Safety module **CS AT-0**

Module, with delayed contacts at the opening of the input channels, for emergency stop, gate monitoring, solid-state output circuits (e.g. light curtains) 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 the input channels to opposite potentials
- Can be connected to solid-state output circuits (e.g. light curtains), to electromechanical contacts or to magnetic safety sensors
- 45 mm housing
- 2 NO instantaneous safety contacts, 1 NC auxiliary contact, instantaneous, 2 NO safety contacts, delayed.
- 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 op. cycles/minute)
Ue (V) 24
Ie (A) 4

Markings, quality marks and certificates:

UL approval:	E131787
EAC approval:	RU C-IT ДМ94.В.01024
CCC approval:	2013010305640211

In conformity with the requirements of:
Low Voltage Directive 2006/95/EC,
Machinery Directive 2006/42/EC,
EMC Directive 2004/108/EC

Technical data

Housing

PA 6.6 polyamide housing, self-extinguishing, V0 acc. to UL 94	
Protection degree:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 284, design C

General data

SIL CL:	up to SIL CL 3 acc. to EN 62061
Performance Level (PL):	up to PL e acc. to EN ISO 13849-1
Safety category:	up to category 4 (instantaneous contacts), category 3 (delayed contacts) acc. to EN ISO 13849-1
Safety parameters:	see page 333
Ambient temperature:	-25°C...+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse voltage (Uimp):	4 kV
Rated insulation voltage (Ui):	250 V
Overvoltage category:	II
Weight:	0.5 kg

Supply

Rated supply voltage (Un):	24 Vac/dc; 50...60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
DC maximum residual ripple:	10%
Supply voltage tolerance:	±15% of Un
AC consumption:	< 10 VA
DC consumption:	< 5 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0.5 A
PTC timing:	intervention > 100 ms, reset > 3 s
Maximum input resistance:	≤ 50 Ω
Input current:	< 30 mA
Min. duration of start impulse t_{MIN}:	> 200 ms
Operating time t_A:	< 150 ms
Releasing time t_{R1}:	< 20 ms
Releasing time in absence of power supply t_R:	< 150 ms
Releasing time, delayed contacts t_{R2}:	see "Code structure"
Simultaneity time t_C:	infinite

In conformity with standards:
EN 60204-1, EN ISO 13855, EN 1037, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 62326-1, EN 60664-1, EN 60947-1, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	2 NO instantaneous safety contacts, 1 NC auxiliary contact, instantaneous, 2 NO safety contacts, delayed.
Contact type:	forcibly guided
Contact material:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Max. total current Σ Ith^2:	72 (instantaneous), 36 (delayed) 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 231-240.

Code structure

CS AT-00V024-TF1

Releasing time, delayed contacts (t_{R2})	
0	Fixed time (see TF)
1	from 0.3 to 3 s, step 0.3 s
2	from 1 to 10 s, step 1 s
3	from 3 to 30 s, step 3 s
4	from 30 to 300 s, step 30 s

Releasing 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	±15%
120	120 Vac	±15%
230	230 Vac	±15%

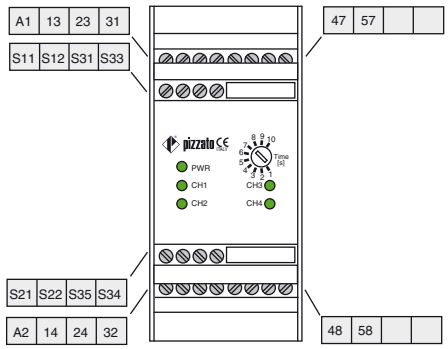
Characteristics approved by UL

Rated supply voltage (Un):	24 Vac/dc; 50...60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
AC consumption:	< 10 VA
DC consumption:	< 4 W
Maximum switching voltage:	230 Vac
Max. current per contact:	6 A
Utilization category	C300

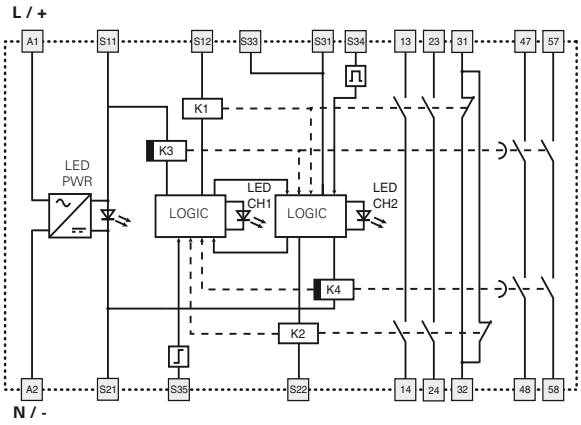
Notes:
- Use 60° or 75 °C copper (Cu) conductor, rigid or flexible, wire size AWG 30-12.
- Terminal tightening torque of 5-7 Lb In.
- Only for 24 Vac/dc version, supply from remote class 2 source or limited voltage and limited energy. (Supply from Remote Class 2 Source or limited voltage limited energy).

Safety module CS AT-0

Terminal layout

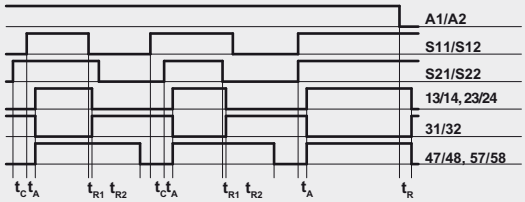


Internal diagram

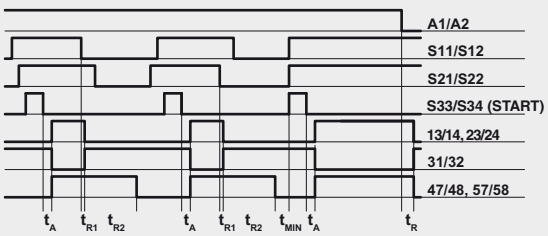


Operation diagrams

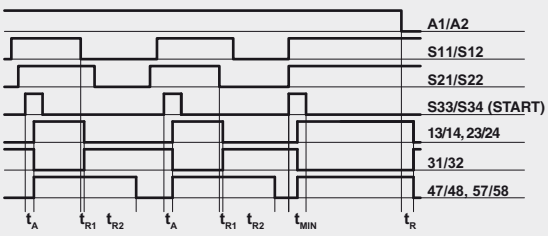
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



Legend:

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

Notes:

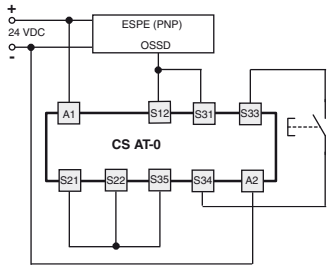
The configurations with one channel are obtained taking into consideration only the S11/S12 input. In this case it is necessary to consider time t_{R1} and t_{R2} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred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

Input configuration

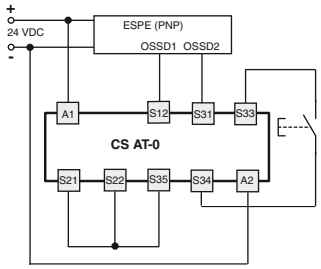
Solid state output circuits (e.g. light curtains)

Input configuration with manual start

1 channel



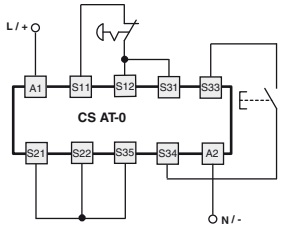
2 channels



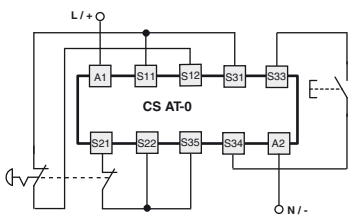
Emergency stop circuits

Input configuration with manual start

1 channel

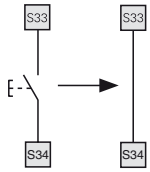


2 channels



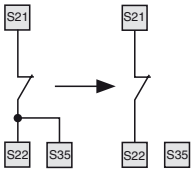
Automatic start

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



Monitored start

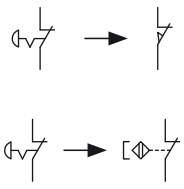
With regard to the indicated diagrams, it is necessary to remove the connection between S22 and S35 in order to activate the monitored start module.



Movable guard monitoring and magnetic safety sensors

The safety module can control emergency stop circuits, movable guard monitoring circuits or 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 241

Safety module **CS AT-1**

Module, with delayed contacts at the opening of the input channels, for emergency stop, gate monitoring, solid-state output circuits (e.g. light curtains) 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 the input channels to opposite potentials
- Can be connected to solid-state output circuits (e.g. light curtains), to electromechanical contacts or to magnetic safety sensors
- 45 mm housing
- 3 NO instantaneous safety contacts, 2 NO safety contacts, delayed.
- 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 op. cycles/minute)
Ue (V) 24
Ie (A) 4

Markings, quality marks and certificates:

UL approval:	E131787
EAC approval:	RU C-IT ДМ94.B.01024
CCC approval:	2013010305640211

In conformity with the requirements of:
Low Voltage Directive 2006/95/EC,
Machinery Directive 2006/42/EC,
EMC Directive 2004/108/EC

Technical data

Housing
PA 6.6 polyamide housing, self-extinguishing, V0 acc. to UL 94

Protection degree:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 284, design C

General data

SIL CL:	up to SIL CL 3 acc. to EN 62061
Performance Level (PL):	up to PL e acc. to EN ISO 13849-1
Safety category:	up to category 4 (instantaneous contacts), category 3 (delayed contacts) acc. to EN ISO 13849-1
Safety parameters:	see page 333
Ambient temperature:	-25°C...+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse voltage (Uimp):	4 kV
Rated insulation voltage (Ui):	250 V
Overvoltage category:	II
Weight:	0.5 kg

Supply

Rated supply voltage (Un):	24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz
DC maximum residual ripple:	10%
Supply voltage tolerance:	±15% of Un
AC consumption:	< 10 VA
DC consumption:	< 5 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0.5 A
PTC timing:	intervention > 100 ms, reset > 3 s
Maximum input resistance:	≤ 50 Ω
Input current:	< 30 mA
Min. duration of start impulse t_{MIN}:	> 200 ms
Operating time t_A:	< 150 ms
Releasing time t_{R1}:	< 20 ms
Releasing time in absence of power supply t_R:	< 150 ms
Releasing time, delayed contacts t_{R2}:	see "Code structure"
Simultaneity time t_C:	infinite

In conformity with standards:
EN 60204-1, EN ISO 13855, EN 1037, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 62326-1, EN 60664-1, EN 60947-1, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	3 NO instantaneous safety contacts, 2 NO safety contacts, delayed.
Contact type:	forcibly guided
Contact material:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Max. total current Σ Ith^2:	72 (instantaneous), 36 (delayed) 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 231-240.

Code structure

CS AT-10V024-TF1

Releasing time, delayed contacts (t_{R2})	
0	Fixed time (see TF)
1	from 0.3 to 3 s, step 0.3 s
2	from 1 to 10 s, step 1 s
3	from 3 to 30 s, step 3 s
4	from 30 to 300 s, step 30 s

Releasing 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	±15%
120	120 Vac	±15%
230	230 Vac	±15%

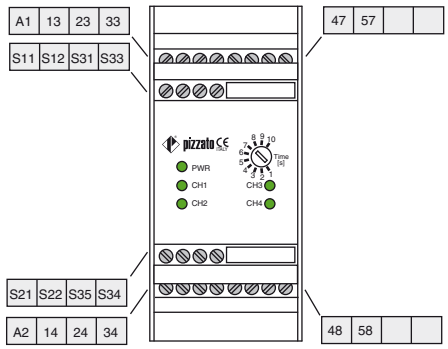
Characteristics approved by UL

Rated supply voltage (Un):	24 Vac/dc; 50...60 Hz 120 Vac; 50...60 Hz 230 Vac; 50...60 Hz
AC consumption:	< 10 VA
DC consumption:	< 4 W
Maximum switching voltage:	230 Vac
Max. current per contact:	6 A
Utilization category	C300

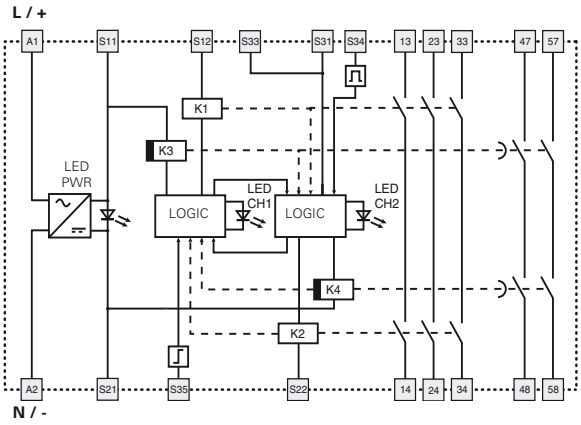
Notes:
- Use 60° or 75 °C copper (Cu) conductor, rigid or flexible, wire size AWG 30-12.
- Terminal tightening torque of 5-7 Lb In.
- Only for 24 Vac/dc version, supply from remote class 2 source or limited voltage and limited energy. (Supply from Remote Class 2 Source or limited voltage limited energy).

Safety module CS AT-1

Terminal layout

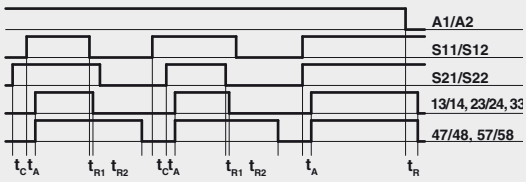


Internal diagram

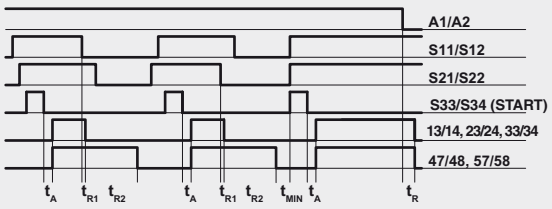


Operation diagrams

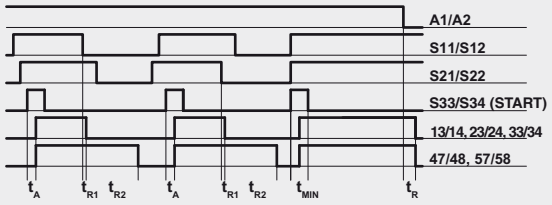
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



Legend:

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

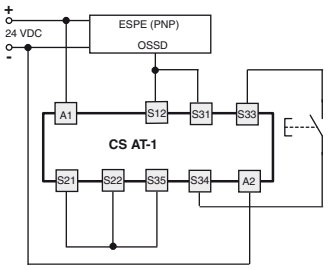
Notes:
The configurations with one channel are obtained taking into consideration only the S11/S12 input. In this case it is necessary to consider time t_{R1} and t_{R2} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred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

Input configuration

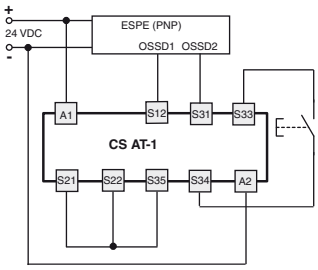
Solid state output circuits (e.g. light curtains)

Input configuration with manual start

1 channel



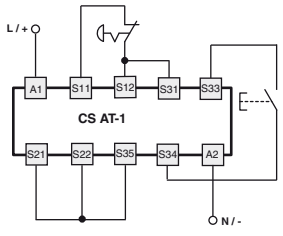
2 channels



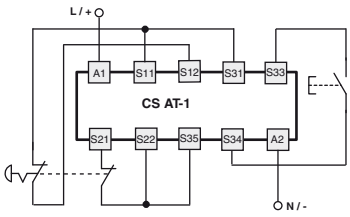
Emergency stop circuits

Input configuration with manual start

1 channel

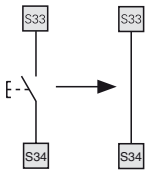


2 channels



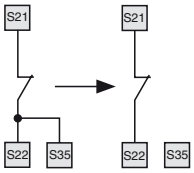
Automatic start

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



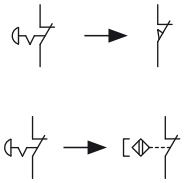
Monitored start

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



Movable guard monitoring and magnetic safety sensors

The safety module can control emergency stop circuits, movable guard monitoring circuits or 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 241

Safety module **CS AT-3**

Module for emergency stop and gate 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
- Connectible to electromechanical contacts or to magnetic safety sensor
- 45 mm housing
- 2 NO instantaneous safety contacts, 1 NO safety contact, delayed.
- Supply voltage: 24 Vac/dc

Utilization categories
Alternating current: AC15 (50...60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 op. cycles/minute)
Ue (V) 24
Ie (A) 4

Markings, quality marks and certificates:

UL approval:	E131787
EAC approval:	RU C-IT ДМ94.B.01024
CCC approval:	2013010305640211

In conformity with the requirements of:
Low Voltage Directive 2006/95/EC,
Machinery Directive 2006/42/EC,
EMC Directive 2004/108/EC

Technical data

Housing
PA 6.6 polyamide housing, self-extinguishing, V0 acc. to UL 94

Protection degree:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 284, design C

General data

SIL CL:	up to SIL CL 3 acc. to EN 62061
Performance Level (PL):	up to PL e acc. to EN ISO 13849-1
Safety category:	up to category 4 (instantaneous contacts) category 3 (delayed contacts) acc. to EN ISO 13849-1
Safety parameters:	see page 333
Ambient temperature:	-25°C...+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse voltage (Uimp):	2.5 kV
Rated insulation voltage (Ui):	250 V
Overvoltage category:	II
Weight:	0.3 kg

Supply

Rated supply voltage (Un):	24 Vac/dc; 50...60 Hz
DC maximum residual ripple:	10%
Supply voltage tolerance:	±15% of Un
AC consumption:	< 10 VA
DC consumption:	< 5 W

Control circuit

Protection against short circuits:	resistance PTC, Ih=0.5 A
PTC timing:	intervention > 100 ms, reset > 3 s
Maximum input resistance:	≤ 50 Ω
Input current:	< 30 mA
Min. duration of start impulse t_{MIN}:	> 100 ms
Operating time t_A:	< 70 ms
Releasing time t_{R1}:	< 15 ms
Releasing time in absence of power supply t_R:	< 100 ms
Releasing time, delayed contacts t_{R2}:	see "Code structure"
Simultaneity time t_C:	infinite

In conformity with standards:
EN 60204-1, EN ISO 13855, EN 1037, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 62326-1, EN 60664-1, EN 60947-1, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 n° 14-95

Output circuit

Output contacts:	2 NO instantaneous safety contacts, 1 NO safety contact, delayed.
Contact type:	forcibly guided
Contact material:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current Ith:	6 A
Max. total current Σ Ith^2:	36 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 231-240.

Code structure

CS AT-30V024-TF1

Releasing time, delayed contacts (t_{R2})	
0	Fixed time (see TF)
1	from 0.3 to 3 s, step 0.3 s
2	from 1 to 10 s, step 1 s
3	from 3 to 30 s, step 3 s
4	from 30 to 300 s, step 30 s

Connection type	
V	screw terminals
M	connector with screw terminals
X	connector with spring terminals

Supply voltage		
024	24 Vac/dc	±15%

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

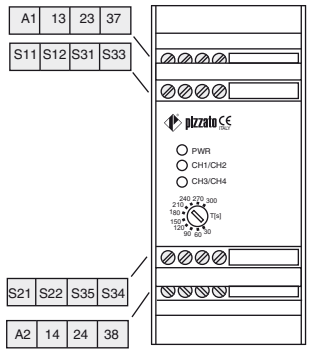
Characteristics approved by UL

Rated supply voltage (Un):	24 Vac/dc; 50...60 Hz
AC consumption:	< 10 VA
DC consumption:	< 4 W
Maximum switching voltage:	230 Vac
Max. current per contact:	6 A
Utilization category	C300

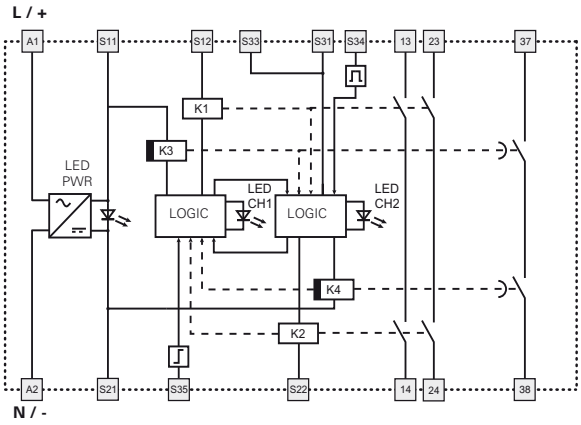
Notes:
- Use 60° or 75 °C copper (Cu) conductor, rigid or flexible, wire size AWG 30-12.
- Terminal tightening torque of 5-7 Lb In..
- Only for 24 Vac/dc version, supply from remote class 2 source or limited voltage and limited energy. (Supply from Remote Class 2 Source or limited voltage limited energy).

Safety module CS AT-3

Terminal layout

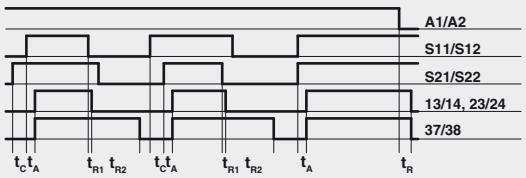


Internal diagram

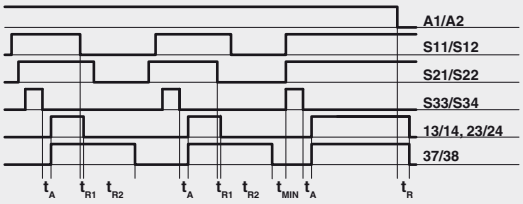


Operation diagrams

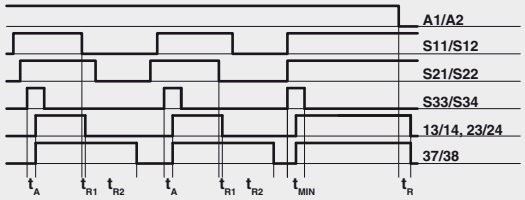
Configuration with automatic start



Configuration with monitored start



Configuration with manual start

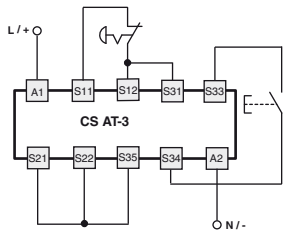


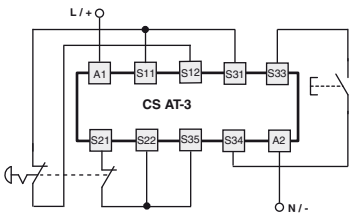
Legend:
- t_{MIN}: min. duration of start impulse
- t_C: simultaneity time
- t_A: operating time
- t_{R1}: releasing time
- t_R: releasing time in absence of power supply
- t_{R2}: releasing time, delayed contacts adjustable (see "Code structure")

Notes:
The configurations with one channel are obtained taking into consideration only the S11/S12 input. 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

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

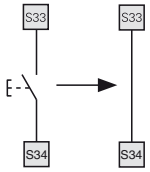




The diagram does not show the exact position of terminals in the product

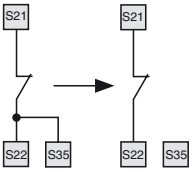
Automatic start

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



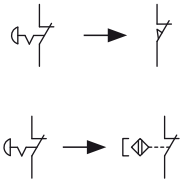
Monitored start

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



Movable guard monitoring and magnetic safety sensors

The safety module can control emergency stop circuits, movable guard monitoring circuits or 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 terminals in the product

Application examples See page 241