10101/2/1 Fail-safe digital input module (24 Vdc, 16 channels)

Description

The fail-safe digital input module 10101/2/1 has sixteen 24 Vdc digital input channels. The input stage of the module is of a 'fail-to-safe' nature. This means that a component failure results in a de-energized input signal to the processor, which is the safe condition in a normally energized system.

The remaining logic circuitry on the module is completely covered by the self-test functions of the system. Within the configured process safety time, the modules are tested for:

- ability to receive logic level '0' signals,
- ability to receive logic level '1' signals, and
- crosstalk between inputs.

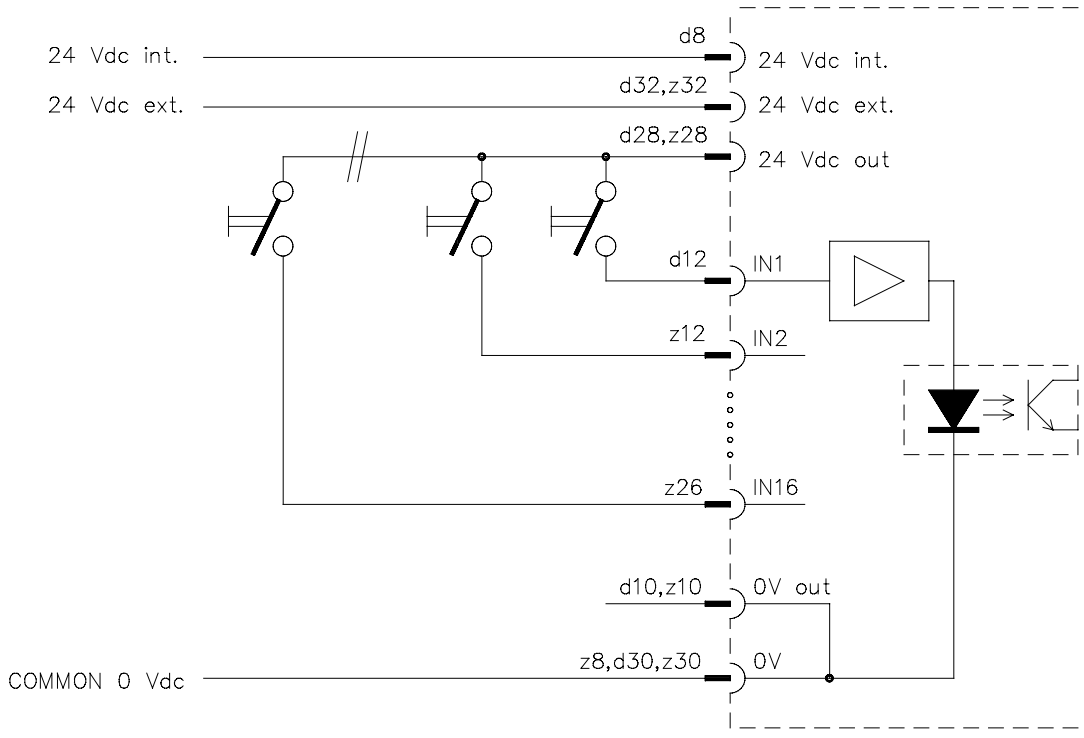
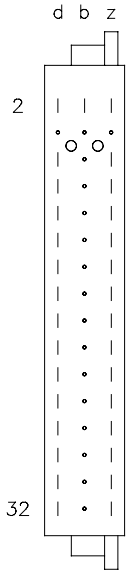


Figure 1 Schematic diagram for connection of inputs to the 10101/2/1 module

Pin allocation

The back view and pin allocation of the 10101/2/1 module connector are as follows:



d2		b2	GND	z2	5 Vdc
d4	–			z4	–
d6				z6	
d8	Supply 24 Vdc int.			z8	Supply 0 Vdc
d10	0 Vdc out			z10	0 Vdc out
d12	IN 1			z12	IN 2
d14	IN 3			z14	IN 4
d16	IN 5			z16	IN 6
d18	IN 7			z18	IN 8
d20	IN 9			z20	IN 10
d22	IN 11			z22	IN 12
d24	IN 13			z24	IN 14
d26	IN 15			z26	IN 16
d28	24 Vdc ext. out			z28	24 Vdc ext. out
d30	Supply 0 Vdc			z30	Supply 0 Vdc
d32	Supply 24 Vdc ext.			z32	Supply 24 Vdc ext.

Connection examples

The figures below show a number of connection examples for the fail-safe digital input module 10101/2/1.

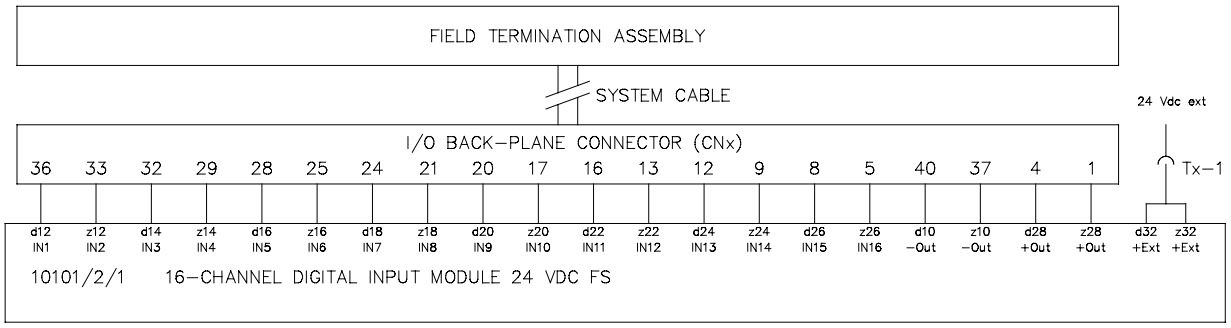


Figure 2 Connection example of 10101/2/1 module to FTA for both non-redundant and redundant I/O configurations

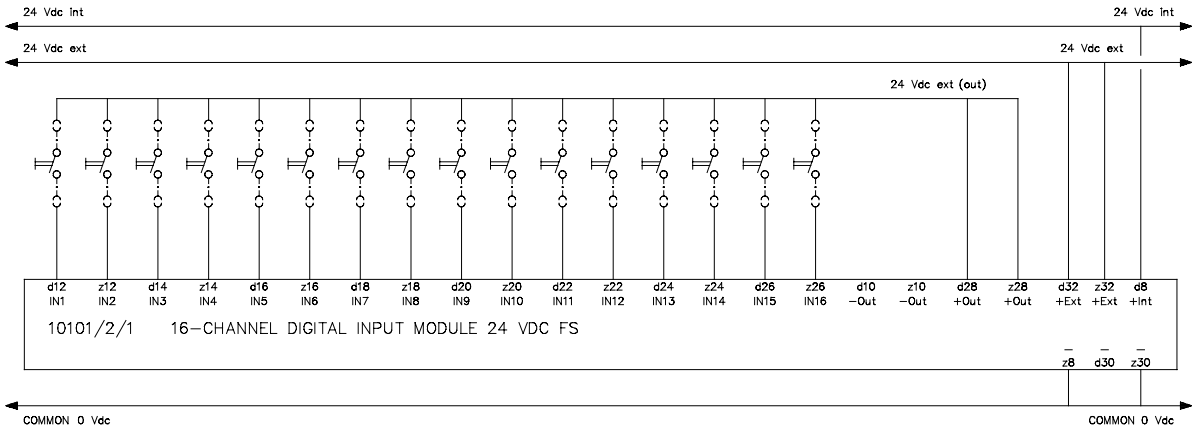
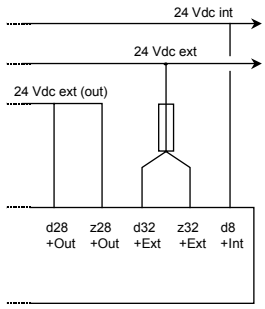


Figure 3 I/O connection example of 10101/2/1 module for non-redundant I/O configurations

Important!
If the external power pins (24 Vdc ext. out, connected to pins z28 and d28) are used without an FTA, a 500 mA fuse must be used to limit the combined field current (as shown on the right). If you use a fuse higher than 500 mA, the module may be damaged.



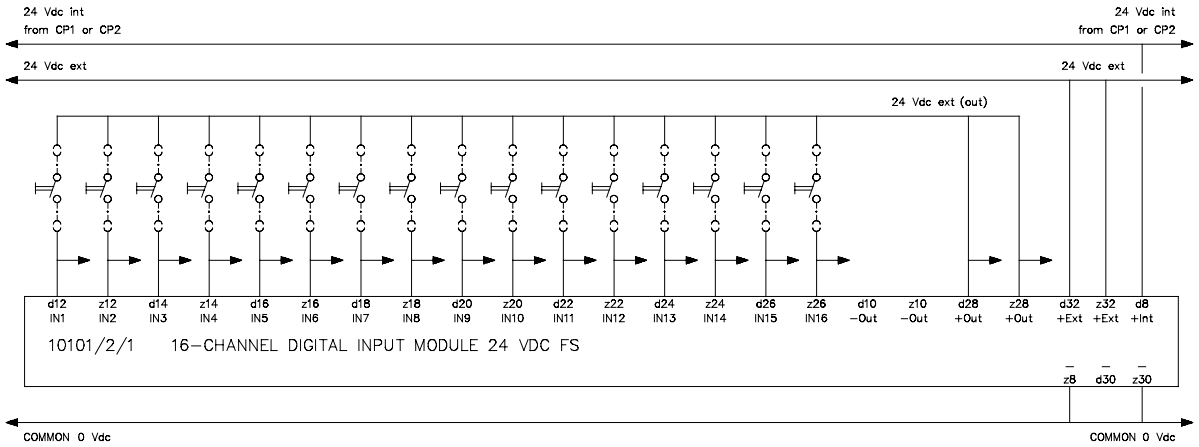
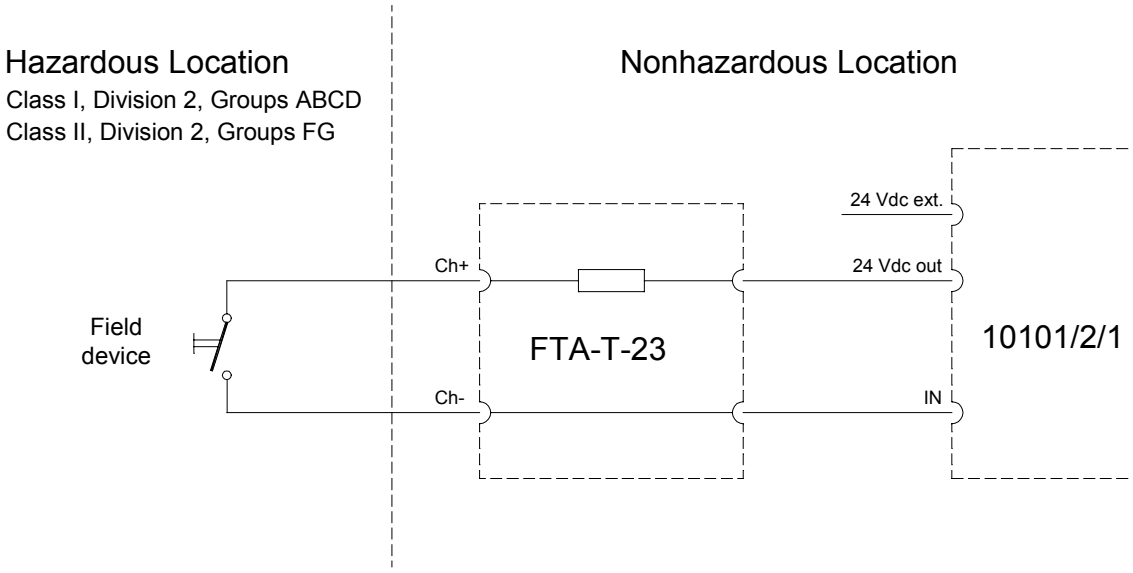


Figure 4 I/O connection example of 10101/2/1 module for redundant I/O configurations

Note:
The 24 Vdc (internal) supply must be connected to prevent fault detection during the self-test.

Hazardous locations (FM 3611)

To use the 10101/2/1 digital input module in nonhazardous areas for nonincendive field circuits to Division 2 locations in compliance with FM 3611 (Class I, Division 2, Groups ABCD; Class II, Division 2, Groups FG), the module must be connected to the field device via an FTA-T-23 as indicated in Figure 5. The 24 Vdc power-limited circuit is delivered via an external resistor on the FTA-T-23. The field devices, including field wiring, must adhere to the capacitance and inductance levels as given in Figure 5.



Non-Incendive Field Wiring Parameters:

Voc (V)	ISC (mA)	Gas Groups	Ca (µF)	La (mH)
31.2	100.0	A and B	0.24	6.96
		C	0.71	27.15
		D, F and G	1.89	54.92

Figure 5 Connection of input in hazardous locations

Considerations for FM approval

Please note the following constraints that are required for FM approval:

1. No revisions to drawings may be carried out without prior FMRC approval.
2. The Non-Incendive Field Wiring Parameter Concept allows interconnection of Non-Incendive Apparatus with Associated Non-Incendive Apparatus not specifically examined in combination as system when: Vmax ≥ Voc; Imax ≥ Isc; Ca ≥ Ci + Ccable; La ≥ Li + Lcable.
3. Modules must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01.

4. Control equipment connected to modules must not use or generate more than 250 Vrms or Vdc.
5. Installation should be in accordance with the National Electrical Code (ANSI/NFPA 70).
6. Non-Incendive Apparatus manufacturer's installation drawings must be followed when installing this equipment.
7. Non-Incendive Field Device must be FMRC Entity Approved or be simple apparatus (a device which will neither generate nor store more than 1.2 V, 0.1 A, 25 mW, or 20 µJ, ex. switches, thermocouples, LEDs and RTDs)

Technical data

The 10101/2/1 module has the following specifications:

General

Type number:	10101/2/1 11000
Approvals:	CE, TÜV, UL, FM*
Software versions:	≥ 3.00
Space requirements:	4 TE, 3 HE (= 4 HP, 3U)

Power

Power requirements:	5 Vdc 8 mA 24 Vdc int. 110 mA 24 Vdc ext. 110 mA (input currents)
Ripple content (on 5 Vdc):	< 0.5 Vp-p (0-360 Hz)

Input

Number of input channels:	16
Maximum input voltage:	36 Vdc
Input current:	7 mA at 24 Vdc
Input HIGH:	> 15 Vdc
Input LOW:	< 9 Vdc (I < 2 mA)
Input delay:	typically 10 ms

Key coding

(See 'Key coding' data sheet)

Module connector code:	
– holes	A5, C5
Rack connector code:	
– large pins	A5, C5

*** Note:**
For FM approval please note the considerations on page 6.