LMS product information

Eight-channel Voltage/ICP® Differential Input Module
[VD8-E]

VD8-E input module

The VD8-E is an LMS SCADAS Mobile module with differential and single-ended inputs supporting full voltage and ICP signal conditioning and signal processing for eight channels. The VD8-E offers the unique combination of ultra-low power consumption, high performance 204.8kHz 24-bits analog to digital conversion and a spurious free dynamic range of 150 dB.

Signal conditioning

Each input channel has a voltage amplifier with an input range from ±100mV to ±10V. It includes floating ICP with differential input to eliminate ground loops and power supply for ICP sensors. The VD8-E has an ICP cable check circuit to detect an open loop in the sensor cable; errors are indicated through a front-panel LED for optimum user feedback and simultaneously transferred to the host. Selectable AC coupling from 0.05Hz to 7Hz equipped with boost function for fast setup time reduces low frequency signals that might otherwise overload the input amplifier. The overload LED indicates both analog overloads, detected at the input amplifier, and digital overloads, detected by digital signal processor. The VD8-E supports smart sensors according to IEEE 1451.4. Without changing cables, LMS SCADAS Mobile can read the Transducer Electronic Data Sheet (TEDS) with essential information including sensor type, sensitivity, calibration date, coordinates etc.

Analog to digital conversion

The VD8-E uses low-power high performance 24-bit sigma-delta analog to digital converters. A 4-pole analog anti-alias filter precedes each ADC. Running at a maximum sample rate of 204.8kHz, the VD8-E supports both vibration and acoustic applications. A wide range of digital decimation filters reduces bandwidth in steps of 2 and 2.5.

Signal processing

The VD8-E is equipped with a low-power high-performance DSP56321 and 512Kx24-bit memory for digital filtering, calibration, overload handling, 1/1 and 1/3rd octave filtering, independent of the number of channels.

Features and benefits

- 8 input channels via CAMAC or Sub-D connectors
- Floating ICP with differential input to eliminate ground loops
- Smart sensor (TEDS) support
- Fast AC coupling settling time even at very low high-pass filter frequency (from 0.05Hz to 7Hz)
- Combined analog and digital anti-alias filters for a guaranteed alias suppression of 100dB

- Analog and digital overload detection with LED indication on front-panel
- 24-bit analog to digital conversion with 92kHz bandwidth
- 150dB dynamic range eliminates the need for range setting
- Built-in calibration for improved specifications over a longer period

LMS
ENGINEERING INNOVATION

Specifications VD8-E

Input function:

Single ended & differential voltage input via isolated CAMAC connector

Input voltage:

±100mV, ±316mV, ±1V, 3.16V, ±10V

Input protection:

±40V without damage

Input impedance:

1MΩ//50pF (AC & DC modes)
100kΩ (ICP mode)

Input coupling:

DC, AC, ICP in single ended & differential modes

AC coupling:

0.05Hz ±1%, 0.5Hz ±1%, 7Hz ±1% Boost function for fast setup time

Supply for ICP sensors:

4.5mA±15% from 28V isolated source (optional 9mA±15%)

ICP cable check:

Checking the sensor bias voltage continuously for open loop and short circuit with indication by LED in the front panel with colour coded feedback

Common mode rejection:

100dB@60Hz for 0.1V range
86dB@60Hz for 10V range

Overload detection and indication:

Analog overload detection at the input is combined with digital overload detection after the ADC; overloads are indicated on the front panel LED and transmitted to the host

TEDS:

Full support of IEEE 1451.4 smart (up to 80m length with quality cable)

Dynamic range

Input range	Signal to Noise Ratio	Spurious Free Floor
10V	115dB	-150dB
3.16V	110dB	-147dB
1V	110dB	-147dB
316mV	103dB	-140dB
100mV	93dB	-130dB

(20kHz bandwidth, 32k FFT, 16 averages)

Overall dynamic range with gain:170dB

Crosstalk:

Between any two channels: -116dB at 1 kHz typical, independent of input range settings

Accuracy:

At 1kHz better than ± 0.2% between 5ºC and 40ºC

Residual Offset:

< ± 0.1% between 5ºC and 40ºC for all input ranges

Calibration:

Factory gain & offset calibration factors are stored in non-volatile RAM

Analog anti-alias filter:

4-pole Equal Time Delay filter with 164kHz cut-off frequency and 0.01dB flatness

Analog to digital conversion:

24-bit ΣΔ ADC with a maximum sampling frequency of 204.8kHz; 150dB/oct digital filter with 100dB alias protection provides an alias free bandwidth of 92kHz

Total Harmonic Distortion:

Better than -87dB @ 3dB below full scale

Phase match:

Better than 0.3º @ 10kHz with 10V input range

DSP section:

DSP 56321 with 512Kx24-bit SRAM

Decimation filter

Reduces bandwidth prior to signal processing; bandwidth can be down-sampled in steps of 2 and 2.5.

Signal processing

1. Fixed sampling:

Continuous time data output; bandwidth selection via the decimation filters, including support for multiple sample rates

2. Octave filters

Time domain third octave filters with maximum band of 20kHz according to ANSI S1.11-2004 class 1 and IEC 61260:1995 class 1; time domain A-weighting according to ANSI S1.42 can be switched on or off

Dimensions:

One 20 mm high SCADAS Mobile slot

Power consumption:

6W (during normal operation, no overload and ICP supply switched on)

When installed in SCM/SCR/SCD platforms, VD8-E complies with the standards:
EN61010 & EN60950, EN50081-1, EN50082-1
LMS SCADAS is a product of LMS Instruments

Ordering information:

SCM-VD8-E: LMS SCADAS Mobile 8-channel V/ICP/TEDS module with differential inputs (CAMAC), including adapter cables to BNC

SCM-VD8s-E: LMS SCADAS Mobile 8-channel V/ICP/TEDS module with differential inputs (Sub-D), including Sub-D mating connector

LMS ®
ENGINEERING INNOVATION