



Code 3756_3756-V1

labV8x3-Iso II

labV8x3-Iso II-V1

labV8x3-Iso II and labV8x3-Iso II-V1 are 24-channel HEADlab input modules designed for triaxial accelerometers, featuring electrical isolation of their channels, which makes them suitable for use in electromagnetically demanding environments. They differ only in the configuration of the eight interfaces ($\frac{1}{4}$ -28 UNF or ECG.0B.309.CLN - LEMO).

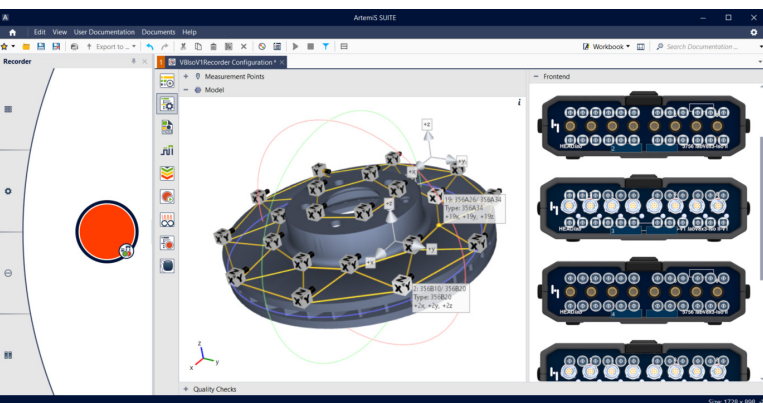
OVERVIEW

labV8x3-Iso II

Code 3756

A key advantage of both *labV8x3-Iso II* and the *labV8x3-Iso II-V1* variant is their extended operating range. The eight triaxial inputs are electrically isolated from one another and from the digital *HEADlink* interfaces, enabling the device to be used even in electromagnetically demanding environments. In addition, both input modules feature flexibly configurable sampling rates of 2.048 kHz up to a maximum of 204.8 kHz.

The input modules are connected to a *HEADlab* controller, which—depending on application requirements—can itself be connected to additional controllers, input modules, supply modules (for autonomous power supply), artificial heads, and other components to form a larger *HEADlab* system comprising several hundred channels.



KEY FEATURES

24-channel *HEADlab* input modules for direct connection of triaxial accelerometers via

- › ¼-28 UNF, 4-pin, male (*labV8x3-Iso II*)
- › ECG.0B.309.CLN – LEMO (*labV8x3-Iso II-V1*)

Electrical isolation of the triaxial inputs from one another and from the digital *HEADlink* interfaces

HEADlink 2.0 transmission protocol with a maximum sampling rate of 204.8 kHz

- › With the *labCTRL II.1*, *labCOMPACT12 II*, and *labCOMPACT24 II* controllers
- › With the 2-channel *labHSU* frontend (firmware version 2.1 or later)
- › With controllers supporting the *HEADlink* 1.0 transmission protocol, a maximum sampling rate of 102.4 kHz can be achieved

Dual Link for measurements with twice the number of channels at sampling rates \geq system sampling rate

Power supply via controller

Configuration and control (*Artemis SUITE*)

- › APR Framework (APR 000) is required
- › Recorder (APR 040)
- › Impact Measurement (APR 430)

APPLICATIONS

Data acquisition with high numbers of channels for universal measurements, modal analyses, etc. in sectors such as

- › Automotive, aviation and aerospace, shipbuilding
- › Research and development
- › Electrical appliances
- › ...

DETAILS

Input Channels

Electrical Isolation

labV8x3-Iso II and *labV8x3-Iso II-V1* each provide eight triaxial inputs for direct connection of the sensors. The three signal lines of each input share a common ground that is electrically isolated from the grounds of the other inputs as well as from both *HEADlink* interfaces. This enables triaxial accelerometers to be used without case isolation, even in electromagnetically demanding environments.

Sampling Rates up to 204.8 kHz

Both input modules use *HEADlink 2.0* for data transfer to the controller. In this way, a maximum sampling rate of up to 204.8 kHz is achieved.

Furthermore, they are compatible with controllers supporting *HEADlink 1.0*, enabling sampling rates of up to 102.4 kHz.

Dual Link

A key feature of the *labCTRL II.1* controller is the Dual Link mode. In this mode, an input module is connected to the controller using two *HEADlink* cables, which—at sampling rates \geq the system sampling rate—enables measurements with twice the number of channels compared to operation using a single *HEADlink* cable (Single Link).

Dual Link with <i>HEADlink 2.0</i> via <i>labCTRL II.1</i> at a system sampling rate of	32.768 (2 ⁿ) kHz	48 kHz	51.2 kHz
up to 24 channels	≤ 32.768 kHz	≤ 48 kHz	≤ 51.2 kHz
up to 12 channels	≤ 65.536 kHz	≤ 96 kHz	≤ 102.4 kHz
up to 6 channels	≤ 131.072 kHz	≤ 192 kHz	≤ 204.8 kHz

Safety

labV8x3-Iso II and *labV8x3-Iso II-V1* provide cable-break and short-circuit detection for connected IEPE/ICP sensors.

In addition, as of firmware version 25.1, out-of-band overloads that result in distortion of the recorded signal are detected. To ensure unambiguous identification of the affected sections, the recording is additionally marked by the insertion of signaling pulses during the time intervals in which out-of-band overloads occur. Outside these time intervals, the recorded signal is undistorted and can be used as usual.

Power Supply

A separate power supply is not required, since the connected input modules are powered by the controller (one *labCTRL II.1* controller with a maximum of ten modules). Controllers are powered either by the supplied power adapter or the battery of a supply module.

Autonomous Operation

We provide a range of supply modules with different performance levels, enabling autonomous operation of both the controllers and the connected modules to ensure continuous operation, for example, in the event of power outages. Depending on the configuration, the battery of a supply module can power a system for several hours.

Rugged

Both input modules are characterized by a rugged design and can be interconnected with other *HEADlab* modules using the proven mechanical connection technology. Like all modules, they operate noiselessly (no fan).

Control (ArtemiS SUITE)

For configuration and control purposes, *labV8x3-Iso II* and *labV8x3-Iso II-V1* are connected to a controller, which is subsequently connected to a computer via USB or LAN. The computer must have ArtemiS SUITE installed, and licenses for APR Framework (APR 000) and for either the Recorder or Impact Measurement must be available.

Recorder (APR 040)

The Recorder features a task-oriented and clearly arranged user interface that is very easy to operate and suitable for a wide range of measurement scenarios, from simple start/stop recordings to complex, sequence-controlled measurement tasks.

Using the visual representation, the inputs of *labV8x3-Iso II* and *labV8x3-Iso II-V1* can be configured quickly and reliably. The tri-axial sensors are displayed graphically and can be dragged and dropped onto the corresponding channels as well as onto the measurement points of an (optional) 3D grid model or a CAD model to connect them. The entire configuration can also be performed offline using individually configurable tri-axial sensors from a Sensor Library in order to prepare the measurement system.

Impact Measurement (APR 430)

Alternatively, for structure-borne sound measurements using an impact hammer, APR 430 can be used, which—compared with the Recorder—provides additional quality checks with visual and acoustic feedback. This enables the automatic identification of double strikes, overloads, or strikes with too low an excitation level.

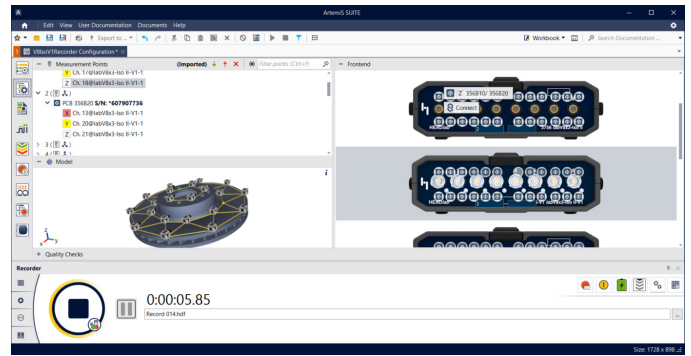
Measurement Point Library

The Measurement Point Library (included in APR Framework) provides an easy-to-use tool for visually representing the test object, enabling the creation of a 3D grid model. The measurement points can be defined directly in the Measurement Point Library by entering the coordinates and manually connecting the measurement points with lines to form a model.

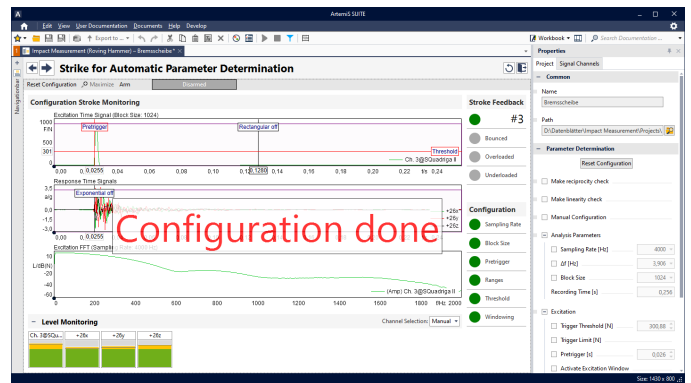
If a CAD model of the measurement object or simulation data is available, it can be imported and merged.

More Tools in ArtemiS SUITE

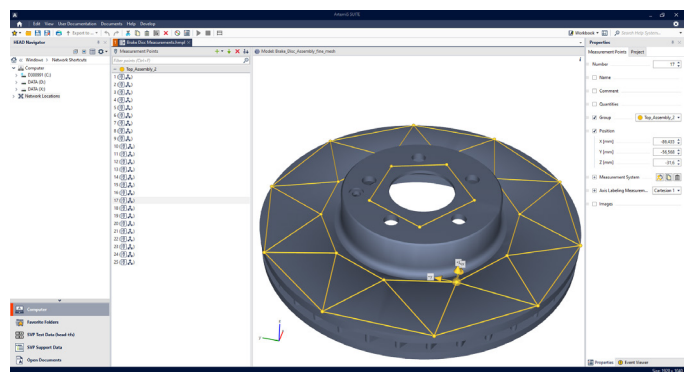
ArtemiS SUITE also provides tools for further processing of the measurements. These include, for example, the Structural Analysis package (APR 420, APR 440, APR 400, APR 410), which employs artificial intelligence (AI) to facilitate the efficient and intuitive determination and extraction of dynamic structural properties, as well as the TPA package (APR 600, APR 610, ASP 601, ASP 602, ASP 603), which provides guided, step-by-step execution of a transfer path analysis.



Recorder: The measurement and model points, the sensors, and the connectors are easily connected via drag-and-drop.



Impact Measurement: During the automatic determination of the measurement parameters, an acoustic feedback is provided in addition to the visual information provided by colored status indications, signaling when a strike was doubled, too strong, or too weak.



Measurement Point Library: Even a large number of measurement points can be clearly displayed.

AT A GLANCE

DATA ACQUISITION



CONNECTION OF TRIAXIAL ACCELEROMETERS

labV8x3-Iso II

- › ¼-28 UNF, 4-pin, male

labV8x3-Iso II-V1

- › ECG.0B.309.CLN – LEMO

CONTROL / POWER SUPPLY



CONNECTION TO CONTROLLER / FRONTEND / SYSTEM

HEADlink Protocol 2.0 via HEADlink

- › *labCTRL II.1* controller
- › *labCOMPACT12 II* and *labCOMPACT24 II* compact systems
- › *labHSU* high-end 2-channel frontend (firmware version 2.1 or later)
- › HMS V digital head measurement system (firmware version 2.1 or later)

HEADlink Protocol 1.0 via HEADlink

- › *labCTRL I.2* and *labCTRL I.1* controllers
- › *labCOMPACT12(-V1)* and *labCOMPACT24(-V1)* compact systems
- › *labHSU* 2-channel frontend (up to firmware version 2.1)
- › HMS V digital artificial head measurement system (up to firmware version 2.1)

POWER SUPPLY

Via HEADlink

SCOPE OF DELIVERY AND OPTIONAL FEATURES

Scope of Delivery

Code	Name	Description
3756	labV8x3-Iso II	24-channel HEADlab input module with eight ¼-28 UNF interfaces for the connection of triaxial accelerometers

or

3756-V1	labV8x3-Iso II-V1	24-channel HEADlab input module with eight LEMO interfaces for the connection of triaxial accelerometers
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Requirements

(One of the Following Controllers, ...)

Code	Name	Description	Availability
3704	labCTRL II.1	HEADlab-Controller A maximum of ten HEADlab modules can be connected	Available
3701	labCTRL I.1	HEADlab controller	Discontinued
3702	labCTRL I.2	HEADlab controller	Discontinued
31020	labCOMPACT12 II	12-channel HEADlab compact system A HEADlab module can be connected	Available
31021	labCOMPACT24 II	24-channel HEADlab compact system A HEADlab module can be connected	Available
3708	labCOMPACT12	12-channel HEADlab compact system	Discontinued
3708-V1	labCOMPACT12-V1	12-channel HEADlab compact system	Discontinued
3709	labCOMPACT24	24-channel HEADlab compact system	Discontinued
3709-V1	labCOMPACT24-V1	24-channel HEADlab compact system	Discontinued
3710	labHSU	2-channel frontend	Available
1502	HMS V	Digital artificial head measurement system	Available

Options

(Supply Modules)

Code	Name	Description
3711	labPWR I.1	Supply module for HEADlab systems up to max. 40 W
3712	labPWR I.2	Supply module for HEADlab systems up to max. 100 W
3713	labPWR I.3	Supply module for HEADlab systems up to max. 35 W
0623B	PS 24-60-L2 24 V, 60 W, LEMO 2-pin	Power adapter for labPWR I.1, labPWR I.3
0621B	PS 24-150-L2 24 V, 150 W, LEMO 2-pin	Power adapter for labPWR I.1, labPWR I.2, labPWR I.3

Requirements

(Cables for connection to a controller, ...)

Code	Name	Description
3780-xx	CLL X.xx	HEADlink cable LEMO 8-pin to LEMO 8-pin
Available cable lengths: 0.17 m, 0.26 m, 0.36 m, 0.5 m, 1 m, 1.5 m, 2.5 m, 5 m, 10 m, 20 m, 25 m, 30 m, 40 m, 50 m, 60 m		

Options

(Cables)

Code	Name	Description
3581-1	CUB I.1	Cable ¼–28 UNF female to 3 x BNC female, 1 m
3582-5	CUU V.5	Cable ¼–28 UNF female to ¼–28 UNF female, 5 m
3583-5	CUU VI.5	Cable ¼–28 UNF female to 8–36 UNF female, 5 m
3584-5	CUU VII.5	Cable ¼–28 UNF female to ¼–28 UNF female, 5 m (for B&K sensors)
3585-1	CLB X.1	Cable LEMO male to 3 x BNC female, 1 m
3586-5	CLU V.5	Cable LEMO male to ¼–28 UNF female, 5 m
3587-5	CLU VI.5	Cable LEMO male to 8–36 UNF female, 5 m
3588-5	CLU VII.5	Cable LEMO male to ¼–28 UNF female, 5 m (for B&K sensors)
3589-5	CUU VIII.5	Extension cable ¼–28 UNF female to ¼–28 UNF male, 5 m

Requirements

(Licenses of ArtemiS SUITE)

Code	Name	Description
50000	APR 000 APR Framework	Basis of ArtemiS SUITE

and

50040	APR 040 Recorder	Universal Recorder of ArtemiS SUITE
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50430	APR 430 Impact Measurement	Performing impact measurements (Roving Hammer / Roving Accelerometer)
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or

50440	ASP 440 Reference+	Determination of optimal reference points for experimental modal analyses
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Optional Features

(Licenses of ArtemiS SUITE)

Code	Name	Description
51302	ASP 302 Data Preparation	Measurement data preparation

50420	APR 420 Modal Analysis Project	AI-supported and intuitively performable modal analysis
50400	APR 400 ODS Project	Animation and analysis of deflection shapes
50410	APR 410 Shape Comparison Project	Analysis and comparison of deflection shapes

(TPA Package of ArtemiS SUITE)

50600	APR 600 TPA Project	Performing transfer path analyses
50610	APR 610 TPA – Data Acquisition	Measuring the transfer functions required for a TPA Project
51601	ASP 601 TPA – Virtual Point Transformation	Calculating forces, moments, accelerations, and angular accelerations at points that cannot be measured physically
51602	ASP 602 TPA – Structure-Borne Analysis	Calculating the Effective Mount Transfer Matrix (EMTF) and the procedure for quantifying indirectly acting structure-borne sound contributions (IFC)
51603	ASP 603 TPA – Airborne Analysis	Indirect determination of the volume velocity via matrix inversion (IQD) and calculation of the airborne sound attenuation model (p2p)

Additional modules of ArtemiS SUITE (see the ArtemiS SUITE Overview data sheet)

TECHNICAL DATA

The technical data listed below apply to both *labV8x3-Iso II* and the *labV8x3-Iso II-V1* variant. Any deviating specifications are indicated within the list.

General Information	
Connectors data acquisition / data generation	24 x voltage/IEPE/ICP input (8 x 3 channels, each electrically isolated)
Communication interfaces	2 x HEADlink
Supply connection	HEADlink 1 (input)
Supply voltage	10 V _{DC} to 28 V _{DC}
Reverse polarity protection	Yes
Maximum power consumption in operation – device only	5.5 W
Maximum power consumption with sensors connected	8 W
System sampling rate	32.768 (2 ⁿ) kHz, 44.1 kHz, 48 kHz, 51.2 kHz
Min. to max. sampling rate @32.768 (2 ⁿ) kHz	2.048 kHz to 131.072 kHz
Min. to max. sampling rate @44.1 kHz	2.75625 kHz to 176.4 kHz
Min. to max. sampling rate @48 kHz	3 kHz to 192 kHz
Min. to max. sampling rate @51.2 kHz	3.2 kHz to 204.8 kHz
Synchronization	HEADlink
Max. sampling rate	204.8 kHz
Cooling	Convection (without fan)
Operating temperature	-10 °C to +60 °C (+14 °F to +140 °F)
Storage temperature	-20 °C to +70 °C (-4 °F to +158 °F)
Relative humidity	0% to 90% non-condensing
Housing dimensions	148 x 48 x 175 mm (W x H x D)
Weight	708 g

HEADlink	
Plug connector	2 x LEMO 8-pin
Number of interfaces	2
Supply voltage	10 V _{DC} to 28 V _{DC}
HEADlink version	HEADlink 1.0, HEADlink 2.0
Electrical Isolation	No
Synchronization	32 kHz, 32.768 (2 ⁿ) kHz, 44.1 kHz, 48 kHz, 51.2 kHz
Maximum cable length	60 m

Voltage/IEPE/ICP (Analog Inputs)¹

Plug connector	<i>labV8x3-Iso II</i> <i>labV8x3-Iso II-V1</i>	8 x ¼-28 UNF, 4-pin, male 8 x ECG.0B.309.CLN – LEMO
Number of channels	24	
Measured quantity	Voltage	
Measurement ranges	0.1 V _p , 1 V _p , 10 V _p	
Input impedance	100 kΩ	
Coupling	AC, IEPE/ICP	
Analog highpass filter	0.34 Hz, 1st order, ±5%	
Digital highpass filter @f _s = 48 kHz, proportional to f _s	0.15 Hz	
Digital lowpass filter @f _s = 48 kHz, proportional to f _s	23 kHz	
Resolution	32 bits	
Electrical isolation input/output	Yes	
Electrical isolation, channel by channel	Yes, per triaxial channel	
Electric strength	±24 V	
IEPE/ICP voltage	22.8 V	
IEPE/ICP current	4 mA (-7.5% , +25%)	
Cable break and short-circuit detection for IEPE/ICP sensors	Yes	
TEDS (IEEE 1451,4) read	TEDS class 1, shared signal wire (versions 0.9 and 1.0)	

Voltage/IEPE/ICP Measurement Ranges (Analog Inputs)¹

Measurement Range	0.1 V _p	1 V _p	10 V _p
S/N	100 dB(A)	110 dB(A)	110 dB(A)
Crosstalk at 1 kHz	-105 dB	-105 dB	-104 dB
THD+N at 1 kHz	-97 dB	-106 dB	-94 dB
Dynamics 5 Hz analysis bandwidth	136 dB	146 dB	146 dB
Input-related noise (24 kHz bandwidth)	1.4 μV	4.5 μV	44.7 μV
AC accuracy at 1 kHz	0.4%	0.4%	0.4%
Frequency response 20 Hz to 20 kHz @f _s = 48 kHz re 1 kHz	+0.02 dB, -0.05 dB	+0.05 dB, -0.03 dB	+0.05 dB, -0.03 dB
Frequency response 20 Hz to 40 kHz @f _s = 96 kHz re 1 kHz	+0.02 dB, -0.16 dB	+0.15 dB, -0.03 dB	+0.12 dB, -0.03 dB

¹ Valid for: ambient temperature 23 °C, 73.4 °F (±3 °C, ±5.4 °F), operating duration ≥1 h. Vibration excitation of the device may cause deviations.

Voltage/IEPE/ICP Measurement Ranges (Analog Inputs)¹

Measurement Range	0.1 V _p	1 V _p	10 V _p
Frequency response 20 Hz to 80 kHz @fs = 192 kHz re 1 kHz	+0.02 dB, -0.40 dB	+0.58 dB, -0.03 dB	+0.49 dB, -0.03 dB
Linearity 0 to 80 dB below full scale	0.06 dB	0.03 dB	0.02 dB
Linearity 0 to 100 dB below full scale	0.56 dB	0.12 dB	0.11 dB

¹ Valid for: ambient temperature 23 °C, 73.4 °F (±3 °C, ±5.4 °F), operating duration ≥1 h. Vibration excitation of the device may cause deviations.

All measurement ranges are calibrated at the factory. In addition, the measurement ranges 0.1 V_p to 10 V_p can be calibrated in our accredited calibration laboratory in accordance with DIN EN ISO 17025.

Dynamic Range

There is no standardized method for calculating the “dynamic range”.

Therefore, the signal-to-noise ratio (SNR or S/N) has been specified for *labV8x3-Iso II* and *labV8x3-Iso II-V1*. It is calculated as the ratio of the level of a full-scale sinusoidal signal to the broadband noise floor of *labV8x3-Iso II* or *labV8x3-Iso II-V1*, measured over the entire relevant frequency range.

In some literature, the term “dynamic range” is used by analogy with the S/N value, however, this is often based on a narrow-band calculation of the inherent noise. Depending on the analysis bandwidth, this results in a significantly higher “dynamic range” value for *labV8x3-Iso II* and *labV8x3-Iso II-V1*.

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