HV AD4 ECAT TBM Series
Type IF1000

Key features

EtherCAT | HS ▶▶ | ⚠

- ▶ *4 analog inputs with reinforced insulation, galvanically isolated*
- ▶ *Measurement data rate up to 1 MHz per channel*
- ▶ *Galvanically isolated sensor excitation with reinforced insulation*
- ▶ *Use of standard sensors in high-voltage environments*
- ▶ *Precise synchronization (modules & channels)*

Product description

The **HV AD4 IF1000** is equipped with four analog measurement inputs with sensor excitation. When combined with special sensor cables, standard sensors, which are typically used in low-voltage applications, can also be safely operated in a high-voltage environment.

Designed as a slide-in unit for 19-inch racks, this module is excellently suited for test bench applications. It is also applicable for mobile use in all types of vehicles and can, for example, be mounted in the trunk of a car.

The **HV AD4 IF1000** features a maximum measurement data rate of 1 MHz per channel and can be used for the measurement of very fast analog signals.

Shipping content

- ▶ Measurement module HV AD4 IF1000
- ▶ Configuration software CSMconfig
- ▶ Documentation
- ▶ Device Description File (*.xml)
- ▶ Calibration certificate in accordance with DIN EN ISO/IEC 17025
- ▶ HV isolation test certificate

Maintenance

- ▶ HV isolation test at least every 12 months, see EN 61010 for scope of testing
- ▶ Calibration every 12 months recommended

Accessories

- ▶ See datasheet "ECAT Accessories"

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Technical data

Type designation	HV AD4 IF1000
Measurement inputs	4 analog inputs
Measurement ranges	±1, ±2, ±5, ±10, ±20 V
Internal resolution	16 bit
Internal sampling rate per ch.	1,000 kHz
Measurement data rate/ send rate per ch. [1]	1, 2, 5, 10, 20, 50, 100, 200, 500, 1,000 kHz
HW input filter	9th order Butterworth filter, threshold frequency approx. 360 kHz
SW input filter	switchable 6th order Butterworth filter, threshold frequency automatically adjusted to measurement data rate, alternatively adjustable per channel
Input impedance	approx. 900 kΩ / approx. 100 pF
Channel-specific comments	free text consisting of up to 100 characters per channel
Measurement deviation [2]	
Gain error at 25 °C	max. ±0.05 % of measured value
Offset and scaling error	max. ±0.02 % of range
Gain drift	max. ±10 ppm/K of measured value
Zero drift	max. ±10 ppm/K of range
Sensor excitation	unipolar, galvanically isolated, switchable and adjustable per channel
Voltage	10, 12, 15 V DC
Power output	typ. 200 mW per channel
Tolerance	max. ±5 %
Fields of application [3]	for measurements in HV environments [4] for details see the following document that is also applicable: "Technical Information: Fields of Application for CSM HV Measurement Modules".
Measurement voltages (unipolar & bipolar)	up to 20 V peak for working voltages [4] up to 846 V DC
Isolation test [3]	
Type approval test	by external accredited test laboratory [4]
Routine test	test voltage [4] 3,100 V DC, isolation test is to be performed at least every 12 months
EtherCAT® interface	Ethernet 100 Base-TX, 100 Mbit/s, EtherCAT® slave controller, synchronization via Distributed Clocks or Sync Manager 3
Configuration	with configuration software CSMconfig via XCP-Gateway or EtherCAT® master software via CANopen over EtherCAT® (CoE), settings and configurations stored in the device

Type designation	HV AD4 IF1000
LED indicators	
ECAT	Status / Link Activity IN / Link Activity OUT
Measurement channels	configuration / operation
Sensor excitation	on / overload
Power supply	
Minimum	6 V DC (-10 %)
Maximum	30 V DC (+10 %)
Power consumption	typ. 3.7 W
Housing	aluminium with HV designation on the front-side (RAL 2003)
Protection class	IP65
Ground connection	M6 threaded hole
Weight	approx. 750 g
Dimensions (w × h × d)	12 HP (approx. 61 mm) 3 U (approx. 129 mm) 134 mm (+ 25 mm protective bracket)
Connectors	
EtherCAT® IN	LEMO 1B, 8-pole, code L
EtherCAT® OUT	LEMO 1B, 8-pole, code A
Signal inputs	LEMO Redel 2P, 8-pole, code C (black)
Operating and storage conditions	
Operating temperature range	-40 °C to +85 °C
Relative humidity	5 % to 95 % (non-condensing)
Operating altitude	max. 5,000 m above sea level
Pollution degree	3
Storage temperature	-40 °C to +85 °C
Conformity	CE
Device safety	EN 61010-1:2010

[1] All measurement data rates are configurable via XCP-Gateway. When configuring via a standard EtherCAT® master, a maximum measurement data rate of 10 kHz/channel is supported.

[2] Further information can be found in the Technical Information document on the subject of "Deviation of Measurement".

[3] Please also read the CSM document "Safety Instructions HV AD4 ECAT TBM"

[4] According to EN 61010-1:2010

additional products

XCP-Gateway

CSM's **XCP-Gateway** protocol converter is especially designed for the CSM EtherCAT® measurement module series and has been developed for measurement tasks with multiple measurement channels and high measurement data rates. **XCP-Gateway** is available in two versions: "Basic" and "pro". **XCP-Gateway pro** features two CAN interfaces to be used for connecting CSM's CAN-based measurement modules and to integrate them into the XCP-on-Ethernet measurement data protocol.

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