3TK2810-0BA01 SAFE STANDSTILL MONITOR

Product information | Entries | Technical Data

SIRIUS SAFETY RELAY FOR SAFETY-ORIENTED STANDSTILL MONITORING, 24V DC, 45.0MM, SCREW TERMINAL, FK INSTANT.: 3NO 1NC, FK DELAYED: 0, MK: 3, AUTO START, BASIC UNIT, MAX. ACHIEV. CAT. EN954-1: 4, MAX. ACHIEV. SIL TO IEC61508:3,

General technical details:

Product designation	safety relays
Design of the product	for safe stoppage monitoring
Type of voltage	
• of the operating voltage	AC/DC
• of the controlled supply voltage	DC
Operating voltage	
• 1 / for AC / rated value	230 V
• 1 / for DC / rated value	24 V
Control supply voltage	
• at DC / rated value / minimum	24 V
• at DC / rated value / maximum	24 V
Number of outputs	
• as contact-less semiconductor switching element	
◦ fail-safe / non-delayed	0
◦ fail-safe / delayed switching	0
◦ for reporting function / non-delayed	2
◦ for reporting function / delayed switching	0
• as contact-affected switching element	
◦ fail-safe / non-delayed	4
◦ fail-safe / delayed switching	0
◦ for reporting function / non-delayed	2
◦ for reporting function / delayed switching	0
Breaking capacity current	
• at AC-15 / at 230 V	3 A
• at DC-13 / at 24 V	2 A

Ambient temperature	
• during the operating phase	-25 °C...60 °C
Mechanical design:	
Type of the safety-related wiring / of the inputs	measuring inputs
Design of the electrical connection	screw-type terminals
• Jumper socket	Yes
Design of the input	
• Start-up entrance	No
• Reducing-entrance	Yes
• Cascading-entrance/operation-even switching	No
Width	45 mm
Height	138.5 mm
Depth	120 mm
Product Function:	
Product function / Protective door monitoring	No
Product function / monitored start-up	No
Product function / Automatic start	No
Product function / Rotation speed monitoring	No
Product function / Standstill monitoring	Yes
Product function / Step mat monitoring	No
Product function / Emergency-OFF function	No
Product function / Pressing control	No
Product function / Light grid monitoring	No
Product function / Light barrier monitoring	No
Product function / Laser scanner monitoring	No
Product function / Magnetic switch monitoring Normally closed contact-Normally closed contact	No
Product function / Magnetic switch monitoring Normally closed contact-Normally open contact	No
Certificates/approvals:	
Safety Integrity Level / acc. to IEC 61508	3
Category / acc. to EN 954-1	4
Further information:	
Information- and Downloadcenter (Catalogs, Brochures,...) http://www.siemens.com/lowvoltage/catalogs	
A&D Mall (Online ordering system) http://www.siemens.com/lowvoltage/mall	
Service&Support (Manuals, Certificates, Characteristics, FAQs,...) http://support.automation.siemens.com/WW/view/en/3TK2810-0BA01/all	
last change:	11/10/2008

Standstill monitoring

AZR 31 S1

- Sensor-free detection of standstill by monitoring e.m.f.
- Direct connection to three-phase motors
- Suitable for connection to a frequency converter with the following interface data: rotary hysteresis 0 ... 1000 Hz; switching frequency of the end level up to 16 kHz; engine voltage range 0 ... 400 V
- 3 enabling paths, Stop 0
- 1 indication contact (NC)
- No reference value setting required
- Wire-breakage monitoring of measuring inputs
- Self-test with fault memory
- Cyclic self-testing
- 5 LEDs to show operating conditions
- Control Category 4 to EN 954-1
- Plug-in terminals

Technical data

Standards:	IEC/EN 60204-1, EN 954-1, BG-GS-ET-20
Control category:	4
Enclosure:	glass-fibre reinforced thermoplastic
Connection:	plug-in, screw terminals
Cable section:	max. 2.5 mm² solid or multi-strand lead (incl. conductor ferrules)
U_e:	24 VDC – 15 % / + 20 % 24 VAC ± 10 % 110 VAC ± 10 % 230 VAC ± 10 %
Frequency range:	50/60 Hz (on AC operational voltage)
I_e:	0.13 A (DC version)
Protection class:	terminals IP 20 enclosure IP 40 to EN 60529
Power consumption:	max. 3 W
Max. fuse rating:	Glass fuse F1, tripping current 315 mA (Ue 24 VAC/DC) tripping current 80 mA (Ue 110 VAC) tripping current 40 mA (Ue 230 VAC)
Monitored inputs	3-phase motor L1, L2, L3: 400 VAC
Feedback circuit:	yes
Utilisation category:	AC-15, DC-13
Enabling contacts:	3 enabling paths
Switching capacity:	enabling paths: 6 A/230 VAC, 6 A/24 VDC
Signalling output:	1 NC contact
Switching capacity:	Indicating contact: 2 A/24 VDC
Test cycle time:	8 seconds (2 seconds optionally)
Switch-off time:	< 15 ms (< 130 ms on supply failure)
Overvoltage category:	III to DIN VDE 0110
Degree of pollution:	2 to DIN VDE 0110
Ambient temperature:	0 °C ... + 55 °C
Storage and transport temperature:	– 25 °C ... + 70 °C
Function display:	5 LEDs
Weight:	400 g
Dimensions:	45 x 73.2 x 121 mm

Approvals

Ordering details

AZR 31 S1 ①

No.	Replace	Description
①	24VDC	24 VDC
	24VAC	24 VAC
	110VAC	110 VAC
	230VAC	230 VAC

Function table

Test cycle time: time between the standstill detection and enabling of the enabling paths

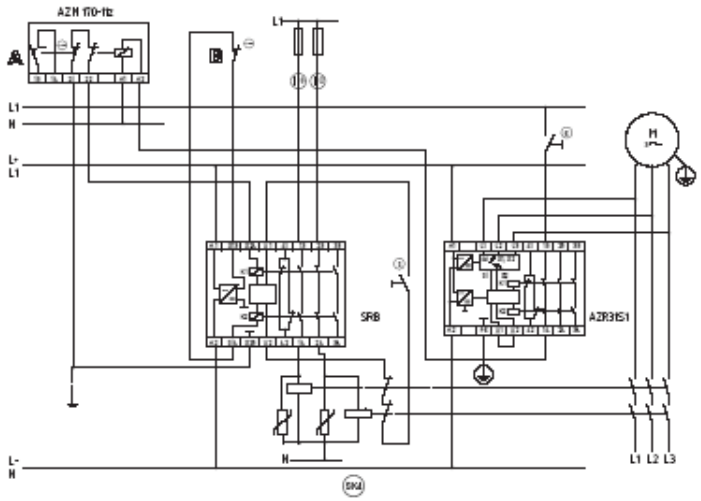
Pole pair/ Number of motors	Zero-axis crossing, per revolution	Standstill detection, device with 2 s test cycle time [h/min]	Standstill detection, device with 8 s test cycle time [h/min]
1	2	15.00	3.75
2	4	7.50	1.88
4	8	3.75	0.94
6	12	2.50	0.63
8	16	1.88	0.47

Standstill monitoring

Note

- The sensor-free standstill monitor checks the e.m.f. of the three phase motor.
- Monitors a guard door to Control Category 4 to EN 954-1
- The SRB range guard door monitor checks the position of the guard door. The function of the guard door monitor is described in chapter 5.
- Monitoring the guard door using a solenoid interlock and a safety switch with separate actuator (A and B).
- Release takes place by means of the NO contact only when the run-down movement has been terminated ⓔ.
- After release has taken place, the guard door must be opened.

Wiring diagram



LED

Function indication:
The integrated LEDs indicate the following operating states.

- Position relay K1/ K2, green (out)
- Input signal channel A, red (A)
- Input signal channel B, red (B)
- Error channel A and B, red (err)
- Supply voltage U_B, green (on)

Note

The wiring diagram is shown with guard doors closed and in de-energised condition.

This fail-safe standstill monitor has the particular advantage that no adjustment for a required-value is needed during comissioning.

Standstill monitoring

FWS 1205

- Detects standstill using 1 or 2 impulse sensors
- Control Category 3 to EN 954-1
- Operating voltage 24 VDC
- 2 enabling paths
- Reset input
- 2 short-circuit proof additional transistor outputs
- ISD Integral System Diagnostics
- 2 channel microprocessor controlled
- Customer-specific standstill frequencies possible

Technical data

Standards:	EN 60204-1, EN 954-1, BG-GS-ET-20
Control category:	3
Enclosure:	glass-fibre reinforced thermoplastic, ventilated
Mounting:	snaps onto standard DIN rail to EN 50022
Connection:	screw terminals
Cable section:	min. 0,2 mm^2 , max. 2.5 mm^2 solid or multi-strand lead (incl. conductor ferrules)
Protection class:	IP 20 to EN 60529
U_B:	24 VDC ± 15%
I_B:	0.2 A
Monitored inputs	2 channels, pulse generator p-type
Input resistance:	approx. 4 kΩ to ground
Input signal „1":	10 ... 30 VDC
Input signal „0":	0 ... 2 VDC
Max. cable length:	100 m of 0.75 mm^2 conductor
Standstill frequency:	version A: input X1/X2: 1 Hz/2 Hz; version B: input X1/X2: 2 Hz/2 Hz; version C: input X1/X2: 1 Hz/1 Hz
Hysteresis:	10 % of standstill frequency
Max. input frequency:	4000 Hz
Min. pulse duration:	125 µs
Enabling contacts:	2 enabling paths
Utilisation category:	AC-15, DC-13
I_e/U_e:	3 A / 230 VAC 2 A / 24 VDC
Contact load capacity:	max. 250 VAC, max. 6 A (cos φ = 1)
Max. fuse rating:	6 A gG D-fuse
Signalling output:	2 transistor outputs, 24 VDC, Y1 + Y2 = max. 100 mA, p-type, short-circuit proof
Function display:	LED (ISD)
EMC rating:	conforming to EMC Directive
Overvoltage category:	III to DIN VDE 0110
Degree of pollution:	2 to DIN VDE 0110
Resistance to vibration:	10 ... 55 Hz / amplitude 0.35 mm
Resistance to shock:	30 g / 11 ms
Ambient temperature:	0 °C ... + 55 °C
Storage and transport temperature:	– 25 °C ... + 70 °C
Dimensions:	22.5 x 100 x 121 mm
Note:	Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

Approvals

Ordering details

FWS 1205 ①

No.	Replace	Description
①		Standstill frequencies Inputs X1/X2:
	A	1 Hz/2 Hz
	B	2 Hz/2 Hz
	C	1 Hz/1 Hz

Function table

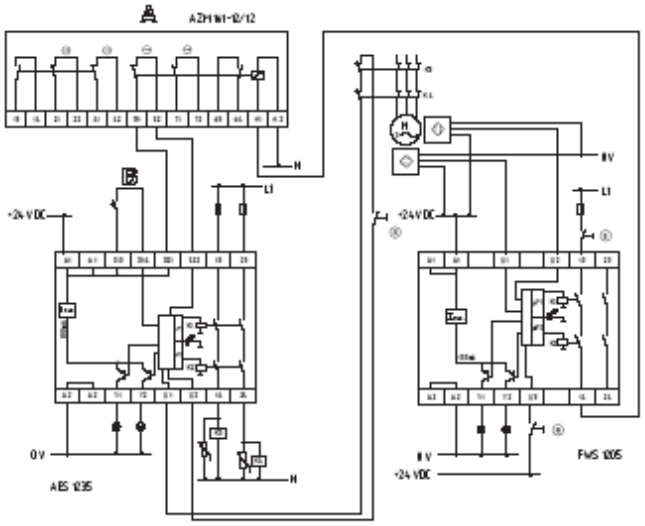
Additional transistor output:	Function:
Y1	Authorized operation, enabling paths closed
Y2	Fault, high signal

Standstill monitoring

Note

- FWS to monitor one guard door at plants with dangerous run-on movements up to control category 3 to EN 954-1
- Standstill monitoring for unlocking solenoid interlocks
- The solenoid interlock can be opened, when the standstill monitor has detected the end of the run-on movement by means of one or two inductive proximity switches. When the button Ⓢ is actuated, the solenoid of the olenoid interlock is energised.
- If only one inductive proximity switch is connected to the standstill monitor, the standstill frequencies must be identical and inputs X1 and X 2 must be bridged
- For suitable IFL range p-type inductive proximity switches, refer to „Schmersal Catalogue Automation technology".

Wiring diagram



ISD

The following faults are recognised by safety monitoring module and indicated by the ISD

- Interruption of the connections to the inductive proximity switches
- Failure of the proximity switches
- Failure of one channel being evaluated
- Failure of safety relay to pull-in or drop-out
- Faults on input or relay control circuits of the safety monitoring module

Note

The wiring diagram is shown with guard doors closed and in de-energised condition.

The ISD tables (Intergral System Diagnostics) for analysis of the fault indications and their causes are shown in the appendix.