

TM3SAK6R

SAFETY MODULE FOR PLC TM2xx, 3 FUNCTIONS, CAT4, SCREW TERMINALS



Main

Range of product	Modicon TM3 Safety
Product or component type	Safety module
Device short name	TM3SAK
Safety module application	For emergency stop, switch, sensing mat/edges or safety light curtain monitoring
Function of module	Emergency stop monitoring 1-channel wiring Emergency stop monitoring 2-channel wiring Monitoring of a movable guard Multiple emergency stop monitoring 2-channel wiring Sensing mat and edges monitoring Monitoring of electro-sensitive protection equipment (ESPE) PNP/PNP Proximity sensor monitoring PNP/PNP Monitoring of electro-sensitive protection equipment (ESPE) PNP/NPN Proximity sensor monitoring PNP/NPN Monitoring of a movable guard with 2 switches and automatic start
Safety level	Can reach PL e/category 4 EN/ISO 13849-1:2008 Can reach PL e/category 4 EN/ISO 13849-2:2012 Can reach SILCL 3 EN/IEC 62061:2005 Can reach SIL 3 EN/IEC 61508:2010

Complementary

Safety reliability data	DC = 95 % EN/ISO 13849-1 PFHd = 5E-9 1/h IEC 61508-1 1 operation/hour DC-13 24 V DC 4 A PFHd = 30E-9 1/h IEC 61508-1 60 operations/hour DC-13 24 V DC 1 A MTTFd = 500 years EN/ISO 13849-1 1 operation/hour DC-13 24 V DC 4 A MTTFd = 85 years EN/ISO 13849-1 60 operations/hour DC-13 24 V DC 1 A SFF = 95 % IEC 61508-1 HFT = 1 IEC 61508-1 Type = A IEC 61508-1
Synchronisation time between inputs	Unlimited 2 or 4 s depending of wiring configurable by software
Connections - terminals	Captive screw clamp terminals, removable terminal block 1 x 0.2...1 x 2.5 mm ² flexible without cable end 13-14, 23-24, 33-34 Captive screw clamp terminals, removable terminal block 1 x 0.2...1 x 2.5 mm ² solid without cable end 13-14, 23-24, 33-34 Captive screw clamp terminals, removable terminal block 1 x 0.25...1 x 2.5 mm ² flexible with cable end, with bezel 13-14, 23-24, 33-34 Captive screw clamp terminals, removable terminal block 1 x 0.25...1 x 2.5 mm ² flexible with cable end, without bezel 13-14, 23-24, 33-34 Captive screw clamp terminals, removable terminal block 2 x 0.2...2 x 1.5 mm ² flexible without cable end 13-14, 23-24, 33-34 Captive screw clamp terminals, removable terminal block 2 x 0.2...2 x 1.5 mm ² solid without cable end 13-14, 23-24, 33-34 Captive screw clamp terminals, removable terminal block 2 x 0.25...2 x 1 mm ² flexible with cable end, without bezel 13-14, 23-24, 33-34 Captive screw clamp terminals, removable terminal block 2 x 0.5...2 x 1.5 mm ² flexible with cable end, with double bezel 13-14, 23-24, 33-34 Captive screw clamp terminals, removable terminal block 1 x 0.14...1 x 1.5 mm ² flexible without cable end other terminals Captive screw clamp terminals, removable terminal block 1 x 0.14...1 x 1.5 mm ² solid without cable end other terminals Captive screw clamp terminals, removable terminal block 1 x 0.25...1 x 0.5 mm ² flexible with cable end, with bezel other terminals Captive screw clamp terminals, removable terminal block 1 x 0.25...1 x 1.5 mm ² flexible with cable end, without bezel other terminals Captive screw clamp terminals, removable terminal block 2 x 0.14...2 x 0.5 mm ² flexible without cable end other terminals

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Captive screw clamp terminals, removable terminal block 2 x 0.14...2 x 0.75 mm² solid without cable end other terminals
 Captive screw clamp terminals, removable terminal block 2 x 0.25...2 x 0.34 mm² flexible with cable end, without bezel other terminals
 Captive screw clamp terminals, removable terminal block 2 x 0.5 mm² flexible with cable end, with double bezel other terminals

Number of safety circuits	3 NO (relay instantaneous opening)
Output type	3 NO relay instantaneous opening potential free
Maximum switching voltage	230 V utilisation category AC-15 at 50 Hz (relay instantaneous opening) 24 V utilisation category DC-13 (relay instantaneous opening)
[Us] rated supply voltage	24 V DC - 15...20 %
Power consumption in W	0.2 W 5 V DC 3.6 W 24 V DC
Input protection type	Internal, electronic
Control circuit voltage	24 V DC
Cable length	<= 30 m
Breaking capacity	360 VA holding AC-15 B300 relay output 3600 VA inrush AC-15 B300 relay output
Breaking capacity	4 A 24 V 50 ms DC-13 relay output
Output thermal current	6 A per relay relay output
[Ith] conventional free air thermal current	18 A
Associated fuse rating	4 A gG or gL relay output EN/IEC 60947-5-1 6 A fast blow relay output EN/IEC 60947-5-1
Minimum output current	10 mA relay output
Output voltage	10 V relay output
Response time on input open	<= 40 ms
[Ui] rated insulation voltage	300 V 2 IEC 60647-5-1
[Uimp] rated impulse withstand voltage	4 kV III IEC 60647-5-1
Current consumption	100 mA 24 V DC external supply
Local signalling	8 LEDs green/red user
Electrical connection	Screw terminal
Product compatibility	Safety light curtains EN/IEC 61496-1 (type 4) Sensing mat/edges EN 1760-1
Standards	EN/ISO 13849-1:2008 EN/ISO 13849-2:2012 EN/IEC 62061:2005 EN/IEC 61508:2010 EN/IEC 60947-5-1:2010 EN/IEC 61131-2:2007 EN/IEC 60204-1:2005 EN/IEC 60204-1:2009/A1 IEC 61010-1:2010 EN 50581:2012
Product certifications	TÜV RCM EAC UL 61010-2-201 CSA 61010-2-201 (pending) ANSI Haz Loc Class 1 Division 2 (pending) CSA Haz Loc Class 1 Division 2 (pending)
Marking	CE CSA UL EFUP 10 REACH TÜV EAC RCM
Electromagnetic compatibility	Electrostatic discharge immunity test 8 kV air discharge conforming to EN/IEC 61000-4-2 Electrostatic discharge immunity test 6 kV contact discharge conforming to EN/IEC 61000-4-2 Susceptibility to electromagnetic fields 10 V/m 80 MHz to 1 GHz conforming to EN/IEC 61000-4-3 Susceptibility to electromagnetic fields 3 V/m 1.4 GHz...2 GHz conforming to EN/IEC 61000-4-3 Susceptibility to electromagnetic fields 1 V/m 2 GHz...3 GHz conforming to EN/IEC 61000-4-3

Magnetic field at power frequency 30 A/m 50...60 Hz conforming to EN/IEC 61000-4-8
 Electrical fast transient/burst immunity test 3 kV power lines (DC) conforming to EN/IEC 61000-4-4
 Electrical fast transient/burst immunity test 2 kV I/O conforming to EN/IEC 61000-4-4
 1.2/50 µs shock waves immunity test 1 kV power lines (DC) conforming to EN/IEC 61000-4-5
 Conducted RF disturbances 10 V 0.15...80 MHz conforming to EN/IEC 61000-4-6
 Radiated emission 40 dBµV/m class A 24 V conforming to EN 55011
 Radiated emission 47 dBµV/m class A 24 V conforming to EN 55011

Mounting support	Wall mount using attached fasteners Rail top hat type TH35-7.5 IEC 60715 Rail top hat type TH35-15 IEC 60715
Height	94 mm
Depth	73 mm
Width	43.7 mm
Product weight	0.19 kg

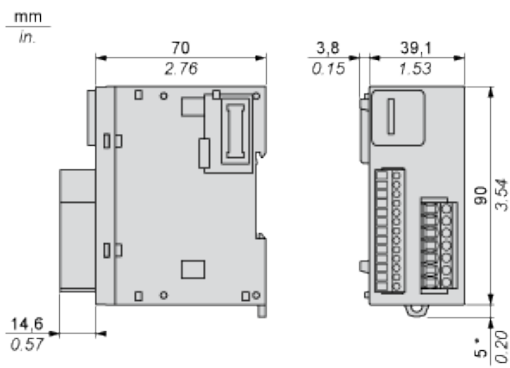
Environment

standards	EN 1088/ISO 14119 EN 60204-1 EN/IEC 60947-1 EN/IEC 60947-5-1 EN/ISO 13850
resistance to electrostatic discharge	8 kV in air EN/IEC 61000-4-2 6 kV on contact EN/IEC 61000-4-2
resistance to electromagnetic fields	10 V/m 80 MHz...1 GHz EN/IEC 61000-4-3 3 V/m 1.4 GHz...2 GHz EN/IEC 61000-4-3 1 V/m 2 GHz...3 GHz EN/IEC 61000-4-3
resistance to magnetic fields	30 A/m 50...60 Hz EN/IEC 61000-4-8
resistance to fast transients	3 kV power lines (DC) EN/IEC 61000-4-4 DC 2 kV I/O lines EN/IEC 61000-4-4
surge withstand	1 kV power lines (DC) differential mode EN/IEC 61000-4-5 DC 1 kV power lines (DC) common mode EN/IEC 61000-4-5 DC
resistance to conducted disturbances, induced by radio frequency fields	10 V 0.15...80 MHz EN/IEC 61000-4-6
electromagnetic emission	Radiated emissions 50 dBµV/m class A 24 V DC 30...230 Hz IEC 61131-3 Radiated emissions 57 dBµV/m class A 24 V DC 230...1000 Hz IEC 61131-3
ambient air temperature for operation	-10...55 °C horizontal installation
ambient air temperature for storage	-25...70 °C
relative humidity	10...95 % without condensation in operation 10...95 % without condensation in storage
IP degree of protection	IP20 EN/IEC 60529 terminals
pollution degree	2
operating altitude	0...2000 m
storage altitude	0...3000 m
vibration resistance	+/- 3.5 mm 5...150 Hz IEC 60068-2-6
shock resistance	15 gn 11 ms IEC 60068-2-27
mechanical robustness	Bumps 6 ms 300 shocks 25 gn IEC 60068-2-27

Offer Sustainability

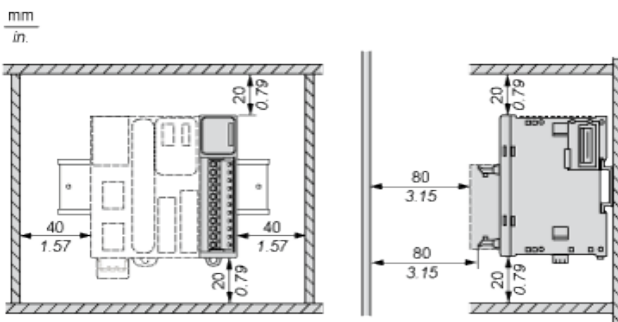
Sustainable offer status	Green Premium product
RoHS (date code: YYWW)	Compliant - since 1408 - Schneider Electric declaration of conformity
REACH	Reference not containing SVHC above the threshold
Product environmental profile	Available
Product end of life instructions	Available

Dimensions

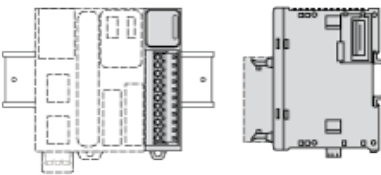


(*) 8.5 mm/0.33 in when the clamp is pulled out.

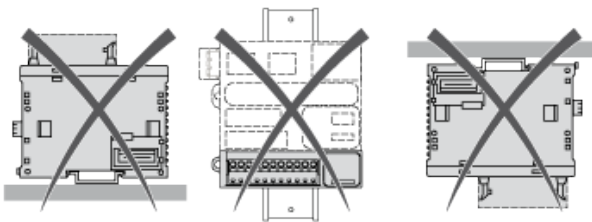
Spacing Requirements



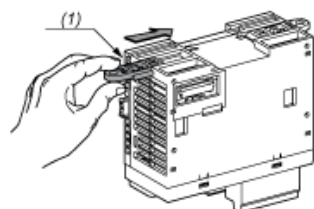
Mounting on a Rail



Incorrect Mounting

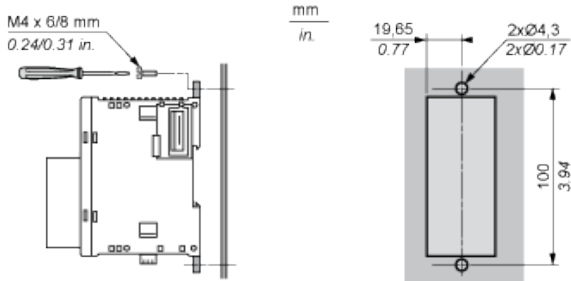


Mounting on a Panel Surface

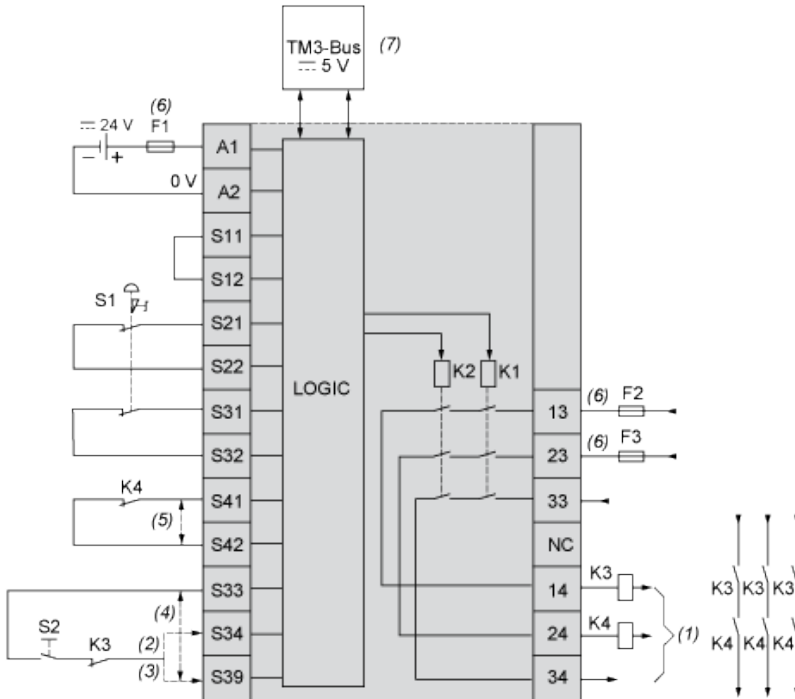


(1) Install a mounting strip

Mounting Hole Layout



Emergency Stop Wiring Diagram



S1 : Emergency stop switch

S2 : Start switch

(1) Safety outputs

(2) Monitored start

(3) Non-monitored start

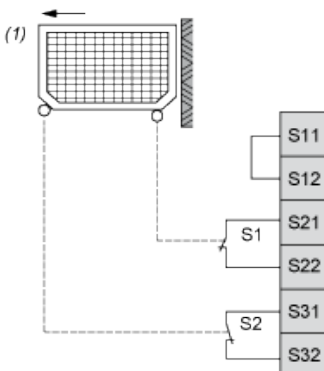
(4) For automatic start, directly connect [S33] and [S39] terminals

(5) Second external device monitoring channel. Connect [S41] and [S42] terminals if not used

(6) Fuses. Refer to technical specifications for fuse values

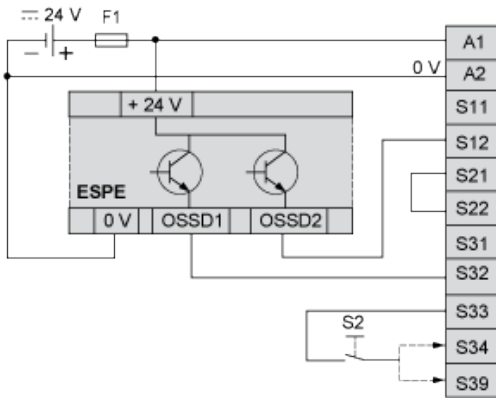
(7) Non-safety related TM3 Bus communication with logic controller

Protective Guard Wiring



(1) Protective guard

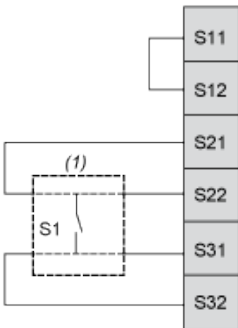
Electro-Sensitive Protective Equipment (ESPE) Wiring



S2: Start switch

NOTE: The ESPE must be supplied by the same PELV/SELV power supply as the safety module.

Safety-Mat Wiring

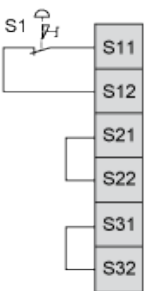


(1) Safety-mat

NOTE: Normally, most safety-mats are maladapted for use in combination with the automatic start mode. In addition, if you use the safety-mat in your application which includes the automatic startmode, you should consider this in your risk analysis.

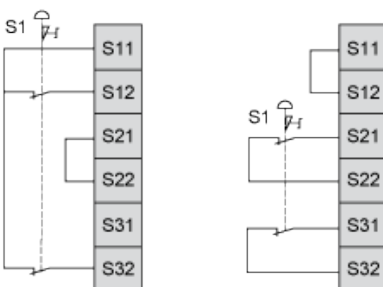
Emergency Stop Wiring

One Channel



S1: Emergency stop switch

Two Channel

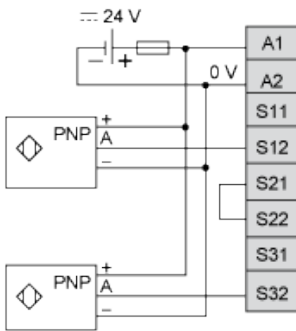


S1: Emergency stop switch

NOTE: Inputs S11 and S12 are not intended for the monitoring of short circuits in external wiring.

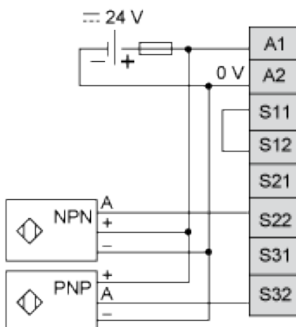
Proximity Sensors Wiring

Without Short Circuit Detection



NOTE: The sensors must be supplied by the same PELV/SELV power supply as the safety module.

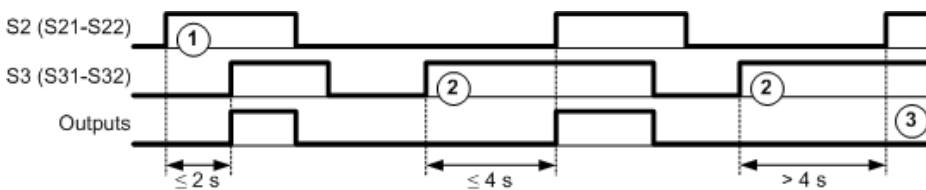
With Short Circuit Detection



NOTE: The sensors must be supplied by the same PELV/SELV power supply as the safety module.

Synchronization Time Monitoring Chronogram

2 Channel Application



- 1 : S2 operated before S3
- 2 : S3 operated before S2
- 3 : Outputs are not activated because the synchronization time is expired.