10102/2/1 Fail-safe analog input module (4 channels)

Description

The fail-safe analog input module 10102/2/1 has four 0-2 V analog input channels. The analog inputs have a common 0 V connection, but are galvanically isolated from the 24 Vdc and 5 Vdc.
The analog inputs can either be used actively (i.e. each input has a separate 26 Vdc, > 20 mA short-circuit protected output) or passively (i.e. the supply is directly connected to the transmitter).
The 10102/2/1 input stage has a high input impedance. It is therefore allowed to connect two 10102/2/1 modules in parallel. Each input requires an analog input converter module 10102/A/. (see the 10102/A/. data sheets).

Note:
As the inputs require a 10102/A/. converter module, the 10102/2/1 module can only be used in combination with an I/O backplane in the rack.

The analog input module scans the analog inputs, the 26 V output voltages, the internal supply voltages, and a reference voltage generated by a D/A converter. This D/A converter generates several reference voltages which are used to test the analog input module completely. The self-test includes a leakage test of the input filter as this could influence the accuracy of the analog input value.

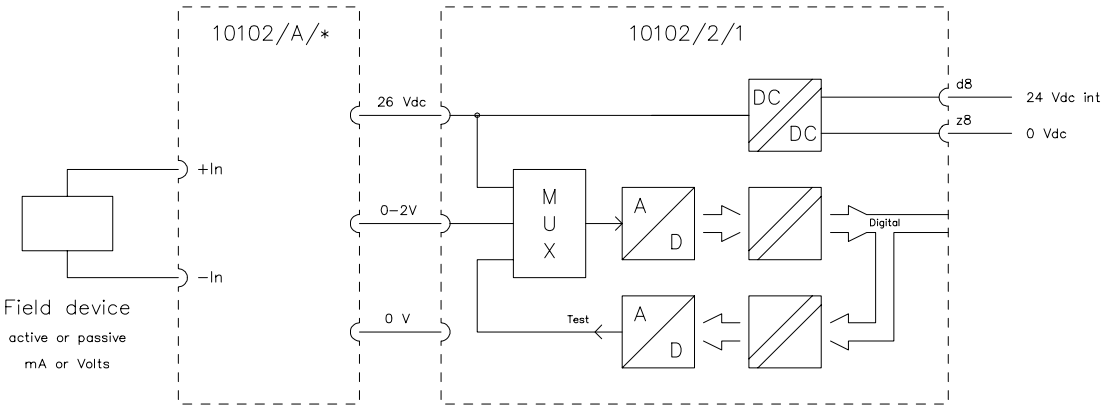


Figure 1 Schematic diagram for connection of inputs to the 10102/2/1 module

Within the configured process safety time, the analog inputs are tested for:

- absolute accuracy,
- correct conversion over full range,
- crosstalk between inputs, and
- output voltage of the 26 Vdc outputs.

The 26 Vdc outputs are generated by the DC/DC converter and stabilized at 26 Vdc. They are therefore independent of the voltage of the incoming 24 Vdc.

Note:
The maximum output current is at least 21 mA. If the transmitters require a higher supply current, the input channel must be used in passive mode (= external supply).

Analog input ranges for FSC

Table 1 provides an overview of the analog input ranges for the FSC system, and how the 10102/2/1 module can be used for each of these ranges.

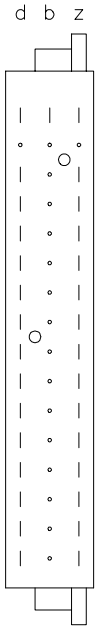
Table 1 Overview of analog inputs for FSC

0(4)-20 mA	Internal power	10102/2/1 + 10102/A/1
0(4)-20 mA	External power	10102/2/1 + 10102/A/2
0(1)-5 V	External power	10102/2/1 + 10102/A/3
0(2)-10 V	External power	10102/2/1 + 10102/A/4
Loop-monitored digital input		10102/2/1 + 10102/A/5

Other analog input signals such as thermocouple, PT-100, etc. can only be used after conversion to one of the analog input ranges that the FSC system can handle.

Pin allocation

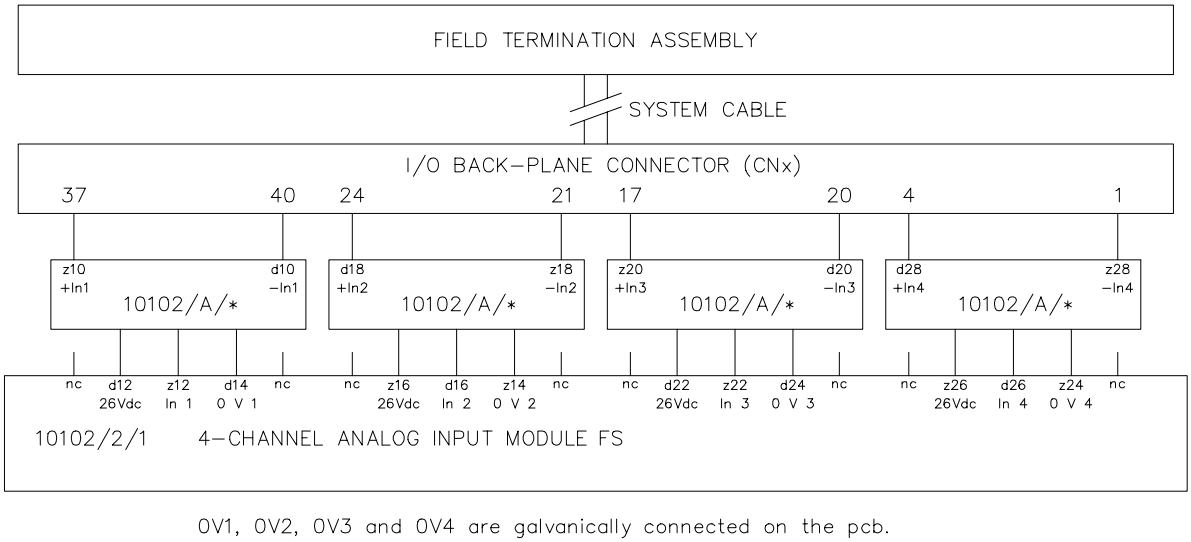
The back view and pin allocation of the 10102/2/1 module connector are as follows:



d2		b2	GND	z2	5 Vdc
d4	–			z4	–
d6				z6	
d8	Supply 24 Vdc int.			z8	Supply 0 Vdc
d10	(IN1–)			z10	(IN 1+)
d12	26 Vdc 1			z12	IN 1
d14	0 V 1			z14	0 V 2
d16	IN 2			z16	26 Vdc 2
d18	(IN 2+)			z18	(IN 2–)
d20	(IN 3–)			z20	(IN 3+)
d22	26 Vdc 3			z22	IN 3
d24	0 V 3			z24	0 V 4
d26	IN 4			z26	26 Vdc 4
d28	(IN 4+)			z28	(IN 4–)
d30				z30	
d32				z32	

Connection example

Figure 2 shows a connection example for the fail-safe analog input module 10102/2/1.



0V1, 0V2, 0V3 and 0V4 are galvanically connected on the pcb.

Figure 2 Connection example of 10102/2/1 module to FTA for both non-redundant and redundant I/O configurations

Calibration

The 10102/2/1 module has potentiometers for calibration purposes (P1, P2, P4, P5). The module can be calibrated using the calibration option of the 'View FSC system and process status' program, an external calibrator, an extender module and an extender flatcable.

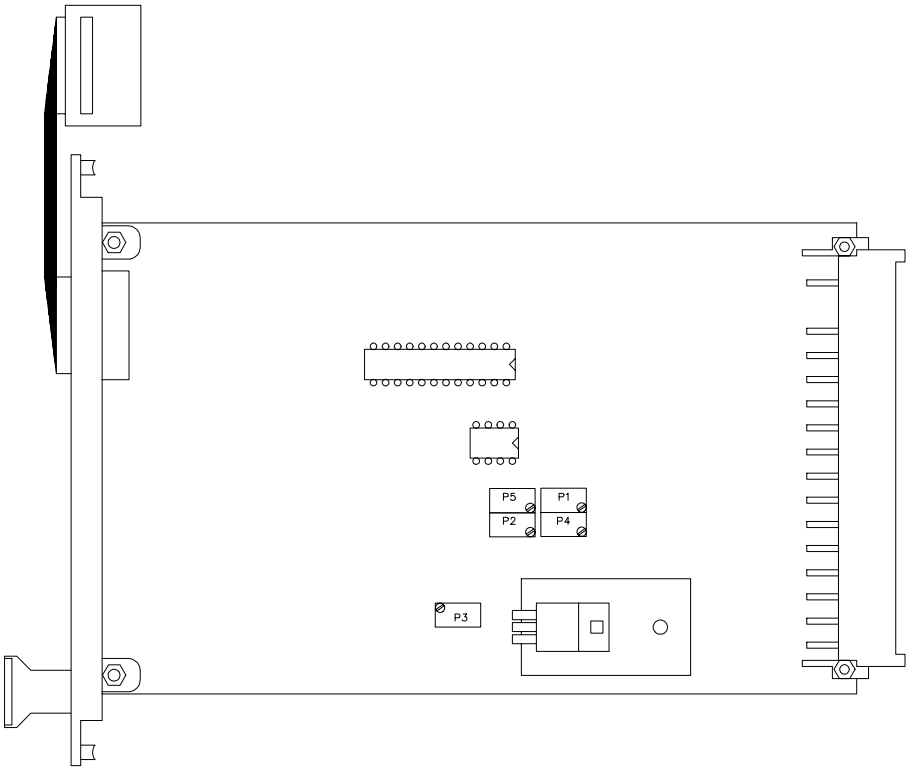


Figure 3 Location of potentiometers on 10102/2/1 module

Technical data

The 10102/2/1 module has the following specifications:

General

Type number:	10102/2/1 11301*
Approvals:	CE, TÜV, UL
Software versions:	≥ 3.00
Space requirements:	4 TE, 3 HE (= 4 HP, 3U)

Power

Power requirements:	5 Vdc 30 mA
	24 Vdc 175 mA + 25 mA for each active input

Technical data (continued)

Input	Number of input channels:	4
	Input specification (V):	0-2 Vdc
	Input resistance:	> 100 kOhm
	Loop powering:	26 Vdc (±1 V for 0.2 mA < I < 20 mA), short-circuit protected
	Loop current limit:	> 21 mA solid state
	A/D converter:	12-bit
	Inaccuracy:	≤ 0.75%
	Absolute max. input signal:	± 5 Vdc
Key coding	(See 'Key coding' data sheet)	
	Module connector code:	
	– holes	A5, C17
	Rack connector code:	
	– large pins	A5, C17

*** Notes:**
10102/2/1 modules with suffix code 11301 have improved EMC behavior.