

Module for emergency stops, end position monitoring for movable guards, OSSD semiconductor outputs 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 OSSD semiconductor outputs, to electromechanical contacts or to magnetic safety sensors
- · 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 Ie (A) 3 Direct current: DC13 (6 oper. cycles/min.) Ue (V) 24 Ie (A) 4

Quality marks:

certificate: IMQ CP 432 DM
E131787
2020970305002290
RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Code structure

CS AR-01<u>V024</u>

Connection type

- V Screw terminals
- M 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

Housing Polyamide housing PA 66, self-extinguishing V Protection degree acc. to EN 60529: Dimensions:	0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) see page 355, design A
General data SIL level (SIL CL) up to: Performance Level (PL) up to: Safety category up to: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Rated impulse withstand voltage (U _{imp}): Rated insulation voltage (U _i): Overvoltage category:	SIL CL 3 acc. to EN 62061 PL e acc. to EN ISO 13849-1 cat. 4 acc. to EN ISO 13849-1 see page 417 -25°C+55°C >10 million operating cycles >100,000 operating cycles external 3, internal 2 4 kV 250 V II
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} \begin{array}{l} \mbox{Protection against short circuits:} \\ \mbox{PTC times:} \\ \mbox{Maximum resistance per input:} \\ \mbox{Current per input:} \\ \mbox{Min. duration of start impulse } t_{\mbox{MIN}} \hfill : \\ \mbox{Response time } t_{\mbox{A}} \hfill : \\ \mbox{Release time } t_{\mbox{R}} \hfill : \\ \mbox{Release time in absence of power supply } t_{\mbox{R}} \hfill : \\ \mbox{Simultaneity time } t_{\mbox{C}} \hfill : \\ \mbox{Circuits} \hfill : \\ \mbox{Circuits} \hfill : \\ \mbox{Circuits} \hfill : \\ \mbox{Release time in absence of power supply } t_{\mbox{R}} \hfill : \\ \mbox{Circuits} \hfill : \\ \$	PTC resistance, lh=0.5 A response time > 100 ms, release time > 3 s \leq 50 Ω 30 mA (typical) > 100 ms, > 50 ms (E02) < 50 ms, $<$ 150 ms (E02) < 20 ms < 70 ms, $<$ 100 ms (E02) unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95, GB/T14048.5

Output circuit

Output contacts:
Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current I_{th} : Max. total current ΣI_{th}^{2} : Minimum current: Contact resistance:
External protection fuse: The number and the load capacity of output contacts ca
The number and the load capacity of output contacts ca

2 NO safety contacts, 1 NC auxiliary contact forcibly guided gold-plated silver alloy 230/240 Vac; 300 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 pages 295-304.

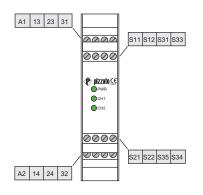
Features approved by UL

Rated supply voltage (U_n) :	24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz
	230 Vac; 5060 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W
Electrical ratings:	230/240 Vac
J J	6 A general use
	C300 pilot duty
Notes:	
- Use 60 or 75°C copper (Cu) cond stranded or solid.	ductor and wire size No. 30-12 AWG,
The terminal tightening tergue of F	-7 lb in

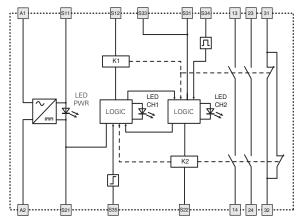
- The terminal tightening torque of 5-7 lb in. - Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.



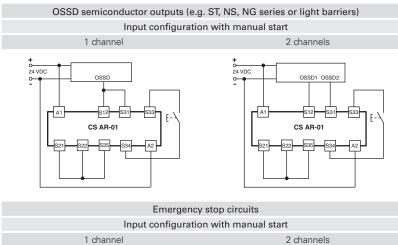
Pin assignment



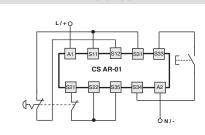
Internal block diagram



Input configuration



CS AR-01

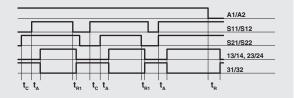


The diagram does not show the exact position of the terminals in the product

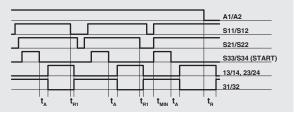
A2

Function diagrams

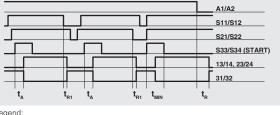
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



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_{n1} referred to input S11/S12, time t_n referred to the supply, time t_n referred to input S11/S12 and to the start, and time t_{n10} referred to the start.

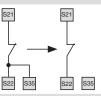
Automatic start

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



Monitored start

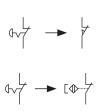
With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



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.







Module for emergency stops, end position monitoring for movable guards, **OSSD** semiconductor outputs 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 OSSD semiconductor outputs, to electromechanical contacts or to magnetic safety sensors
- 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:



EC type examination	n certificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2020970305002290
EAC approval:	RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Code structure

CS AR-02V024

Connection type

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

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

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0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) see page 355, design A
SIL CL 3 acc. to EN 62061 PL e acc. to EN ISO 13849-1 cat. 4 acc. to EN ISO 13849-1 see page 417 -25°C+55°C >10 million operating cycles >100,000 operating cycles external 3, internal 2 4 kV 250 V II
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
PTC resistance, Ih=0.5 A response time > 100 ms, release time > 3 \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 ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048.5

Output circuit

Output contacts:	3 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 ΣI_{tb}^2 :	72 A ²
Minimum current:	10 mA
Contact resistance:	≤ 100 m Ω
External protection fuse:	4 A
The number and the load capacity of output contacts can	be increased by using expansion

ision modules or contactors. See pages 295-304.

Features approved by UL

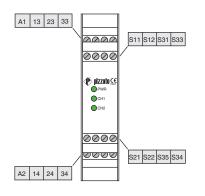
Rated supply voltage (U _n):	24 Vac/dc; 5060 Hz 120 Vac; 5060 Hz
	230 Vac; 5060 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W
Electrical ratings:	230/240 Vac
	6 A general use
	C300 pilot duty
Notes: - Use 60 or 75°C copper (Cu) conduct	or and wire size No. 30-12 AWG,
stranded or solid	

-The terminal tightening torque of 5-7 lb in.

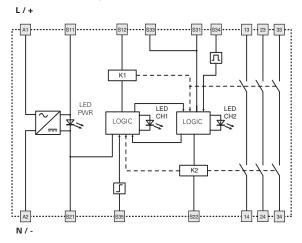
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy



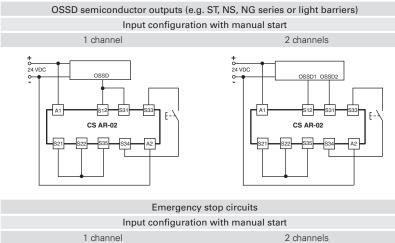
Pin assignment



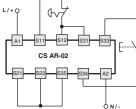
Internal block diagram

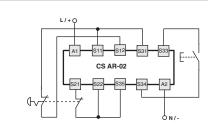


Input configuration



1 channel

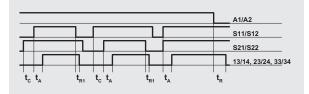




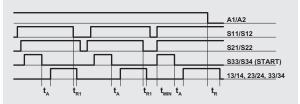
The diagram does not show the exact position of the terminals in the product

Function diagrams

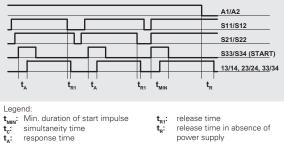
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



release time t_{R1}: 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 $t_{\rm R1}$ 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 $\dot{\mathbf{t}}_{\text{MIN}}$ referred to the start.

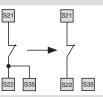
Automatic start

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



Monitored start

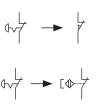
With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



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.







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: 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:

EC type examination certificate: IMQ CP 432 DM E131787 UL approval: 2020970305002290 CCC approval: EAC approval: RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Code structure

CS AR-04V024

Connection type

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

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Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 Protection degree acc. to EN 60529: IP40 (housing), IP20 (terminal strip) see page 355, design A Dimensions: 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 417 -25°C...+55°C Ambient temperature: 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): 250 V Overvoltage category: Ш Supply Rated supply voltage (U_): 24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz Max. DC residual ripple in DC: 10% ±15% of U Supply voltage tolerance: < 5 VA Power consumption AC: 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 O Current per input: 30 mA (typical) Min. duration of start impulse ${\rm t_{_{MIN}}}$: > 100 ms Response time t₄: < 50 ms Release time t_{R1}: < 20 ms Release time in absence of power supply t_P: < 70 ms unlimited Simultaneity time t_c:

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048.5

Output circuit

Output contacts:

Supply voltage

024 24 Vac/dc

120 120 Vac

230 230 Vac

forcibly guided Contact type: gold-plated silver alloy Material of the contacts: Maximum switching voltage: 230/240 Vac; 300 Vdc Max. current per contact: 6 A Conventional free air thermal current I,...: 6 A Max. total current ΣI_{tb}^{2} : 64 A² Minimum current: 10 mA Contact resistance: < 100 mO External protection fuse: 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 295-304.

Features approved by UL

Rated supply voltage (U_n) :	24 Vac/dc; 5060 Hz 120 Vac; 5060 Hz
Power consumption AC: Power consumption DC: Electrical ratings:	230 Vac; 5060 Hz < 5 VA < 4 W 230/240 Vac 6 A general use C300 pilot duty
Notes: - Use 60 or 75°C copper (Cu) cond stranded or solid.	ductor and wire size No. 30-12 AWG

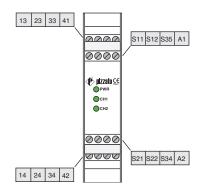
3 NO safety contacts

1 NC auxiliary contact

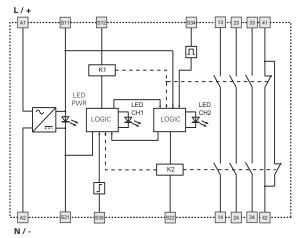
The terminal tightening torque of 5-7 lb in. - Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy



Pin assignment



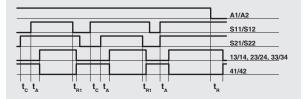
Internal block diagram



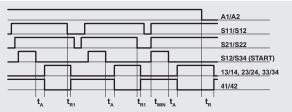
Input configuration

Function diagrams

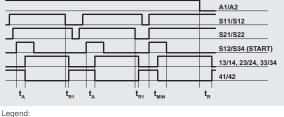
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



--yerid: t_{MN} : Min. duration of start impulse t_c : simultaneity time t_a : response time

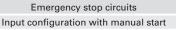
t_R: release time t_R: release time in absence of power supply

Notes:

S21

S22 S35

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_{n1} referred to input S11/S12, time t_{n} referred to the supply, time t_{A} referred to input S11/S12 and to the start, and time t_{NN} .



2 channels

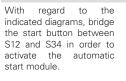
L/+ 0 A1 S11 S12 S35 CS AR-04 S21 S22 S34 A2 O N/-

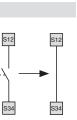
1 channel

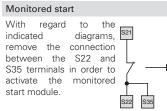
The diagram does not show the exact position of the terminals in the product

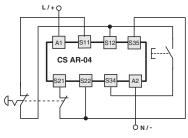
E

Automatic start



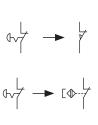






Monitoring of movable guards and magnetic safety sensors

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.







Module for emergency stops, end position monitoring for movable guards, **OSSD** semiconductor outputs 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 OSSD semiconductor outputs, 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:

EC type examination	n certificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2020970305002290
EAC approval:	RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Code structure

CS AR-05V024

Start mode

- 05 manual or automatic start
- 06 monitored start

Connection type

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

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 355, 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 417 Ambient temperature: -25°C...+55°C >10 million operating cycles Mechanical endurance: >100,000 operating cycles Electrical endurance: Pollution degree: external 3, internal 2 Rated impulse withstand voltage (U_{imp}): 4 kV 250 V Rated insulation voltage (U): Overvoltage category: Ш Supply 24 Vac/dc; 50...60 Hz Rated supply voltage (U_): 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz Max. DC residual ripple in DC: 10% Supply voltage tolerance: ±15% of U

< 5 VA

< 2 W

Control circuit

Power consumption AC:

Power consumption DC:

Protection against short circuits: PTC resistance, Ih=0.5 A PTC times: response time > 100 ms, release time > 3 s < 50 0 Maximum resistance per input: Current per input: < 30 mA Min. duration of start impulse t_{MIN}: $> 250 \, \text{ms}$ < 200 ms Response time t₄: Release time t_{R1}: < 15 ms Release time in absence of power supply t_p: < 70 ms unlimited Simultaneity time t_c:

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048 5

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 I_{+n}: Max. total current ΣI_{th}^2 : Minimum current: Contact resistance: External protection fuse:

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 $< 100 \text{ m}\Omega$ 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 295-304.

Features approved by UL

Rated supply voltage (U _n):	24 Vac/dc; 5060 Hz 120 Vac; 5060 Hz
	230 Vac; 5060 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W
Electrical ratings:	230/240 Vac
Ŭ l	6 A general use
	C300 pilot duty
Notes:	
- Use 60 or 75°C copper (Cu) conduct	tor and wire size No. 30-12 AWG,

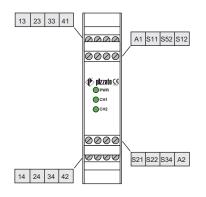
- The terminal tightening torque of 5-7 lb in.

- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy

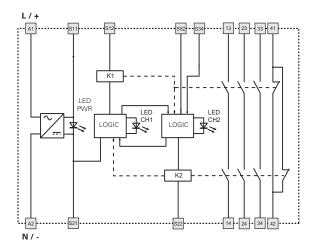


Safety module CS AR-05 / CS AR-06

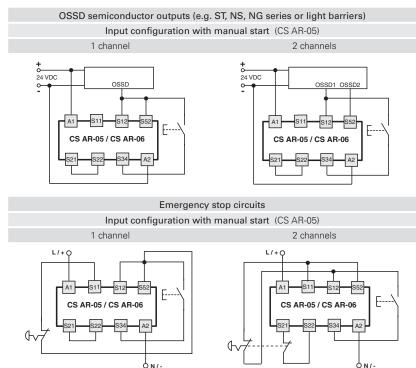
Pin assignment



Internal block diagram



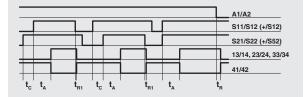
Input configuration



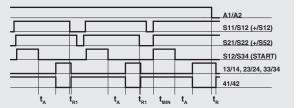
The diagram does not show the exact position of the terminals in the product

Function diagrams

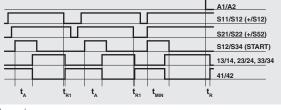
Configuration with automatic start (CS AR-05 only)



Configuration with monitored start (CS AR-06 only)



Configuration with manual start (CS AR-05 only)

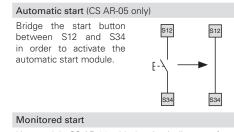


Legend: t_{MM}: Min. duration of start impulse t_c: simultaneity time t_A: response time

t_R: release time
 t_R: release time in absence of power supply

Notes

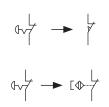
The configurations with one channel are obtained taking into consideration the CH1 input only. In this case it is necessary to consider time \boldsymbol{t}_n referred to input CH1, time \boldsymbol{t}_n referred to the supply, time \boldsymbol{t}_n referred to input CH1 and to the start, and time \boldsymbol{t}_{mm}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



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

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.







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

Quality marks:

EC type examination certificate: IMQ CP 432 DM UL approval: E131787 2020970305002290 CCC approval: EAC approval: RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Code structure

CS AR-07M024

Connection type

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

Supply voltage

024 24 Vac/dc

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) Protection degree acc. to EN 60529: Dimensions: see page 355, design B

General data

SIL level (SIL CL) up to: Performance Level (PL) up to: Safety category up to: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution dearee: Rated impulse withstand voltage (U_{imp}): Rated insulation voltage (U): Overvoltage category:

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 t₄: Release time t_{R1}: Release time in absence of power supply t_p: Simultaneity time t_c:

±15% of U < 5 VA < 2 W

SIL CL 3 acc. to EN 62061

see page 417

4 kV 250 V

10%

Ш

-25°C...+55°C

PL e acc. to EN ISO 13849-1

cat. 4 acc. to EN ISO 13849-1

>10 million operating cycles

>100,000 operating cycles

external 3, internal 2

24 Vac/dc; 50...60 Hz

PTC resistance. Ih=0.5 A response time > 100 ms, release time > 3 s $\leq 50 \Omega$ 30 mA (typical) > 100 ms < 70 ms < 40 ms < 80 ms unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048.5

Output circuit

Output contacts:

Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current I...: Max. total current ΣI_{tb}^2 : 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 A² 10 mA $\leq 100 \text{ m}\Omega$ 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 295-304.

Features approved by UL

Rated supply voltage (U_): Power consumption AC: Power consumption DC: Electrical ratings:

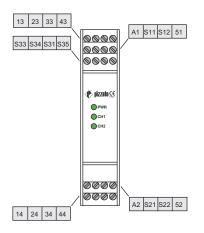
24 Vac/dc; 50...60 Hz < 5 VA < 4 W 230/240 Vac 6 A general use C300 pilot duty

Notes: - Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG,

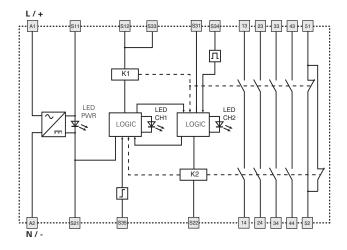
stranded or solid. - The terminal tightening torque of 5-7 lb in. - Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.



Pin assignment

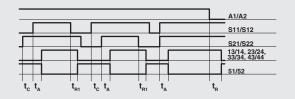


Internal block diagram

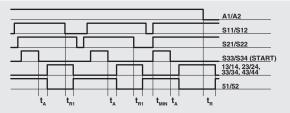


Function diagrams

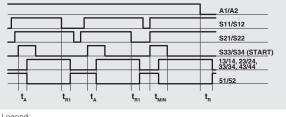
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



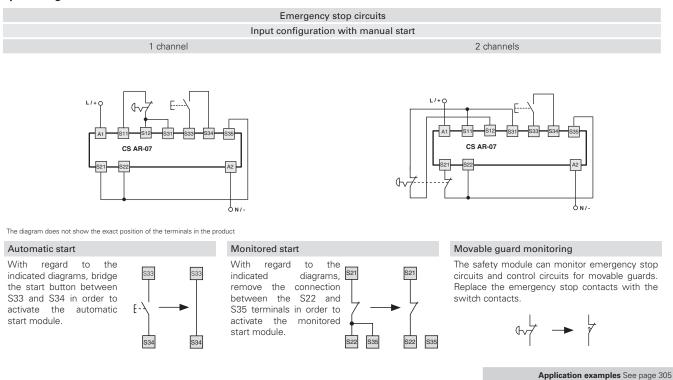
Legend: t_{MN} : Min. duration of start impulse t_c : simultaneity time t_A : response time

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 $t_{\rm R1}$ 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, OSSD semiconductor outputs 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 OSSD semiconductor outputs, 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



UL approval:	E131787
CCC approval:	2020970305002290
TÜV SÜD approval: Z10	18 05 75157 018
EAC approval:	RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Code structure

CS AR-08<u>V024</u>

Connection type

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

Supply voltage	
J12	12 Vdc
024	24 Vac/dc
120	120 Vac
230	230 Vac

1

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) Protection degree acc. to EN 60529: Dimensions: see page 355, 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 cat. 4 acc. to EN ISO 13849-1 Safety category up to: Safety parameters: see page 417 -25°C...+55°C Ambient temperature: 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 (U₁): 250 V Overvoltage category: Ш Supply Rated supply voltage (U_): 12 Vdc 24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz Max. DC residual ripple in DC: 10% ±15% of U Supply voltage tolerance 24 Vac/dc, 120 Vac, 230 Vac: Supply voltage tolerance 12 Vdc: -10% ... +15% of U < 5 VA Power consumption AC Power consumption DC: < 2 W **Control circuit** Protection against short circuits: PTC resistance, Ih=0.5 A response time > 100 ms, release time > 3 s PTC times: Maximum resistance per input: 30 mA (70 mA)* (typical) Current per input: > 200 ms (100 ms)³ Min. duration of start impulse t_{MIN}: Response time t₄: < 300 ms (220 ms)* Release time t_{R1}: < 20 ms (15 ms)*

Release time in absence of power supply ${\rm t_{R}}$: Simultaneity time ${\rm t_{c}}$:

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 60947-5-3, EN 61508-1, EN 61508-2, EN 61508-4, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95, GB/T14048.5

Output circuit

Output contacts: Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current I_{th} : Max. total current $\Sigma \ I_{th}^2$: 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

< 200 ms (50 ms)*

* Version CS AR-08•U12

unlimited

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 295-304.

Features approved by UL

Rated supply voltage (U_n): Power consumption AC: Power consumption DC: Electrical ratings:

Notes

24 Vac/dc; 50...60 Hz, 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz < 5 VA < 4 W 230/240 Vac, 6 A general use,

C300 pilot duty copper (Cu) conductor and wire size No. 30-12 A

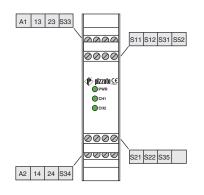
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
 - The terminal tightening torque of 5-7 lb in.
 - Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

Features approved by TÜV SÜD

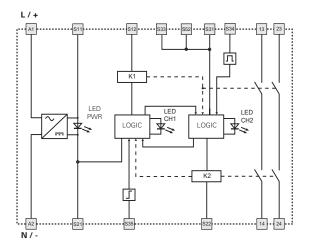
Rated supply voltage (U_): 24 Vac/dc \pm 15%, 120 Vac \pm 15%, 230 Vac \pm 15% Power consumption: 5 VA max AC, 2 W max DC Rated operating current (max.): 4 A Maximum switching load (max.): 1380 VA Ambient temperature: -25°C ... +55°C Storage temperature: -25°C ... + 70°C Protection degree: IP40 (housing), IP20 (terminal strip) In compliance with standards: 2006/42/EC Machinery Directive, EN ISO 13849-1:2015 (fino a Cat. 4 PL e), EN 60947-53:2013, EN 61508-1:2010 (fino a SIL 3), EN 61508-2:2010 (fino a SIL 3), EN 61508-4:2010 (fino a SIL 3), EN 62061:2005/A2:2015 (fino a SIL C),



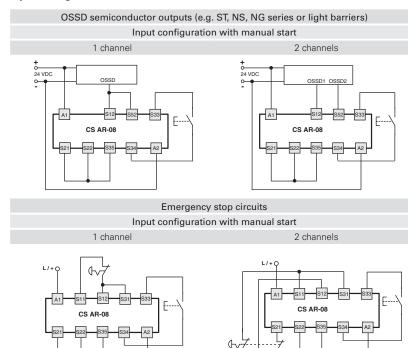
Pin assignment



Internal block diagram

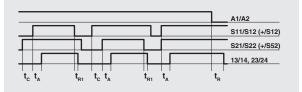


Input configuration

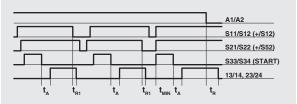


Function diagrams

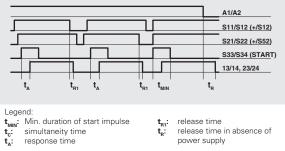
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



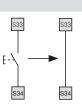
release time t_{R1}: release time in absence of power supply

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

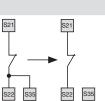
Automatic start

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



Monitored start

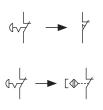
With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



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 305

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

ΔN/



δn/



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 contactsSupply 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



EC type examination certificate: IMQ CP 432 DM		
UL approval:	E131787	
CCC approval:	2020970305002290	
EAC approval:	RU C-IT.YT03.B.00035/19	

Compliance with the requirements of:

Machinery Directive 2006/42/EC, EMC Directive 2014/30/EC, RoHS Directive 2011/65/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 acc. to EN 60529:IP40 (housing), IP20 (terminal strip)Dimensions:see page 355, design A

SIL CL 3 acc. to EN 62061

see page 417 -25°C...+55°C

4 kV 250 V

10%

< 5 VA

< 2 W

≤ 50 **Ω**

> 100 ms

< 50 ms < 100 ms

unlimited

70 mA (typical)

±15% of U

Ш

PL e acc. to EN ISO 13849-1

cat. 3 acc. to EN ISO 13849-1

>10 million operating cycles

>100,000 operating cycles

external 3, internal 2

24 Vac/dc; 50...60 Hz

PTC resistance, Ih=0.5 A

response time > 100 ms, release time > 3 s

120 Vac; 50...60 Hz 230 Vac; 50...60 Hz

General	data	a		
SIL level	(SIL	CL)	up	to:

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

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_{c} :

In compliance with standards: EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95, GB/T14048.5

Output circuit

Supply voltage

024 24 Vac/dc 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 I_{th} : Max. total current $\Sigma \ I_{th}^2$: 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 pages 295-304.

Features approved by UL

Rated supply voltage (U _n):	24 Vac/dc; 5060 Hz 120 Vac; 5060 Hz
	230 Vac; 5060 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.

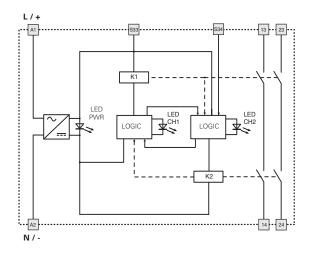


Safety module CS AR-20 / CS AR-21

Pin assignment



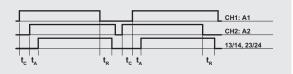
Internal block diagram



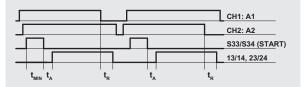
Input configuration

Function diagrams

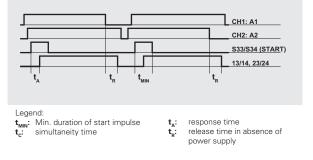
Configuration with automatic start (CS AR-20 only)



Configuration with monitored start (CS AR-21 only)

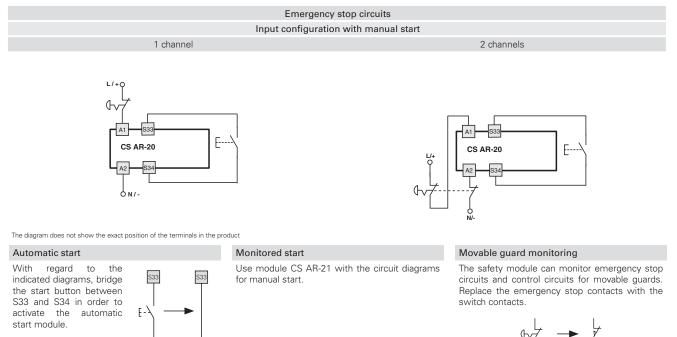


Configuration with manual start (CS AR-20 only)



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 $t_{\rm A}$ referred to input CH1:A1, time $t_{\rm A}$ referred to input CH1:A1 and to the start, and time $t_{\rm MIN}$ referred to the start.



Application examples See page 305

S34

S34





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

Quality marks:



EC type examination	certificate: IMQ CP 432 DM
UL approval:	E131787
CCC approval:	2020970305002290
EAC approval:	RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) Protection degree acc. to EN 60529: Dimensions: see page 355, design A

SIL CL 3 acc. to EN 62061

see page 417

-25°C...+55°C

4 kV 250 V

10%

< 5 VA

< 2 W

 $\leq 50 \Omega$

> 100 ms < 50 ms

< 75 ms

unlimited

70 mA (typical)

±15% of U

Ш

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

PTC resistance, lh=0.5 A

response time > 100 ms, release time > 3 s

120 Vac; 50...60 Hz 230 Vac; 50...60 Hz

cat. 3 acc. to EN ISO 13849-1

General data

SIL level (SIL CL) up to: Performance Level (PL) up to: Safety category up to: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Rated impulse withstand voltage (U_{imp}): Rated insulation voltage (U₁): Overvoltage category:

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 t₄: Release time in absence of power supply t_R: Simultaneity time t_c:

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048.5

Output circuit Output contacts:

Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current I_{th}: Max. total current $\Sigma \mid_{th}^2$: Minimum current: Contact resistance: External protection fuse:

3 NO safety contacts 1 NC auxiliary contact forcibly guided gold-plated silver alloy 230/240 Vac; 300 Vdc 6 A 6 A 80 A² 10 mA $\leq 100 \text{ m}\Omega$ 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 295-304.

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

- Supply voltage
- 024 24 Vac/dc
- 120 120 Vac
- 230 230 Vac

Features approved by UL

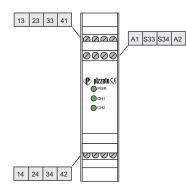
- Rated supply voltage (U_): 24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz Power consumption AC: < 5 VA Power consumption DC: < 4 W 230/240 Vac Electrical ratings: 6 A general use C300 pilot duty Notes
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid. - Only for 24 Vac/dc versions: supply from remote Class 2 source or limited

 - voltage limited energy

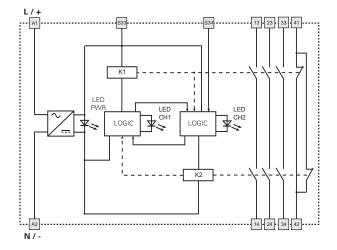


Safety module CS AR-22 / CS AR-23

Pin assignment



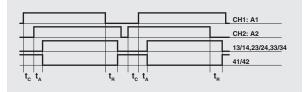
Internal block diagram



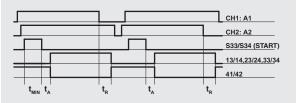
Input configuration



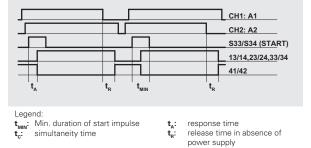
Configuration with automatic start (CS AR-22 only)



Configuration with monitored start (CS AR-23 only)

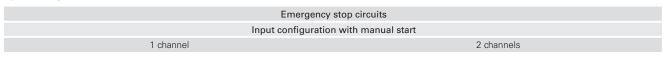


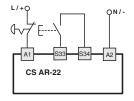
Configuration with manual start (CS AR-22 only)



Notes:

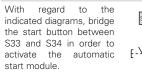
The configurations with one channel are obtained taking into consideration the CH1:A1 input only. In this case it is necessary to consider time $t_{_{I\!R}}$ referred to input CH1:A1, time $t_{_{\!A}}$ referred to input CH1:A1 and to the start, and time $t_{_{\!MIN}}$ referred to the start.

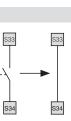




The diagram does not show the exact position of the terminals in the product

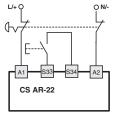
Automatic start





Monitored start

Use module CS AR-23 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.







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:

EC type examination certificate: IMQ CP 432 DM UL approval: E131787 CCC approval: 2020970305002290 EAC approval: RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) Protection degree acc. to EN 60529: Dimensions: see page 355, design A

General data

SIL level (SIL CL) up to: Performance Level (PL) up to: Safety category up to: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution dearee: Rated impulse withstand voltage (U_{imp}): Rated insulation voltage (U): Overvoltage category:

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 times: Maximum resistance per input: Current per input: Min. duration of start impulse t_{MIN}: Response time t₄: Release time t_{B1}: Release time in absence of power supply t_p: Simultaneity time to:

< 2 WPTC resistance, Ih=0.5 A response time > 100 ms, release time > 3 s

SIL CL 3 acc. to EN 62061

see page 417

4 kV 250 V

10%

< 5 VA

±15% of U

Ш

-25°C...+55°C

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

cat. 3 acc. to EN ISO 13849-1

> 100 ms < 85 ms < 40 ms < 170 ms

 $\leq 50 \Omega$ 30 mA (typical) unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048.5

Output circuit Output contacts:

Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current I,...: Max. total current ΣI_{th}^2 : Minimum current: Contact resistance: External protection fuse:

4 NO safety contacts 1 NC auxiliary contact forcibly guided gold-plated silver allov 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 pages 295-304.

Code structure

CS AR-24V024

Start mode

24 manual or automatic start

25 monitored start

Connection type

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

Supply voltage

024 24 Vac/dc

Features approved by UL

Rated supply voltage (U_): Power consumption AC: Power consumption DC: Electrical ratings:

24 Vac/dc; 50...60 Hz < 5 VA < 4 W 230/240 Vac

6 A general use C300 pilot duty

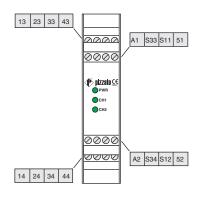
Notes: - Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, The terminal tightening torque of 5-7 lb in.
Only for 24 Vac/dc versions: supply from remote Class 2 source or limited

voltage limited energy.



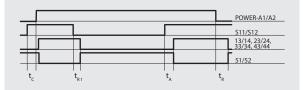
Safety module CS AR-24 / CS AR-25

Pin assignment

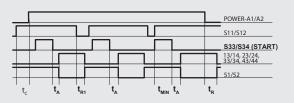


Function diagrams

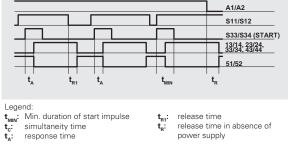
Configuration with automatic start (CS AR-24 only)



Configuration with monitored start (CS AR-25 only)



Configuration with manual start (CS AR-24 only)

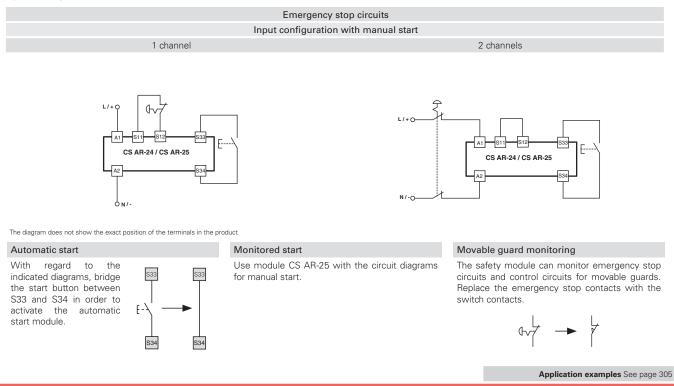


release time in absence of power supply

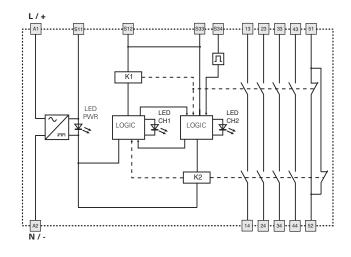
Notes:

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

Quality marks:



EC type examination certificate: IMQ CP 432 DM UL approval: E131787 CCC approval: 2020970305002290 EAC approval: RU C-IT.YT03.B.00035/19

Compliance with the requirements of:

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

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) Protection degree acc. to EN 60529: Dimensions: see page 355, design D

General data

SIL level (SIL CL) up to: Performance Level (PL) up to: Safety category up to: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Rated impulse withstand voltage (U_{imp}): Rated insulation voltage (U): Overvoltage category:

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 times: Maximum resistance per input: Current per input: Min. duration of start impulse t_MIN Response time t₄: Release time in absence of power supply t_p: Simultaneity time t_c:

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

SIL CL 2 acc. to EN 62061

see page 417

-25°C...+55°C

4 kV

10%

< 5 VA

< 2 W

±15% of U

Ш

250 V

PL d acc. to EN ISO 13849-1

cat. 2 acc. to EN ISO 13849-1

>10 million operating cycles

>100.000 operating cycles external 3, internal 2

24 Vac/dc; 50...60 Hz

unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048.5

Output circuit

Output contacts: Contact type: Material of the contacts: Maximum switching voltage: Max. current per contact: Conventional free air thermal current I,...: Max. total current ΣI_{th}^{2} : 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 A² 10 mA < 100 mO 4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 295-304.

Code structure

CS AR-40V024

Start mode

40 manual or automatic start

41 monitored start

Connection type

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

Supply voltage

024 24 Vac/dc

Features approved by UL

Rated supply voltage (U_): Power consumption AC: Power consumption DC: Electrical ratings:

24 Vac/dc; 50...60 Hz < 5 VA < 4 W 230/240 Vac 6 A general use

C300 pilot duty

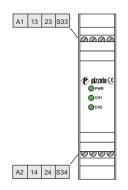
Notes: - Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, The terminal tightening torque of 5-7 lb in.
Only for 24 Vac/dc versions: supply from remote Class 2 source or limited

voltage limited energy.

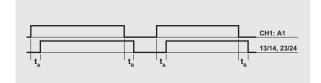


Safety module CS AR-40 / CS AR-41

Pin assignment

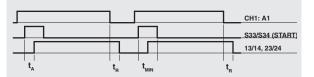


Function diagrams

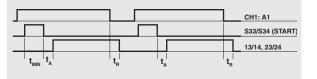


1-channel configuration with automatic start (CS AR-40 only)

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

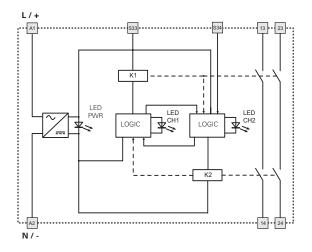


1-channel configuration with monitored start (CS AR-41 only)



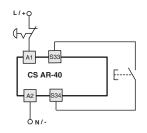
 $\begin{array}{l} -\text{Signature} \\ \textbf{t}_{MM} & \text{Min. duration of start impulse} \\ \textbf{t}_{A} & \text{response time} \\ \textbf{t}_{R} & \text{release time} \end{array}$ response time release time in absence of power supply

Internal block diagram



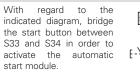
Input configuration

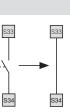
Emergency stop circuits One channel input configuration with manual start



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.







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

Quality marks:



UL approval: CCC approval: EAC approval: F131787 2020970305002290 RU C-IT.YT03.B.00035/19

Compliance with the requirements of: Machinery Directive 2006/42/EC, EMC Directive 2014/30/EC,

RoHS Directive 2011/65/EU.

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94 IP40 (housing), IP20 (terminal strip) Protection degree acc. to EN 60529: Dimensions: see page 355, design D

General data

SIL level (SIL CL) up to: Performance Level (PL) up to: Safety category up to: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Rated impulse withstand voltage (U_{imp}): Rated insulation voltage (U_i): Overvoltage category:

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 times: Maximum resistance per input: Current per input: Response time t₄: Release time t_{R1}: Release time in absence of power supply t_P: Simultaneity time t_c:

PTC resistance, Ih=0.5 A response time > 100 ms, release time > 3 s ≤ 50 **Ω** 20 mA (typical) < 15 ms < 20 ms < 100 ms unlimited

SIL CL 1 acc. to EN 62061

see page 417

-25°C...+55°C

4 kV

250 V

10%

< 5 VA

< 2 W

±15% of U

Ш

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

>10 million operating cycles

>100.000 operating cycles

external 3, internal 2

24 Vac/dc; 50...60 Hz

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048.5

Output circuit

Output contacts: Material of the contacts: 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 Minimum current: 10 mA Contact resistance: $\leq 100 \text{ m}\Omega$ External protection fuse: 4 A The number and the load capacity of output contacts can be increased by using expansion modules or

1 NO safety contact

contactors. See pages 295-304.

Code structure

CS AR-46V024

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_): Power consumption AC Power consumption DC: Electrical ratings:

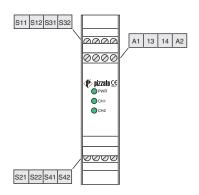
24 Vac/dc; 50...60 Hz < 5 VA < 4 W 230/240 Vac 6 A general use C300 pilot duty

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

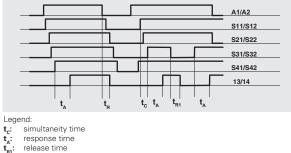
- voltage limited energy.



Pin assignment



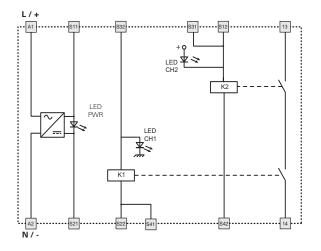




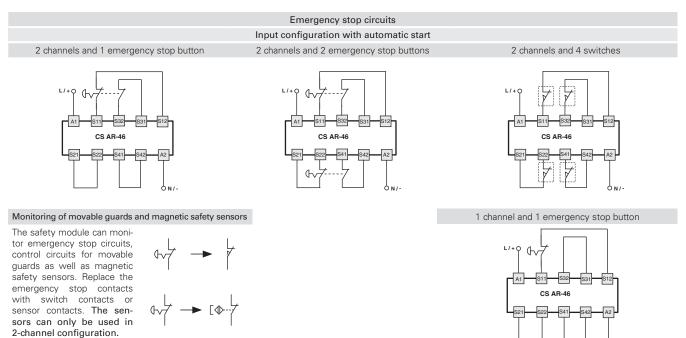
t_{R1}: t_R:

release time in absence of power supply

Internal block diagram



Input configuration



pizzato

6 N/-



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.) Ue (V) 24 le (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 2020970305002290 CCC approval: RU C-IT.YT03.B.00035/19 EAC approval: 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

Code structure

CS AR-91V024

Connection type

V Screw terminals

M Connector with screw terminals

X Connector with spring terminals

Technical data

Housing

Housing Polyamide housing PA 66, self-extinguishing V0 a Protection degree acc. to EN 60529: Dimensions:	acc. to UL 94 IP40 (housing), IP20 (terminal strip) see page 355, design A
General data SIL level (SIL CL) up to: Performance Level (PL) up to: Safety category up to: Safety parameters: Ambient temperature: Mechanical endurance: Electrical endurance: Pollution degree: Rated impulse withstand voltage (U _{imp}): Rated insulation voltage (U _i): Overvoltage category:	SIL CL 3 acc. to EN 62061 PL e acc. to EN ISO 13849-1 cat. 4 acc. to EN ISO 13849-1 see page 417 -25°C+55°C >10 million operating cycles >100,000 operating cycles external 3, internal 2 4 kV 250 V II
Supply Rated supply voltage (U _n): Max. DC residual ripple in DC: Power consumption AC: Power consumption DC:	24 Vac/dc; ±15%; 5060 Hz 10% < 5 VA < 2.5 W
$\label{eq:constraint} \begin{array}{l} \mbox{Control circuit} \\ \mbox{Protection against short circuits:} \\ \mbox{PTC response time:} \\ \mbox{Maximum resistance per input:} \\ \mbox{Min. duration of start impulse } t_{\mbox{MIN}}: \\ \mbox{Response time } t_{\mbox{A}}: \\ \mbox{Release time } t_{\mbox{R}}: \\ \mbox{Release time in absence of power supply } t_{\mbox{R}}: \\ \mbox{Simultaneity time } t_{\mbox{c}}: \\ \mbox{Response time starting from application of the supply:} \end{array}$	PTC resistance, lh=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 < 300 ms
Auxiliary signalling circuit Auxiliary output (Y43-Y44): Rated operating voltage (U _e): Rated operating current (I _e): Rated impulse withstand voltage (U _{imp}): Release time t _{R2} :	1NO opto-decoupled 24 Vdc 25 mA 4 kV < 1 ms

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, 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 IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 nº 14-95, GB/T14048.5

Output circuit

Supply voltage

024 24 Vac/dc

Output contacts: 2 NO safety contacts, Contact type: forcibly guided Material of the contacts: gold-plated silver alloy 230/240 Vac; 300 Vdc Maximum switching voltage: Max. current per contact: 6 A Conventional free air thermal current I,...: 6 A Max. total current $\Sigma |_{th}^{2}$: 36 A² Minimum current: 10 mA Contact resistance: ≤ 100 mΩ 4 A type F External protection fuse: The number and the load capacity of output contacts can be increased by using expansion modules or

contactors. See pages 295-304.

Features approved by UL

Rated supply voltage (U_): Power consumption AC Power consumption DC: Electrical ratings:

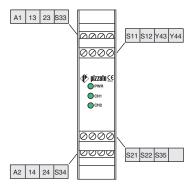
24 Vac/dc; 50...60 Hz < 5 VA < 4 W 230/240 Vac 6 A general use C300 pilot duty

Notes: - Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, 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.



Pin assignment

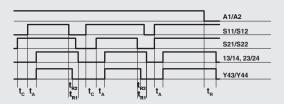


Voltage dips, short interruptions and voltage variations

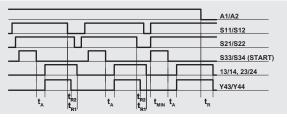
The CS AR-91 safety module has a built-in voltage drop sensor which serves to protect and safeguard the internal state of the safety relays, in the event of dips or short voltage interruptions. This is to prevent unwanted switching states in relation to the state of the inputs from occurring. When voltage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

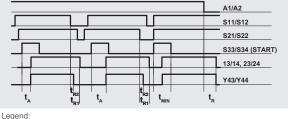
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



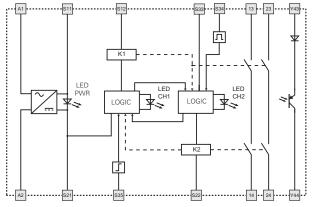
 t_{MIN} : Min. duration of start impulse t_{c} : simultaneity time t_{A} : response time

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 \boldsymbol{t}_{rr} referred to input S11/S12, time \boldsymbol{t}_{rr} referred to the supply, time \boldsymbol{t}_{A} referred to input S11/S12 and to the start, and time \boldsymbol{t}_{www} referred to the start.

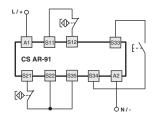
Internal block diagram



Input configuration

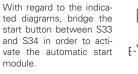
Input configuration with magnetic sensors

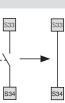
2 channels

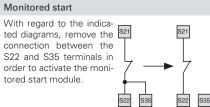


The diagram does not show the exact position of the terminals in the product

Automatic start







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.

