





Trusted TMR 24 Vdc Analog Input Module 40 Channel

PD-T8431 Issue 19

Apter Power

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Product Description Original Instructions

Product overview

The Trusted® TMR 24 Vdc Analog Input module interfaces to 40 sourcing field input devices, acting as a current sink for all these devices. Comprehensive diagnostic tests are performed on each input channel. Fault tolerance is achieved through a Triple Modular Redundant (TMR) architecture within the Module for each of the 40 input channels.

Using the built-in line-monitoring feature, the Module can detect open and shorted field cables. Line monitoring functions are independently configured for each input channel.

The Module provides onboard Sequence of Events (SOE) reporting with a resolution of 1 ms. A change of state triggers an SOE entry. States are determined by voltage thresholds that can be configured on a per channel basis. When the field voltage and field return are connected to the auxiliary input channels of the Module, thresholds can be specified as a ratio of the field supply voltage.

Features

- 40 Triple Modular Redundant (TMR) input channels per Module.
- Comprehensive, automatic diagnostics and self-test.
- Selectable line monitoring per channel to detect open circuit and short circuit field wiring faults.
- 2500V impulse withstand opto/galvanic isolation barrier.
- Onboard Sequence of Events (SOE) reporting with 1 ms resolution.
- Module can be hot-replaced online using dedicated Companion (adjacent) Slot or SmartSlot (one spare slot for many modules) configurations.
- Front panel input status Light Emitting Diodes (LEDs) for each channel indicate input status and field wiring faults.
- Front panel module status LEDs indicate module health and operational mode (Active, Standby, Educated).
- TÜV Certified IEC 61508 SIL 3.

Module pin-out connections

This table describes the module pin-out connections:

Table 2 Field Connector Pin-out

	C	B	A
1	SmartSlot Link C	SmartSlot Link B	SmartSlot Link A
2			
3	Chan 28 (+)	Chan 14 (+)	Chan 0 (+)
4	Chan 28 (+)	Chan 14 (+)	Chan 0 (+)
5	Chan 29 (+)	Chan 15 (+)	Chan 1 (+)
6	Chan 29 (+)	Chan 15 (+)	Chan 1 (+)
7	Chan 30 (+)	Chan 16 (+)	Chan 2 (+)
8	Chan 30 (+)	Chan 16 (+)	Chan 2 (+)
9	Return	Return	Return
10	Chan 31 (+)	Chan 17 (+)	Chan 3 (+)
11	Chan 31 (+)	Chan 17 (+)	Chan 3 (+)
12	Chan 32 (+)	Chan 18 (+)	Chan 4 (+)
13	Chan 32 (+)	Chan 18 (+)	Chan 4 (+)
14	Chan 33 (+)	Chan 19 (+)	Chan 5 (+)
15	Chan 33 (+)	Chan 19 (+)	Chan 5 (+)
16	Chan 34 (+)	Chan 20 (+)	Chan 6 (+)
17	Chan 34 (+)	Chan 20 (+)	Chan 6 (+)
18	Chan 35 (+)	Chan 21 (+)	Chan 7 (+)
19	Chan 35 (+)	Chan 21 (+)	Chan 7 (+)
20	Return	Return	Return
21	Chan 36 (+)	Chan 22 (+)	Chan 8 (+)
22	Chan 36 (+)	Chan 22 (+)	Chan 8 (+)
23	Chan 37 (+)	Chan 23 (+)	Chan 9 (+)
24	Chan 37 (+)	Chan 23 (+)	Chan 9 (+)
25	Chan 38 (+)	Chan 24 (+)	Chan 10 (+)
26	Chan 38 (+)	Chan 24 (+)	Chan 10 (+)
27	Chan 39 (+)	Chan 25 (+)	Chan 11 (+)
28	Chan 39 (+)	Chan 25 (+)	Chan 11 (+)
29	Chan 40 (+)	Chan 26 (+)	Chan 12 (+)
30	Chan 40 (+)	Chan 26 (+)	Chan 12 (+)
32	Chan 41 (+)	Chan 27 (+)	Chan 13 (+)
32	Chan 41 (+)	Chan 27 (+)	Chan 13 (+)

Trusted module polarization and keying

All Trusted modules have been Keyed to prevent insertion into the wrong position within a chassis. The polarization comprises two parts: the module and the associated field cable.

Each module type has been Keyed during manufacture. The organization responsible for the integration of the Trusted System must key the cable by

removing the keying pieces from the cable so that they correspond with the bungs fitted to the associated module before fitting.

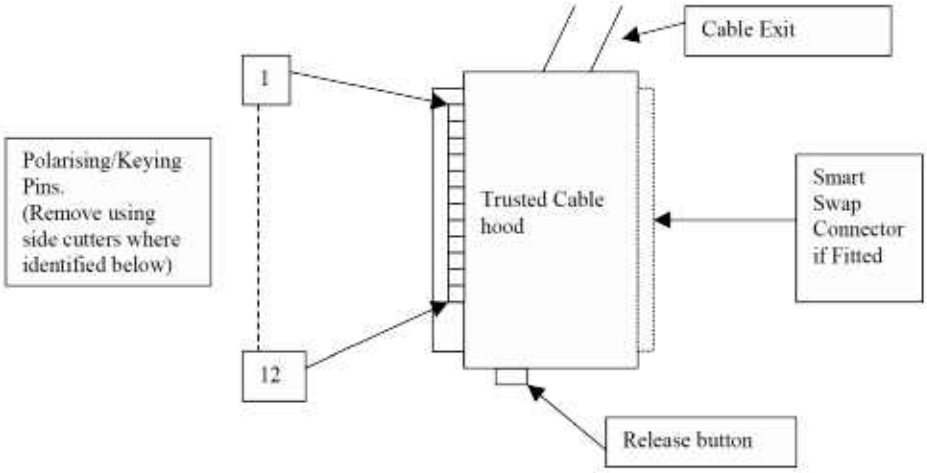


Figure 3: Module Polarization

For Cables with Companion Slot installations both keying strips must be polarized.

For this module (T8431) remove keying pins 1, 4, and 5.

Specifications

This table lists the module specifications:

Item	Description
Backplane (IMB) Supply	
Voltage	20 Vdc to 32 Vdc
Power	20 W
Field Supply	N/A
Maximum Power Dissipation	20 W
Module Location	T8100, T8300 I/O Module Slot
Isolation	
Field Common	50 V Reinforced (continuous)[1] 250 V Basic (fault)[2] [Type tested at 2436 Vdc for 60 s].
Channel to Channel	None
Fusing	None
Number of Inputs	40
Input	
Impedance (FTA)	250 Ohm
Impedance (module)[3]	16.967 K Ohm
Current	0 mA - 22 mA
Voltage	0 Vdc – 5.5 Vdc
Thresholds	Configurable
Resolution (LSB)	3.906 µA
Safety Accuracy	±200 µA
Calibration Accuracy[4]	±0.15 %
Intrinsic Safety	None - External barrier required
Sequence of Events	
Event Resolution (LSB)	1 ms
Time stamp Accuracy	±10 ms
Operating Temperature	0 °C to +60 °C (+32 °F to +140 °F)
Storage Temperature	-25 °C to +70 °C (-13 °F to +158 °F)
Relative Humidity – Operating and Storage	10% - 95%, noncondensing
Environmental Specifications	Refer to Trusted 8000 Series International Safety and Environmental Approvals, publication ICSTT-TD003
Dimensions	
Height	266 mm (10.5 in)

[1] 50 Vrms Secondary circuit derived from Mains, OVC II up to 300V.

[2] 250 Vrms Mains circuit, OVC II up to 300V. Exposure to voltages at these levels shall be temporally constrained consistent with the system MTTR.

[3] In the case where partner modules are fitted then the effective Module input impedance is halved.

[4] Refer to T8094 Trusted Safety Manual for guidance on calibration maintenance.

Item	Description
Width	31 mm (1.2 in)
Depth	303 mm (12.0 in)
Weight	1.149 kg (2.5 lb)