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LASER VIBROMETRY

- 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 × width × height: 147 × 270 × 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

Inputs and Outputs

Analog signal inputs	• Up to 12 channel Lemo, ± 1 V / ± 10 V, for synchronous reference signal recording • 24-bit A/D converter per channel • Support for IEPE (Integrated Electronic Piezoelectric), TEDS and DC/AC coupling • Input impedance 1 MOhm ‖ 20 pF (other configurations up to 1 GOhm ‖ 3 pF available on request)
Analog HF signal inputs	• Up to 4 channel (BNC), ± 1 V synchronous high-frequency (HF) signal recording • Input impedance 50 Ohm
Analog signal outputs	• Up to 8 × BNC, ± 2 V • Versatile signal outputs: 8 channel arbitrary signal generator • Produce various preset functions (sine, chirp, gaussian, …) or load arbitrary signals • Data rate: 312.5 Msamples/s @ 16 bit • Source impedance 50 Ohm
Digital signal output & PC-Interface	• 10 Gbit RJ45 Ethernet: Data rate: 10 Gbit/s (up to 312.5 MSamples/s @ 48 bit) • Digital data acquisition- and analysis software SMART Lab • Digital remote control of device settings
External trigger	• Digital external trigger in/out via SMB • Configurable with up to 3 x digital trigger inputs and 3 x digital trigger outputs

The exact features depend on the configured options.

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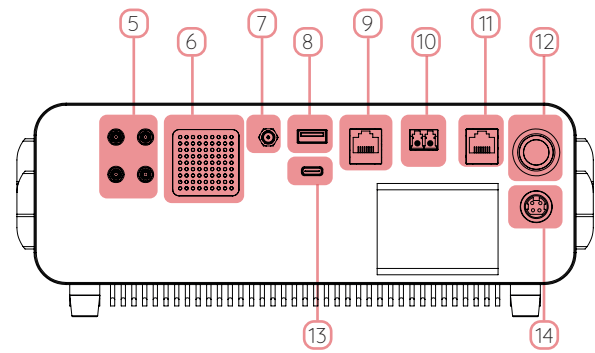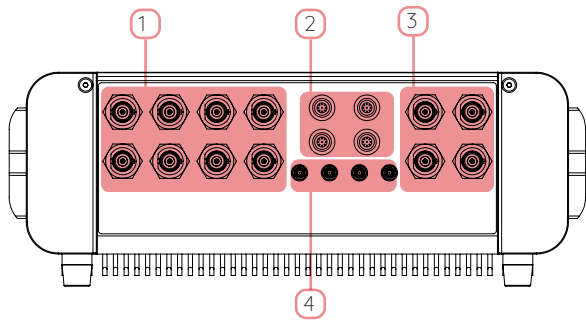
1	Analog signal outputs (BNC)	8	USB port (Type-A)
2	LEMO signal inputs (12 Channels)	9	Ethernet port for device communication/data
3	BNC HF signal inputs (up to 50 MHz)	10	Optical fiber connector (LC-Duplex)
4	Multi-purpose SMB ports	11	Ethernet port for device communication/data
5	Multi-purpose SMB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

Configurable options

Connectivity

Analog IN	12	Lemo, ± 1 V / ± 10 V	Synchronous recording of reference signals with 24 bits precision and up to 1.5 MSPS. IEPE, TEDS and DC/AC coupling
HF Analog IN	4	BNC, ± 1 V	Synchronously record reference signals up to 50 MHz with 14 bits precision and ultra-high sample rates of 312.5 MSPS
Analog OUT	8	BNC, ± 2 V	Signal generator output with 16 bits precision and up to 312.5 MSPS
Digital IN	3	SMB	Enables external triggering of the device or PPS
Digital OUT	3	SMB	Trigger external devices or use as PPS
Digital interface	3	• 10 Gbit/s ethernet • 1 Gbit/s ethernet • Fiber optical or copper	• Stream the measurement data over ethernet with up to 312.5 MSPS and remote control the SMART DAQ • Use the SMART DAQ as a control hub for your ethernet-based equipment • Synchronize the SMART DAQ with other SMART series devices
USB (optional)	2	• 1 x USB-C (USB 3.2) • 1 x USB-A (USB 3.0)	Connect USB devices such as cameras, keyboards or storage devices to the SMART DAQ for direct data recording
Bluetooth (optional)			Connect human interface devices such as keyboard, mouse or headphones to the SMART DAQ
Wi-Fi (optional)			Control the SMART DAQ wirelessly and stream measurement data over the air using the fast Wi-Fi 7 connection
GNSS module (optional)			GNSS module for precise absolute time and position
Synchronization (optional)	6	SMB	10 MHz output and 10 MHz input for synchronization with other devices + 2 x PPS output and 2 x PPS input

The exact features depend on the configured options.

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Maintenance

Warranty	12 months	S
Warranty extension	Extension of standard warranty to 24 months	O
Extended maintenance	Additional extension of hardware maintenance by 12+ months	O

Accessories

| Transport case	• Stable and waterproof Peli case for safe storage and transport of the SMART DAQ • External dimensions (L x W x H): 62 x 49 x 22 cm	S	
Transport bag	Compact and light transport bag for convenient transport	O	

Software

SMART Lab software features

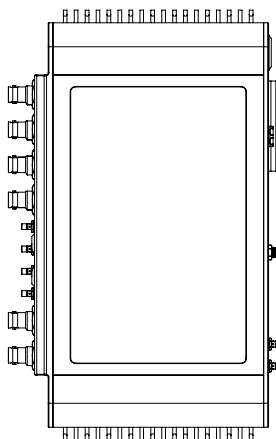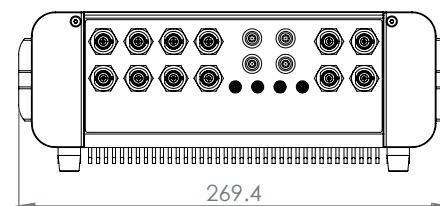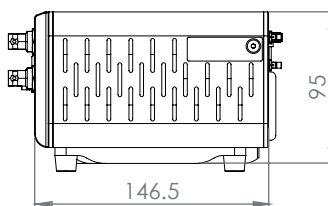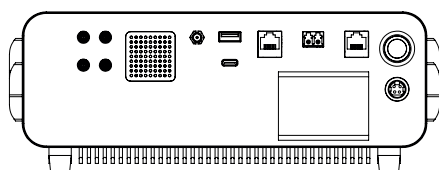| Remote control	• All DAQ settings via a single ethernet connection • Multiple SMART devices at once for reference, multipoint and 3D vibration measurements
Data acquisition	• Phase correct and fully-synchronized reference data acquisition • Convenient access to all your data in a single software - from vibrometers to multiple reference sensors • Live view of measured time and frequency data • Multi-channel arbitrary signal generator to generate predefined signals (sine, sine sweep, rectangle, random, etc.) or custom signals from imported .csv or .wav files • Triggering on measured signals or external triggers • Trace history to record and recall multiple traces of the acquisition data
Measurement analysis	• Real-time Fast Fourier Transform for responsive data analysis • Frequency domain representation with up to 536 Mio FFT lines • Fourier boundaries to limit FFT calculations to certain time ranges of the time data • Several window functions for FFT calculations, including rectangular, hanning, hamming, exponential • Phase correct calculation of the frequency response function (FRF) • Live Spectrogram of the ongoing measurements FFT's
Data import and export	• Export time and frequency data to .csv, .h5, or .mat files • Export time data as .wav audio file • Take screenshots from within our software and export with up to 4K resolution • Save projects to and load projects from the native file format

SMART Lab runs on any modern computer with Microsoft Windows.

Mechanical parameters
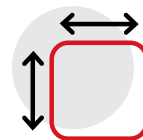
Overview

Dimensions	Length × width × height: 147 × 270 × 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

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