HEAD acoustics

DATA SHEET

Code 3756

labV8x3-Iso II

labV8x3-Iso II is a 24-channel HEADlab input module with HEADlink 2.0 transmission protocol for triax accelerometers. The eight triax channels are electrically isolated from each other and from the digital HEADlink interfaces, enabling the module to be used in electromagnetically demanding environments for standard measurements, modal analysis measurements, and much more.

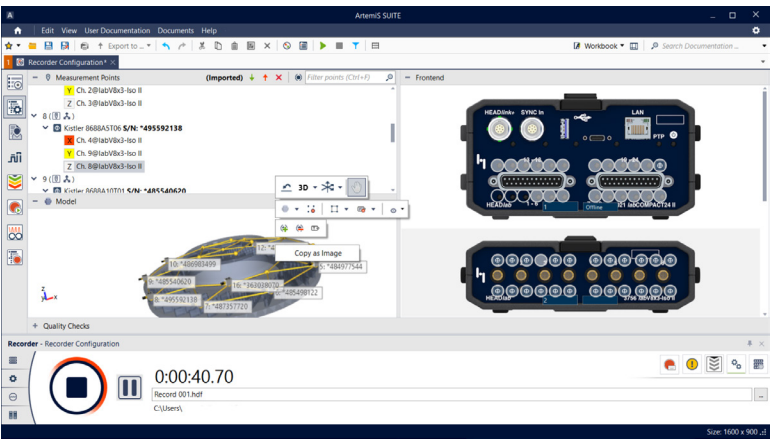
OVERVIEW

*lab*V8x3-Iso II

Code 3756

One of its advantages is that *lab*V8x3-Iso II can be used in a wide range of applications. The eight triaxial inputs are electrically isolated from each other and from the digital HEAD*link* interfaces, enabling the device to be used even in electromagnetically demanding environments.
Furthermore, the input module is characterized by flexibly adjustable sampling rates of 2.048 kHz to max. 204.8 kHz.

Connected to a HEAD*lab*-Controller, *lab*V8x3-Iso II can—depending on requirements—be integrated into larger HEAD*lab* systems comprising additional controllers, input modules, supply modules (providing autonomous power supply), artificial heads, and other components, enabling system configurations with several hundred channels.



KEY FEATURES

24-channel HEAD*lab* input module for direct connection of triaxial accelerometers (IEPE/ICP)

Electrical isolation of the triaxial inputs (¼"-28 UNF, 4-pin, male) from each other and also from the digital HEAD*link* interfaces

HEAD*link* 2.0 transmission protocol with a maximum sampling rate of 204.8 kHz

- With the *lab*CTRL II.1, *lab*COMPACT12 II, and *lab*COMPACT24 II controllers
- With the 2-channel *lab*HSU frontend (as of firmware 2.1)
- With controllers that support the HEAD*link* 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 ≥ 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

*lab*V8x3-Iso II provides 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 HEAD*link* interfaces. This enables triaxial accelerometers to be used without case isolation, even in electromagnetically demanding environments.

Sampling Rates up to 204.8 kHz

*lab*V8x3-Iso II uses HEAD*link* 2.0 to transmit data to the controller. In this way, a maximum sampling rate of up to 204.8 kHz is achieved.

Furthermore, *lab*V8x3-Iso II is compatible with controllers that provide HEAD*link* 1.0, enabling sampling rates of up to 102.4 kHz.

Dual Link

A distinctive feature of the *lab*CTRL II.1 controller is the Dual Link mode. In this mode, *lab*V8x3-Iso II is connected to the controller using two HEAD*link* cables, which—at sampling rates ≥ the system sampling rate—enables measurements with twice the number of channels compared with using only a single HEAD*link* cable (Single Link) for the connection.

Dual Link with HEAD*link* 2.0 via *lab*CTRL II.1 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

Power Supply

*lab*V8x3-Iso II does not need a separate power supply, since the controller provides power to the input module and all other connected modules (one *lab*CTRL II.1 controller with up to ten modules). Controllers are powered either by the supplied power adapter or the battery of a supply module.

Self-Sufficient

HEAD acoustics offers supply modules with different performance levels, enabling autonomous operation of controllers and connected modules, for example to ensure fail-safe operation in the event of power outages. Depending on the configuration, the battery of a supply module can power a system for several hours.

Rugged

*lab*V8x3-Iso II is characterized by a rugged design and can be plugged together with other HEAD*lab* modules using the proven mechanical connection technology. Like all modules, *lab*V8x3-Iso II operates noiselessly (no fan).

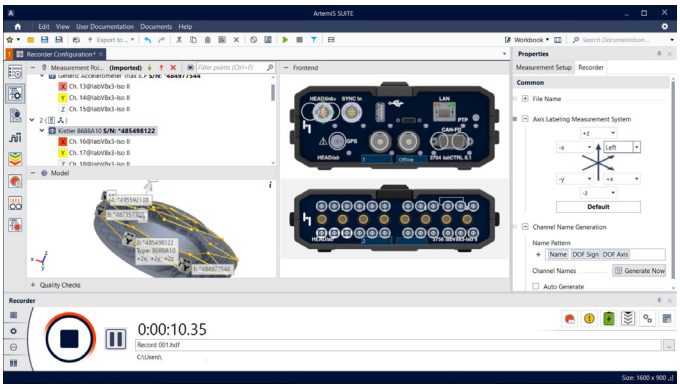
Control (ArtemiS SUITE)

For configuration and control purposes, *lab*V8x3-Iso II is connected to a controller, which, in turn is connected to a computer via USB/LAN. The computer must have ArtemiS SUITE installed, and licenses for APR Framework (APR 000) as well as for the Recorder or Impact Measurement must be available.

Recorder (APR 040)

The Recorder of ArtemiS SUITE offers a task-oriented, clear user interface that is very easy to operate and suitable for all types of measurements, from simple start/stop recordings to complex sequence-controlled tasks.

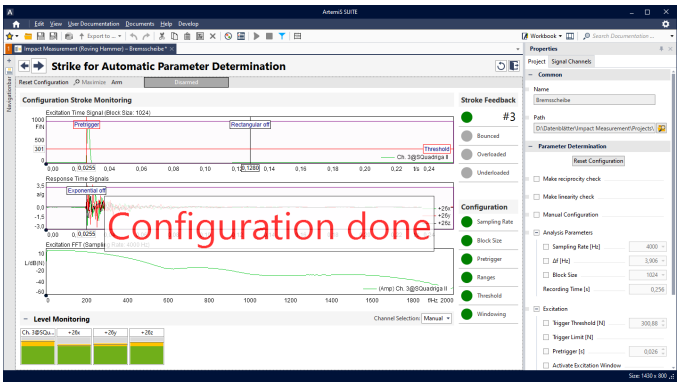
The visual representation enables the inputs of *lab*V8x3-Iso II to be configured quickly and reliably. The triaxial sensors are displayed graphically and can be dragged and dropped onto the corresponding channels as well as onto the measurement points of an (optional) 3D grid model or a CAD model to connect them. The entire configuration can also be performed offline using individually configurable triaxial sensors from a Sensor Library in order to prepare the measurement system.



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

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.

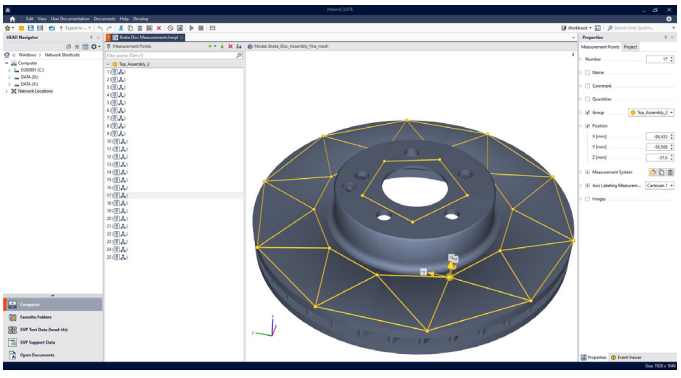


Impact Measurement: During the automatic determination of the measurement parameters, an acoustic feedback is provided in addition to the visual information provided by colored status indications, signaling when a strike was doubled, too strong, or too weak.

Measurement Point Library

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.



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

More Tools from ArtemiS SUITE

ArtemiS SUITE also provides tools to further process 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 intuitive determination and extraction of dynamic structural properties, and the TPA package (APR 600, APR 610, ASP 601, ASP 602, ASP 603), which provides step-by-step guidance through a transfer path analysis.

AT A GLANCE

DATA ACQUISITION

CONNECTION OF SENSORS

Triaxial accelerometers

CONTROL / POWER SUPPLY

CONNECTION TO CONTROLLER / FRONTEND / SYSTEM

HEAD*link* Protocol 2.0 via HEAD*link*

- *lab*CTRL II.1 controller
- *lab*COMPACT12 II and *lab*COMPACT24 II compact systems
- *lab*HSU high-end 2-channel frontend (from firmware version 2.1)
- HMS V digital head measurement system (from firmware version 2.1)

HEAD*link* Protocol 1.0 via HEAD*link*

- *lab*CTRL I.2 and *lab*CTRL I.1 controllers
- *lab*COMPACT12(-V1) and *lab*COMPACT24(-V1) compact systems
- *lab*HSU 2-channel frontend (up to firmware version 2.1)
- HMS V digital artificial head measurement system (up to firmware version 2.1)
- VMA V HEAD VISOR microphone array

POWER SUPPLY

Via HEAD*link*

SCOPE OF DELIVERY AND OPTIONS

Scope of Delivery

Code	Name	Description
3756	*lab*V8x3-Iso II	24-channel HEAD*lab* input module with HEAD*link* 2.0 transmission protocol for connecting triaxial accelerometers

Required

(One of the Following Controllers, ...)

Code	Name	Description	Availability
3704	*lab*CTRL II.1	HEAD*lab* controller A maximum of ten HEAD*lab* modules can be connected	*Available*
3701	*lab*CTRL I.1	HEAD*lab* controller	*Discontinued*
3702	*lab*CTRL I.2	HEAD*lab* controller	*Discontinued*
31020	*lab*COMPACT12 II	12-channel HEAD*lab* compact system A HEAD*lab* module can be connected	*Available*
31021	*lab*COMPACT24 II	24-channel HEAD*lab* compact system A HEAD*lab* module can be connected	*Available*
3708	*lab*COMPACT12	12-channel HEAD*lab* compact system	*Discontinued*
3708-V1	*lab*COMPACT12-V1	12-channel HEAD*lab* compact system	*Discontinued*
3709	*lab*COMPACT24	24-channel HEAD*lab* compact system	*Discontinued*
3709-V1	*lab*COMPACT24-V1	24-channel HEAD*lab* compact system	*Discontinued*
3710	*lab*HSU	2-channel frontend	*Available*
1502	HMS V	Digital artificial head measurement system	*Available*
7528	VMA V	HEAD VISOR microphone array	*Available*

Required

(For Connection to a Controller, ...)

Code	Name	Description	Availability
3780-xx	CLL X.xx	HEAD*link* cable LEMO 8-pin → LEMO 8-pin	*Available*
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

(Supply Modules)

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

Required

(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

or

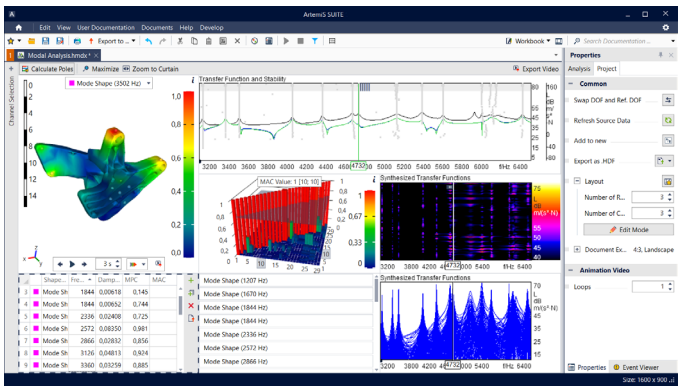
50430	APR 430 Impact Measurement	Assistant-guided impact measurement

Optional

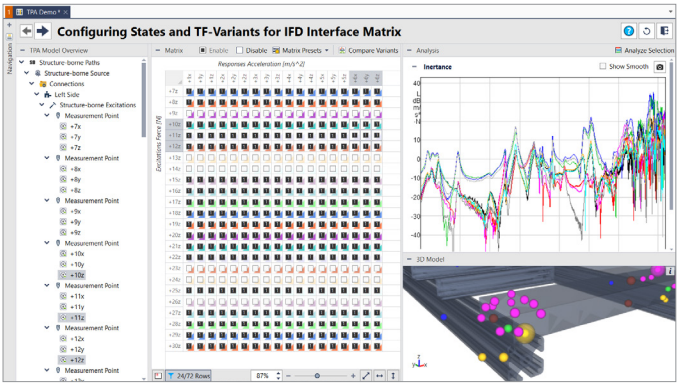
(Licenses of ArtemiS SUITE)

Code	Name	Description
51302	ASP 302 Data Preparation	Measurement data preparation
50420	APR 420 Modal Analysis Project	AI-supported and intuitively performable modal analysis
50440	ASP 440 Reference+	Determination of optimal reference points for experimental modal analyses
50400	APR 400 ODS Project	Animation and analysis of deflection shapes
50410	APR 410 Shape Comparison Project	Analysis and comparison of deflection shapes
50600	APR 600 TPA Project	Performing a TPA and creating of data sets for PreSense and Prognoise
50610	APR 610 TPA – Data Acquisition	Measuring transfer functions for a TPA Project
51601	ASP 601 TPA – Virtual Point Transformation	Calculating forces and moments at points that cannot be physically measured
51602	ASP 602 TPA – Structure-Borne Analysis	Calculating the Effective Mount Transfer Matrix (EMTF)
51603	ASP 603 TPA – Airborne Analysis	Calculating the IQD Matrix and the Airborne Attenuation Model (p2p)

Further ArtemiS SUITE modules
(see data sheet ArtemiS SUITE Overview)



APR 420: Modal Analysis Project



APR 600: TPA Project

TECHNICAL DATA

General Information

Connectors data acquisition / data generation	24 x Voltage/ICP In (8 x 3 channels, each of them electrically isolated)
Communication interfaces	2 x HEAD*link*
Supply connection	HEAD*link* 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	HEAD*link*
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 bis +70 °C, -4 °F to +158 °F
Dimensions	148 x 48 x 175 mm (W x H x D)
Weight	708 g

HEAD*link*

Plug connector	2 x LEMO 8-pin
Number of interfaces	2
Supply voltage	10 V_{DC} to 28 V_{DC}
HEAD*link* version	HEAD*link* 1.0, HEAD*link* 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/ICP (Analog Inputs)[1]

Plug connector	8 x ¼"-28 UNF, 4-pin, male
Number of channels	24
Measured quantity	Voltage
Measurement ranges	0.1 V_P, 1 V_P, 10 V_P

[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/ICP (Analog Inputs)[1]

Input impedance	100 kΩ
Coupling	AC, ICP
Analog high-pass 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 triaxialial channel
Electric strength	±24 V
ICP voltage	22.8 V
ICP current	4 mA (-7.5% / +25%)
Cable break and short-circuit detection for ICP sensors	Yes
TEDS (IEEE 1451,4) read	TEDS class 1, shared signal wire (versions 0.9 and 1.0)

Voltage/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	-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 @fs = 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 @fs = 96 kHz re 1 kHz	+0.02 dB, -0.16 dB	+0.15 dB, -0.03 dB	+012 dB, -0.03 dB
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 the accredited calibration laboratory of HEAD acoustics GmbH in accordance with DIN EN ISO 17025.

Dynamics

There is no standardized calculation method for the term “dynamics”.

For this reason, *the signal-to-noise ratio (SNR or S/N) is specified for lab*V8x3-Iso II. It is calculated based on the level of a sinusoidal tone with maximum modulation in relation to the full bandwidth noise floor level of *lab*V8x3-Iso II, measured over the entire relevant frequency range.

In some literature, the term “dynamics” 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, *lab*V8x3-Iso II will then have a significantly higher “dynamic“ value.

HEAD acoustics

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