TRION-2402-MULTI

DEWETRON

- Universal analog module
- Sampling: 24 bit, 200 kS/s per channel
- Input types: Voltage, bridge, resistance, RTD, IEPE®
- CAN: High-speed CAN2.0 port



Module specifications

TRION-2402-MULTI specifications		
Input channels	TRION-2402-MULTI-8-L0B	8 channels 0B LEMO connector (CH1 can be used as CAN port)
ADC – Resolution – Sampling rate		 24 bit 1 kS/s to 200 kS/s per channel
Input ranges – Voltage – IEPE® – Bridge – Resistance		 ±2 mV to ±100 V freely programmable ±100 mV to ±10 V freely programmable ±1 to 1000 mV/V 10 Ω, 30 Ω, 100 Ω, 300 Ω, 1 kΩ, 3 kΩ, 10 kΩ, 30 kΩ
Accuracy[1)] – Gain drift – Offset drift – Linearity		±0.02 % of reading ± 0.02 % of range ±20 µV Typical 10 ppm/°C max. 20 ppm/°C Typical 0.3 µV/°C+ 10 ppm of range/°C, max 2 µV/°C + 20 ppm of range/°C Typical ±0.01 %
Input impedance	0 to 10 V range	100 MΩ
	>10 to 100 V range	2 MΩ
Input bias current	<5 nA	
Input configuration	Single-ended or differential (programmable)	
Input coupling	DC / AC (high pass filter 0.16 Hz)	
Rated input voltage to earth according to EN 61010-2-30	33 V_{RMS}, 46.7 V_{PEAK}, 70 V_{DC}	
Isolation voltage (channel-to-channel and channel-to-chassis)	350 V_{DC}	
Common mode voltage to $GND_{isolated}$	0 to 10 V range	±10 V_{DC}
	>10 to 100 V range	±100 V_{DC}
Overvoltage protection	0 to 10 V range	±50 V_{DC} continuous, 100 V_{DC} (1 min)
	>10 to 100 V range	±200 V_{DC}

Tab. 27: Module specifications

TRION-2402-MULTI specifications	
Excitation voltage range	0 to 24 V_{DC} freely programmable; separately for each channel
– Resolution	1 mV
– 1 year accuracy	±0.03 % ±1.5 mV
– Drift	±10 ppm/°C ±50 µV/°C
– Current limit	0.1 to 5 V: 100 mA >5 V to 24 V: limited to 0.5 W
– Protection	Continuous short
– Load and line regulation error	±0.002 % with sense line connected
Excitation current	0.1 to 60 mADC (programmable, 16-bit DAC)
– Resolution	1 µA
– 1 year accuracy	0.1 to 5 mA: 0.05 % ±2 µA >5 to 60 mA: 2 % ±5 µA
– Drift	15 ppm/°C
– Compliance voltage	0.1 to 20 mA: 24 V >20 mA: 10 V
– Output impedance	>10 MΩ
Supported sensors	▸ 4-or 6-wire full bridge ▸ 3-or 5-wire ½ bridge with internal completion (software programmable) ▸ 3- or 4-wire ¼ bridge with internal resistor for 120 Ω and 350 Ω (software programmable) ▸ 4-wire full bridge with constant current excitation (piezoresistive bridge sensors) ▸ Potentiometer ▸ Resistance ▸ Resistance temperature detection: Pt100, Pt200, Pt300, Pt500, Pt1000, Pt2000 (2-, 3-, 4-wire) ▸ IEPE®
Bridge resistance	80 Ω to 10 kΩ @ ≤5 V_{DC} excitation
Shunt calibration	Two internal shunt resistors 50 kΩ and 100 kΩ
Shunt and completion resistor accuracy	0.05 % ±15 ppm/K
Automatic bridge balance	±400 % of range
Low pass filter (-3 dB, digital)	1 Hz to 40 % of sample rate freely programmable or OFF
– Characteristic	Bessel or Butterworth
– Filter order	2^{nd} , 4^{th}, 6^{th}, 8^{th}
– Filter setting AUTO	30 % of sample rate with 8th order Bessel
Analog anti-aliasing filter Sample rate > 10 kS/s	2^{nd} order Bessel, 250 kHz (-3 dB), 150 kHz (-1 dB)
ADC anti-aliasing filter	-3 dB @ Filter = OFF
– 1 kS/s ≤ fs ≤ 51.2 kS/s	0.494 fs
– 51.2 kS/s < fs ≤ 102.4 kS/s	0.49 fs
– 102.4 kS/s < fs ≤ 200 kS/s	0.38 fs
	fs = sample frequency

Tab. 27: Module specifications

TRION-2402-MULTI specifications																
Typical signal-to-noise ratio, spurious	10 mV range				100 mV range				1 V range				10 V range			
Free SNR, effective number of Bits[2]	SNR	SFDR[3]	ENOB[4]	Noise	SNR	SFDR[3]	ENOB[4]	Noise	SNR	SFDR[3]	ENOB[4]	Noise	SNR	SFDR[3]	ENOB[4]	Noise
Sample rate	[dB]	[dB]	[Bit]	[mV_{pp}]	[dB]	[dB]	[Bit]	[mV_{pp}]	[dB]	[dB]	[Bit]	[mV_{pp}]	[dB]	[dB]	[Bit]	[mV_{pp}]
1 kS/s	82	108	13.3	0.002	101	128	16.5	0.002	111	141	18.1	0.025	112	141	18.3	0.100
10 kS/s	82	108	13.3	0.005	101	123	16.5	0.005	106	134	17.3	0.030	112	140	18.3	0.120
100 kS/s	72	103	11.7	0.015	92	123	15.0	0.016	104	134	17.0	0.058	104	136	17.0	0.210
200 kS/s	69	99	11.2	0.022	88	120	14.3	0.025	88	133	14.3	0.230	96	135	15.7	0.950
200 kS/s; Filter = OFF	69	99	11.2	0.059	80	106	13.0	0.061	81	106	13.2	1.300	81	106	13.2	5.400
Typical THD	-100 dB															
Typcial crosstalk	-125 dB (10 V range; 0 to 1 kHz)															
Typical CMRR	110 dB @ 50 Hz, 90 dB @ 1 kHz, 80 dB @ 10 kHz															
Self test (self calibration)	Each channel is able to perform a complex self test by using internal high precision references															
Channel-to-channel phase mismatch	Typically <60 ns between channels using the same range															
CAN specification	CAN 2.0															
CAN physical layer	High-speed															
CAN termination	Programmable: high impedance or 120 Ω															
Bus fault pin protection	±36 V_{DC}															
Input connector	9-pin LEMO EPG.0B.309, 9-pin D-SUB connector															
REF connector	SMB															
Supported MSI	MSI-BR-TH-x, MSI-BR-CH-x, MSI2-TH-x, MSI2-CH-x, MSI2-LVDT															
Power consumption	Typ. 13 W, max. 23 W – Voltage mode, no excitation – IEPE® mode (4 mA / 8 mA) – Loop powered sensor (24 V, 20 mA) – 350 Ω full bridge (5 V / 10 V) – PT100, PT1000								10.5 W 13.5 W / 14.5 W 18 W 13 W / 16 W 13 W							

Tab. 27: Module specifications

1) 1 year accuracy 23 °C ±5 °C

2) LP Filter in auto mode

3) SFDR excluding harmonics

4) ENOB calculated from SNR

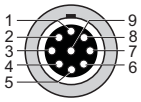
Connection



Mating connector



FGG.0B.309.CLADxx



9-pin LEMO connector female
EPG.0B.309.HLN

1: EXC+ (CAN power supply 12 V, CH1 only)
2: EXC-
3: IN+
4: IN-
5: SENSE+ (CAN high, CH1 only)
6: SENSE- (CAN low, CH1 only)
7: R+
8: TEDS
9: $GND_{isolated}$ (CAN GND, CH1 only)
Housing connected to chassis GND