



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)
 U_e (V) 230
 I_e (A) 3
 Direct current: DC13 (6 oper. cycles/min.)
 U_e (V) 24
 I_e (A) 4

Quality marks:



EC type examination certificate: IMQ CS 487 DM
 UL approval: E131787
 CCC approval: 2021000305000107
 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
 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 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 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 ... 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 V
 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 STARTY1-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_R: < 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 14118, EN ISO 12100, 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 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 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
 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 pages 355-364.

Code structure

article options
CS AM-01VE01-TC00UR1

Connection type	Simultaneity time (t _c)
V Screw terminals	3s (standard)
M Connector with screw terminals	TC00 infinite at standstill (t _c)
X Connector with spring terminals	TA00 infinite on startup and standstill(t _c)
	TD0 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
 Relay output:
 Electrical ratings: 230/240 Vac
 6 A general use
 C300 pilot duty
 Semiconductor output: 24 Vdc, 50 mA
 Motor input: up to 600 V

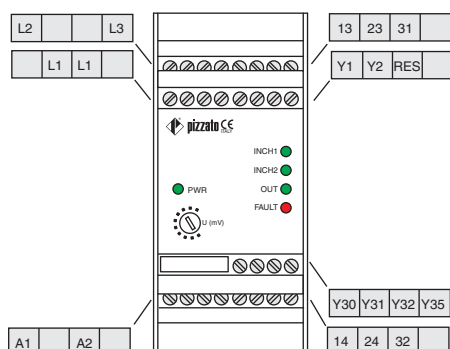
Notes:
 - For use in pollution degree 2 environment
 - Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
 - The terminal tightening torque of 5-7 lb in.

- Pour une utilisation dans un environnement de degré de pollution 2.
 - 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.

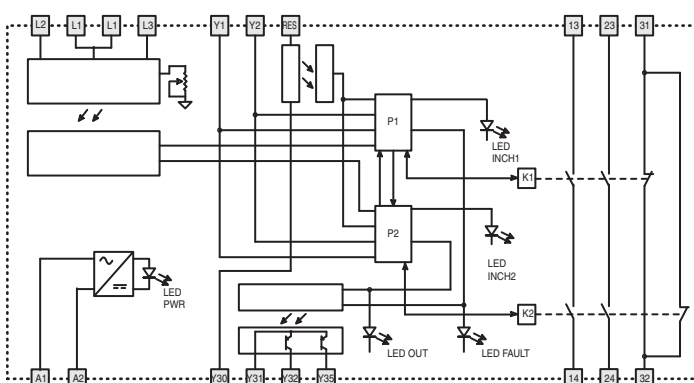


Safety module CS AM-0

Pin assignment

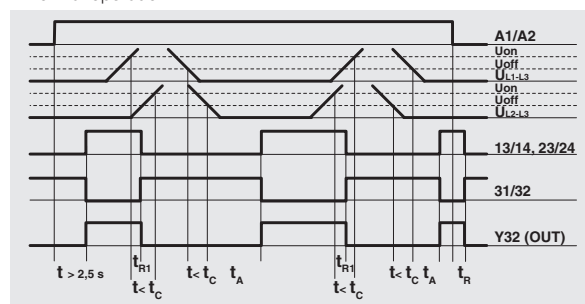


Internal wiring diagram

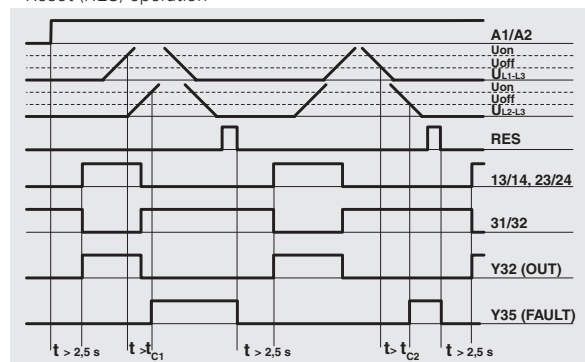


Function diagrams

Normal operation



Reset (RES) operation

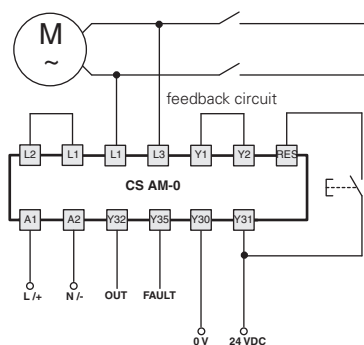


Legend:
 $t_{C1, C2}$: Simultaneity time
 t_A : response time

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

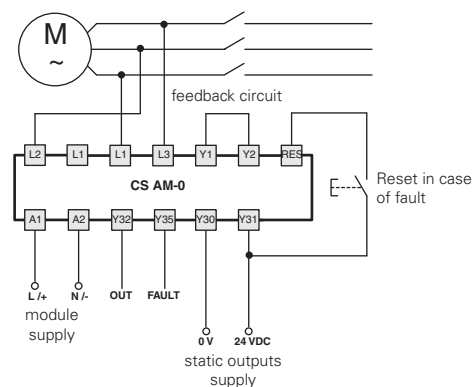
Input configuration

Single-phase motor



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.
For single-phase connections, connect the phase with L1 and the neutral with L3.
The diagram does not show the exact position of the terminals in the product

Three-phase motor



Application example on page 367.