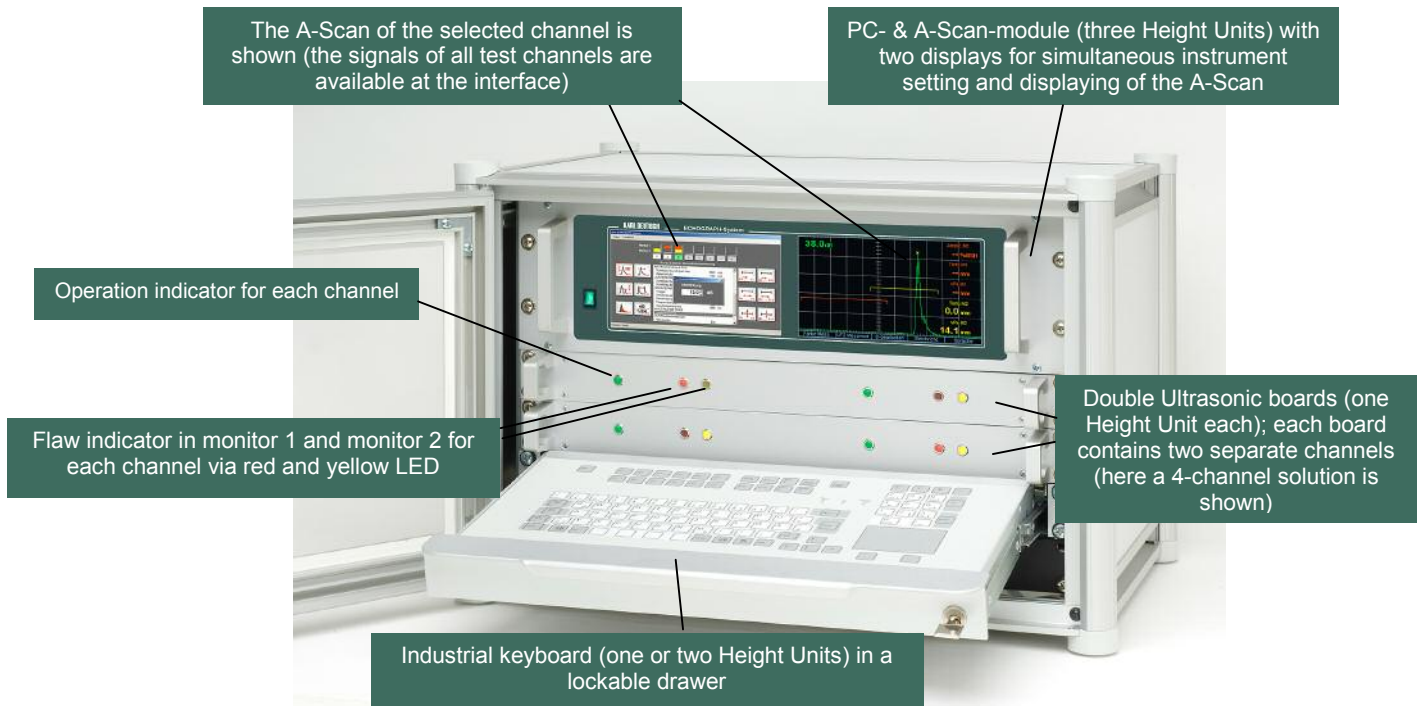


# Product Information Ultrasonic Flaw Detector ECHOGRAPH 1093

## Multi-Channel Ultrasonic Test Electronics for Compact Automated Ultrasonic Testing Systems

The ultrasonic flaw detector ECHOGRAPH 1093 has completely separate testing channels, which are controlled with the help of a higher-ranked host pc. This pc works as a user interface and helps the operator to configure the ultrasonic system. In measuring mode the host collects data, stores data and produces statistical evaluations. Each test channel has its own complete ultrasonic electronics with a maximum pulse repetition frequency up to 3.000 Hz. So each channel can drive its individual inspection task with its own parameter set. In consequence, the system electronics ECHOGRAPH 1093 is very flexible and fast. The device is especially suited for use in small automated inspection systems for the realisation of different inspection tasks (e.g. tube testing for longitudinal and transverse flaws and testing for lamination).



PC & A-Scan module from rear side with signal interfaces and power supplies for the different testing channels.



Two channel ultrasonic board from rear side with interfaces and connectors for the PC module and the probes.

Clear Indication of monitor status separately for each channel

Operator interface for individual configuration of each channel (here channel resp. device 4, green marked, from altogether 8 channels)

Identification of the test task is separately editable for each channel

Often used parameters are directly accessible via function keys (F1 to F10)

Channel 4 (11027): Transversal Flaw

CONTROLS  
 Delayed Time-Base Sweep 0,0 mm  
 Time Base Range 125,8 mm  
 Gain Adjustment 12,6 dB  
 Suppression 0 %SH  
 Monitor 1 On ->  
 Monitor 2 On ->  
 Measurement Selection On ->

USER GUIDANCE  
 Screen Adjustment ->

AMPLITUDE EVALUATION  
 TOF-Mode Maximum

PROBE PARAMETERS  
 Probe Type Straight ->

User: Level 3 (Administrator) Ready

All parameters are accessible via keyboard or mouse via the clear text menu

Set access rights for Level 1 user

- CONTROLS
- Delayed Time-Base Sweep
- Time Base Range
- Gain Adjustment
- Suppression
- Monitor 1
- Monitor 2
- Measurement selection
- USER GUIDANCE
- Screen adjustment
- AMPLITUDE EVALUATION
- TOF-Mode
- PROBE PARAMETERS
- Probe type
- MATERIAL PARAMETERS
- Sound velocity mat
- Material Thickness
- INSTRUMENT PARAMETERS
- Trigger
- Trigger delay
- Transmitter settings
- Transmitter damping
- Frequency range
- Rectification
- Pulse Rep. Frequency intern
- Pulse Rep. Frequency global
- SYSTEM PARAMETERS
- Grid
- Fill echoes
- Envelope
- Colour Measurement

OK

The access rights are divided into 3 levels. Level 1 is for the regular operator. With the help of a special level 2 and level 3 menu the supervisor is able to control, which parameters are accessible for the level 1 operator. So unintentional changes of important parameters can be avoided.

Change user

User  
 Level 3 (Administrator)

Password  
 \*\*\*\*\*

OK

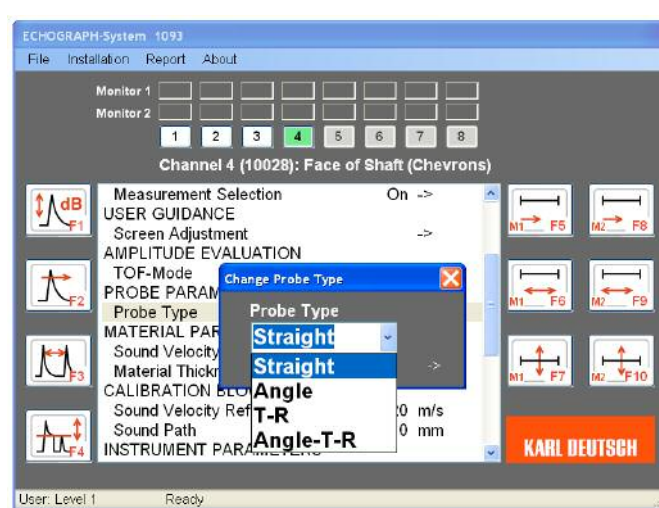
Assign channels

Station: Testing Station

Ser.-No.:	Comment:
1: 10129.l	Transversal flaw
2: 10129.r	Longitudinal flaw
3: nc	
4: nc	
5: nc	
6: nc	
7: nc	
8: nc	

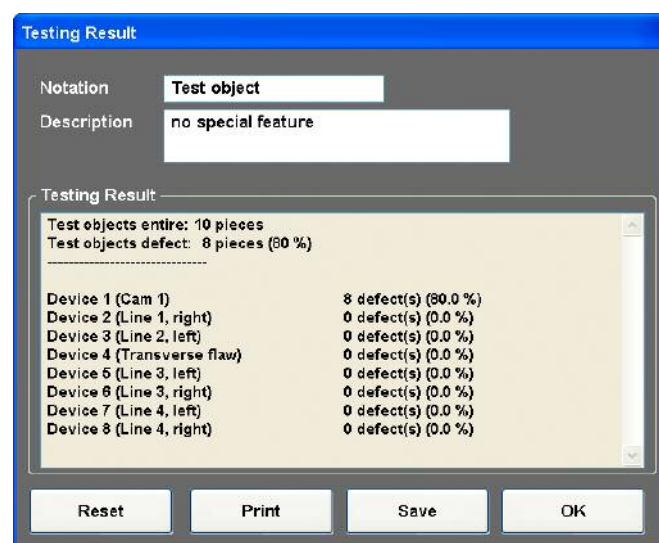
OK

Correlation of the channels to the different inspection tasks. The text (comment) is freely editable. This informs the operator about the assignment between inspection task and testing channel. This text is also shown during the adjustment of the channel to be changed in the main menu (see above).



Main menu as well as submenus are shown in clear text. So all menus are very comprehensible without reading the instruction manual.

The picture shows a four-channel system, where channel 4 is adjusted.



Customer-specific evaluation of the test results; here the example for a statistical evaluation per batch in tabulated form. A graphical evaluation of the echo height.

**and...**

- ... each channel is extensible with a multiplexer
- ... selectable colours for the A-Scan
- ... freezable echo dynamics curve
- ... Trigger: freewheeling, global, external (input /output) and 1<sup>st</sup> echo (immersion testing)
- ... suppression counter for all monitors
- ... single shot evaluation with full PRF
- ... large external monitor for A-Scan display available (option)
- ... evaluation with DAC method
- ... specifications acc. to EN 12668-1

**Technical Data**

**DISPLAY**

Quantity	2 (PC-menu, A-Scan)
Screen type	TFT monitor
Screen size	7" diagonal
Resolution	800 x 480 pixels
Scale	Electronically generated, switchable
Scale division (for A-Scan display)	<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 DIGITIZATION\***

Image refresh rate	50 Hz
A-Scan display	<ul style="list-style-type: none"> <li>➤ normal display (envelope curve)</li> <li>➤ filled echoes</li> <li>➤ echo dynamics curve</li> </ul>
RF display	For the entire testing range
Rectification	Without (RF), full wave, positive, negative
Suppression	Adjustable: 0 – 99% screen height in 1%-steps (linear)
A/D converter	9-bit
Digitization method	Direct, with A/D-converter
Sampling rate	80 MHz
Sampling error for digitization	< ± 0.5% screen height at 4 MHz
Response time (display)	< 20ms

**MEASURING RANGES\***

Testing range	2.5 – 4850 mm steel
Sound velocity	100 – 15000 m/s in 1 m/s steps
Delay	0 – 3000 mm in 0.1 mm steps
Linearity of time axis	+ 0.5 % of screen width

**TRANSMITTER\***

Numbers of transmitters	2 (resolution and power)
Pulse shape	Unipolar (negative) needle pulse
Transmitter damping	10, 50, 220 [Ω], without
Pulse repetition frequency (PRF)	Up to 3000 Hz
Trigger	Freewheeling, global, external

**AMPLIFIER AND ATTENUATOR\***

Frequency ranges	3 (settings: LF-, RF- and broadband)
Adjustable gain	100 dB in 0.1-1-2-6-12-20 dB steps

**FLAW EVALUATION (ON DISPLAY)\***

Evaluation of echo height (for both monitors)	<ul style="list-style-type: none"> <li>➤ % screen height (% SH)</li> <li>➤ dBrel (for DAC-version)</li> </ul>
Flaw position	<ul style="list-style-type: none"> <li>➤ sound path</li> <li>➤ depth</li> <li>➤ projection distance and shortened projection distance</li> <li>➤ resolution 0.1 mm steel</li> </ul>

**MONITORS\***

Number of monitors	2
Response time	With PRF (max. 3 kHz)
Operation modes	normal, inverse, off
Setting range	<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>
Statistical noise suppression	0 – 250 pulses
Signal output for each channel	<ul style="list-style-type: none"> <li>➤ 2 x flaw outputs TTL</li> <li>➤ 2 x analogue outputs (programmable with depth or amplitude or wall thickness or further parameters on request)</li> </ul>
Optical indication	2 luminescent diodes on front panel

**STORAGE**

Parameter set	<ul style="list-style-type: none"> <li>➤ separately for each channel</li> <li>➤ entire configuration for all test channels</li> </ul>
Test results	Storage is customer-specific
Hard-disk drive	160 GByte

**INPUTS, OUTPUTS**

Inputs	D-Sub socket for up to 16 customer-specific control signals
Outputs	D-Sub socket for up to 16 customer-specific flaw signals
Interfaces	<ul style="list-style-type: none"> <li>➤ auxiliary interface for external printer</li> <li>➤ RS 232 interface</li> <li>➤ USB 2 (3 to 10 free interfaces)</li> <li>➤ 2 x Ethernet</li> </ul>

**MISCELLANEOUS**

Measuring units	mm
Date and time	Built-in real-time clock
Languages	German, English (switchable)

**POWER SUPPLY**

Mains operation	<ul style="list-style-type: none"> <li>➤ 85 – 264 V AC, 47 – 63 Hz</li> <li>➤ operation temp.: 0 °C to +50 °C</li> <li>➤ allowed humidity: 0 to 95%</li> </ul>
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**DIMENSIONS, WEIGHT ETC.**

Dimensions	19" rack / height in compliance with configuration
Protection class	IP 20 (IP 54 on request)
Weight	Depending on the configuration
Number of channels	8 (more channels on request)

\* valid for each channel