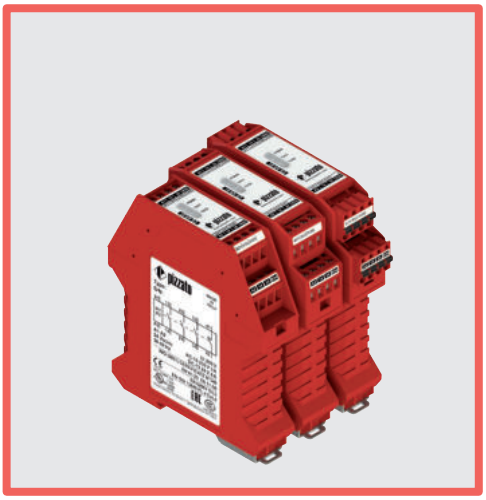
Safety module **CS AR-91**



Module for emergency stops, end position monitoring for movable guards and magnetic safety sensors

Main features

- For safety applications up to SIL 3/PL e
- Choice between automatic start, manual start or monitored start
- Connection of input channels of opposite potentials
- Reduced housing width of 22.5 mm
- Output contacts:
  2 NO safety contacts, 1 NO opto-decoupled auxiliary contact
- Supply voltage: 24 Vac/dc
- Insensitive to voltage dips

Utilization categories

Alternating current: AC15 (50…60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 oper. cycles/min.)
Ue (V) 24
Ie (A) 4

Quality marks:

EU-type examination certificate: IMQ n. 340
(EN 81-20:2014; EN 81-50:2014; EN 81-1:1998+A3:2009; EN 81-2:1998+A3:2009)
EC type examination certificate: IMQ CP 432 DM
(Machinery Directive)

UL approval:	E131787
CCC approval:	2013010305640211
EAC approval:	RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:

Machinery Directive 2006/42/EC,
EMC Directive 2014/30/EC,
RoHS Directive 2011/65/EU,
Lifts Directive 2014/33/EU

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 317, design A

General data

SIL level (SIL CL) up to:	SIL CL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Safety category up to:	cat. 4 acc. to EN ISO 13849-1
Safety parameters:	see page 375
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Rated impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; ±15%; 50…60 Hz
Max. DC residual ripple in DC:	10%
Power consumption AC:	< 5 VA
Power consumption DC:	< 2.5 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC response time:	Response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	< 40 mA
Min. duration of start impulse t_{MIN}:	> 50 ms
Response time t_A:	< 120 ms
Release time t_{R1}:	< 15 ms
Release time in absence of power supply t_R:	< 65 ms
Simultaneity time t_C:	unlimited
Response time starting from application of the supply:	< 300 ms

Auxiliary signalling circuit

Auxiliary output (Y43-Y44):	1NO opto-decoupled
Rated operating voltage (U_e):	24 Vdc
Rated operating current (I_e):	25 mA
Rated impulse withstand voltage (U_{imp}):	4 kV
Release time t_{R2}:	< 1 ms

In compliance with standards:

EN 60204-1, EN ISO 13855, EN 1037, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN 50581, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95, GB/T14048.5-2017

Output circuit

Output contacts:	2 NO safety contacts,
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current Σ I_{th}^2:	36 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A type F

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 263-272.

Code structure

CS AR-91V024

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
024	24 Vac/dc

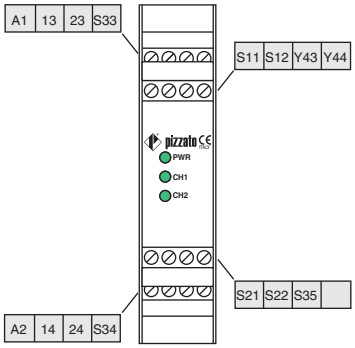
Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W
Electrical ratings:	230/240 Vac 6 A general use C300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

Safety module CS AR-91

Pin assignment

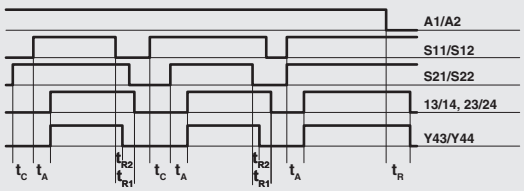


Voltage dips, short interruptions and voltage variations

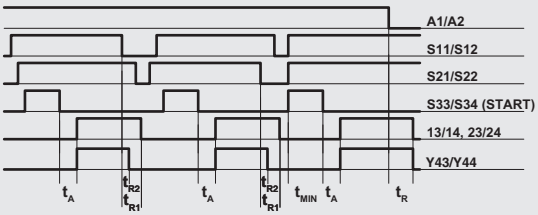
The CS AR-91 safety module has a built-in voltage drop sensor which serves to protect and safeguard the internal state of the safety relays, in the event of dips or short voltage interruptions. This is to prevent unwanted switching states in relation to the state of the inputs from occurring. When voltage is restored, the device continues to operate with a switching state that is consistent with the input signals. The safety module retains its normal function during voltage dips and brief interruptions; for longer voltage interruptions, the safety outputs open and reset themselves automatically during an automatic start if voltage is restored or – in the case of a manual or monitored start – require that the system be reset by the operator.

Function diagrams

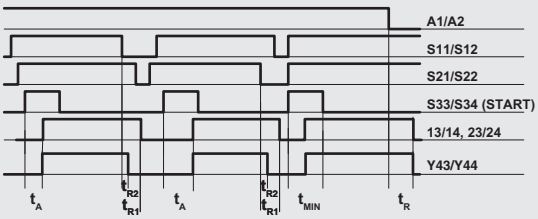
Configuration with automatic start



Configuration with monitored start



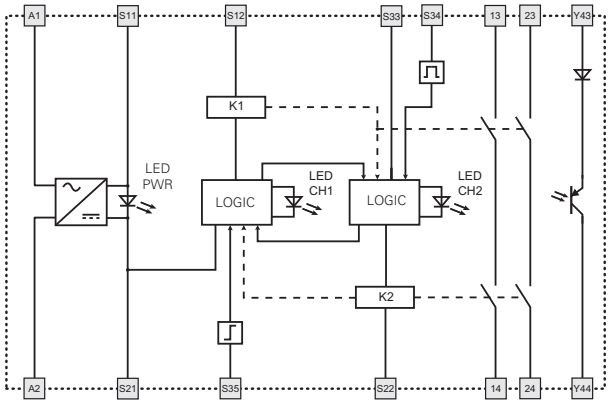
Configuration with manual start



Legend:
t_{MIN}: Min. duration of start impulse
t_c: simultaneity time
t_A: response time
t_{R1}: release time
t_R: release time in absence of power supply

Notes:
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

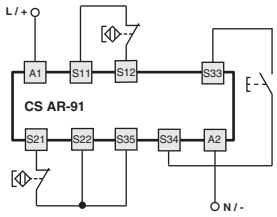
Internal block diagram



Input configuration

Input configuration with magnetic sensors

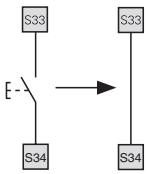
2 channels



The diagram does not show the exact position of the terminals in the product

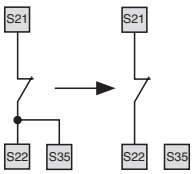
Automatic start

With regard to the indicated diagrams, bridge the start button between S33 and S34 in order to activate the automatic start module.



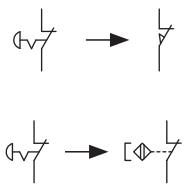
Monitored start

With regard to the indicated diagrams, remove the connection between S22 and S35 in order to activate the monitored start module.



Monitoring of movable guards and magnetic safety sensors

The safety module can monitor emergency stop circuits, control circuits for movable guards as well as magnetic safety sensors. Replace the emergency stop contacts with switch contacts or sensor contacts.
The sensors can only be used in 2-channel configuration.



Application examples See page 273