

## Mx-STG2 6

### 6 fast strain gauge measurement inputs up to 100 kHz

- 6 dual sensor excitations (up to  $\pm 5$  V)
- Offset adjust functions, shunt check
- Internal resistors for bridge completion selectable
- TEDS Class-2 supported
- Measurement data output via XCP on Ethernet or CAN
- Designed for engine compartment applications
- Toolless module to module connection
- Ruggedized and compact modules for harsh environments



| Measurement input DMS |   |
|-----------------------|---|
| Special functions     | Sensor breakage detection (activation via software setting)<br>Offset adjust, during measurement, multiple groups<br>Shuntcheck, also during measurement<br>Bridge adjustment<br>Shunt resistance simulation 5 ... 200 k $\Omega$<br>Resistance for bridge completion 120, 350, 1000 $\Omega$<br>Internal bridge completion |
| Special functions     | Bridge adjustment<br>Shunt check<br>Shunt resistance simulation 5 ... 200 k $\Omega$<br>Resistance for bridge completion 120, 350, 1000 $\Omega$<br>Internal bridge completion  |

|   |   |
|---|---|
| Accuracy at ambient temperature 25 °C             | ±0.075 % in measuring range ±0.005 / ±0.01 / ±0.02 V<br>±0.02 % in measuring range ±0.05 / ±0.1 / ±0.2 / ±0.5 V<br>±0.01 % in measuring range ±1 V                                  |
| Accuracy at ambient temperature -40 ... 105 °C    | ±0.3 % in measuring range ±0.005 / ±0.01 / ±0.02 V<br>±0.1 % in measuring range ±0.05 / ±0.1 / ±0.2 / ±0.5 V<br>±0.05 % in measuring range ±1 V                                     |
| <b>General channel properties</b>                 |   |
| AD converter                                      | 24 bit / SAR (successive approximation register)  |
| Oversampling                                      | 100 kHz   |
| Channel sampling rates                            | 10/ 20/ 50/ 100/ 200/ 500 ... 100 kHz<br>10/ 20/ 50/ 100/ 200/ 500/ 1000/ 2000 Hz (CAN up to 2 kHz)   |
| Aggregate sample rate                             | 600 kHz   |
| Hardware filter (switchable)                      | 12 kHz Cut-off frequency<br>Butterworth (8-pole)<br>Accuracy 10 %   |
| Hardware filter (fixed)                           | 46 kHz Cut-off frequency for measuring ranges (±0.05/ 0.1/ 0.2/ 0.5/ 1 V)<br>Typ RC 2-Pol<br>30 kHz Cut-off frequency for measuring ranges (±0.005 / 0.01 / 0.02 V)<br>Typ RC 3-Pol |
| Software filter types                             | Bessel<br>Butterworth<br>Elliptic (8-pole)  |
| Channel impedance                                 | 10 MΩ (differential), 5 MΩ (mass-related)   |
| Software filter (DSP selectable)                  | 10/ 12.5/ 16.67/ 25/ 50/ 66.67/ 100/ 125/ 166.67/ 250/ 500/ 667 Hz<br>1.0 / 1.25 / 1.67 / 2.5 / 5.0 / 6.67 / 10 / 12.5 / 16.67 / 25 / 33,34 kHz<br>Accuracy 0.00002 %               |
| Channel LED                                       | Yes   |
| Channel LED                                       | Yes<br>Sensor break detection<br>In case of overcurrent of sensor supply<br>Channel LED is flashing during configuration  |
| TEDS  | Class 2   |
| <b>ENOB (Effective Number Of Bits)</b>            |   |
| ENOB 1.8Vpp sine, measuring range 2Vpp, at 125 Hz | 16.9 bit, without filter (full bandwidth)<br>17.5 bit, with hardware and software filter (250 Hz, Butterworth)  |
| ENOB 1.8Vpp sine, measuring range 2Vpp, at 1 kHz  | 16.5 bit, without filter (full bandwidth)<br>21.3 bit, with hardware and software filter (1250 Hz, Butterworth)   |
| <b>THD (Total Harmonic Distortion)</b>            |   |
| THD 1.8Vpp sine, measuring range 2Vpp, at 125 Hz  | typ. 102 dB, without filter (full bandwidth)<br>typ. 106 dB, with hardware and software filter (250 Hz, Butterworth)  |
| THD 1.8Vpp sine, measuring range 2Vpp, at 1 kHz   | typ. 100 dB, without filter (full bandwidth)<br>typ. 129 dB, with hardware and software filter (1250 Hz, Butterworth)   |
| <b>Offset drift AAF (Anti Aliasing Filter) ON</b> |   |

|   |   |
|---|---|
| Offset drift AAF ON - Umgebungstemperatur -40 ... 85 °C   | Typ. $\pm 0.13 \mu\text{V}/^\circ\text{C}$ ( $\pm 0.005 \text{ V}$ measuring range)<br>Max. $\pm 0.40 \mu\text{V}/^\circ\text{C}$ ( $\pm 0.005 \text{ V}$ measuring range)<br>Typ. $\pm 0.13 \mu\text{V}/^\circ\text{C}$ ( $\pm 0.05 \text{ V}$ measuring range)<br>Max. $\pm 0.40 \mu\text{V}/^\circ\text{C}$ ( $\pm 0.05 \text{ V}$ measuring range)<br>Typ. $\pm 1.67 \mu\text{V}/^\circ\text{C}$ ( $\pm 1 \text{ V}$ measuring range)<br>Max. $\pm 5 \mu\text{V}/^\circ\text{C}$ ( $\pm 1 \text{ V}$ measuring range) |
| Offset drift AAF ON - Umgebungstemperatur 85 ... 105 °C   | Typ. $\pm 0.30 \mu\text{V}/^\circ\text{C}$ ( $\pm 0.005 \text{ V}$ measuring range)<br>Max. $\pm 0.90 \mu\text{V}/^\circ\text{C}$ ( $\pm 0.005 \text{ V}$ measuring range)<br>Typ. $\pm 0.27 \mu\text{V}/^\circ\text{C}$ ( $\pm 0.05 \text{ V}$ measuring range)<br>Max. $\pm 0.80 \mu\text{V}/^\circ\text{C}$ ( $\pm 0.05 \text{ V}$ measuring range)<br>Typ. $\pm 2.33 \mu\text{V}/^\circ\text{C}$ ( $\pm 1 \text{ V}$ measuring range)<br>Max. $\pm 7 \mu\text{V}/^\circ\text{C}$ ( $\pm 1 \text{ V}$ measuring range) |
| <b>Gain drift AAF ON</b>                                  |   |
| Gain drift AAF ON - Umgebungstemperatur -40 ... 105 °C    | Typ. $\pm 6.7 \text{ ppm}/^\circ\text{C}$ ( $\pm 0.005 \text{ V}$ measuring range)<br>Max. $\pm 20 \text{ ppm}/^\circ\text{C}$ ( $\pm 0.005 \text{ V}$ measuring range)<br>Typ. $\pm 6.7 \text{ ppm}/^\circ\text{C}$ ( $\pm 0.05 \text{ V}$ measuring range)<br>Max. $\pm 20 \text{ ppm}/^\circ\text{C}$ ( $\pm 0.05 \text{ V}$ measuring range)<br>Typ. $\pm 5 \text{ ppm}/^\circ\text{C}$ ( $\pm 1 \text{ V}$ measuring range)<br>Max. $\pm 15 \text{ ppm}/^\circ\text{C}$ ( $\pm 1 \text{ V}$ measuring range)         |
| <b>Excitation</b>   |   |
| Sensor excitation ranges                                  | Bipolar $\pm 0.5/ \pm 1.25/ \pm 2.5/ \pm 5 \text{ V}$   |
| Accuracy excitation at ambient temperature 25 °C          | 0.03 %  |
| Accuracy excitation at ambient temperature -40 ... 105 °C | 0.1 %   |
| Sensor excitation current                                 | 45 mA, short-circuit proof (software monitored)   |
| Sensor Anschluss  | 4-wire<br>6-wire  |
| <b>Galvanic isolation</b>                                 |   |
| Input ↔ module power supply                               | $\pm 100 \text{ V}$ (indefinitely), $\pm 500 \text{ V}$ (pulse voltage)   |
| Input ↔ CAN   | $\pm 100 \text{ V}$ (indefinitely), $\pm 500 \text{ V}$ (pulse voltage)   |
| Input ↔ enclosure   | $\pm 100 \text{ V}$ (indefinitely), $\pm 500 \text{ V}$ (pulse voltage)   |
| Input ↔ input   | $\pm 100 \text{ V}$ (indefinitely), $\pm 500 \text{ V}$ (pulse voltage)   |
| <b>Device</b>   |   |
| Inputs  | 6   |
| Maximum input protection voltage (channel)                | $\pm 100 \text{ V}$ (continuous), $\pm 200 \text{ V}$ (short-time, $t < 1 \text{ ms}$ )   |
| Voltage supply  | 9 ... 36 VDC  |
| Supply voltage thresholds                                 | On 9 $\pm 0.3 \text{ VDC}$ / Off 6 $\pm 0.3 \text{ VDC}$  |
| Power consumption, typical                                | 5.0 W (all excitations off)   |
| Working temperature range                                 | -40 ... 95 °C (-40 ... 203 °F) $\geq$ HW Revision 02.00<br>-40 ... 105 °C (-40 ... 221 °F) $<$ HW Revision 02.00  |
| Storage temperature range                                 | -55 ... 105 °C (-67 ... 221 °F)   |
| IP-Code   | IP 67 (ISO 20653 - 2013)  |

|                                      |  |
|--------------------------------------|--|
| Relative humidity                    | 5 ... 95 %   |
| Operating altitude (above sea level) | 55.000 Fuß / 16.764 m  |
| Dimensions                           | W212 mm x H60 mm x D35 mm (8.35 in x 2.36 in x 1.38 in)  |
| Weight                               | 700 g (1.54 lb)  |
| Configuration interface              | Ethernet   |
| Data transfer rate                   | 100 Mbit Ethernet (IEEE 802.3)   |
| Housing material                     | Aluminum, gold anodized  |
| Input sockets                        | Lemo EGG 2B 310 (10-pin) for TEDS  |
| Status LED                           | Yes  |
| <b>Accessories</b>                   |  |
| System cable                         | 630-500 X-Link system cable<br>630-501 X-Link cable PWR banana<br>630-502 X-Link cable RJ45 ETH<br>630-504 X-Link cable M-CAN<br>630-505 X-Link PWR cable X-Link-CAN/M-CAN<br>630-507 X-Link cable M-LOG PR08 ETH<br>630-524 X-Link system cable LOG X-Link<br>630-522 X-Link system cable PC RJ45 (galv)<br>630-528 X-Link cable, ETH RJ45/PWR banana/ for M3 integration<br>630-302 X-Link system cable ES ETH LEMO 1B8p<br>X-Link-DEF<br>X-Link-TERM<br>USB2ETH-XLINK |
| Input cable                          | 600-747 STG LEMO 2B10p. cable open<br>600-760 STG 2B 10p. TEDS cable open  |