

EPOCH 4

Flaw Detectors

NONDESTRUCTIVE TESTING



ULTRASONIC FLAW DETECTOR

The Panametrics-NDT™ EPOCH 4 is an advanced digital ultrasonic flaw detector that combines powerful, fully featured measurement capabilities, a comprehensive internal datalogger, and a wide range of software options to solve many demanding inspection problems.

Signal processing features include a 25 MHz bandwidth to permit testing of thinner materials, a selectable square wave pulser to optimize penetration on thick or attenuating materials, and narrowband filters to improve signal-to-noise in high gain applications. The EPOCH 4 incorporates rugged packaging and a conveniently organized direct-access keypad, and offers the choice of high-resolution Liquid Crystal or Electroluminescent displays.

A large capacity datalogger allows field storage of test data that can then be transferred to the PC via its versatile GageView PRO Interface Program.

EASY AND FAST OPERATION

The EPOCH 4 with its robust packaging design, large display, and functional color-coded keypad provides easy and fast operation in difficult inspection environments.

Important keys such as Gain, Freeze, Save Thickness, Save Waveform, Enter, and Slewing Keys are grouped together for easy thumb control and one-handed operation of all critical parameter settings.

The five Function keys allow quick access to preset parameter values that can be customized by the operator.

FEATURES

- Customizable narrowband filtering
- Selectable, tunable square wave or negative spike excitation pulser
- Light, ergonomically designed (5.7 lbs / 2.6 Kg)
- Fast minimum 60 Hz electronics update rate
- High-power NiMH battery
- Large, bright, high-resolution ELD or LCD with full/split screen views
- Automated transducer calibration
- 400" (10,000 mm) full screen range at longitudinal velocity of steel
- Superior minimum range capability (0.038" or 1 mm full scale at longitudinal velocity of steel)
- Display Freeze holds waveform and soundpath data
- Soundpath data viewable in inches, millimeters, or microseconds
- Peak Hold and Peak Memory
- RF display mode
- Alarms, threshold positive/negative, or minimum depth
- Dual Gate with Echo-to-Echo measurements
- Security Key enables remote upgrade of software options

TUNABLE SQUARE WAVE PULSER – STANDARD FEATURE

The EPOCH 4 set a new industry standard in 2001 when it was introduced with both a Tunable Square Wave Pulser and a Negative Spike Pulser as standard features. These high voltage pulsers offer the operator extensive application versatility and ease of use. The Tunable Square Wave Pulser along with Narrowband filtering produce class-leading material penetration and signal-to-noise ratios in difficult materials such as cast metals, large forgings, composites, and plastics.

Both pulsers are standard equipment on the EPOCH 4PLUS, EPOCH 4, and EPOCH 4B.

 PANAMETRICS-NDT™

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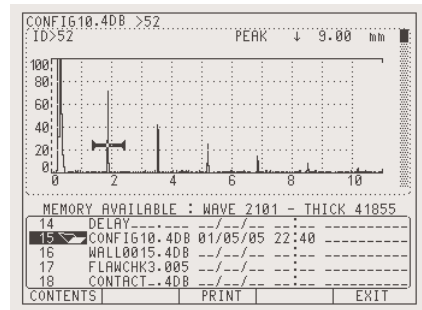
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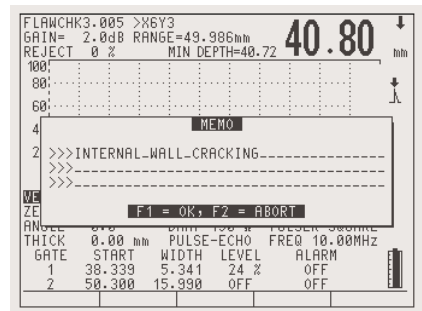
SOPHISTICATED ALPHANUMERIC INTERNAL DATALOGGER

The EPOCH 4's sophisticated datalogger is designed for ease of use while providing a wide range of features for virtually all flaw detection and thickness gaging applications. All saved data can be organized in alphanumeric file names and identifier (ID) codes that can be scrolled and reviewed on-screen. A Memo feature permits entry of additional inspection data and the Edit feature can be used to add, delete, or clear file names and ID numbers.

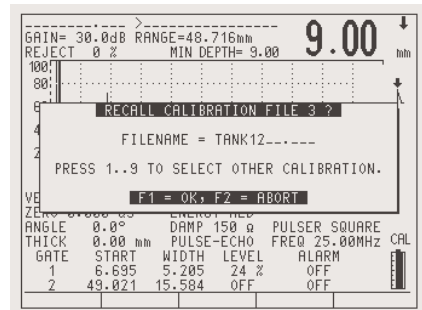
Save and recall inspection data sets in any combination of 500 waveforms (or instrument setups) or 10,000 thickness readings. The expandable memory option saves any combination of up to 2,000 waveforms or 40,000 thickness readings.



Datalogger File Menu



Memo Feature



Quick Recall Feature

INTERNATIONAL VERSATILITY

The EPOCH 4's keypad is available in English or International Symbols. Display languages are keypad selectable in French, German, Spanish, Italian, Russian, Japanese, English, and many other user defined languages.

AN AWESOME DISPLAY OF CHOICES

LCD or ELD: The EPOCH 4's Liquid Crystal Display provides cutting edge brightness and optimum viewing of the waveform in conditions from bright, direct sunlight to complete darkness.

The Electroluminescent Display offers a fast update rate, four brightness levels, and a very high degree of sharpness.



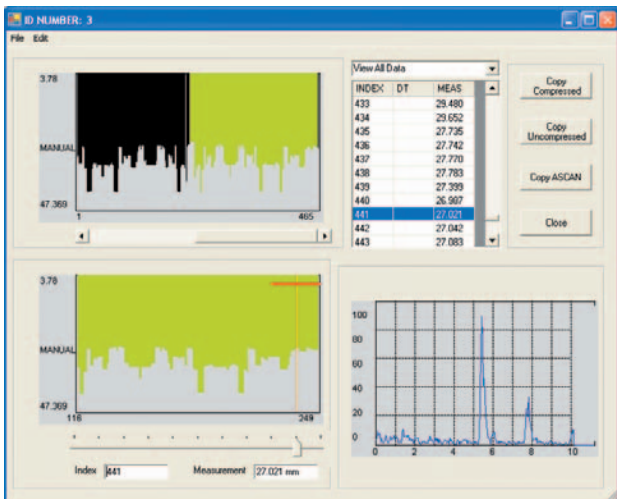
LCD

ELD

EXTENSIVE DOCUMENTATION AND TRANSFER CAPABILITIES

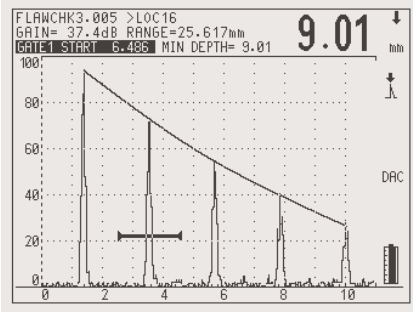
The optional Windows-based GageView™ PRO Interface program adds practical collection, editing, and review capabilities to the EPOCH 4. GageView PRO is a powerful tool that collects, manages, and formats stored inspection data.

GageView PRO database tracking allows setup of inspection plans with pre-loaded calibrations, IDs, and memos. Data can be printed or easily copied and pasted into word processing and spreadsheet documents for further reporting needs. GageView is compatible with the EPOCH 4, EPOCH LT, EPOCH 4B and EPOCH 4PLUS flaw detectors.

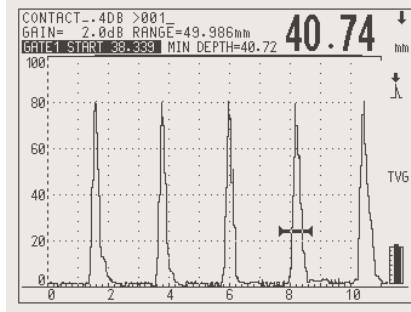


GageView PRO Interface Program Viewing a B-Scan Data File





DAC (Distance Amplitude Correction)



TVG (Time Varied Gain)

SOFTWARE OPTIONS

DAC (Distance Amplitude Correction)

Calculates signal amplitude as a percentage or dB difference of the DAC curve level (ASME, ASME-3, or JIS). Same size reflectors peak along the curve independent of their location. An alarm can be activated when a gated signal breaks the curve. (PN: EP4/DAC)

CSC (Curved Surface Correction)

Corrects sound path information when using an angle beam transducer to inspect a curved surface circumferentially. (PN: EP4/CSC)

Spotweld

The Weld Overlay feature allows on-screen comparison of the live waveform with a stored reference waveform. The Stamping feature permits stored weld data to be stamped "good", "undersized", "stick", or two other operator defined conditions. (PN: EP4/SPOTWELD)

TVG (Time Varied Gain)

TVG with 40 dB dynamic range corrects for distance/amplitude variations due to material attenuation and beam spreading. Reference echoes are brought to a standard full screen level of 80%. (PN: EP4/TVG)

Floating Gate

Automatically varies Gate Level by -6 dB or -12 dB of the gated backwall echo. Results in consistency of edge-depth measurements by making readings at the same relative amplitude. (PN: EP4/FG)

Interface Gate

Powerful tool for immersion applications where the water path distance between the transducer and front surface of the part is continually changing. Maintains the Interface Echo (between the water and the front surface of the part) on the left side of the EPOCH 4's display. (PN: EP4/IG)

AWS D1.1 and D1.5

Provides a dynamic reflector "indication rating" for various AWS weld inspection applications. This allows for a more efficient inspection by eliminating manual calculations. (PN: EP4/AWS)

Wave Analysis

Used to select particular points along an RF waveform and then obtain a timing/thickness measurement and also a dB difference between the two points. Applications include measuring the scale/oxide buildup on the inner diameter of boiler tubes. (PN: EP4/WAVE)

DGS/AVG

Flaw sizing technique that permits echo signals to be evaluated using DGS/AVG diagram associated with a particular type of probe and material. The DGS/AVG diagram shows the relationship among echo height, flaw size, and distance from the transducer. (PN: EP4/DGS/AVG)

Expanded Memory

Increases datalogger capacity from 500 waveforms/10,000 thickness readings to 2,000 waveforms/40,000 thickness readings. (PN: EP4/ MEM)

High PRF (1,000 Hz)

Increases the PRF rate of the EPOCH 4 and is useful for higher scanning speed inspections. The high PRF software fixes the PRF at 1 KHz. (PN: EP4/HPRF)

Low PRF (30 Hz)

Reduces or eliminates "wrap-around" noise by setting the PRF to a fixed 30 Hz. This feature is often necessary when inspecting materials that are highly attenuating or have long sound paths. (PN: EP4/LPRF)

Auto-Freeze

Provides the ability to automatically freeze the A-Scan waveform when a gate alarm has been triggered. (PN: EP4/AUTOFREEZE)

B-Scan

Generates an easy to understand cross-sectional profile view of an inspected part. Excellent for corrosion mapping of pipes, boilers, and storage tanks. This view can be used to visually verify acquired thickness measurements and also highlight areas with critically thin thickness values. Contact us for a detailed brochure on the B-Scan option. (PN: EP4/BSCAN)

GageView PRO

A powerful software that collects, manages, and formats stored inspection data. (PN: GAGEVIEWPRO-SERIAL)



EPOCH 4 SPECIFICATIONS*

MEASUREMENTS

Sensitivity: 110 dB Max and Reference level sensitivity feature with 6 dB or 0.1 dB selectable resolution

Auto Transducer Calibration: Automated calibration of transducer Zero Offset and/or Velocity

Reject: 0% to 80% of full scale in 1% increments

Units: English, Metric, or Microseconds

Material Velocity: 0.025 to 0.6000 in/ μ sec (635 to 15240 m/S)

Range: Standard 0.038 inch to 400 inch (1 mm to 10,000 mm)

Refracted Angle: Fixed settings of 0°, 30°, 45°, 60°, 70°, or variable from 10° to 85° in 0.1° resolution

Peak Memory: Simultaneous display of live A-scan at 60 Hz update rate and peak envelope of A-scan display

Peak Hold: Freezes Peak Memory echo envelope for waveform comparison with live A-scan

Pulsar Type, User Selectable: Tunable square wave, negative spike excitation

Pulse Energy: Low (100 V), Medium (200 V), High (300 V), and Max (400 V)

Damping: 50, 63, 150, and 400 ohms

Rectification: Full Wave, Half Wave Positive or Negative, and unrectified RF settings

Analog Bandwidth: 0.05 MHz to 25 MHz at -3 dB

Filters: Broadband, Narrowband, or Custom Selectable Low and High Pass Filters

Test Modes: Pulse Echo, Dual, or Through Transmission

Alarms: Selectable threshold positive/negative or minimum depth modes

DISPLAY

Display: 320 pixels (W) X 240 pixels (H), ELD or LCD screens

Display Update Rate: Minimum 60 Hz

POWER SUPPLY

Power Requirements: AC Mains: 100-120 VAC, 200-240 VAC, 50-60 Hz

Battery: Internal Rechargeable NiMH battery pack rated at 12 V at 4000 mA

Battery Operating Time: ELD 7 hours nominal. LCD 10 hours nominal. 2 hours typical Recharge Time

OUTPUTS

High Speed Parallel Port: Allows rapid communication to external devices and B-Scan encoder communication

Analog Output: Keypad selectable voltage output of depth or amplitude data

VGA Output Port: Connects to standard VGA monitor or A/V projector

RS-232 Communications Port: Allows interfacing with PCs and printers. Max Baud Rate 38.4

GENERAL

Keypad: English or International symbols

Languages: Available in keypad selectable languages: English, French, German, Spanish, Italian, Russian, Japanese, and user-defined custom languages

Transducer Cable Connectors: Fits BNC or Number 1 Lemo®

Dimensions:
(ELD) 11.15" H x 6.55" W x 2.6" T
(LCD) 11.15" H x 6.55" W x 2.4" T

Weight: 5.7 lbs. (2.6 Kg) with battery

Operating Temperature:
ELD/ -20°C to 50°C (-4°F to 122°F)
LCD/ 0°C to 50°C (32°F to 122°F)

Storage Temperature: -40°C to 70°C (-40°F to 158°F) depending on battery and display

PC Requirements: PC running minimum Microsoft® Windows® XP®, Microsoft Windows 2000®

Warranty: One year warranty, battery not included. Optional second year warranty available

STANDARD INCLUSIONS

EPOCH 4, Advanced Microprocessor-Based Ultrasonic Flaw Detector. Includes:

- EP4/MCA Mini Charger Adapter
- EP4/BAT Nickel Metal Hydride Rechargeable Battery
- EP4/CAL-NIST NIST Calibration Certificate
- EP4/MAN Instruction Manual
- EP4/TC Transport Case
- EP4/PS Stainless Steel Pipe Stand
- EP4/HS Hand Strap

OPTIONAL ACCESSORIES

EP4/SC Shipping hard shell case

EP4/BAT-AA Alkaline battery pack

EP4/EC External stand-alone charger

EP4/RPC Rubber protective carrying case

EP4/PR Printer: 110-120 V

EP4/PRE Printer: 230-240 V

EP4/DP-E Display Protectors (ELD)

EP4/DP-L Display Protectors (LCD)

EP4/C-15VGA-6 VGA cable

EP4/C-25PRL-6 Parallel port cable

EP4/C-9FAT-6 Serial port cable

GAGEVIEWPRO-SERIAL Interface program



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