

## ES415

### High Definition A/D Module with Sensor Supply



#### Description

The ES415 measurement module includes an analog-digital converter for high definition measurements on analog signals. 4 electrically isolated measurement channels with adjustable and short circuit proof sensor supply are available for measurement. Data can be sampled at up to 100 kHz on each measurement channel.

The universal A/D measurement module provides the connection of various sensors and measurement transducers via a standardized interface. Sensors with integrated TEDS (Transducer Electronic Data Sheet) can be automatically detected and configured. The sensors are therefore immediately ready for measurement.

The small modules of the ES400 series are equipped with practical mounting possibilities. Due to its robust design, it works very reliably even under extreme operating conditions such as in the engine compartment of test vehicles.

#### Advantages

- Direct connection to computer for fast start-up
- Measurement data acquisition via Ethernet for efficient data transfer at high sampling rates
- Robust design ensures reliable use under extreme conditions
- Flexible connection of a wide range of sensors and measurement transducers via standardized interface
- Automatic measurement data synchronization when working together with other ETAS measurement modules
- Easy integration into existing measurement systems by using standardized XCP protocol for measurement and calibration data transfer, as well as UDP protocol for network communication
- Measurement data acquisition and analysis with professional software solutions like ETAS INCA and MDA

#### At a Glance

4 galvanically isolated channels, separately configurable

Measurement range between 100 mV and 60 V

Adapters for extended measurement possibilities

Data acquisition rates between 0.5 Hz and 100 kHz, separately adjustable per channel

Adjustable and short circuit proof sensor supply voltage between 5 V and 15 V

Low pass filters for optimal signal conditioning

Automatic detection and configuration of sensors with TEDS (Transducer Electronic Data Sheet)

Robust, water- and dust-tight housing and connectors (IP67)

Operating temperature between -40 °C and 120 °C (-40 °F and 248 °F)

## Technical Data

Item	Characteristics	Features
Size and weight	Dimension (HxWxD)	52 x 40 x 142 mm / 2.0 x 1.6 x 5.6 in (total) 39 x 40 x 63 mm / 1.5 x 1.6 x 2.5 in (tapered rear)
	Weight	350 g / 0.77 lb
Environment	Temperature range (operation)	-40 °C to +120 °C (-40 °F to +248 °F)
	Protection class	IP67
	Altitude (operation)	Up to 5,000 m / 16,400 ft
	Tested for	Mechanical shock, vibration, fall, temperature shock, temperature alteration, storage in humidity, salt fog attack, impact from flying rocks, according to DIN EN 60068 res. ISO 16750
Power supply	Operating voltage	5 V to 50 V DC (-40 °C to +85 °C / -40 °F to +185 °F) 6 V to 50 V DC (+85 °C to +120 °C / +185 °F to +248 °F)
	Power consumption	2.2 W typ., 6 W max. (operation), 25 mW max. (standby)
Host interface	Ethernet connection, protocol	100 Base-T, Full-Duplex required, XCP-on-UDP/IP
	IP address	192.168.40.44 (Default), configurable
Inputs	Channels	4, with separate sensor supply
	Input measurement ranges (MR)	± 100 mV, ± 1 V, ± 10 V, ± 60 V
	Sampling rate	0.5 Samples/s to 100,000 Samples/s, configurable per channel
	Anti-aliasing filter (in hardware)	Low-pass 4th order Butterworth, 50 kHz corner frequency
	Digital filter (in software)	Low pass 2nd order CIC (moving average)
	Overvoltage protection <sup>1</sup>	±100 V DC (input to external overvoltage)
	Maximum isolation voltage <sup>1</sup>	100 V DC (input to input or input to supply, ground, or housing)
	Input impedance	> 2 MΩ    < 400 pF (± 10 V, ± 60 V) > 10 MΩ    < 300 pF (± 1 V, ± 100 mV)
Accuracy	Resolution	3,6 μV (MR: ± 100 mV), 37,2 μV (MR: ± 1 V) 366 μV (MR: ± 10 V), 2,16 mV (MR: ± 60 V)
	Measurement error	± (100 μV +  U <sub>in</sub>   * 0,1 %) (MB: ± 100 mV) ± (500 μV +  U <sub>in</sub>   * 0,05 %) (MB: ± 1 V) ± (3 mV +  U <sub>in</sub>   * 0,05%) (MB: ± 10 V) ± (16 mV +  U <sub>in</sub>   * 0,2%) (MB: ± 60 V)
	Temperature drift (-40 °C - 85 °C)	8 μV/K (MR: ± 100 mV), 8 μV/K (MR: ± 1 V) 36 μV/K (MR: ± 10 V), 3,6 mV/K (MR: ± 60 V)
	Temperature drift (85 °C - 120 °C)	150 μV/K (MR: ± 100 mV), 150 μV/K (MR: ± 1 V) 360 μV/K (MR: ± 10 V), 3,6 mV/K (MR: ± 60 V)
	Output voltage	0 V, 5 V to 15 V DC, individually configurable per channel
	Accuracy	± 10 mV
Sensor supply	Output current	30 mA max. / channel
	Diagnostics	Overload warning by LED and in the software
Software	Supported by INCA V7.0 and higher, ES400 configuration and integration tool for XCP applications V1.4.0 and higher, ASCET-RP V6.1.3 and higher, INTECRIO Integration Platform V4.2 and higher, INTECRIO-RLINK V1.0 and higher, HSP Update-Tool V10.0.0 and higher	

<sup>1</sup>60 V maximum for use inside the US.

## Ordering Information

Order Name	Short Name	Order Number
High Definition A/D Module with Sensor Supply (4-CH)	ES415.1	F-00K-107-908

For ES400 system cables and accessories, please refer to [www.etas.com](http://www.etas.com).

## ETAS Locations Worldwide

### Germany

Stuttgart (Headquarter)

### Brazil

São Bernardo do Campo

### Canada

Kitchener

### France

Saint-Ouen

### India

Bangalore

Pune

### Italy

Turin

### Japan

Utsunomiya

Yokohama

### Korea

Seongnam-si

### P.R. China

Beijing

Changchun

Chongqing

Guangzhou

Shanghai

Wuhan

### Sweden

Gothenburg

### United Kingdom

Derby

York

### USA

Ann Arbor

[www.etas.com](http://www.etas.com)