



## ECHOGRAPH 1090

Digital Ultrasonic Flaw Detector

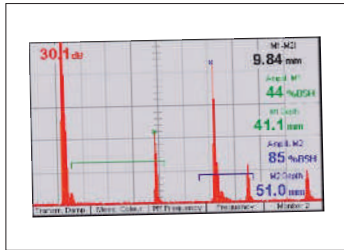
Models  
1090 BASIC  
1090 DAC  
1090 DGS/DAC

# KARL DEUTSCH

# ECHOGRAPH 1090 – Always the Perfect Choice



The rubber protective holster is available in several colours and ensures additional protection even in rough testing conditions.



Daylight usable TFT-LC-Display with 6.3" (16.5 cm) A- Scan size, can be read in direct sunlight, 256 colours



Scope of supply ECHOGRAPH 1090

## Scope of supply

	Order Nrs
<b>ECHOGRAPH 1090 Basic</b>	1090.001
<b>ECHOGRAPH 1090 DAC</b>	1090.201
<b>ECHOGRAPH 1090 DGS/DAC</b>	1090.301
<i>Delivered parts: instrument with red protective holster, Li-ion rechargeable battery, ECHOTRACE couplant, mains/charging device, operating instructions, carrying case</i>	
<b>Accessories for standard package</b>	
Carrying case incl. belt	6189.001
Carrying belt	6189.002
Spare loop	6189.003
USB-Cable	1657.702
Ecom 90, PC-Software for Windows XP/2000	1995.005
<b>Options</b>	
Protective holster (black)	6189.006
Protective holster (yellow)	6189.007
Protective holster (green)	6189.008

## ECHOGRAPH 1090 – Compact, sturdy, digital, high-contrast and fast Ultrasonic Testing made Simple!

The new ECHOGRAPH 1090 is the ideal instrument for a manual ultrasonic testing. It is reliable and sturdy and thus can be used outdoors or even in rough industry environment.

### The ECHOGRAPH 1090 ...

- is with 1.6 kgs light-weight and handy
- is equipped with a very large and high-contrast colour display (16.5 cm diagonal)
- can easily be read even in case of extreme illumination conditions due to its high-contrast and high-resolution TFT-LC colour display
- guides you safely and self-explaining through the applications with its clear text menu
- guarantees extremely simple and complete adjustment with its user guidance
- supports the operator during probe handling and instrument adjustment (DAC, AWS, DGS, ...)
- offers a direct key access to all important functions
- represents up to 5 measured values, which are displayed in big figures on the display
- is equipped with two monitors to measure amplitude and time-of-flight, and two additional control lamps on the front panel for monitoring the threshold values
- enables the storage of reference echoes and the possibility to record the echo dynamics
- enables a simple freezing and storage of A-scans
- comes with a comfortable text editor which enables the storage of each data set with an individual file name
- contains a probe data base for up to 99 different probes for easy entering of probe data, even for any kind of probes.
- can display all functions even in plain text on the screen for easy identification of its 5 function keys
- permits selection of the pulse repetition frequency (PRF) from 8 Hz up to 1500 Hz: low PRF to avoid ghost echoes, and high PRF for high testing speeds in case of automated tests
- evaluates time-of-flight between transmitter pulse and the echo within the monitor
- measures the wall thickness between the echoes within both monitors. Evaluation either between echo peaks, echo edges or zero crossing.
- 0.01 mm indication accuracy in the echo-echo-mode
- allows the evaluation also on circularly curved surfaces (e.g. pipes)
- VGA output for external monitor
- is delivered with a colour rubber protective holster to avoid sliding and for additional protection
- is splash-protected according to IP 54

The ECHOGRAPH 1090 is available in 3 versions:

### 1090 Basic

is the ideal basic instrument for manual ultrasonic testing

### 1090 DAC

offers additionally the echo evaluation according to the reference line method (DAC = distance amplitude correction)

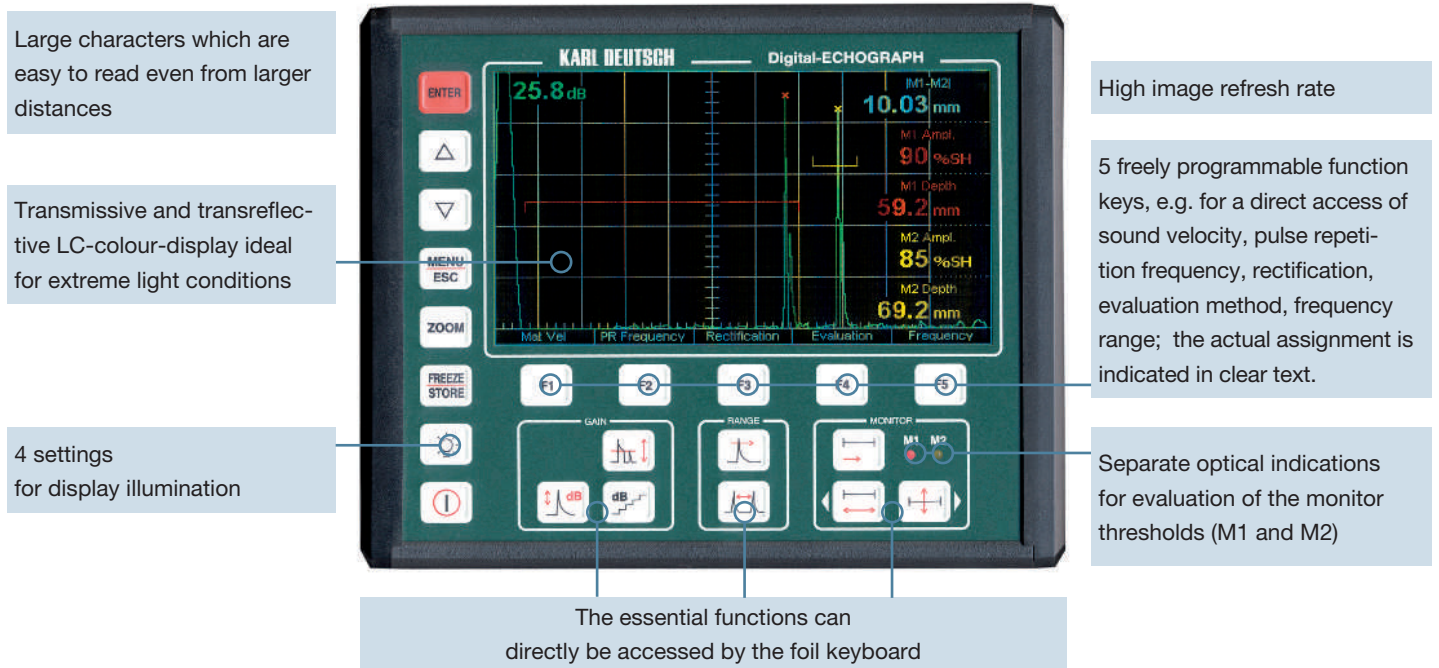
### 1090 DGS/DAC

offers furthermore the echo evaluation according to the DGS method (DGS = distance gain size)

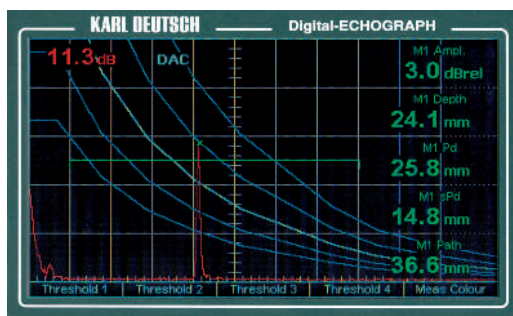
## Keyboard and front panel of the ECHOGRAPH 1090

The extremely compact flaw detector with a thickness of only 50 mm contains a fast digital ultrasonic electronics with a high sampling rate and up to 1500 Hz pulse repetition frequency. Two monitors for amplitude and time-of-flight, a large A-scan storage and two control lamps on the front panel for evaluation of threshold levels.

A new user guidance supports ultrasonic operators with little experience during probe handling and instrument adjustment: Simply activate the program assistant, and then follow the instructions indicated on the screen. Almost automatically, even difficult evaluating procedures for flaw size determination (DAC, AWS and DGS) are carried out.

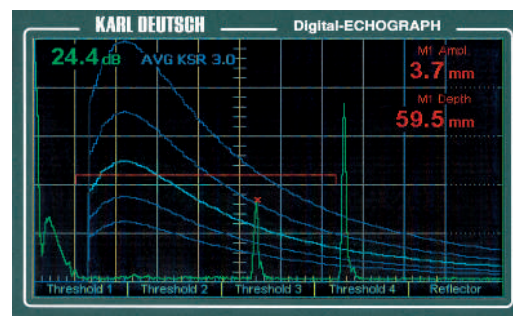


## Echo Evaluation



DAC method (option): Reference line method (EN 1330-4)

- Curve can freely be shifted within -80 dB up to +80 dB
- Indication of up to 4 additional curves, each curve can be shifted  $\pm 15$  dB with respect to main DAC-curve



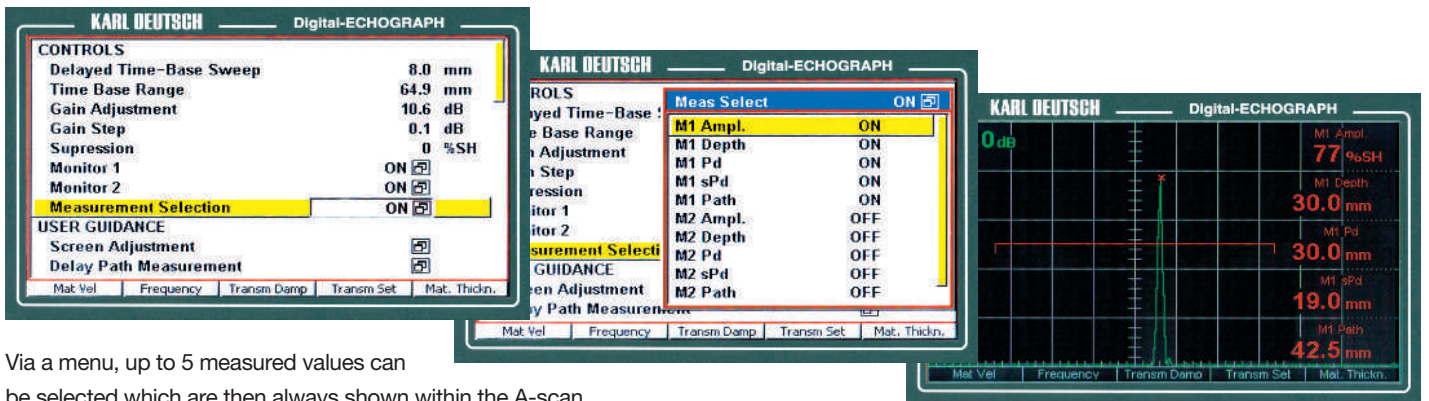
DGS method (option): (acc. to EN 1330-4)

- Not restricted to special probes (DGS-curve is calculated within the instrument)
- Visualisation of the reference-DGS-curve
- Flaw size (FBH = flat bottom hole) is directly calculated (for both monitors)
- Indication of up to 4 additional curves, each curve can be shifted  $\pm 15$  dB with respect to main DGS-curve

# Application Examples

Simple and memorable operating structure by plain text menu.

Example: „Measurement Selection“

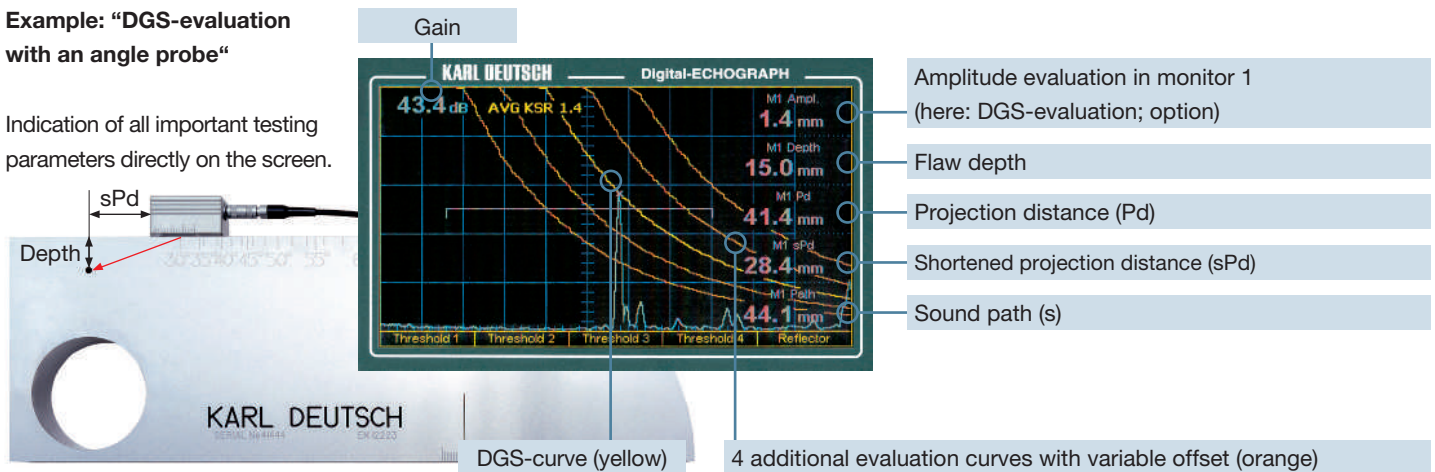


Via a menu, up to 5 measured values can be selected which are then always shown within the A-scan.

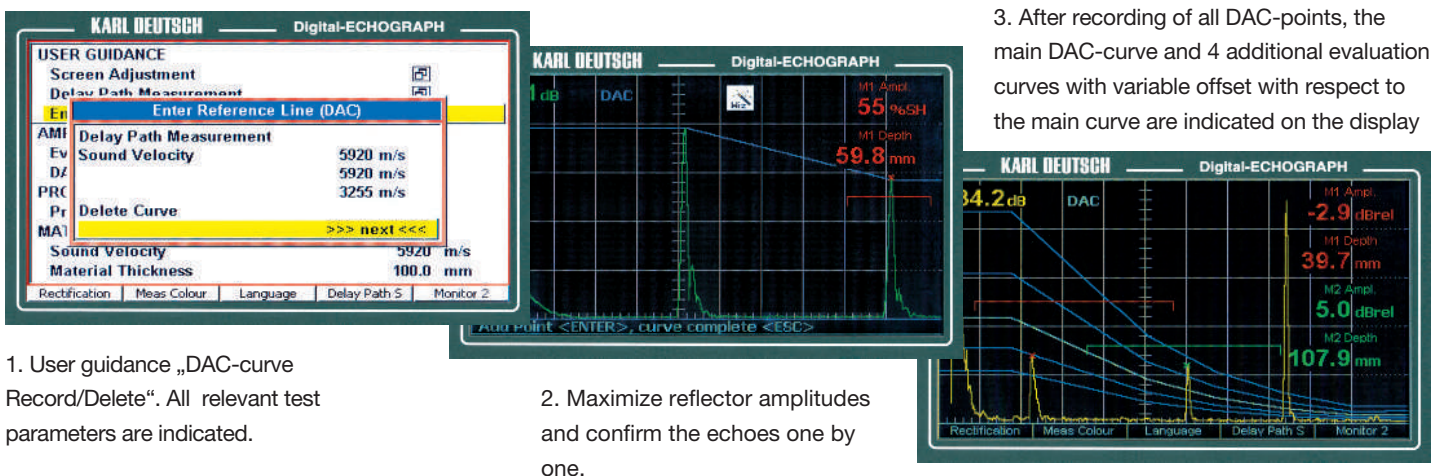
The user guidance of the ECHOGRAPH 1090 ultrasonic flaw detector allows, among others for a quick and simple adjustment of the testing range and flaw sizing acc. to DGS and DAC method.

Example: “DGS-evaluation with an angle probe“

Indication of all important testing parameters directly on the screen.



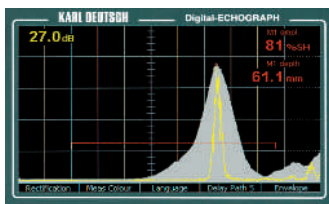
Example: „Recording of the DAC curve“



1. User guidance „DAC-curve Record/Delete“. All relevant test parameters are indicated.

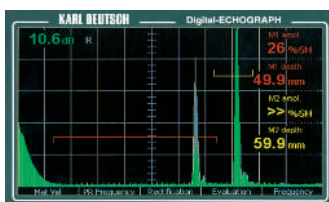
2. Maximize reflector amplitudes and confirm the echoes one by one.

3. After recording of all DAC-points, the main DAC-curve and 4 additional evaluation curves with variable offset with respect to the main curve are indicated on the display



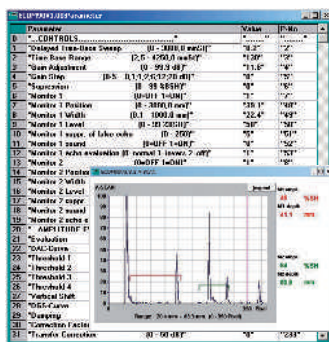
### Envelope curve:

For evaluation of the echo dynamics, the envelope curve can be recorded.



### Reference curve:

Stored data can be used as a reference curve. Thus, in case of a repeated testing, the actual result can be compared with the previous measurement.



### PC-Software (option):

Comfortable data interface program ECOM 90 for

- Data exchange between flaw detector und PC
- Data storage on the PC
- Evaluation and documentation of test results
- Easy export into other programs (e.g. MS office)

### ... overview of more features of the ECHOGRAPH 1090

- Compact aluminium housing with rubber protective holster
- Built-in Li-ion-rechargeable battery for up to 15 hrs of operation, safe automatic quick charge with a built-in charging processor
- Charging of the battery also during test while connected to the mains power supply
- Energy saving mode in battery operation
- Separately selectable screen colours for A-Scan and menu mode
- Languages, parameter and help texts can be edited via the PC and stored in the flaw detector\*
- Real-time output for both monitors
- Triggering: internal, external (in-/output) and 1st echo
- Update resp. upgrade via PC (CD-ROM, e-mail, download)\*
- Specifications acc. to EN 12668-1

\* upon request

## SCREEN

Screen type	<ul style="list-style-type: none"> <li>• colour LC-Display</li> <li>• transmissive / transreflective</li> <li>• daylight suitable</li> <li>• background illumination</li> </ul>
Screen size	143.4 x 79.3 mm <sup>2</sup>
Resolution	400 x 240 points, 256 colours
A-scan size	142 x 73.5 mm <sup>2</sup>
Grid	electronically generated, can be switched on/off
Grid visualization	<ul style="list-style-type: none"> <li>• coarse: 10-fold horizontal, 5-fold vertical</li> <li>• fine: 50-fold horizontal, 25-fold vertical</li> </ul>

## A-SCAN DISPLAY AND DIGITISATION

Image refresh rate	50 Hz
A-scan display	<ul style="list-style-type: none"> <li>• normal display</li> <li>• filled echoes</li> <li>• frozen</li> <li>• echo dynamics curve (envelope curve)</li> <li>• zoom over monitor 1</li> </ul>
RF display	possible across the entire testing range
Rectification	full wave, RF (all Versions) positive, negative (DAC and DGS/DAC version)
Suppression	adjustable: 0 to 99 % screen height in 1 % steps (linear)
Zoom	monitor range (monitor 1) spread on full screen width

## MEASURING RANGES

Testing range	2.5 – 4850 mm steel 2.5 – 9600 mm steel (option)
Sound velocity	100 – 15000 m/s in 1 m/s steps
Pulse shift	0 – 3000 mm in 0.1 mm steps
Linearity of time axis	± 0.5 % of screen width
Pulse repetition frequency	8 Hz to 1500 Hz (depending on measuring length, adjustable from -85 % to +50 % in 1 % steps)
Trigger	internal, external, 1st echo

## TRANSMITTER

Number of transmitters	2 (resolution and power)
Shape of transmitter pulses	unipolar (negative) needle pulse
Transmitter damping	10, 50, 220, without [Ω]

## AMPLIFIER AND ATTENUATOR

Frequency ranges	LF range: 0.5 – 5.5 MHz RF range: 1.5 – 17 MHz broadband: 0.5 – 20 MHz
Adjustable gain	100 dB in 0.1/1/2/6/12/20 dB steps

# Technical Data (continued)

## ECHO EVALUATION, FLAW SIZE DETERMINATION

<b>Display of echo height (for both monitors)</b>	<ul style="list-style-type: none"> <li>• % screen height (% SH)</li> <li>• dBrel (DAC and DGS/DAC version)</li> <li>• dBabs (DAC and DGS/DAC version)</li> <li>• dBaws (DAC and DGS/DAC version)</li> <li>• mm FBH (DGS/DAC version)</li> </ul>
<b>Display of distance (for both monitors)</b>	<ul style="list-style-type: none"> <li>• sound path</li> <li>• depth and projection distance and shortened projection distance</li> <li>• resolution 0.1 mm</li> <li>• wall thickness mode resolution: 0.01 mm</li> </ul>

## REFERENCE LINE (DAC and DGS/DAC version)

<b>Number of DAC points</b>	max. 11, AWS evaluation available for one DAC point
<b>Reference line</b>	adjustable offset: max. $\pm 80$ dB
<b>Evaluation curves</b>	additional 4 (up to $\pm 15$ dB offset to main DAC curve)

## DGS METHOD (DGS/DAC version)

<b>DGS curve</b>	0 to 30 mm FBH and backwall
<b>Reference reflector</b>	backwall, flat bottom hole or side drilled hole
<b>Evaluation curves</b>	additional 4 (up to $\pm 15$ dB offset to main DAC curve)

## MONITORS

<b>Number of monitors</b>	2
<b>Response time</b>	with pulse repetition freq. (max. 1500 Hz)
<b>Operation modes</b>	normal, inverse, off
<b>Setting range</b>	<ul style="list-style-type: none"> <li>• monitor start: 0 to 4000 mm in 0.1 mm steps</li> <li>• monitor width: 0 to 3000 mm in 0.1 mm steps</li> </ul>
<b>Statistical noise suppression</b>	0 to 250 pulses
<b>Data output (for both monitors)</b>	<ul style="list-style-type: none"> <li>• digital: TTL (5V) level, low active, <math>Z_A = 100 \Omega</math> response accuracy: <math>\pm 0.5</math> % SH</li> <li>• switching hysteresis: <math>&lt; 0.5</math> % SH</li> <li>• holding time: max. 12 ms</li> <li>• analogue for first monitor: amplitude and depth (0 to 2,5V)</li> </ul>
<b>Optical indication</b>	2 luminescent diodes on front panel
<b>Acoustical indication</b>	alarm tone

## IN- AND OUTPUTS

<b>USB interface</b>	USB interface for PC connection and for printing via the PC connection
<b>VGA output</b>	for external monitor
<b>Trigger in- / output</b>	TTL level (5V), low active, trigger threshold, approx. 2V, trigger on and off

## FURTHER FACILITIES

<b>Measuring units</b>	mm, inch
<b>Date and time</b>	built-in real-time clock
<b>Languages</b>	English, German, a further language* can be transferred from a PC to the instrument (the texts can freely be edited by the PC)
<b>Operation/storage temperature</b>	-10 °C to +50 °C / -20 °C to +60 °C

## STORAGE

<b>A-scan</b>	actual A-scan by means of a FREEZE function on the screen
<b>Internal memory</b>	224 data sets incl. A-scan, testing parameters, date and time

## POWER SUPPLY

<b>Mains operation</b>	via mains power supply (article no. 1808.501) <ul style="list-style-type: none"> <li>• 85 to 264 VAC, 47 to 63 Hz</li> <li>• output: 12 VDC</li> <li>• operation temperature: 0°C to +50°C</li> <li>• storage temperature: -40°C to +85°C</li> <li>• allowable humidity: 5 to 95 %</li> </ul>
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<b>Battery operation</b>	with built-in Li-ion rechargeable battery <ul style="list-style-type: none"> <li>• approx. 8 hrs with screen illumination</li> <li>• approx. 15 hrs without screen illumination</li> </ul>
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<b>Energy economy mode</b>	on / off
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<b>Automatic switch-off</b>	in case of low voltage of mains or battery
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## DIMENSIONS, WEIGHT etc.

<b>Dimensions (H x W x D)</b>	<ul style="list-style-type: none"> <li>• 166 x 201 x 50 mm<sup>3</sup> without protective holster</li> <li>• 190 x 217 x 64 mm<sup>3</sup> with protective holster</li> </ul>
<b>Front panel (H x W)</b>	147 x 178 mm <sup>2</sup>
<b>Weight</b>	<ul style="list-style-type: none"> <li>• 2.0 kg (with Li-ion battery and protective holster)</li> <li>• 1.6 kg (with Li-ion battery without protective holster)</li> </ul>
<b>Connecting sockets</b>	<ul style="list-style-type: none"> <li>• 2 x Lemo 1: for ultrasonic probes</li> <li>• USB mini: for PC</li> <li>• VGA: monitor</li> <li>• socket (9 poles): for servicing, flaw output and triggering input</li> <li>• 5.5 mm-DC socket: for mains power supply</li> </ul>

\* upon request

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