HSI-STG — Isolated universal input module

- *Strain gauge, bridge sensors:* ±0.1 to ±1000 mV/V (@ 5 V_{DC} excitation)
- *Piezoresistive bridge:* ±0.5 to ±10000 mV/mA (@ 1 mA excitation)
- *Voltage input:* ±500 µV to ±10 V
- *RTD* Resistance Temperature Detector (Pt100 to Pt1000)
  9 resistance ranges (8 to 4000 Ω)
- *Resistance:* 25 mΩ to 100 kΩ
- *Isolation:* 350 V_{DC}
- *Signal connection:* 9-pin SUB-D socket

HSI-STG-D

Additional signal input using MSI

- *IEPE®* Constant current powered sensors (accelerometers, microphones); 12 ranges (±100 mV to 10 V); requires MSI-BR-ACC
- *THERMOCOUPLE* full range of TC type; requires MSI-BR-TH-x
- *CHARGE* Charge up to 50000 pC; requires MSI-BR-CH-50
- *VOLTAGE* up to ±200 V; requires MSI-BR-V-200

Module specifications

	HSI-STG
Gain	0.5 to 10 000; free programmable
Voltage input ranges Sensitivity @ 5 V_{DC} excitation	±0.5[3], ±1[3], ±2.5[3], ±5, ±10, ±25, ±50, ±100, ±250, ±500 mV, ±1 V, ±2V, ±5 V,±10 V[3] ±0.1[3], ±0.2[3], ±0.5[3], ±1, ±2, ±5, ±10, ±20, ±50, ±100, ±200, ±400, ±1000 mV/V
Resistance	25 mΩ to 100 kΩ
Input impedance	>100 MΩ (power off: 50 kΩ)
Input noise	7 nV * √Hz
Voltage input 1 year accuracy[1] Gain drift Offset drift linearity	±0.05 % of reading ± 0.02 % of range ±10 µV typical 10 ppm/°K max. 20 ppm/°K typical 0.3 µV/°K + 5 ppm of range/°K, max 2 µV/°K + 10 ppm of range typical 0.03 %
Input coupling	DC or AC (-3 dB @ 1 Hz); max. DC voltage when AC coupled: 35 V
Excitation voltage 1 year accuracy[1] Drift Current limit Protection	0, 0.25, 0.5, 1, 2.5, 5,10 and 12 V_{DC} software programmable (16 Bit DAC) ±0.03 % ±1 mV ±10 ppm/°K ±50 µV/°K 100 mA Continuous short to ground
Excitation current 1 year accuracy[1] Compliance voltage Output impedance	0.1, 0.2, 0.5, 1, 2, 5, 10 and 20 mA software programmable (16 Bit DAC) 0.1 mA to 5 mA: 0.05% ±0.5 µA typical 15 ppm/°C >5 mA to 60 mA: 0.3% ±20 µA typical 100 ppm/°C 12 V >1 MOhm
Supported sensors	4- or 6-wire full bridge 3- or 5-wire ½ bridge with internal completion (software programmable) 3- or 4-wire ¼ bridge with internal resistor for 120 and 350 Ohm (software programmable)[1] 4-wire full bridge with constant current excitation (piezoresistive bridge sensors) Potentiometric Resistance Resistance Temperature Detection with Software linearization: Pt100, Pt200, Pt500, Pt1000
Bridge resistance	80 Ω to 10 kΩ @ ≤ 5 V_{DC} excitation
Shunt calibration	Two internal shunt resistors 59.88 kOhm and 175 kOhm
Shunt and completion resistor accuracy	0.05 % ±15 ppm/°K
Automatic bridge balance	Input range 500 µV to 25 mV: ±400 % of Range >25 mV to 10 V : ±200% of Range, or limited by input range to maximum ±10 V
Bandwidth[2] (-3 dB)	5 mV to 5V input range: 2 MHz; 500 µV: 1 MHz; 1 mV: 1.5 MHz, 2.5 mV 1.9 Mhz, 10 V: 1 MHz
Filters (low pass)	100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz (±1.5 dB @ f_0)
Filter characteristics	100 Hz to 1 MHz: Butterworth or Bessel 40 dB/dec (2nd order; ±1.5 dB @ f_0) 2 MHz: Butterworth 60 dB/dec (3rd order; 0 to -3 dB @ 2 MHz)
Signal delay @ 2 MHz bandwidth	450 nsec

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Rise time @ 2 MHz bandwidth	≥ 200 nsec							
Typical THD	95 dB, 1 KHz input signal at 1 V range							
Typical SFDR and SNR	1 kHz bandwidth		10 kHz bandwidth		100 kHz bandwidth		1 MHz bandwidth	
	SFDR	SNR	SFDR	SNR	SFDR	SNR	SFDR	SNR
1 mV	80 dB	66 dB	80 dB	62 dB	80 dB	55 dB	47 dB	46 dB
100 mV	100 dB	82 dB	90 dB	78 dB	90 dB	71 dB	66 dB	60 dB
1000 mV	110 dB	100 dB	110 dB	97 dB	106 dB	91 dB	87 dB	79 dB
Typical CMRR	0.5mV to 1V range		2V to 10V range					
50Hz	160 dB		160 dB					
1kHz	126 dB		105 dB					
10kHz	104 dB		87 dB					
100kHz	87 dB		71 dB					
Isolation	±350 V_{DC} continuous (for input, excitation and TEDS interface)							
Common mode voltage	±350 V_{DC} input to housing							
Over voltage protection	±30 V_{DC} input (+) to input (-)							
ESD protection	IEC61000-4-2: ±8 kV air discharge, ±4 kV contact discharge							
Output voltage	±5 V							
Output resistance	10 Ω							
Output current	Max. 5 mA							
Output protection	Short to ground for 10 seconds							
RS-485 interface	Yes							
Special function	Integrated temperature sensor							
Supported TEDS chips	DS2406, DS2430A, DS2431, DS2432, DS2433							
MSI support	MSI-BR-TH-x, MSI-BR-ACC, MSI-BR-V-200, MSI-BR-CH-50							
Power supply voltage	±9 V_{DC} (±1 %)							
Power consumption	Typ. 1.5 W @ 350 Ohm, 2 W @ 120 Ohm (both full bridge @ 5 V_{DC} excitation) Max. 3 W (depending on sensor); overall current should not exceed DEWE-30-xx maximum power.							

[1] Conditions fo accuracy: module temperature is calibration temperature ±5 °C; humidity is 30 % to 90 % relative humidity.

[2] Please consider possible bandwidth limitation of further components in the measuring chain e.g. A/D card or signal conditioning mainframe.

[3] This range has limited full power bandwidth.

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