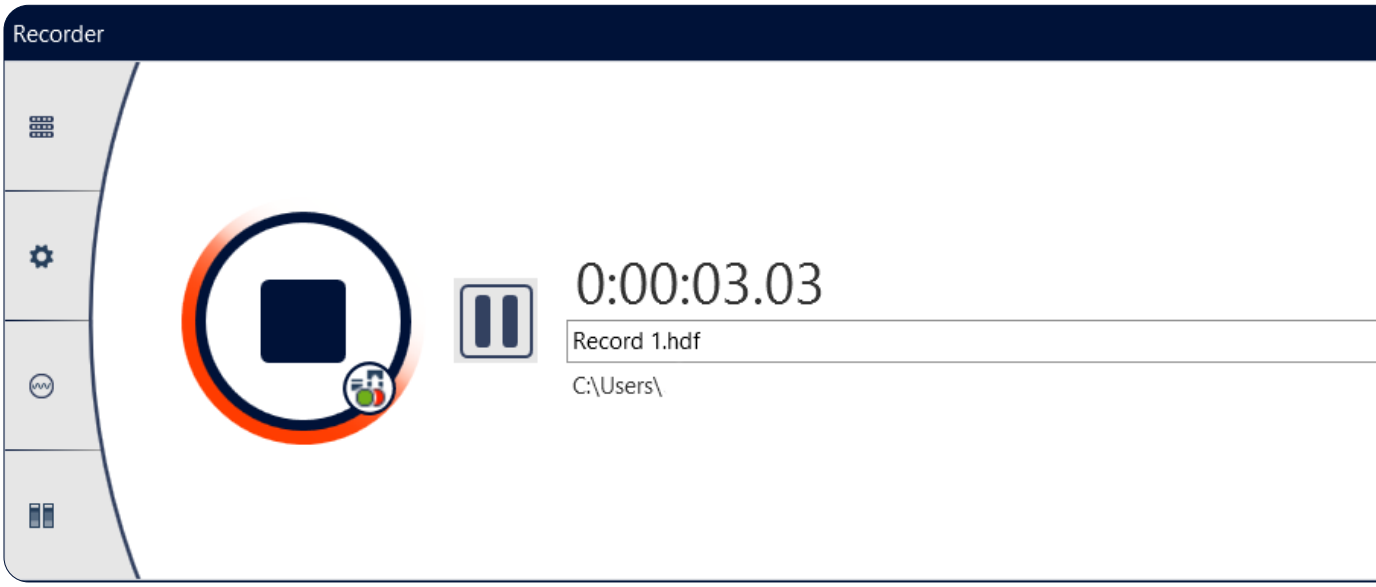
HEAD acoustics

DATA SHEET



ArtemiS SUITE
PRoject

Code 50040

APR 040 Recorder

The universal Recorder is the central data acquisition module of ArtemiS SUITE for all acoustic and vibroacoustic measurement tasks, from simple start/stop recordings to complex measurement workflows. Flow Control, triggers, and real-time analyses, as well as the integration of 2D or 3D models, enable efficient and reliable measurement workflows. The measurement results can then be automatically presented in Reports.

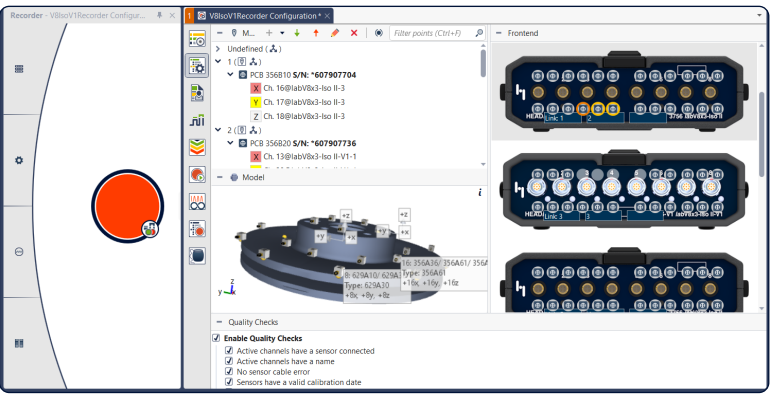
OVERVIEW

APR 040 Recorder

Code 50040

With HEAD*lab*, our high-end, modular, second-generation data acquisition system, the Recorder enables subsample-accurate synchronized measurements (typically <1 µs) across more than 1,000 channels and sampling rates from 2.048 kHz to 204.8 kHz. In addition, artificial head measurement systems, the handheld recording and playback systems SQuadriga III and SQobold, and other hardware can be seamlessly integrated.

The innovative operating concept is evident, among other things, in the visual representation of the measurement chain elements and the integration of 3D models. After loading a Measurement Point Library (included in APR 000), you can simply assign sensors to the measurement points of a 3D model and the corresponding frontend channels of the displayed frontend using drag-and-drop.



KEY FEATURES

General benefits
- Universal Recorder for all measurement tasks
- Task-oriented, clearly structured user interface

Frontend Selection
- Automatic detection of supported frontends
- Offline frontends

Channel Configuration
- Easy naming and configuration of channels
- Use of custom Sensor Libraries
- Wizards for sensor calibration, reading TEDS information, and level adjustment

Measurement Setup
- Visual representation of the measurement setup for intuitive and safe configuration
- Structured planning and execution of measurements using measurement points and 3D models

Integration of User Documentation and additional information that is automatically available for use in a Report

Individually adjustable triggers

Flow Control for automating recurring tasks (no programming skills are required)

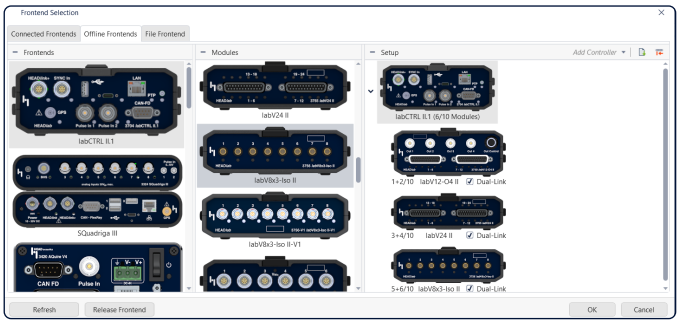
Real-time monitoring using 2D and 3D analyses, tachometers, single-value displays, and more

Shaker excitation with simultaneous measurement of the test object response

DETAILS

Frontend Selection

The Frontend Selection automatically displays all connected and supported frontends and modules in a graphical overview. Even if the hardware is not currently available, simulated frontends enable you to prepare future measurements with ease. To do so, you can intuitively assemble your measurement system using drag-and-drop, enabling even large measurement systems with more than 1,000 channels to be configured quickly. All configured settings can be transferred to the actual frontend once it has been connected.



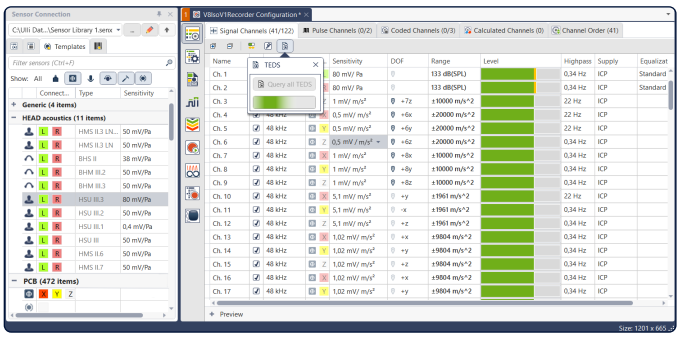
Frontend Selection

Recorder Configuration

The task-oriented, clearly structured Recorder Configuration covers all aspects of data acquisition. Each aspect has an icon that provides direct access to the associated settings, ensuring that you always maintain a clear overview.

Channel Configuration

The Channel Configuration presents signal and pulse channels, as well as encoded and calculated channels, in separate tabs, with all relevant information displayed in tabular form. With just a few mouse clicks, you can select the channels to be recorded, configure them intuitively, and optimize signal levels. Sensor Calibration (AC/DC) guides you quickly and safely through the calibration procedure of the connected sensors. The TEDS function automatically reads the information stored in the sensor.

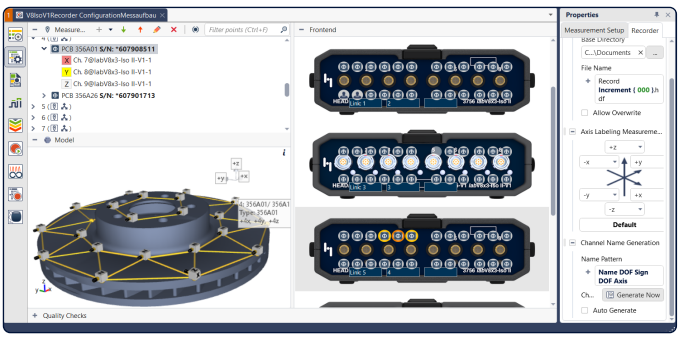


Channel Configuration

Measurement Setup

The Measurement Setup is used to assign sensors, frontend connectors, and measurement points to one another. To do so, a sensor is dragged onto the corresponding frontend connectors and measurement points. The orientation of the sensors can be adjusted individually.

Alternatively, simple measurement tasks can be performed using generic sensors without measurement points.



Measurement Setup

User Documentation

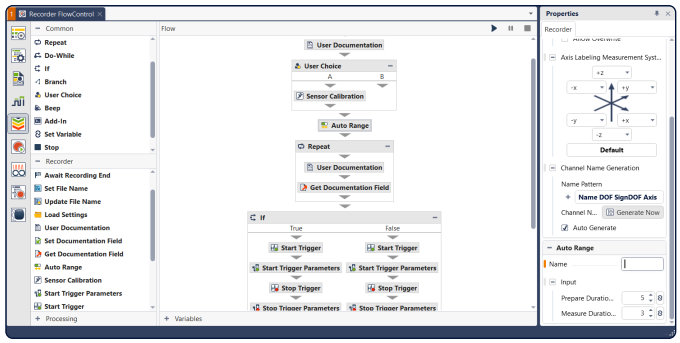
The User Documentation enables you to supplement measurements with technical information at the very beginning of the measurement chain, allowing the stored information to be used, for example, for reporting.

Trigger

Triggers enable you to automatically start and stop measurements upon the occurrence of specific conditions.

Flow Control

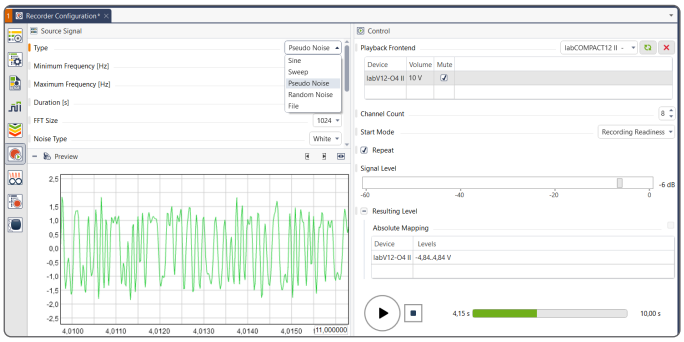
The Flow Control enables you to create simple to complex program sequences for individual tasks—with no programming knowledge required.



Flow Control

Excitation

The Excitation enables playback of an excitation signal (sine, sweep, pseudo-noise, etc.) to record their effects on a test object.



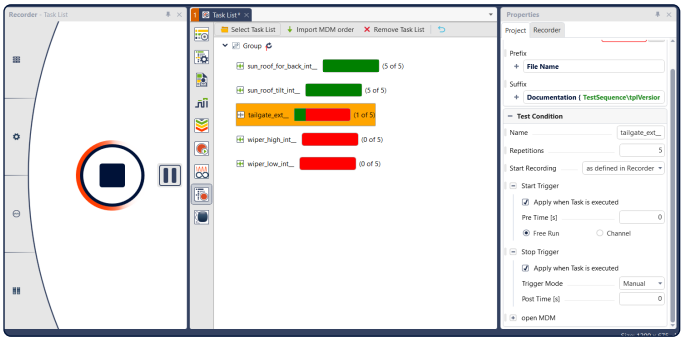
Excitation

Online Analysis

For visual monitoring using the Online Monitor, the following analyses can be configured individually: FFT, 1/n Octave, Level, FFT vs. RPM, Level vs. RPM, Sound Power, Order, Order Cut vs. RPM, Partial and Multiple Coherence. In addition, selected analysis results can be used as triggers to define the start and end of recording.

Task List

The Task List enables you to configure and work through a list of planned recordings. It can be extracted from a Standardized Test Project (APR 220 is required) and simplifies the execution of a test series in accordance with a required quality standard. This also enables openMDM® measurement tasks to be performed quickly and easily using MDM Recording (ASP 702 is required).

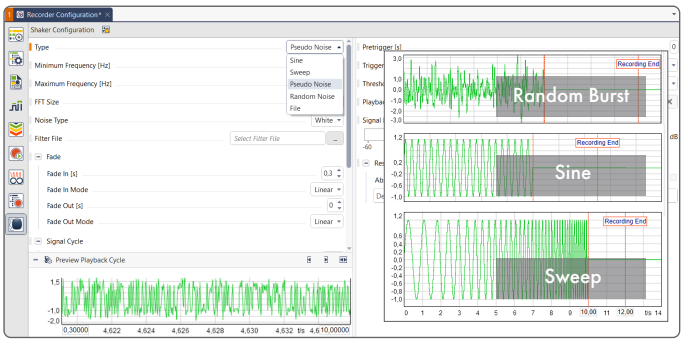


Task List

Shaker Configuration

The combined HEAD*lab* input and output module *lab*V12-O4 II is particularly well suited for shaker measurements, enabling simultaneous excitation of structures using shakers and measuring the resulting responses.

Partial Coherence and Multiple Coherence are available as Online Analyses to support the measurement setup and troubleshooting during shaker measurements.



Shaker Configuration

Online Monitor

For visual monitoring of the incoming signals, the Online Monitor provides 2D and 3D diagrams such as Floating, Floating vs. RPM, XY Floating, and Point Map, along with bar graphs, tachometers, single-value displays, and more. For example, the Point Map Diagram can be used to display analysis results as a function of two reference quantities. The elements can be selected, arranged, and resized as needed.

A custom-configured Online Monitor can be saved as a separate document for future reuse.



Online Monitor

Supported Frontends

Preferred hardware includes our flexible, modular HEAD*lab* systems, handheld data acquisition systems (e.g., SQuadriga III and SQobold), digital artificial head measurement systems (e.g., HMS V and HSU III.2), and the AQuire V4 EoL frontend.

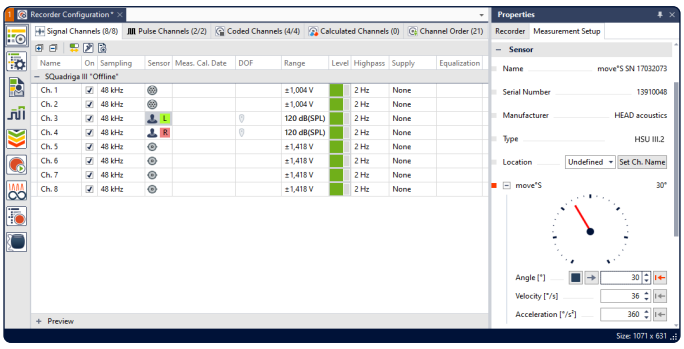
HEAD*lab* controllers and modules can be synchronized with sub-sample accuracy using HEAD*link* interfaces, PTP (Precision Time Protocol), or navigation satellite systems, enabling the optimal use of RPM, pressure, charge, and temperature sensors, measuring bridges (strain gauges), IEPE/ICP and condenser microphones, artificial heads, and much more.

Selected third-party frontends can also be used. When combined with the *lab*CTRL II.1 HEAD*lab* controller, gateways and modules from CSM GmbH enable high-voltage signal measurements, while network interfaces from Vector Informatik GmbH support the acquisition of Automotive Ethernet signals.

The HMS/HSU upgrade for motorized head rotation, move°S, is available for the HSU III.2 artificial head (manufactured in 2021 or later) and all HMS II measurement systems. It enables precise, repeatable head rotation while keeping the shoulders stationary, providing a realistic simulation of human head movements. move°S can be controlled via the Channel List or Flow Control, for example, to perform a series of measurements with different head orientations.



HEADlab system



move°S configuration for HSU III.2 head rotation

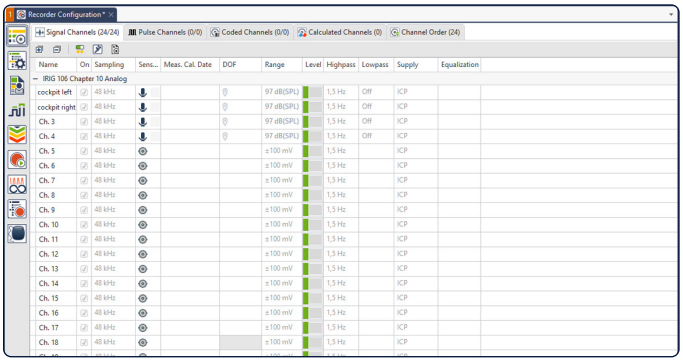


HSU III.2 with move°S

Recording of Data Streams According to IRIG 106 Chapter 10

The Recorder supports the acquisition of analog channel data from UDP data streams in the standard IRIG 106 Chapter 10 format (ASP 708 is required), a format widely used in high-performance test and telemetry systems, particularly in aerospace applications.

This enables you to record analog channel data from UDP network streams integrated as Recorder frontends while continuing to use your existing measurement infrastructure.



ASP 708 IRIG 106 Chapter 10 Support

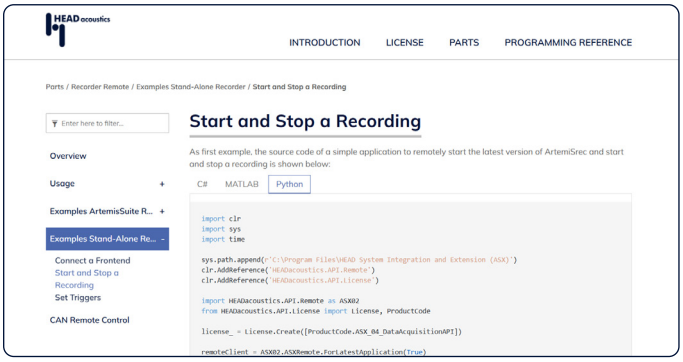
ASX Programming Interfaces (HEAD System Integration and Extension)

Using the ASX 08 and ASX 04 programming interfaces, you can control the Recorder either as a stand-alone application without a user interface or directly from within your own software applications.

› Local Recording Service (ASX 08)

ASX 08 enables automated measurements using the stand-alone Recorder and our frontends. Key functions can be executed at the touch of a button or by a trigger, allowing the Recorder to be integrated into test-bench workflows.

ArtemiS SUITE does not need to be installed.

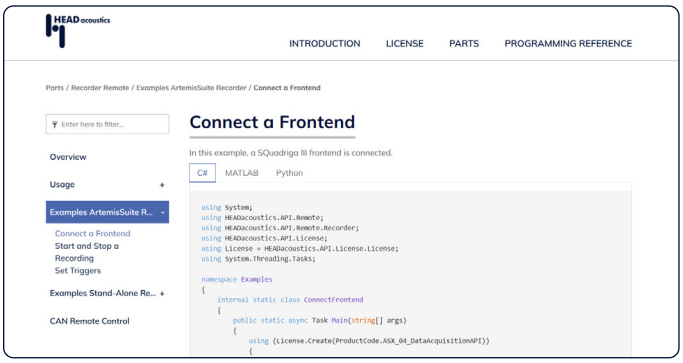


Python programming example: Local Recording Service (ASX 08)

› Data Acquisition API (ASX 04)

ASX 04 allows you to control various Recorder functions directly from within your own software applications, including starting and stopping measurements, connecting frontends, and configuring triggers. Recorder configurations can be stored and reloaded as needed.

To access the full functionality of ASX 04, ArtemiS SUITE must be installed.



C# programming example: Data Acquisition API (ASX 04)

SUPPORTED HARDWARE

HEAD*lab* Products

Code	Product Name	Description	Availability
3704	*lab*CTRL II.1	Controller	*Available*
3701, 3702	*lab*CTRL I.1, *lab*CTRL I.2	Controller	*Discontinued*
31020, 31021	*lab*COMPACT12 II, *lab*COMPACT24 II	Compact system	*Available*
3708, 3708-V1, 3709, 3709-V1	*lab*COMPACT12, *lab*COMPACT12-V1, *lab*COMPACT24, *lab*COMPACT24-V1	Compact system	*Discontinued*
3710	*lab*HSU	2-channel frontend	*Available*
37XX	*lab*VF6 II, *lab*VF6-Iso II, *lab*V6HD, *lab*V12 II, *lab*V24 II, *lab*M6 II, *lab*V8x3-Iso II, *lab*V8x3-Iso II-V1, *lab*V12-O4 II, *lab*SG6, *lab*T6, *lab*CF6, *lab*DX-B, *lab*HRT6	Module	*Available*

Other Systems

Code	Product Name	Description	Availability
1502	HMS V	Digital artificial head measurement system	*Available*
1500	HMS IV	Digital artificial head measurement system	*Discontinued*
1391	HSU III.2	Artificial head microphone, analog version with IEPE/ICP microphones	*Available*
1750	UG move°S	HMS/HSU upgrade for motorized head rotation	*Available*
3324	SQuadriga III	Mobile recording and playback system	*Available*
3320	SQuadriga II	Mobile recording and playback system	*Discontinued*
3302	SQobold	Mobile recording and playback system	*Available*
3420	AQuire V4	4-channel frontend	*Available*
1346	BEQ II.0	2-channel frontend	*Discontinued*
1347	BEQ II.1	Binaural frontend	*Discontinued*

Shakers from Qsources

Code	Product Name	Description	Availability
0280	Qsources Qlws	Miniature shaker, self-supporting and self-aligning, 250 Hz to 3,000 Hz	*Available*
0285	Qsources Qsls	Large shaker, self-supporting and self-aligning, 22 Hz to 1,000 Hz	*Available*
0288	Qsources Qwis	Shaker, self-supporting and self-aligning, 25 Hz to 2,400 Hz	*Available*

Gateways and Modules from CSM GmbH

Product Name	Description	Availability
XCP Gateway Basic, XCP Gateway pro, XCP Gateway 4S pro (with XCP Gateway 4S pro, use is limited to one of the four gateways)	Gateway	*Available*
HV AD4 OW1000, HV AD4 XW1000, HV AD4 IF1000, HV BM 1.1, HV BM 1.2, HV BM 1.2 C, HV BM 1.2+S, HV BM 1.2+U, HV BM 3.1, HV SAM 1.1, HV IEPE FL100, AD4 OG100, AD4 OG1000, AD4 IG100, AD4 IG100 pro, AD4 IG1000, AD4 IG1000 pro, AD4 IE100, AD4 IE1000, AD4 OE100	EtherCAT module	*Available*
HV AD4 XW4000, HV BM 3.1 OBC, HV BM 3.3, HV BM 3.3 C, HV SAM 3.3	XCP module	*Available*

Network Interfaces from Vector Informatik GmbH

Product Name	Description	Availability
VN5430, VN5620, VN5640	Interface	*Available*

The information on supported hardware applies to the current version of ArtemiS SUITE.

LICENSES AND OPTIONAL FEATURES

General Requirements

Code	Product Name	Description
50000	APR 000 APR Framework	Basis of ArtemiS SUITE
50040	APR 040 Recorder	Universal Recorder of ArtemiS SUITE for all types of measurements

Optional Features

Code	Product Name	Description
51702	ASP 702 MDM Recording	Performing openMDM measurement tasks
51801	ASP 801 Basic Decoder	The following decoders are available: CAN FD, CAN, OBD, FlexRay, GPS, GPS Track, Pulse, Trigger, Resolver, Ethernet, Quadrature
51708	ASP 708 IRIG 106 Chapter 10 Support	Recording of data streams in accordance with IRIG 106 Chapter 10
50020	APR 020 Report	Central element of ArtemiS SUITE: display of filtered, analyzed, and statistically processed input signals in an individual Report
50220	APR 220 Standardized Test Project	Central project of ArtemiS SUITE: performing measurements on test objects under different operating conditions with the Recorder and analyzing the data in various ways

Licenses Required for ASX 08

Code	Product Name	Description
5098	ASX 08 Local Recording Service	ASX programming interface: stand-alone measurements using the Recorder
5094	ASX 04 Data Acquisition API	ASX programming interface: controlling the Recorder from within your own software
We recommend creating a Recorder Configuration (*.hrcx) with the Recorder (licenses for APR 000 and APR 040 are required for this purpose) and using it for stand-alone measurements with ASX 08.		

Licenses Required for ASX 04

Code	Product Name	Description
5094	ASX 04 Data Acquisition API	ASX programming interface: controlling the Recorder from within your own software
50000	APR 000 APR Framework	Basis of ArtemiS SUITE
50040	APR 040 Recorder	Universal Recorder of ArtemiS SUITE for all types of measurements
We recommend creating a Recorder Configuration (*.hrcx) with the Recorder (licenses for APR 000 and APR 040 are required for this purpose) to control the Recorder from within your software.		
Optionally, the Recorder can be controlled via the CAN remote control. For this purpose, the following items are required: › PCAN-USB or PCAN-USB FD adapter › Device drivers and tools from PEAK-System › Dongle with a license for ASX 04		

IEPE is an industry standard for piezoelectric sensors with integrated impedance converter electronics. Similar technologies are marketed by different manufacturers under proprietary names such as ICP, CCLD, IsoTron, and DeltaTron. Throughout this document, the term IEPE/ICP is used as a generic designation representing the corresponding manufacturer-specific product and trademark names.

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HEAD acoustics

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