



## High Speed Analogue Input Module (HSA)

### MODULE FUNCTIONS

The Trainnet® High Speed Analogue Input Module (HSA) provides a standard interface for analogue input signals. Signals can be current (-20...+20mA) and voltage (-10...+10V). Separate channels are provided for frequency signal measurements with the capability to measure pulse-width ratio (PWM). The Trainnet® HSA converts the analogue signals and makes them available to the train computer's CPU Module.

The Trainnet® High Speed Analogue Input Module can be used as a part of a Trainnet® TCMS, VCU or Event Recorder.

### KEY FEATURES

The Trainnet® HSA has 4 current channels and 4 voltage channels divided in four isolated groups. 4 frequency channels are also available.

The 4 current measurement channels can measure currents between -20 and +20 mA. The module has the capability to supply voltage to external sensors or to supply loop voltage to the current loops. The module 4 voltage measurement channels can

measure voltages between -10 and +10 V. The resolution of the input A/D conversion is sign+12 bits, and the cut-off frequency of the hardware low pass filter is 150 Hz. Both current and voltage channels are capable of giving over range indications which can be used for diagnostic purposes.

The 4 frequency input channels can measure frequencies up to 16 kHz, period, pulse width, pulse count and rotary decoding with direction indication (compatible with most industry standard tachometers).

The module has its own 32-bit Floating point Digital Signal Processor for a high signal processing capability and uses factory calibration values to convert the measurement value to mV or  $\mu$ A with great accuracy. The embedded DSP processor can be used to perform signal processing tasks like filtering. It also implements diagnostics functions and reports to the system CPU module if it suspects that the input values cannot be trusted.

### SIL-2 CERTIFIED

The module development is based on the railway standards EN 50126, EN 50128 and EN 50129 that are in accordance with safety integrity level SIL 2. A non-SIL certified version of the module is also available.

**SIL-2**

- EN 50126
- EN 50128
- EN 50129
- EN 50155
- EN 45545



### TECHNICAL SPECIFICATIONS

#### Dimensions (W x H x D)

4 TE x 3 U x 160 mm

#### Weight

170 g

#### Input Power

5 V DC  $\pm$  5% (1 A typ. 3 A max.)

#### Temperature Range (operational)

-40 °C...+70 °C

#### MTBF (40 °C ambient temperature)

410 000 h (HSA2620A)

#### I/O Connector

DIN41612-F48 (at front)

#### Host Interface

VME Bus A24/D08/D16 Slave

#### Input Channels, Analogue

4 voltage channels, -10...+10 V (Vin)

4 current channels, -20...+20 mA (Iin)

#### Input Channels, Frequency

4 input channels

#### Frequency Input Voltage Range

0...36 V DC (HSA2620A)

#### Frequency Input Current Range

0...24 mA (HSA2620B)

#### Frequency Input Threshold level

Each channel has its own software configurable threshold level, fixed hysteresis

#### Frequency Input Range

DC to 16 kHz, 0.25 Hz resolution

#### Frequency Input Pulse Width Measurement

0.1% resolution

#### Tachometer Supply Outputs

15 VDC, max. 70 mA each