labV6HD (Code 3728)

6-channel line/ICP input module with high-dynamic input range

Overview

*lab*V6HD is a 6-channel Line/ICP module, which allows all channels to be used either as high-dynamic wide-range inputs or conventionally with fixed measuring ranges from 10 mV to 30 V.

This provides the option to record signals with a high dynamic range too. The wide-range inputs do not require adjustments due to possible undermodulations or signal clipping even with strongly fluctuating levels. This makes it possible, for example, to record engine run-ups with level ranges differing over time without the need to change the recording level settings.

Microphones, acceleration sensors, and other ICP sensors can be connected to *lab*V6HD. Furthermore, the high input impedance also allows the use of high-impedance voltage sources.

Another *lab*V6HD highlight is the "0 Hz ICP/DC coupling" developed by HEAD acoustics, which allows ICP measurements from 0 Hz to 45 kHz. For example, users are allowed to connect seismic ICP sensors for measuring extremely low-frequency signals.

Features

- Input module with 6 Line/ICP channels, a high-dynamic input range, and „0 Hz ICP/DC Coupling"

High-dynamic input range
(HD Mode, Dual ADC)

- A single measuring range for recording high dynamic signals
  - for example, run-up measurements with level ranges differing over time or with fluctuating signal levels

Fixed measuring ranges

- 0.01 Vp, 0.1 Vp, 1 Vp, 10 Vp, 30 Vp

„0 Hz ICP/DC Coupling" from HEAD acoustics

- ICP/DC coupling: 0 Hz to 45 kHz

Connections to front ends from HEAD acoustics

- *lab*CTRL II.1/*lab*CTRL I.2 (HEAD*lab* Controller)
- *lab*HSU High-end dual-channel data acquisition system
- *lab*COMPACT12-V1/ *lab*COMPACT24-V1 (compact systems)
- SQuadriga III (mobile 8-channel recording and playback system)
- HMS V (artificial head measuring system)
- MMF III.0/MMF III.0-V1 (Brake*OBSERVER* front ends)
- VFE II.1/VMA II.1/VMA III.0 (HEAD VISOR arrays)

Connections for sensors

- Line/ICP sensors
  - Microphones, pulse sensors etc.
  - Charge, temperature, pressure sensors etc.
  - High-impedance voltage sources
- ICP switchable for AC/DC coupling
- TEDS sensors
- Binaural headset BHS II (via adapter CLB I.2)

Functions

- Input impedance: 1 MΩ
- 24 bit data with high phase accuracy
- Sampling frequency up to 96 kHz (3 channels)
- 7 W power consumption
- Electrical isolation of the *lab*V6HD inputs to the inputs of other HEAD*lab* modules and the PC interface

Filters

- Analog high-pass filter 0.16 Hz, 1. order, not switchable in AC mode
- Analog high-pass filter (switchable): 22 Hz, 2nd order

Scope of supply

- *lab*V6HD (Code 3728)
  6-channel Line/ICP input module
  with high-dynamic input range

Optional

- CLL X.xx (Code 3780-xx)
  Cable HEAD*link*
  LEMO 8-pin ↔ LEMO 8-pin

- CLB I.2 (Code 9847)
  Adapter for connecting BHS II to
  *lab*V6HD

Technical data

General

Number of channels:	6
Sampling frequencies (Fs):	2, 3, 4, 6, 8, 12, 24, 48, 96 kHz (3 channels at 96 kHz); depending on the system sampling rate, for each module one individual sampling rate can be adjusted
Coupling:	DC, AC, ICP, ICP-DC
Power supply:	10 V to 28 V
ICP voltage supply:	22.4 V (max. 23 V)
ICP current supply:	4 mA ($\pm$20%)
Electric strength:	Max. $\pm$35 V
Resolution:	24 bit
Frequency range:	0 Hz to 22 kHz at $F_S = 48$ kHz 0 Hz to 45 kHz at $F_S = 96$ kHz
Input impedance:	1 MΩ
Power consumption:	7 W, at 23 °C
Maximum cable length to the controller:	60 m (with cable CLL X)
Cooling:	Convection, no fan
Dimensions incl. BNC connectors: incl. locking mechanism and rubber pads:	140 x 180 x 42 mm (W x D x H) 148 x 180 x 48 mm (W x D x H)
Weight:	650 g (1.4 lb)
Operating temperature:	-10 °C to 60 °C
Storage temperature:	-20 °C to 70 °C

Dynamic range

There is no standardized definition of „dynamic range".

Therefore, the **Signal to Noise Ratio** (SNR or S/N) value is given as a value for all HEAD*lab* modules. This based on the level of a sinusoidal tone with maximum modulation in relation to the full relevant bandwidth noise floor level of the system, measured with the entire relevant frequency range.

Sometimes in the literature the term „**dynamic range**" is used identically to the S/N, but this „dynamic range" value is often based on a narrow-band calculation of the inherent noise.

Depending on the analysis bandwidth, *lab*V6HD will then have a much higher „dynamic range" value.

Line/ICP inputs

Number of channels:	6 x BNC					
						HD Mode
Ranges (AC/DC, inputs are TEDS-compliant):	±0,01 Vp	±0,1 Vp	±1 Vp	±10 Vp	±30 Vp	±10 Vp
S/N, F_S = 48 kHz, termination 50 Ω, 20 Hz to 20 kHz incl. 0.16 Hz filter in AC mode:	82.5 dB(A)	101 dB(A)	110,5 dB(A)	110 dB(A)	96 dB(A)	133 dB(A)
Dynamic range (5 Hz analysis bandwidth):	117.5 dB	136 dB	145.5 dB	145 dB	131 dB	168 dB
Inherent noise signal level, F_S = 48 kHz, termination 50 Ω, 20 Hz to 20 kHz incl. 0.16 Hz filter in AC mode <300 mV: ≥300 mV:						-116 dBV(A) -93 dBV(A)
THD+N, F_S = 48 kHz, signal 1 kHz, 50% level, 20 Hz to 20 kHz incl. 0.16 Hz filter in AC mode:	-73 dB(A)	-93 dB(A)	-98 dB(A)	-97 dB(A)	-82 dB(A)	-97 dB(A)
Crosstalk measurement, F_S = 48 kHz, termination 75 Ω, sinus signal 1 kHz, 50% level:	>99 dB(A)	>120 dB(A)	>130 dB(A)	>130 dB(A)	>119 dB(A)	>130 dB(A)
Frequency response[2], F_S = 48 kHz, 20 Hz to 20 kHz incl. 0.16 Hz filter in AC mode:	<0.26 dB	<0.061 dB	<0.061 dB	<0.061 dB	<0.13 dB	<0.061 dB
DC accuracy[2], F_S = 48 kHz, tolerance:	1.8%	0.2%	0.1%	0.1%	0.1%	0.2%
Filters (analog) HP filter (not defeatable in AC mode): HP filter 2nd order (switchable):	0.16 Hz 22 Hz					
Filter (digital) HP filter:	In proportion to the sampling rate: 1 Hz (F_S = 48 kHz) (0.5 Hz (F_S = 24 kHz), 0.25 Hz (F_S = 12 kHz), …)					
TEDS (IEEE 1451.4), read:	TEDS class 1, shared signal wire (version 0.9 and 1.0)					

[1] Valid for: ambient temperature 23 °C/73 °F (±3 °C/37 °F), operating duration ≥1 h. Vibration excitation of the device can cause deviation.

[2] All measuring ranges receive a calibration by the factory. The measuring ranges ±0.1 Vp to ±30 Vp can additionally be calibrated in the calibration laboratory of HEAD acoustics GmbH accredited according to DIN EN ISO 17025.

HEADlink (HEAD acoustics standard)

Controlling/data transfer via controller:	LEMO 8-pin

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