

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

Main features

10A

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- 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 NC auxiliary contact
- Supply voltage: 10 ... 30 Vdc, 24 Vac/dc, 120 Vac, 230 Vac

Utilization categories

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

Quality marks and certificates:



EC type examination ce	rtificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2013010305640211
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Code structure

CS AR-01V024

Connection type

- V Screw terminals
- М Connector with screw terminals
- X Connector with spring terminals

Supply voltage		
024	24 Vac/dc	
120	120 Vac	
230	230 Vac	
E02	10 30 Vdc	

Stock items CS AR-01V024 CS AR-01V120 CS AR-01VE02

Features approved by UL

Rated supply voltage (U_):

Power consumption AC: Power consumption DC: Maximum switching voltage: Max. current per contact: Utilization category

24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz < 5 VA < 2 W 230 Vac 6 A C300

Votes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).

Polyamide housing PA 66, self-extinguishing V Protection degree: Dimensions:	0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) see page 295, design A
General data 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 349
Ambient temperature:	-25°C+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse withstand voltage (U _{imp}):	4 kV
Rated insulation voltage (U _i):	250 V
Overvoltage category:	II
Weight:	0.3 kg
Supply	
Rated supply voltage (U _n):	10 30 Vdc 24 Vac/dc; 5060 Hz 120 Vac; 5060 Hz 230 Vac; 5060 Hz
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	-10% +15% of U
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W
Control circuit	
Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time $>$ 100 ms, release time $>$ 3 s
Maximum resistance per input:	\leq 50 Ω
Current per input:	30 mA (typical)
Min. duration of start impulse t _{MIN} :	> 100 ms, > 50 ms (E02)
Response time t _A :	< 50 ms, < 150 ms (E02)
Release time t _{R1} :	< 20 ms
Release time in absence of power supply t_{R} :	< 70 ms, < 100 ms (E02)
Simultaneity time t _c :	unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95

Output circuit

Technical data

Housing

Output contacts:

Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Max. total current Σ Ith²: Minimum current: Contact resistance: External protection fuse:

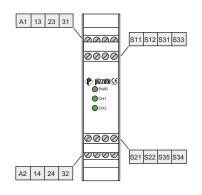
2 NO safety contacts, 1 NC auxiliary contact forcibly guided gold-plated silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 72 A² 10 mA ≤ 100 mΩ 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See page 241-250.



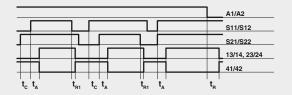
General Catalogue Safety 2017-2018

Pin assignment

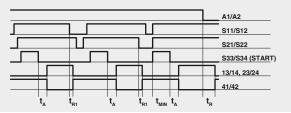


Function diagrams

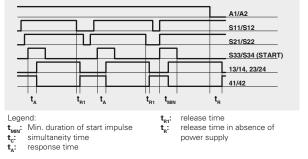
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



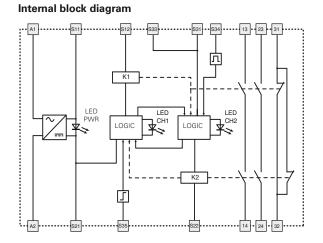
Notes:

S21

S22

S35

The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time \boldsymbol{t}_{n1} referred to input S11/S12, time \boldsymbol{t}_n referred to the supply, time \boldsymbol{t}_n referred to input S11/S12 and to the start, and time \boldsymbol{t}_{nm} referred to the start.



Input configuration

 Emergency stop circuits

 Input configuration with manual start

 1 channel
 2 channels

Monitored start

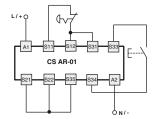
module.

With regard to the indicated diagrams, remove the S21

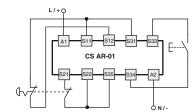
connection between S22

and S35 in order to acti-

vate the monitored start



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



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 251

Items with code on $\ensuremath{\textbf{green}}$ background are stock items

S33

S34

E-)

S33

S34

General Catalogue Safety 2017-2018

Automatic start

module.

With regard to the indica-

ted diagrams, bridge the

start button between S33

and S34 in order to acti-

vate the automatic start



S22 S35



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

Main features

10A

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
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- Reduced housing width of 22.5 mm
- Output contacts: 3 NO safety contacts
- Supply voltage: 10 ... 30 Vdc, 24 Vac/dc, 120 Vac, 230 Vac

Utilization categories

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

Quality marks and certificates:



EC type examination ce	rtificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2013010305640211
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Code structure

CS AR-02V024

Connection type

- V Screw terminals
- М Connector with screw terminals
- X Connector with spring terminals

Supply voltage		
024	24 Vac/dc	
120	120 Vac	
230	230 Vac	
E02	10 30 Vdc	

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) Protection degree: Dimensions: see page 295, design A

General data SIL CL: Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U _{imp}): Rated insulation voltage (U _i): Overvoltage category: Weight:	up to SIL CL 3 acc. to EN 62061 up to PL e acc. to EN ISO 13849-1 up to cat. 4 acc. to EN ISO 13849-1 see page 349 -25°C+55°C >10 million operating cycles >100,000 operating cycles external 3, internal 2 4 kV 250 V II 0.3 kg
Supply Rated supply voltage (U _n): Max. DC residual ripple in DC: Supply voltage tolerance: Power consumption AC: Power consumption DC:	10 30 Vdc 24 Vac/dc; 5060 Hz 120 Vac; 5060 Hz 230 Vac; 5060 Hz 10% ±15% of U _n < 5 VA < 2 W
$\label{eq:control circuit} \hline Protection against short circuits: \\ PTC times: \\ Maximum resistance per input: \\ Current per input: \\ Min. duration of start impulse t_{MIN}: \\ Response time t_{A}: \\ Release time t_{R1}: \\ Release time in absence of power supply t_{R}: \\ Simultaneity time t_{C}: \\ \hline \end{tabular}$	PTC resistance, Ih=0.5 A Response time > 100 ms, release time > 3 s \leq 50 Ω < 30 mA > 100 ms < 50 ms < 20 ms < 70 ms unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit 3 NO safety contacts, Output contacts: Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Max. total current Σ Ith²: Minimum current: Contact resistance: 4 A External protection fuse:

forcibly guided gold-plated silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 72 A² 10 mA ≤ **100** mΩ

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See page 241-250.

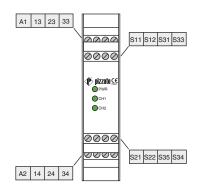
Stock items

CS AR-02V024

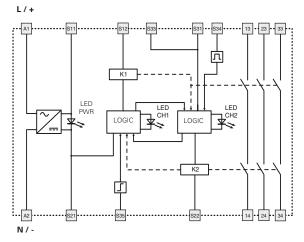
Features approved by UL 24 Vac/dc; 50...60 Hz Rated supply voltage (U_): 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz < 5 VA Power consumption AC: < 2 W Power consumption DC: 230 Vac Maximum switching voltage: Max. current per contact: 6 A Utilization category C300 Votes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).



Pin assignment



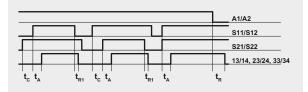
Internal block diagram



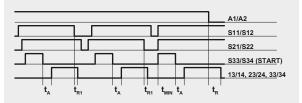
Input configuration

Function diagrams

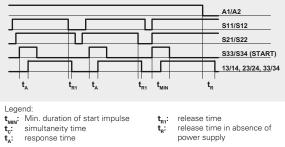
Configuration with automatic start



Configuration with monitored start



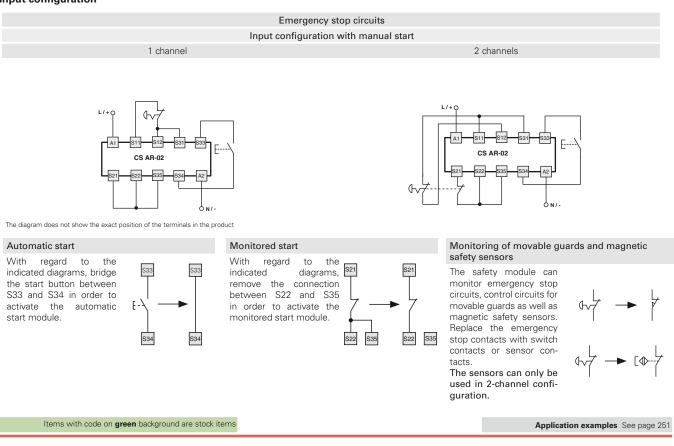
Configuration with manual start



release time release time in absence of t 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 \boldsymbol{t}_{RT} referred to input S11/S12, time \boldsymbol{t}_{R} referred to the supply, time \boldsymbol{t}_{A} referred to input S11/S12 and to the start, and time \boldsymbol{t}_{MIN} referred to the start.





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

Main features

10A

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- Output contacts: 3 NO safety contacts, 1 NC auxiliary contact

 Supply voltage: 24 Vac/dc, 120 Vac, 230 Vac

Utilization categories

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

Quality marks and certificates:



EC type examination certificate: IMQ CP 432 DM E131787 UL approval: CCC approval: 2013010305640211 RU C-IT.АД35.В.00454 EAC approval:

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Code structure

CS AR-04V024

Connection type

- V Screw terminals
- М Connector with screw terminals
- X Connector with spring terminals

Tec	hnica	l data

Housing Polyamide housing PA 66, self-extinguishing V0 Protection degree:	acc. to UL 94 IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 295, design A
General data SIL CL: Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U _{imp}): Rated insulation voltage (U _i): Overvoltage category: Weight:	up to SIL CL 3 acc. to EN 62061 up to PL e acc. to EN ISO 13849-1 up to cat. 4 acc. to EN ISO 13849-1 see page 349 -25°C+55°C >10 million operating cycles >100,000 operating cycles external 3, internal 2 4 kV 250 V II 0.3 kg
Supply Rated supply voltage (U _n):	24 Vac/dc; 5060 Hz 120 Vac; 5060 Hz 230 Vac; 5060 Hz
Max. DC residual ripple in DC: Supply voltage tolerance: Power consumption AC: Power consumption DC:	10% ±15% of U _n < 5 VA < 2 W
$\label{eq:constraint} \begin{aligned} & \textbf{Control circuit} \\ & \textbf{Protection against short circuits:} \\ & \textbf{PTC times:} \\ & \textbf{Maximum resistance per input:} \\ & \textbf{Current per input:} \\ & \textbf{Min. duration of start impulse } t_{\text{MIN}} \\ & \textbf{Response time } t_{\text{A}} \\ & \textbf{Release time } t_{\text{R1}} \\ & \textbf{Release time in absence of power supply } t_{\text{R}} \\ & \textbf{Simultaneity time } t_{\text{C}} \\ \end{aligned}$	PTC resistance, Ih=0.5 A Response time > 100 ms, release time > 3 s \leq 50 Ω 30 mA (typical) > 100 ms < 50 ms < 20 ms < 70 ms unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95

Output circuit Output contacts:

Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Max. total current Σ Ith²: Minimum current: Contact resistance: External protection fuse:

Supply voltage

024 24 Vac/dc

120 120 Vac

230 230 Vac

3 NO safety contacts 1 NC auxiliary contact forcibly guided gold-plated silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 64 A² 10 mA \leq 100 m Ω 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. see page 241-250.

Stock items

CS AR-04V024

Features approved by UL

Rated supply voltage (U_):

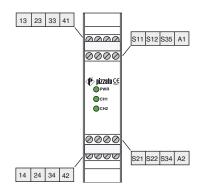
Power consumption AC: Power consumption DC: Maximum switching voltage: Max. current per contact: Utilization category

24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz < 5 VA < 2 W 230 Vac 6 A C300

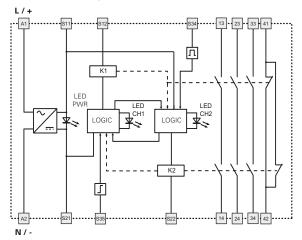
Votes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).



Pin assignment



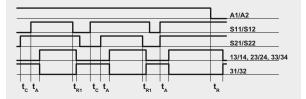
Internal block diagram



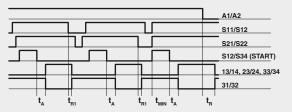
Input configuration

Function diagrams

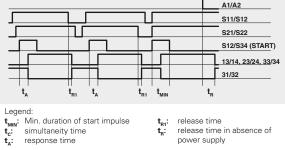
Configuration with automatic start



Configuration with monitored start



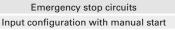
Configuration with manual start



release time t_{R1}: t_R: release time in absence of power supply

Notes:

The configurations with one channel are obtained taking into consideration only the effect of the S11/S12 input on the supply. 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 \mathbf{t}_{MIN}



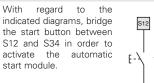
2 channels

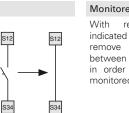
L/+C A1 S11 CS AR-04 522 0 N/-

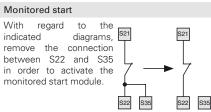
1 channel

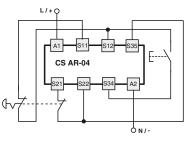
The diagram does not show the exact position of the terminals in the product

Automatic start



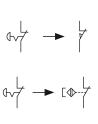






Monitoring of movable guards and magnetic safety sensors

The safety module can monitor emergency stop circuits, control circuits for movable guards well as 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.



Items with code on green background are stock items

Application examples See page 251



Module for emergency stops, end position monitoring for movable guards, semiconductor outputs (e.g. light barriers) and magnetic safety sensors

Main features

10A

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start (CS AR-05 only) or monitored start (CS AR-06 only)
- Can be connected to semiconductor outputs (e.g. light barriers), to electromechanical contacts or to magnetic safety sensors
- Output contacts: 3 NO safety contacts, 1 NC auxiliary contact
- Supply voltage
- 24 Vac/dc, 120 Vac, 230 Vac

Utilization categories

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

Quality marks and certificates:

EC type examination ce	rtificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2013010305640211
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Code structure

CS AR-05V024

Start mode

- 05 manual or automatic start
- 06 monitored start

Connection type

- Screw terminals V
- Connector with screw terminals Μ
- X Connector with spring terminals

Technical data

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Housing Polyamide housing PA 66, self-extinguishing V Protection degree: Dimensions:	/0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) see page 295, design A
General data SIL CL: Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U _{imp}): Rated insulation voltage (U _j): Overvoltage category: Weight:	up to SIL CL 3 acc. to EN 62061 up to PL e acc. to EN ISO 13849-1 up to cat. 4 acc. to EN ISO 13849-1 see page 349 -25°C+55°C >10 million operating cycles >100,000 operating cycles external 3, internal 2 4 kV 250 V II 0.3 kg
Supply Rated supply voltage (U _n): Max. DC residual ripple in DC: Supply voltage tolerance: Power consumption AC: Power consumption DC:	24 Vac/dc; 5060 Hz 120 Vac; 5060 Hz 230 Vac; 5060 Hz 10% ±15% of U _n < 5 VA < 2 W
Control circuitProtection against short circuits:PTC times:Maximum resistance per input:Current per input:Min. duration of start impulse t_{MIN} :Response time t_{R_1} :Release time t_{R_1} :Release time in absence of power supply t_R :Simultaneity time t_C :	PTC resistance, Ih=0.5 A Response time > 100 ms, release time > 3 s \leq 50 Ω < 30 mA > 250 ms < 200 ms < 70 ms unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95

Output circuit Output contacts:

Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Max total current Σ lth². Minimum current: Contact resistance: External protection fuse: The number and the load capacity of output contacts can be increased by using expansion modules or

contactors. see page 241-250.

pizzato

Supply voltage

024 24 Vac/dc

120 120 Vac

230 230 Vac

Stock items

CS AR-05V024 CS AR-06V024

Features approved by UL

3 NO safety contacts

1 NC auxiliary contact

gold-plated silver alloy

230/240 Vac; 300 Vdc

forcibly guided

6 A

6 A 64 A²

4 A

10 mA

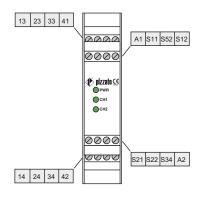
 \leq 100 m Ω

Rated supply voltage (U_):

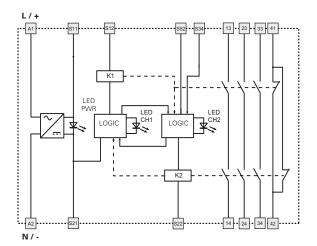
Power consumption AC: Power consumption DC: Maximum switching voltage: Max. current per contact: Utilization category

24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz < 5 VA < 2 W 230 Vac 6 A C300

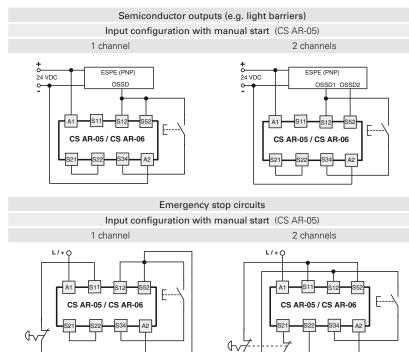
Pin assignment



Internal block diagram

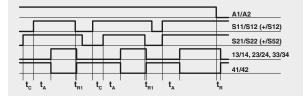


Input configuration

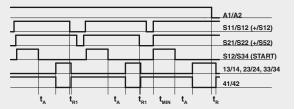


Function diagrams

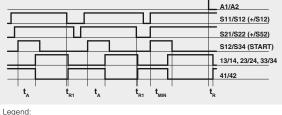
Configuration with automatic start (CS AR-05 only)



Configuration with monitored start (CS AR-06 only)



Configuration with manual start (CS AR-05 only)

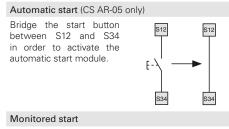


 t_{MIN} : Min. duration of start impulse t_c : simultaneity time t_A : response time

t_{R1}: release time
 t_R: release time in absence of power supply

Notes

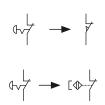
The configurations with one channel are obtained taking into consideration the CH1 input only. In this case it is necessary to consider time \boldsymbol{t}_n referred to input CH1, time \boldsymbol{t}_n referred to the supply, time \boldsymbol{t}_n referred to input CH1 and to the start, and time \boldsymbol{t}_{mm} referred to the start.



Use module CS AR-06 with the circuit diagrams for manual start.

Monitoringofmovableguardsandmagneticsafetysensors

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 251

ΟN/·



Module for emergency stops and end position monitoring for movable guards

Main features

10A

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- 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:
- 4 NO safety contacts,
- 1 NC auxiliary contact
- Supply voltage: 24 Vac/dc

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 and certificates:

EC type examination certificate: IMQ CP 432 DM UL approval: E131787 CCC approval: 2013010305640211 EAC approval: RU C-IT.АД35.B.00454

Compliance with the requirements of:

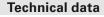
Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Code structure

CS AR-07<u>M024</u>

Connection type

- M Connector with screw terminals
- **X** Connector with spring terminals



Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94Protection degree:IP40 (housing), IP20 (terminal strip)Dimensions:see page 295, design B

up to SIL CL 3 acc. to EN 62061

>10 million operating cycles

>100,000 operating cycles external 3, internal 2

24 Vac/dc; 50...60 Hz

see page 349

-25°C...+55°C

4 kV 250 V

0.3 kg

10%

< 5 VA

< 2 W

±15% of U_

Ш

up to PL e acc. to EN ISO 13849-1 up to cat. 4 acc. to EN ISO 13849-1

General data SIL CL:

Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U_{imp}): Rated insulation voltage (U_i): Overvoltage category: Weight:

Supply

Rated supply voltage (U_n): Max. DC residual ripple in DC: Supply voltage tolerance: Power consumption AC: Power consumption DC:

Control circuit

Protection against short circuits: PTC resistance, Ih=0.5 A PTC times: Response time > 100 ms, release time > 3 s Maximum resistance per input: ≤ **50** Ω Current per input: 30 mA (typical) Min. duration of start impulse t_{MIN}: > 100 ms Response time t_A : < 70 ms Release time t_{R1}: < 40 ms Release time in absence of power supply t_B: < 80 ms Simultaneity time t_c: unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit Output contacts:

Supply voltage

024 24 Vac/dc

Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (lth): Max. total current Σ lth²: Minimum current: Contact resistance: External protection fuse: 4 NO safety contacts 1 NC auxiliary contact forcibly guided gold-plated silver alloy 230/240 Vac; 220 Vdc 6 A 6 A 72 A^2 10 mA \leq 100 m Ω 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See page 241-250.

Stock items

CS AR-07M024

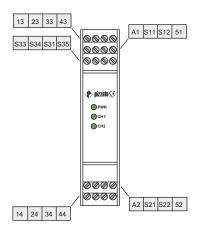
Features approved by UL

Rated supply voltage (U_n): Power consumption AC: Power consumption DC: Maximum switching voltage: Max. current per contact: Utilization category 24 Vac/dc; 50...60 Hz < 5 VA < 2 VV 230 Vac 6 A C300

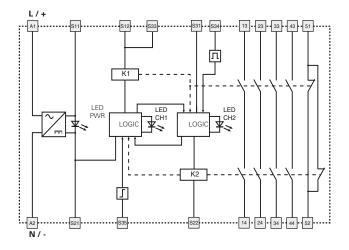
Notes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).



Pin assignment

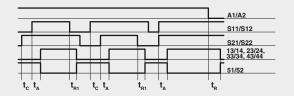


Internal block diagram

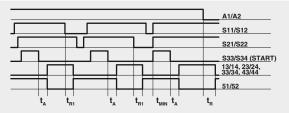


Function diagrams

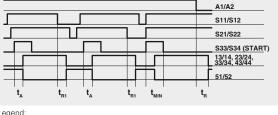
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



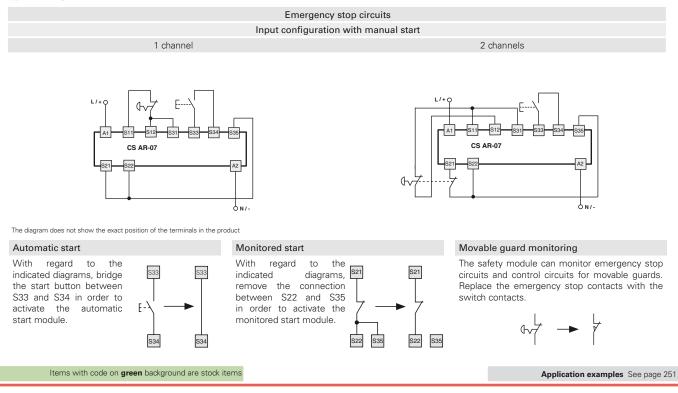
 $\begin{array}{l} \label{eq:total_states} Legend: \\ t_{MN}: \mbox{ Min. duration of start impulse } \\ t_{c}: \mbox{ simultaneity time } \\ t_{A}: \mbox{ response time } \end{array}$

t_R: 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 $t_{\rm R1}$ referred to input S11/S12, time $t_{\rm R}$ referred to the supply, time $t_{\rm A}$ referred to input S11/S12 and to the start, and time $t_{\rm MIN}$ referred to the start.

Input configuration





Module for emergency stops, end position monitoring for movable guards, semiconductor outputs (e.g. light barriers) and magnetic safety sensors

Main features

10A

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start or monitored start
- Can be connected to semiconductor outputs (e.g. light barriers), to electromechanical contacts or to magnetic safety sensors
- Output contacts:
- 2 NO safety contacts
- Supply voltage:
- 12 Vdc, 24 Vac/dc, 120 Vac, 230 Vac
- Possibility of parallel reset of several modules

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



EC type examination	on certificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2013010305640211 TÜV
SÜD approval: Z10	10 09 75157 002
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU Code structure

CS AR-08V024

Connection type

- V Screw terminals
- M Connector with screw terminals
- **X** Connector with spring terminals

Stock items

CS AR-08V024

Technical data

Housing

F

5

Ν

2

5

Housing	
Polyamide housing PA 66, self-extinguishing V	0 acc. to UL 94
Protection degree:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 295, design A
General data 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 349
Ambient temperature:	-25°C+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse withstand voltage (U _{imp}):	4 kV
Rated insulation voltage (U _i):	250 V
Overvoltage category:	II
Weight:	0.3 kg
Supply	
Rated supply voltage (U _n):	12 Vdc 24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz
Max. DC residual ripple in DC:	230 Vac; 50…60 Hz 10%
Supply voltage tolerance	±15% of U
24 Vac/dc, 120 Vac, 230 Vac:	
Supply voltage tolerance 12 Vdc:	-10% +15% of U
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W
Control circuit	
Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	Response time > 100 ms, release time > 3 s
Maximum resistance per input:	\leq 50 Ω (15 Ω)* 20 mA (70 mA)* (typical)
Current per input: Min. duration of start impulse t _{min} :	30 mA (70 mA)* (typical) > 200 ms (100 ms)*
Response time t_{A} :	< 150 ms (220 ms)*
Release time t_{R_1} :	< 20 ms (15 ms)*
Release time in absence of power supply t_{p} :	< 150 ms (50 ms)*
Simultaneity time t_c :	unlimited

* Version CS AR-08•U12

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit

contactors. see page 241-250.

Supply voltage

U12 12 Vdc

024 24 Vac/dc

120 120 Vac

230 230 Vac

Output contacts: Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Max. total current Σ Ith²: Minimum current: Contact resistance: External protection fuse: 2 NO safety contacts, forcibly guided gold-plated silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 36 A² 10 mA \leq 100 m Ω 4 A

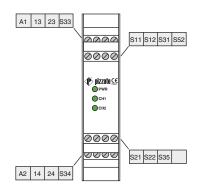
The number and the load capacity of output contacts can be increased by using expansion modules or

Features approved by UL

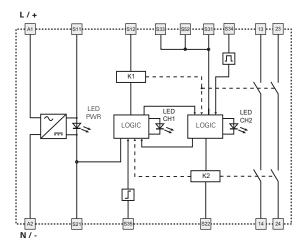
Rated supply voltage (U,): 24 Vac/dc, 50...60 Hz, 120 Vac; 50...60 Hz: 230 Vac; 50...60 Hz Power consumption AC: < 5 VA Power consumption DC: < 2 W Maximum switching voltage: 230 Vac Max. current per contact: 6 A Utilization category: C300 - Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. -Tightening torque for terminal screws of 5-7 bin. - Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy). **Features approved by TÜV SÜD** Rated supply voltage (U,): 24 Vac/dc, \pm 15%, 120 Vac \pm 15%, 230 Vac \pm 15% Power consumption: 5 VA max AC, 2 W max DC Rated operating current (max.): 4 A Maximum switching load (max.): 1380 VA Ambient temperature: -25°C ... \pm 70°C Protection degree: IP40 (housing), IP20 (terminal strip) In compliance with standards: 2006/42/EEC Machine Directive, EN ISO 13849-1 (up to cat. 4 PL e), EN 60178:1997, EN 60947-5-3/ A1:2005, EN 61508-1:1998 (SIL CL 1-3), IEC 62061:2005 (SIL CL 3)



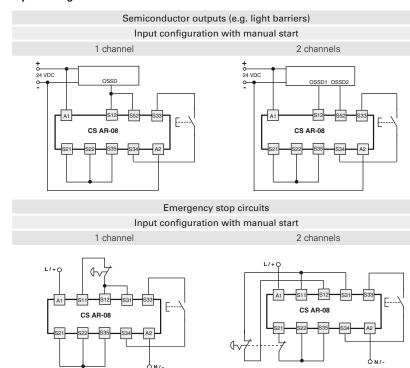
Pin assignment



Internal block diagram



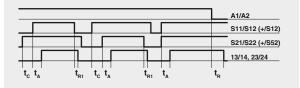
Input configuration



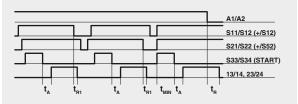
The diagram does not show the exact position of the terminals in the product Items with code on green background are stock items

Function diagrams

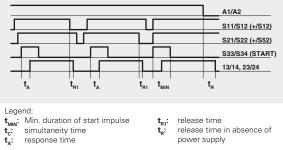
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



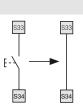
release time t_{R1}: release time in absence of power supply

Notes The configurations with one channel are obtained taking into consideration the CH1 input only. In this case it is necessary to consider time $\mathbf{t}_{\mathbf{r}1}$ referred to input CH1, time $\mathbf{t}_{\mathbf{r}}$ referred to the supply, time $\mathbf{t}_{\mathbf{r}}$ referred to input CH1 and to the start, and time $\mathbf{t}_{_{MIN}}$ referred to the start.

t

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.

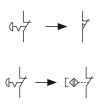


Monitoringofmovableguardsandmagneticsafetysensors

S22 S35

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.



S35

S22

Application examples See page 251

General Catalogue Safety 2017-2018





Module for emergency stops and end position monitoring for movable guards

Main features

10A

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start (CS AR-20 only) or monitored start (CS AR-21 only)
- Reduced housing width of 22.5 mm
- 2 NO safety contacts
 Supply voltage:
- 24 Vac/dc, 120 Vac, 230 Vac

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 and certificates:

EC type examination ce	rtificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2013010305640211
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Code structure

CS AR-<u>20V024</u>

Start mode

- 20 manual or automatic start
- 21 monitored start

Connection type

- V Screw terminals
- M Connector with screw terminals
- **X** Connector with spring terminals

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94Protection degree:IP40 (housing), IP20 (terminal strip)Dimensions:see page 295, design A

General data up to SIL CL 3 acc. to EN 62061 SIL CL: Performance Level (PL): up to PL e acc. to EN ISO 13849-1 Safety category: up to cat. 3 acc. to EN ISO 13849-1 Safety parameters: see page 349 Ambient temperature: -25°C...+55°C >10 million operating cycles Mechanical endurance: Electrical endurance: >100,000 operating cycles Pollution degree: external 3, internal 2 Impulse withstand voltage (U_{imp}): 4 kV 250 V Rated insulation voltage (U₁): Overvoltage category: Ш Weight: 0.2 kg Supply Rated supply voltage (U_n): 24 Vac/dc: 50 60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz Max. DC residual ripple in DC: 10% Supply voltage tolerance: ±15% of U_ Power consumption AC: < 5 VA Power consumption DC: < 2 W**Control circuit** Protection against short circuits: PTC resistance. Ih=0.5 A PTC times: Response time > 100 ms, release time > 3 s Maximum resistance per input: ≤ **50** Ω Current per input: 70 mA (typical) Min. duration of start impulse t_{MIN}: > 100 ms Response time t₄: < 50 ms Release time in absence of power supply t_R: < 100 ms Simultaneity time t_c: unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts: Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Max. total current Σ Ith²: Minimum current: Contact resistance: External protection fuse:

2 NO safety contacts forcibly guided gold-plated silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 36 A² 10 mA \leq 100 m Ω 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or

contactors. see page 241-250.

Supply voltage

024 24 Vac/dc

120 120 Vac

230 230 Vac

Stock items

CS AR-20V024

Features approved by UL Rated supply voltage (U_): 24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz < 5 VA Power consumption AC: Power consumption DC: < 2 W Maximum switching voltage: 230 Vac Max. current per contact: 6 A Utilization category C300 Votes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).

205



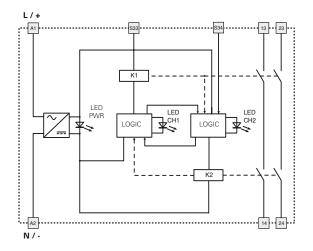
General Catalogue Safety 2017-2018

Safety module CS AR-20 / CS AR-21

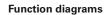
Pin assignment



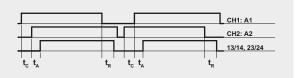
Internal block diagram



Input configuration



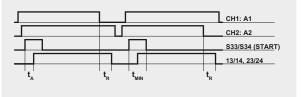
Configuration with automatic start (CS AR-20)



Configuration with monitored start (CS AR-21)



Configuration with manual start (CS AR-20)



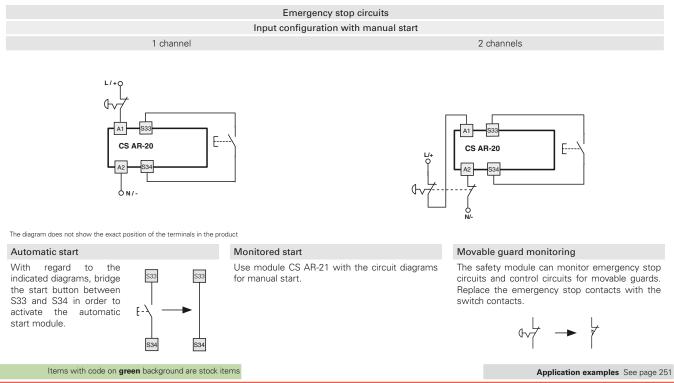
 $\begin{array}{l} \textbf{f}_{\text{MN}}: \\ \textbf{Min. duration of start impulse} \\ \textbf{t}_{c}: \\ \textbf{simultaneity time} \end{array}$

response time release time in absence of power supply

Notes:

The configurations with one channel are obtained taking into consideration the CH1:A1 input only. In this case it is necessary to consider time $t_{\rm R}$ referred to input CH1:A1, time $t_{\rm A}$ referred to input CH1:A1 and to the start, and time $t_{\rm MNN}$ referred to the start.

t_A: t_R:





Module for emergency stops and end position monitoring for movable guards

Main features

10A

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start (CS AR-22 only) or monitored start (CS AR-23 only)
- Reduced housing width of 22.5 mm
- 3 NO safety contacts, 1 NC auxiliary contact
- Supply voltage: 24 Vac/dc, 120 Vac, 230 Vac

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 and certificates:

EC type examination ce	rtificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2013010305640211
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94Protection degree:IP40 (housing), IP20 (terminal strip)Dimensions:see page 295, design A

up to SIL CL 3 acc. to EN 62061 up to PL e acc. to EN ISO 13849-1

>10 million operating cycles

>100,000 operating cycles

external 3, internal 2

24 Vac/dc: 50 60 Hz

120 Vac; 50...60 Hz

230 Vac; 50...60 Hz

see page 349

-25°C...+55°C

4 kV

10%

< 5 VA

< 2 W

±15% of U_

ll 0.2 kg

250 V

up to cat. 3 acc. to EN ISO 13849-1

General data SIL CL:

Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U_{imp}): Rated insulation voltage (U_i): Overvoltage category: Weight:

Supply

Rated supply voltage (U_):

Max. DC residual ripple in DC: Supply voltage tolerance: Power consumption AC: Power consumption DC:

Control circuit

Protection against short circuits: PTC resistance, Ih=0.5 A PTC times: Response time > 100 ms, release time > 3 s < 50 O Maximum resistance per input: 70 mA (typical) Current per input: Min. duration of start impulse t_{MIN} > 100 ms Response time t_{Δ} : < 50 ms Release time in absence of power supply t_R: < 75 ms Simultaneity time to: unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit Output contacts:

Supply voltage

024 24 Vac/dc

120 120 Vac

230 230 Vac

Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Max. total current Σ Ith²: Minimum current: Contact resistance: External protection fuse:

forcibly guided gold-plated silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 80 A² 10 mA \leq 100 m Ω 4 A

3 NO safety contacts

1 NC auxiliary contact

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. see page 241-250.

Stock items

Code structure

CS AR-22V024

Start	mode

- 22 manual or automatic start
- 23 monitored start

Connection type

- V Screw terminals
- M Connector with screw terminals
- X Connector with spring terminals

CS AR-22V024

Features approved by UL

Rated supply voltage (U_):

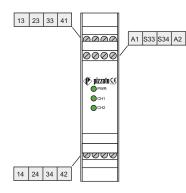
Power consumption AC: Power consumption DC: Maximum switching voltage: Max. current per contact: Utilization category 24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz < 5 VA < 2 W 230 Vac 6 A C300

Votes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).

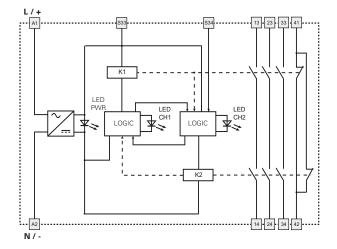


Safety module CS AR-22 / CS AR-23

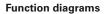
Pin assignment



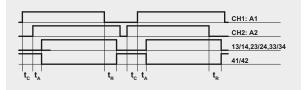
Internal block diagram



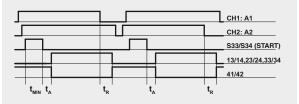
Input configuration



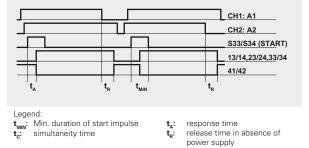
Configuration with automatic start (CS AR-22)



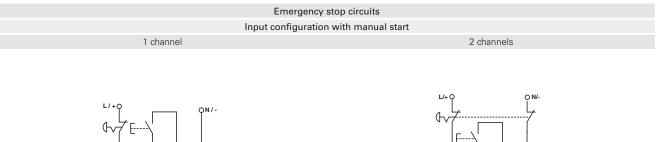
Configuration with monitored start (CS AR-23)

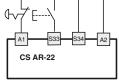


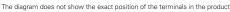
Configuration with manual start (CS AR-22)



Notes The configurations with one channel are obtained taking into consideration the CH1:A1 input only. In this case it is necessary to consider time ${\bf t}_{\bf R}$ referred to input CH1:A1, time ${\bf t}_{\bf A}$ referred to input CH1:A1 and to the start, and time ${\bf t}_{\rm MIN}$ referred to the start.







Automatic start Monitored start With regard to Use module CS AR-23 with the circuit diagrams the S33 S33 indicated diagrams, bridge for manual start. the start button between S33 and S34 in order to switch contacts. Eactivate the automatic start module. S34 S34 Items with code on green background are stock items

Movable guard monitoring

A2

S33 A1

CS AR-22

The safety module can monitor emergency stop circuits and control circuits for movable quards. Replace the emergency stop contacts with the



Application examples See page 251



Module for emergency stops and end position monitoring for movable guards

Main features

10A

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start (CS AR-24 only) or monitored start (CS AR-25 only)
- Reduced housing width of 22.5 mm
- 4 NO safety contacts
- 1 NC auxiliary contact
- Supply voltage: 24 Vac/dc

Utilization categories

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

Quality marks and certificates:

EC type examination certificate: IMQ CP 432 DM	
UL approval:	E131787
CCC approval:	2013010305640211
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 Protection degree: IP40 (housing), IP20 (terminal strip) Dimensions: see page 295, design A

General data SIL CL: Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U _{imp}): Rated insulation voltage (U _i): Overvoltage category: Weight:	up to SIL CL 3 acc. to EN 62061 up to PL e acc. to EN ISO 13849-1 up to cat. 3 acc. to EN ISO 13849-1 see page 349 -25°C+55°C >10 million operating cycles >100,000 operating cycles external 3, internal 2 4 kV 250 V II 0.3 kg
Supply Rated supply voltage (U_):	24 Vac/dc; 5060 Hz

10%

< 5 VA

< 2 W

±15% of U

Rate Max. DC residual ripple in DC: Supply voltage tolerance: Power consumption AC: Power consumption DC:

Control circuit

Control circuit	
Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	Response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	30 mA (typical)
Min. duration of start impulse t _{MIN} :	> 100 ms
Response time t_{a} :	< 100 ms
Release time t _{B1} :	< 40 ms
Release time in absence of power supply t _B :	< 170 ms
Simultaneity time t _c :	unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95

Output circuit 4 NO safety contacts Output contacts: 1 NC auxiliary contact Contact type: forcibly guided gold-plated silver alloy Material of the contacts: Maximum switching voltage: 230/240 Vac; 300 Vdc 6 A Max. current per contact: Conventional free air thermal current (Ith): 6 A Max. total current Σ lth²: 72 A² Minimum current: 10 mA Contact resistance: \leq 100 m Ω External protection fuse: 4 A The number and the load capacity of output contacts can be increased by using expansion modules or contactors. see page 241-250.

Code structure

CS AR-24V024

Start mode

24 manual or automatic start

25 monitored start

Connection type

- Screw terminals V
- Connector with screw terminals Μ
- X Connector with spring terminals

024 24 Vac/dc

Supply voltage

Features approved by UL

Rated supply voltage (U_): Power consumption AC Power consumption DC: Maximum switching voltage: Max. current per contact: Utilization category

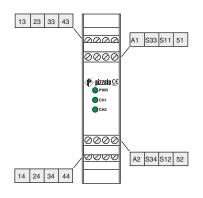
24 Vac/dc; 50...60 Hz < 5 VA < 2 W 230 Vac 6 A C300

Notes: Use 60 or 75 °C copper (Cu) conductors, figid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).



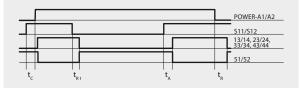
Safety module CS AR-24 / CS AR-25

Pin assignment

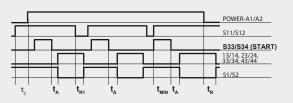


Function diagrams

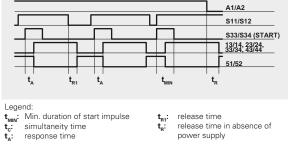
Configuration with automatic start (CS AR-24)



Configuration with monitored start (CS AR-25)



Configuration with manual start (CS AR-24)

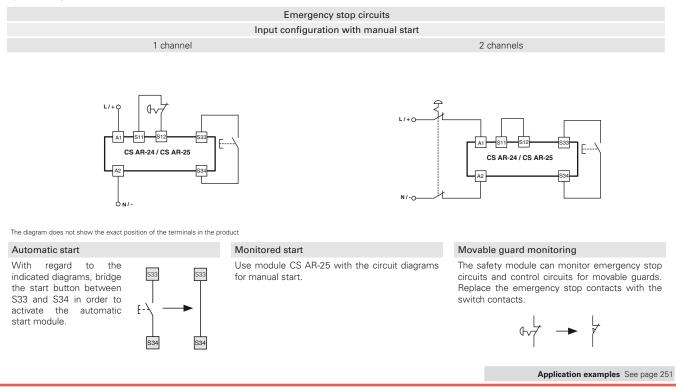


release time in absence of power supply

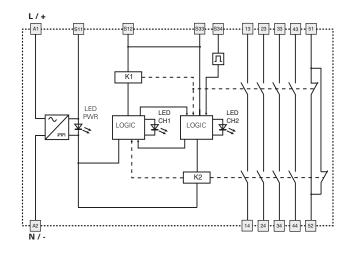
Notes:

The configurations with one channel are obtained taking into consideration the S11/ S12 input only. In this case it is necessary to consider time \boldsymbol{t}_{RT} referred to input S11/S12, time \boldsymbol{t}_{R} referred to the supply, time \boldsymbol{t}_{A} referred to input S11/S12 and to the start, and time \boldsymbol{t}_{MIN} referred to the start.

Input configuration



Internal block diagram







Module for emergency stops and end position monitoring for movable guards

Main features

10A

- For safety applications up to SIL CL 2/PL d
- Choice between automatic start, manual start (CS AR-40 only) or monitored start (CS AR-41 only)
- Reduced housing width of 22.5 mm
- 2 NO safety contacts
 Supply voltage: 24 Vac/dc

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 and certificates:

EC type examination certificate: IMQ CP 432 DM	
UL approval: E131787	
CCC approval:	2013010305640211
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94Protection degree:IP40 (housing), IP20 (terminal strip)Dimensions:see page 296, design D

General data SIL CL:

Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U_{imp}): Rated insulation voltage (U_i): Overvoltage category: Weight:

Supply

Rated supply voltage (U_n): Max. DC residual ripple in DC: Supply voltage tolerance: Power consumption AC: Power consumption DC:

Control circuit

Protection against short circuits: PTC times: Maximum resistance per input: Current per input: Min. duration of start impulse t_{MIN} : Response time t_A : Release time in absence of power supply t_R : Simultaneity time t_R : 24 Vac/dc; 50...60 Hz 10% ±15% of U_n < 5 VA < 2 W

see page 349

-25°C...+55°C

4 kV 250 V

0.2 kg

Ш

up to SIL CL 2 acc. to EN 62061

>10 million operating cycles

>100,000 operating cycles

external 3, internal 2

up to PL d acc. to EN ISO 13849-1

up to cat. 2 acc. to EN ISO 13849-1

PTC resistance, Ih=0.5 A Response time > 100 ms, release time > 3 s \leq 50 Ω 70 mA (typical) > 100 ms < 50 ms < 105 ms unlimited

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts: Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (lth): Max. total current Σ lth²: Minimum current: Contact resistance: External protection fuse: 2 NO safety contacts forcibly guided silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 36 A^2 10 mA \leq 100 m Ω 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. see page 241-250.

Code structure

CS AR-40V024

Start mode

40 manual or automatic start

41 monitored start

Connection type

- V Screw terminals
- M Connector with screw terminals
- X Connector with spring terminals

Supply voltage

024 24 Vac/dc

Stock items

CS AR-40V024

Features approved by UL

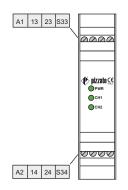
Rated supply voltage (U_n): Power consumption AC: Power consumption DC: Maximum switching voltage: Max. current per contact: Utilization category 24 Vac/dc; 50...60 Hz < 5 VA < 2 W 230 Vac 6 A C300

Notes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).



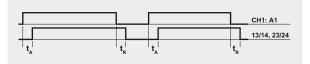
Safety module CS AR-40 / CS AR-41

Pin assignment

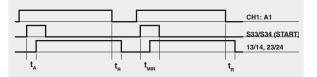


Function diagrams

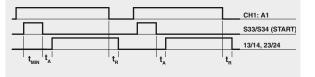
1-channel configuration with automatic start (CS AR-40)



1-channel configuration with manual start (CS AR-40)

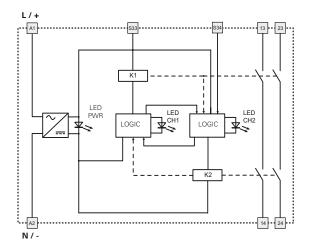


1-channel configuration with monitored start (CS AR-41)



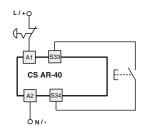
- $\begin{array}{l} \begin{array}{c} -\text{cybrid:} \\ \textbf{t}_{MN}, & \text{Min. duration of start impulse} \\ \textbf{t}_{a}, & \text{response time} \\ \textbf{t}_{n}, & \text{release time implies} \end{array}$ power supply

Internal block diagram



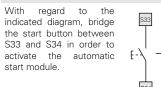
Input configuration

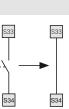
Emergency stop circuits One channel input configuration with manual start



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

Automatic start





Monitored start

Use module CS AR-41 with the circuit diagrams for manual start.

Movable guard monitoring

The safety module can monitor emergency stop circuits and control circuits for movable guards. Replace the emergency stop contacts with the switch contacts.



Items with code on green background are stock items





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

Main features

10A

- For safety applications up to SIL CL 1/PL c
- Reduced housing width of 22.5 mm
- 1 NO safety contact
- Supply voltage:
- 24 Vac/dc

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 and certificates:

EC type examination of	certificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2013010305640211
EAC approval:	RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 Protection degree: IP40 (housing), IP20 (terminal strip) Dimensions: see page 296, design D

General data SIL CL:

Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U_{imp}): Rated insulation voltage (U_i): Overvoltage category: Weight:

Supply

Rated supply voltage (U_n): Max. DC residual ripple in DC: Supply voltage tolerance: Power consumption AC: Power consumption DC:

Control circuit

Protection against short circuits: PTC times: Maximum resistance per input: Current per input: Response time t_A : Release time t_{R1} : Release time in absence of power supply t_R : Simultaneity time t_R : PTC resistance, Ih=0.5 A Response time > 100 ms, release time > 3 s \leq 50 Ω 20 mA (typical) < 15 ms < 20 ms < 100 ms unlimited

up to SIL CL 1 acc. to EN 62061

>10 million operating cycles >100,000 operating cycles

see page 349

-25°C...+55°C

4 kV 250 V

10%

< 5 VA

< 2 W

±15% of U

ll 0.2 kg

external 3, internal 2

24 Vac/dc; 50...60 Hz

up to PL c acc. to EN ISO 13849-1

up to cat. 1 acc. to EN ISO 13849-1

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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit

Supply voltage

024 24 Vac/dc

Output contacts: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Minimum current: Contact resistance: External protection fuse: 1 NO safety contact silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 10 mA \leq 100 m Ω 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. see page 241-250.

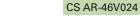
Stock items

Code structure

CS AR-46<u>V024</u>

Connection type

- V Screw terminals
- M Connector with screw terminals
- **X** Connector with spring terminals



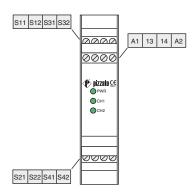
Features approved by UL

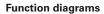
Rated supply voltage (U_n): Power consumption AC: Power consumption DC: Maximum switching voltage: Max. current per contact: Utilization category 24 Vac/dc; 50...60 Hz < 5 VA < 2 W 230 Vac 6 A C300

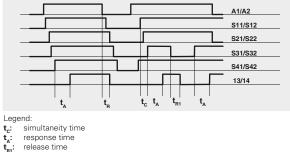
Notes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).



Pin assignment



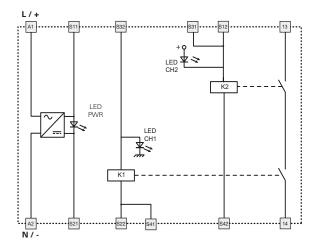




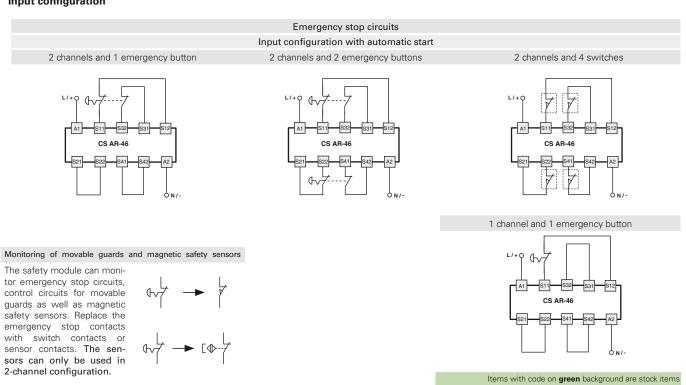
t_{R1}: t_R:

release time in absence of power supply

Internal block diagram



Input configuration





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

Main features

10A

- 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 le (A) 3 Direct current: DC13 (6 oper. cycles/min.) 24 Ue (V) le (A) 4

Quality marks and certificates: **CE** 0 0 5 1 c**(VL)**us ((((()

IMQ certificate of conformity no. 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) EC type examination certificate: IMQ 236 (Machinery Directive) CCC approval: 2013010305640211 EAC approval: RU C-IT.АД35.В.00454

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Code structure

CS AR-91V024

Connection type

- V Screw terminals
- M Connector with screw terminals
- Х Connector with spring terminals

Technical data

Housing Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94		
Protection degree: Dimensions:	IP40 (housing), IP20 (terminal strip) see page 295, design A	
General data SIL CL: Performance Level (PL): Safety category: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Impulse withstand voltage (U _{imp}): Rated insulation voltage (U _i): Overvoltage category: Weight:	up to SIL CL 3 acc. to EN 62061 up to PL e acc. to EN ISO 13849-1 up to cat. 4 acc. to EN ISO 13849-1 see page 349 -25°C+55°C >10 million operating cycles >100,000 operating cycles external 3, internal 2 4 kV 250 V II 0.2 kg	
Supply Rated supply voltage (U _n): Max. DC residual ripple in DC: Power consumption AC: Power consumption DC:	24 Vac/dc; ±15%; 50…60 Hz 10% < 5 VA < 2.5 W	
Control circuit Protection against short circuits: PTC response time: Maximum resistance per input: Current per input: Min. duration of start impulse t_{MIN} : Response time t_A : Release time t_R : Release time in absence of power supply t_R : Simultaneity time t_c : Response time starting from application of the supple	PTC resistance, Ih=0.5 A Response time > 100 ms, release time > 3 s \leq 50 Ω < 40 mA > 50 ms < 120 ms < 15 ms < 65 ms unlimited ly: < 300 ms	

Auxiliary signalling circuit

Auxiliary output (Y43-Y44): 1NO opto-decoupled Rated operating voltage (U_): 24 Vdc Rated operating current (I_): 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 ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95

Output circuit

Supply voltage

024 24 Vac/dc

Output contacts: Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current (Ith): Max. total current Σ lth²: Minimum current: Contact resistance External protection fuse:

2 NO safety contacts, forcibly guided gold-plated silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 36 A² 10 mA < 100 mO 4 A type F

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See page 241-250.

Rated supply voltage (U_): Power consumption AC Power consumption DC: Maximum switching voltage: Max, current per contact: Utilization category

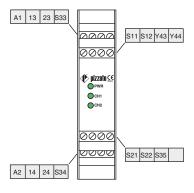
Features approved by UL

24 Vac/dc; 50...60 Hz < 5 VA < 2.5 W 230 Vac 6 A C300

Notes: Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG. Tightening torque for terminal screws of 5-7 lb in. Only for 24 Vac/dc versions: power supply only with class 2 sources or with limited voltage and energy. (Supply from Remote Class 2 Source or limited voltage limited energy).



Pin assignment

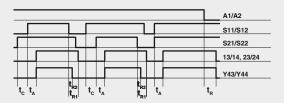


Voltage dips, short interruptions and voltage variations

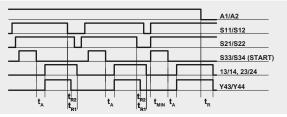
The CS AR-91 safety module has a built-in voltage drop sensor which serves to protect and safeguard the internal state of the safety relays, in the event of dips or short voltage interruptions. This is to prevent unwanted switching states in relation to the state of the inputs from occurring. When voltage 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 extent 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

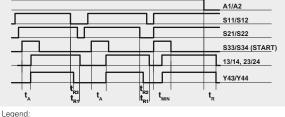
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



 $\begin{array}{l} \textbf{t}_{\text{MM}}: & \text{Min. duration of start impulse} \\ \textbf{t}_{c}: & \text{simultaneity time} \\ \textbf{t}_{A}: & \text{response time} \end{array}$

t_{R1}: release time
 t_R: release time in absence of power supply

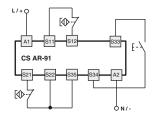
Notes

The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time \boldsymbol{t}_{n1} referred to input S11/S12, time \boldsymbol{t}_n referred to the supply, time \boldsymbol{t}_n referred to input S11/S12 and to the start, and time \boldsymbol{t}_{nm} referred to the start.

. . .

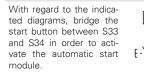
Input configuration with magnetic sensors

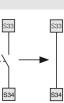
2 channels

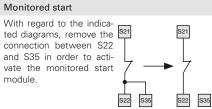


The diagram does not show the exact position of the terminals in the product

Automatic start



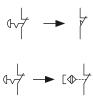




Monitoring of movable guards and magnetic safety sensors

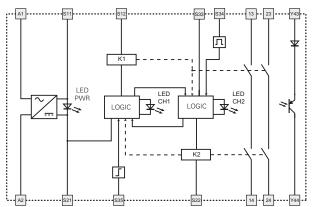
The safety module can monitor emergency stop circuits, control circuits for movable guards as well as magnetic safety sensors. Replace the emergency stop contacts with switch contacts or sensor contacts.

The sensors can only be used in 2-channel configuration.



Application examples See page 251

Internal block diagram



Input configuration

