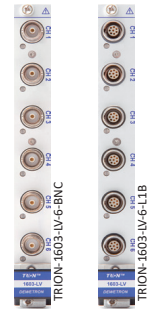


# TRION-1603-LV



- ▶ Isolated input module
- ▶ Sampling: 250 kS/s per channel at 16-bit;
- ▶ ADC: Low noise, SAR
- ▶ Voltage range:  $\pm 5$  mV to  $\pm 100$  V



## Module specifications

TRION-1603-LV specifications									
Input channels	TRION-1603-LV-6-BNC			6 channels BNC; voltage input					
	TRION-1603-LV-6-L1B			6 channels LEMO; voltage or current input; TEDS					
Sampling rate / resolution	100 S/s to 250 kS/s			16-bit					
Data transfer	16-bit								
ADC type	SAR (Successive Approximation Register)								
Data rate DMA transfer	6 analog channels: max. 3 MB/s								
Input ranges	<ul style="list-style-type: none"> <li>– Voltage: <math>\pm 5</math> mV, <math>\pm 10</math> mV, <math>\pm 20</math> mV, <math>\pm 50</math> mV, <math>\pm 100</math> mV, <math>\pm 200</math> mV, <math>\pm 500</math> mV, <math>\pm 1</math> V, <math>\pm 2</math> V, <math>\pm 5</math> V, <math>\pm 10</math> V, <math>\pm 20</math> V, <math>\pm 50</math> V, <math>\pm 100</math> V</li> <li>– Current<sup>1)</sup>: <math>\pm 10</math> mA, <math>\pm 20</math> mA, <math>\pm 50</math> mA, <math>\pm 100</math> mA</li> </ul>								
Accuracy <sup>2)</sup>	Voltage	DC to 1kHz		$\pm 0.02$ % of reading $\pm 0.02$ % of range $\pm 20$ $\mu$ V					
		>1 kHz to 5 kHz		$\pm 0.2$ % of reading $\pm 0.02$ % of range $\pm 20$ $\mu$ V					
		>5 kHz to 10 kHz		$\pm 1$ % of reading $\pm 0.02$ % of range $\pm 20$ $\mu$ V					
	Current <sup>1)</sup>	DC to 1kHz		$\pm 0.1$ % of reading $\pm 0.02$ % of range $\pm 10$ $\mu$ A					
		>1 kHz to 5 kHz		$\pm 0.2$ % of reading $\pm 0.02$ % of range $\pm 10$ $\mu$ A					
		>5 kHz to 10 kHz		$\pm 0.5$ % of reading $\pm 0.02$ % of range $\pm 10$ $\mu$ A					
MTBF <sup>3)</sup>	TRION-1603-LV-6-BNC: 292,916 h								
Input noise (5 mV range)	<ul style="list-style-type: none"> <li>– 0 to 10 Hz: <math>1.5 \mu\text{V}_{pp}</math></li> <li>– Noise density: <math>6.4 \text{ nV}/\sqrt{\text{Hz}}</math></li> </ul>								
Input impedance	1 M $\Omega$ shunted by 18 pF								
Input bias current	<1 nA								
Input coupling	DC								
Gain drift	Typical 10 ppm/ $^{\circ}$ C max. 20 ppm/ $^{\circ}$ C								
Offset drift	Typical 0.3 $\mu$ V/ $^{\circ}$ C + 10 ppm of range/ $^{\circ}$ C, max 15 $\mu$ V/ $^{\circ}$ C + 20 ppm of range/ $^{\circ}$ C								
Linearity	Typical 0.01 %								
Current input	Internal 10 $\Omega$ shunt; max. 100 mA protected with resettable fuse								
Typical signal-to-noise ratio, spurious	20 mV range			2 V range			100 V range		
	SNR	SFDR <sup>5)</sup>	ENOB <sup>6)</sup>	SNR	SFDR <sup>5)</sup>	ENOB <sup>6)</sup>	SNR	SFDR <sup>5)</sup>	ENOB <sup>6)</sup>
Free SNR, effective number of Bits <sup>4)</sup>	[dB]	[dB]	[Bit]	[dB]	[dB]	[Bit]	[dB]	[dB]	[Bit]
Sample rate	[dB]	[dB]	[Bit]	[dB]	[dB]	[Bit]	[dB]	[dB]	[Bit]

Tab. 16: Module specifications

TRION-1603-LV specifications									
1 kS/s	93	120	15.2	93	120	15.2	93	120	15.2
10 kS/s	90	120	14.7	93	120	15.2	93	120	15.2
100 kS/s	80	116	13.0	93	120	15.2	93	120	15.2
250 kS/s	74	100	12.0	93	120	15.2	93	120	15.2
Typical THD	-97 dB								
Typical CMR	<ul style="list-style-type: none"> <li>– ≤2 V range      140 dB @ 50 Hz    120 dB @ 1 kHz</li> <li>– &gt;2 V range      90 dB @ 50 Hz      60 dB @ 1 kHz</li> </ul>								
Low pass filter (-3 dB, digital)	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz								
– Characteristic	Bessel or Butterworth								
– Filter order	2 <sup>nd</sup> , 4 <sup>th</sup> , 6 <sup>th</sup> , 8 <sup>th</sup>								
Analog antialiasing filter	2 <sup>nd</sup> order Bessel, automatically selected								
Bandwidth (-3 dB, deactivated digital filter)	100 kHz 2 <sup>nd</sup> order Bessel filter								
Crosstalk fin 1 kHz [10 kHz]	≤2 V range: 120 dB [105 dB]								
Channel-to-channel phase mismatch	Typically <10 ns when using the same range; <60 ns for using different ranges								
Board-to-board phase mismatch	<30 ns								
Rated input voltage to earth according to EN 61010-2-30	33 V <sub>RMS</sub> , 46.7 V <sub>PEAK</sub> , 70 V <sub>DC</sub>								
Input configuration	Isolated								
– Isolation impedance	Isolation resistance >1 GΩ; Isolation capacitance typically 15 pF								
– Isolation voltage (channel-to-channel and channel-to-chassis)	1500 V <sub>PEAK</sub> with TRION-1603-LV-6-BNC 800 V <sub>PEAK</sub> with TRION-1603-LV-6-L1B								
Overvoltage protection	±300 V <sub>DC</sub>								
Voltage excitation <sup>1)</sup>	1 to 28 V @ 1 % ±1 mV accuracy freely programmable (max. 100 mA, max. 1 W) per channel								
ESD protection	IEC61000-4-2: ±8 kV air discharge, ±4 kV contact discharge								
Supported TEDS chips (LEMO only)	All common TEDS chips are supported.								
Power consumption	6 W w/o sensor supply <sup>1)</sup> ; absolute maximum with sensor supply <sup>1)</sup> : 13 W								

Tab. 16: Module specifications

- 1) TRION-1603-LV-6-L1B only
- 2) 1 year accuracy 23 °C ±5 °C
- 3) Mean time between failure

- 4) LP Filter in auto mode
- 5) SFDR excluding harmonics
- 6) ENOB calculated from SNR