



# HV AD4 ECAT MM series

Type XW1000 | OW1000



## Product description

The **HV AD4** ECAT MiniModule series is equipped with four analog measurement inputs and has been specifically designed for measuring analog voltages (type **OW**) and high voltages (type **XW**) in high-voltage environments.

This makes the modules especially suitable for applications in the fields of electric mobility – electric and hybrid vehicles – for stationary and mobile use.

The **HV AD4** ECAT measurement modules feature 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 XW1000 | OW1000
- ▶ Configuration software CSMconfig
- ▶ Documentation
- ▶ Device Description File (\*.xml)
- ▶ Calibration certificate
- ▶ HV isolation test certificate

## Key features



- ▶ **4 analog inputs with reinforced insulation**
- ▶ **Measurement data rate up to 1 MHz per channel**
- ▶ **Measurement range adjustable per channel**
  - ▶ **Type XW: up to  $\pm 1,000$  V (extended up to  $\pm 2,000$  V)**
  - ▶ **Type OW: up to  $\pm 90$  V**
- ▶ **Precise synchronization (modules & channels), important for calculation of electrical power, etc.**



## Maintenance

- ▶ HV isolation test according to EN 61010 at least every 12 months
- ▶ Calibration every 12 months recommended

## Accessories

- ▶ See datasheet "ECAT Accessories"

## Technical data

Type designation	HV AD4 XW1000	HV AD4 OW1000
		
<b>Measurement inputs</b>	4 analog inputs	
Measurement ranges	±100, ±200, ±500, ±1,000 V	±5, ±10, ±20, ±45, ±90 V
Extended	(±2,000 V) <sup>1)</sup>	—
Internal resolution	16 bit	
Internal sampling rate per ch.	1,000 kHz	
Measurement data rate per ch. <sup>2)</sup>	1, 2, 5, 10, 20, 50, 100, 200, 500, 1,000 kHz	
HW input filter	4th 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. 9 MΩ / approx. 20 pF	approx. 900 kΩ / approx. 100 pF
<b>Measurement uncertainty</b>		
Gain error at 25 °C	max. ±0.05 % of measured value	
Offset and scaling error	max. ±0.02 % of range	
Gain drift	max. ±20 ppm/K of measured value	max. ±10 ppm/K of measured value
Zero drift	max. ±10 ppm/K of range	
<b>Fields of application</b> <sup>3)</sup>	for measurements in HV environments according to EN 61010-1:2010 For details see co-applicable document: “Technical Information: Fields of Application for CSM HV Measurement Modules”.	
Battery voltages	up to 1,000 V (DC)	
Measurement voltages	up to 1,000 V (peak-to-peak) <sup>1)</sup>	up to 90 V (peak-to-peak)
<b>Isolation test</b> <sup>3)</sup>		
Type approval test	test voltage 3,510 V (AC) according to EN 61010-1:2010	
Routine test	test voltage 3,100 V (DC) according to EN 61010-1:2010, isolation test is to be performed at least every 12 months	
<b>EtherCAT® interface</b>	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	
<b>LED indicators</b>		
ECAT	Status / Link Activity IN / Link Activity OUT	
Measurement channels	configuration / operation	

<b>Type designation</b>	<b>HV AD4 XW1000</b>	<b>HV AD4 OW1000</b>
<b>Power supply</b>		
Minimum	6 V DC (-10 %)	
Maximum	30 V DC (+10 %)	
Power consumption	typ. 3 W (@ +25 °C) typ. 6 W (@ +100 °C)	
<b>Housing</b>	aluminium with HV designation on the front-side (RAL 2003)	
Protection class	IP67	
Ground connection	M6 threaded hole	
Weight	approx. 500 g	
Dimensions (w × h × d)	approx. 200 × 40 × 76 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 Redel 2P, 8-pole, code D (grey/red)	LEMO Redel 2P, 8-pole, code B (grey/black)
<b>Operating and storage conditions</b>		
Operating temperature range	-40 °C to +100 °C	
Relative humidity	5 % to 95 % (non-condensing)	
Operating altitude	max. 5,000 m above sea level	
Pollution degree	4	
Storage temperature	-40 °C to +100 °C	
<b>Conformity</b>	<b>CE</b>	
<b>Device safety</b>	EN 61010:2010	

<sup>1</sup> The measurement ranges of the analog inputs are dimensioned for  $\pm 2,000$  V for acquiring transient overvoltages.

<sup>2</sup> 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.

<sup>3</sup> Please read the CSM document "Safety Instructions HV AD4 ECAT MM" additionally!

## additional products

### AD4 OG1000

The measurement module **AD4 OG1000** features a maximum measurement data rate of 1 MHz per channel and has been designed for the acquisition of very fast analog signals in the fields of automotive measurement technology in low voltage applications.



### XCP-Gateway

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





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2017-10-10