STG6 pro ECAT MM Series

Type BS20

Product description

STG6 pro BS20 is an EtherCAT®-based, robust and extremely compact measurement module for strain gauge measurements and it is excellently suited for distributed measurement applications under challenging environmental conditions.

With the extension of the supply voltage range, sensors with up to 10 V supply can be used. Due to the automatic selection of the suitable input voltage range, as well as a better signal-to-noise ratio, extremely small measurement signals (e.g. strain) can be accurately recorded with the **STG6 pro BS20**.

In order to compensate for out-of-range measurements when the preload of the target is very high, the **STG6 pro BS20** has an additional option for bridge balancing by means of hardware compensation.

It features six time-synchronous strain gauge inputs and offers the advantage of being mechanically compatible to measurement modules of the CSM MiniModule series. Up to 100 modules of the ECAT measurement module series are cascadable both electrically and mechanically.

If used in combination with CSM's XCP-Gateway, **STG6 pro BS20** modules can be easily configured and operated by using the configuration software CSMconfig and XCP-compatible data acquisition software (e.g. vMeasure exp, CANape®, INCA, etc.), respectively. **STG6 pro BS20** measurement modules can be directly connected to a computer if data acquisition software supporting EtherCAT® master operation is used.

Key features

- *Time-synchronous acquisition of strain gauge signals with measurement data rates up to 20 kHz per channel*
- *Extended range of excitation voltage from 1 to 10 V*
- *Also suitable for extremely small measurement signals / strains due to automatic selection of input voltage range*
- *"Ultra Low Noise" due to optimized signal-to-noise ratio*
- *Hardware bridge balancing*
- *High resistance to interference due to ratiometric measuring principle and configurable software filter*

Scope of delivery

- Measurement module STG6 pro BS20
- Configuration software CSMconfig
- Documentation
- Device Description File (*.xml)
- Calibration certificate

Maintenance

- Calibration every 12 months recommended

Accessories

- See datasheet "XCP/ECAT Accessories"

Technical data

Type designation	**STG6 pro BS20**
Measurement inputs	6 time-synchronous strain gauge inputs
Type of bridge	Full and half bridges 120, 350, 700, 1000 Ω, quarter bridges 120 Ω und 350 Ω via special cable K356 with preconfigured TEDS [1]
Bridge connection	4- and 6-wire
Measuring unit	mV/V, µm/m
Input voltage range	±5, ±10, ±25, ±50, ±100 mV, automatically selected on the basis of the DMS-specific configuration information
Internal resolution	eff. 21 bit
Internal sampling rate	320 kS/s
Bridge balancing	via configuration software, up to 50 % of input voltage range via hardware, up to 90 % of input voltage range at the same resolution
Measurement data rate/ sending rate per channel [2]	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz and 1, 2, 5, 10, 20 kHz [3]
HW input filter	6th order anti-aliasing low-pass Bessel filter, fg approx. 16 kHz, 191 st order digital decimation linear-phase FIR-filter, fg approx. 10 kHz
SW input filter	6th order low-pass Butterworth, 0.1 Hz to 5 kHz, switchable, threshold frequency automatically adapted to measurement data rate, alternatively selectable channel by channel
Input protection [4]	-3.5 to +10 V permanent, additional ESD protection
Measurement deviation	
Gain error[5] at 25 °C	max. ±0.05 % of measured value
Untarred offset error	$\text{max. } 2\,\mu V/V \times \frac{10\,V}{\text{excitation voltage}}$
Offset and scaling error	in connection with a bridge adjustment, depending on the excitation voltage
1 V	max. 4.0 µV/V +0.006 % of measurement range (corresponding to 2 LSB)
2.5 V	max. 1.7 µV/V +0.006 % of measurement range (corresponding to 2 LSB)
5 V	max. 1.0 µV/V +0.006 % of measurement range (corresponding to 2 LSB)
10 V	max. 0.7 µV/V +0.006 % of measurement range (corresponding to 2 LSB)
Gain drift [5]	±10 ppm/K
Zero drift	0.5 µV/K
Noise	at 5 V excitation voltage (measurement range 2 mV/V)
0.1 Hz ≤ f_g ≤ 10 Hz	typ. 0.004 µV/V rms
10 Hz < f_g ≤ 100 Hz	typ. 0.008 µV/V rms
100 Hz < f_g ≤ 1 kHz	typ. 0.025 µV/V rms
0.1 Hz ≤ f_g ≤ 10 kHz	typ. 0.075 µV/V rms
Excitation voltage	1, 2.5, 5, 10 V, adjustable per channel, optionally switchable, max. 42 mA per channel

Type designation	STG6 pro BS20
Galvanic isolation [4, 6]	no safety isolation in terms of high-voltage applications
Channel/channel	500 V
Channel/power supply	500 V
Power supply/ excitation voltage	500 V
EtherCAT® interface	Ethernet 100 Base-TX, 100 Mbit/s, EtherCAT® slave controller, synchronization via Distributed Clocks or Sync Manager 3
Configuration	with CSMconfig via XCP-Gateway or EtherCAT® master software via CANopen over EtherCAT® (CoE), settings and configurations stored in the device
Power supply	
Minimum	6 V DC (-10 %)
Maximum	50 V DC (+10 %)
Power consumption [7]	typ. 5.4 W (without sensor excitation), typ. 6.1 W (all channels with 350 Ω full bridges and 5 V excitation voltage)
LED indicator	
ECAT	status, Link Activity IN, Link Activity OUT
Measurement channels	configuration, operation
Housing	aluminum, silver anodized
Protection class	IP67
Weight (device)	580 g
Dimensions (w × h × d)	approx. 200 × 40 × 50 mm (Slide Case)
Connectors	
EtherCAT® IN	LEMO 1B, 8-pole, code L
EtherCAT® OUT	LEMO 1B, 8-pole, code A
Signal inputs	LEMO 1B, 8-pole, code G
Operating and storage conditions	
Operating temperature range	-40 °C to +85 °C
Relative humidity	5 % to 95 %
Pollution degree	3
Storage temperature	-55 °C to +90 °C
Conformity	CE

[1] A full bridge with 120 Ω and 10 V supply voltage is not supported.

[2] The following measurement data rates can be configured via XCP-Gateway: 10, 20, 50, 100, 200, 500 Hz and 1, 2, 5, 10, 20 kHz.

[3] A measurement data rate of 20 kHz requires an XCP-Gateway as of hardware revision B.

[4] Observe information regarding the intended use. See CSM document “Safety Instructions MiniModule”.

[5] In relation to the units mV/V or µm/m measured by the measuring module.

[6] These MiniModule devices are designed for measurements in vehicles with 12 V or 24 V on-board power supply systems. Not suitable to be directly connected to systems with higher operating voltages, e.g. high-voltage batteries of hybrid or electric vehicles.

[7] Typ. 9.8 W at max. load (all channels with 120 Ω half bridge strain gauges and 10 V bridge excitation voltage)

CSM GmbH Headquarters (Germany)

Raiffeisenstraße 36 • 70794 Filderstadt
+49 711-77 96 40 sales@csm.de

CSM Office Southern Europe (France, Italy)

ArchParc • Immeuble ABC 1 • Entrée A
60, rue Douglas Engelbart • 74160 Archamps, France
+33 4 50 95 86 44 info@csm-produits.fr

CSM Products, Inc. USA (USA, Canada, Mexico)

1920 Opdyke Court, Suite 200 • Auburn Hills, MI 48326
+1 248 836-4995 sales@csmproductsinc.com

CSM (RoW)

Vector Informatik (China, Japan, Korea, India, Great Britain)
ECM AB (Sweden)
DATRON-TECHNOLOGY (Slovakia, Czech Republic)

Our partners guarantee you worldwide availability.
Feel free to contact us.

CSM GmbH Germany is certified.

ISO 9001, ISO 14001
Certified Integrated Quality and Environmental Management System
www.tuv-sud.com/ms-cert