

Индикативно предложение по проведени пазарни консултации №46004
с предмет "Доставка на апаратура за ултразвуков контрол"

от

ИННОВИА ЕООД, ЕИК 202159811, гр. София, ул. Петър Парчевич 51, телефон: 08892288001, 024448801, www.innovia.bg, Октав Тес

№ по ред	Описание и технически характеристики на предлаганата апаратура	М.е.
1	<p>Поция № 1 - Доставка на ултразвуков дефектоскоп</p> <p>Ултразвуков дефектоскоп EP650-KIT-NE-LX BASE KIT, Q0500067 включващ: уред EPOCH 650 (Навигационна подложка, английска клавиатура, LEMO конектор), 600-BAT-L-2 литиево-йонна батерия, зарядно устройство EP-MCA, транспортен куфар 600-TC, microSD карта MICROSD-ADP-2GB, инструкция за експлоатация EP650-MANUAL-CD CD с ръчен. Фабрично калибриране.</p> <p>Входно-изходни устройства:</p> <ul style="list-style-type: none"> - Слот за карта памет с включена SD карта; - USB порт; - RS-232 port; - 3 alarm outputs, 5V TTL, 10m; - Encoder input; - Видео изход тип VGA; - Конектори тип Lemo 1 за свързване на конвенционален осезател; - Конектор за хранване; - Li-ion акумулаторна батерия(минимум 15-16 часа работа на батерия с едно зареждане), мрежово зарядно устройство за мрежа от 220 VAC до 240 VAC с честота 50 Hz. <p>Дисплей:</p> <ul style="list-style-type: none"> - Тип- TFT /LCD; - Минимална резолюция 640x480 пиксела; - Минимално опресняване на дисплея 60 Hz. - Поддържа TCG/DAC и библиотека с вградени DGS/AVG настройки за различни осезатели. - Обхват на дълбокомера от 3.36 mm до 13388 mm със стъпка 1 mm. - Регулиране на напрежението на генериращия импулс в конвенционален режим 100 V, 200 V, 300 V или 400 V. - Покриване на честотен обхват за осезатели от 0.2 MHz до 26.5 MHz (-3 dB). - Регулиране на скоростта на ултразвука в диапазон 635÷15240 m/s със стъпка 1m/s. - Демпфиране на сигнала 50, 100, 200, 400 Ω. - Обхват на усилването от 0 dB до 110 dB със стъпка 0,1 dB. - Задаване ъгъла на осезателя от 0° до 90° със стъпка 0,1°. - Работна температура от -10 OC до +50 OC. 	бр.

- Модулиране на приетия импулс: цяла вълна, отрицателна или положителна полувълна, RF сигнал.
- Регулиране закъснението в призмата на осезателя (автоматично измерване на закъснението).
- Измервателни бленди: амплитуда на сигнала, разстояние по пътя, разстояние по дълбочина, разстояние между два сигнала, дебелина.
- Дефектоскопа има възможност за запаметяване на настройки за минимум 200 или повече различни осезателя с възможност за обновяване.
- Безопасна експлоатация в експлозивна атмосфера съгласно стандарт MIL-STD-810F.
- Панела за управление на дефектоскопа е проектиран да отговаря на стандарт за защита от проникване IP67 съгласно IEC 60529-2004 или еквивалент/и.
- Дефектоскопа издържа на удар и вибрации съгласно стандарта MIL-STD-810F.
- Производителя на ултразвуковия дефектоскоп прилага сертифицирана система по качество в съответствие с БДС EN ISO 9001:2015 "Системи за управление на качеството. Изисквания" или еквивалент/и, за което представя валиден сертификат.
- Максимално тегло на ултразвуковия дефектоскоп с монтирана батерия е 1,6 килограма.
- Корпусът на ултразвуковия дефектоскоп е изработен от противоударен материал, лицев панел лесен за почистване и удобна дръжка за носене.

Обща

Поция № 2 - Доставка на осезатели за ултразвуков контрол

1	<p>Осезатели RTD 0°L2,25 (Ø25)</p> <ul style="list-style-type: none"> - Корпус от неръждаема стомана с размери ш/д- 40x40 mm; - Конектор тип Lemo 00 от горната страна; - Свързващи тръбички за вода 2xØ4 mm, h = 10 mm; - Монтажни отвори за държачи 4xM4, h = 10 mm; - Ъгъл на осезателя 0°- надлъжни вълни; - Големина на кристала Ø25 mm; - Честота на осезателя 2.25 MHz. 	бр.
2	<p>Осезател RTD 0°TRL2,25 (Ø19)</p> <ul style="list-style-type: none"> - Корпус от неръждаема стомана с размери ш/д- 30x30 mm; - Конектор тип microdot от горната страна; - Свързващи тръбички за вода 2xØ4 mm, h = 10 mm; - Монтажни отвори за държачи 4xM4, h = 10 mm; - Ъгъл на осезателя 0°- надлъжни вълни; - Големина на кристала Ø19 mm; - Честота на осезателя 2.25 MHz. 	бр.

3	<p>Осезател RTD 0°TRL 2,25, 2(10x15)</p> <ul style="list-style-type: none"> - Корпус от неръждаема стомана с размери ш/д- 40x40 mm; - Конектори тип Lemo 00 от горната страна; - Свързващи тръбички за вода 2xØ4 mm, h = 10 mm; - Монтажни отвори за държачи 4xM4, h = 10 mm; - Ъгъл на осезателя 0°- надлъжни вълни; - Големина на кристала 2(10x15); фокусиран FD~10; - Честота на осезателя 2.25 MHz. 	бр.
4	<p>Осезатели RTD Creeping Wave TRCr4-Aust, 2(6x13)</p> <ul style="list-style-type: none"> - Корпус от неръждаема стомана с размери ш/д- 25x25 mm; - Конектори тип Lemo 00 от горната страна - Големина на кристала 2(6x13), фокусиран FS~10; - Честота на осезателя 4.0 MHz. 	бр.
5	<p>Осезатели RTD 45° TRL 2-Aust., 2(10x18)</p> <ul style="list-style-type: none"> - Корпус от неръждаема стомана с размери ш/д- 30x30 mm; - Конектор тип microdot от горната страна; - Свързващи тръбички за вода 2xØ4 mm, h = 10 mm; - Монтажни отвори за държачи 4xM4, h = 10 mm; - Ъгъл на осезателя 45° - надлъжни вълни (5750 mm/s); - Големина на кристала 2(10x18), фокусиран FS~45; - Честота на осезателя 2,0 MHz. 	бр.
6	<p>Осезател RTD 60° T2-St., (25x19)</p> <ul style="list-style-type: none"> - Корпус от неръждаема стомана с размери ш/д- 40x40 mm; - Конектор тип Lemo 00 от горната страна; - Свързващи тръбички за вода 2xØ4 mm, h = 10 mm; - Монтажни отвори за държачи 4xM4, h = 10 mm; - Ъгъл на осезателя 60°- напречни вълни (3250 mm/s); - Големина на кристала (25x19); - Честота на осезателя 2.0 MHz. 	бр.
7	<p>Осезател RTD 70° TRL2-St., 2(15x25)</p> <ul style="list-style-type: none"> - Корпус от неръждаема стомана с размери ш/д- 40x40 mm; - Конектор тип Lemo 00 от горната страна; - Свързващи тръбички за вода 2xØ4 mm, h = 10 mm; - Монтажни отвори за държачи 4xM4, h = 10 mm; - Ъгъл на осезателя 70°- надлъжни вълни (5920 mm/s); - Големина на кристала 2(15x25), фокусиран FS~30; - Честота на осезателя 2,0 MHz. 	бр.

8	Осезатели RTD 70° TRL2-Aust., 2(10x18) - Корпус от неръждаема стомана с размери ш/д- 30x30 mm; - Конектор тип microdot от горната страна; - Свързващи тръбички за вода 2x Ø4mm, h = 10 mm; - Монтажни отвори за държачи 4x M4, h = 10 mm; - Ъгъл на осезателя 70°- надлъжни вълни (5750 mm/s); - Големина на кристала 2(10x18), фокусиран FS~30; - Честота на осезателя 2,0 MHz.	бр.
9	Производителя прилага сертифицирана система по качество в съответствие с БДС EN ISO 9001:2015 Системи за управление на качеството	

Обща

Срок на доставка: 8 седмици от получаване на поръчка

Условие на доставка: до адрес посочен от купувача

Гаранционен срок, Срок за отстраняване на дефекти през гаранционния период: Гаранция от една (1) година от датата на производство се прилага за всички осезатели.

За непроизводствени грешки и ремонти след една (1) година от датата на производство, ремонтните дейности ще бъдат таксувани спрямо действителни

Съпроводителна документация при доставка: Фактура оригинал, приемо-предавателен протокол, сертификати за калибриране и сертификати за качеств



PERRY JOHNSON REGISTRARS, INC.

Certificate of Registration

Perry Johnson Registrars, Inc., has audited the Quality Management System of:

Olympus Scientific Solutions Americas Corporation

48 Woerd Avenue, Waltham, MA 02453 United States

(This is a multisite scheme. See Appendix for site specific details.)

*(Hereinafter called the Organization) and hereby declares that
Organization is in conformance with:*

ISO 9001:2015

This Registration is in respect to the following scope:

***Design, Manufacturing, Distribution, Service, Repair and Rental of Non-Destructive Testing
Systems***

*This Registration is granted subject to the system rules governing the Registration referred to above, and the
Organization hereby covenants with the Assessment body duty to observe and comply with the said rules.*

Заличено на основание
ЗЗЛД



Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)
755 West Big Beaver Road, Suite 1340
Troy, Michigan 48084
(248) 358-3388

The use of the UKAS accreditation symbol is in respect to the activities covered by the Accreditation Certificate Number 0105.

The validity of this certificate is dependent upon ongoing surveillance and fulfillment of required sampling of sites.

*Effective Date: June 23, 2019
Expiration Date: June 22, 2022*

*Certificate No.: C2019-02042
Page 1 of 3*



PERRY JOHNSON REGISTRARS, INC.

Appendix

*Olympus Scientific Solutions Technologies Incorporated
Olympus Scientific Solutions Americas Corporation
48 Woerd Avenue,
Waltham, MA 02453 United States*

*Design, Manufacturing, Distribution, Service and Repair
of Non-Destructive Testing Systems, and Sales*

*Olympus America Incorporated
110 Magellan Circle,
Webster, TX 77598 United States*

*Distribution, Service, Repair and Rental of Non-
Destructive Test Equipment*

*Olympus NDT Canada Incorporated
3415 rue Pierre-Ardouin,
Quebec, Quebec G1P 0B3 Canada*

*Design, Manufacturing, Distribution, Service and Repair
of Non-Destructive Testing Systems*

*Olympus Scientific Solutions Technologies Incorporated
60 Decibel Road, Suite 102,
State College, PA 16801 United States*

*Design, Manufacturing, Distribution, Service and Repair
of Non-Destructive Testing Systems*

*Olympus Scientific Solutions Technologies Incorporated
421 North Quay Street,
Kennewick, WA 99336 United States*

*Manufacturing, Distribution and Service of Non-
Destructive Testing Systems*

Design, Manufacturing, Distribution, Service, Repair and Rental of Non-Destructive Testing Systems

Заличено на основание
ЗЗЛД

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Perry Johnson Registrars, Inc. (PJR)
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(248) 358-3388

Certificate No.: C2019-02042

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The validity of this certificate is dependent upon ongoing surveillance and fulfillment of required sampling of sites.



PERRY JOHNSON REGISTRARS, INC.

Appendix

*Olympus America Incorporated
3500 Corporate Parkway, Building D1,
Center Valley, PA 18034 United States*

Service and Repair of Microscope Product Line

Design, Manufacturing, Distribution, Service, Repair and Rental of Non-Destructive Testing Systems

Залічено на основаніе
ЗЗЛД

Terr

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Certificate No.: C2019-02042
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The validity of this certificate is dependent upon ongoing surveillance and fulfillment of required sampling of sites.

Hamburg, Germany, 22/07/2019

Manufacturer Statement

The Epoch 650 is designed to be used in explosive atmosphere according to the safe operation as defined by class I, Division 2, Group D, as defined in the National Fire Protection Associated Code (NFPA 70), Artical 500, and tested using MIL-STD-810F, Method 511.4, Procedure I.

Environmental Ratings

IP rating	Designed to meet the standards of the Ingress Protection (IP) rating number IP67 (navigation pad version) or IP66 (knob version) per IEC 60529-2004 (Degrees of Protection provided by enclosures – IP Code). The product design was confirmed to meet the IP rating by means of the Olympus internal design verification test process that occurs prior to the release of the product to production.
Explosive atmosphere	Safe operation as defined by Class I, Division 2, Group D, as defined in the National Fire Protection Association Code (NFPA 70), Article 500, and tested using MIL-STD-810F, Method 511.4, Procedure I. A version that conforms to the requirements of the ATEX directive is available.* For more information, visit us online at www.olympus-ossa.com .
Shock tested	MIL-STD-810F, Method 516.5 Procedure I, 6 cycles each axis, 15 g, 11 ms half sine.
Vibration tested	MIL-STD-810F, Method 514.5, Procedure I, Annex C, Figure 6, general exposure: 1 hour each axis
Operating temperature	-10 °C to 50 °C (14 °F to 122 °F)
Battery storage temperature	0 °C to 50 °C (32 °F to 122 °F)

Заличено на основание
ЗЗЛД

KOJI
Indust

Scientific Solutions Division

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OLYMPUS EUROPA SE & CO. KG

Amsinckstraße 63, 20097 Hamburg, Postfach 10 49 08, 20034 Hamburg, Telefon +49 40 23773-0, Fax +49 40 233765

Sitz der Kommanditgesellschaft: Hamburg, Handelsregister: Amtsgericht Hamburg HRA 116518

Komplementärin: Olympus Europa Management SE

Geschäftsführende Direktoren: Frank Drewalowski (Executive Managing Director), Dr. Thorben Finken, Miquel-Àngel García,

Christiane Iwanoff, Dr. André Roggan, Michael Speiser, Akihiro Taguchi, Constantin Zangemeister

Vorsitzender des Verwaltungsrates: Frank Drewalowski

Sitz der Komplementärin: Hamburg · Handelsregister: Amtsgericht Hamburg HRB 126986

EPOCH 650

Versatile and Rugged Flaw Detector



- Compact and Rugged
- Powerful Data Reporting
- Intuitive Interface
- EN12668-1 Compliant

EPOCH 650 Ultrasonic Flaw Detector

Economical Size, Quality Performance

The large, full VGA transfective display combined with our patented digital high dynamic range receiver provides a stable, striking A-scan representation in any lighting condition. The EPOCH 650 is designed to meet the requirements of EN12668-1 and allows a full range of standard and optional flaw detection features. Multiple onboard reporting tools and a comprehensive data filing system enable you to easily collect and report high quality inspection data. The rugged, ergonomic design allows use in nearly any inspection environment, while the flexible PerfectSquare™ pulser and highest number of digital filters in its class can tackle nearly any application.



The EPOCH 650 Digital Ultrasonic Flaw Detector combines Olympus' industry leading conventional flaw detection capabilities with the efficiency of a highly portable, intuitive instrument. The EPOCH 650 flaw detector's blend of efficient menus and direct access keys allows you to take advantage of the highest quality flaw detection platform with exceptional ease of use.

Designed for All Inspection Environments

The EPOCH 650 is designed for use in nearly any inspection environment, from bench top testing in a laboratory to extreme outdoor and hazardous conditions. Designed for IP rating in either knob (IP66) or navigation pad (IP67) configurations, and tested to very high environmental and reliability standards, the EPOCH 650 allows users in any inspection environment to feel confident in both the performance and durability of the instrument.

Key Features

- Designed to meet the requirements of EN12668-1
- PerfectSquare™ tunable square wave pulser
- Full screen A-scan mode
- Digital high dynamic range receiver
- Thirty digital filters for enhanced signal-to-noise ratio
- 2 kHz PRF for rapid scanning
- Knob or navigation pad adjustment configurations
- Large, full VGA sunlight readable display
- 15+ hours of battery life
- Standard dynamic DAC/TCG and onboard DGS/AVG
- Multiple on-board report formats
- MicroSD memory card for data transfers
- Optional Corrosion Module software with Encoded B-scan
- USB On-The-Go (OTG) for PC communication
- Alarm and VGA outputs
- Optional analog output

Simple and Comfortable Operation

The EPOCH 650 design is focused on providing a very high level of flaw detection with the simplicity of a basic instrument. The EPOCH 650 is designed to be ergonomic, intuitive, and practical for both experienced and novice ultrasonic inspectors.

Intuitive User Interface

The EPOCH 650 user interface is based on the industry leading EPOCH 600 flaw detector. The EPOCH 650 combines a simple menu structure for instrument settings, calibration and software feature adjustment, with the EPOCH brand's hallmark direct-access key approach for critical inspection functions such as gain and gate adjustment, screen freeze, and file save. Supported in multiple languages, the EPOCH 650 user interface is intuitive for any level of operator.

Vibrant VGA Display with Full Screen Mode

The EPOCH 650 features a full VGA (640 x 480 pixels) resolution display. The horizontal design of the EPOCH 650 optimizes the A-scan size and readability on this high quality display. Built with transfective technology, this VGA display provides excellent clarity in indoor, low lighting conditions using its powerful backlight, as well as in direct sunlight by using the ambient light as a pseudo-backlight. The full screen mode feature enhances this vibrant display to provide the largest A-scan in an EPOCH series flaw detector!

Options for Comfortable Navigation

In order to accommodate different user needs and preferences, the EPOCH 650 is available in two hardware configurations:

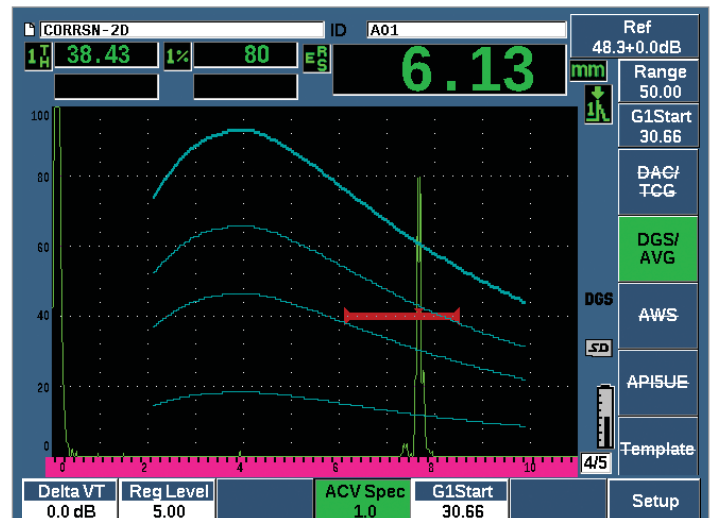
Knob

The adjustment knob on the EPOCH 650 is used along with the CHECK and ESC keys to adjust parameter values in either coarse or fine increments. You have the ability to lock the knob to prevent accidental parameter value changes during an inspection. This configuration provides smooth value slewing for customers who prefer adjusting parameters using a knob. The knob configuration is designed to meet the requirements of IP66.

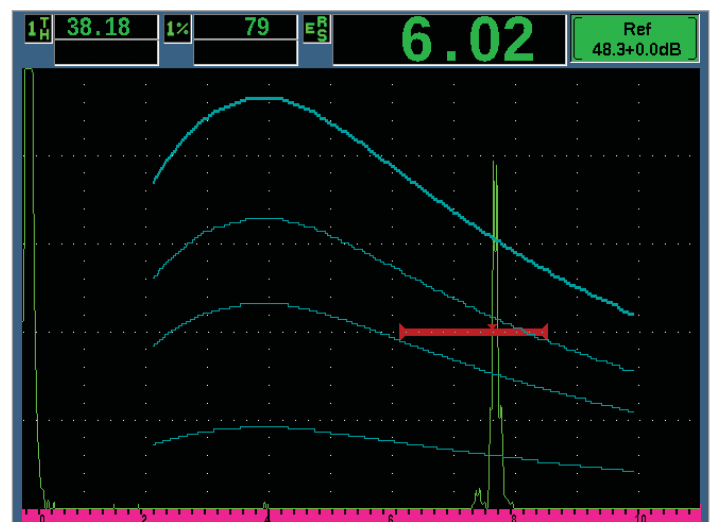


Navigation Pad

The EPOCH 650 navigation pad is a hallmark feature of the EPOCH flaw detectors. The up and down arrows on the navigation pad are used for coarse parameter adjustment, and the left and right arrows for fine adjustment. The navigation pad also contains additional functions and frequently used parameters such as gain, save, and the CHECK and ESC keys. The navigation pad configuration is designed to meet the requirements of IP67.



EPOCH 650 DGS/AVG feature - Standard Screen mode



EPOCH 650 DGS/AVG feature - Full Screen mode

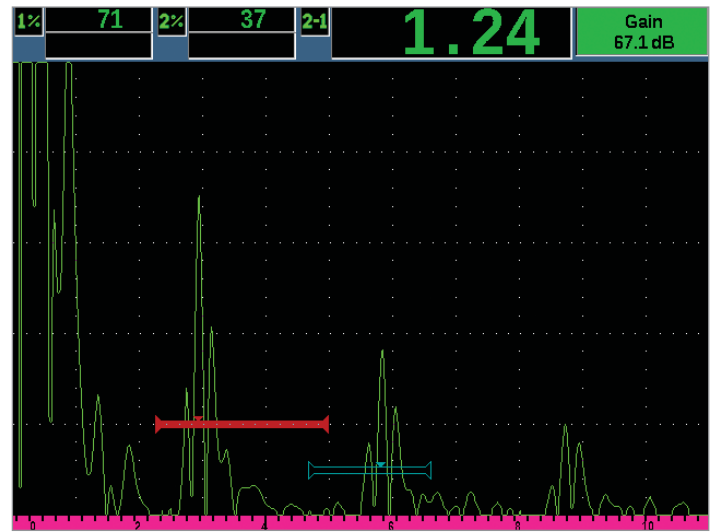
Optimized Access to Powerful Features

The EPOCH 650 provides excellent quality ultrasonic performance. Based on the same digital architecture as the EPOCH 600 and EPOCH 1000 Series, the EPOCH 650 provides flexible, powerful pulsing and receiving features to accommodate the needs of most flaw detection inspections.

Pulser/Receiver

The EPOCH 650 comes standard with powerful flaw detection capabilities, such as:

- PerfectSquare™ tunable square wave pulser
- Digital high dynamic range receiver
- Thirty (30) 100% digital filter sets
- Auto or manually adjustable PRF from 10 Hz to 2000 Hz
- Pulser voltage from 100 V to 400 V
- Amplitude resolution to $\pm 0.25\%$
- Five customizable digital measurements



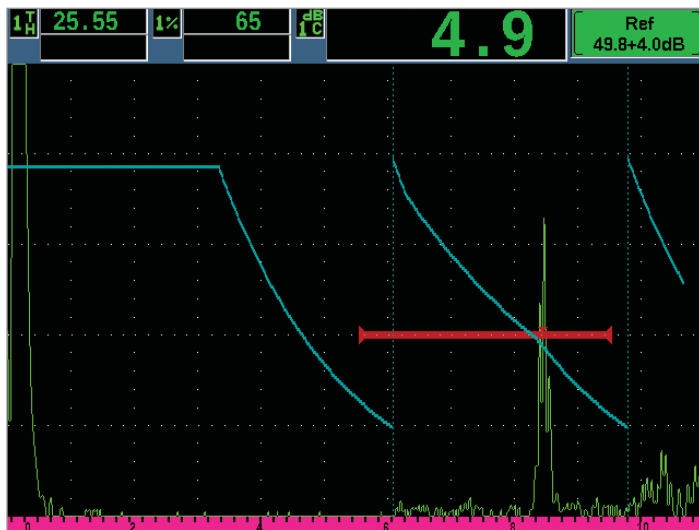
EPOCH 650 Echo-to-Echo with Gate Tracking

Standard Software Features

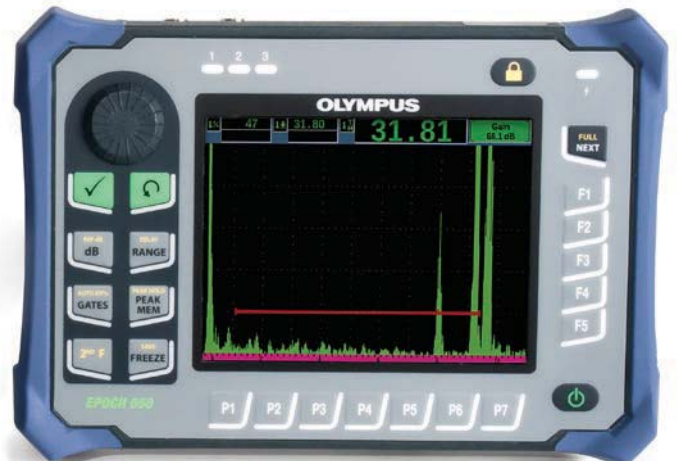
Dynamic DAC/TCG: Calculates signal amplitude as a percentage or decibel level compared to a DAC curve or a reference echo amplitude fixed at a time-varied gain. DAC versions include Standard, ASME 3, JIS, and Custom. Also includes several key features: dynamically adjustable DAC curves, switchable DAC and TCG views, custom DAC warning curves, and 20-80% DAC views.

DGS/AVG: This flaw sizing technique allows echo signals to be evaluated with a DGS/AVG diagram associated to a particular type of probe and material. The DGS/AVG diagram illustrates the relationships between echo height, flaw size, and distance from the transducer.

AWS D1.1 and D1.5: Provides a dynamic reflector indication rating for various AWS weld inspection applications. This allows more efficient inspections by eliminating manual calculations.



EPOCH 650 Dynamic DAC/TCG Feature



Versatility Through Optional Performance

Optional Software Features

Interface Gate: This optional third measurement gate enables real-time tracking of a variable interface echo in order to maintain consistent digital measurements.

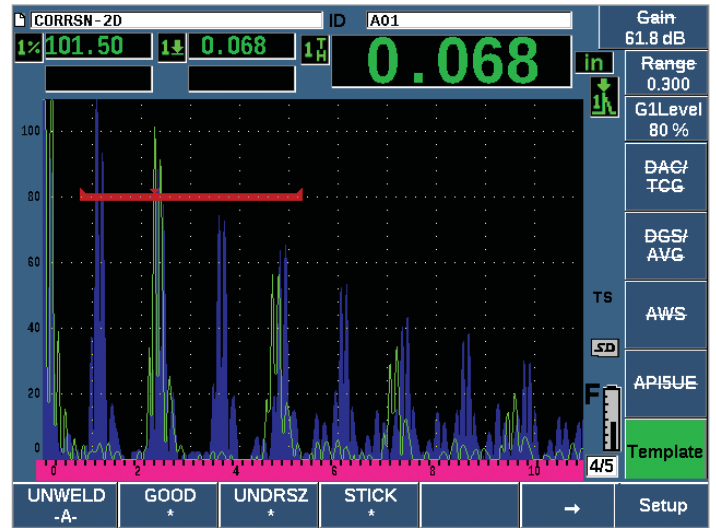
Corrosion Module: Simplified corrosion mode allowing automatic ultrasonic setups based on transducer selection, Automatic Gain Control (AGC), thickness gage measurement algorithm, V-Path correction, and transducer wear compensation using an automatic zero function (“Do Zero”). Also features color-coded Grid View and encoded B-scan.

Template Storage: Allows on-screen comparison of a live waveform with a saved reference waveform. Saved templates can be dynamically toggled on and off with a single key press for fast waveform comparison. Excellent for spotweld analysis and other applications.

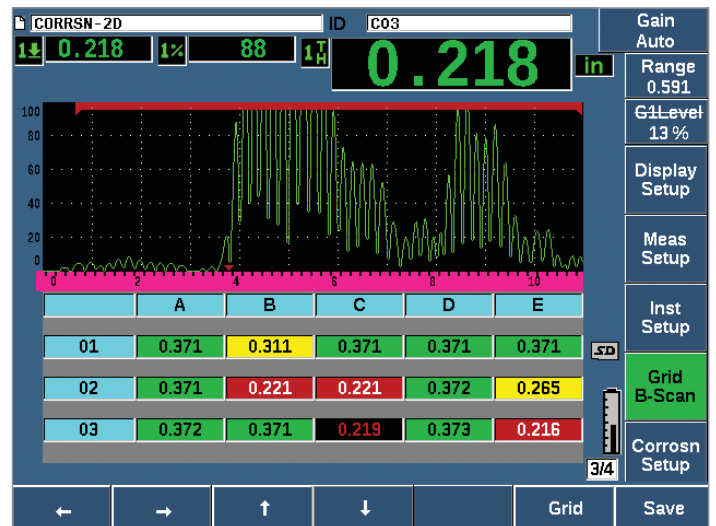
Backwall Echo Attenuator (BEA): Attenuates the backwall of an inspected part using the screen region defined by Gate 2.

API 5UE: Allows defect sizing according to API Recommended Practice 5UE. Uses the Amplitude Distance Differential Technique (ADDT) to measure the size of potential defects during the prove-up process of OCTG pipe.

Waveform Averaging: This feature allows live A-scan averaging 2X, 4X, 8X, 16X, and 32X.



EPOCH 650 Template Storage Feature



EPOCH 650 Corrosion Module Feature



Data Logging and PC Interfacing

Data Management

The EPOCH 650 allows several methods of storing, archiving and reporting inspection and calibration data. The instrument features up to 100,000 points of onboard memory, as well as video recording and review. It is also fully compatible with Olympus PC interface program, GageView™ Pro. With quick file setup functions and flexible data management, logging and reporting inspection data is simple and efficient.

Data Logger

The EPOCH 650 features an onboard data logger for calibration and inspection file storage. The instrument comes with two primary file types: calibration (CAL) and incremental (INC) files. CAL files allows you to save a virtually unlimited number of parameter setups for fast and easy recall to live settings. INC files store multiple pieces of inspection data under a single file name for downloading and reporting by inspection.

The onboard data logger is enhanced by full featured corrosion-style data logger file types standard on the EPOCH 650. This feature includes the following data file types: sequential, sequential with custom point, 2-D grid, 2-D grid with custom point, 3-D grid, boiler, 2-D EPRI.

GageView™ Pro

The EPOCH 650 is fully compatible with our PC interface program, GageView™ Pro. You can download inspection data, review measurements on a PC, export measurements

and calibration data to common spreadsheet programs, back up calibration and inspection data from the instrument, and perform basic operations such as instrument firmware upgrades and screen captures.

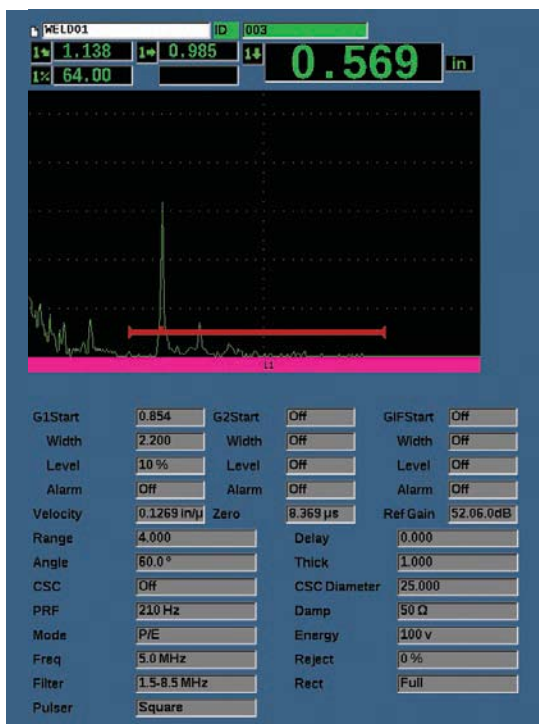
MicroSD

The EPOCH 650 utilizes an external microSD memory card (2 GB included, up to 64 GB supported) for both onboard and removable memory. Through removable memory, you are able to share files between instruments, as well as output reports in various formats. A second 2 GB microSD card is mounted to the PC board inside the instrument, and is responsible for all onboard data storage. In the event the instrument is damaged beyond repair, this microSD card can be removed at an authorized service center, allowing the operator to recover critical data from the damaged instrument.

On-board Reporting

The EPOCH 650 allows report generation on-board in a variety of formats. You can easily capture screen shots to the removable microSD card, as well as exporting saved data in .csv or .xml files. The instrument also features Bitmap report generation for single data points or entire files.

The EPOCH 650 comes standard with a video recording feature. You can capture up to 8 minutes of the live A-scan inspection data at 60 frames per second. This data can be reviewed on the EPOCH 650 or exported for review on a PC.



EPOCH 650 on-board file report output (Bitmap format)



Portable, Rugged, and Ergonomic



Standard Package

- EPOCH 650 Digital ultrasonic flaw detector, AC or battery operation
- Charger/AC adapter (100 VAC, 115 VAC, 230 VAC, 50 Hz or 60 Hz)
- Rechargeable lithium-ion battery
- Transport case
- USB cable
- Quick reference card
- Comprehensive operation manual (CD)



Physical Features – Rear

- A – USB On-The-Go port
- B – MicroSD card
- C – DC power connector
- D – VGA port
- E – Digital I/O port
- F – Transducer connectors (2)
- G – Battery door
- H – Pipe stand

Physical Features

The EPOCH 650 is a lightweight, portable flaw detector built to be rugged and flexible for nearly any inspection. Some key physical features include:

- Large, full VGA resolution transfective display for vivid clarity in any indoor lighting and direct sunlight conditions
- Rubber overmolded bumpers on all four corners for shock absorption and anti-marring considerations
- Four-point harness connection for chest straps
- “No tools” access to battery compartment and side I/O door
- Continuous position stand with right angle crook for improved stability from 0 to 180 degrees
- Gasketed side door for USB OTG connection and removable memory
- Standard internal, rechargeable lithium-ion battery
- Lightweight, ergonomic design for increased portability and ease of use

Instrument Inputs/Outputs

USB ports	USB On-The-Go (OTG)
RS-232 port	Yes
Video output	VGA output standard
Analog output	1 analog output (optional), Selectable 1 V/10 V Full Scale, 4 mA max
Alarm output	3 alarm outputs, 5 V TTL, 10 mA
Trigger I/O	Trigger input, 5V TTL; Trigger output, 5V TTL, 10 mA max
Encoder inputs	1-axis encoder line (quadrature - Corrosion Module mode only)

Environmental Ratings

IP rating	Designed to meet the standards of the Ingress Protection (IP) rating number IP67 (navigation pad version) or IP66 (knob version) per IEC 60529-2004 (Degrees of Protection provided by enclosures – IP Code). The product design was confirmed to meet the IP rating by means of Olympus internal design verification test process that occurs prior to the release of the product to production.
Explosive atmosphere	Safe operation as defined by Class I, Division 2, Group D, as defined in the National Fire Protection Association Code (NFPA 70), Article 500, and tested using MIL-STD-810F, Method 511.4, Procedure I.
Shock tested	MIL-STD-810F, Method 516.5 Procedure I, 6 cycles each axis, 15g, 11 ms half sine.
Vibration tested	MIL-STD-810F, Method 514.5, Procedure I, Annex C, Figure 6, general exposure: 1 hour each axis
Operating temperature	-10 °C to 50 °C (14 °F to 122 °F)
Battery storage temperature	0 °C to 50 °C (32 °F to 122 °F)

EPOCH 650 Specifications*

General

Overall dimensions (W x H x D)	236 mm x 167 mm x 70 mm (9.3 in. x 6.57 in. x 2.76 in.)
Weight	1.6 kg (3.5 lb), including lithium-ion battery
Keypad	English, International, Japanese, Chinese
Languages	English, Spanish, French, German, Japanese, Chinese, Portuguese, Russian
Transducer connections	BNC or Number 1 LEMO
Data storage	100,000 IDs onboard, removable 2 GB microSD card (standard)
Battery type	Single lithium-ion rechargeable standard
Battery life	15 h to 16 h (lithium-ion)
Power requirements	AC Mains: 100 VAC to 120 VAC, 200 VAC to 240 VAC, 50 Hz to 60 Hz
Display type	Full VGA (640 x 480 pixels) transreflective color LCD, 60 Hz update rate
Display dimensions (W x H, Diag.)	117 mm x 89 mm, 146 mm (4.62 in. x 3.49 in., 5.76 in.)

Pulsar

Pulsar	Tunable Square Wave
PRF	10 Hz to 2000 Hz in 10 Hz increments
Energy settings	100 V, 200 V, 300 V or 400 V
Pulse width	Adjustable from 25 ns to 5,000 ns (0.1 MHz) with PerfectSquare™ technology
Damping	50, 100, 200, 400 Ω

Receiver

Gain	0 to 110 dB
Maximum input signal	20 V p-p
Receiver input impedance	400 Ω ± 5%
Receiver bandwidth	0.2 MHz to 26.5 MHz at -3 dB
Digital filter settings	Thirty digital filter sets standard Seven EN12668-1:2010 compliant filters (0.2-10 MHz, 2.0-21.5 MHz, 8.0-26.5 MHz, 0.5-4 MHz, 0.2-1.2 MHz, 1.5-8.5 MHz, 5-15 MHz)
Rectification	Full-wave, Positive Half-wave, Negative Half-wave, RF
System linearity	Horizontal: ± 0.5% FSW
Resolution	0.25% FSH, amplifier accuracy ± 1 dB
Reject	0 to 80% FSH with Visual Warning
Amplitude measurement	0 to 110% full screen height with 0.25% resolution
Measurement rate	Equivalent to PRF in all modes

Calibration

Automated calibration	Velocity, Zero Offset Straight Beam (First Backwall or Echo-to-Echo) Angle Beam (Soundpath or Depth)
Test modes	Pulse Echo, Dual, or Through Transmission
Units	Millimeters, inches, or microseconds
Range	3.36 mm to 13,388 mm (0.132 in. to 527.10 in.) at 5,900 m/s (0.2320 in./μs)
Velocity	635 m/s to 15240 m/s (0.0250 in./μs to 0.6000 in./μs)
Zero offset	0 to 750 μs
Display delay	-59 mm to 13,401 mm (-2.320 in. to 526.97 in.) @ longitudinal velocity in steel
Refracted angle	0° to 90° in 0.1° increments

Gates

Measurement gates	2 fully independent gates for amplitude and TOF measurements
Gate start	Variable over entire displayed range
Gate width	Variable from Gate Start to end of displayed range
Gate height	Variable from 2 to 95% full screen height
Alarms	Positive and Negative Threshold, Minimum Depth (Gate 1 and Gate 2)

Measurements

Measurement display locations	5 locations available (manual or auto selection)
Gate (1, 2)	Thickness, Soundpath, Projection, Depth, Amplitude, Time-Of-Flight, Min./Max. Depth, Min./Max. Amplitude
Echo-to-Echo	Standard Gate 2-Gate 1, Optional IF Gate Tracking
Other measurements	Overshoot (dB) value for DGS/AVG, ERS (equivalent reflector size) for DGS/AVG, AWS D1.1/D1.5 A, B, C and D values, Reject Value, Echo to RefdB values
DAC/TCG	Standard
DAC points	Up to 50 points, 110 dB dynamic range
Special DAC modes	Custom DAC (up to 6 curves), 20-80% View
Curved surface correction	Standard OD or Bar correction for Angle Beam measurements
Corrosion (optional)	Zero-cross measurement algorithm, V-Path correction, Single or Echo-to-Echo, Encoded B-scan

Software Options

- **EP650-TEMPLATE (Q1400002):** Template Storage
- **EP650-API5UE (Q1400003):** API 5UE Flaw Sizing
- **EP650-AVERAGE (Q1400004):** Waveform Averaging
- **EP650-IG (Q1400005):** Interface Gate
- **EP650-BEA (Q1400006):** Backwall Echo Attenuator (BEA)
- **EP650-CORRSN (Q1400001):** Corrosion Module (includes encoded B-scan)

Optional Accessories

- **600-BAT-L-3 (U8051431):** Rechargeable lithium-ion battery
- **EP4/CH (U8140055):** Chest harness
- **600-TC (U8780294):** Transport case
- **CBAS-10668-0060 (Q7790012):** RS232 communication cable
- **DSUB-HD15-6 (U8780333):** Digital output cable
- **600-C-VGA-5 (U8780298):** VGA output cable
- **MICROSD-ADP-2GB (U8779307):** 2 GB microSD memory card
- **600-SC-K (U8780334):** Soft carrying case with pouch (knob version)
- **600-SC-N (U8779879):** Soft carrying case with pouch (navigation pad version)
- **N600-EXTALM (U8780332):** External alarm beeper
- **CBAS-10669-0010 (Q7790008):** Encoder cable for B-scan buggy (10 feet, other lengths available)

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