

## M-SENS2

### 4-channel analog input module with sensor excitation

- Measurement modes: V, mA selectable for each input
- 4 sensor excitations (unipolar 15 V, up to  $\pm 60$  mA)
- TEDS Class-2 supported
- Measurement data output to CAN
- Galvanic isolation (inputs, CAN, supply, enclosure)
- Designed for engine compartment applications
- Toolless module to module connection
- Ruggedized and compact modules for harsh environments



<b>Device</b>	
Maximum input protection voltage (channel)	$\pm 100$ V (indefinitely), $\pm 200$ V (short-time, $t < 2$ ms)
Channel sampling rates	1/ 2/ 5/ 10/ 50/ 100/ 200/ 500/ 1000/ 2000 Hz
Oversampling	4 kHz
Aggregate sample rate	8 kHz
Voltage supply	6 ... 36 VDC
Supply voltage thresholds	Switch-on $6 \pm 0.3$ VDC / Switch-off $6 \pm 0.3$ VDC
Power consumption, typical	3.0 W (all excitations off)
Working temperature range	$-40 \dots 125$ °C ( $-40 \dots 257$ °F)
Storage temperature range	$-55 \dots 150$ °C ( $-67 \dots 302$ °F)
IP-Code	IP 67 (ISO 20653 - 2013)
Relative humidity	5 ... 95 %
Dimensions	W106 mm x H43 mm x D60 mm (4.17 in x 1.69 in x 2.36 in)
Weight	420 g (0.93 lb)
Configuration interface	CAN high speed
Data transfer rate	Software selectable up to 1 Mbit/s (ISO11898-2)
Input sockets	Lemo EGG 1B 306 (6-pin)
Input sockets	ODU series F, size 1 (5-pin)
<b>Galvanic isolation</b>	
Input module power supply	$\pm 100$ V (indefinitely), $\pm 500$ V (short-time, $t < 2$ ms)
Input CAN	$\pm 100$ V (indefinitely), $\pm 500$ V (short-time, $t < 2$ ms)
Input enclosure	$\pm 100$ V (indefinitely), $\pm 500$ V (short-time, $t < 2$ ms)
Input input	$\pm 100$ V (indefinitely), $\pm 500$ V (short-time, $t < 2$ ms)
Input excitation	$\pm 100$ V (indefinitely), $\pm 500$ V (short-time, $t < 2$ ms)
<b>General channel properties</b>	
A/D converter	16 bit / SAR (successive approximation register)
Special functions	Offset adjust, during measurement, multiple groups

Channel LED	No
TEDS	Class 2 (licensing option)
Channel impedance	10 M $\Omega$
Hardware filter (switchable)	500 Hz (M-SENS2/M-SENS2 DSP), Butterworth (8-pole)
Hardware filter (switchable)	250 Hz (M-SENS2 250Hz/M-SENS2 250 Hz DSP), Butterworth (8-pole)
Hardware filter (switchable)	Accuracy 10 %
Software filter types	Butterworth, Bessel, Elliptic (8-pole)
Software filter (DSP selectable)	6/ 7.5/ 9.96/ 15/ 30/ 39.96/ min
Software filter (DSP selectable)	1/ 1.25/ 1.67/ 2.5/ 5.0/ 6.67/ 10/ 12.5/ 16.67/ 25/ 50/ 66.7 Hz
Software filter (DSP selectable)	100/ 125/ 166.67/ 250 (M-SENS2 250Hz DSP)
Software filter (DSP selectable)	100/ 125/ 166.67/ 250 / 500 (M-SENS2 DSP)
Software filter (DSP selectable)	Accuracy 0.05 %
<b>Channel current</b>	
Measurement range current	0 ... 20 mA, $\pm 20$ mA
Accuracy at ambient temperature 25 °C	$\pm 0.30$ %
Internal shunt resistor	50 $\Omega$
<b>Excitation</b>	
Sensor excitation ranges	Unipolar 0.5/ 1.25/ 2.5/ 5/ 10/ 12/ 15V
Accuracy excitation at ambient temperature 25 °C	$\pm 0.20$ %
Accuracy excitation at ambient temperature 85 °C	$\pm 0.40$ %
Accuracy excitation at ambient temperature 120 °C	$\pm 0.60$ %
Sensor excitation current	60 mA, short-circuit proof (software controlled)
<b>Channel volt</b>	
Measurement range SENS	$\pm 0.1/ 0.2/ 0.5/ 1/ 2/ 5/ 10/ 20/ 30/ 50/ 100$ V
Accuracy at ambient temperature 25 °C	$\pm 0.13$ % (unipolar measurement ranges)
Accuracy at ambient temperature 25 °C	$\pm 0.05$ % (bipolar measurement ranges)
Drift for ambient temperature -40 ... 85 °C	$\pm 40$ ppm/K
Drift for ambient temperature 85 ... 105 °C	$\pm 80$ ppm/K
Drift for ambient temperature 105 ... 125 °C	$\pm 120$ ppm/K
<b>Accessories</b>	
System cable	620-561.pdf
System cable	620-502.pdf
System cable	620-560.pdf
System cable	620-567.pdf
System cable	620-509.pdf
System cable	M-CAN-ABS.pdf
System cable	M-DEF-200.pdf
Input cable	620-674.pdf
Input cable	600-807.pdf
Input cable	600-866.pdf

