ECHOGRAPH 1090
Digital Ultrasonic Flaw Detector

Models
1090 BASIC
1090 DAC
1090 DGS/DAC

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KARL DEUTSCH
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
- 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 ± 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 ± 15 dB with respect to main DGS-curve
**Application Examples**

Simple and memorable operating structure by plain text menu.

**Example: „Measurement Selection“**

![Menu Example]

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“**

![DGS-evaluation Diagram]

Indication of all important testing parameters directly on the screen.

- Flaw depth
- Projection distance (Pd)
- Sound path (s)
- Shortened projection distance (sPd)

**Example: „Recording of the DAC curve“**

![DAC Recording Example]

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.
**Screen type**
- Colour LC-Display
- Transmissive / transreflective
- Daylight suitable
- Background illumination

**Screen size**
143.4 x 79.3 mm²

**Resolution**
400 x 240 points, 256 colours

**A-scan size**
142 x 73.5 mm²

**Grid**
- Electronically generated, can be switched on/off

**Grid visualization**
- Coarse: 10-fold horizontal, 5-fold vertical
- Fine: 50-fold horizontal, 25-fold vertical

**A-scan display**
- Normal display
- Filled echoes
- Frozen
- Echo dynamics curve (envelope curve)
- Zoom over monitor 1

**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

**Testing ranges**
- 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

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

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

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**Additional Features**
- 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
## ECHO EVALUATION, FLAW SIZE DETERMINATION

- Display of echo height (for both monitors)
  - % screen height (% SH)
  - dB rel (DAC and DGS/DAC version)
  - dB abs (DAC and DGS/DAC version)
  - dB aws (DAC and DGS/DAC version)
  - mm FBH (DGS/DAC version)

- Display of distance (for both monitors)
  - sound path
  - depth and projection distance and shortened projection distance
  - resolution 0.1 mm
  - wall thickness mode resolution: 0.01 mm

## FURTHER FACILITIES

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

## STORAGE

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-scan</td>
<td>actual A-scan by means of a FREEZE function on the screen</td>
</tr>
<tr>
<td>Internal memory</td>
<td>224 data sets incl. A-scan, testing parameters, date and time</td>
</tr>
</tbody>
</table>

## POWER SUPPLY

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains operation</td>
<td>via mains power supply (article no. 1808.501)</td>
</tr>
<tr>
<td>- output</td>
<td>12VDC</td>
</tr>
<tr>
<td>- operation temperature</td>
<td>0°C to +50°C</td>
</tr>
<tr>
<td>- storage temperature</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>- allowable humidity</td>
<td>5 to 95 %</td>
</tr>
<tr>
<td>Battery operation</td>
<td>with built-in Li-ion rechargeable battery</td>
</tr>
<tr>
<td>- approx.</td>
<td>hrs with screen illumination</td>
</tr>
<tr>
<td>- approx.</td>
<td>15 hrs without screen illumination</td>
</tr>
</tbody>
</table>

## DIMENSIONS, WEIGHT etc.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>166 x 201 x 50 mm³ without protective holster</td>
</tr>
<tr>
<td></td>
<td>190 x 217 x 64 mm³ with protective holster</td>
</tr>
<tr>
<td>Front panel (H x W)</td>
<td>147 x 178 mm²</td>
</tr>
<tr>
<td>Weight</td>
<td>2.0 kg (with Li-ion battery and protective holster)</td>
</tr>
<tr>
<td></td>
<td>1.6 kg (with Li-ion battery without protective holster)</td>
</tr>
</tbody>
</table>

## IN- AND OUTPUTS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB interface</td>
<td>USB interface for PC connection and for printing via the PC connection</td>
</tr>
<tr>
<td>VGA output</td>
<td>for external monitor</td>
</tr>
<tr>
<td>Trigger in-/ output</td>
<td>TTL level (5V), low active, trigger threshold, approx. 2V, trigger on and off</td>
</tr>
</tbody>
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