Safety module **CS AT-0**

Module for emergency stops, end position monitoring for movable guards with delayed contacts at the opening of the input channels, OSSD semiconductor outputs and magnetic safety sensors

Main features

- 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
- Can be connected to OSSD semiconductor outputs, to electromechanical contacts or to magnetic safety sensors
- Standard housing width of 45 mm
- 2 instantaneous NO safety contacts, 1 instantaneous NC auxiliary contact, 2 delayed 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:

EC type examination certificate: IMQ CP 432 DM
UL approval: E131787
CCC approval: 2021000305000107
EAC approval: RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:

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

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 415, design C

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: category 4 (instantaneous contacts), category 3 (delayed contacts) acc. to EN ISO 13849-1
Safety parameters: see page 481
Ambient temperature: -25°C…+55°C
Mechanical endurance: >10 million operating cycles
Electrical endurance: >100,000 operating cycles
Pollution degree: external 3, internal 2
Rated impulse withstand voltage (U_{imp}): 4 kV
Rated insulation voltage (U_i): 250 V
Overvoltage category: II

Supply

Rated supply voltage (U_n): 24 Vac/dc; 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_n
Power consumption AC: < 10 VA
Power consumption DC: < 5 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: 40 mA (typical)
Min. duration of start impulse t_{MIN}: > 100 ms
Response time t_A: < 300 ms
Release time t_{R1}: < 25 ms
Release time in absence of power supply t_R: < 150 ms
Release time, delayed contacts t_{R2}: see "Code structure"
Simultaneity time t_C: 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, GB/T14048.5

Output circuit

Output contacts: 2 instantaneous NO safety contacts, 1 instantaneous NC auxiliary contact, 2 delayed 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_{th}^2: 72 (instant. contacts), 36 (del. contacts) A^2
Minimum current: 10 mA
Contact resistance: ≤ 100 mΩ
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 355-364.

Code structure

article | options

CS AT-00V024-TF1

Release time, delayed contacts (t_{R2})	
0	Fixed time (see TF)
1	0.3 … 3 s, 0.3 s steps
2	1 … 10 s, 1 s steps
3	3 … 30 s, 3 s steps
4	30 … 300 s, 30 s steps

Release time, delayed contacts (t_{R2})	
TF0.5	0.5 s fixed time
TF1	1 s fixed time
TF3	3 s fixed time
…	…

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

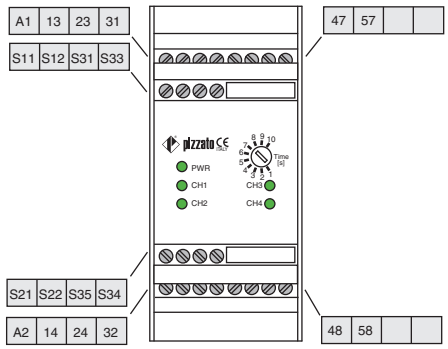
Rated supply voltage (U_n): 24 Vac/dc; 50…60 Hz
120 Vac; 50…60 Hz
230 Vac; 50…60 Hz
Power consumption AC: < 10 VA
Power consumption DC: < 4 W
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

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.
- Surrounding air of 55°C.

- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.
- Air ambiant de 55°C.

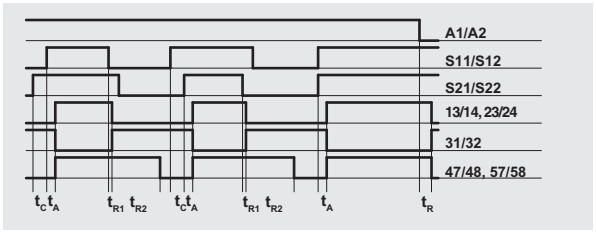
Safety module CS AT-0

Pin assignment

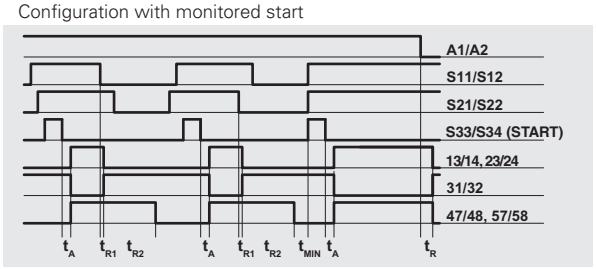


Function diagrams

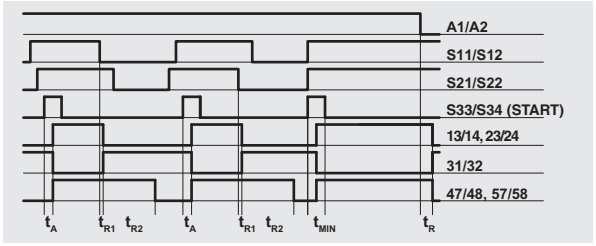
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



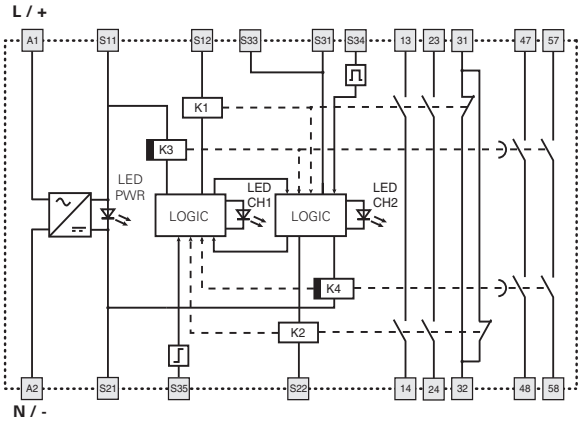
Legend:

- t_{MIN}: Min. duration of start impulse
- t_c: simultaneity time
- t_A: response time
- t_{R1}: release time
- t_R: release time in absence of power supply
- t_{R2}: release time, delayed contacts adjustable (see "Code structure")

Notes:

The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} and t_{R2} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

Internal wiring diagram

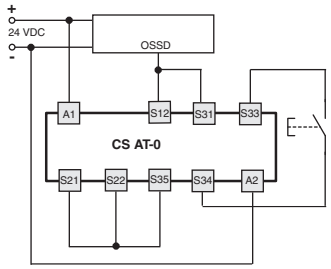


Input configuration

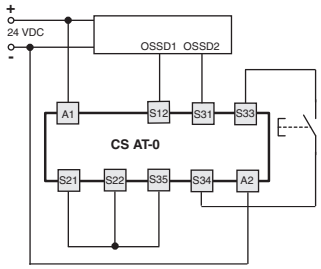
OSSD semiconductor outputs (e.g. ST, NS, NG series or light barriers)

Input configuration with manual start

1 channel



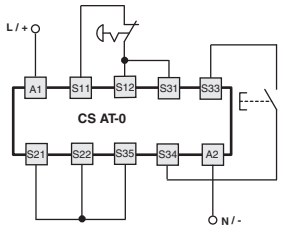
2 channels



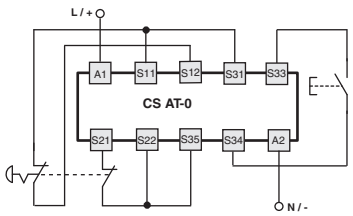
Emergency stop circuits

Input configuration with manual start

1 channel

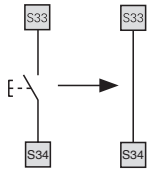


2 channels



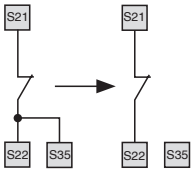
Automatic start

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



Monitored start

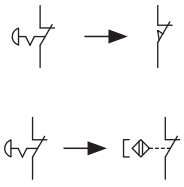
With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



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.



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

Application examples See page 365

Safety module **CS AT-1**

Module for emergency stops, end position monitoring for movable guards with delayed contacts at the opening of the input channels, OSSD semiconductor outputs and magnetic safety sensors

Main features

- 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
- Can be connected to OSSD semiconductor outputs, to electromechanical contacts or to magnetic safety sensors
- Standard housing width of 45 mm
- 3 instantaneous NO safety contacts, 2 delayed 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:

EC type examination certificate: IMQ CP 432 DM
UL approval: E131787
CCC approval: 2021000305000107
EAC approval: RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:

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

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 415, design C

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: category 4 (instantaneous contacts), category 3 (delayed contacts) acc. to EN ISO 13849-1
Safety parameters: see page 481
Ambient temperature: -25°C…+55°C
Mechanical endurance: >10 million operating cycles
Electrical endurance: >100,000 operating cycles
Pollution degree: external 3, internal 2
Rated impulse withstand voltage (U_{imp}): 4 kV
Rated insulation voltage (U_i): 250 V
Overvoltage category: II

Supply

Rated supply voltage (U_n): 24 Vac/dc; 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_n
Power consumption AC: < 10 VA
Power consumption DC: < 5 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: 40 mA (typical)
Min. duration of start impulse t_{MIN}: > 100 ms
Response time t_A: < 300 ms
Release time t_{R1}: < 25 ms
Release time in absence of power supply t_R: < 150 ms
Release time, delayed contacts t_{R2}: see "Code structure"
Simultaneity time t_C: 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, GB/T14048.5

Output circuit

Output contacts: 3 instantaneous NO safety contacts, 2 delayed 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_{th}^2: 72 (instant. contacts), 36 (del. contacts) A^2
Minimum current: 10 mA
Contact resistance: ≤ 100 mΩ
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 355-364.

Code structure

article | options

CS AT-10V024-TF1

Release time, delayed contacts (t_{R2})	
0	Fixed time (see TF)
1	0.3 … 3 s, 0.3 s steps
2	1 … 10 s, 1 s steps
3	3 … 30 s, 3 s steps
4	30 … 300 s, 30 s steps

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

Release time, delayed contacts (t_{R2})	
TF0.5	0.5 s fixed time
TF1	1 s fixed time
TF3	3 s fixed time
…	…

Features approved by UL

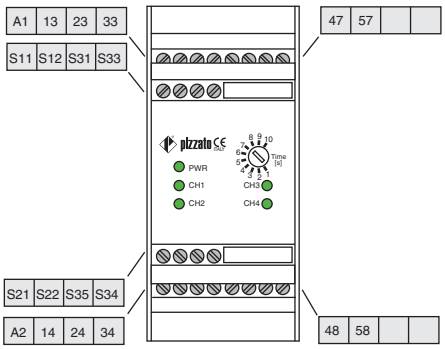
Rated supply voltage (U_n): 24 Vac/dc; 50…60 Hz
120 Vac; 50…60 Hz
230 Vac; 50…60 Hz
Power consumption AC: < 10 VA
Power consumption DC: < 4 W
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

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.
- Surrounding air of 55°C.

- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.
- Air ambiant de 55°C.

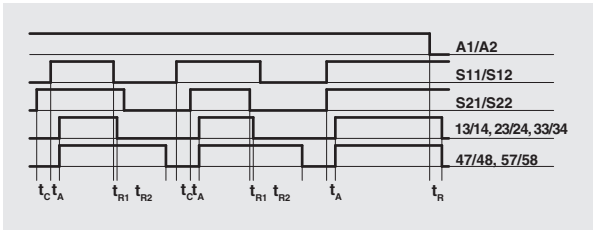
Safety module CS AT-1

Pin assignment

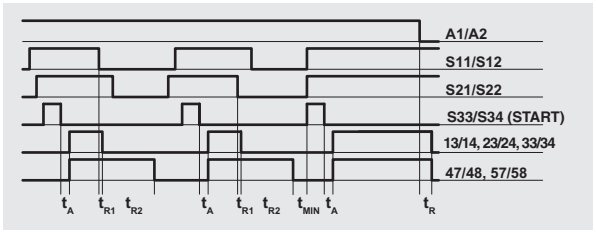


Function diagrams

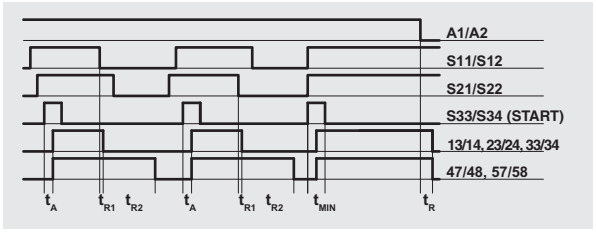
Configuration with automatic start



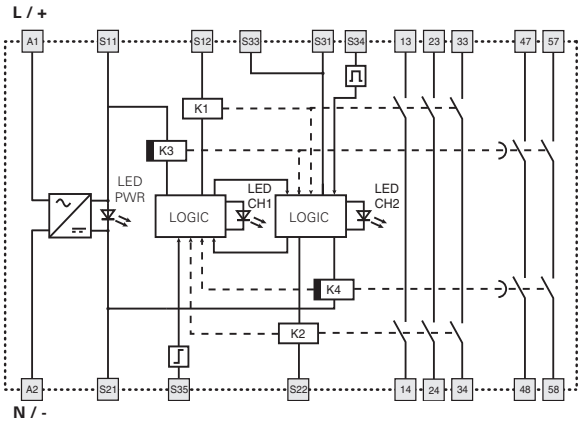
Configuration with monitored start



Configuration with manual start



Internal wiring diagram



Legend:

t_{MIN}: Min. duration of start impulse
t_C: simultaneity time
t_A: response time
t_{R1}: release time
t_R: release time in absence of power supply
t_{R2}: release time, delayed contacts adjustable (see "Code structure")

Notes:

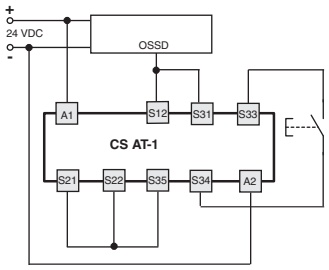
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} and t_{R2} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

Input configuration

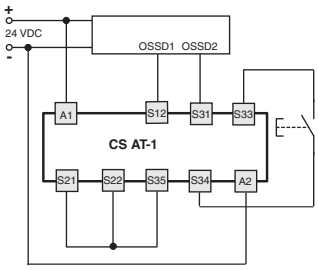
OSSD semiconductor outputs (e.g. ST, NS, NG series or light barriers)

Input configuration with manual start

1 channel



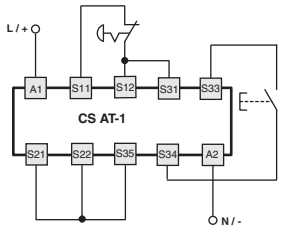
2 channels



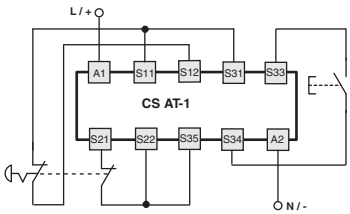
Emergency stop circuits

Input configuration with manual start

1 channel

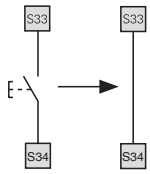


2 channels



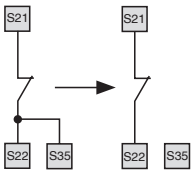
Automatic start

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



Monitored start

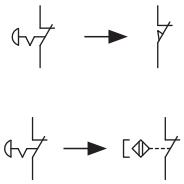
With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



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.



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

Application examples See page 365

Safety module **CS AT-3**

Module for emergency stop and end position monitoring for movable guards with delayed contacts at the opening of the input channels and magnetic safety sensors

Main features

- 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 electromechanical contacts or to magnetic safety sensors
- 45 mm housing
- 2 instantaneous NO safety contacts, 1 delayed 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:

EC type examination certificate: IMQ CP 432 DM
UL approval: E131787
CCC approval: 2021000305000107
EAC approval: RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:
Machinery Directive 2006/42/EC, EMC Directive 2014/30/EC, RoHS Directive 2011/65/EU.

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 415, design C

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:	category 4 (instantaneous contacts) category 3 (delayed contacts) acc. to EN ISO 13849-1
Safety parameters:	see page 481
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Rated impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 10 VA
Power consumption DC:	< 5 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:	30 mA (typical)
Min. duration of start impulse t_{MIN}:	> 100 ms
Response time t_A:	< 120 ms
Release time t_{R1}:	< 20 ms
Release time in absence of power supply t_R:	< 200 ms
Release time, delayed contacts t_{R2}:	see "Code structure"
Simultaneity time t_C:	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, GB/T14048.5

Output circuit

Output contacts:	2 instantaneous NO safety contacts, 1 delayed NO safety contact.
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current Σ I_{th}^2:	36 A²
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
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 355-364.

Code structure

article | options

CS AT-30V024-TF1

Release time, delayed contacts (t_{R2})	
0	Fixed time (see TF)
1	0.3 … 3 s, 0.3 s steps
2	1 … 10 s, 1 s steps
3	3 … 30 s, 3 s steps
4	30 … 300 s, 30 s steps

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

Supply voltage	
024	24 Vac/dc

Release time, delayed contacts (t_{R2})	
TF0.5	0.5 s fixed time
TF1	1 s fixed time
TF3	3 s fixed time
...	…

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Power consumption AC:	< 10 VA
Power consumption DC:	< 4 W

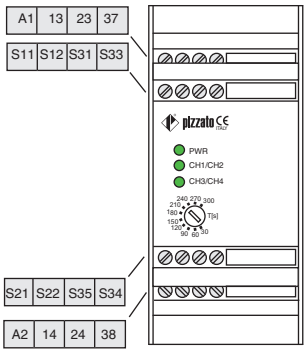
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

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.
- Surrounding air of 55°C.

- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.
- Air ambiant de 55°C.

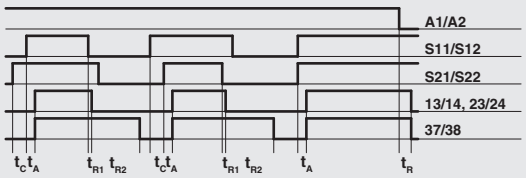
Safety module CS AT-3

Pin assignment

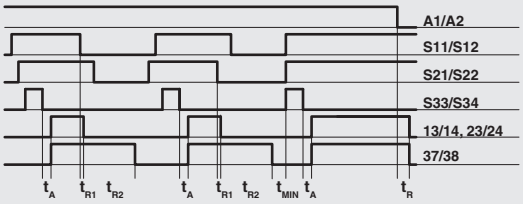


Function diagrams

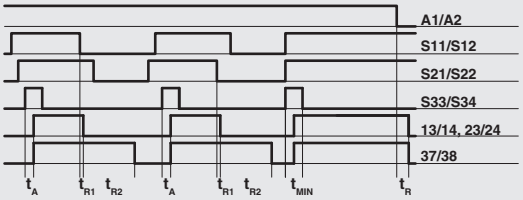
Configuration with automatic start



Configuration with monitored start



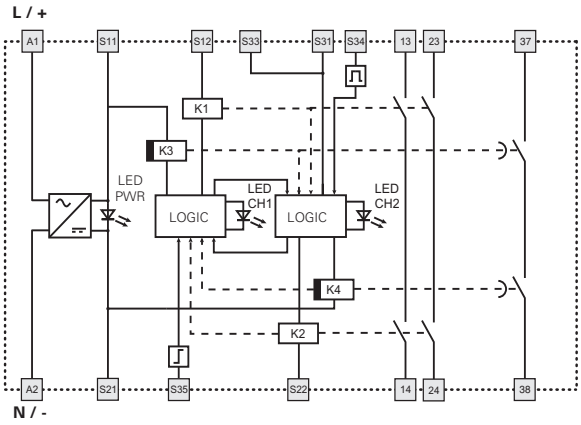
Configuration with manual start



Legend:
t_{MIN}: Min. duration of start impulse
t_C: simultaneity time
t_A: response time
t_{R1}: release time
t_R: release time in absence of power supply
t_{R2}: release time, delayed contacts adjustable (see "Code structure")

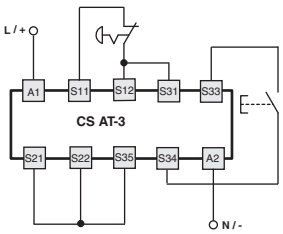
Notes:
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider times t_{R1} and t_{R2} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

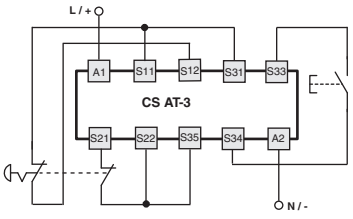
Internal wiring diagram



Input configuration

Emergency stop circuits	
Input configuration with manual start	
1 channel	2 channels

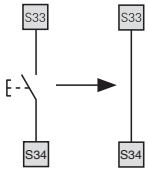




The diagram does not show the exact position of the terminals in the product

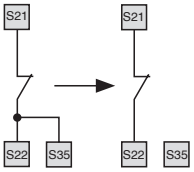
Automatic start

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



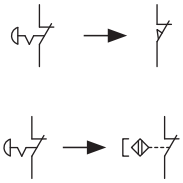
Monitored start

With regard to the indicated diagrams, remove the connection between 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.**



Application examples See page 365