

## M-SENS3 8

### Freely selectable voltage, current, and frequency measurement incl. sensor excitation for each channel

- Freely selectable operating mode for each input: voltage, current, frequency
- Toolless, magnetic connection
- TEDS class 2 support
- Channel and device status display in the software (e.g. sensor excitation/undervoltage monitoring)
- System connection without connection cable
- Measurement data output to CAN FD
- IP 67 and extended temperature range
- System status information (system, devices, channel)
- Highly compact and ruggedized
- Galvanic isolation (channel, CAN, supply, enclosure)
- Channel status LED for each input displaying the selected measurement mode
- Support for up to 8 non-linear calibration curves for sensor-specific linearisation
- Direct power calculation in the module



General channel properties	
AD converter	18 Bit (SAR)
Special functions	Selectable number of averaging values (1-100) Offset adjust, during measurement, multiple groups
Internal sampling rate	5 kHz
Channel sampling rates	2 / 5 / 10 min - 1 / 2 / 5 / 10 / 100 / 200 / 500 / 1000 / 5000 Hz
Total sampling rate	40 kHz
Hardware filter (switchable)	600 Hz 8. Order
Input resistance	10 MΩ
Software filter (DSP adjustable)	0.1 / 0.125 / 0.166 / 0.25 / 0.5 / 0.666 / 1 / 1.25 / 1.666 / 2.5 / 5 / 6.666 Hz 10 / 12.5 / 16.666 / 25 / 50 / 66.666 / 100 / 125 / 166.666 / 250 / 500 Hz Accuracy 0.05 %
Channel LED	Yes Displays the color of the selected measurement mode Channel-LED is activated for 10s after initialization in color of measurementmode In case of overcurrent of sensor supply
TEDS	Class 2
ENOB (Effective Number Of Bits)	
ENOB 3.6Vpp sinus, measurement range 4Vpp, at 125 Hz	16.05 bit, without filter (full bandwidth)

ENOB 3.6Vpp sinus, measurement range 4Vpp, at 400 Hz	17.87 bit, with hardware and software filter (500 Hz, Butterworth)
<b>THD (Total Harmonic Distortion)</b>	
THD 3.6Vpp sinus, measurement range 4Vpp, at 125 Hz	typ. 100 dB, without filter (full bandwidth)
THD 3.6Vpp sinus, measurement range 4Vpp, at 400 Hz	typ. 114 dB, with hardware and software filter (500 Hz, Butterworth)
<b>Channel volt</b>	
Measurement range	±0.01 / 0.02 / 0.05 / 0.1 / 0.2 / 0.5 / 1 / 2 / 5 / 10 / 25 / 100 V
Deviation at 23 °C	± 0.05 % (± 0.01 ...± 0.02 V) ± 0.025 % (± 0.05 ...2 V) ± 0.05 % (5 ...100 V)
Drift at ambient temperature -40...125°C	10 ppm/K 20 ppm/K (± 0.01 ...± 0.02 V)
<b>Channel frequency</b>	
Measurement range	0...200 Hz
Deviation	±1.1 % (0...50 Hz) ±2.2 % (50...100 Hz) ±4.25 % (100...190 Hz) By design
<b>Channel current</b>	
Measurement range	±20 mA
Deviation at 23 °C	±0.05 %
Temperature drift at -40 °C to 125 °C	10 ppm/K
Internal burden	50 Ω
<b>Excitation</b>	
Sensor supply voltage	Bipolar ±2.5 / ±5 / ±7.5 / ±10 / ±12 / ±15 V Unipolar 2.5 / 5 / 7.5 / 10 / 12 / 15 V (Derating of maximum current at 85°C)
Accuracy supply at ambient temperature 25°C	±0.25 % (at 15 V)
Drift at ambient temperature -40 ... 125 °C	10 ppm/K
Sensor supply Output current	35 ... 75 mA (depending on supply voltage combination)
<b>Galvanic isolation</b>	
Measurement input ↔ CAN	±100 V (indefinitely), ±500 V (pulse voltage)
Measurement input ↔ Housing	±100 V (indefinitely), ±500 V (pulse voltage)
Measurement input ↔ Measurement input	±100 V (indefinitely), ±500 V (pulse voltage)
Measurement input ↔ Sensor supply	±100 V (indefinitely), ±500 V (pulse voltage)
<b>Device</b>	
Inputs	8
Power supply	6 ... 59 VDC For On-board power supply of 12   24   48 V

Switching thresholds of the operating voltage	On 9 ±0.3 VDC / Off 6 ±0.3 VDC
Power consumption, typical	2.7 W
Operating temperature range	-40 ... 125 °C (-40 ... 257 °F)
Storage temperature range	-55 ... 150 °C (-67 ... 302 °F)
IP protection class	IP 67 (ISO 20653 - 2013)
Relative humidity	5 ... 95 %
Operating altitude (above sea level)	max. 5000m
Dimensions	L165 mm x B33 mm x H58 mm (L6.50 in x B1.30 in x H2.28 in)
Weight	500 g (1,10 lb)
Configuration interface	CAN FD (ISO 11898-2-2016)) 125kBit/s to 5MBit/s 64 data bytes Via CAN-FD or X-Link (tunneling) with IPEmotion PC, RT
Data rate	Software adjustable up to 5Mbit/s (ISO11898-2-2016)
Input sockets	001 - Lemo HGG 1B 307 (7-Pin) 002 - ODU Serie F,1 (5+1-Pin)
Status-LED	Yes Display of the operating status as well as warnings in case of undervoltage or expired calibration
<b>Accessories</b>	
Module	IPE-COV-M3-001 cover cap IPE-HWI-M3-001 mounting plate IPE-HWI-M3-002 mounting plate
System cable	623-500 M3-CAN/PWR cable, SubD9/S term, banana 623-502 M3-CAN/PWR cable, LOG term 623-503 M3-CAN/PWR cable 623-504 M3-CAN/PWR cable, M-CAN/PWR 623-506 M3-CAN cable, SUB-D/9S term 623-507 M3-CAN/PWR cable, banana 623-508 M3-CAN/PWR cable, CAN/PWR 0B-5p. 623-509 M3-CAN/PWR cable, X-LINK/PWR 623-510 M3-CAN/ cable, ETAS-CAN 1B-8p 623-511 M3-CAN cable, M-CAN/noPWR M-feed
Input cable	600-731 SENS LEMO 1B 7p cable banana 620-715 SENS LEMO 1B7p cable IPEshunt3 670-810 SENS LEMO 1B 7p TEDS Chip Kabel offen 670-811 SENS LEMO 1B 7p TEDS Kabel offen SENS8-TEDS SENS LEMO 1B 7p TEDS-chip plug  620-478 SENS LEMO 1B 7p Adapter ODU-F 5p 620-674 SENS LEMO 1B6p I-measure cable open 600-541 SENS ODU-F 5pol extension 620-713 SENS FIPS 5p. cable IPEshunt 3 670-867 ODU-F 5pol cable open