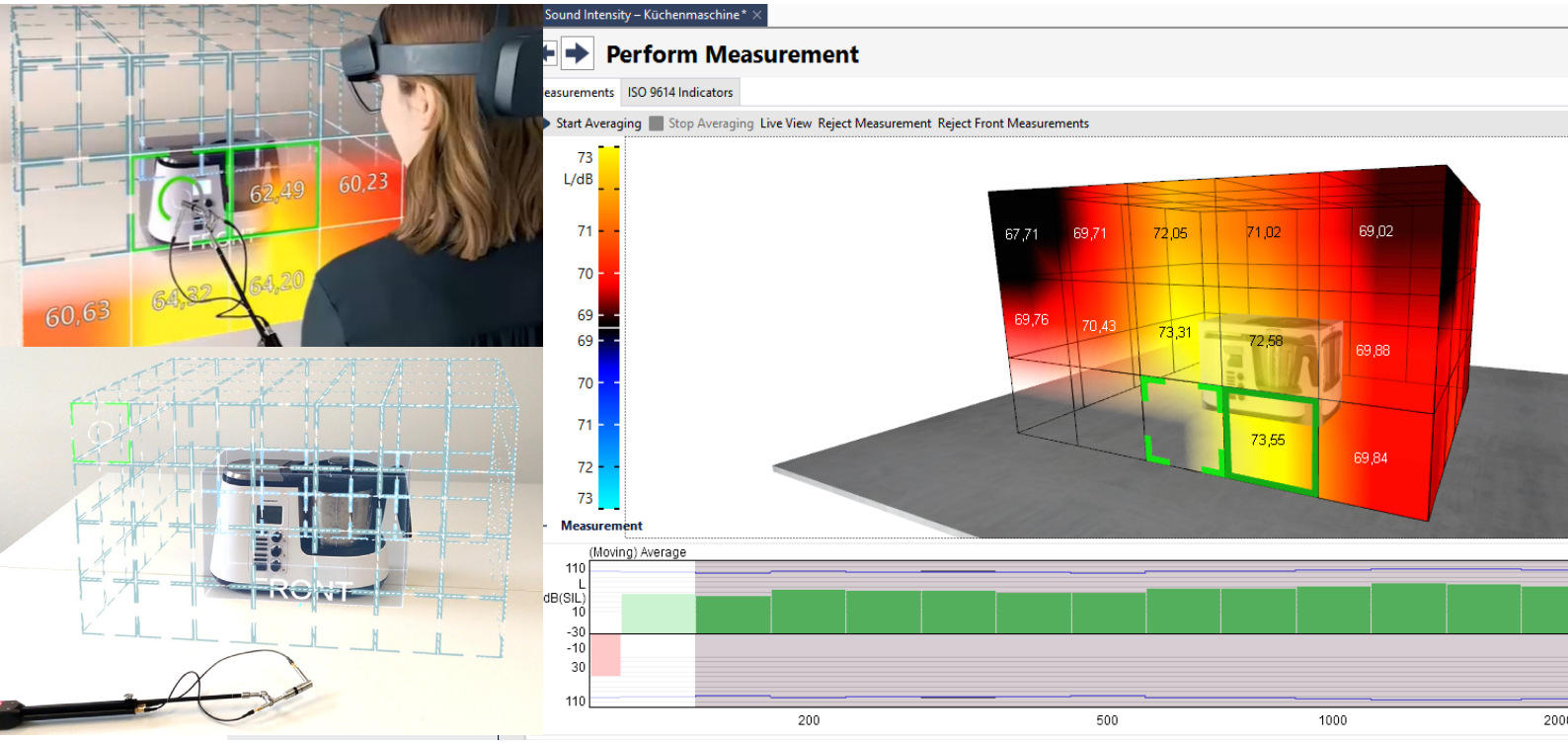
HEAD acoustics

DATA SHEET



ArtemiS SUITE
PRoject

Code 50300

APR 300 Sound Intensity Measurement

Sound Intensity Measurement of ArtemiS SUITE enables sound power measurement and determination according to DIN EN ISO 9614 and offers the use of the trend-setting virtual measuring procedure with augmented reality glasses.

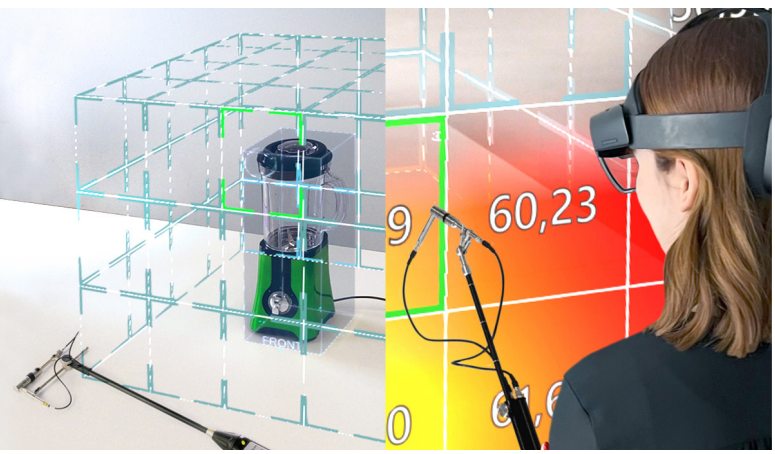
OVERVIEW

APR 300 Sound Intensity Measurement

Code 50300

Sound Intensity Measurement is used to generate a sound intensity map of a 3D model using sound intensity measurements (Discrete Points / Scanning) in order to determine the sound power emitted by a test object according to ISO 9614.

As an alternative to the construction of a physical grid for Discrete Point and Scanning measurements according to ISO 9614, Sound Intensity Measurement provides the use of the HoloLens 2 Augmented Reality glasses from Microsoft. AR glasses can be seamlessly integrated into the procedure, making ISO-compliant measurements easier and thus enabling faster measurements. This efficient virtual solution facilitates the required sound intensity measurements and enables even less experienced users to perform ISO-compliant measurements.



KEY FEATURES

Performing sound intensity measurements for determining sound power according to ISO 9614

- Discrete Points (ISO 9614-1), Scanning (ISO 9614-2, ISO 9614-3)
- Quick diagnostics for troubleshooting

HoloLens 2 Augmented Reality for all measurements according to ISO 9614-1, ISO 9614-2, ISO 9614-3

- Easy use of virtual, ISO-compliant measurement grids
- Assistant-guided measurement process
- High measurement reliability thanks to visual control of probe positioning
- Visualization of the measurement progress for each measurement and verification of ISO conformity
- Automatic display of measurement results in a sound intensity map including measured single values

One-click Report, either ISO-compliant or freely designed (APR 020 is required)

Quick diagnostics (troubleshooting) for localization of sound sources, comparative measurements, etc.

Support of the SQuadriga III and SQobold frontends for mobile measurement tasks, for example

APPLICATIONS

Innovative and easy performance of ISO-compliant sound intensity measurements even for less experienced users

DETAILS

Measurements using the HoloLens 2 Augmented Reality glasses from Microsoft

HOLOLENS 2 AR GLASSES

The use of the HoloLens 2 AR glasses eliminates the need to construct a real measurement grid and reduces faults during the measurement procedure.

This is made possible by a jointly developed new interface of ArtemiS SUITE to Sound HUB, a software solution for which our partner HoloMetrix was awarded the German Innovation Award 2022 in gold. Intuitive assistance functions of the software use augmented reality to guide even inexperienced users safely through the entire measurement procedure and visualize the measurement progress as well as the measurement results of the segments.

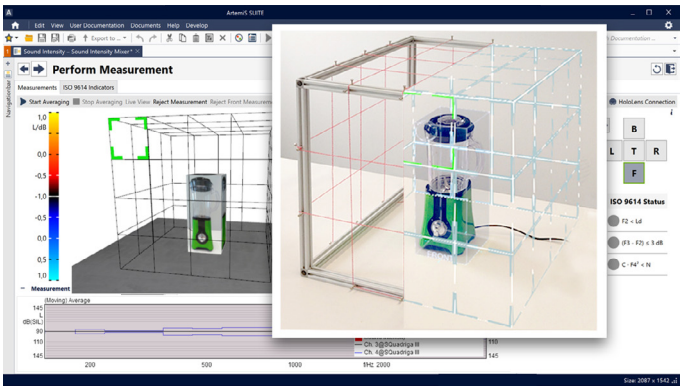
The AR glasses are connected to the computer via Bluetooth and can be controlled with simple gestures. The measurement grid visualized by the Sound Intensity App via the AR glasses can be adjusted very easily and brought into line with the standard enveloping surface.

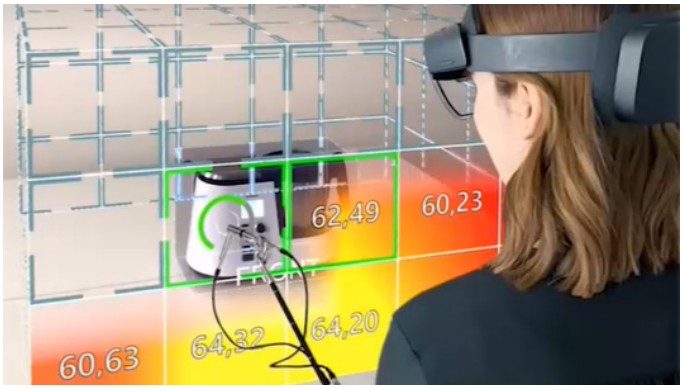
DISCRETE POINTS / SCANNING

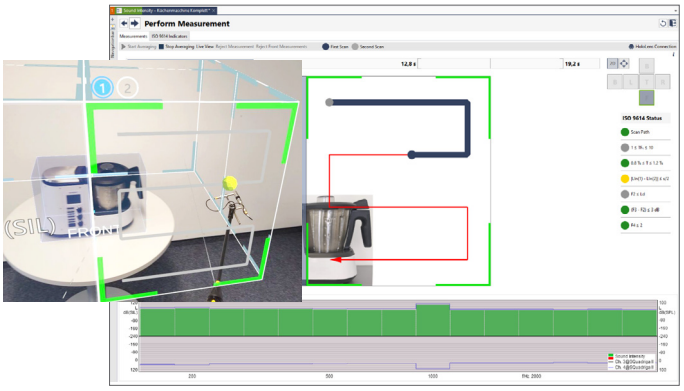
The individual measurement surfaces are displayed in the visualized measurement grid so that the probe can be used precisely. After each measurement, users receive feedback on whether the results comply with the specifications of ISO 9614-1, ISO 9614-2, and ISO 9614-3.
In combination with a remote control on the measurement probe, all necessary measurements can be managed in one operation without having to switch to the computer.

SOUND INTENSITY MAP

The sound power single values and the corresponding color mappings are automatically displayed for the measured surfaces so that users are able to locate critical sound emissions immediately.







Assistance functions of the Sound Intensity App guide users safely through the measurement procedure. The standard-compliant measurement positions and the measurement progress are automatically visualized via the AR glasses. The app displays measurement results in the measured areas in the form of a sound intensity map including the measured single values.

ISO-compliant sound intensity measurements

- With or without the use of HoloLens 2 AR glasses:
  - Discrete Points: Measurement according to ISO 9614-1
  - Scanning: Measurement according to ISO 9614-2, ISO 9614-3

Assistant-guided procedures

From frontend and sensor configuration to compliance with the ISO standard, users are supported by the software assistant and safely guided through the respective procedure. In addition, acoustic and visual feedback functions are provided, enabling users to detect violations of the standard immediately during the measurement, for example. Furthermore, it enables switching between ISO measurement and quick diagnostics.

Saving as a project

All measurements, including the frontend configuration and all settings, are saved as a project, enabling users to re-use or modify them later.

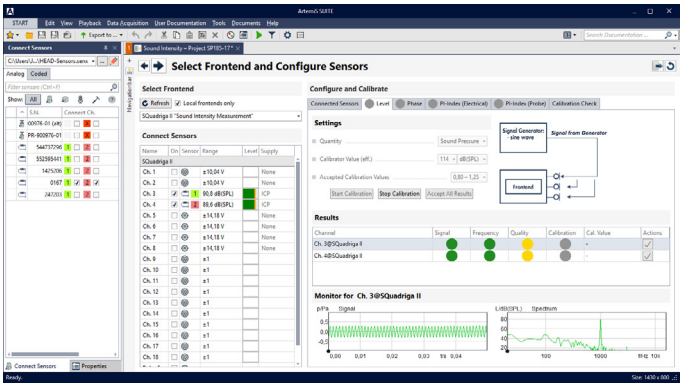
Frontend and sensor configuration

FRONTENDS

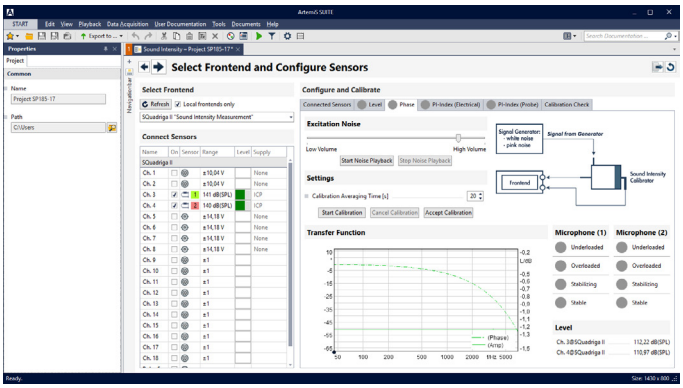
Various frontends from HEAD acoustics are available for the measurements. Using the powerful, lightweight, battery-powered SQuadriga or SQobold frontends is recommended if the hardware is to be used for mobile applications.

SENSORS

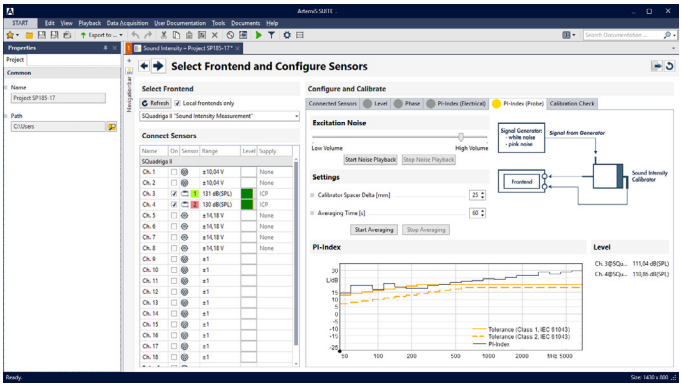
When assigning sensors, users can make use of a Sensor Library, which contains the technical specifications of common PU and PP probes. If no matching probe is in the list, new probes can be easily added to the library.



During level calibration, the current progress and the status of all channels currently handled by the calibration are displayed. To the right of the settings, a setup scheme facilitates the creation of a measurement setup suitable for channel calibration.



For the phase calibration of a PP probe, it is also possible to use noise playback via an internal or external sound card (e.g., the labO2 equalizer), where the noise volume can be adjusted with a slider.



The diagram shows the pressure-residual intensity index resulting from the averaging, together with the tolerance curves for class 1 and class 2 according to IEC 61043. In addition, all connected and active channels are listed along with their current signal levels.

Measurements (Discrete Points / Scanning)

3D MODEL REPRESENTATION

A 3D representation simplifies the specification of the geometry of the test object and the surrounding measurement surface. The test object is displayed as a freely rotatable, movable, and zoomable 3D box, surrounded by a three-dimensional, rectangular grid, which can be configured very easily. Custom images of the test object (JPG or PNG files) can be mapped onto the sides of the object box for better orientation and use in the resulting Report.

MEASUREMENT METHODS

› Discrete Points (ISO 9614-1)
› Scanning (ISO 9614-2 / 9614-3)

Thanks to the 3D representation, the measurement procedure can be performed very easily, assisted by visual and acoustic feedback functions indicating any violations of the standard. In this case, individual steps can be repeated.

› The measurement method Discrete Points enables the individual measurement points to be measured step by step.
› When using the Scanning measurement method, the representation changes to a 2D plan view of the relevant partial area, above which the scan path to be followed is displayed as a red line.

SOUND INTENSITY MAP

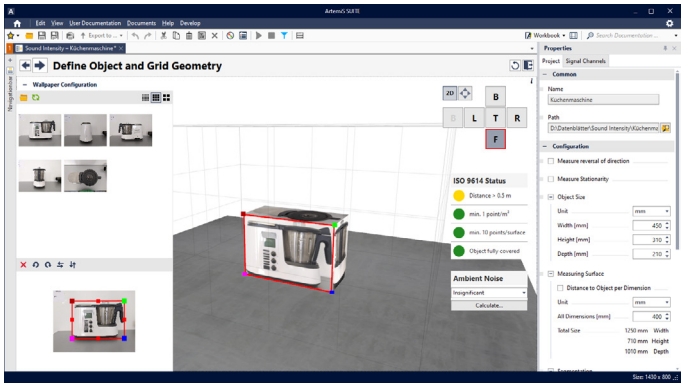
After a measurement, the 3D sound intensity map automatically displays the performed averaging with colors and as additional single values. The color-coding of the individual frequency bands immediately indicates whether the measurement was successful and complies with the standard.

REAL-TIME TEST DIAGRAMS

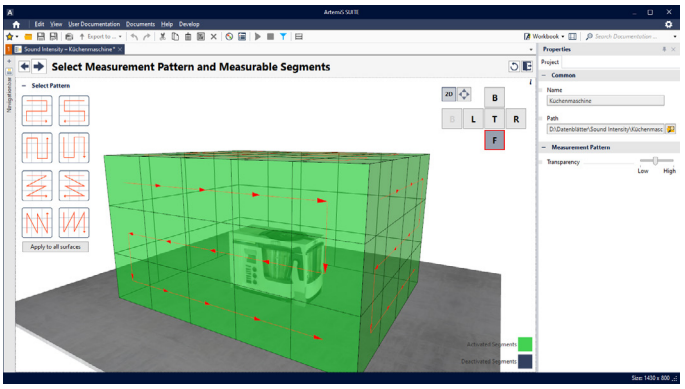
Status indicators indicate whether the results are compliant with the ISO 9614 requirements and suggest how identified problems can be solved.

Multiple diagrams immediately inform about the status of the field indicators F2, F3, and F4.

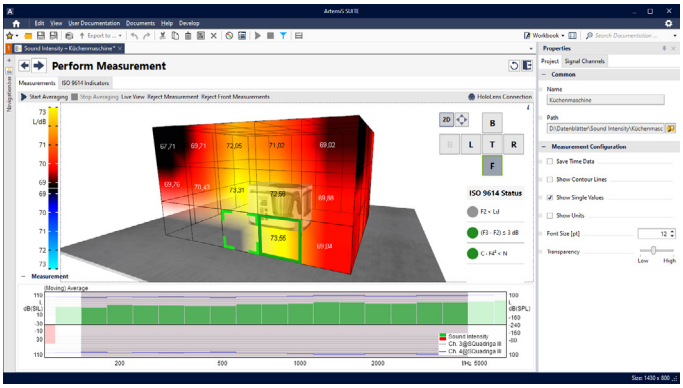
The moving average values of sound intensities and signal levels are displayed in Butterfly Diagrams as columns (sound intensity) or curves (levels). If a measurement violates the ISO criteria, this is indicated immediately.



When defining the object and grid geometries, the dimensions and the subdivision of the measurement surface surrounding the test object can be specified very easily. Images of the test object can be mapped onto the sides of the 3D box representing the object.



When specifying the pattern based on which the individual segments are to be processed during the measurement, partial surfaces can be excluded from the measurement.



Easily identifiable for the user during the measurement, the next point to be measured and the corresponding side of the measurement surface are highlighted with a green frame. Below that, a Butterfly Diagram shows the moving averages of the sound intensity as columns and the signal levels of all active, connected channels as curves.

SOUND INTENSITY ANALYSIS

After the measurement, the test object is displayed with the overlaid sound intensity map in an unfolded 2D representation for determining the sound power. By means of graphical selection elements, users can select which pages or segments are to be used for calculating the sound power.

QUICK DIAGNOSTICS (TROUBLESHOOTING)

As an alternative to the ISO 9614 measurement, a quick diagnostics mode for troubleshooting is available.
This is a very versatile method allowing any position on a test object to be measured. With little effort, sound sources can be located and multiple measurement objects or surface materials can be compared with each other.

For measurements of test objects with very stationary sound emissions, a single scan with the measurement probe is usually sufficient to locate the sound source by means of the peaks in the "(Moving) Average" Butterfly Diagram.

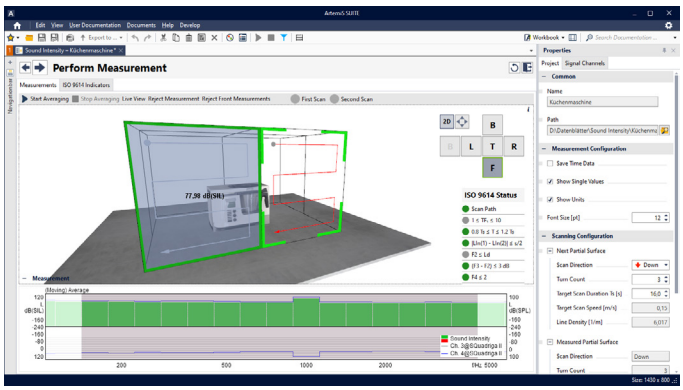
For a comparison, e.g., of different surface materials, different averaged measurement results can be saved as "snapshots" and compared with each other. The differences are displayed in the "(Moving) Profit" Butterfly Diagram.

EXPORT AND REPORTING

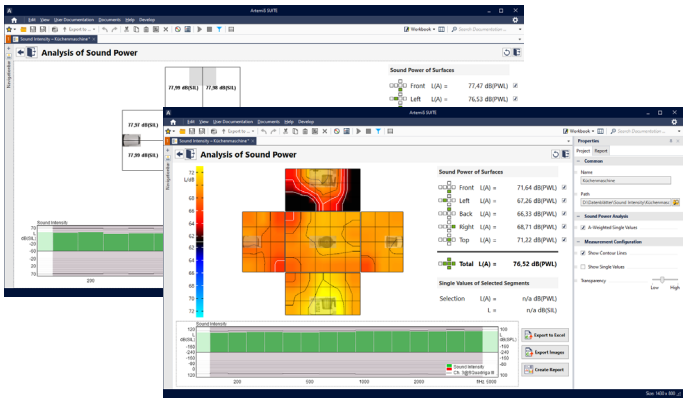
The resulting data can be exported to Excel as images or as a Report (APR 020 is required).

Various options are available for creating a Report. An ISO-compliant Report is generated automatically containing all information required by ISO 9614 which can be edited by the user.

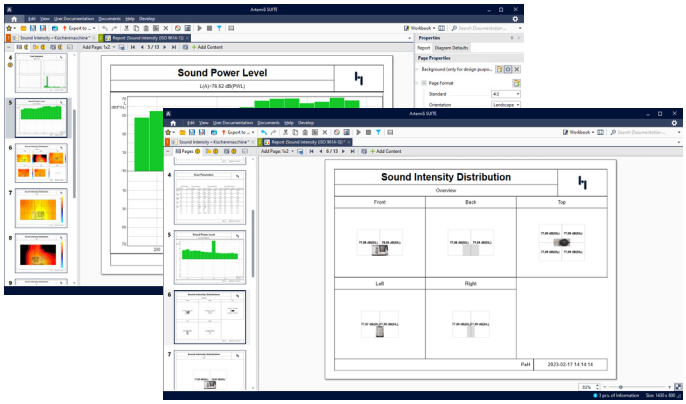
A created Report can be saved as a template and re-used later.



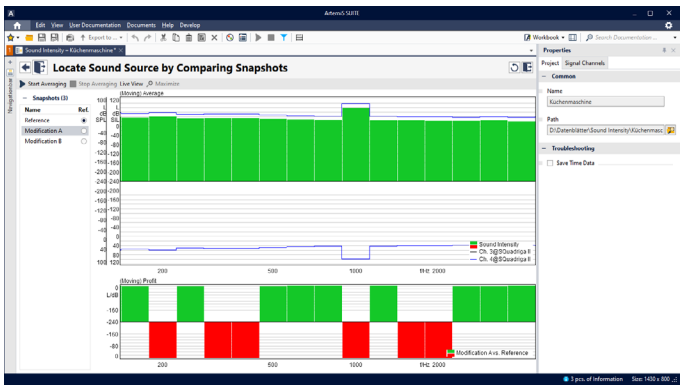
The toolbar below the progress bar shows the target value of the scanning duration, the allowed, and the expired duration of the active averaging.



The Butterfly Diagram shows the averaged sound intensities of all selected segments in the 2D view.



A Report summarizes the results, images, diagrams, and so on. The Report can be made ISO-compliant so that it contains the information required by ISO 9614.



Quick diagnostics method: Butterfly Diagram

RECOMMENDED HARDWARE

- Mobile frontends from HEAD acoustics with built-in battery
  - SQuadriga III (3324)
    Mobile 8-channel recording and playback system
  - SQobold (Code 3302)
    Mobile 4-channel recording and playback system
  - SQuadriga II
  - SQuadriga
    (when using SQuadriga, only the channels 1+2 or 3+4 are available)
- Multi-channel frontend systems
  - HEAD*lab* system (Code 3700)
    (second generation HEAD*lab* systems as of ArtemiS SUITE 13.5)
  - *lab*HSU (Code 3710)
    HEAD*lab* 2-channel frontend
  - *lab*COMPACT HEAD*lab* modules
- Supported probe types
  - One-dimensional PP probes with two microphones
  - One-dimensional PU probes (Microflown)
    (not compliant with ISO 9614)
- Remote control
  For remote controls, one remote control each from G.R.A.S. and Microtech Gefell are supported, as well as the combination of RC X.1 and RC X.2 from HEAD acoustics
  - RC X.2 (Code 9851)
    Wireless module for controlling RC X.1
  - RC X.1 (Code 9850)
    Remote control for connection to a PC, SQuadriga III, and SQobold
- DATaRec 4
  Data acquisition system
  DATaRec 4 Support (ASP 701) is required

Required: APR 000 Framework (Code 50000)

HEAD acoustics

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