

ECHOGRAPH 1170 Basic

Multichannel Ultrasonic Electronics for Automated Testing

KARL DEUTSCH

ECHOGRAPH 1170 Basic

Ultrasonic Testing Electronics

The ultrasonic device **ECHOGRAPH 1170 Basic** is a modular ultrasonic electronics that is accommodated in a 4 U 10"-rack. The rack contains a master module and up to three ultrasonic modules.

Each ultrasonic module contains 4 multiplexed, independently configurable channels for TR or single element probes. The maximum pulse repetition frequency of 8 kHz can be allocated to the four channels in the module at will, thus resulting in an average maximum pulse repetition frequency of 2 kHz. One of the four channels from each module can carry out a measurement at the same time, so - if several modules are used - a parallel operation of multiple channels is possible as well. The master module receives the data of the individual ultrasonic channels, configures them and controls the cycle program.

Via 24 V compatible inputs and outputs, probe enables can be controlled and flaw indication signals can be exported.

The linked computer (PC) runs the evaluation software **ECHOVIEW Basic**, which is used to setup all ultrasonic parameters of the individual channels, to configure the cycle program and to evaluate the ultrasonic results. These are collected, evaluated and stored as needed, depending on the application. **ECHOVIEW Basic** provides an extensive multi-level user administration. The setting parameters and test results are stored in a database and therefore they are retrievable in a document-safe manner for each test carried out. Up to

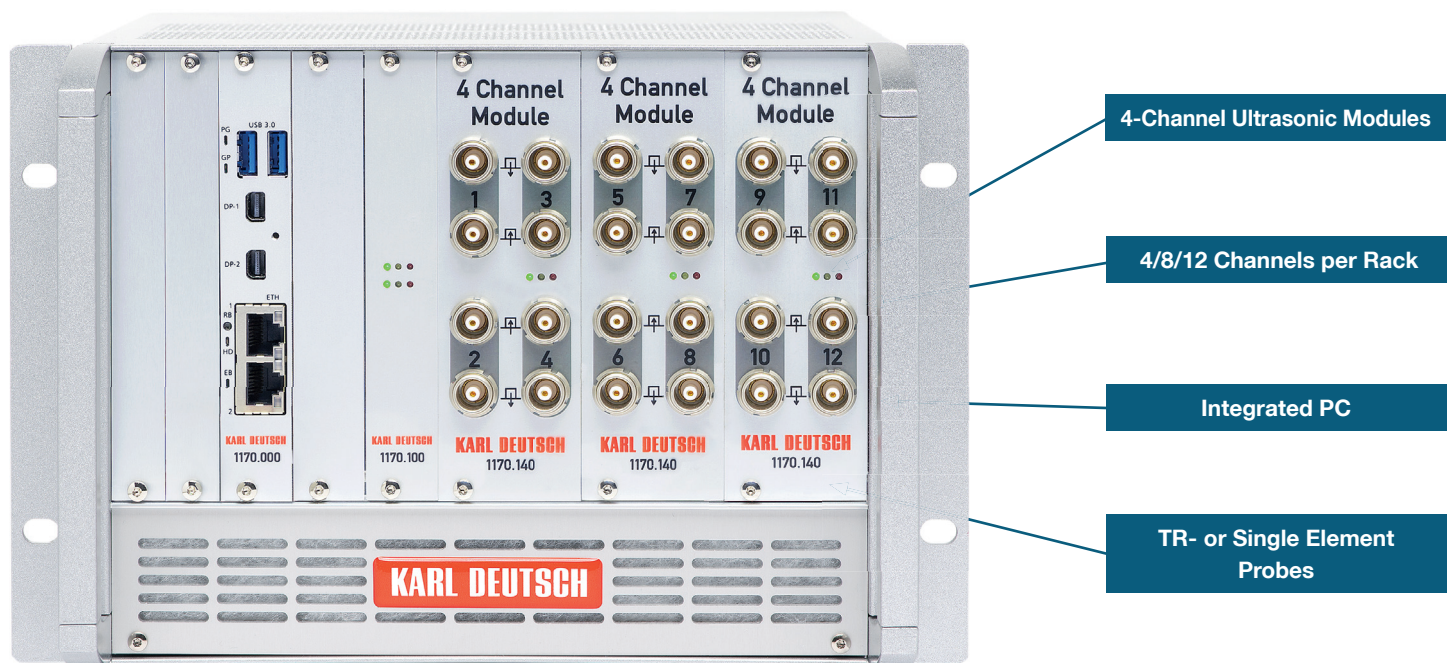
four A-scans can be displayed simultaneously, as well as strip charts (optional) or C-scans (optional)*.

The device is suitable for multichannel automated test systems used for the implementation of a wide variety of testing tasks (e.g. longitudinal defect testing, transverse defect testing, lamination defect inspection on tubes, flaw testing of forgings and weld inspection on gear parts, wall thickness measurement).

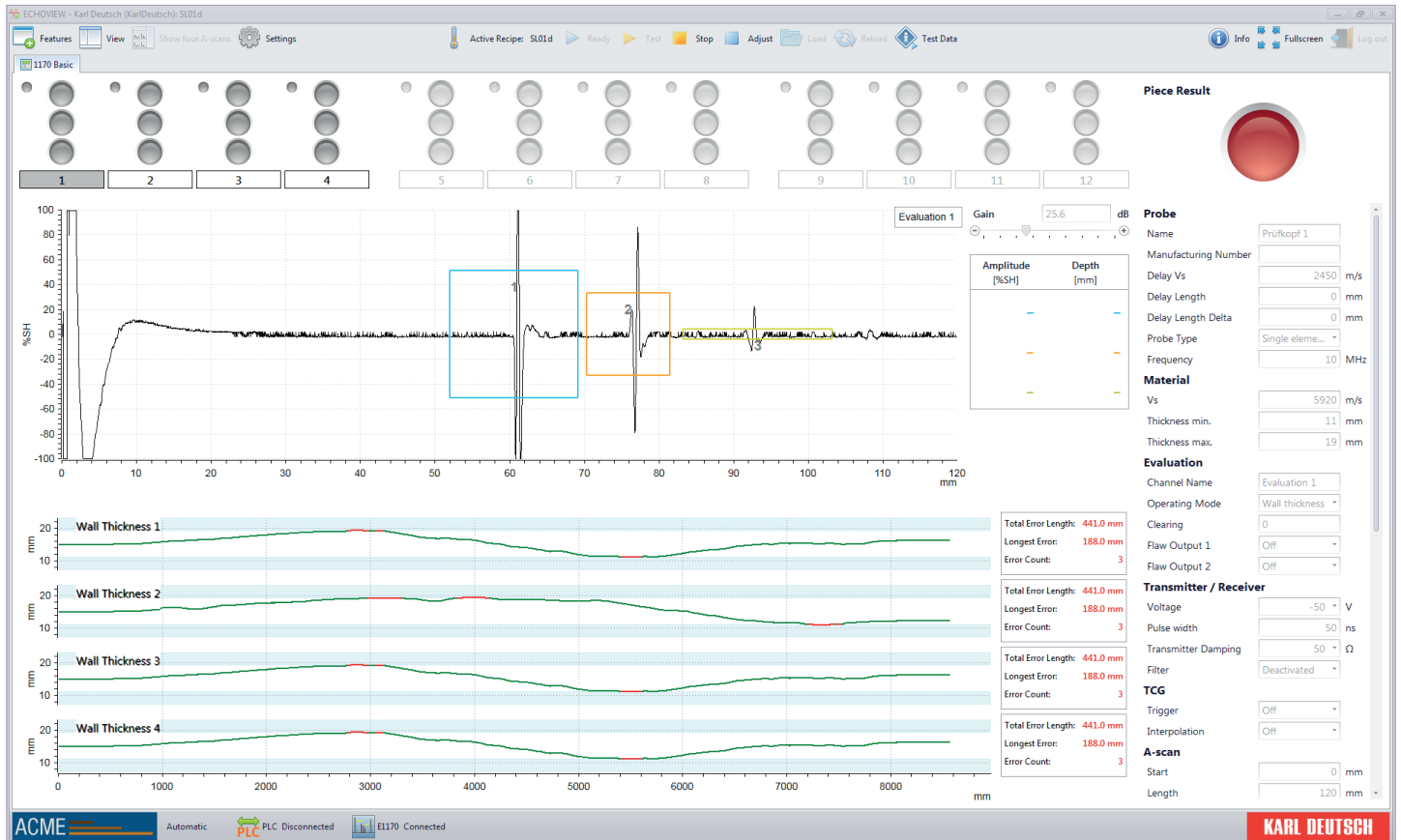
* on request

The Special Features at a Glance

- Modular configuration for up to 12 channels per rack
- Easy spare parts handling due to similar 4-channel modules
- 3 overlapping monitor gates
- 2 Trigger gates for simultaneous surface echo and back wall echo triggering or flexible BE-BE wall thickness measuring
- Measuring range up to 5 m
- Multiplex and parallel operation possible
- Digital time controlled gain (TCG) – also triggerable
- High resolution time measurement for wall thickness measuring up to 0.01 mm and better
- Easy-to-operate cycle program
- Integrated PC as a complete solution

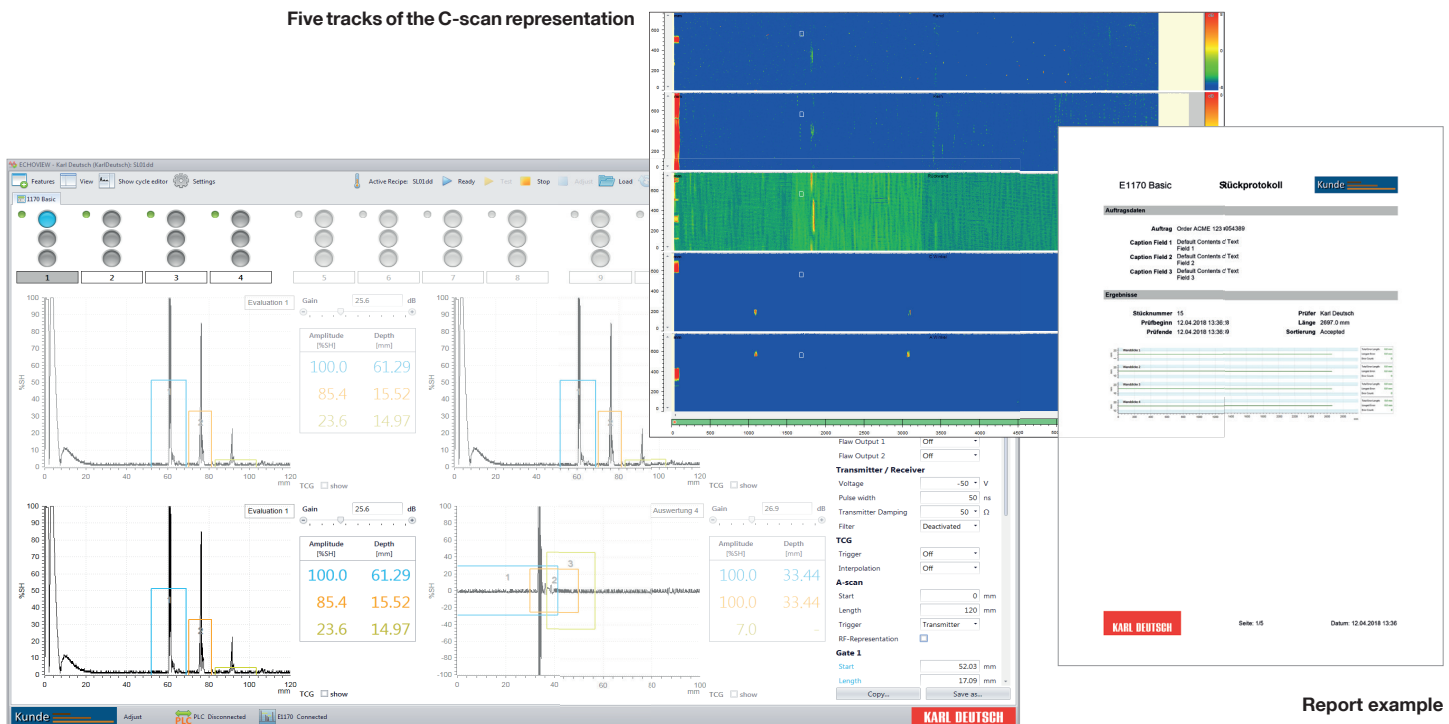


ECHOVIEW Evaluation and Control Software User Interface



ECHOVIEW screen mask: The image shows the optional arrangement of four strip charts

Five tracks of the C-scan representation



ECHOVIEW: Set-up screen with four A-scans

Report example

Technical Data

Screen	
Type	user's choice, recommended: 24", TFT

A-Scan	
Representation	<ul style="list-style-type: none">• screen windows• up to 4 A-scans can be represented simultaneously• maximum values w/ reference to all shots
Rectification	full wave, without (RF)
Screen range	0 – 5,000 mm steel (depending on PRF)
Amplitude representation	%SH/dB

Strip Chart (option)	
Representation	<ul style="list-style-type: none">• individually, or several test functions in one window• wall thickness [mm, Inch]• amplitude [%SH]

C-Scan (option)*	
Representation	<ul style="list-style-type: none">• separate images per gate or testing task possible• amplitude [%SH]

Transmitter	
Probe types	TR-probe or single element, selectable by software
Shape of transmitter pulses	<ul style="list-style-type: none">• rectangular transmitter• 50 – 300 Vpp, 30 – 1000 ns
Pulse repetition frequency	up to 8000 Hz per 4-channel module
Cycle program	<ul style="list-style-type: none">• can be combined in 1 to 32 steps• internal or external triggering

Measuring Ranges	
Time-base range	2.5 mm – 10,000 mm steel
Sound velocity	100 m/s – 19,000 m/s

Amplifier and Filter	
Frequency ranges	low pass: 2 MHz band pass: 2, 4, 10 MHz high pass: 5 MHz broadband: 1 – 14 MHz
Frequency response	0.5 – 20 MHz
Adjustable gain	90 dB (analog and digital)
Depth compensation	64 steps
Digitization	16 bit, 100 MHz

Monitor Gates	
Number of monitor gates	3, can be shifted at will, overlapping is possible
Operating mode	normal, inverted
Results	amplitude, transit time
Flaw outputs	24 V compatible flaw outputs, can be elongated, adjustable clearing
Triggering	gates 1 and 2 can be used as trigger sources, permitting surface and backwall echo triggering with one shot to provide - for instance - a large measuring range for wall thickness measuring

Miscellaneous	
Temperature range	0 – 40 °C / 32 – 104 °F
Dimensions	19", 4 U
Number of channels	4/8/12 per rack
Resolution wall thickness	150 ps corresponding to 0.9 µm (restricted by the application to typically 0.1 – 0.01 mm)
Resolution amplitude	better than 0.01 %SH

Control Inputs and Outputs	
Per channel	1 x channel enable 2 x flaw outputs, incl. clearing and flaw elongation
Central (all inputs and outputs are 24 V compatible)	inputs: <ul style="list-style-type: none">• test enable automatic mode• piece enable out: <ul style="list-style-type: none">• test enable automatic mode• result is valid• go• no go

* on request

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