



# ECAT STGMM 6



## Distributed strain gauge measurement

ECAT STGMM 6 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. ECAT STGMM 6 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, ECAT STGMM 6 modules can be easily configured and operated by using the configuration software CSMconfig and XCP-compatible data acquisition software (e.g. vMeasure CSM, CANape®, INCA, etc.), respectively. ECAT STGMM 6 measurement modules can be directly connected to a computer if data acquisition software supporting EtherCAT® master operation is used.

## Shipping content

- ▶ Measurement module ECAT STGMM 6
- ▶ Configuration software CSMconfig
- ▶ Documentation
- ▶ Device Description File (\*.xml)
- ▶ Calibration certificate

## 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*


## Maintenance

- ▶ Calibration every 12 months recommended

## Accessories

- ▶ See datasheet "ECAT Accessories"

## Technical data

Type designation	ECAT STGMM 6
Technical data valid as of revision	B013
	
<b>Measurement inputs</b>	6 time-synchronous strain gauge inputs
Type of bridge	Full and half bridges 120, 350, 700, 1000 $\Omega$ , quarter bridges 120 $\Omega$ und 350 $\Omega$ via special cable K356 with preconfigured TEDS
Bridge connection	4- and 6-wire
Measuring unit	mV/V, $\mu\text{m/m}$
Input voltage range	$\pm 200$ mV
Internal resolution	eff. 21 bit
Bridge balancing	via configuration software, up to 50 % of input voltage range
Time synchronization	better than 1 $\mu\text{s}$
Measurement data rate / sending rate per channel <sup>1)</sup>	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz and 1, 2, 5, 10, 20 kHz <sup>2)</sup>
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 <sup>3)</sup>	$\pm 20$ V permanent, additional ESD protection
<b>Measurement deviation</b>	
Gain error <sup>4)</sup> at 25 $^{\circ}\text{C}$	max. $\pm 0.05$ % of measured value
Offset and scaling error	depending on the measurement range
40 mV - 200 mV	max. $\pm 0.01$ %
20 mV - 40 mV	max. $\pm 0.02$ %
6 mV - 20 mV	max. $\pm 0.05$ %
3 mV - 6 mV	max. $\pm 0.1$ %
Gain drift <sup>4)</sup>	$\pm 10$ ppm/K
Zero drift	0.5 $\mu\text{V/K}$
<b>Noise</b>	at 5 V excitation voltage (peak-to-peak)
$f_g \leq 10$ Hz	< 1 $\mu\text{V/V}$
10 Hz < $f_g \leq 100$ Hz	< 2 $\mu\text{V/V}$
100 Hz < $f_g \leq 1$ kHz	< 6 $\mu\text{V/V}$
<b>Excitation voltage</b>	from 1 to 5 V in 0.5 V steps (adjustable per channel, optionally switchable) max. 42 mA per channel
<b>Galvanic isolation <sup>3), 5)</sup></b>	no safety isolation in terms of high-voltage applications
Channel / channel	500 V
Channel / power supply	500 V
Power supply / bridge excitation voltage	500 V

<b>Type designation</b>	<b>ECAT STGMM 6</b>
<b>EtherCAT® interface</b>	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
<b>Power supply</b>	
Minimum	6 V DC (-10 %)
Maximum	50 V DC (+10 %)
Power consumption <sup>6)</sup>	typ. 2.5 W (without sensor excitation), typ. 3 W (all channels with 350 Ω full bridges and 5 V bridge excitation voltage)
<b>LED indicator</b>	
ECAT	status / Link Activity IN / Link Activity OUT
Measurement channels	configuration / operation
<b>Housing</b>	
Protection class	IP67
Weight	approx. 790 g
Dimensions (w × h × d)	approx. 200 × 35 × 50 mm / approx. 200 × 40 × 50 mm (Slide Case)
<b>Connectors</b>	
EtherCAT® IN	LEMO 1B, 8-pole, code L
EtherCAT® OUT	LEMO 1B, 8-pole, code A
Signal inputs	LEMO 1B, 8-pole, code G
<b>Operating and storage conditions</b>	
Operating temperature range	-40 °C to +85 °C
Relative humidity	5 % to 95 %
Pollution degree	3
Storage temperature	-55 °C to +90 °C
<b>Conformity</b>	<b>CE</b>

<sup>1</sup> 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.

<sup>2</sup> A measurement data rate of 20 kHz requires an XCP-Gateway as of hardware revision B.

<sup>3</sup> Observe information regarding the intended use. See CSM document "Safety Instructions MiniModule".

<sup>4</sup> Referring to the units mV/V or μm/m measured by the module

<sup>5</sup> 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.

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

## additional products

### STG6 BK10

STG6 BK10 is a robust and extremely compact CAN-based measurement module for strain gauge measurements and is excellently suited for distributed measurement applications.





**CSM GmbH**  
**Computer-Systeme-Messtechnik**

Raiffeisenstr. 36, 70794 Filderstadt, Germany

☎ +49 711-779640 ✉ info@csm.de

www.csm.de

Our company is certified.



To product page  
at [www.csm.de](http://www.csm.de)



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