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 triaxial channels are electrically isolated from each other and also from the digital HEADlink interfaces, so the module can also be used in electromagnetically demanding environments to perform standard measurements, measurements for modal analysis, and much more.

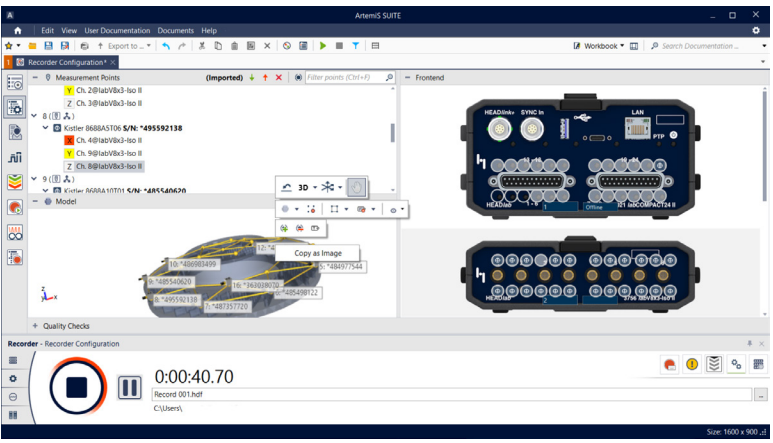
OVERVIEW

*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 triax inputs are electrically isolated from each other and also from the digital HEAD*link* interfaces, thus enabling the device to be used even in electromagnetically demanding environments.
The input module is characterized by flexibly adjustable sampling rates of 2.048 kHz to a maximum of 204.8 kHz.

*lab*V8x3-Iso II is connected to a HEAD*lab* controller which, in turn, depending on requirements, can be connected to further controllers, input modules, supply modules (for an independent power supply), artificial heads, etc. to form a larger HEAD*lab* system 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 (Microtech) 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

- Using the controllers *lab*CTRL II.1, *lab*COMPACT12 II, *lab*COMPACT24 II
- Using the 2-channel frontend *lab*HSU (as of firmware 2.1)
- Using 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 (software)

- Recorder of ArtemiS SUITE – APR Framework (APR 000) is required

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 triax inputs (Microtech) for direct connection of the sensors. The three signal lines of each input have a common ground that is electrically isolated from the grounds of the other inputs and the two 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 have HEAD*link* 1.0, thus achieving a sampling rate of up to 102.4 kHz.

Dual Link

A special feature of the *lab*CTRL II.1 controller is the Dual Link mode. Here, *lab*V8x3-Iso II is connected to the controller using two HEAD*link* cables, thus enabling measurements with twice the number of channels at sampling rates ≥ system sampling rate compared to using only one 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 require its own power supply as the power supply for the input module and all other connected modules (one *lab*CTRL II.1 controller with a maximum of ten modules) is provided by the controller. Controllers are supplied with power via the power adapter supplied or the battery of a supply module.

Self-Sufficient

HEAD acoustics offers supply modules with different power levels that can be used to operate controllers and the connected modules as self-sufficient systems and protect them in the event of power failures, for example. Depending on the configuration, the battery of a supply module supplies HEAD*lab* systems with power 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 (Software)

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. ArtemiS SUITE must be installed on the computer, and licenses for APR Framework (APR 000) and Recorder (APR 040) must be available.

ArtemiS SUITE

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

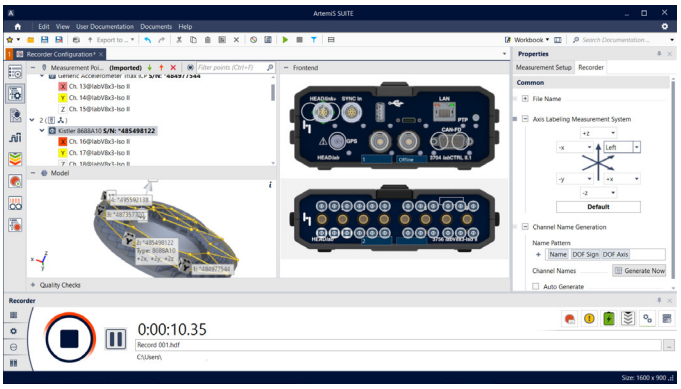
Measurement Point Library (Included in APR Framework)

The Measurement Point Library provides an easy-to-use tool for the visual representation of the measurement object that can be used to create a 3D grid model. Users define the measurement points directly in the Measurement Point Library by entering the coordinates and manually connecting the measurement points with lines to form a model.

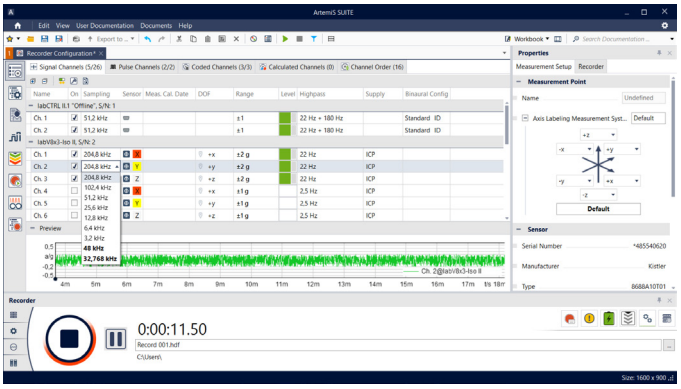
If a CAD model of the measurement object or simulation data is available, it can be imported and merged.

More Tools from ArtemiS SUITE

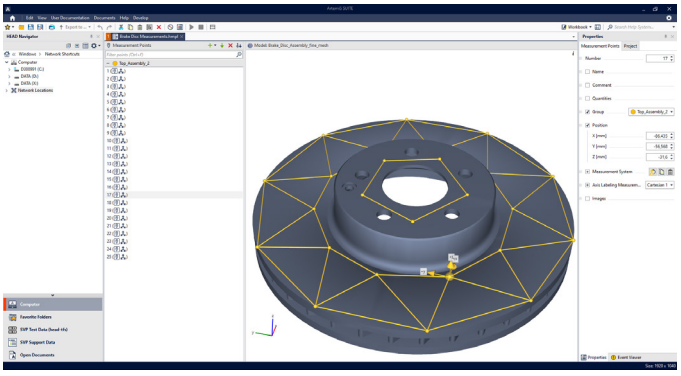
ArtemiS SUITE also provides tools for further processing the measurements. These include, for example, the powerful and perfectly coordinated Structural Analysis Package (APR 400, APR 410, and APR 420) which enables easy and intuitive determination and extraction of dynamic structural properties with the help of artificial intelligence (AI).



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



Recorder: the Channel Configuration view shows all relevant information on all channels.



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

AT A GLANCE

Data Acquisition

Connection of ...

Triax accelerometers

Control / Power Supply

Connection to ...

Via HEAD*link* 2.0

- Dual Link (HEAD*link* 1 + HEAD*link* 2) or Single Link (HEAD*link* 1)
  - *lab*CTRL II.1
- Single Link (HEAD*link* 1)
  - *lab*COMPACT12 II, *lab*COMPACT24 II
  - *lab*HSU (as of firmware 2.1)
  - HMS V Digital HEAD Measurement System (as of firmware 2.1)

Via HEAD*link* 1.0

- Single Link (HEAD*link* 1)
  - VMA V HEAD VISOR microphone array

Power supply

Via HEAD*link* 1

- *lab*CTRL II.1
- *lab*COMPACT12 II, *lab*COMPACT24 II
- *lab*HSU
- HMS V Digital HEAD Measurement System
- VMA V HEAD VISOR microphone array

Scope of Delivery and Accessories

Scope of Delivery

*lab*V8x3-Iso II (Code 3756)
24-channel HEAD*lab* input module with HEAD*link* 2.0 transmission protocol for connecting triax accelerometers

Hardware Accessories

Required

(with HEAD*link* 2.0)

Controller

*lab*CTRL II.1 (Code 3704)
- Controller

or

*lab*COMPACT12 II (Code 31020)
- 12-channel compact system (controller)

or

*lab*COMPACT24 II (Code 31021)
- 24-channel compact system (controller)

or

2-Channel Frontend

*lab*HSU (Code 3710)
- 2-channel frontend with stand-alone mode (as of firmware 2.1) (up to firmware 2.1, only HEAD*link* 1.0 is available)

or

Artificial Head

HMS V (Code 1502)
- Digital HEAD Measurement System (as of firmware 2.1) (up to firmware 2.1, only HEAD*link* 1.0 is available)

or

(with HEAD*link* 1.0)

HEAD VISOR

VMA V (Code 7528)
- HEAD VISOR microphone array

or

Controller, ... (no longer available)

*lab*CTRL I.1 (Code 3701)
*lab*CTRL I.2 (Code 3702)
*lab*COMPACT12 (Code 3708)
*lab*COMPACT12-V1 (Code 3708-V1)
*lab*COMPACT24 (Code 3709)
*lab*COMPACT24-V1 (Code 3709-V1)
VMA II.1 (Code 7522)

Cables

CLL X.xx (Code 3780-xx)
- HEAD*link* cable LEMO 8-pin → 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

Recommended

Supply Modules

*lab*PWR I.1 (Code 3711)
- For HEAD*lab* systems up to max. 40 W

*lab*PWR I.2 (Code 3712)
- For HEAD*lab* systems up to max. 100 W

*lab*PWR I.3 (Code 3713)
- For HEAD*lab* systems up to max. 35 W

Power Adapters for Supply Modules

PS 24-60-L2
24 V, 60 W, LEMO 2-pin
(Code 0623B)
- For *lab*PWR I.1, *lab*PWR I.3

PS 24-150-L2
24 V, 150 W, LEMO 2-pin
(Code 0621 B)
- For *lab*PWR I.1, *lab*PWR I.2, *lab*PWR I.3

Software Accessories

Required

(when connecting a controller to a computer)

APR 000 (Code 50000)
APR Framework
› Basis of ArtemiS SUITE

APR 040 (Code 50040)
Recorder
› Universal Recorder of ArtemiS SUITE

Recommended (Modules of ArtemiS SUITE)

Data Preparation

ASP 302 (Code 51302)
Data Preparation
› Measurement data preparation

Data Processing / Analysis

APR 010 (Code 50010)
Pool Project
› Interactive processing and analyzing

APR 050 (Code 50050)
Automation Project
› Automated processing and analyzing

ASP 001 (Code 51001) to ASP 203 (Code 51203)
Analysis modules of ArtemiS SUITE

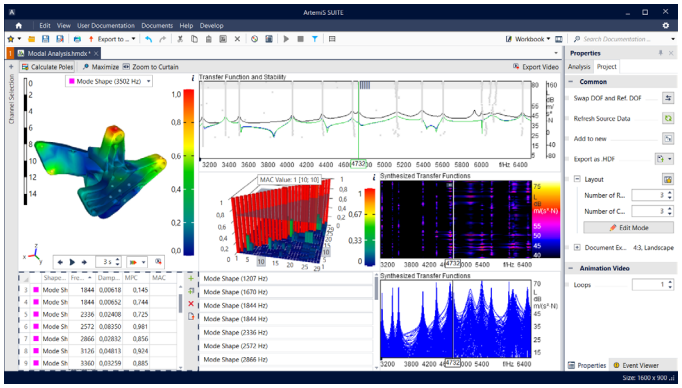
Modal analysis

APR 420 (Code 50420)
Modal Analysis Project
› AI-based and intuitively performable modal analysis

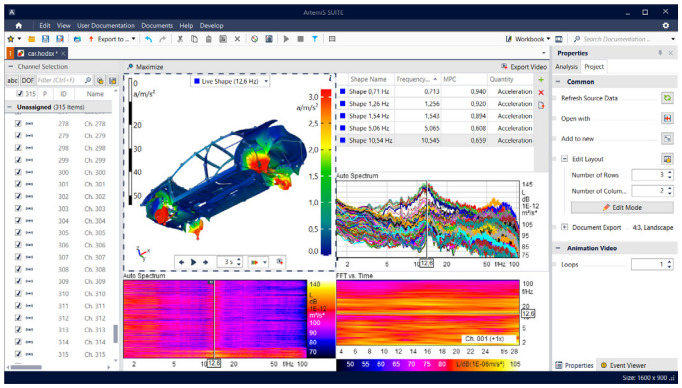
APR 400 (Code 50400)
ODS Project
› Animation and analysis of deflection shapes

APR 410 (Code 50410)
Shape Comparison Project
› Analysis and comparison of deflection shapes

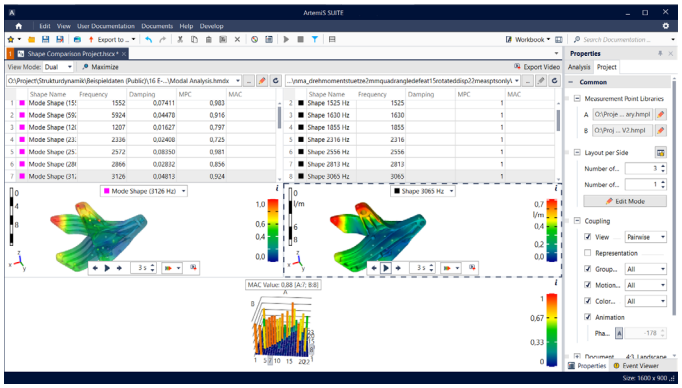
Further modules of ArtemiS SUITE
(see data sheet ArtemiS SUITE Overview)



APR 420: the Modal Analysis Project enables users to examine the vibration behavior of a test object.



APR 400: the Operating Deflection Shape Project (ODS Project) enables users to examine the vibration pattern of a test object in a defined stationary test condition.



APR 410: the Shape Comparison Project enables users to manually compare different deflection shapes of test objects or simulations.

Technical Data

General	
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 bis +60 °C, +14 °F to 140 °F
Storage temperature	-20 °C to +70 °C, -4 °F to +158 °F
Dimensions	148 x 48 x 175 mm (WxHxD)
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 Microtech
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, ±37.4 °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 highpass filter	1.6 Hz, 1st order, ±5%
Digital highpass filter @f_S = 48 kHz, proportional to f_S	1 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 triax 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 (version 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, ±37.4 °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”.

Consequently, *the Signal-to-Noise Ratio (SNR or S/N) is specified for* labV8x3-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 the literature, the term “dynamics” is sometimes used by analogy with the S/N, but 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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