



- SMART data acquisition and analysis
- Compact 3 in 1 solution: DAQ box, oscilloscope and arbitrary signal generator
- High-frequency signal analysis up to 50 MHz
- Seamless experience: fully-featured data analysis in SMART Lab
- Synchronization with other SMART devices
- Excellent connectivity: Wi-Fi, Bluetooth & USB
- Noiseless operation through passive cooling

# SMART DAQ

High performance multichannel data acquisition and signal generation, fully synchronized with all other SMART devices, ensuring seamless integration and efficient, real-time data analysis.

# General specifications



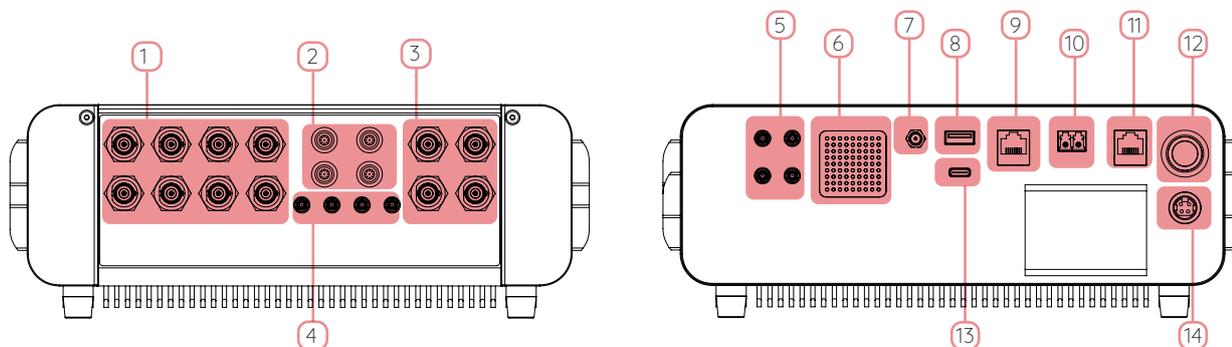
## Overview

|                          |  |
|--------------------------|--|
| Max. frequency bandwidth | DC to 50 MHz   |
| Signal processing        | Digital (FPGA based)   |
| User interface           | 7" Full HD+ touchscreen with 1000 nits peak brightness                 |
| Operating temperature    | 0 °C to 40 °C  |
| Dimensions               | Length x width x height: 147 x 270 x 95 mm                             |
| Weight                   | ~ 2.5 kg   |
| Power supply             | 100 - 240 V AC (50-60 Hz) or 12 V DC                                   |
| Portability              | Convenient all-in-one design for seamless portability and simple setup |
| Storage temperature      | -10 °C to 65 °C  |

# Connectivity



## Schematic



|   |                                     |    |   |
|---|-------------------------------------|----|---|
| 1 | Analog signal outputs (BNC)         | 8  | USB port (Type-A)                           |
| 2 | LEMO signal inputs (12 Channels)    | 9  | Ethernet port for device communication/data |
| 3 | BNC HF signal inputs (up to 50 MHz) | 10 | Optical fiber connector (LC-Duplex)         |
| 4 | Multi-purpose SMB ports             | 11 | Ethernet port for device communication/data |
| 5 | Multi-purpose SMB ports             | 12 | Power button                                |
| 6 | Loudspeaker                         | 13 | Power input                                 |
| 7 | GNSS antenna connector              | 14 | USB port (Type-C)                           |

## Analog inputs and outputs

|                         | Connector type                                | Characteristics   | Description  |
|-------------------------|---|---|--|
| Analog signal inputs    | Up to 4 x LEMO<br>Up to 4 x 3 = 12 channels   | $\pm 1\text{ V} / \pm 10\text{ V}$ (switchable)<br>24-bit A/D converter per channel<br>1.5 MSPS sample rate | <ul style="list-style-type: none"> <li>Synchronous reference signal recording up to 750 kHz on 12 channels</li> <li>Support for IEPE (Integrated Electronic Piezoelectric), TEDS and DC/AC coupling</li> <li>Input impedance: 1 MOhm    20 pF (optional 1 GOhm    3 pF)</li> </ul>         |
| Analog HF signal inputs | Up to 3 x BNC                                 | $\pm 2\text{ V}$<br>14-bit A/D converter<br>312.5 MSPS sample rate  | <ul style="list-style-type: none"> <li>Synchronous HF signal recording up to 50 MHz on 3 channels</li> <li>Input impedance: 50 Ohm</li> </ul>  |
| Analog signal outputs   | Up to 8 x BNC<br>Up to 8 independent channels | $\pm 2\text{ V}$<br>16-bit D/A converter<br>312.5 MSPS sample rate  | <ul style="list-style-type: none"> <li>Versatile signal outputs: Analog velocity, displacement, acceleration and arbitrary signal generator</li> <li>Generate various preset functions (sine, chirp, gaussian, ...) or load arbitrary signals</li> <li>Source impedance: 50 Ohm</li> </ul> |
| Trigger inputs          | 2 x SMB                                       |   | <ul style="list-style-type: none"> <li>Digital external trigger input for the device</li> <li>Input impedance: 50 Ohm</li> </ul>   |
| Trigger outputs         | 2 x SMB                                       |   | <ul style="list-style-type: none"> <li>Digital trigger output for external devices</li> <li>Source impedance: 50 Ohm</li> </ul>  |

## Digital interface

|                          | Connector type      | Characteristics                             | Description  |
|--------------------------|---------------------|---|--|
| Ethernet (copper)        | Up to 2 x RJ45      | 1 Gbit/s data rate                          | <ul style="list-style-type: none"> <li>Stream the measurement data over Ethernet with up to 312.5 MSPS and 48-bit</li> <li>Digital remote control of device settings</li> <li>Interface with digital data acquisition and analysis software SMART Lab</li> <li>Use your device as control hub for your Ethernet-based equipment</li> </ul>                                       |
| Ethernet (fiber optical) | Up to 2 x LC-Duplex | 10 Gbit/s / 1 Gbit/s data rate (switchable) | <ul style="list-style-type: none"> <li>Stream the measurement data over Ethernet with up to 312.5 MSPS and 48-bit</li> <li>Digital remote control of device settings</li> <li>Interface with data acquisition and analysis software SMART Lab</li> <li>PTP-based synchronization with other SMART series devices</li> <li>Up to 20 km range (up to 160 km on request)</li> </ul> |

## Connectivity options

|                                 | Connection type                            | Description   |
|---------------------------------|--|---|
| Synchronization                 | 4 x SMB                                    | <ul style="list-style-type: none"> <li>2 x synchronization inputs (Input impedance: 50 Ohm, 3.3 V or 5 V)</li> <li>2 x synchronization outputs (Source impedance: 50 Ohm, 3.3 V)</li> <li>Frequency synchronization with external devices using 10 MHz signals</li> <li>Frequency &amp; phase synchronization with external devices via PPS (Pulse per second)</li> </ul> |
| USB                             | 1 x USB-C (USB 3.2)<br>1 x USB-A (USB 3.0) | <ul style="list-style-type: none"> <li>Connect USB devices such as cameras, keyboards or storage devices to the vibrometer for direct data recording</li> </ul>   |
| Wireless                        | Bluetooth 5.2<br>Wi-Fi 7                   | <ul style="list-style-type: none"> <li>Bluetooth: connect human interface devices such as keyboard, mouse or headphones to the vibrometer</li> <li>Wi-Fi: control your vibrometer wirelessly and stream measurement data over the air</li> </ul>  |
| GNSS-module                     | GPS, Galileo, GLONASS and BeiDou           | <ul style="list-style-type: none"> <li>Precise absolute time and position information using global navigation satellite systems (GNSS)</li> <li>External antenna connector</li> </ul>   |
| Inertial measurement unit (IMU) |  | <ul style="list-style-type: none"> <li>Synchronous recording of the vibrometer's acceleration and orientation</li> <li>Vibration monitoring of vibrometer enables detection of disturbances</li> <li>More accurate alignment with your test object</li> </ul>   |

# Configurable options



## Warranty

|                    |   |   |
|--------------------|---|---|
| Waranty            | 12 months                                   | S |
| Warranty extension | Extension of standard warranty by 12 months | O |

## Maintenance

|                          |  |   |
|--------------------------|--|---|
| Extended maintenance     | Additional extension of hardware maintenance by 12+ months   | O |
| Recalibration & cleaning | Check, cleaning & realignment of optical parts, check of laser output power, and factory calibration | O |

## Accessories

|                |   |   |   |
|----------------|---|---|---|
| Transport case | <ul style="list-style-type: none"><li>• Stable and waterproof Peli case for safe storage and transport of the vibrometer</li><li>• External dimensions (L x W x H): 62 x 49 x 22 cm</li></ul> | S |  |
| Transport bag  | Compact and light transport bag for outdoor measurements  | O |  |

# Software SMART Lab



## Highlights

- Lifetime license with no recurring costs
- Installation on any capable computer with Windows 10 / Windows 11
- 1 x license key included (via dongle or online license key)
- Analysis of measurement files for up to 3 users with a single software license
- Connect and control multiple devices at the same time for effortless data acquisition
- Selection of measurement point on loaded 3D-model
- Convenient access to all data in a single software - from vibrometers to multiple reference sensors
- Seamless switching between time and frequency domain representation
- Multichannel arbitrary signal generator for generating predefined signals (sine, sine sweep, square, random, etc.) or custom signals from imported .csv or .wav files
- Calculation of various frequency functions: FRF, FFT, auto-spectrum, cross-spectrum, coherence
- Multithreading export of time data, all frequency functions, and reference channel data into the Universal File Format (.uff), Hierarchical Data Format (.hdf5), and MATLAB® file format (.mat)
- Save and load all settings and measurement data in Optomet File Format

## SMART Lab - Features

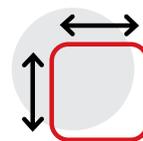
|                    |   |
|--------------------|---|
| Remote control     | <ul style="list-style-type: none"> <li>• All DAQ settings via a single ethernet connection</li> <li>• Multiple vibrometers at once for reference, multipoint and 3D vibration measurements</li> </ul>   |
| Acquisition module | <ul style="list-style-type: none"> <li>• Phase correct and fully-synchronized reference data acquisition</li> <li>• Convenient access to all your data in a single software - from vibrometers to multiple reference sensors</li> <li>• Live view of measured time and frequency data</li> <li>• Multi-channel arbitrary signal generator to generate predefined signals (sine, sine sweep, rectangle, random, etc.) or custom signals from imported .csv or .wav files</li> <li>• Triggering on measured signals or external triggers</li> <li>• Trace history to record and recall multiple traces of the acquisition data</li> </ul> |
| Analysis module    | <ul style="list-style-type: none"> <li>• Real-time Fast Fourier Transform (FFT) for responsive data analysis</li> <li>• Frequency domain representation with up to 536 Mio FFT lines</li> <li>• Fourier boundaries to limit FFT calculations to certain time ranges of the time data</li> <li>• Several window functions for FFT calculations, including rectangular, hanning, hamming, exponential</li> <li>• Phase correct calculation of the frequency response function (FRF)</li> <li>• Live Spectrogram of the ongoing measurements FFT's</li> </ul>  |
| Data export        | <ul style="list-style-type: none"> <li>• Export time and frequency data to .csv, .h5, or .mat files</li> <li>• Export time data as .wav audio file</li> <li>• Take screenshots from within our software and export with up to 4K resolution</li> <li>• Save projects to and load projects from the native file format</li> </ul>  |

SMART Lab runs on any modern computer with Microsoft Windows.

## SMART Lab - Software updates

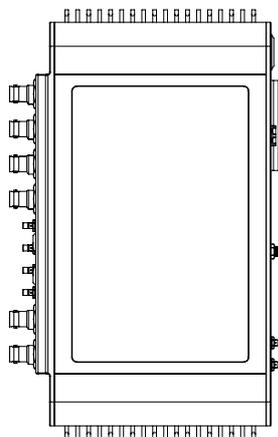
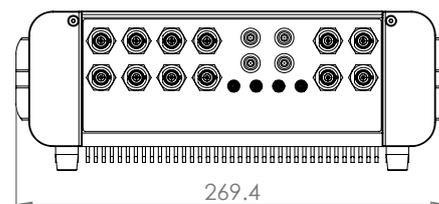
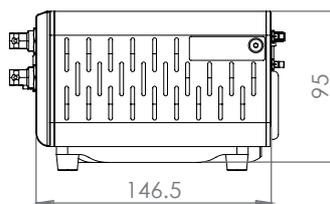
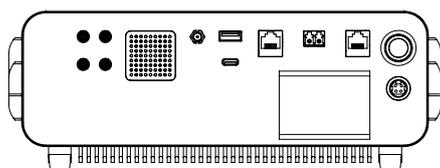
|  |   |
|--|---|
| 2 years of included software updates     | S |
| Extension of software updates by 2 years | O |

# Mechanical parameters



## Overview

|                       |  |
|-----------------------|--|
| Dimensions            | Length x width x height: 147 x 270 x 95 mm |
| Weight                | ~ 2.5 kg                                   |
| Operating Temperature | 0 °C to 40 °C                              |
| Storage Temperature   | -10 °C to 65 °C                            |
| Relative Humidity     | max. 80 %, non-condensing                  |



Optomet GmbH  
Pfungstaedter Strasse 92  
64297 Darmstadt  
Germany

Tel.: +49 6151 38432-0  
Fax: +49 6151 3688460

sales@optomet.de  
<https://www.optomet.com>

**optomet.**  
LASER VIBROMETRY