pizzato elettrica

Safety modules

2004-2005

ZE BRC02A04-ENG

Welcome from Pizzato Elettrica

Dear Sirs,

It is a pleasure for me to introduce this brochure which presents more than one hundred of our safety modules because it allows me to share with you the results of our engineers work over the past years.

“Maximum Safety” has been our philosophy throughout the development of these products; a philosophy that has been implemented with multiple checks from design drawings and prototype to full production models. To obtain “Maximum Safety” we use components selected for their reliability whilst our production processes are ISO 9001:2000 certified for quality. Furthermore, to maintain “Maximum Safety” every single product is computer checked with a sequence of tests and only if these tests are passed the final label is printed.

The development of these products has lead to the creation of new internal departments, registration of Patents and production processes that gives us the flexibility in our design to manufacture our standard as well as customer specific models.

We also pride ourselves in being able to offer technical help about the usage of Safety Switches and Safety Modules for most circuit designs.

We hope that this brochure will help you in your daily work and that you may find in it, as well as in our products, the “passion for quality” that characterizes Pizzato Elettrica.

Sincerely,

Eng. Pizzato Giuseppe

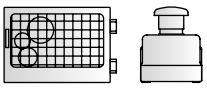
Introduction

1 Company profile

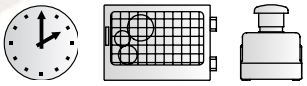
2 Selection table and general features of safety modules CS series

Safety modules

3.1 Safety modules for emergency stop and gate monitoring
CS AR series

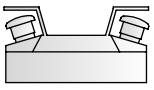


3.2 Safety modules for emergency stop and gate monitoring with contacts delayed at de-energizing
CS AT series

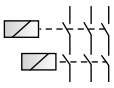


3.3 Safety timer module with delayed contacts at energizing
CS FS series

3.4 Safety modules for bimanual control devices
CS DM series



3.5 Expansion modules
CS ME series



Appendix

4 Introduction to the Safety and installation's examples

5 Dimensional drawings and housing features

6 Technical definitions

Company profile

Pizzato Elettrica company was established in the year 1984 at Marostica (VI) - Italy and is now one of the most important European companies manufacturing position switches, microswitches, foot switches and safety devices. A dynamic company focused to the market development, since its beginning has experienced a constant growth, achieving a leading position in the Italian and European markets. Since all the products are designed and assembled inside, the company is able to satisfy any time the specific requirements of the customers offering a range of 6000 standard articles and more of 1000 special items.

New site

The production of the Pizzato Elettrica is developed in 4 plants with covered production area of more than 8000 m^2, employing about 90 people.

The company owns many national and European patents and focuses on maintaining high quality standards for its products.

Quality certified by the marks IMQ, UL, CSA standing in the most of its products. Pizzato Elettrica has earned the UNI EN ISO 9001: 2000 certification, which guarantees the production-quality.

- 6000 items in the catalog
- 4 production-plants
- Certification UNI EN ISO 9001:2000 (Vision 2000)
- Quality marks IMQ, UL, CSA

Production

Pizzato Elettrica's products range offers more than 6000 standard articles and 1000 special items created on specific requirements of the customer.

Documentation

General Catalog 17A
available languages:

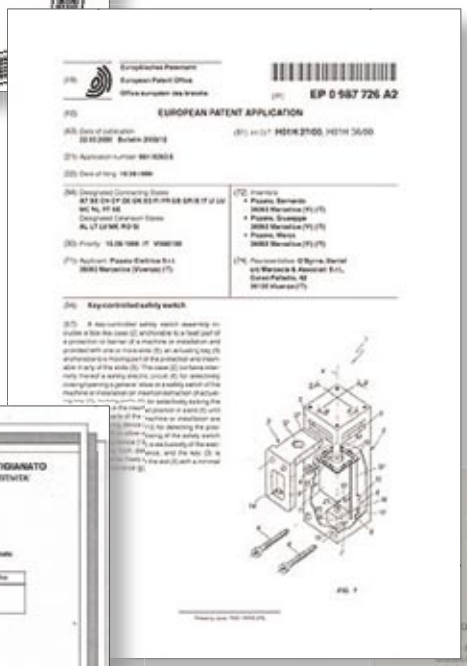
Production Program Switches
available languages:

Production Program Safety Devices
available languages:

General Catalog CD-ROM 17B
available languages:

www.pizzato.it
www.pizzato.com

- general catalog on line PDF format
- search engine for product code
- download 2D CAD drawings in DXF format
- download documentations



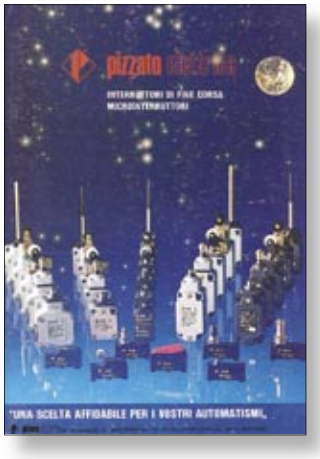
Know how

Research and development has always been the most important factors for the growth of Pizzato Elettrica. The dozens of Italian and European patents achieved over the years demonstrate this.

Early in the year 1973 Pizzato Elettrica patented and protected its innovative ideas. This strategic sector has been always believed and revealed essential through the years. Our ideas distinguish us and allowed us to become what we are today.

1980

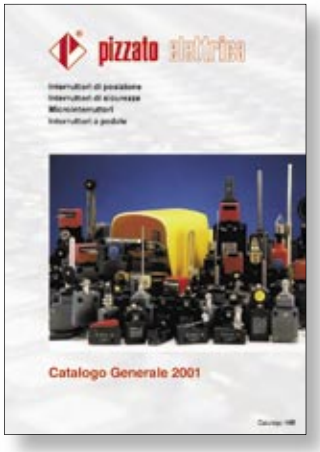
1984



1988

1995

1999



2001

2003

Certification ISO 9001:2000

The production system of Pizzato Elettrica is in accordance with the national standards UNI EN ISO 9001:2000 and the international standard ISO 9001:2000. The acquired certification regulates all the activities of production and management of the company: from the check-in, through the activities in the technical, purchase and marketing offices, to the inspection of the productive process, the checks and final inspections of the products before their delivery to customers, passing through the overhaul of the instruments and the management of the metrological laboratory. The certification covers all our plants and the various production processes, from the assembly lines to the plastics mouldings.

Certification of the quality systems of companies

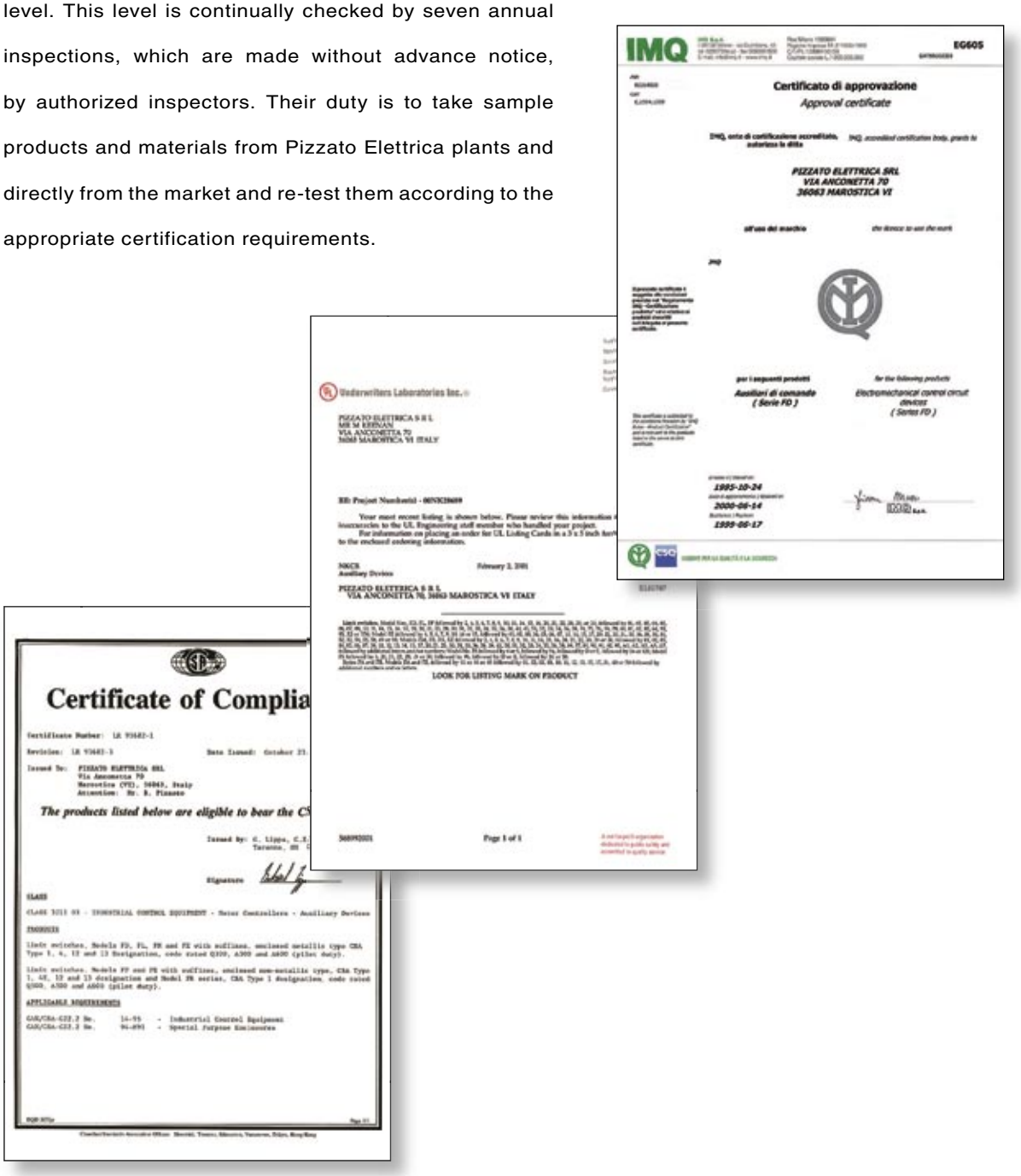
The quality of products and services, their continuous compliance with national and international standards are basically requirements of the market. The Quality-systems are modern tools, which allow companies to achieve these targets. The survey of the company quality-system with the standards in force, is the best guarantee of the company capability to satisfy the requirements of quality and reliability. That is why the UNI EN ISO 9000 certification of conformity issued by a third independent corporation nationally and internationally acknowledged, has become a basic reference in order to gain the trust of the customer.

CSQ, CISQ and IQNet

The CSQ system is part of the federation CISQ (Italian Certification of Quality Systems). It is composed by the main companies for the certification of quality systems which are responsible in Italy for the various market-branches. CISQ is the Italian representative in IQNet, the largest international network for certification of the quality and company-management systems; 25 certification organizations from as many countries join to it.

Certified product quality

The product's quality is guarantee by frequent and programmed internal controls and certified by three external firms: IMQ, UL, CSA. These brands appears in the majority of Pizzato Elettrica products. They require the company to achieve and maintain a high quality level. This level is continually checked by seven annual inspections, which are made without advance notice, by authorized inspectors. Their duty is to take sample products and materials from Pizzato Elettrica plants and directly from the market and re-test them according to the appropriate certification requirements.



Technical office

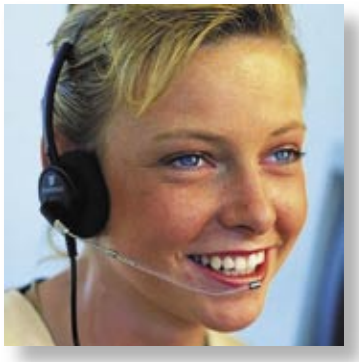
For any technical information about our products, or even for any instruction about their installation, do not hesitate to contact our technical service. You will find qualified technicians at your disposal, who will help you choosing the suitable product for your application, avoiding unnecessary wasting of time and reducing to the minimum the event of a wrong choice.

office hours :	from Monday to Friday
	08.00-12.00 / 14.00-18.00 CET
phone :	++39.0424.470.930
fax :	++39.0424.470.955
e-mail :	tech@pizzato.com

Italy sales-office

For any market information, for any offer or even just to know where is the nearest point of sale to you, do not hesitate to contact Italy sales-office.

office hours :	from Monday to Friday
	08.00-12.00 / 14.00-18.00 CET
phone :	++39.0424.470.930
fax :	++39.0424.470.955
e-mail :	info@pizzato.com



Export sales-office

For any market information, for any offer or even just to know where are our point of sale in the world, do not hesitate to contact export sales-office.

office hours : from Monday to Friday
08.00-12.00 / 14.00-18.00 CET

phone : ++39.0424.470.930

fax : ++39.0424.470.955

e-mail : info@pizzato.com

Product selection table

Product code	Supply voltages			Output contacts									Housing thickness (mm)
	24 VAC/DC	120 VAC	230 VAC	NO instantaneous				NC instantaneous				delayed	
Safety modules for emergency stop and gate monitoring													
CS AR-01V024	■	-	-		**2**			**1**					22,5 mm
CS AR-01V120	-	■	-		**2**			**1**					22,5 mm
CS AR-01V230	-	-	■		**2**			**1**					22,5 mm
CS AR-02V024	■	-	-			**3**							22,5 mm
CS AR-02V120	-	■	-			**3**							22,5 mm
CS AR-02V230	-	-	■			**3**							22,5 mm
CS AR-03V024	■	-	-		**2**								22,5 mm
CS AR-03V120	-	■	-		**2**								22,5 mm
CS AR-03V230	-	-	■		**2**								22,5 mm
CS AR-04V024 NEW	■	-	-			**3**			**1**				22,5 mm
CS AR-04V120 NEW	-	■	-			**3**			**1**				22,5 mm
CS AR-04V230 NEW	-	-	■			**3**			**1**				22,5 mm
CS AR-07M024 NEW	■	-	-				**4**		**1**				22,5 mm
CS AR-20V024	■	-	-		**2**								22,5 mm
CS AR-20V120	-	■	-		**2**								22,5 mm
CS AR-20V230	-	-	■		**2**								22,5 mm
CS AR-21V024	■	-	-		**2**								22,5 mm
CS AR-21V120	-	■	-		**2**								22,5 mm
CS AR-21V230	-	-	■		**2**								22,5 mm
CS AR-22V024 NEW	■	-	-			**3**			**1**				22,5 mm
CS AR-23V024 NEW	■	-	-			**3**			**1**				22,5 mm
Safety modules for emergency stop and gate monitoring with delayed contacts at de-energizing													
CS AT-0⑤V024	■	-	-		**2**			**1**				**2 NO**	45 mm
CS AT-0⑤V120	-	■	-		**2**			**1**				**2 NO**	45 mm
CS AT-0⑤V230	-	-	■		**2**			**1**				**2 NO**	45 mm
CS AT-1⑤V024	■	-	-			**3**						**2 NO**	45 mm
CS AT-1⑤V120	-	■	-			**3**						**2 NO**	45 mm
CS AT-1⑤V230	-	-	■			**3**						**2 NO**	45 mm
Safety timer module with delayed contacts at energizing													
CS FS-0⑤V024 10/2004	■	-	-									**1 NO+ 2 NC**	22,5 mm
CS FS-0⑤V120 10/2004	-	■	-									**1 NO+ 2 NC**	22,5 mm
CS FS-0⑤V230 10/2004	-	-	■									**1 NO+ 2 NC**	22,5 mm
Safety modules for bimanual controls or synchronism check													
CS DM-01V024 NEW	■	-	-			**3**			**1**				22,5 mm
CS DM-01V120 NEW	-	■	-			**3**			**1**				22,5 mm
CS DM-01V230 NEW	-	-	■			**3**			**1**				22,5 mm
Expansion modules													
CS ME-01V024 NEW	■	-	-					**5**		**2** ①			22,5 mm

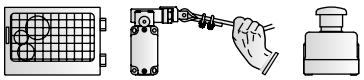
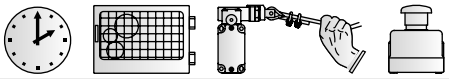
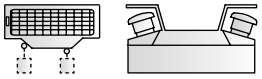
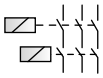
Legend

■ Available with this Product
- Not available with this Product
① 1 auxiliary NC contact and 1 feedback NC contact
② Dependent from the base module
③ On demand
④ Category 4 for instantaneous contacts, category 3 for delayed contacts

⑤	Delayed contacts releasing time
1	from 0,3 to 3 s, step 0,3 s
2	from 1 to 10 s, step 1 s
3	from 3 to 30 s, step 3 s
4	from 30 to 300 s, step 30 s
A	0,5 s fixed
B	1 s fixed
C	3 s fixed
D	10 s fixed

⑥	Kind of connection
V	screw terminals
M	connector with screw terminals
X	connector with spring terminals

For examples, see chapters 3.2 - 3.3

Product code	Automatic or manual start	Monitored start	Kind of connection (⑥) V	M	X	Safety category 2	3	4	Page
									
CS AR-01V024	■	■	■	③	③	■	■	■	chap. 3.1, pag. 1
CS AR-01V120	■	■	■	③	③	■	■	■	chap. 3.1, pag. 1
CS AR-01V230	■	■	■	③	③	■	■	■	chap. 3.1, pag. 1
CS AR-02V024	■	■	■	③	③	■	■	■	chap. 3.1, pag. 3
CS AR-02V120	■	■	■	③	③	■	■	■	chap. 3.1, pag. 3
CS AR-02V230	■	■	■	③	③	■	■	■	chap. 3.1, pag. 3
CS AR-03V024	■	■	■	③	③	■	■	■	chap. 3.1, pag. 5
CS AR-03V120	■	■	■	③	③	■	■	■	chap. 3.1, pag. 5
CS AR-03V230	■	■	■	③	③	■	■	■	chap. 3.1, pag. 5
CS AR-04V024	■	■	■	③	③	■	■	■	chap. 3.1, pag. 7
CS AR-04V120	■	■	■	③	③	■	■	■	chap. 3.1, pag. 7
CS AR-04V230	■	■	■	③	③	■	■	■	chap. 3.1, pag. 7
CS AR-07M024	■	■	-	■	③	■	■	■	chap. 3.1, pag. 9
CS AR-20V024	■	-	■	③	③	■	■	-	chap. 3.1, pag. 11
CS AR-20V120	■	-	■	③	③	■	■	-	chap. 3.1, pag. 11
CS AR-20V230	■	-	■	③	③	■	■	-	chap. 3.1, pag. 11
CS AR-21V024	-	■	■	③	③	■	■	-	chap. 3.1, pag. 11
CS AR-21V120	-	■	■	③	③	■	■	-	chap. 3.1, pag. 11
CS AR-21V230	-	■	■	③	③	■	■	-	chap. 3.1, pag. 11
CS AR-22V024	■	-	■	③	③	■	■	-	chap. 3.1, pag. 13
CS AR-23V024	-	■	■	③	③	■	■	-	chap. 3.1, pag. 13
									
CS AT-0⑤V024	■	■	■	③	③	■	■	■ (④)	chap. 3.2, pag. 1
CS AT-0⑤V120	■	■	■	③	③	■	■	■ (④)	chap. 3.2, pag. 1
CS AT-0⑤V230	■	■	■	③	③	■	■	■ (④)	chap. 3.2, pag. 1
CS AT-1⑤V024	■	■	■	③	③	■	■	■ (④)	chap. 3.2, pag. 3
CS AT-1⑤V120	■	■	■	③	③	■	■	■ (④)	chap. 3.2, pag. 3
CS AT-1⑤V230	■	■	■	③	③	■	■	■ (④)	chap. 3.2, pag. 3
									
CS FS-0⑤V024	-	-	■	③	③	②	②	②	chap. 3.3, pag. 1
CS FS-0⑤V120	-	-	■	③	③	②	②	②	chap. 3.3, pag. 1
CS FS-0⑤V230	-	-	■	③	③	②	②	②	chap. 3.3, pag. 1
									
CS DM-01V024	-	-	■	③	③	III C according to EN 574			chap. 3.4, pag. 1
CS DM-01V120	-	-	■	③	③	III C according to EN 574			chap. 3.4, pag. 1
CS DM-01V230	-	-	■	③	③	III C according to EN 574			chap. 3.4, pag. 1
									
CS ME-01V024	-	-	■	③	③	②	②	②	chap. 3.5, pag. 1

Safety modules **CS** series general data

“Maximum safety”

The CS series safety modules have been studied with clear aims of safety and reliability for the product. The design, the development and the production of these units have been faced with the passion for quality that distinguishes Pizzato Elettrica. “Maximum safety” is the base principles for this range of products.

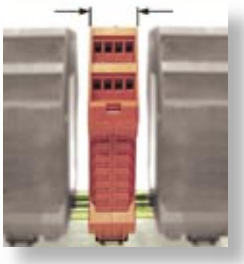
During the design of these products principles of over sizing were adopted, and the circuit schemes have been checked by independent third party institutes. Also the selection of the used components has been made with accurate quality purposes and the basic parts, as relays with forced guided contacts, have been chosen between the best existing trades. The production phase itself, completely developed inside Pizzato Elettrica, is supervised with a functional testing on the 100% of the production.
Every piece produced is verified in a computerised testing station that, only when the product passes every test, prints the

Screw terminals

Plug-in connectors with screw terminals

Plug-in connectors with spring terminals

Reduced housing dimensions



LED indicating the switching state of the channels and of the supply voltage

Supply voltages:
- 24 VAC/DC
- 120 VAC
- 230 VAC

Computerised testing

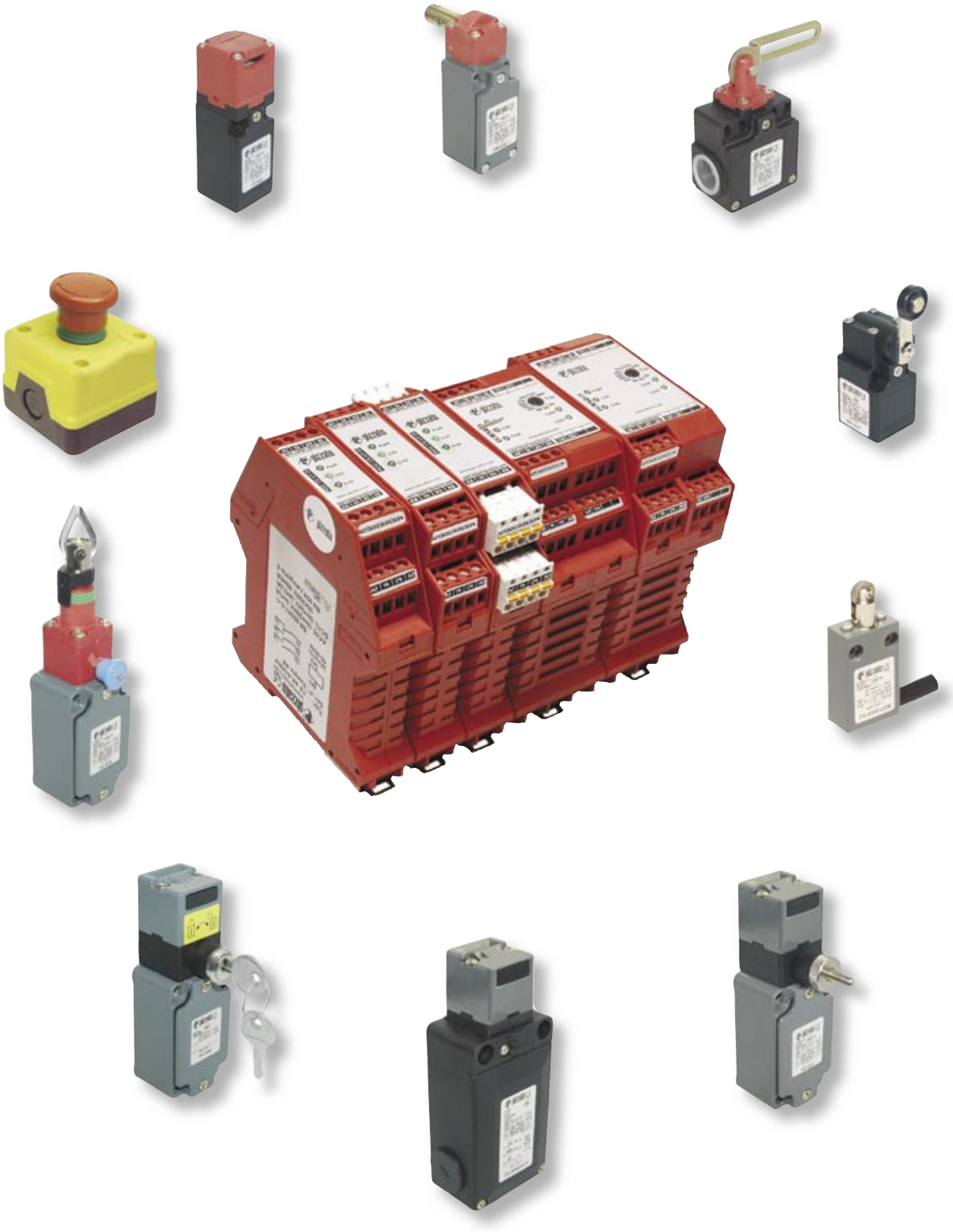
Snap montage on DIN-rail

Expansion for output contact

Forced guided contacts

safety module label, identified from a unique serial number.

Pizzato Elettrica has improved also the most practical aspects using compact housings and with LED signals of the modules operation state. A particular attention has been paid to the connection possibilities, allowing the customer to choose between fixed clamps or plug-in connectors and with screw or spring terminals. At last, the range of products provides different supply tensions with wide tolerance on nominal values to avoid any problem in the less industrialised countries.



Safety module **CS AR-01**, category 4 according to EN 954-1

Module for emergency stop and gate monitoring

Main functions
- Single or dual channel input circuit
- Choice between automatic start, manual start or monitored start
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- Output contacts:
  2 safety NO contacts,
  1 auxiliary NO contact
- Supply voltage:
  24 VAC/DC, 120 VAC, 230 VAC

Utilization categories
Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787
Certificate CE type n°: IMQ 123

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing
Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)

Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	category 4 according to EN 954-1
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	50 ms
Releasing time t_{R1}:	20 ms
Releasing time on de-energisation t_R:	70 ms
Simultaneity time t_C:	infinite

Conforms to the standards:
IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	2 safety NO contacts, 1 auxiliary NO contact
Contacts type:	forced guided contacts
Contacts material:	silver alloy, gold plated
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AR-01V024

Kind of connection

V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

Supply voltage

024	24 VAC/DC	±15%
120	120 VAC	±15%
230	230 VAC	±15%

Items available on stock

CS AR-01V024

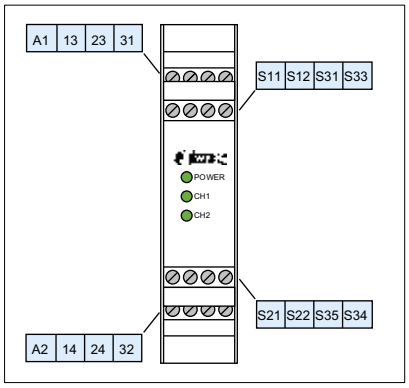
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

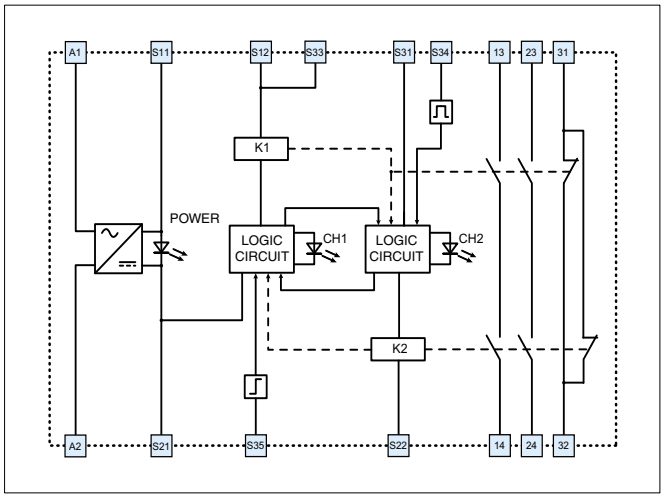
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Safety module CS AR-01

Terminals layout

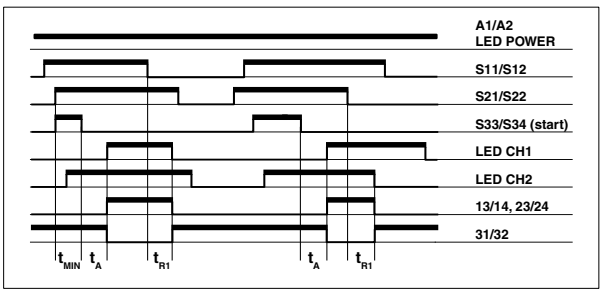


Internal wiring diagram

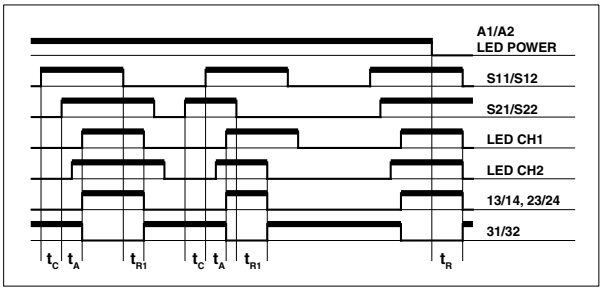


Operations diagrams

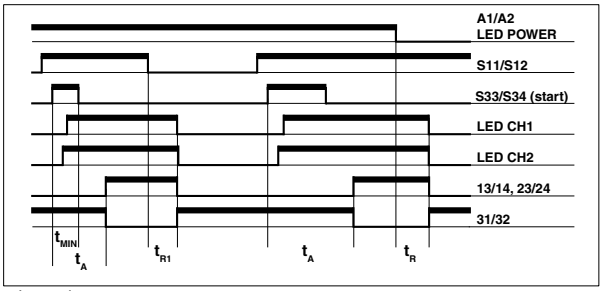
Configuration with 2 channels and monitored start



Configuration with 2 channels and automatic start

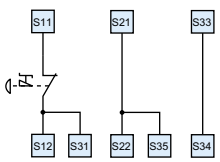
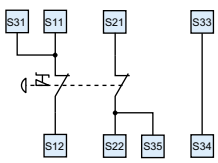
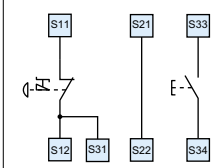
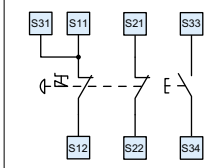
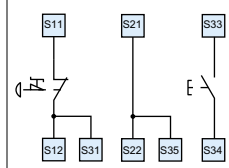
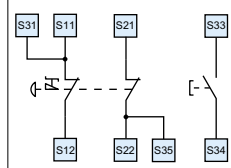


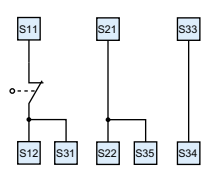
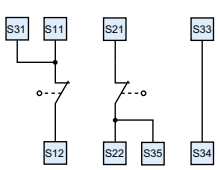
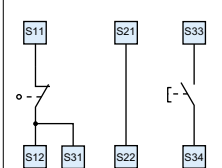
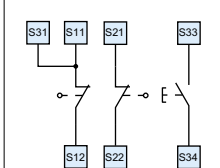
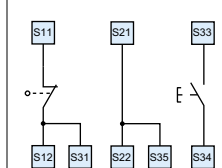
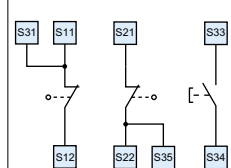
Configurations with 1 channel and manual start



Legend:
t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_{R1}: releasing time
t_R: releasing time on de-energisation

Application examples

Emergency stop					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Gate monitoring					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Safety module **CS AR-02**, category 4 according to EN 954-1

Module for emergency stop and gate monitoring

Main functions
- Single or dual channel input circuit
- Choice between automatic start, manual start or monitored start
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- Output contacts: 3 safety NO contacts
- Supply voltage: 24 VAC/DC, 120 VAC, 230 VAC

Utilization categories
Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing
Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)

Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	category 4 according to EN 954-1
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	50 ms
Releasing time t_{R1}:	20 ms
Releasing time on de-energisation t_R:	70 ms
Simultaneity time t_C:	infinite

Conforms to the standards:
IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	3 safety NO contacts
Contacts type:	forced guided contacts
Contacts material:	silver alloy, gold plated
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AR-02V024

Kind of connection

V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

Supply voltage

024	24 VAC/DC	±15%
120	120 VAC	±15%
230	230 VAC	±15%

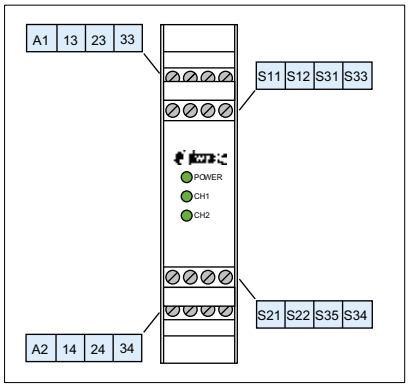
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

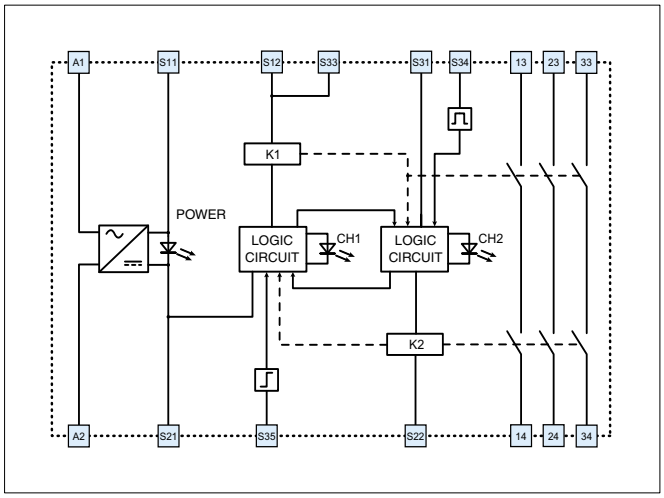
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Safety module CS AR-02

Terminals layout

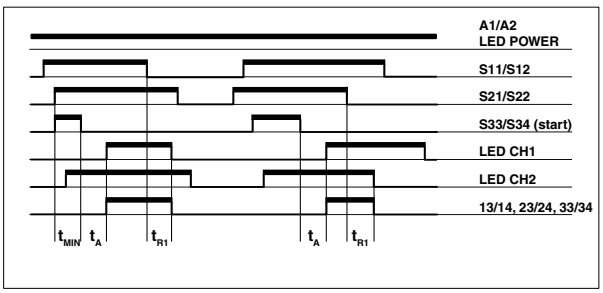


Internal wiring diagram

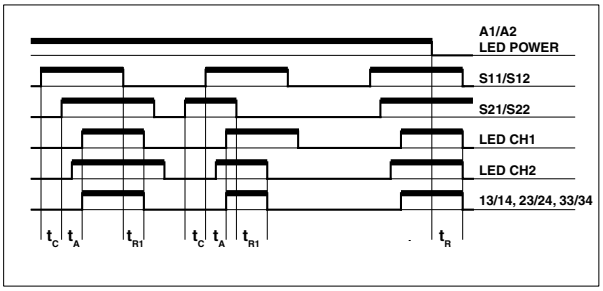


Operations diagrams

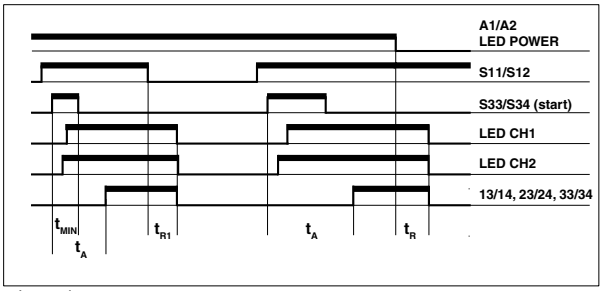
Configuration with 2 channels and monitored start



Configuration with 2 channels and automatic start

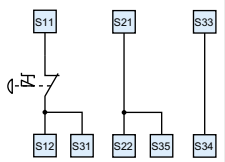
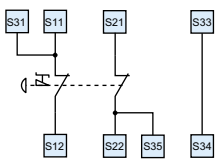
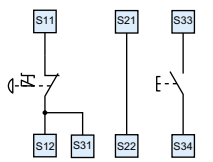
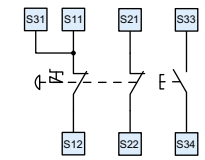
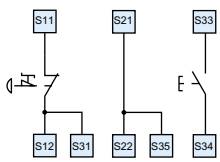
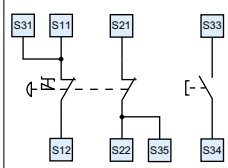


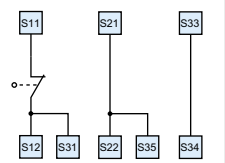
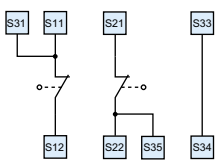
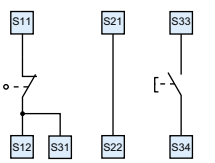
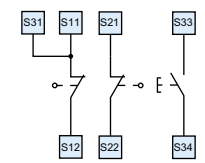
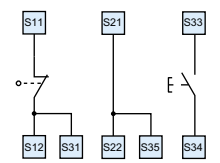
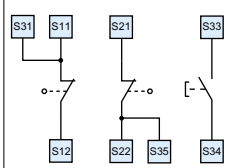
Configurations with 1 channel and manual start



Legend:
t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_{R1}: releasing time
t_R: releasing time on de-energisation

Application examples

Emergency stop					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Gate monitoring					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Safety module **CS AR-03**, category 4 according to EN 954-1

Module for emergency stop and gate monitoring

Main functions
- Single or dual channel input circuit
- Choice between automatic start, manual start or monitored start
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- Output contacts: 2 safety NO contacts
- Supply voltage: 24 VAC/DC, 120 VAC, 230 VAC

Utilization categories
Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)	
Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	category 4 according to EN 954-1
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	50 ms
Releasing time t_{R1}:	20 ms
Releasing time on de-energisation t_R:	70 ms
Simultaneity time t_C:	infinite

Conforms to the standards:
IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	2 safety NO contacts,
Contacts type:	forced guided contacts
Contacts material:	silver alloy, gold plated
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AR-03V024

Kind of connection		Supply voltage		
V	screw terminals	**024**	24 VAC/DC	±15%
M	plug-in connectors with screw terminals	**120**	120 VAC	±15%
X	plug-in connectors with spring terminals	**230**	230 VAC	±15%

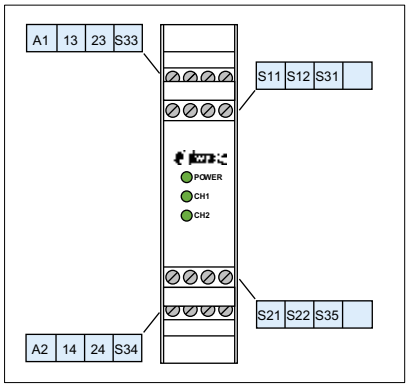
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

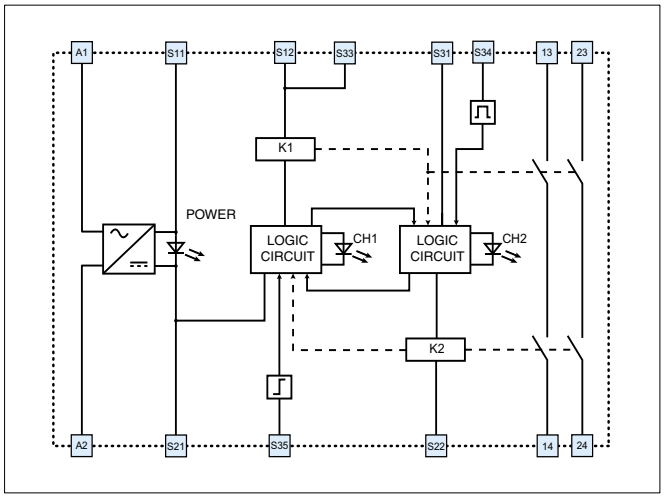
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Safety module CS AR-03

Terminals layout

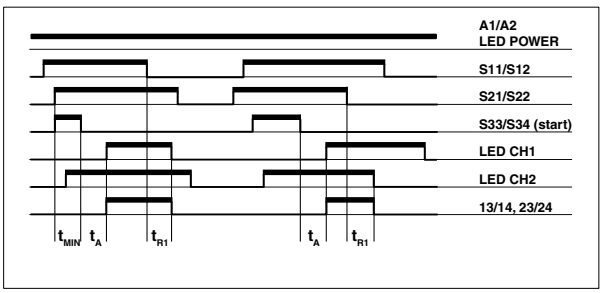


Internal wiring diagram

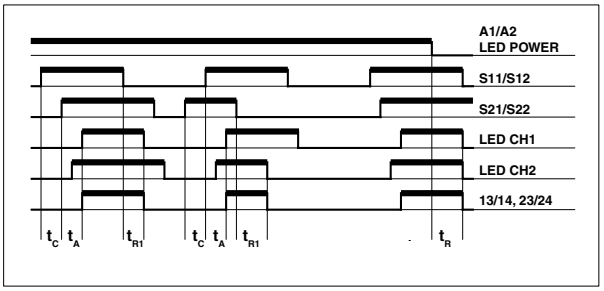


Operations diagrams

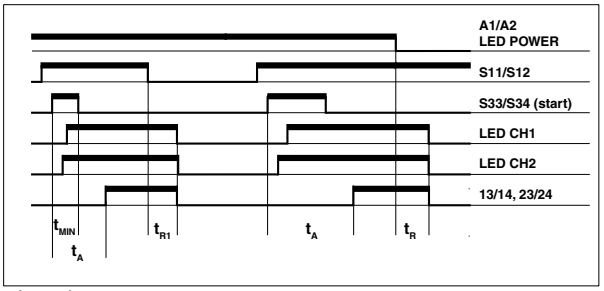
Configuration with 2 channels and monitored start



Configuration with 2 channels and automatic start



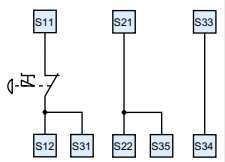
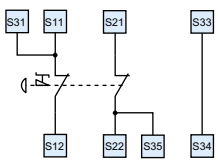
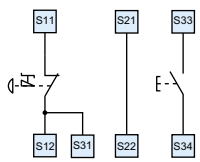
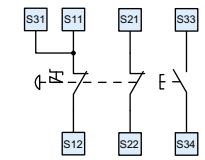
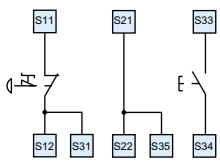
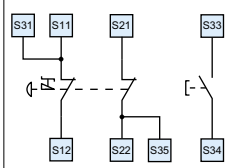
Configurations with 1 channel and manual start

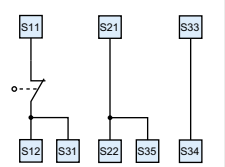
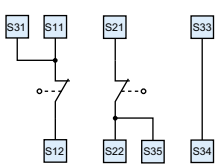
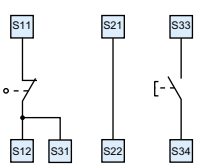
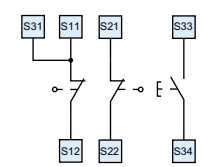
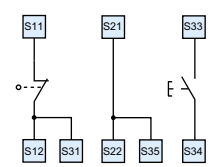
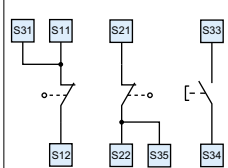


Legend:

t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_{R1}: releasing time
t_R: releasing time on de-energisation

Application examples

Emergency stop					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Gate monitoring					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Safety module **CS AR-04**, category 4 according to EN 954-1

Module for emergency stop and gate monitoring

Main functions
- Single or dual channel input circuit
- Choice between automatic start, manual start or monitored start
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- Output contacts:
  3 safety NO contacts,
  1 auxiliary NO contact
- Supply voltage:
  24 VAC/DC, 120 VAC, 230 VAC

Utilization categories
Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)	
Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	category 4 according to EN 954-1
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	50 ms
Releasing time t_{R1}:	20 ms
Releasing time on de-energisation t_R:	70 ms
Simultaneity time t_C:	infinite

Conforms to the standards:
IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	3 safety NO contacts 1 auxiliary NO contact
Contacts type:	forced guided contacts
Contacts material:	silver alloy
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AR-04V024

Kind of connection		Supply voltage		
V	screw terminals	**024**	24 VAC/DC	±15%
M	plug-in connectors with screw terminals	**120**	120 VAC	±15%
X	plug-in connectors with spring terminals	**230**	230 VAC	±15%

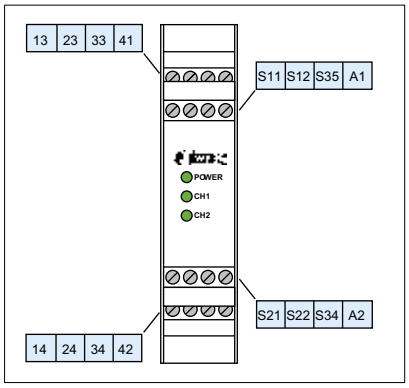
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

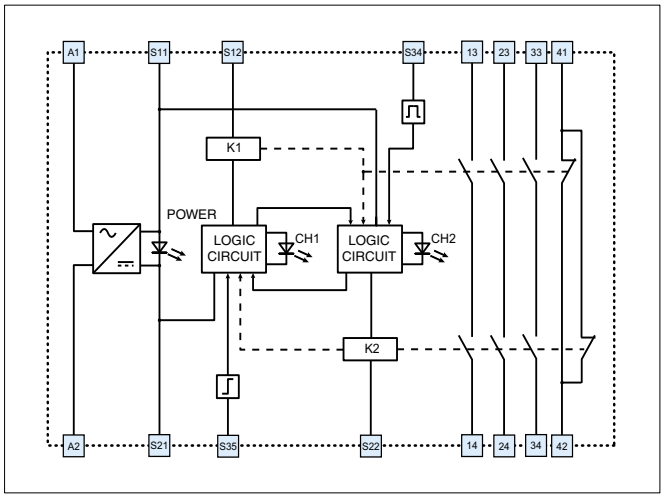
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Safety module CS AR-04

Terminals layout

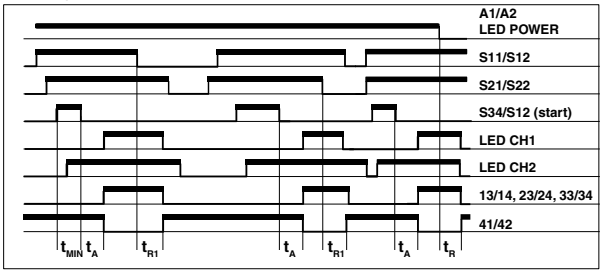


Internal wiring diagram

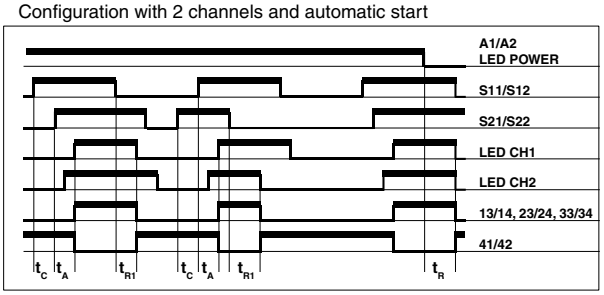


Operations diagrams

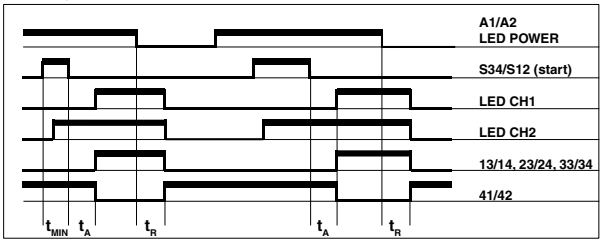
Configuration with 2 channels and monitored start



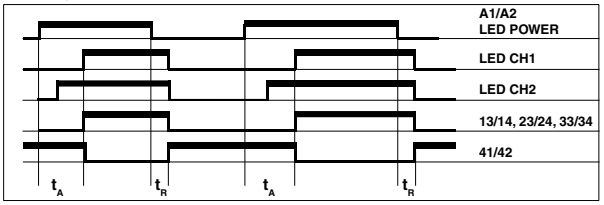
Configuration with 2 channels and automatic start



Configuration with 1 channel and monitored start



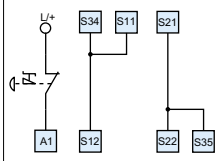
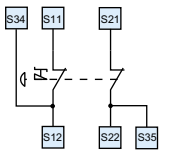
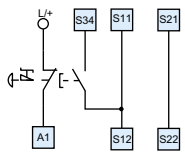
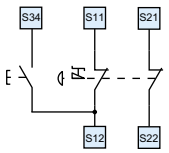
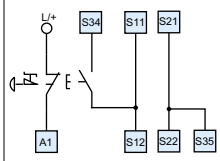
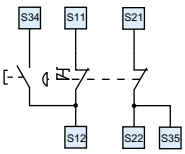
Configuration with 1 channel and automatic start

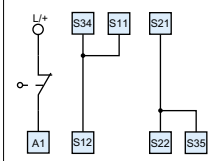
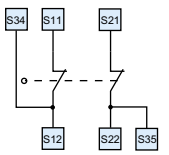
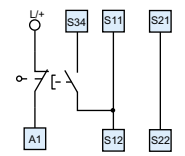
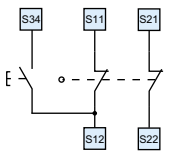
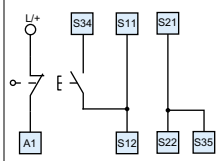
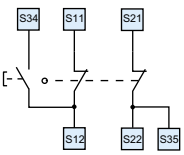


Legend:

t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_{R1}: releasing time
t_R: releasing time on de-energisation

Application examples

Emergency stop					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Gate monitoring					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Safety module **CS AR-07**, category 4 according to EN 954-1

Module for emergency stop and gate monitoring

Main functions
- Single or dual channel input circuit
- Choice between automatic start, manual start or monitored start
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- Output contacts:
  4 safety NO contacts,
  1 auxiliary NO contact
- Supply voltage: 24 VAC/DC

Utilization categories
Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)	
Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape B

General data

Safety category:	category 4 according to EN 954-1
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	70 ms
Releasing time t_{R1}:	40 ms
Releasing time on de-energisation t_R:	80 ms
Simultaneity time t_C:	infinite

Conforms to the standards:
IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	4 safety NO contacts 1 auxiliary NO contact
Contacts type:	forced guided contacts
Contacts material:	silver alloy, gold plated
Max switching voltage:	230/240 VAC; 220 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AR-07M024

Kind of connection

M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

Supply voltage

024	24 VAC/DC ±15%

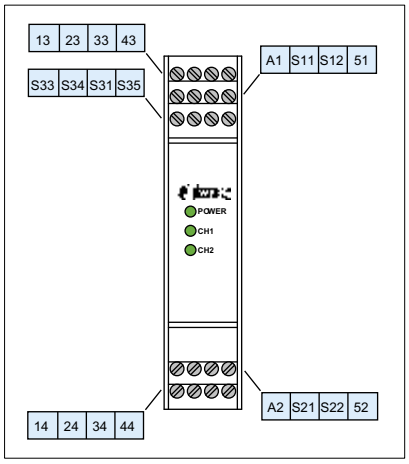
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

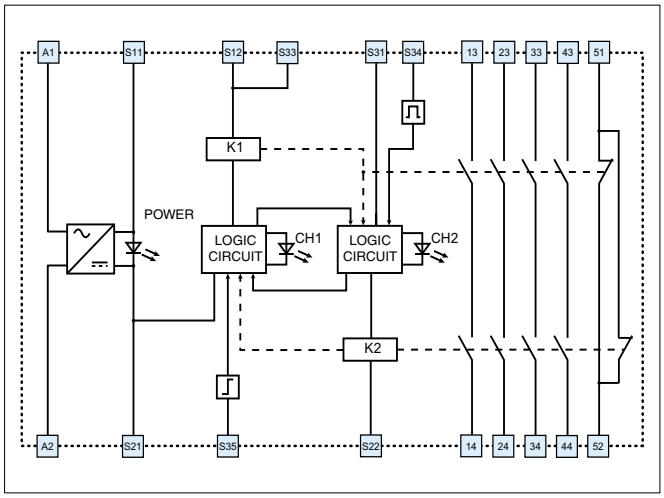
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Safety module CS AR-07

Terminals layout

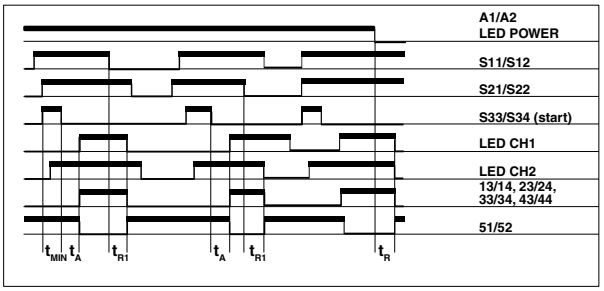


Internal wiring diagram

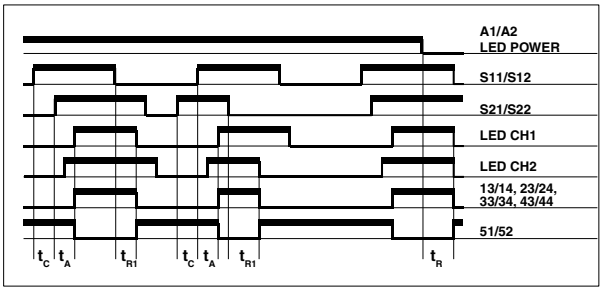


Operations diagrams

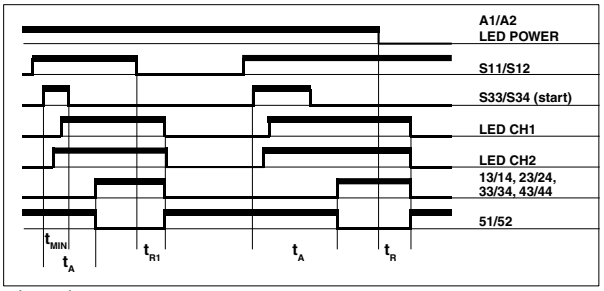
Configuration with 2 channels and monitored start



Configuration with 2 channels and automatic start



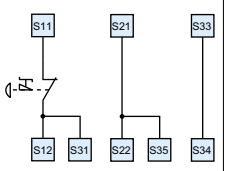
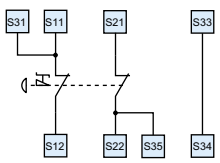
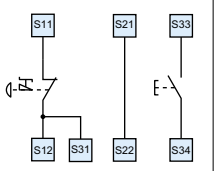
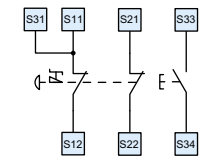
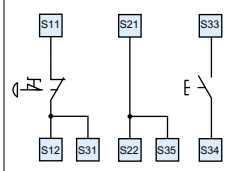
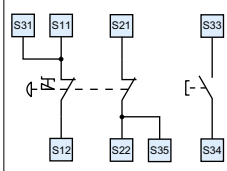
Configurations with 1 channel and manual start

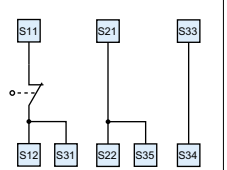
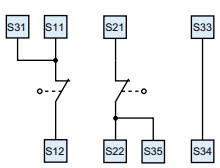
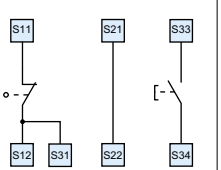
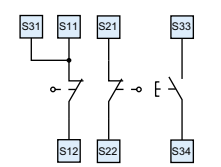
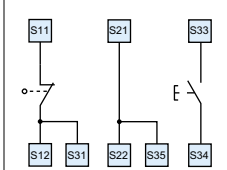
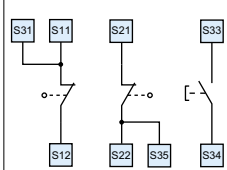


Legend:

t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_{R1}: releasing time
t_R: releasing time on de-energisation

Application examples

Emergency stop					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Gate monitoring					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Safety module **CS AR-20 / CS AR-21**, category 3 according to EN 954-1

Module for emergency stop and gate monitoring

Main functions
- Single or dual channel input circuit
- Choice between automatic start, manual start (CS AR-20 only) or monitored start (CS AR-21 only)
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- 2 safety NO contacts
- Supply voltage: 24 VAC/DC, 120 VAC, 230 VAC

Utilization categories
Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)	
Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	category 3 according to EN 954-1
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	50 ms
Releasing time on de-energisation t_R:	70 ms
Simultaneity time t_C:	infinite

Conforms to the standards:
IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	2 safety NO contacts
Contacts type:	forced guided contacts
Contacts material:	silver alloy, gold plated
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AR-20V024

Kind of start

20	manual or automatic start
21	monitored start

Kind of connection

V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

Supply voltage

024	24 VAC/DC	± 15%
120	120 VAC	± 15%
230	230 VAC	± 15%

Items available on stock

CS AR-20V024

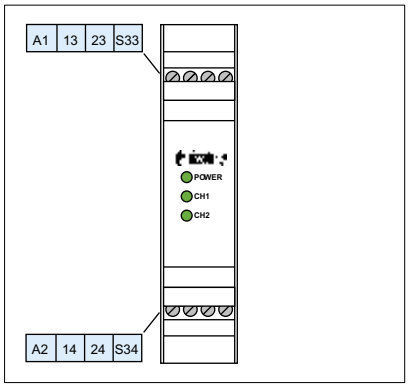
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

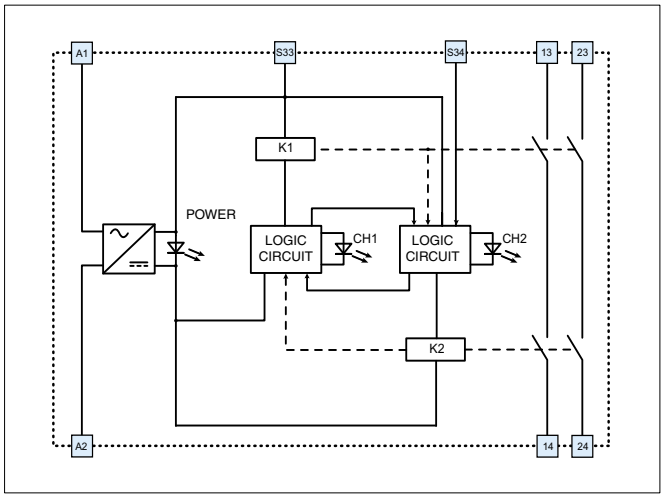
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Safety module CS AR-20 / CS AR-21

Terminals layout

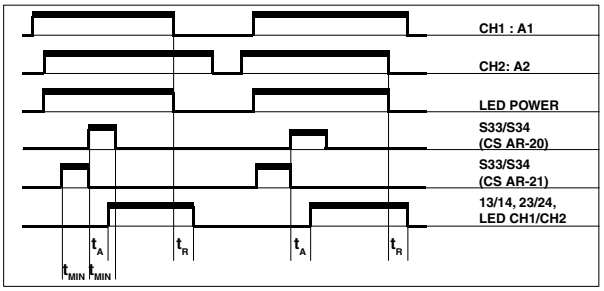


Internal wiring diagram

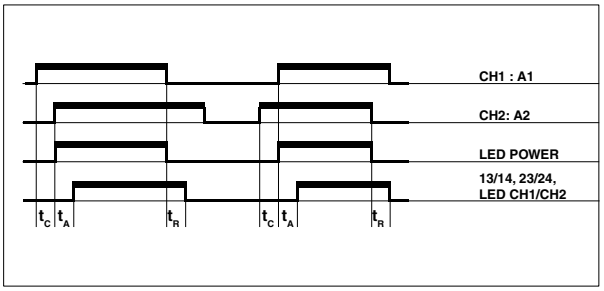


Operations diagrams

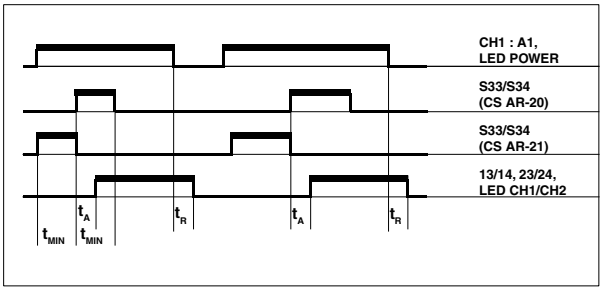
Configurations with 2 channels and manual or monitored start



Configuration with 2 channels and automatic start (CS AR-20 only)



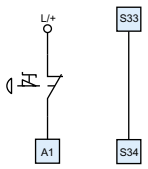
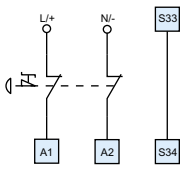
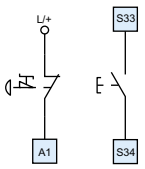
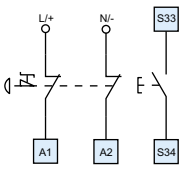
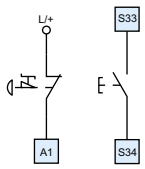
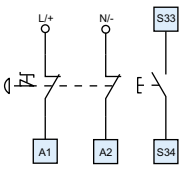
Configurations with 1 channel and manual or monitored start

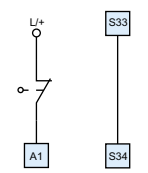
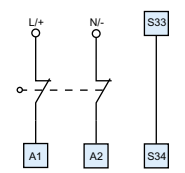
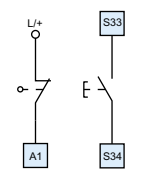
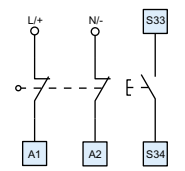
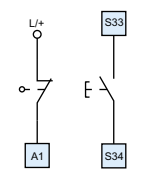
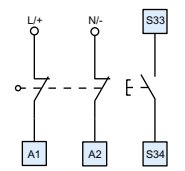


Legend:

t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_R: releasing time on de-energisation

Application examples

Emergency stop					
Automatic start wiring (CS AR-20 only)		Monitored start wiring (CS AR-21 only)		Manual start wiring (CS AR-20 only)	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Gate monitoring					
Automatic start wiring (CS AR-20 only)		Monitored start wiring (CS AR-21 only)		Manual start wiring (CS AR-20 only)	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Safety module **CS AR-22 / CS AR-23**, category 3 according to EN 954-1

Module for emergency stop and gate monitoring

Main functions
- Single or dual channel input circuit
- Choice between automatic start, manual start (CS AR-22 only) or monitored start (CS AR-23 only)
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- 3 safety NO contacts, 1 auxiliary NO contact
- Supply voltage: 24 VAC/DC

Utilization categories
Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)	
Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	category 3 according to EN 954-1
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	50 ms
Releasing time on de-energisation t_R:	60 ms
Simultaneity time t_C:	infinite

Conforms to the standards:
IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	3 safety NO contacts, 1 auxiliary NO contact
Contacts type:	forced guided contacts
Contacts material:	silver alloy
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AR-22V024

Kind of start

22	manual or automatic start
23	monitored start

Kind of connection

V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

Supply voltage

024	24 VAC/DC ± 15%

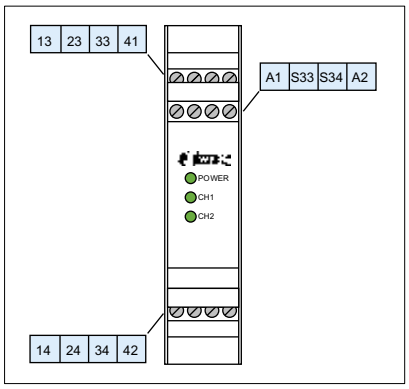
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

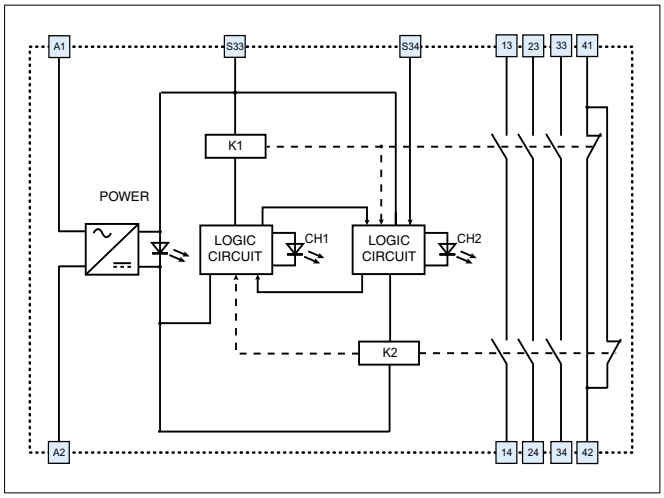
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Safety module CS AR-22 / CS AR-23

Terminals layout

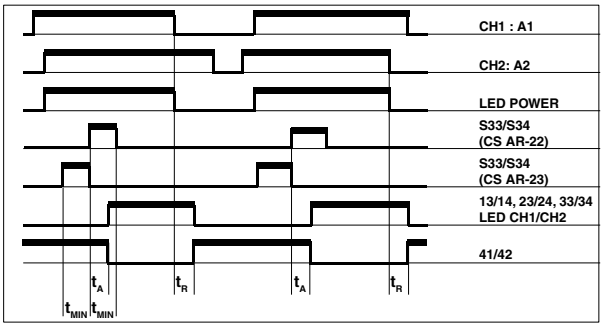


Internal wiring diagram

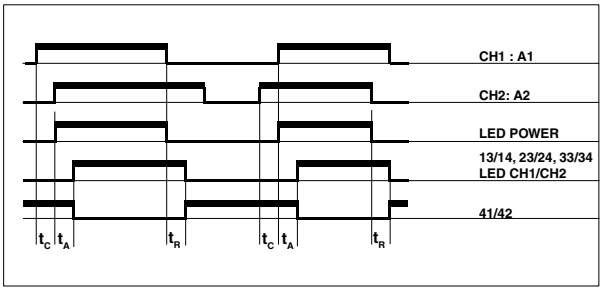


Operations diagrams

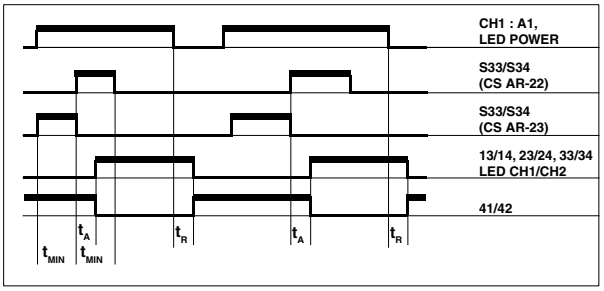
Configurations with 2 channels and manual or monitored start



Configuration with 2 channels and automatic start (CS AR-22 only)



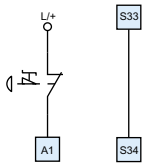
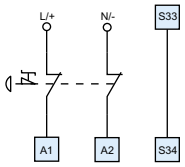
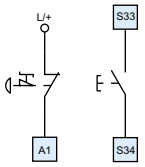
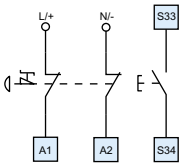
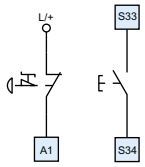
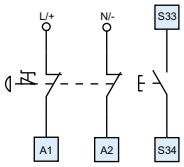
Configurations with 1 channel and manual or monitored start

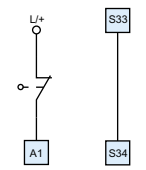
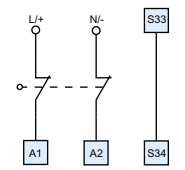
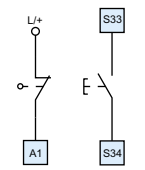
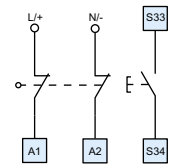
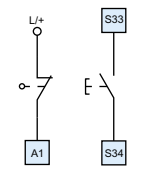
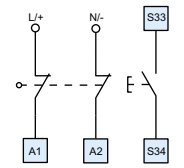


Legend:

t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_R: releasing time on de-energisation

Application examples

Emergency stop					
Automatic start wiring (CS AR-22 only)		Monitored start wiring (CS AR-23 only)		Manual start wiring (CS AR-22 only)	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Gate monitoring					
Automatic start wiring (CS AR-22 only)		Monitored start wiring (CS AR-23 only)		Manual start wiring (CS AR-22 only)	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Safety module **CS AT-0**, category 4/3 according to EN 954-1

Module for emergency stop and gate monitoring with delayed contacts at de-energizing

Main functions

- Single or dual channel input circuit
- Choice between automatic start, manual start or monitored start
- Connection of the input channels to opposite potentials
- 45 mm housing
- 2 safety instantaneous NO contact, 1 auxiliary instantaneous NO contact, 2 safety delayed NO contacts.
- Supply voltage: 24 VAC/DC, 120 VAC, 230 VAC

Utilization categories

Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)

Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 2, shape C

General data

Safety category according to EN 954-1:	category 4 (instantaneous contacts) category 3 (delayed contacts)
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,45 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 10 VA
Rated power consumption DC:	< 5 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	50 ms
Releasing time t_{R1}:	20 ms
Releasing time on de-energisation t_R:	70 ms
Delayed contacts releasing time t_{R2}:	see “How to order”
Simultaneity time t_C:	infinite

Conforms to the standards:

IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	2 safety instantaneous NO contacts, 1 auxiliary instantaneous NO contact , 2 safety delayed NO contacts.
Contacts type:	forced guided contacts
Contacts material:	silver alloy, gold plated
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AT-01V024

Delayed contacts releasing time (t_{R2})

1	from 0,3 to 3 s, step 0,3 s
2	from 1 to 10 s, step 1 s
3	from 3 to 30 s, step 3 s
4	from 30 to 300 s, step 30 s
A	0,5 s fixed
B	1 s fixed
C	3 s fixed
D	10 s fixed

Supply voltage

024	24 VAC/DC	± 15%
120	120 VAC	± 15%
230	230 VAC	± 15%

Kind of connection

V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

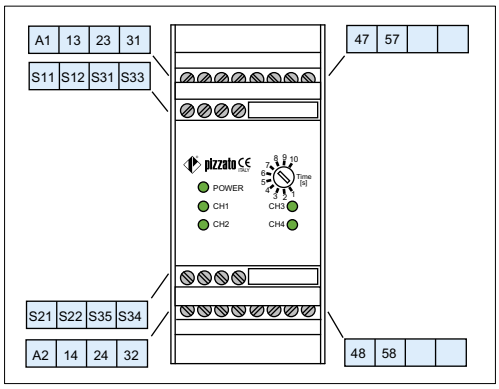
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Rated power consumption AC:	< 10 VA
Rated power consumption DC:	< 5 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

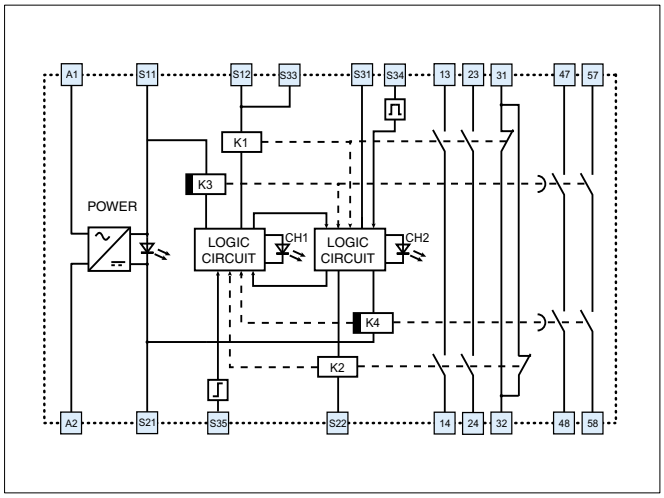
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.
- Surrounding air of 55 °C

Safety module CS AT-0

Terminals layout

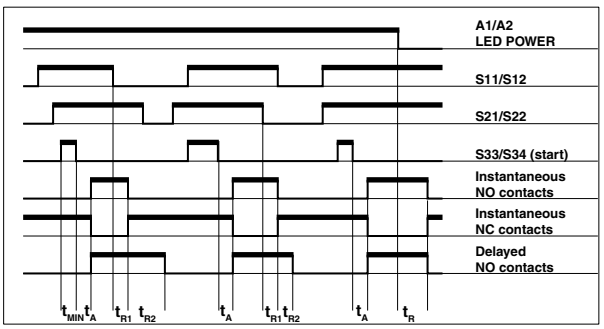


Internal wiring diagram

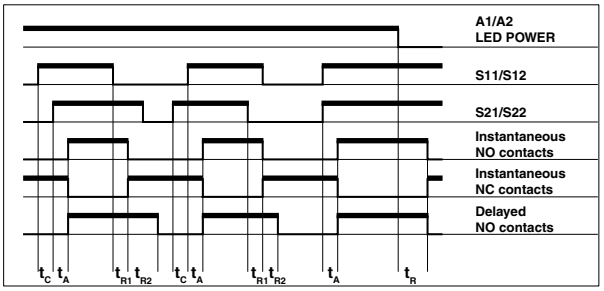


Operations diagrams

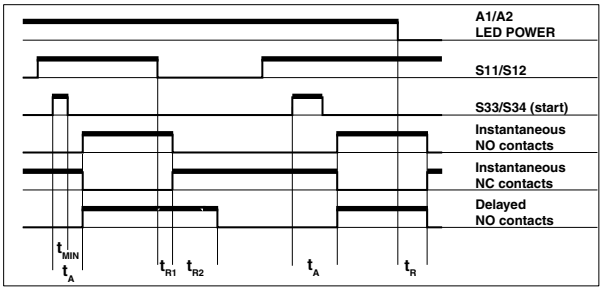
Configuration with 2 channels and monitored start



Configuration with 2 channels and automatic start



Configurations with 1 channel and manual start



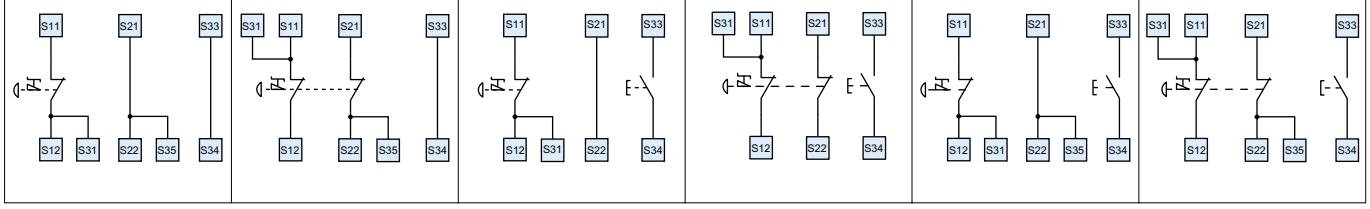
Legend:

t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_{R1}: releasing time
t_R: releasing time on de-energisation
t_{R2}: adjustable delayed contacts releasing time (see “How to order”)

Application examples

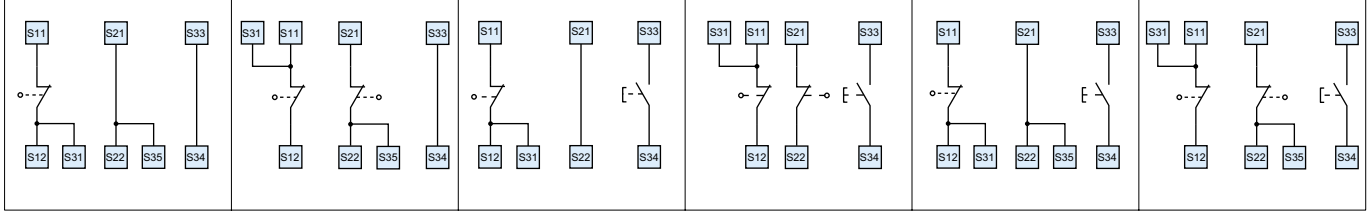
Emergency stop

Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels



Gate monitoring

Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels



Safety module **CS AT-1**, category 4/3 according to EN 954-1

Module for emergency stop and gate monitoring with delayed contacts at de-energizing

Main functions
- Single or dual channel input circuit
- Choice between automatic start, manual start or monitored start
- Connection of the input channels to opposite potentials
- 45 mm housing
- 3 safety instantaneous NO contact, 2 safety delayed NO contacts.
- Supply voltage: 24 VAC/DC, 120 VAC, 230 VAC

Utilization categories
Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)	
Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 2, shape C

General data

Safety category according to EN 954-1:	category 4 (instantaneous contacts) category 3 (delayed contacts)
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,45 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 10 VA
Rated power consumption DC:	< 5 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Min. period of start impulse t_{MIN}:	100 ms
Operating time t_A:	50 ms
Releasing time t_{R1}:	20 ms
Releasing time on de-energisation t_R:	70 ms
Delayed contacts releasing time t_{R2}:	see “How to order”
Simultaneity time t_C:	infinite

Conforms to the standards:
IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	3 safety instantaneous NO contacts, 2 safety delayed NO contacts.
Contacts type:	forced guided contacts
Contacts material:	silver alloy, gold plated
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS AT-11V024

Delayed contacts releasing time (t_{R2})

1	from 0,3 to 3 s, step 0,3 s
2	from 1 to 10 s, step 1 s
3	from 3 to 30 s, step 3 s
4	from 30 to 300 s, step 30 s
A	0,5 s fixed
B	1 s fixed
C	3 s fixed
D	10 s fixed

Supply voltage

024	24 VAC/DC	± 15%
120	120 VAC	± 15%
230	230 VAC	± 15%

Kind of connection

V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

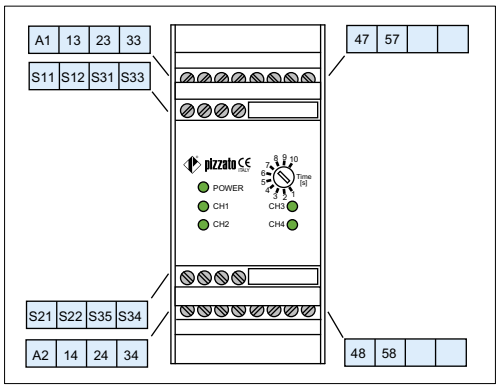
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Rated power consumption AC:	< 10 VA
Rated power consumption DC:	< 5 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

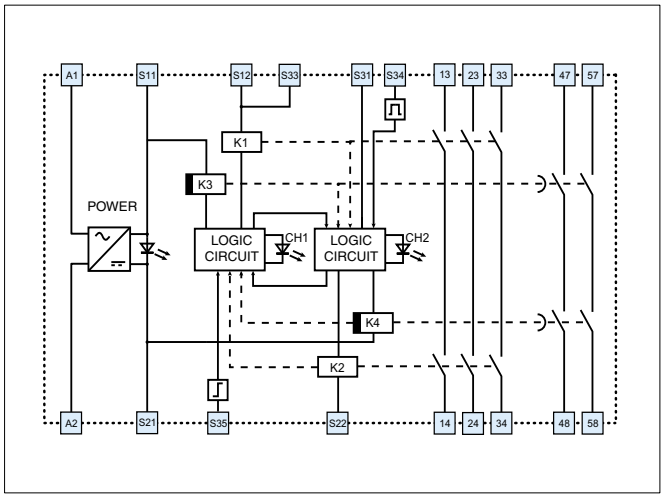
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.
- Surrounding air of 55 °C

Safety module CS AT-1

Terminals layout

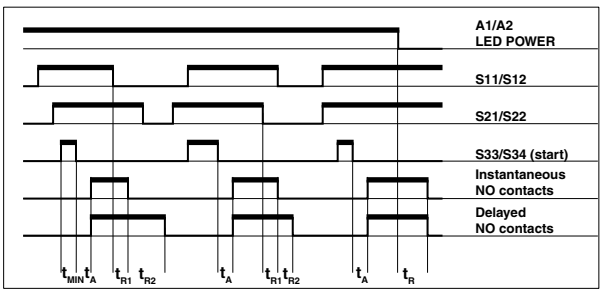


Internal wiring diagram

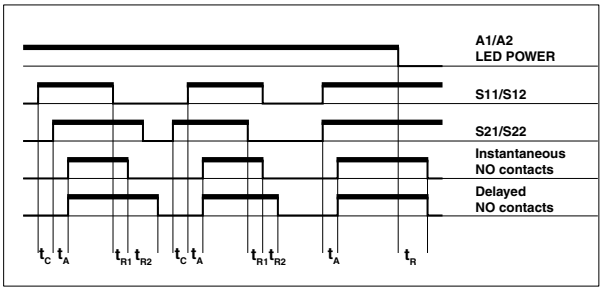


Operations diagrams

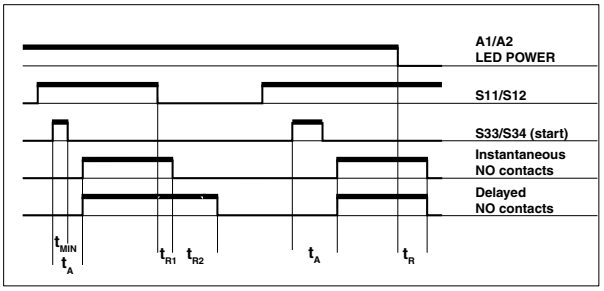
Configuration with 2 channels and monitored start



Configuration with 2 channels and automatic start



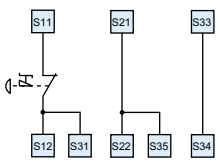
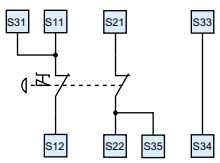
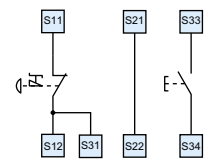
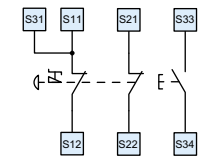
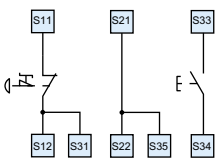
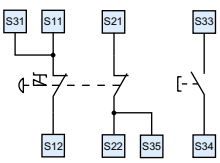
Configurations with 1 channel and manual start

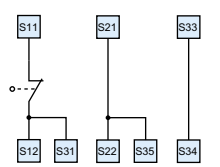
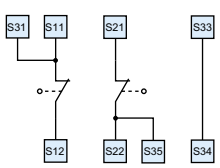
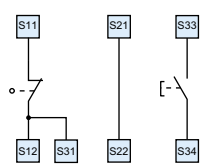
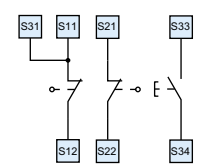
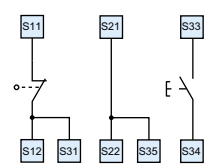
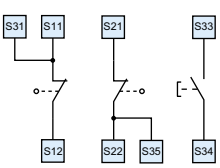


Legend:

t_{MIN}: min. period of start impulse
t_C: simultaneity time
t_A: operating time
t_{R1}: releasing time
t_R: releasing time on de-energisation
t_{R2}: adjustable delayed contacts releasing time (see “How to order”)

Application examples

Emergency stop					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Gate monitoring					
Automatic start wiring		Monitored start wiring		Manual start wiring	
1 channel	2 channels	1 channel	2 channels	1 channel	2 channels
					

Safety module **CS FS-0**, up to category 4 according to EN 954-1

Available from October 2004

Safety timer module with delayed contacts at energizing

Main functions

- Timed circuits through safety system with self-monitoring and redundancy
- Suitable to control safety interlocked devices
- Small 22,5 mm housing
- Output contacts:
  1 safety NO contact,
  2 auxiliary NC contacts,
- Supply voltage:
  24 VAC/DC, 120 VAC, 230 VAC

Utilization categories

Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

CE

Approval UL: request

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)

Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	up to category 4 according to EN 954-1 (dependent from the circuit structure)
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Operating time t_A:	see " How to order"
Releasing time on de-energisation t_R:	40 ms

Conforms to the standards:

IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, EN 1088, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	1 safety NO contact, 2 auxiliary NC contacts,
Contacts type:	forced guided contacts
Contacts material:	silver alloy
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see chapter 6, page 1

How to order

CS FS-01V024

Operating time delayed contacts (t_A)

1	from 0,3 to 3 s, step 0,3 s
2	from 1 to 10 s, step 1 s
3	from 3 to 30 s, step 3 s
4	from 30 to 300 s, step 30 s
A	0,5 s fixed
B	1 s fixed
C	3 s fixed
D	10 s fixed

Supply voltage

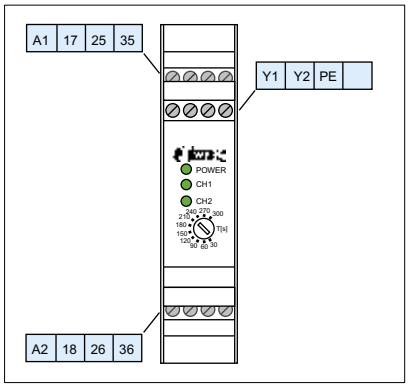
024	24 VAC/DC	± 15%
120	120 VAC	± 15%
230	230 VAC	± 15%

Kind of connection

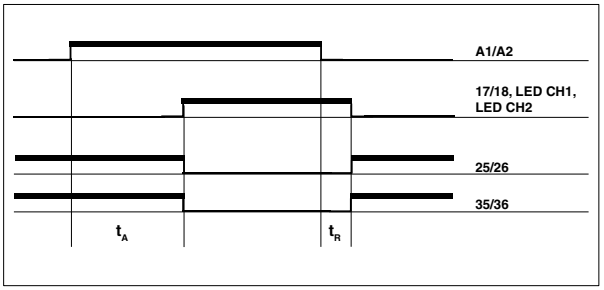
V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

Safety module CS FS-0

Terminals layout

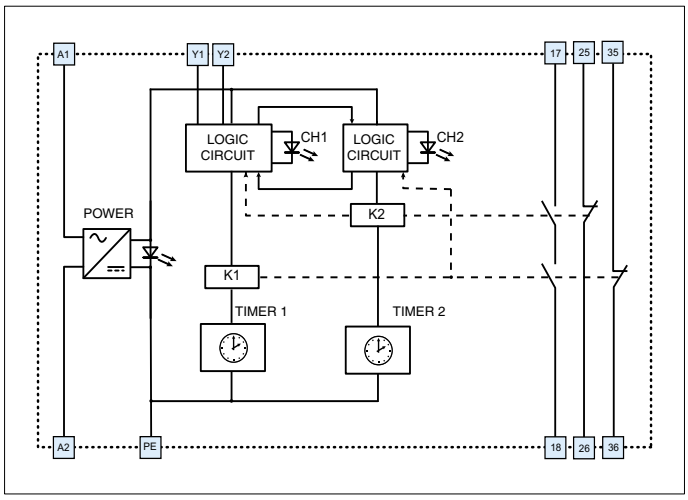


Operations diagrams



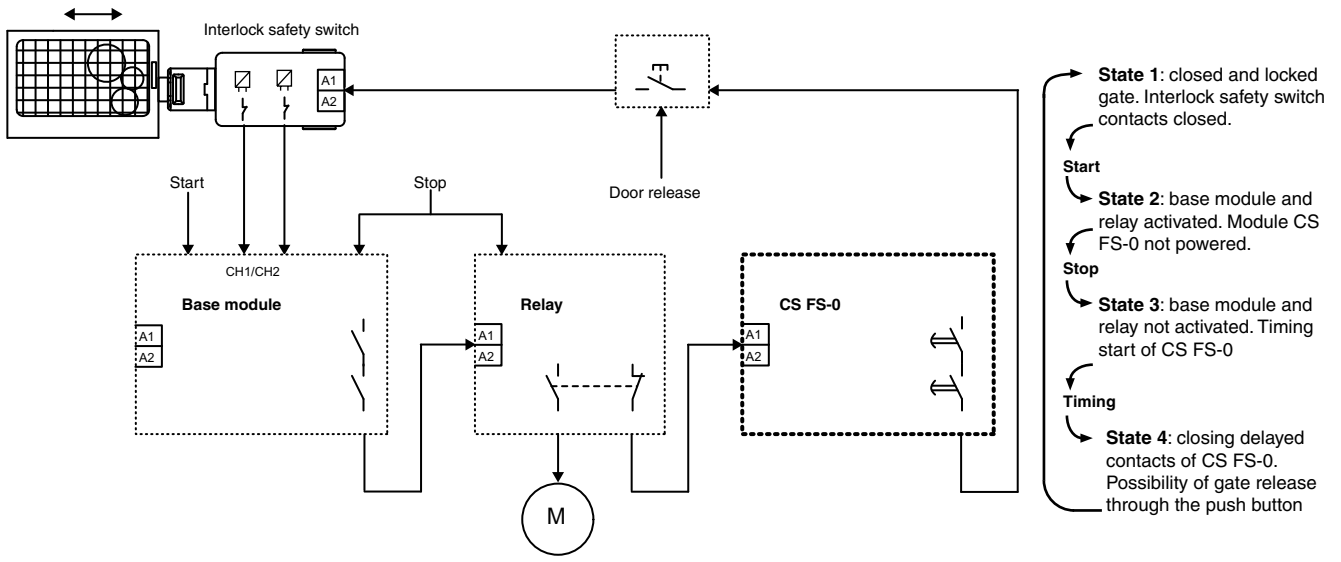
Legend:
t_A: adjustable operating time (see "How to order")
t_R: releasing time on de-energisation

Internal wiring diagram



Circuit structure

Control of a door-lock system with manual release



The shown diagram displays the operation principle of a typical circuit for the control of a door-lock system with door block when interlock safety switch is not energised and manual release of the door.
On this diagram redundant components and required feedback circuits are not represented. In order to obtain the complete wiring diagram, with different modalities of electrical block or with automatic door release, please contact our technical office:

phone ++39.0424.470.930 - **fax** ++39.0424.470.955 - **e mail** tech@pizzato.com

Safety module **CS DM-01**, type III C according to EN 574

Bimanual control device according to EN 574 type III C or safety module with synchronism control

Main functions

- Input circuit with 2 channels for bimanual control device or safety gate
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- 3 safety NO contacts, 1 auxiliary NC contact
- Supply voltage: 24 VAC/DC, 120 VAC, 230 VAC

Utilization categories

Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787
Certificate CE type n°: IMQ BP 210 DM

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)

Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	category 4 according to EN 954-1
Device type for bimanual control :	EN 574: type III C
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Max input resistance :	≤ 50 Ω
Input current:	30 mA
Operating time t_A:	50 ms
Releasing time t_{R1}:	20 ms
Releasing time on de-energisation t_R:	70 ms
Time range for synchronized control t_S:	< 0,5 s

Conforms to the standards:

IEC 204-1, EN 60204-1, EN 292, EN 574, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	3 safety NO contacts, 1 auxiliary NC contact
Contacts type:	forced guided contacts
Contacts material:	silver alloy
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A
The number and the load capacity of output contacts can be increased by using expansion modules or contactors:	see next page

How to order

CS DM-01V024

Kind of connection

V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

Supply voltage

024	24 VAC/DC	± 15%
120	120 VAC	± 15%
230	230 VAC	± 15%

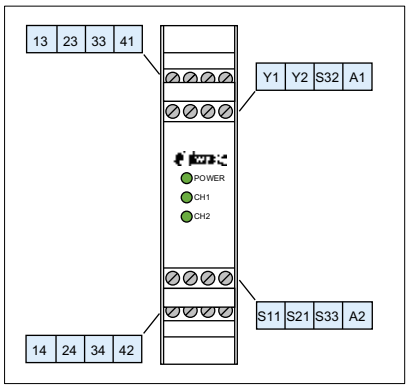
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz 120 VAC; 50...60 Hz 230 VAC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

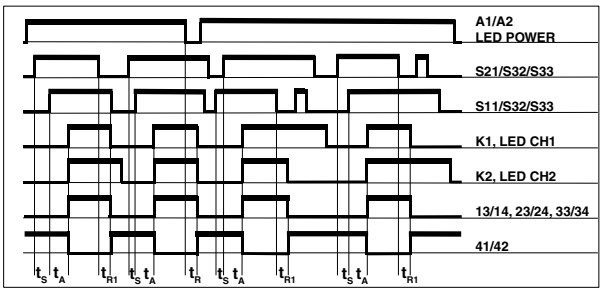
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Safety module CS DM-01

Terminals layout

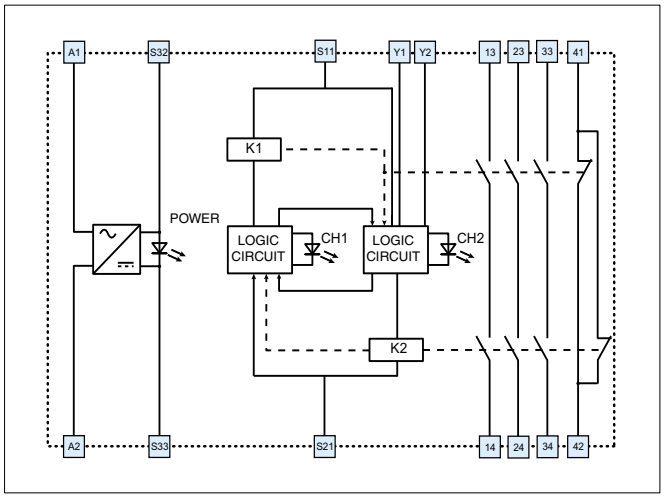


Operations diagrams

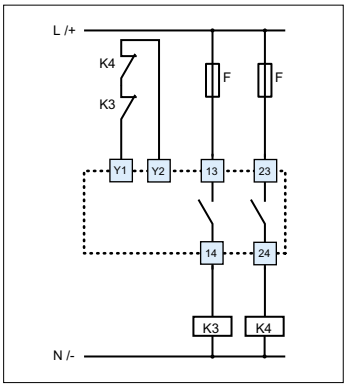


Legend:
t_S: time range for synchronized control
t_A: operating time
t_{R1}: releasing time
t_R: releasing time on de-energisation

Internal wiring diagram



Increase the number and the load capacity of the contacts

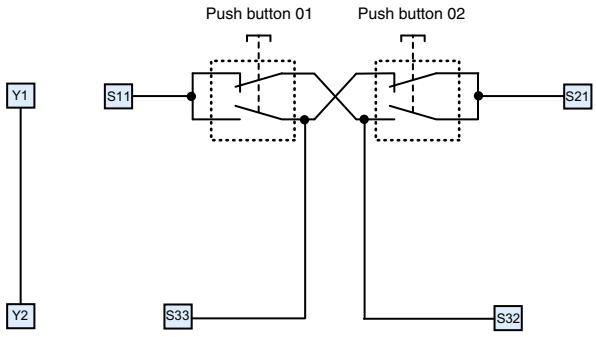


If necessary the number and the load capacity of output contacts can be increased by using expansion modules or contactors with forced guided contacts.

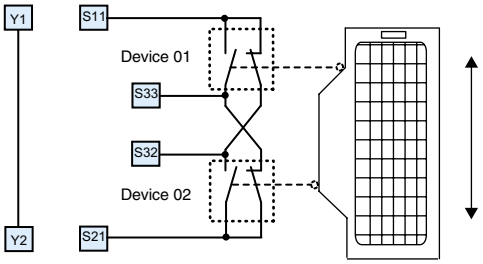
Feedback circuit for external contactors with automatic start wiring

Application examples

Bimanual control device type III C according to EN 574



Safety gate monitoring with automatic start wiring and simultaneity between channels < 0,5 s (safety category 4)



Expansion module **CS ME-01**, up to category 4 according to EN 954-1

Expansion modules for output contacts

Main functions

- Possibility of control with 1 or 2 channels
- Connection of the input channels to opposite potentials
- Small 22,5 mm housing
- Output contacts:
  5 safety NO contacts,
  1 auxiliary NC contact,
  1 feedback NC contact
- Supply voltage: 24 VAC/DC

Utilization categories

Alternate current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 operations/minute)
Ue (V) 24
Ie (A) 6

Markings, quality marks and certificates:

Approval UL: E131787

Complying with the requirements requested by: Low Voltage Directive 73/23/CEE and subsequent modifications and completions, Machinery Directive 98/37/CE, Electromagnetic Compatibility 89/336/CEE and subsequent modifications and completions.

Technical data

Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)

Protection degree:	IP40 (housing), IP20 (terminals)
Dimensions:	see chapter 5, page 1, shape A

General data

Safety category:	up to category 4 according to EN 954-1 (dependent from the base module)
Ambient temperature:	-25°C ... +55°C
Mechanical endurance:	>10 millions of operations
Electrical endurance:	>100.000 operations
Pollution degree:	outside 3, inside 2
Rated impulse withstand voltage (Uimp):	4KV
Rated insulation voltage (Ui):	250 V
Over-voltage category:	III
Weight:	0,2 Kg

Supply

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz
Max residual ripple in DC:	10%
Supply voltage tolerance:	±15% of Un
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0,5 A
Operating time of PTC:	intervention > 100 ms, reset > 3 s
Operating time t_A:	40 ms
Releasing time on de-energisation t_R:	40 ms
Simultaneity time t_C:	infinite

Conforms to the standards:

IEC 204-1, EN 60204-1, EN 292, EN 999, EN 1037, EN 954, EN 418, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 50081-1, EN 50082-2, IEC 62326-1, IEC 60664-1, EN 60947-1, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	5 safety NO contacts, 1 auxiliary NC contact, 1 feedback NC contact,
Contacts type:	forced guided contacts
Contacts material:	silver alloy, gold plated
Max switching voltage:	230/240 VAC; 300 VDC
Max switching current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Contacts resistance:	≤ 100 mΩ
Contact fuse protection	6 A

How to order

CS ME-01V024

Kind of connection

V	screw terminals
M	plug-in connectors with screw terminals
X	plug-in connectors with spring terminals

Supply voltage

024	24 VAC/DC ± 15%

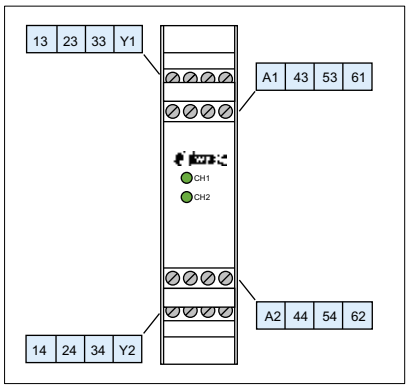
Data type approved by UL

Rated operating voltage (Un):	24 VAC/DC; 50...60 Hz
Rated power consumption AC:	< 5 VA
Rated power consumption DC:	< 2 W
Max switching voltage:	230 VAC
Max switching current per contact:	6 A

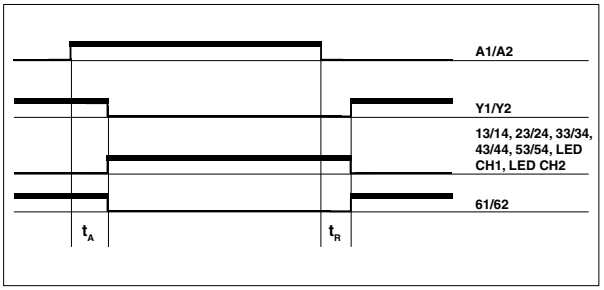
Notes (data type approved by UL):
- Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.
- The terminal tightening torque of 5-7 Lb-In.
- Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

Expansion module CS ME-01

Terminals layout

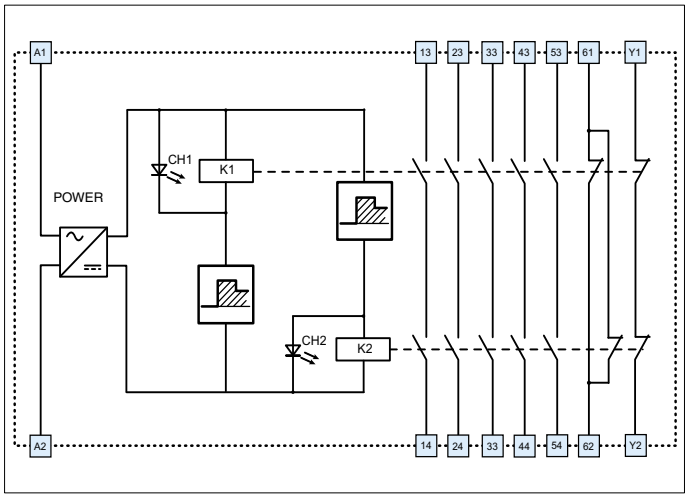


Operations diagrams



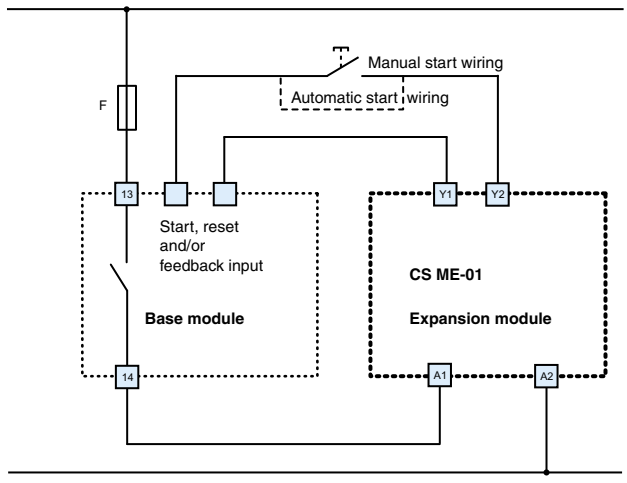
Legend:
t_A: operating time
t_R: releasing time on de-energisation

Internal wiring diagram

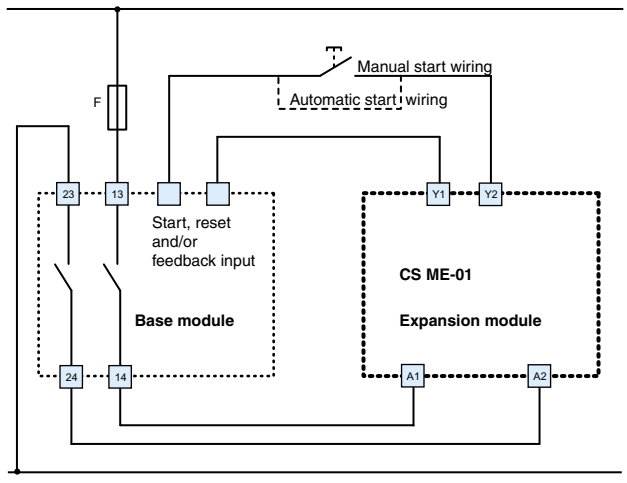


Application examples

1 channel control



2 channels control



1- Safety-design: basics

Every product or machine must comply with the Directive 73/23/ EEC and subsequent modifications and completions, in order to be marketed freely in the countries of the European Community. This Directive determines the fundamental requirements of quality and safety of products.
In particular, the Machinery 89/392/CEE directive and its subsequent modifications and completions determine the features for the machine in order to guarantee a sufficient safety level for the machine-workers.
The conformity of a machine is certified by the issue of the Conformity Declaration by the manufacturer and by the application of the marking CE on the machine itself.
In order to evaluate the risks, that the machine can cause, and to properly implement the safety systems, the European regulation organization CEN/CENELEC issued a series of standards, which translate into technical definitions the contents of the ECC directive mentioned above.

These safety standards (harmonized standards) are divided into three groups: A, B and C.

A standards contain the basic concepts and the designing principles for the construction of all machines.

B standards concern common features of groups of machines and are divided in two sub categories:
- B1 concerns the general safety condition (electric, hydraulic equipments, etc..)
- B2 refers to the devices assigned to the realization of safety circuits.

The last group of standards, C, refers to specific groups of machines, for which the regulation's organizations have issued specific standards, because of their dangerousness nature (e.g. hydraulic presses, injection machines, etc.).

We bring on this side some examples. The rules list is not complete.

A STANDARDS

- **EN 292-1 and -2:**
  - Danger evaluation
  - Safety design of the machine
  - Description of the protection device
  - Check of the residual risk
- **EN 1050:**
  - Damage extent
  - Risk period
  - Possibility to prevent the danger

B1 STANDARDS

- **EN 954-1:**

- cat.B	according with basic safety principles
- cat.1	well tested components and principles
- cat.2	cyclic check
- cat.3	system redundance
- cat.4	redundance and self-control

B2 STANDARDS

- EN 418	device for emergency stop
- EN 1088	devices for interlock of guards
- EN 574	device with bimanuals control
- EN 457	sound-signals of danger
- EN 842	optical signals of danger
- EN 60204-1	electric equipment in the machines

C STANDARDS

- EN 693	hydraulic presses
- EN 201	injection machines
- EN 415	wrapping machines
- EN 1175	warehouse trucks

2 - Procedure for the choice and the design of safety measures

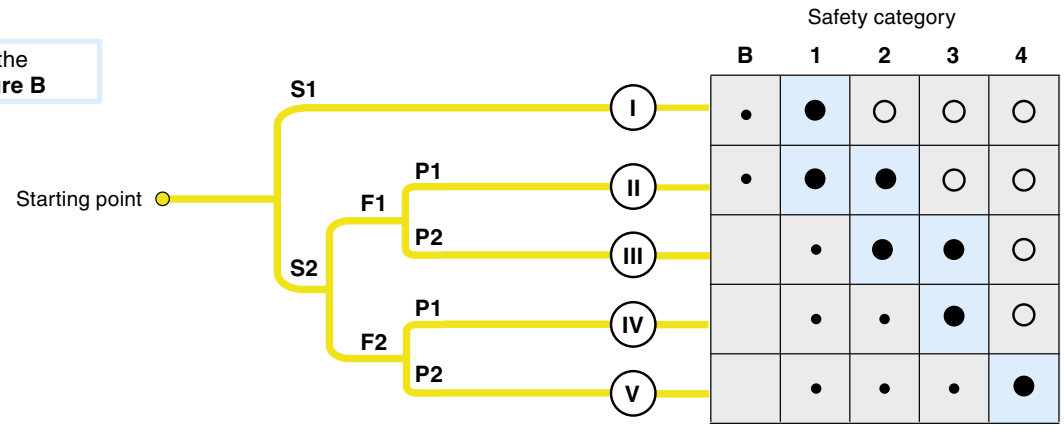
The following 5 steps are quoted from the standard EN 954-1 par. 4.3 for the correct choice and design of safety measures.

Step 1	Danger analysis and risks computation on the machine.
Step 2	Arrangement of measures for the risk reduction by means of control devices.
Step 3	Specification of the safety requirements in terms of: - choice of the safety category. - realization of safety functions;
Step 4	Design and check of the relevant parts for the safety of a control system.
Step 5	Validation of the functions and of the achieved categories by their comparison with what previously defined in step 3.

3 - Risk assessment and safety categories

Relevant to the purposes of the design in safety of every machine is the risk rating (standard **EN 1050**) and therefore the choice of the safety category (standard **EN 954-1**).
Some information regarding the choice of proper safety category suitable for the machine being evaluated is quoted below.

Risk table in accordance to the standard **EN 954-1/enclosure B**



Legend :

○	Starting point for risk assessment.
S	Accident severity: S1 = reversible (slight) injury (i.e. small cuts, burns, light abrasions, etc..). S2 = irreversible (serious) injury or death (i.e. permanent disability, loss of limbs, breath harms, etc..).
F	Presence in the dangerous zone: F1 = from rare to quite frequent (i.e. weekly or more, to once a day). F2 = from often to continuous (i.e. from many times a day to continuous).
P	Chance to avoid the accident or to reduce significantly its effect: P1 = possible on certain conditions (i.e. possibility of the worker to realize the imminent danger). P2 = quite impossible (i.e. impossibility of the worker to realize the imminent danger).
I-V	Estimate risk level.
B, 1-4	Safety categories of control systems.
●	Preferential category foreseen for this risk level.
○	Choice of an higher category.
•	Choice of a lower categories.

It is possible to use different categories than the preferential ones (big circle ●), but the foreseen behaviour of the system in case of faults, must be taken into consideration. Also, the reasons for the derogation must be indicated by the machine manufacturer. When categories indicated by a small circle (•) are chosen, some additional measures can be required, as for example:
- over-sizing or use of techniques for the fault elimination;
- use of a dynamic monitoring.

4 - Requirements table for each category according to the standard EN 954-1 par. 6.2

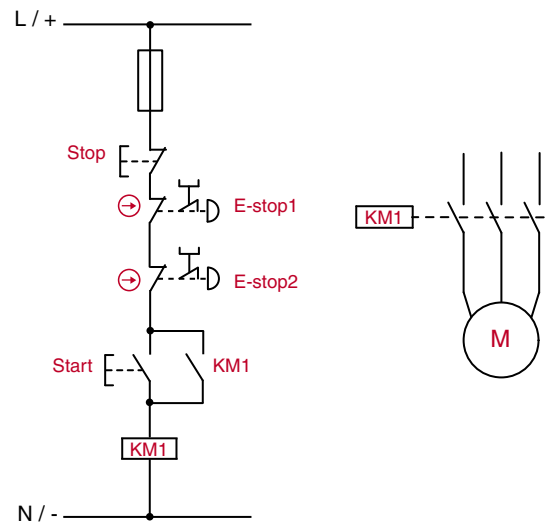
Cat.	List of the requirements	Behaviour of the system	Safety principles
B	Relevant parts for the safety in the control systems and/ or their protection devices, as well as their components have to be designed, manufactured, chosen and combined in compliance with the pertaining standards so that they can resist to the foreseen influence	An occurring error may cause the loss of the safety function.	Mainly marked by the choice of the components
1	The requirements of the category B are applied. Well tested components and safety principles must be used.	An occurring error may cause the loss of the safety function, but the probability of error occurrence is lower than in category B.	
2	The requirements of the category B and the use of well tested safety principles are applied. The safety function has to be checked by the control system from time to time or at least on every machine start and before any dangerous situation.	• An occurring error may cause the loss of the safety function among the controls. • The loss of the safety function is detected by the control.	Mainly marked by the structure
3	The requirements of the category B and the use of well tested safety principles are applied. Relevant parts for the safety have to be designed so that: • one single error in one of these parts doesn't cause the loss of the safety function. • Where reasonably practicable, the single error is detected.	• When one single error occurs the safety function is always performed. • Not all the errors are detected. • The accumulation of undetected errors may cause the loss of the safety function.	
4	The requirements of the category B and the use of well tested safety principles are applied. Relevant parts for the safety have to be designed so that: • one single error in one of these parts doesn't cause the loss of the safety function. • the single error is detected in the moment or before the request of the next safety function. If this is not possible, then the accumulation of errors must not cause the loss of the safety function.	• When errors occur the safety function is always performed. • Errors are detected in time in order to avoid the loss of the safety function.	

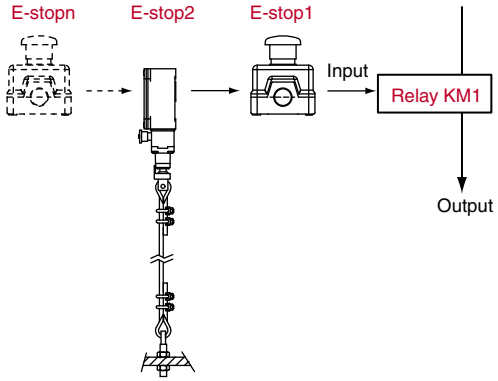
5 - Examples of connections according to the standard EN 954-1 (min. requirements)

Emergency stop push button and rope safety switches for emergency stop installation.

Cat.	Wiring diagram	Circuit structure

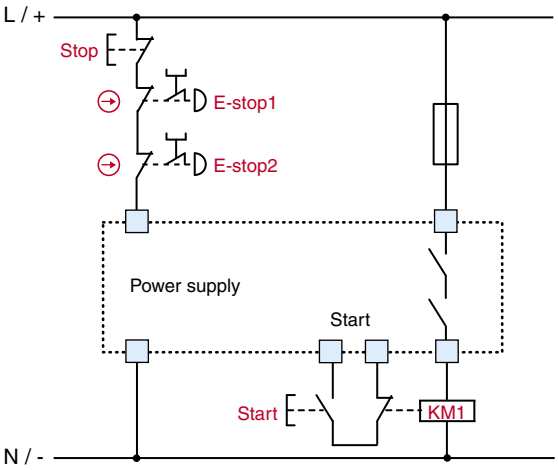
Cat. B, 1

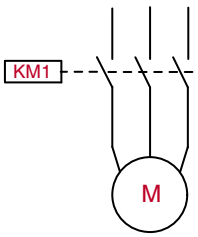




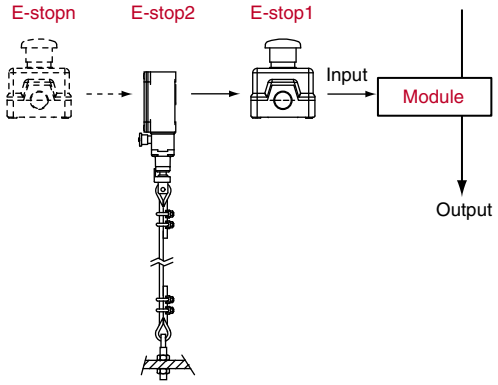
Object	Products code	Description
E-stop1	CC 01AAB00AB	Emergency stop push button, 1 NC contact with positive opening
E-stop2	FD 678	Rope safety switches, 1 NC contact with positive opening

Cat. 2





If an external contactor (KM1) is used to increase the load capacity of the contacts, this contactor should have forced guided contacts

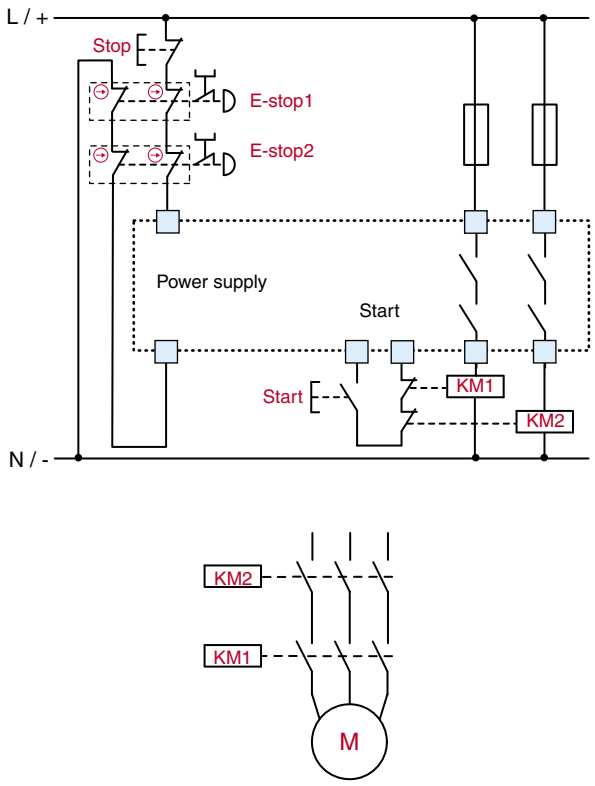


Object	Products code	Description
E-stop1	CC 01AAB00AB	Emergency stop push button, 1 NC contact with positive opening
E-stop2	FD 678	Rope safety switches, 1 NC contact with positive opening
Module	CS AR-20 CS AR-21 CS AR-22 CS AR-23	Safety module category 3 according to EN 954-1

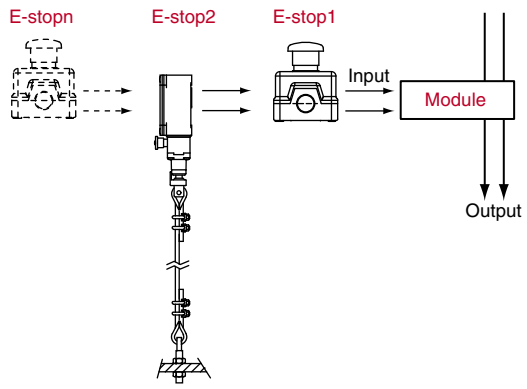
Emergency stop push button and rope safety switches for emergency stop installation.

Cat.	Wiring diagram	Circuit structure

3

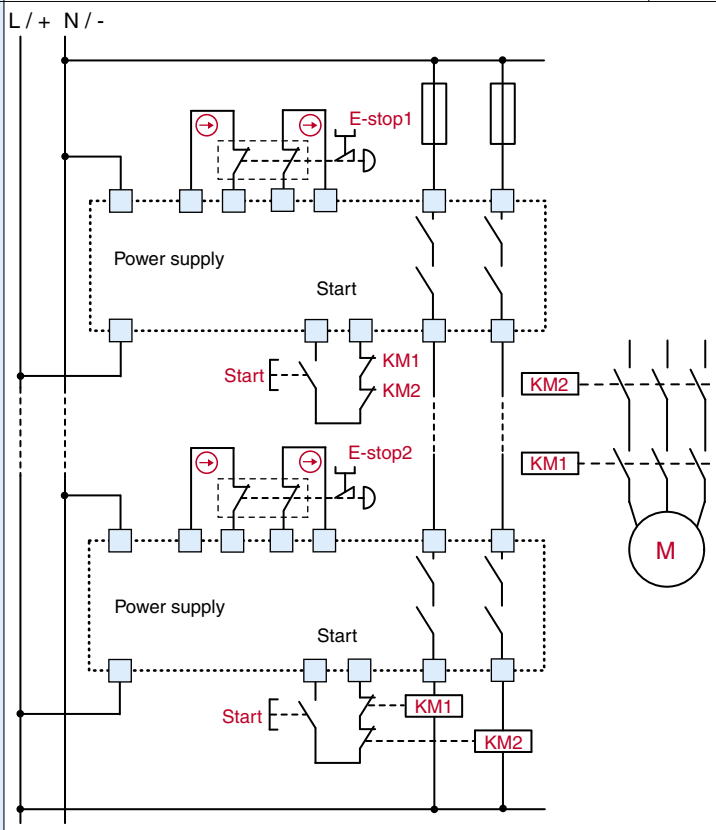


If external contactors (KM1-KM2) are used to increase the load capacity of the contacts, these contactors should have forced guided contacts.

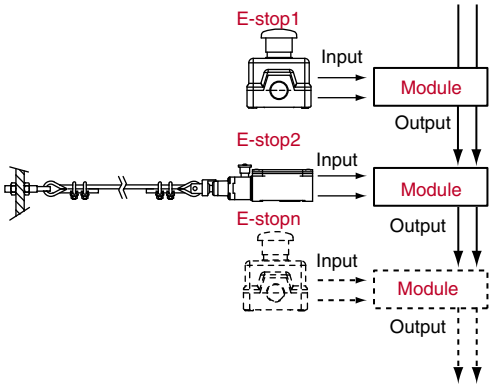


Object	Products code	Description
E-stop1	CC 01AAB00AC	Emergency stop push button, 2 NC contacts with positive opening
E-stop2	FD 978	Rope safety switches, 2 NC contacts with positive opening
Module	CS AR-20 CS AR-21 CS AR-22 CS AR-23	Safety module category 3 according to EN 954-1

4



If external contactors (KM1-KM2) are used to increase the load capacity of the contacts, these contactors should have forced guided contacts.



Object	Products code	Description
E-stop1	CC 01AAB00AC	Emergency stop push button, 2 NC contacts with positive opening
E-stop2	FD 978	Rope safety switches, 2 NC contacts with positive opening
Module	CS AR-01 CS AR-02 CS AR-03 CS AR-04 CS AR-07	Safety module category 4 according to EN 954-1

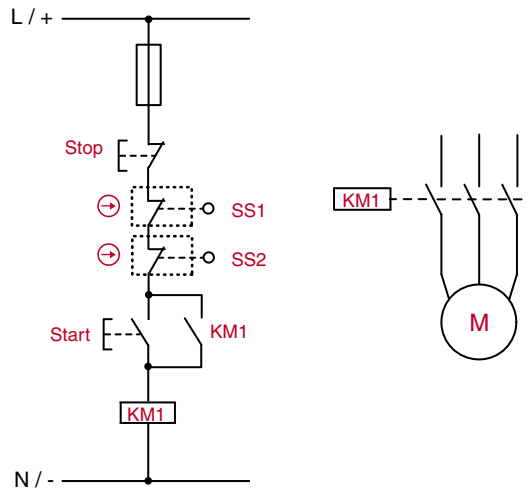
Attention: the examples above mentioned are purely descriptive and give only an indication about how to set up a safety circuit according to the categories foreseen by standard EN 954-1. It is responsibility of the manufacturer to control that correct circuits are applied on each specific machine.

5 - Examples of connections according to the standard EN 954-1 (min. requirements)

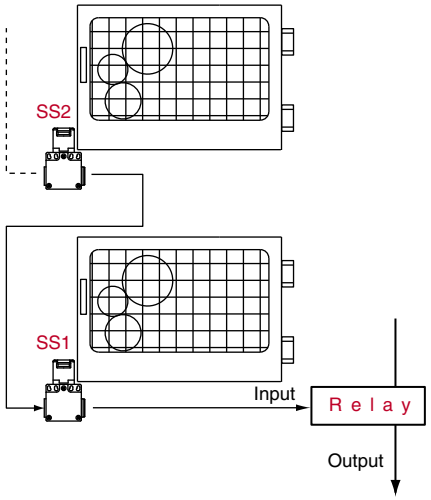
Gate monitoring safety switches applications.

Cat. B, 1

Wiring diagram

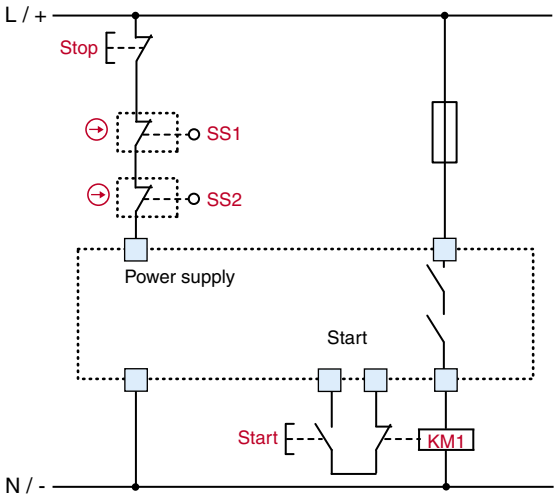


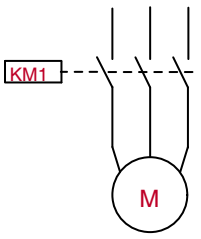
Circuit structure



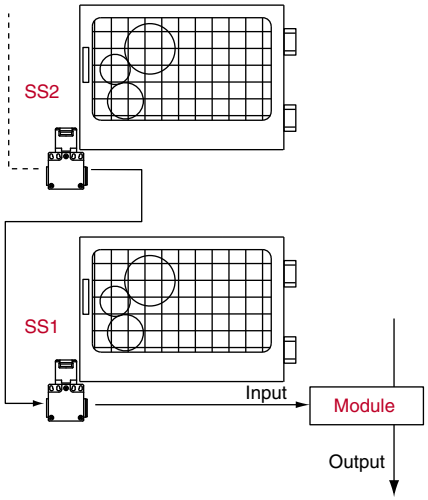
Object	Products code	Description
SS1-SS2	FX 692	Key safety switches, 1 NC contact with positive opening

Cat. 2



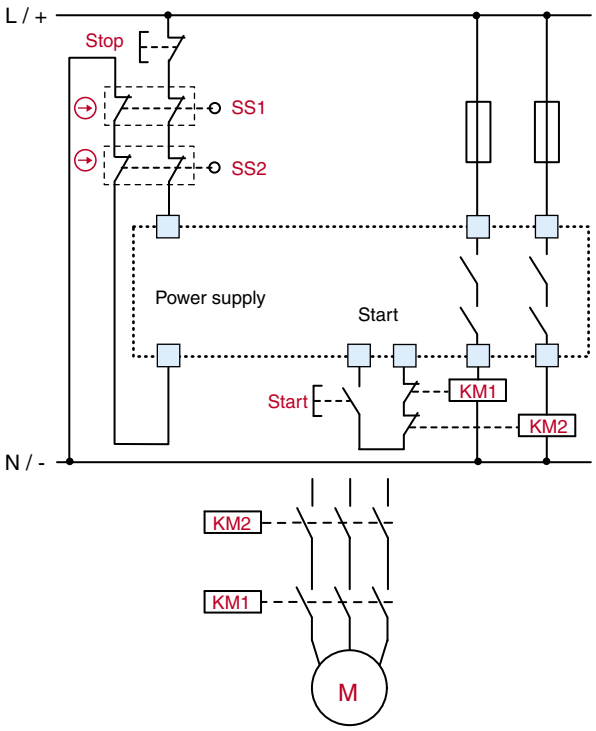
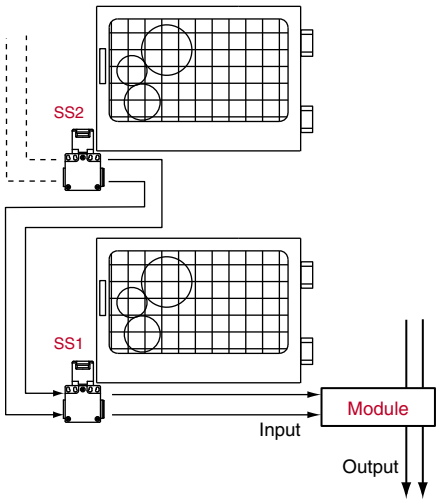


If an external contactor (KM1) is used to increase the load capacity of the contacts, this contactor should have forced guided contacts



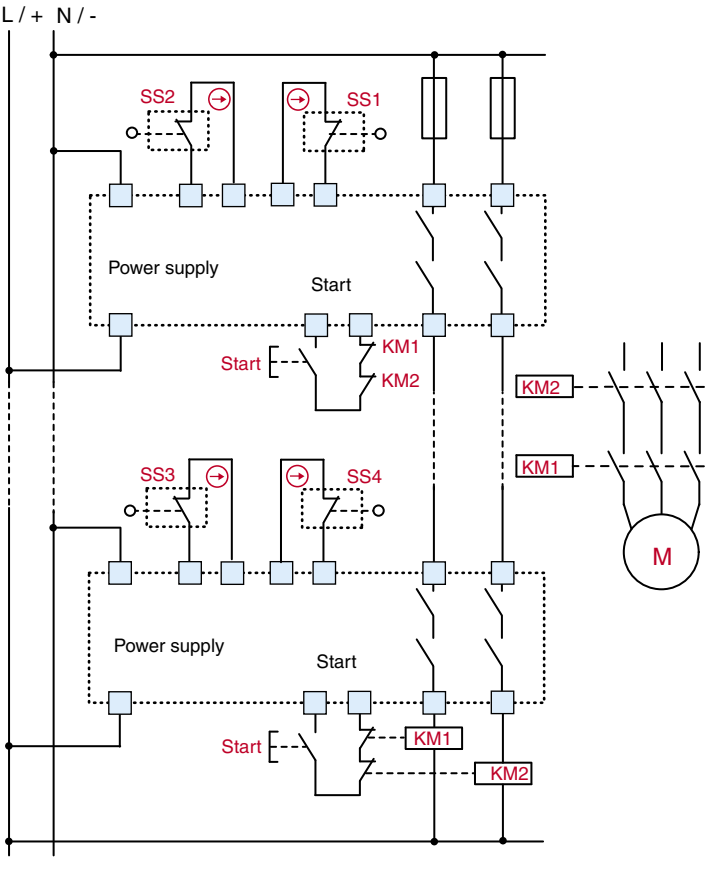
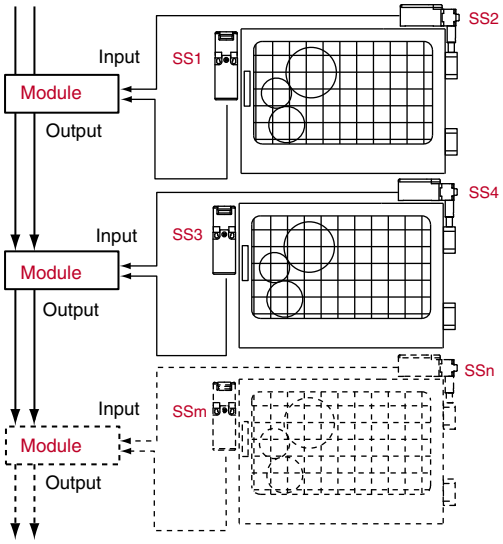
Object	Products code	Description
SS1-SS2	FX 692	Key safety switches, 1 NC contact with positive opening
Module	CS AR-20 CS AR-21 CS AR-22 CS AR-23	Safety module category 3 according to EN 954-1

Gate monitoring safety switches applications.

Cat.	Wiring diagram	Circuit structure
3		

If external contactors (KM1-KM2) are used to increase the load capacity of the contacts, these contactors should have forced guided contacts.

Object	Products code	Description
SS1-SS2	FX 992	Key safety switches, 2 NC contacts with positive opening
Module	CS AR-20 CS AR-21 CS AR-22 CS AR-23	Safety module category 3 according to EN 954-1

4		

If external contactors (KM1-KM2) are used to increase the load capacity of the contacts, these contactors should have forced guided contacts.

Object	Products code	Description
SS1-SS3	FR 692	Key safety switches, 1 NC contact with positive opening
SS2-SS4	FR 1896	Hinge operating safety switches, 1 NC contact with positive opening
Module	CS AR-01 CS AR-02 CS AR-03 CS AR-04 CS AR-07	Safety module category 4 according to EN 954-1

Attention: the examples above mentioned are purely descriptive and give only an indication about how to set up a safety circuit according to the categories foreseen by standard EN 954-1. It is responsibility of the manufacturer to control that correct circuits are applied on each specific machine.

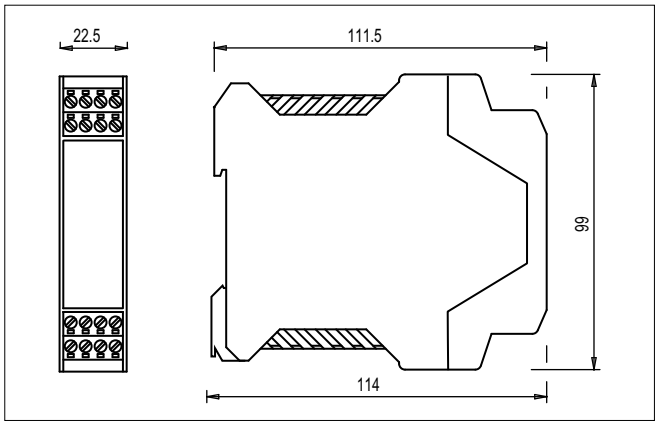
Dimensional drawings, housing features

Shape A | 22,5 mm thickness housing

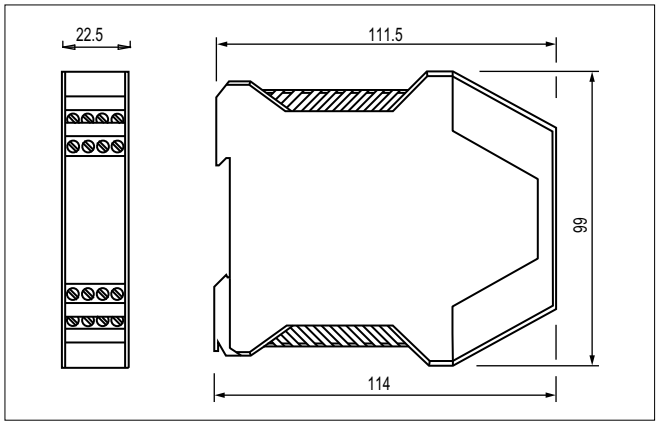
Connection data

Terminals driving torque:	0,5...0,6 Nm
Cross section of the conductors:	0,2...2,5 mm²
	24...12 AWG

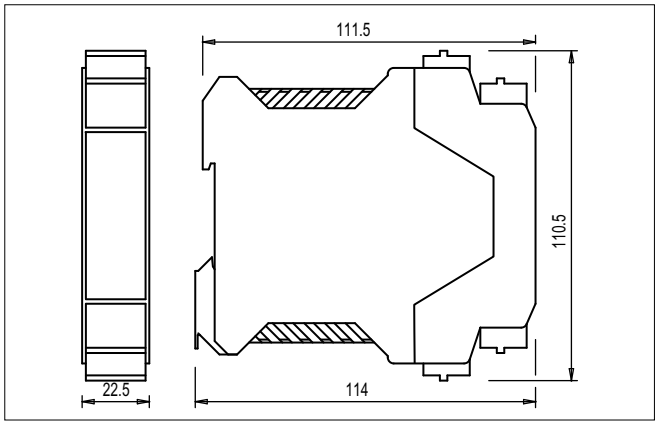
Installation
Snap mounting on DIN-rail



Plug-in connectors with screw terminals



Screw terminals



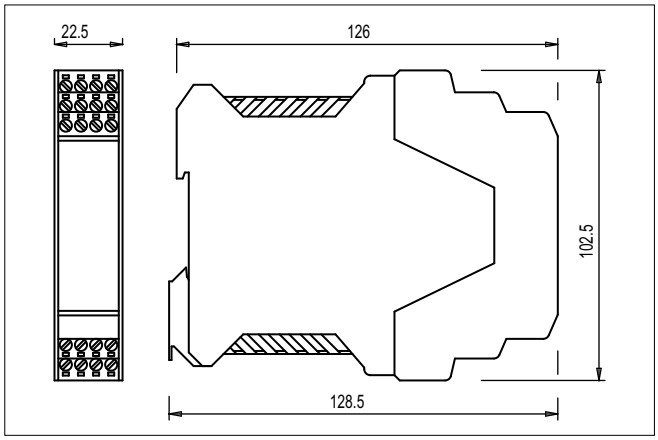
Plug-in connectors with spring terminals

Shape B | 22,5 mm thickness housing

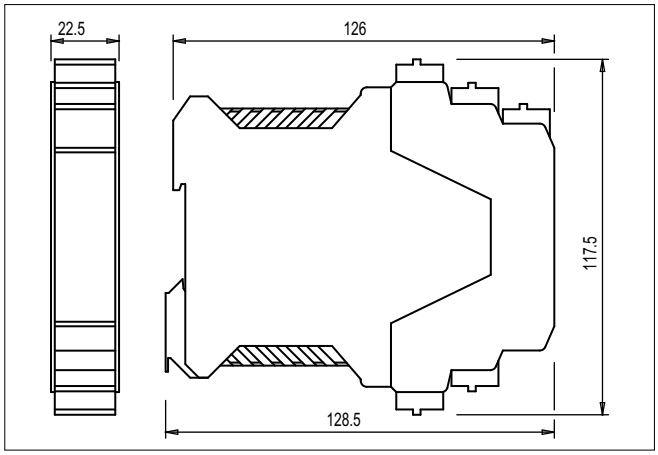
Connection data

Terminals driving torque:	0,5...0,6 Nm
Cross section of the conductors:	0,2...2,5 mm²
	24...12 AWG

Installation
Snap mounting on DIN-rail



Plug-in connectors with screw terminals



Plug-in connectors with spring terminals

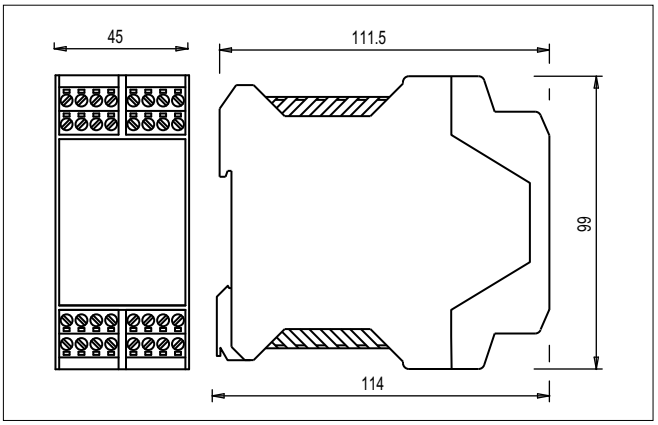
Shape C | 45 mm thickness housing

Connection data

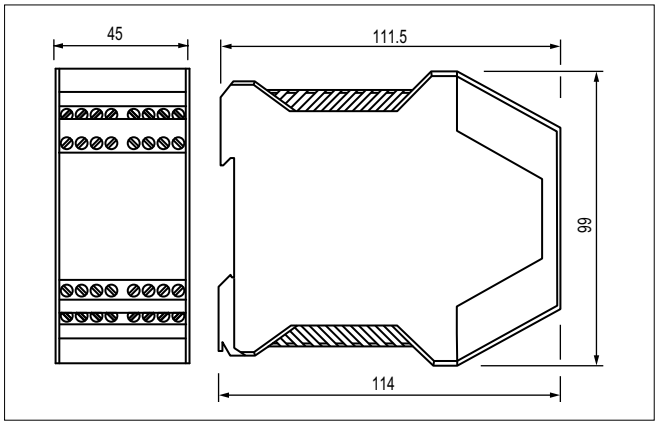
Terminals driving torque:	0,5...0,6 Nm
Cross section of the conductors:	0,2...2,5 mm²
	24...12 AWG

Installation

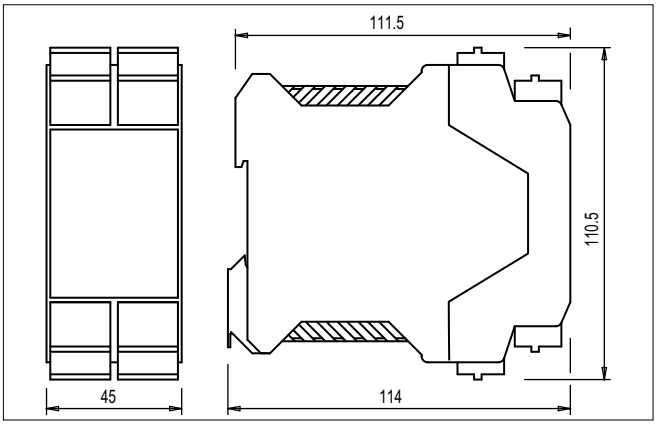
Snap mounting on DIN-rail



Plug-in connectors with screw terminals



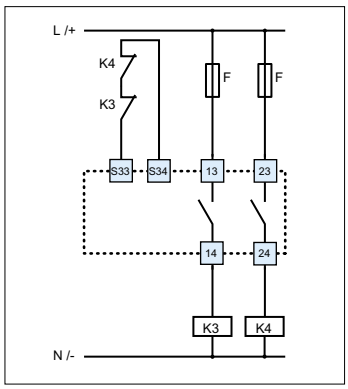
Screw terminals



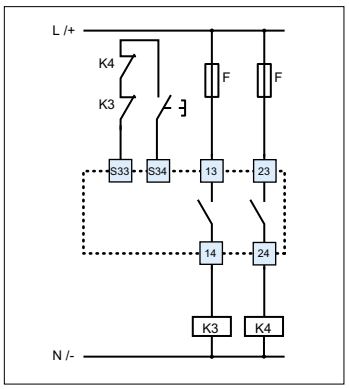
Plug-in connectors with spring terminals

Increase the number and the load capacity of the contacts

If necessary the number and the load capacity of output contacts can be increased by using expansion modules or contactors with forced guided contacts.



Feedback circuit for external contactors with automatic start wiring



Feedback circuit for external contactors with manual start wiring

Technical definitions

Input channels
Input circuits for safety module activation, that are connected to one or more danger monitoring devices.

Feedback output contacts
Output contact of expansion modules that have to be connected to the base module for the functional test of the expansion module itself. A possible welding of one relays contact prevents the start of the base module and consequently of the expansion module.

Signalling output contacts
Safety module output contacts that cannot be used for the machine safety circuit but just to indicate the module state

Safety output contacts
Safety module output contacts that can be used for the machine safety circuit.

Automatic start
Automatic activation of the safety module, if input conditions are observed, when the module is energized.

Monitored start
Activation of the safety module, if input conditions are observed, by an external start button.
The module is activated on the falling edge of the start signal, monitoring the possible welding of the external start button's contacts.

Manual start
Activation of the safety module, if input conditions are observed, by an external start button. The module is activated on the rising edge of the start signal.

Short circuit's check between input channels.
Particular internal connection of the safety module's relay that does not allow the activation of the module if there is a short circuit between input channels' wires.

Notes

Any information or application example, included the connection diagrams, described in this document are to be intended as purely descriptive.
The choice and application of the products in conformity with the Standards, in order to avoid damages to persons or goods, is under the responsibility of the user.
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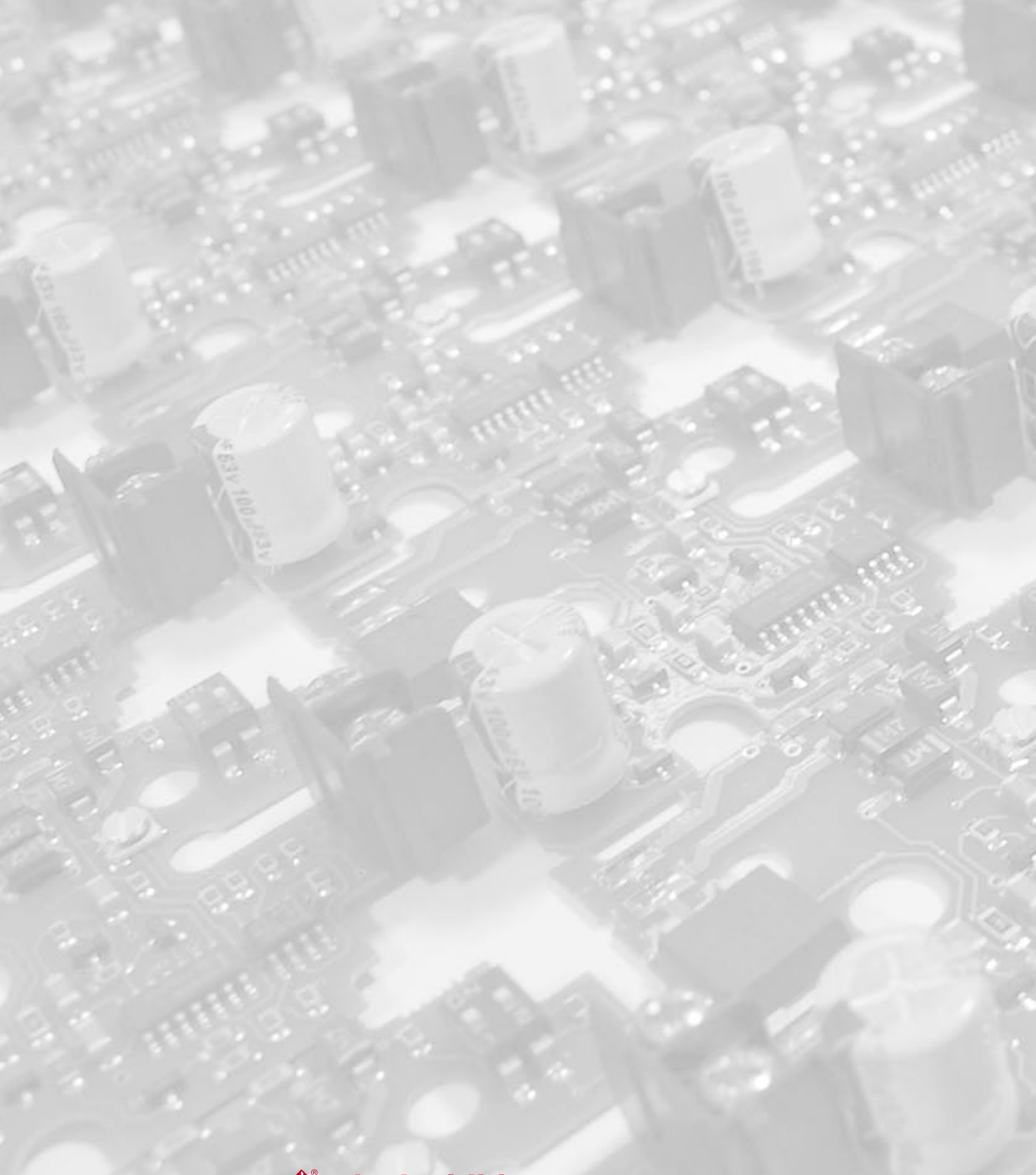

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