

HSI-STG

- **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 μ V to ± 10 V
- **RTD** Resistance Temperature Detector (Pt100 to Pt1000)
9 resistance ranges (8 to 4000 Ω)
- **Resistance:** 25 m Ω to 100 k Ω
- **Isolation:** 350 V_{DC}
- **Signal connection:** 9-pin SUB-D socket

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	$\pm 0.5^{(3)}$, $\pm 1^{(3)}$, $\pm 2.5^{(3)}$, ± 5 , ± 10 , ± 25 , ± 50 , ± 100 , ± 250 , ± 500 mV, ± 1 V, ± 2 V, ± 5 V, ± 10 V ⁽³⁾
Sensitivity @ 5 V _{DC} excitation	$\pm 0.1^{(3)}$, $\pm 0.2^{(3)}$, $\pm 0.5^{(3)}$, ± 1 , ± 2 , ± 5 , ± 10 , ± 20 , ± 50 , ± 100 , ± 200 , ± 400 , ± 1000 mV/V
Resistance	25 m Ω to 100 k Ω
Input impedance	>100 M Ω (power off: 50 k Ω)
Input noise	7 nV * $\sqrt{\text{Hz}}$
Voltage input 1 year accuracy ⁽¹⁾	± 0.05 % of reading ± 0.02 % of range ± 10 μ V
Gain drift	typical 10 ppm/ $^{\circ}$ K max. 20 ppm/ $^{\circ}$ K
Offset drift	typical 0.3 μ V/ $^{\circ}$ K + 5 ppm of range/ $^{\circ}$ K, max 2 μ V/ $^{\circ}$ K + 10 ppm of range
linearity	typical 0.03 %
Input coupling	DC or AC (-3 dB @ 1 Hz); max. DC voltage when AC coupled: 35 V
Excitation voltage	0, 0.25, 0.5, 1, 2.5, 5, 10 and 12 V _{DC} software programmable (16 Bit DAC)
1 year accuracy ⁽¹⁾	± 0.03 % ± 1 mV
Drift	± 10 ppm/ $^{\circ}$ K ± 50 μ V/ $^{\circ}$ K
Current limit	100 mA
Protection	Continuous short to ground
Excitation current	0.1, 0.2, 0.5, 1, 2, 5, 10 and 20 mA software programmable (16 Bit DAC)
1 year accuracy ⁽¹⁾	0.1 mA to 5 mA: 0.05% ± 0.5 μ A typical 15 ppm/ $^{\circ}$ C >5 mA to 60 mA: 0.3% ± 20 μ A typical 100 ppm/ $^{\circ}$ C
Compliance voltage	12 V
Output impedance	>1 MOhm
Supported sensors	4- or 6-wire full bridge 3- or 5-wire $\frac{1}{2}$ bridge with internal completion (software programmable) 3- or 4-wire $\frac{1}{4}$ 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 k Ω @ ≤ 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/ $^{\circ}$ K
Automatic bridge balance	Input range 500 μ V 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 μ V: 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 (2 nd order; ± 1.5 dB @ f ₀) 2 MHz: Butterworth 60 dB/dec (3 rd order; 0 to -3 dB @ 2 MHz)
Signal delay @ 2 MHz bandwidth	450 nsec

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NEW

Dedicated Instruments

Instruments

Front-ends

Signal Conditioning

Components

Software

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 for 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.

