Safety modules for motor standstill monitoring

Main features

- For safety applications up to SIL CL 2/PL d
- Select from 10 different residual voltages on motor standstill.
- Galvanic separation between control circuit and measurement circuit.
- 45 mm housing
- 2 NO safety contacts
  1 NC auxiliary contact
- 2 semiconductor outputs:
  - - 1 signalling output for failure state
  - - 1 signalling output for switching state of safety relays
- Possibility to connect single-phase or three-phase motors to measuring circuits.
- Supply voltages: 24 … 230 Vac/dc

Utilization categories

Alternating current: AC15 (50…60 Hz)

Ue (V)	230
Ie (A)	3

Direct current: DC13 (6 oper. cycles/min.)

Ue (V)	24
Ie (A)	4

Quality marks and certificates:

CE 0051 c(UL)us CCC EAC

EC type examination certificate : IMQ CS 487 DM
EAC approval: RU C-IT.АД35.В.00454
UL approval: E131787
CCC approval: 2013010305640211

Compliance with the requirements of:

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

Technical data

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

General data
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 349
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II
Weight:	< 0.3 kg

Supply
Rated supply voltage (U_n):	24 … 230 Vac/dc; 50…60 Hz
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±±15% of U_n
Power consumption AC:	< 6 VA
Power consumption DC:	< 2 W

Input circuit
Voltage between terminals L1-L2-L3:	0 … 690 Vac
Frequency:	0 … 3 kHz
Input impedance:	>1 MΩ
Started motor threshold voltage:	from 20 mV to 500 mV adjustable in 10 increments
Stopped motor threshold voltage:	half the motor threshold voltage with motor in operation
Maximum input impedance Y1-Y2:	< 20 Ω
Current in START Y1-Y2 circuit:	70 mA (typical)
RESET input voltage:	24 Vdc ± 20%
RESET input current:	10 mA (typical)

Control circuit
Response time t_A:	< 3 s
Release time t_{R1}:	< 200 ms
Release time in absence of power supply t_R:	< 3 s
Simultaneity time t_{C1}, t_{C2}:	3 s
Test:	Self-test upon activation of the supply voltage and after activation of the RESET input.
Test duration:	2.5 s (During the test, the voltage in the measurement circuits must be less than the threshold voltage of the motor while at a standstill)

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

Output circuit
Output contacts:	2 NO safety contacts, 1 NC auxiliary 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 (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
Semiconductor outputs:	PNP outputs galvanically separated, overvoltage and short-circuit protected
Switching voltage:	24 Vdc
Switching current:	50 mA
External supply voltage:	24 Vdc ±20%

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

Code structure

CS AM-01VE01-TC00UR1
article   *options*

Adjustment range for the threshold voltage of the motor while at a standstill	
01	from 20 to 500 mV, 53 mV step

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

Simultaneity time (t_c)	
	3s (standard)
TC00	infinite at standstill (t_c)
TA00	infinite on startup and standstill (t_c)
TD00	infinite on standstill and minimum activation time (t_A)

Threshold voltage for motor at standstill	
	20-500 mV (standard)
UR1	45-750 mV

Features approved by UL

Rated supply voltage (U_n): 24 … 230 Vac/dc;
                                                      50…60 Hz
Power consumption AC: < 9 VA
Power consumption DC: < 2 W
Motor input: up to 600 V
Output relay: C300 pilot duty

Notes:
- Suitable for use in environment with pollution degree 2
- Use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 30-12 AWG.
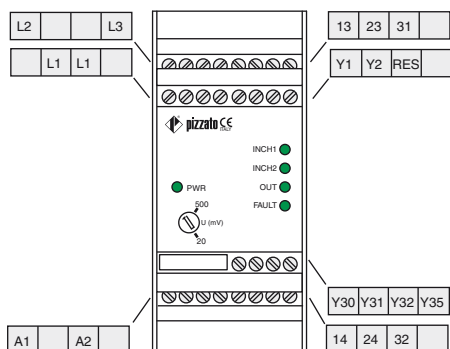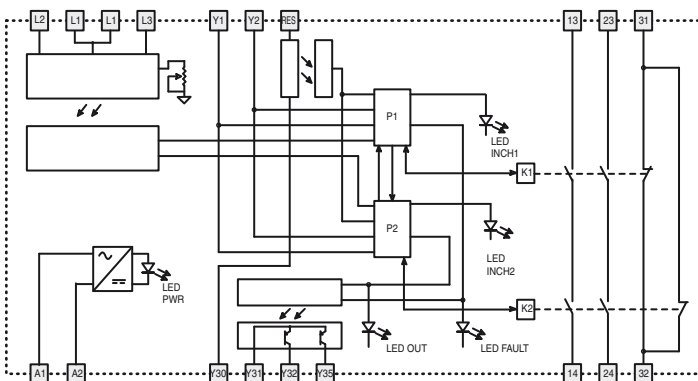- Tightening torque for terminal screws of 5-7 lb in.

Stock items
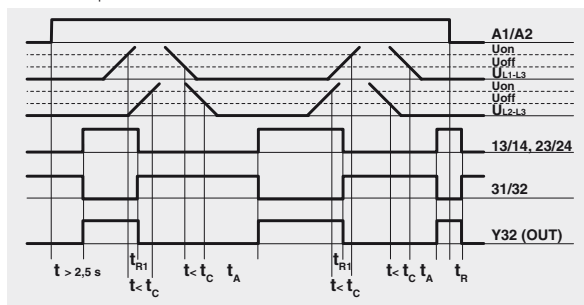
CS AM-01VE01

Safety module CS AM-0

Pin assignment

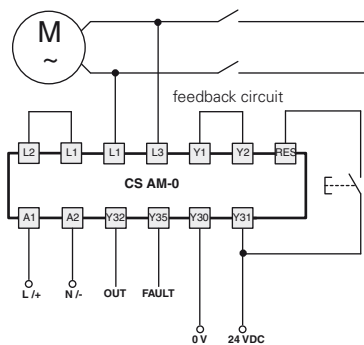### Internal block diagram

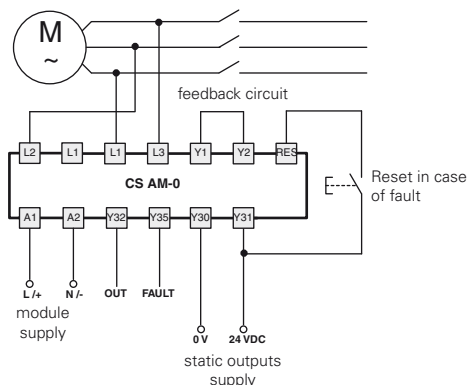### Function diagrams

Normal operation

Reset (RES) operation

Legend:
t_C: simultaneity time
t_A: response time
t_{R1}: release time
t_R: release time in absence of power supply

Input configuration

Single-phase motor	Three-phase motor

feedback circuit

CS AM-0

L /+   N /-   OUT   FAULT

0 V   24 VDC

feedback circuit

CS AM-0

Reset in case of fault

L /+   N /-   OUT   FAULT
module supply

0 V   24 VDC
static outputs supply

In case of star/delta starting, connect the module to the ends of a single winding

For dc motors connect + with L1 and - with L3.

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

Items with code on **green** background are stock items