STG6 ECAT MM Series
Type BK20

Product description

STG6 BK20 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. **STG6 BK20** 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 can be electrically and mechanically connected.

If used in combination CSM's XCP-Gateway, **STG6 BK20** modules can be easily configured and operated by using the configuration software CSMconfig and XCP-compatible data acquisition software (e.g. vMeasure, CANape®, INCA, etc.), respectively. **STG6 BK20** 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

▸ Support of full and half bridge strain gauges with
6- and 4-wire connection

▸ Support of quarter bridges via special cable K356

▸ Simple configuration via CSMconfig using a universal measurement range

▸ High resistance to interference due to ratiometric measuring principle and configurable software filter

Scope of delivery

▸ Measurement module STG6 BK20
▸ Configuration software CSMconfig
▸ Documentation
▸ Device Description File (*.xml)
▸ Calibration certificate

Maintenance

▸ Calibration every 12 months recommended

Accessories

▸ See datasheet "XCP/ECAT Accessories"

Innovative Measurement and Data Technology

Technical data

Type designation	STG6 BK20
Technical data valid as of revision	B013
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
Bridge connection	4- and 6-wire
Measuring unit	mV/V, µm/m
Input voltage range	±200 mV
Internal resolution	eff. 21 bit
Internal sampling rate	80 kS/s
Bridge balancing	via configuration software, up to 50 % of input voltage range
Measurement data rate/ sending rate per channel [1]	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz and 1, 2, 5, 10, 20 kHz [2]
HW input filter	low-pass filter 3rd order, approx. 4 kHz at measurement data rate 1 Hz ... 10 kHz low-pass filter 3rd order, approx. 8 kHz at measurement data rate 20 kHz
SW input filter	at measurement data rate 1 Hz ... 10 kHz: low pass, 6th order Butterworth filter, range: 0.1 Hz to 2 kHz, switchable
Input protection [3]	±20 V permanent, additional ESD protection
Measurement deviation	
Gain error [4] at 25 °C	max. ±0.05 % of measured value
Untared offset error	max. 8 µV/V × $\dfrac{5\,V}{\text{excitation voltage}}$
Offset and scaling error	in connection with a bridge adjustment, depending on the measurement range
40 mV - 200 mV	max. ±0.01 %
20 mV - 40 mV	max. ±0.02 %
6 mV - 20 mV	max. ±0.05 %
3 mV - 6 mV	max. ±0.1 %
Gain drift [4]	±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. 0.075 µV/V rms
10 Hz < f_g ≤ 100 Hz	typ. 0.19 µV/V rms
100 Hz < f_g ≤ 1 kHz	typ. 0.53 µV/V rms
0.1 Hz ≤ f_g ≤ 10 kHz	typ. 1.1 µV/V rms
Excitation voltage	from 1 to 5 V in 0.5 V steps (adjustable per channel, optionally switchable) max. 42 mA per channel

Type designation	STG6 BK20
Galvanic isolation [3, 5]	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 [6]	typ. 2.5 W (without sensor excitation), typ. 3 W (all channels with 350 Ω full bridges and 5 V bridge 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)	approx. 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] 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.

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

[3] Observe information regarding the intended use. See CSM document "Safety Instructions MiniModule".

[4] Referring to the units mV/V or µm/m measured by the module

[5] 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.

[6] Typ. 4.5 W at max. load (all channels with 120 Ω full bridge strain gauges and 5 V bridge excitation voltage)

CSM

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.

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