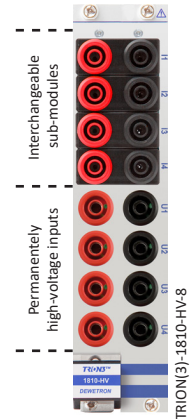


TRION3-1810-HV-8



- ▶ Isolated TRION(3) module for high-voltage inputs
- ▶ Channels: 4 to 8 voltage channels
 - 4 permanently installed high-voltage channels
 - 4 interchangeable sub-modules
- ▶ Sampling: Up to 1 MS/s
- ▶ Resolution: 24-bit
- ▶ Input types
 - Permanently installed channels: 1000 V
 - Interchangeable sub-modules: Different inputs for low-voltage, high-voltage or direct current measurement



Basic module with fixed high-voltage inputs

The following section provides detailed information on the fixed high-voltage inputs. The values given below were determined in a standardized test setting¹⁾.

General specifications

Fixed high-voltage inputs	
Input channels	Up to 8 (high) voltage channels with interchangeable inserts
Sampling rate	Up to 1 MS/s
Resolution	24-bit
Input range	1000 V ($\pm 2000 V_{PEAK}$) CF = 2
Accuracy ^{1)2) 3)}	
– DC	± 0.02 % of reading ± 0.02 % of range
– 0.5 Hz to 1 kHz	± 0.03 % of reading
– 1 kHz to 5 kHz	± 0.15 % of reading
– 5 kHz to 10 kHz	± 0.35 % of reading
– 10 kHz to 50 kHz	± 0.6 % of reading
– 50 kHz to 300 kHz	$\pm (0.02 \% * f)$ of reading f: frequency in kHz
Gain drift	20 ppm/°C
Offset drift	5 mV/°C
Typical THD	-95 dB
CMRR	>85 dB @ 50 Hz; >60 dB @ 1 kHz; >40 dB @ 100 kHz
Bandwidth	5 MHz
Rated input voltage to earth according to EN 61010-2-30	600 V CAT IV / 1000 V CAT III
Common mode voltage	1000 V _{RMS}
Isolation voltage	3750 V _{RMS} (1 min), 35 kV/ μ s transient immunity
Overvoltage protection	4250 V _{PEAK} or 3000 V _{RMS} (1 min)
Input resistance	5 M Ω ; 2 pF
Isolation (earth) resistance	100 G Ω ; 2.5 pF
Connector	Safety banana sockets

Tab. 45: Fixed high-voltage inputs

Fixed high-voltage inputs				
Sample rate	SNR	SFDR ⁴⁾	ENOB ⁵⁾	Noise _{pp}
	[dB]	[dB]	[Bit]	[mV]
0.1 kS/s	126	144	20.6	2.6
1 kS/s	123	140	20.1	4.5
10 kS/s	118	137	19.3	9.5
100 kS/s	110	134	18.0	27.2
1000 kS/s	100	134	16.3	92.5

Tab. 45: Fixed high-voltage inputs

- 1) The following accuracy conditions were applied: Temperature: 23 ± 5 °C; humidity: 40 to 60 % rel. humidity; input waveform: sine wave; common mode voltage: 0 V; line filter: Auto (8th or Butterworth); sample rate: 1 MS/s; resolution: 24-bit; power factor: 1; after warm-up; after zero level, accuracy: Frequency (f) in [kHz] (12-month accuracy ± reading error and range error)
- 2) Add 0.02 % of reading with filter settings OFF
- 3) Below 1 % of range, add 10 ppm of range.
- 4) SFDR excluding harmonics
- 5) ENOB calculated from SNR

Power specifications

Power specifications		
Active power accuracy with PF=1 ^{1) 3)} (f: frequency in kHz)	DC	±0.03 % of reading ±0.03% of range ²⁾
	0.5 Hz–1 kHz	±0.04 % of reading
	1 kHz–5 kHz	±0.2 % of reading
	5 kHz–10 kHz	±0.5 % of reading
	10 kHz–50 kHz	±(0.5 % + 0.05 % * f) of reading
Influence of power factor	Add 0.01 % * f/50 * v(1/PF ² -1) f: frequency in Hz	
Typ. channel-to-channel phase mismatch (Voltage-Voltage, Current-Current, Voltage-Current)	<250 ns (0.1° @ 1 kHz, 0.005° @ 50 Hz)	
Typical board-to-board phase mismatch	<250 ns (0.1° @ 1 kHz, 0.005° @ 50 Hz); same board type only	
Fundamental frequency		
– Range	0.1 Hz–200 kHz (>500 kS/s: >0.2 Hz)	
– Accuracy DEWE2	±0.01 % of reading ± 1 mHz	
– Accuracy DEWE3	±0.005 % of reading ± 1 mHz	
Low pass filter (-3 dB, digital and analog combined)	100 Hz to 300 kHz freely programmable or OFF	
– Filter order and characteristics	2 nd , 4 th , 6 th , 8 th Bessel or Butterworth	
Filter delay compensation	Up to 15 μs the group delay of the selected filter will be automatically compensated. This works for:	
	– 2 nd order filter 15 kHz to 300 kHz	
	– 4 th order filter 30 kHz to 300 kHz	
	– 6 th order filter 60 kHz to 300 kHz	
Onboard data buffer	512 MB	
Power consumption	Typ. 13 W, max. 15 W	
– With sensor supply	Max. 21 W	

Tab. 46: Power specifications

- 1) Voltage and current channel have a minimum input of 1 % range, otherwise individual uncertainty has to be calculated.
- 2) Add 0.03 % of range with no zero level.
- 3) When using the TRION-POWER-SUB-CUR-20A-1B sub-module: For self-generated heat caused by current input, add $1.5 \times 10^{-4} \times I^2 \%$ of reading and additionally for DC only add $10^{-4} \times I^2 \%$ of range to the active power accuracy. I is the current reading [A]. The influence from self-generated heat continues until the temperature of the shunt resistor inside the chassis lowers, even if the current input changes to a small value.