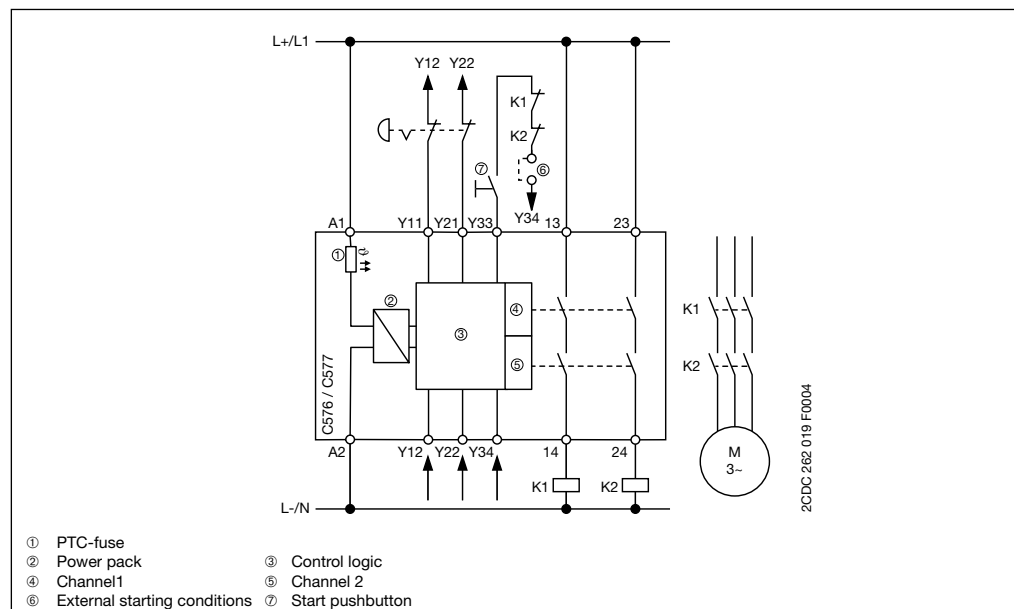
Functions

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.

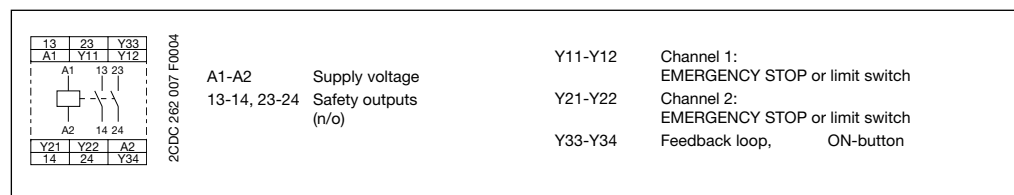
Three LEDs (Power, Channel 1, Channel 2) indicate operating state and function.

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 _c	Start	Order code	Pack unit piece	Price 1 piece	Weight 1 piece kg / lb
C576	24 V AC/DC	auto	1SAR 501 120 R0001	1		0.27 / 0.60
C577	24 V AC/DC	monitored	1SAR 501 220 R0001	1		0.28 / 0.62

• Approvals	144	• Technical data	160
• Dimensional drawings	161		

Safety relays C572

Ordering details



C572

- Auto-start / monitored start
- 24 V DC at EMERGENCY STOP button or limit switch
- Cross circuit detection at EMERGENCY STOP button or limit switch
- Feedback loop for monitoring of external contactors
- Safety outputs: 3 n/o contacts, positively guided
- Signalling contacts: 2 n/c 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 C572

Application

The safety relay C572 can be used in EMERGENCY STOP circuits according to EN 418, in safety circuits according to VDE 0113 Part 1 (06.93) and/or EN 60 204-1 (12.97), e.g. with movable covers and safety gates. Depending on the external connection, safety categories B, 1, 2, 3 or 4 according to DIN EN 945-1 are achievable with this device.

Functions

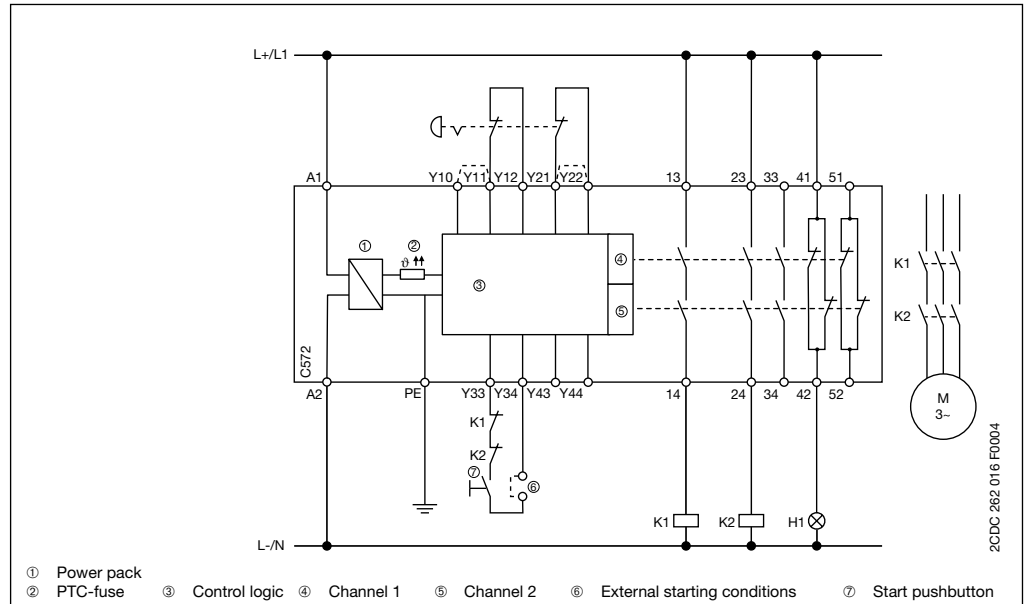
The safety relay C572 has three enabling circuits (safety outputs) which are configured as n/o contacts and two signal circuits configured as a n/c contact.

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

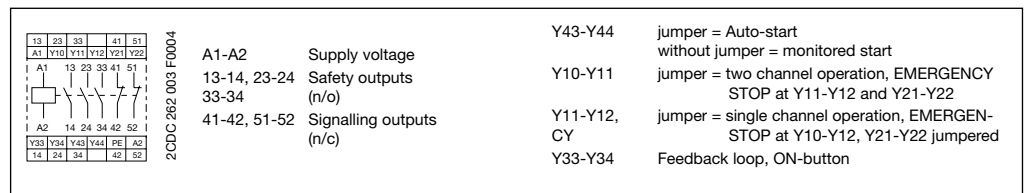
When the EMERGENCY STOP pushbutton or limit pushbutton is unlocked and the ON-button is pressed, the redundant safety relays, electronic circuitry and external contactors are tested for proper functioning.

On the C572, 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 C572



Connection diagram C572



Type	Supply voltage U_c	Order code	Pack. unit piece	Price 1 piece	Weight kg / lb
C572	24 V DC	1SAR 501 032 R0003	1		0.42 / 0.93
	24 V AC	1SAR 501 032 R0002	1		0.42 / 0.93
	115 V AC	1SAR 501 032 R0004	1		0.52 / 1.15
	230 V AC	1SAR 501 032 R0005	1		0.52 / 1.15

• Approvals	144	• Technical data	160
• Dimensional drawings	161		

Safety relays C574

Ordering details



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, 4¹⁾

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 4¹⁾ for undelayed enabling circuits according to DIN EN 954-1.

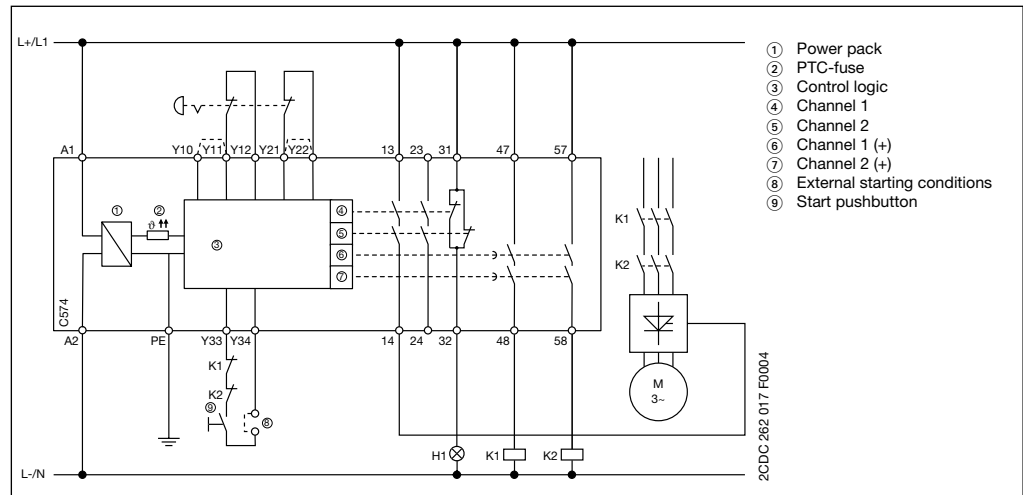
Functions

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.

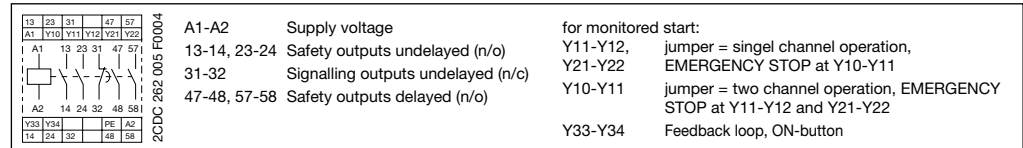
Five LEDs (Power, Channel 1, Channel 2, delayed channel 1, delayed channel 2) indicate the operating status and the functions.

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
C574	24 V DC	0,5-30 s	monitored	1SAR 503 041 R0003	1		0.50 / 1.10
	24 V AC			1SAR 503 041 R0002	1		0.50 / 1.10
	115 V AC			1SAR 503 041 R0004	1		0.65 / 1.43
	230 V AC			1SAR 503 041 R0005	1		0.65 / 1.43
C574	24 V DC	0,5-30 s	auto	1SAR 503 141 R0003	1		0.50 / 1.10
	24 V AC			1SAR 503 141 R0002	1		0.50 / 1.10
	115 V AC			1SAR 503 141 R0004	1		0.65 / 1.43
	230 V AC			1SAR 503 141 R0005	1		0.65 / 1.43
C574	24 V DC	0,05-3 s	monitored	1SAR 533 241 R0003	1		0.50 / 1.10
	24 V AC			1SAR 533 241 R0002	1		0.50 / 1.10
	115 V AC			1SAR 533 241 R0004	1		0.65 / 1.43
	230 V AC			1SAR 533 241 R0005	1		0.65 / 1.43
C574	24 V DC	0,05-3 s	auto	1SAR 533 141 R0003	1		0.50 / 1.10
	24 V AC			1SAR 533 141 R0002	1		0.50 / 1.10
	115 V AC			1SAR 533 141 R0004	1		0.65 / 1.43
	230 V AC			1SAR 533 141 R0005	1		0.65 / 1.43

¹⁾ 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.

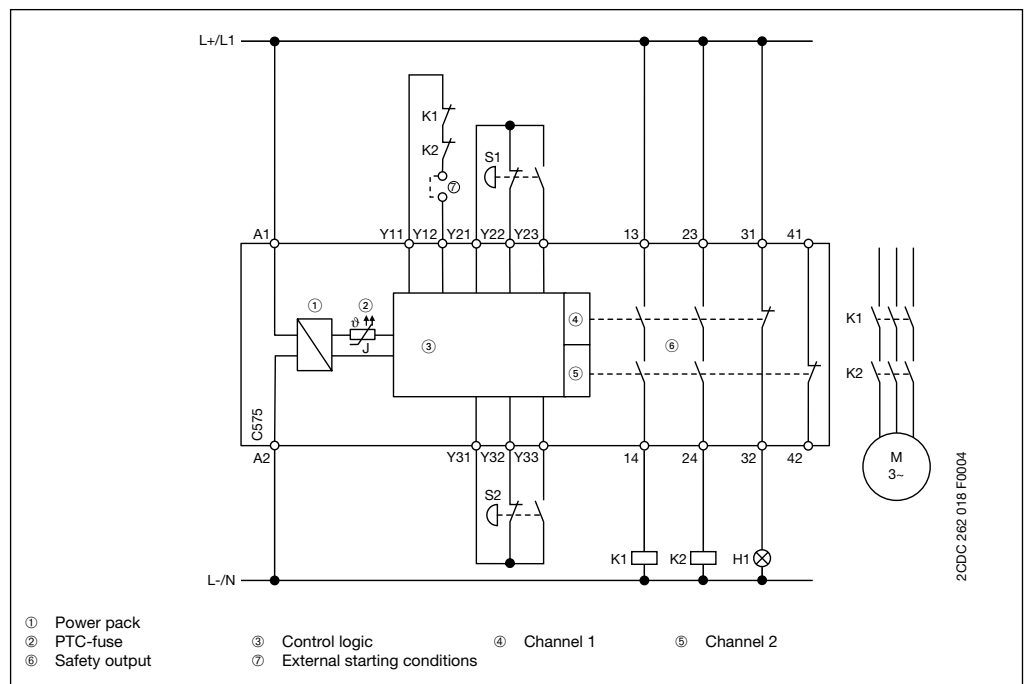
Functions

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.

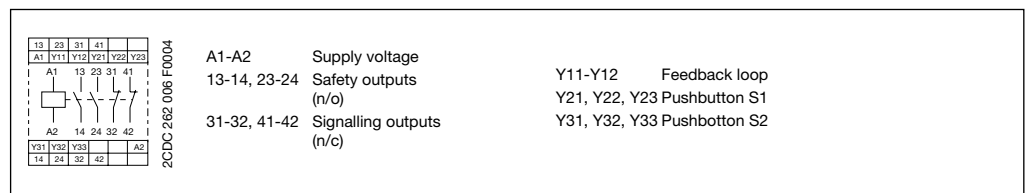
Five LEDs (Power, S1 ON, S1 OFF, S2 ON, S2 OFF) indicate the operating status and the functions.

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
C575	24 V DC	1SAR 504 022 R0003	1		0.42 / 0.93
	24 V AC	1SAR 504 022 R0002	1		0.42 / 0.93
	115 V AC	1SAR 504 022 R0004	1		0.52 / 1.15
	230 V AC	1SAR 504 022 R0005	1		0.52 / 1.15

¹⁾ 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

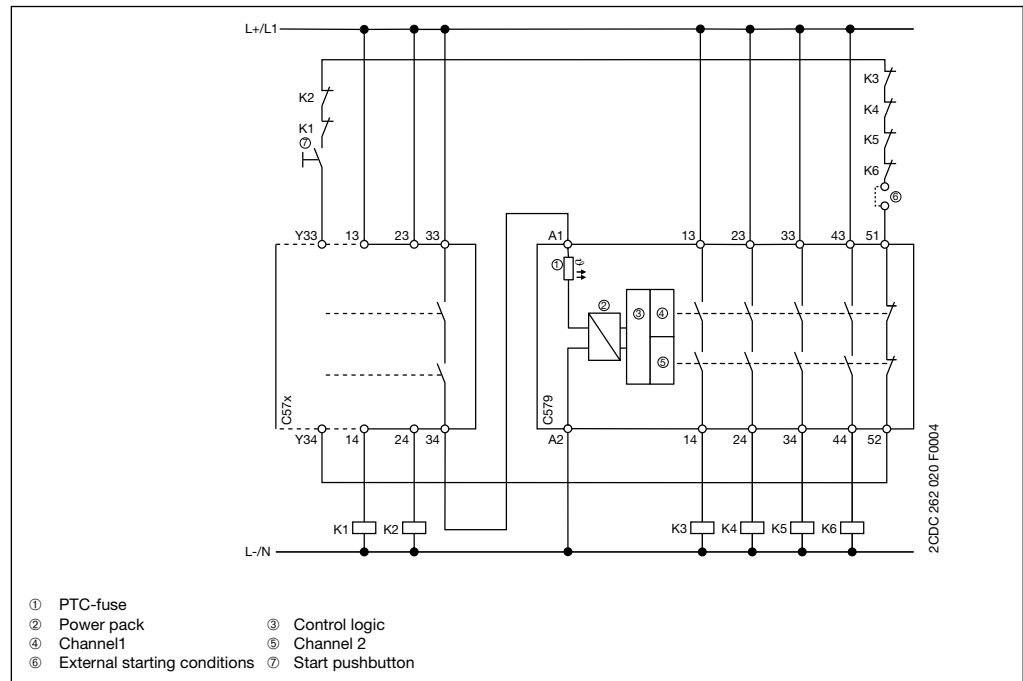
The C579 extension unit has four enabling circuits (safety circuits) configured as n/o circuits.

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

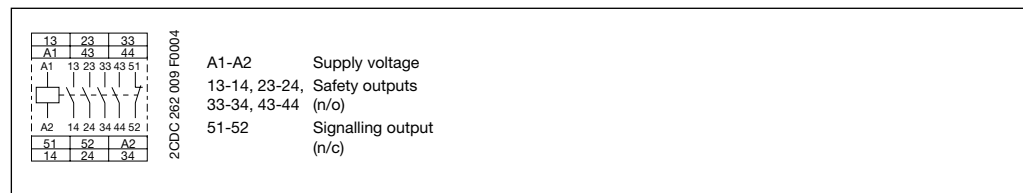
The device is controlled via one enabling circuit of the safety relays C57x.

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
C579	24 V AC/DC	1SAR 502 040 R 0001	1		0.28 / 0.62
C579-AC	115 V AC	1SAR 502 040 R 0004	1		0.31 / 0.68
C579-AC	230 V AC	1SAR 502 040 R 0005	1		0.31 / 0.68

• Approvals	144	• Technical data	160
• Dimensional drawings	161		

Safety relay with solid-state output C6700

Ordering details



C6700

- Auto-start / monitored start
- Feedback loop for monitoring of external contactors
- Safety outputs:
2 solid-state components á 0,5 A
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3
- Safety integrity level acc. to IEC 61508: SIL 1, SIL 2

Electronic safety relay with solid-state output C6700

Applications

The C6700 safety combination 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. for moving covers and safety gates. Safety categories B, 1, 2 or 3 according to DIN EN 954-1 or SIL 1 or SIL 2 according to IEC 61508 can be achieved, depending on the external circuits.

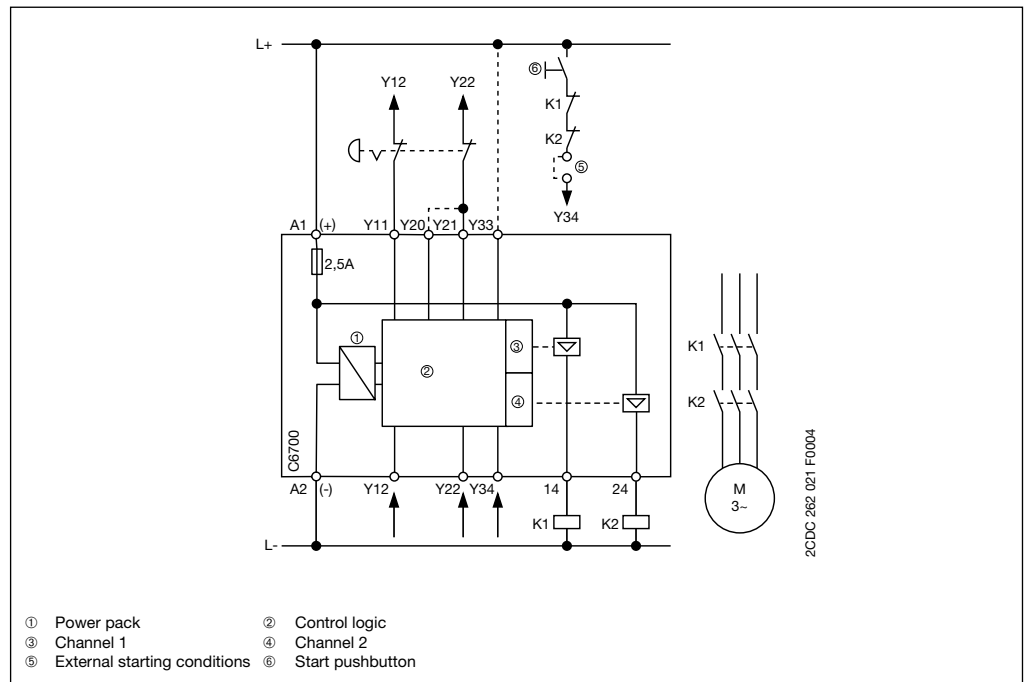
Functions

The C6700 safety relay has two solid-state outputs.

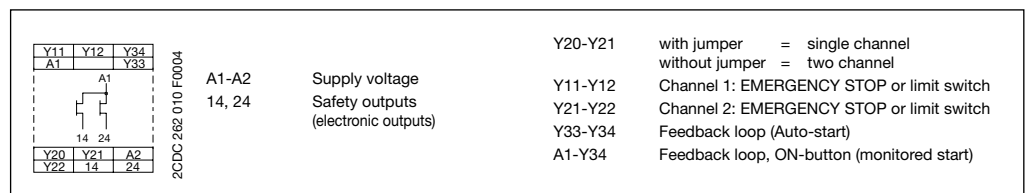
Three LEDs (Power, Run, Fail) indicate the operating state and the function.

During operation, all internal circuit elements are cyclically monitored for faults. Safety category 3 according to EN 954-1 is achieved only in combination with 2 external actuators with positively driven feedback contacts.

Block diagram C6700



Connection diagram C6700



Type	Supply voltage U_c	Release time after EMERG. STOP	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg /lb
C6700	24 V DC	< 30 ms	1SAR 510 120 R0003	1		0.18 / 0.40

• Approvals	145	• Technical data	162
• Dimensional drawings	163		



Safety relay with solid-state outputs C6701

Ordering details



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.

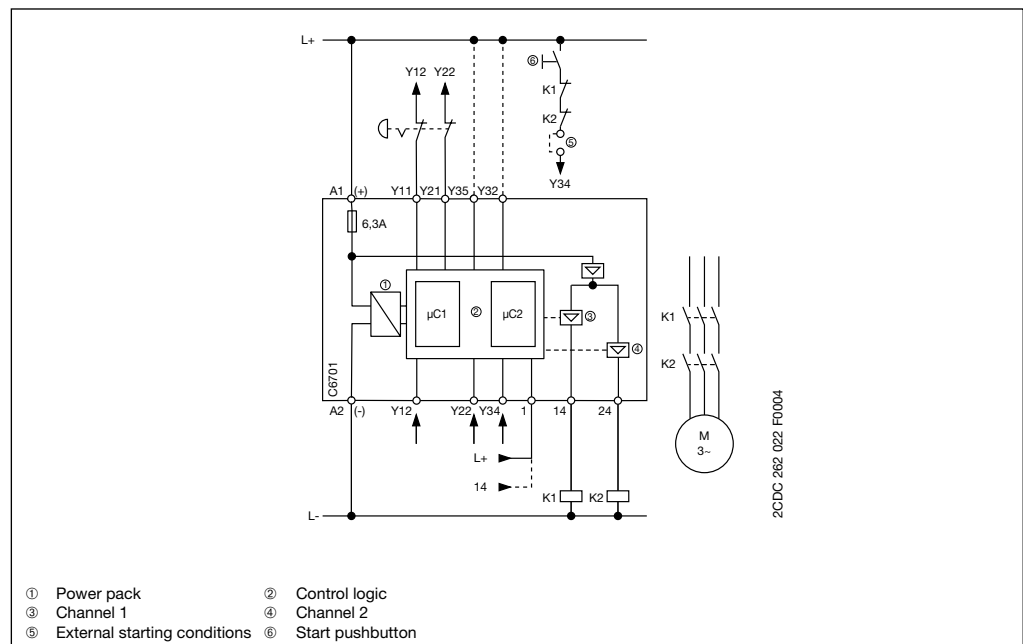
Functions

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

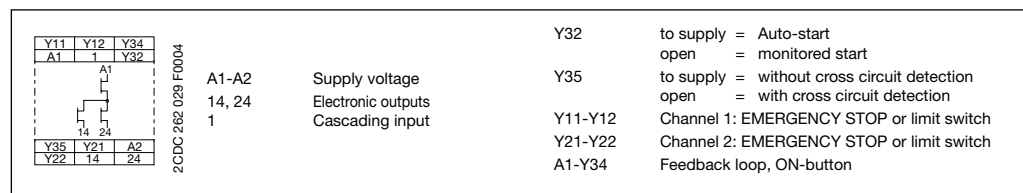
Three LEDs (Power, Run, Fail) indicate the operating state and the function.

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
C6701	24 V DC	30 ms min.	1SAR 511 320 R0003	1		0.17 / 0.37

• Approvals	145	• Technical data	162
• Dimensional drawings	163		

Safety relays with solid-state outputs C6702

Ordering details



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.

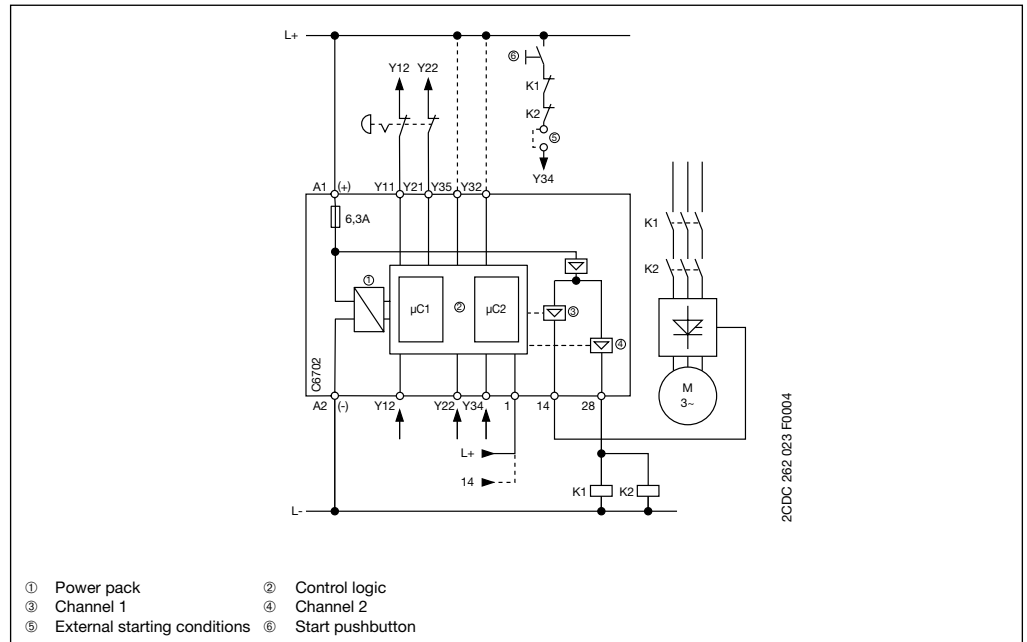
Functions

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

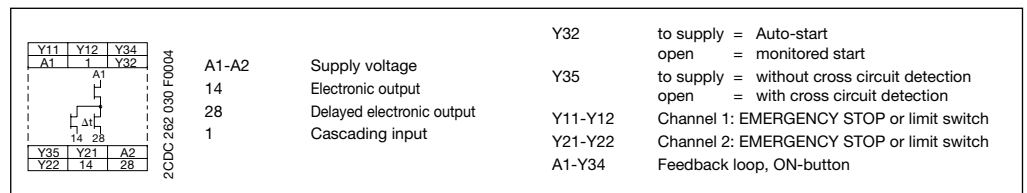
Three LEDs (Power, Run, Fail) indicate the operating state and the function.

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
C6702	24 V DC	0.05-3 s	1SAR 543 320 R0003	1		0.17 / 0.37
C6702	24 V DC	0.5-30 s	1SAR 513 320 R0003	1		0.17 / 0.37

• Approvals	145	• Technical data	162
• Dimensional drawings	163		



Safety relays

C57x range

Technical data

3

Type	C571(-AC)	C573	C576	C577	C579(-AC)	C572	C574	C575	
Input circuit	A1-A2								
Supply voltage	see ordering details								
Supply voltage tolerance	-15 % ... +10 %								
	AC	-15 % ... +20 %						-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	
Time response - Control circuit									
Response time						≤ 30 ms ¹⁾			
monitored start	-	-	-	≤ 30 ms	-	≤ 25 ms	≤ 80 ms	-	
auto-start	≤ 200 ms ^{2),3)}	≤ 200 ms ²⁾	-	-	-	≤ 150 ms	≤ 80 ms	-	
Release time									
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 ⁴⁾	≤ 350 ms	≤ 100 ms	-	
Recovery time									
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 ³⁾	≥ 200 ms	≥ 25 ms	≥ 25 ms	-	≥ 25 ms	≥ 25 ms	-	
ON-button	≥ 150 ms ³⁾	≥ 150 ms	≥ 40 ms	≥ 25 ms	-	≥ 25 ms	≥ 25 ms	-	
Simultaneity	unlimited							500 ms	
Output circuits									
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 ⁸⁾ + 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 ⁵⁾	6 A	
	AC15 230 V	5 A				6 A	5 A / 2 A ⁵⁾	6 A	
	DC13 24 V	5 A				6 A	5 A / 2 A ⁵⁾	6 A	
Rated thermal current	5 A					6 A	5 A	6 A	
for 2-4 release circuits at T _a = 70 °C	2 RC: 4 A		3 RC: 3.5 A		4 RC: 3 A		5 A	4 A	
at T _a = 60 °C	2 RC: 4.5 A		3 RC: 4 A		4 RC: 3.5 A		6 A	5 A	
at T _a = 50 °C	2 RC: 5 A		3 RC: 4.5 A		4 RC: 4 A		6 A	5 A	
Mechanical lifetime	1x10 ⁷ switching cycles								
Electrical lifetime	1x10 ⁵ switching cycles								
Operating frequency	1000/h at load with rated switching current								
Short-circuit proof I _{kc} = 1 kA ⁶⁾ , max. fuse rating	6 A slow, 10 A fast ⁷⁾								
General data									
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	-25...+60 °C								
operation	-25...+60 °C								
storage	-40...+80 °C								
Mounting	DIN rail (EN 50022)								

¹⁾ at 115 V AC, 230 V AC: max. 200 ms

²⁾ at 24 V AC: max. 300 ms

³⁾ at 115 V AC, 230 V AC: max. 300 ms

⁴⁾ at 115 V AC, 230 V AC: max. 80 ms

⁵⁾ undelayed / delayed release circuits

⁶⁾ other fuses on request

⁷⁾ signal circuit of C573 = 6 A

⁸⁾ 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
Electrical connection								
Wire size rigid	2 x 2.5 mm ² / 1 x 4 mm ² (1 x 12 AWG / 2 x 14 AWG)							
fine-strand with wire end ferrules	2 x 1.5 mm ² / 1 x 2.5 mm ² (2 x 16 AWG / 2 x 14 AWG)							
Standards								
Standards	EN 60204-1 (VDE 0113-1), EN 292, EN 954-1							
RoHs Directive	2002/95/EC							
Safety category (EN 954-1)	4 ¹⁾	4 ¹⁾	4	4	as basic device	4	4 ²⁾	4
(EN 574)	-	-	-	-		-	-	-
Type-proof-test	10 a							
PFH	3 x 10 ⁻⁷ [1/h] ³⁾		3 x 10 ⁻⁸ [1/h] ³⁾		3 x 10 ⁻⁹ [1/h] ³⁾	3 x 10 ⁻⁸ [1/h] ³⁾		
Mechanical resistance (EN 60068)	8 g, 10 ms							
Isolation data								
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							

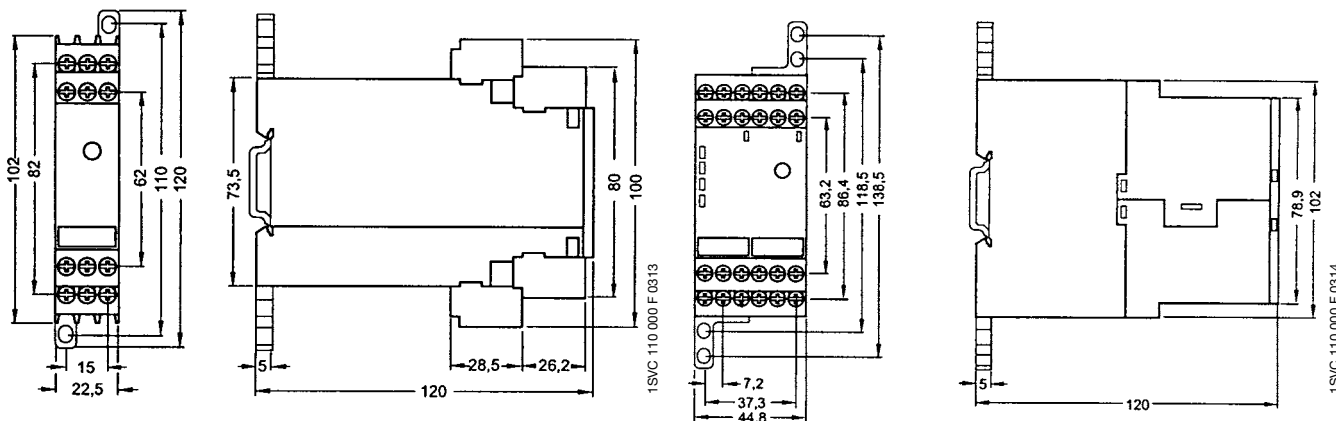


Dimensional drawings

Dimensions in mm

C571, C573, C576, C577, C579

C572, C574, C575



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⁾ Possible with undelayed enable contact.
³⁾ according to target of IEC 61508-1 Tab 3

Safety relays with solid-state outputs

C67xx range

Technical data

3

Type	C6700	C6701	C6702	
Input circuit				
Supply voltage	24 V DC			
Supply voltage tolerance	-10 % ... +15 %			
Power consumption	1.5 W	1.3 W	1.3 W	
Duty time	100 %			
Time response				
Response time	monitored start	125 ms	60 ms	60 ms
	auto-start	250 ms	60 ms	60 ms
Release time	at EMERG. STOP	30 ms	45 ms	45 ms ¹⁾ , adjustable 0.05-30 s ⁴⁾
	at power failure	25 ms	100 ms ²⁾	100 ms ²⁾
Recovery time	at EMERG. STOP	20 ms	400 ms	400 ms
	at power failure	0,02 s	max. 7 s	max. 7 s
Mains buffering	25 ms ³⁾	25 ms ^{2) 3)}	25 ms ^{2) 3)}	
Minimum control pulse length / time	EMERGENCY STOP	20 ms	25 ms	30 ms
	ON-button	0.02 s	0.2-5 s	0.2-5 s
Simultaneity	unlimited			
Output circuits				
Kind of output	2 electrical			
Contact material	solid-state			
Rated switching current (IEC 60947-5-1)	AC15 1150 V	-	-	-
	AC15 230 V	-	-	-
	DC13 24 V	0.5 A	1.5 A	1.5 A
Mechanical lifetime				
Electrical lifetime	unlimited as switching electronically			
Operating frequency	3000/h at load with rated switching current			
Short-circuit proof, max. fuse rating	short-circuit proof, no fusing necessary			
General data				
Dimensions (W x H x D)	22.5 x 100 x 86 mm (0.89 x 3.94 x 3.39 inch)			
Mounting	any			
Degree of protection enclosure / terminals	IP40 / IP 20			
Ambient temperature range	operation	-25...+60 °C		
	storage	-40...+80 °C		
Mounting	DIN rail (EN 50022)			
Electrical connection				
Wire size	rigid	2 x 2.5 mm ² / 1 x 4 mm ² (2 x 14 AWG / 1 x 12 AWG)		
	fine-strand with wire end ferrules	2 x 1.5 mm ² / 1 x 2.5 mm ² (2 x 16 AWG / 1 x 14 AWG)		

¹⁾ only for undelayed output

²⁾ When the cascade input is supplied from A1, the maximum reaction time after an EMERGENCY STOP applies.

³⁾ No supply of the drivers, only internal supply bridging, SELV-/PELV power supply buffers.

⁴⁾ 1SAR 543 320 R0003: 0.05-3 s / 1SAR 513 320 R0003: 0.5-30 s

Safety relays with solid-state outputs C67xx range

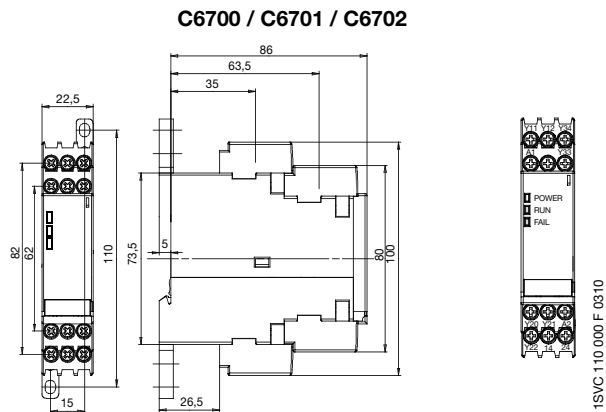
Technical data (continued), dimensional drawing

Type	C6700	C6701	C6702
Standards			
Standards	EN 60204-1 (VDE 0113-1), EN 292, EN 954-1, IEC 61508, DIN EN 0116 ¹⁾		
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	3×10^{-7} [1/h] ²⁾	$5,358 \times 10^{-11}$ [1/h] ²⁾	
Mechanical resistance (EN 60068)	8 g / 10 ms, 15 g / 5 ms		
Insulation data			
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



¹⁾ Electrical equipment of furnaces. VDE-Certificat for C6701 and C6702 available.

²⁾ according to target of IEC 61508-1 Tab 3

