Safety module **CS FS-1**

Safety timer module with delayed contacts at energizing

Main features

- For safety applications up to SIL CL 3/PL e
- Timing circuits by means of safety system with self-monitoring and redundancy
- Release command for interlocked safety devices
- 45 mm housing
- Output contacts:
  1 NO safety contact,
  2 NC auxiliary 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: 2013010305640211
EAC approval: RU C-IT.УТ03.B.00035/19

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

Technical data

Housing

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

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 317, design 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:	cat. 4 acc. to EN ISO 13849-1 (depending on circuit structure)
Safety parameters:	see page 375
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Rated impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; 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:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Response time t_A:	see "Code structure"
Release time in absence of power supply t_R:	< 60 ms

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

Output circuit

Output contacts:	1 NO safety contact, 2 NC auxiliary contacts
Contact type:	forcibly guided
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
Max. total current ΣI_{th}^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 263-272.

Code structure

article | options

CS FS-11V024-TF1

Response time (t_A)	
0	Fixed time (see Tfx)
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

Response time (t_A)	
TF0.5	0.5 s fixed time
TF1	1 s fixed time
TF3	3 s fixed time
TF10	10 s fixed time

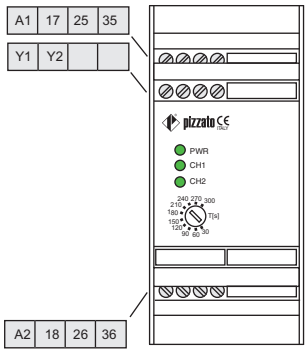
Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W
Electrical ratings:	230/240 Vac 6 A general use C300 pilot duty

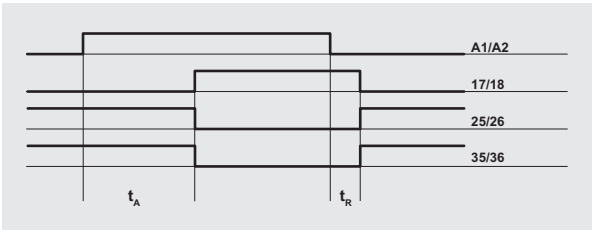
Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

Safety module CS FS-1

Pin assignment

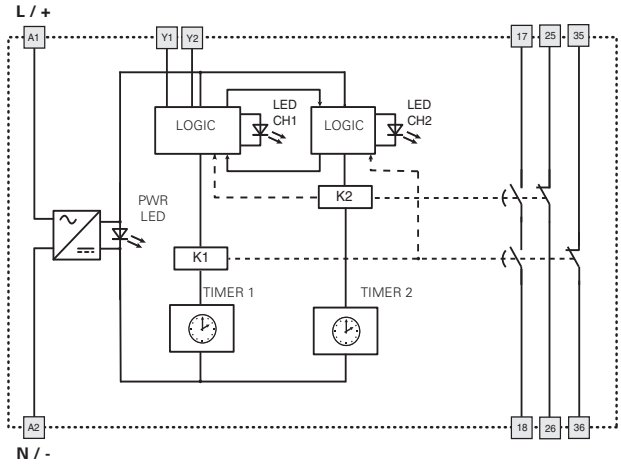


Function diagram



Legend:
t_A: adjustable response time (see "Code structure")
t_R: release time in absence of power supply

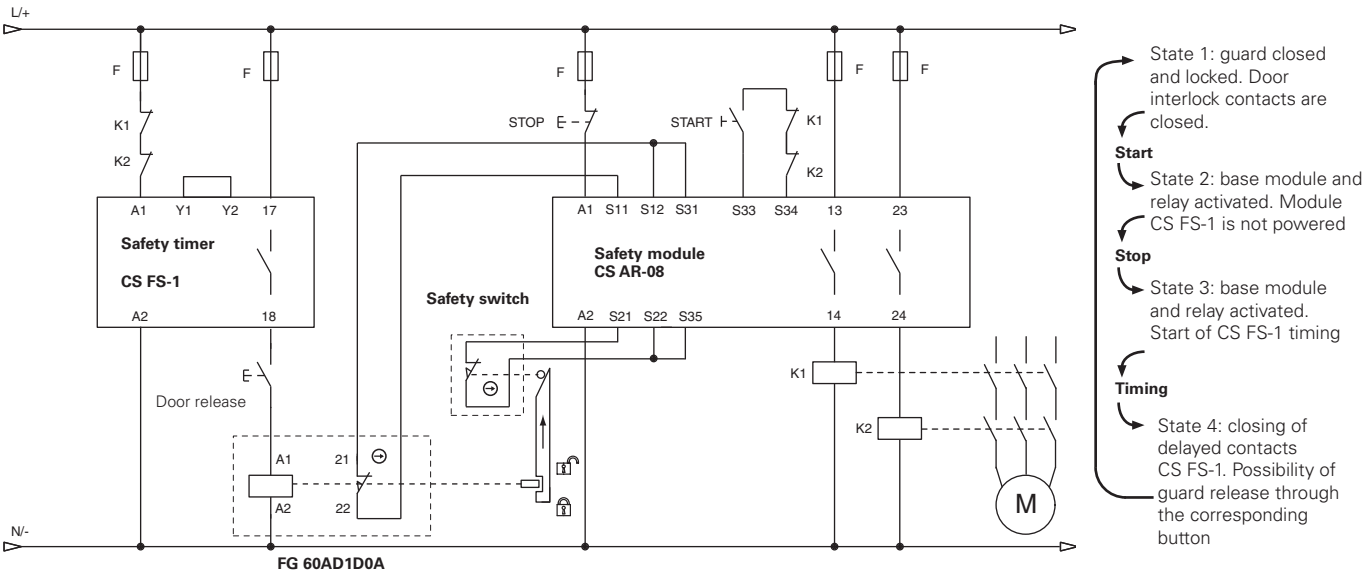
Internal block diagram



Y1-Y2: optional feedback inputs from any external contactors which are directly controlled by the module.

Circuit structure

Monitoring of a door-lock system with manual release



FG 60AD1D0A

The diagram illustrates the operating principle of a typical circuit for monitoring a door-lock system with interlock in the de-energised state and manual release of the individual doors.
For the complete electrical wiring diagrams with various types of electrical locking and release of the doors, please contact our technical office.

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

Safety module **CS FS-2**

Safety timer module with delayed contacts at energizing

Main features

- For safety applications up to SIL CL 2/PL d
- Timing circuits by means of safety system with self-monitoring and redundancy
- Release command for interlocked safety devices
- 45 mm housing
- Output contacts:
  1 NO safety contact, 1 NC auxiliary contact, 1 CO auxiliary contact
- Supply voltage:
  24 Vdc, 120 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: M6A 170575157017
UL approval: E131787
CCC approval: 2013010305640211
TÜV SÜD approval: Z10 17 05 75157 016
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 317, design C

General data

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

Supply

Rated supply voltage (U_n):	24 Vdc (A1-A2) 120 Vac; 50…60 Hz (B1-B2)
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Response time t_A:	see "Code structure"
Release time in absence of power supply t_R:	< 100 ms

In compliance with standards:

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

Output circuit

Output contacts:	1 NO safety contact, 1 NC auxiliary contact, 1 CO auxiliary contact,
Contact type:	forcibly guided
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
Max. total current ΣI_{th}^2:	36 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A
Error signal output (Y14):	Type: PNP
Rated operating voltage (U_e):	24 Vdc
Rated operating current (Ie):	10 mA

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

Code structure

article: **CS FS-20VU24** options: **-TFxx**

Response time (t_A)	
0	Fixed time (see Tfx)
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

Response time (t_A)	
TFxx	xx = s (fixed time)

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

Supply voltage	
U24	24 Vdc
120	24 Vdc (A1-A2) 120 Vac (B1-B2)

Features approved by UL

Rated supply voltage (U_n):	24 Vdc; 120 Vac; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 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.

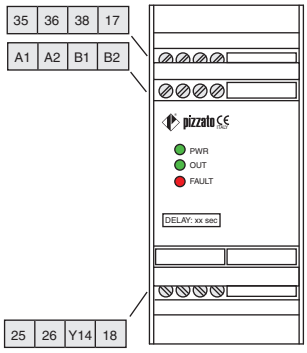
Features approved by TÜV SÜD

Rated supply voltage (U_n): 24 Vdc; ± 15%, 120 Vac ± 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. 3 PL d), EN 61508-1:2010 (SIL 2), EN 61508-2:2010 (SIL 2), EN 61508-3:2010 (SIL 2), EN 61508-4:2010 (SIL 2), EN 62061:2005/A2:2015 (SIL CL 2).

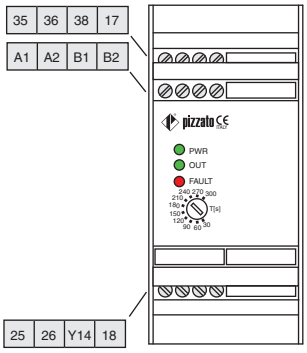
Safety module CS FS-2

Pin assignment

CS FS-20••••-TFxx

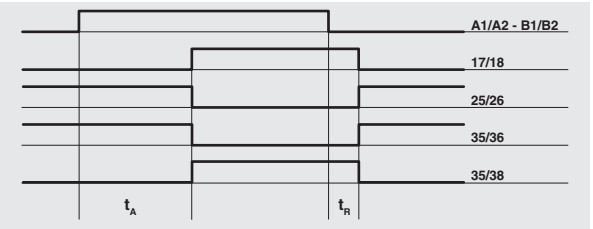


CS FS-2•••••



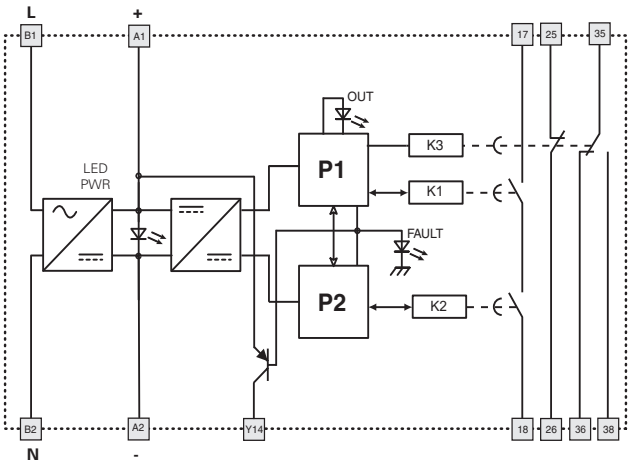
Function diagram

CS FS-2••••• Delay on
Normal operation without faults



Legend:
t_A: adjustable response time (see "Code structure")
t_R: release time in absence of power supply

Internal block diagram



A1-A2: 24 Vdc
B1-B2: 120 Vac

Y14: auxiliary output, activated when the module enters fault state.

Safety module **CS FS-3**

Safety timer modules with response delay

Main features

- For safety applications up to SIL CL 2/PL d
- Timing circuits by means of safety system with self-monitoring and redundancy
- Release command for interlocked safety devices
- 45 mm housing
- Output contacts:
  1 NO safety contact, 1 NC auxiliary contact, 1 CO auxiliary contact
- Supply voltage:
  24 Vdc, 120 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: M6A 170575157017
UL approval: E131787
CCC approval: 2013010305640211
TÜV SÜD approval: Z10 17 05 75157 016
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 317, design C

General data

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

Supply

Rated supply voltage (U_n):	24 Vdc (A1-A2) 120 Vac; 50…60 Hz (B1-B2)
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Release time t_A:	see "Code structure"
Release time in absence of power supply t_R:	< 100 ms
Start-up time t_S:	< 200 ms

In compliance with standards:

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

Output circuit

Output contacts:	1 NO safety contact, 1 NC auxiliary contact, 1 CO auxiliary contact,
Contact type:	forcibly guided
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
Max. total current ΣI_{th}^2:	36 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A
Error signal output (Y14):	Type: PNP
Rated operating voltage (U_e):	24 Vdc
Rated operating current (I_e):	10 mA

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

Code structure

article: **CS FS-30VU24** options: **-TFxx**

Release time (t_A)	
0	Fixed time (see Tfx)
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 (t_A)	
TFxx	xx = s (fixed time)

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

Supply voltage	
U24	24 Vdc
120	24 Vdc (A1-A2) 120 Vac (B1-B2)

Features approved by UL

Rated supply voltage (U_n):	24 Vdc; 120 Vac; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 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.

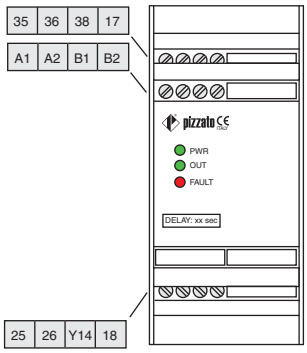
Features approved by TÜV SÜD

Rated supply voltage (U_n): 24 Vdc; ± 15%, 120 Vac ± 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. 3 PL d), EN 61508-1:2010 (SIL 2), EN 61508-2:2010 (SIL 2), EN 61508-3:2010 (SIL 2), EN 61508-4:2010 (SIL 2), EN 62061:2005/A2:2015 (SIL CL 2).

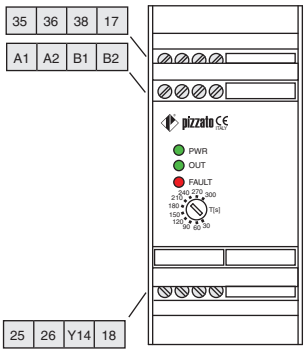
Safety module CS FS-3

Pin assignment

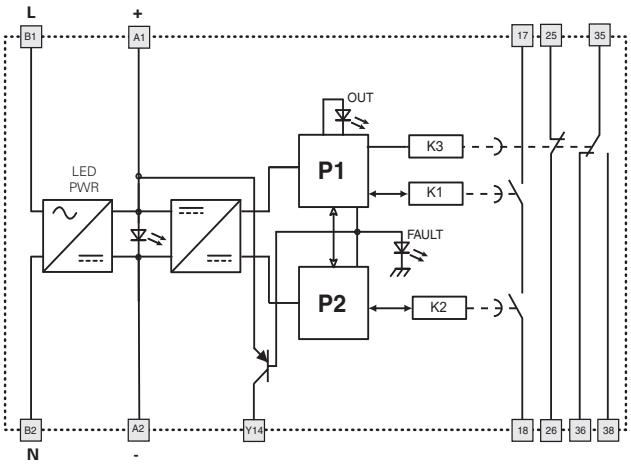
CS FS-30••••-TFxx



CS FS-3•••••



Internal block diagram

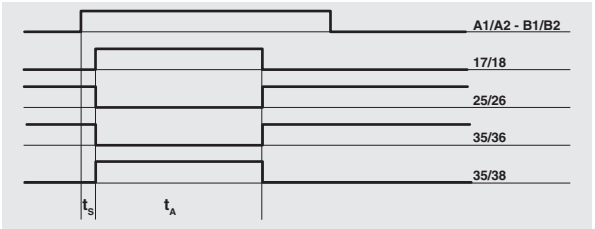


A1-A2: 24 Vdc
B1-B2: 120 Vac

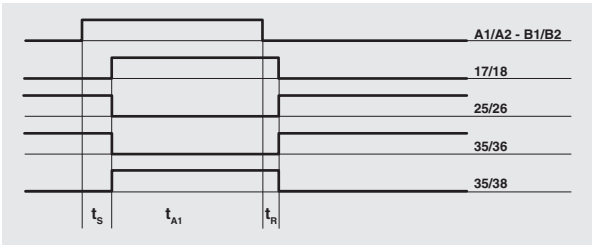
Y14: auxiliary output, activated when the module enters fault state.

Function diagram

CS FS-3••••• Delay off
Normal operation without faults



Operation without power supply



Legend:
t_A: release time (see "Code structure")
t_{A1}: release time if duration of power supply is less than t_A
t_R: release time in absence of power supply
t_S: start-up time

Safety module **CS FS-5**

Safety timer module with delayed contacts upon opening of the inputs

Main features

- For safety applications up to SIL CL 2/PL d
- Timing circuits by means of safety system with self-monitoring and redundancy
- Release command for interlocked safety devices
- 45 mm housing
- Output contacts:
  1 NO safety contact, 1 NC auxiliary contact, 1 CO auxiliary contact,
- Supply voltage:
  24 Vdc, 120 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: M6A 170575157017
UL approval: E131787
CCC approval: 2013010305640211
TÜV SÜD approval: Z10 17 05 75157 016
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 317, design C

General data

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

Supply

Rated supply voltage (U_n):	24 Vdc (A1-A2) 120 Vac; 50…60 Hz (B1-B2)
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Release time t_A:	see "Code structure"
Release time in absence of power supply t_R:	< 100 ms

Input circuit

Maximum resistance per input:	≤ 50 Ω
Current per input:	< 8 mA
Response time t_S:	< 150 ms
Min. duration input signal t_{MIN}:	> 100 ms

In compliance with standards:

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

Output circuit

Output contacts:	1 NO safety contact, 1 NC auxiliary contact, 1 CO auxiliary contact,
Contact type:	forcibly guided
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
Max. total current ΣI_{th}^2:	36 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A
Error signal output (Y14):	Type: PNP
Rated operating voltage (U_e):	24 Vdc
Rated operating current (I_e):	10 mA

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

Code structure

article: **CS FS-50VU24** options: **-TFxx**

Release time (t_A)	
0	Fixed time (see Tfx)
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	
U24	24 Vdc
120	24 Vdc (A1-A2) 120 Vac (B1-B2)

Release time (t_A)	
TFxx	xx = s (fixed time)

Features approved by UL

Rated supply voltage (U_n):	24 Vdc; 120 Vac; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 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.

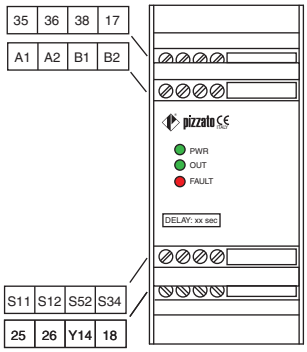
Features approved by TÜV SÜD

Rated supply voltage (U_n): 24 Vdc; ± 15%, 120 Vac ± 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. 3 PL d), EN 61508-1:2010 (SIL 2), EN 61508-2:2010 (SIL 2), EN 61508-3:2010 (SIL 2), EN 61508-4:2010 (SIL 2), EN 62061:2005/A2:2015 (SIL CL 2).

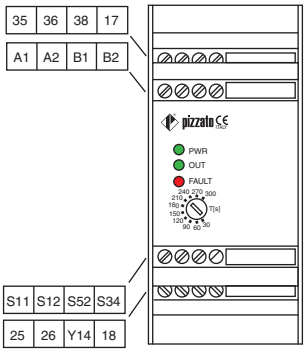
Safety module CS FS-5

Pin assignment

CS FS-50••••-TFxx

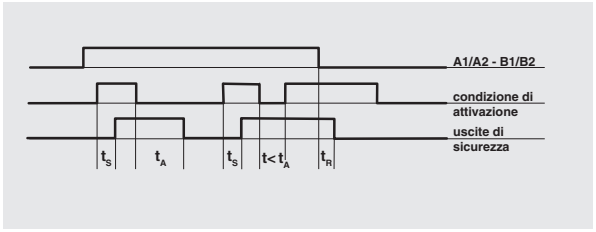


CS FS-5•••••

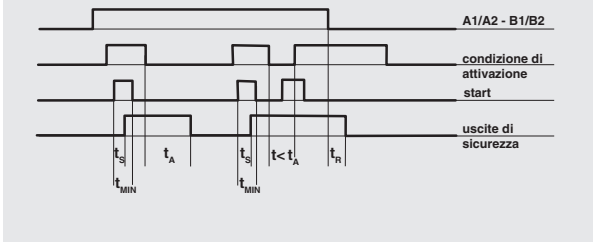


Function diagram

Configuration with automatic start

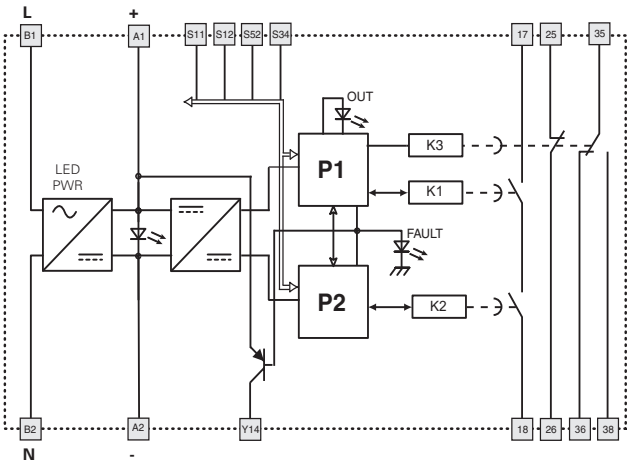


Configuration with manual start



Legend:
t_A: release time (see "Code structure")
t_R: release time in absence of power supply
t_S: response time
t_{MIN}: min. duration input signal

Internal block diagram

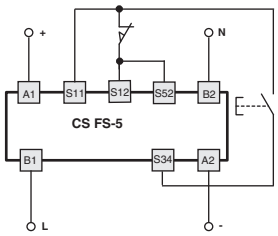


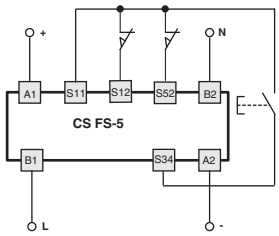
A1-A2: 24 Vdc
B1-B2: 120 Vac

Y14: auxiliary output, activated when the module enters fault state.

Input configuration

Movable guard monitoring	
Input configuration with manual start	
1 channel	2 channels

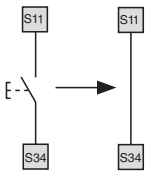




The diagram does not show the exact position of the terminals in the product

Automatic start

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



Monitoring of movable guards and magnetic safety sensors

The safety module can monitor control circuits for movable guards as well as magnetic safety sensors. To do this, the switch contacts must be replaced with sensors.
The sensors can only be used in 2-channel configuration.