



**VITALDRIVE LTD**

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## LABORATORY FOR QUALITY CONTROL OF WELDED CONNECTIONS (LabWC)

Mobile laboratory for quality control of welded connections LKS is intended for inspection works on quality control of welded connections of oil-, gas mains, analysis of condition of welded seams of pipes and main pipelines, details of blocks and units of mechanisms of various purpose at stages of their construction, operation and repair by radiographic, ultrasonic, capillary, magneto powder, electro spark and by the method of visual-optical control in field conditions.

**Mobile laboratory for quality control of welded connections LKS is the instrument for complex quality control of welded connections and for quality assurance of welded seams.**

Mobile laboratory for quality control of welded connections is equipped by all necessary diagnostic equipment for performance of works at each stage by all methods of **non destructive testing**.

### Functions performed by laboratory LKS.

Mobile laboratory for quality control of welded connections is intended for:

- *Transportations of personnel and equipment to a place of work;*
- *Control **by radiographic method** which allows revealing the internal and external defects in seams and near seams zones of end-to-end, angular, tee-form and lap-welded connections of shadow image (lack of penetration, cracks, incomplete fusion, interstices and ash inclusions) sizes of which in direction of radiation exceed the double sensitivity of received pictures.*
- *For detection of coordinates of continuity infringement and consistency of material, measurement of the area of defect **by ultrasonic method**.*
- *For detection of surface and penetrating defects in control objects, their locating **by capillary method**.*
- *For detection of surface and undersurface defects in objects of various form and the sizes **by magnetic particle method**.*
- *For control of continuity of insulated coating of pipeline **by electro spark method**;*
- *For **visually-measuring control**.*



### Technical data

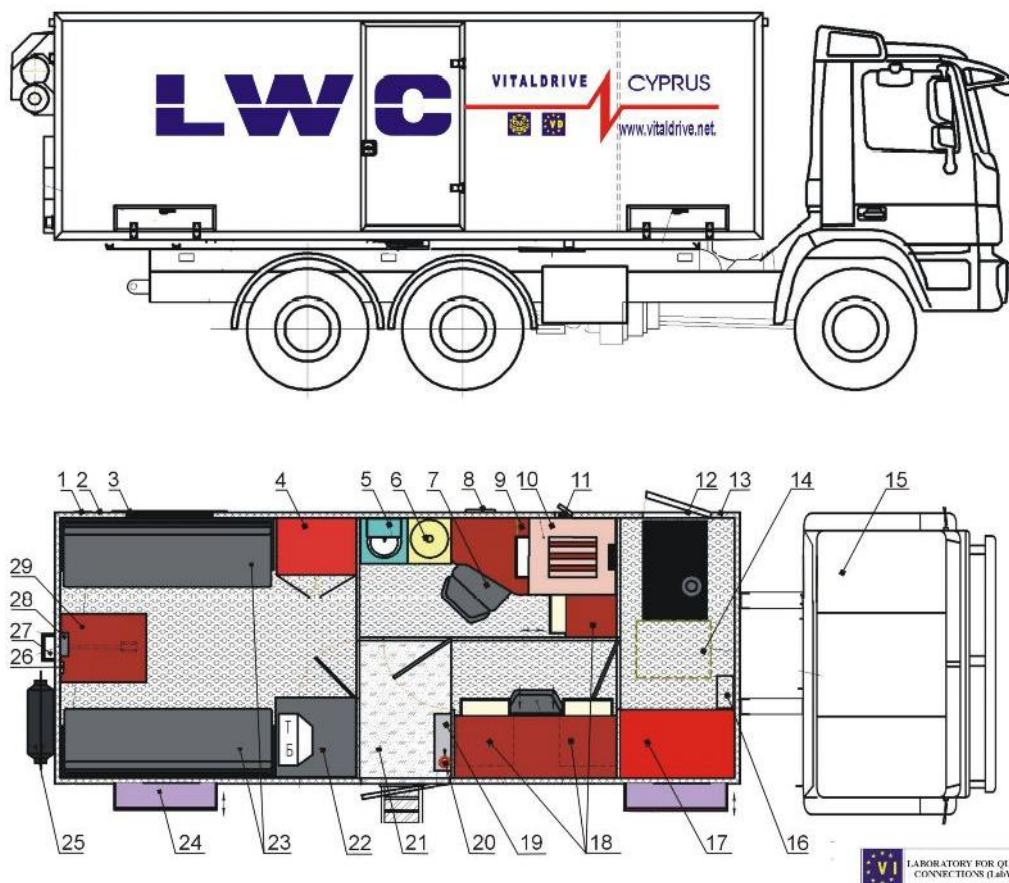
**Mercedes-Benz Actros 332 AK**

### Vehicle description

Model: Mercedes-Benz Actros



	Telligent Maintenance System
	Fuel consumption display
	6-part tail light cluster with reflector
	Headlamp range adjuster Entrance
	step light
	Headlights with transparent lenses (H7)
	Indicator transmitter for extra indicator lamps
MD4	Speed limiter, 90 km/h, EC
MD9	Cruise control



**Figure 1. Plan workroom and equipments in laboratory**

### **3. Main methods of non destructive control, performed by mobile laboratory for quality control of welded connections LKS. Equipment for complex quality control of welded connections.**

#### *X-ray control*

This kind of control is applied for the control of technological pipelines, metal constructions, process equipment and composite materials in various industries and in building complex.

Radiographic control is applied for revealing of cracks, no penetrations, voids; cindery, tungsten, oxide and other inclusions; for revealing of burn-through, undercuts in welded connections; for estimation of size of camber and concavity of seam root.

Radiographic control is done for welded connections which have bilateral access.

**For complex approach to the decision of problems on quality of welded connections by the Radiographic method we bring to your attention main equipment and accessories for radiography:**

### **3.1 X-ray device «ERESKO MF4»**

ERESKO MF4 is a line of mobile X-ray devices suitable for hostile environments. Its lightweight design combined with even more robustness makes on-site inspections an easy task.

Special power electronics allow for an alternative field operation, as well as integration in crawlers.

The digital control module with its new full graphical display is easy and safe to operate. The ease of use is further supported by clear text messages in many international languages, display of character sets, an exposure calculator and many other reporting or administration features. High quality electronic components and robust design of control and tube heads make the ERESKO series suitable for inspections even in hostile environments like rain (IP 65) or high temperatures (100% duty cycle at 30°C/86°F ambient temperature). Its low power consumption keeps not only the energy cost low but also makes operation with portable power supplies an easy thing to do. Due to its unique power mode the ERESKO Series can reduce exposure times up to 50% in comparison to other portables, which impressively shows its position as the leading product for fast and economic on-site inspections.



Typical characteristics:

- Range of installation of high pressure from 5 up to 300 kV
- ☐ Constant potential
- ☐ Ceramic-metal x-ray tube midrange technology
- ☐ The shortest time of an exposition among portable devices
- ☐ Mode of constant capacity
- ☐ Small weight
- ☐ Automatic recognition of type of the used block of radiation
- ☐ Completely automatic program of tube "training"
- ☐ Hours of real time
- ☐ Output to the display precise text messages
- ☐ Storage in memory parameters of last expositions
- ☐ Opportunity of programming

Standard set of delivery:

- ☐ Block of radiation ERESKO MF4
- ☐ Digital control panel
- ☐ Packing bag
- ☐ Connecting cable, length - 20 m
- ☐ Power cable (230), length - 10 m
- ☐ Set of accessories

### **3.2 Densitometer DENSORAPID A**

**Densitometer** Measures density of the film.

A compact, battery powered instrument with hand-held "wander" probe for measuring densities while the film is on the viewer. Primarily intended for site use, the unit is supplied complete with mains adaptor/charger in a tough, plastic carrying case.

### *Technical data*

Measuring range:

0,1 to 5,0D

Accuracy:

Better than +/- 0,05D

Film viewer luminance range:

15.000 to 80.000 Cd/m<sup>2</sup>

Mains adaptor input voltage:

230V AC, 50Hz

Carrying case dimensions:

355 x 275 x 55mm

Overall weight

1,1 kg



### 3.3 Compact High Intensity Weld Film Viewer

#### **KOWOLUX 4/ KOWOLUX 4S**

The distinctive, red KOWOLUX viewers are to be seen in X-ray laboratories and on construction sites all over the world. They conform to European Union Low Voltage and EMC Directives 73/23/CEE and 89/336/CEE and their performance, including uniformity of luminance, is in accordance with EN 25580.

### *Technical data*

Screen area:

205 x 85mm

Film density to EN 25580:

KOWOLUX 4 - 3,8D

KOWOLUX 4S - 4,2D

Luminance:

KOWOLUX 4 - 65.000 Cd/m<sup>2</sup>

KOWOLUX 4S - 150.000 Cd/m<sup>2</sup>

Light source:

KOWOLUX 4 - 1 x 1000W

KOWOLUX 4S - 2 x 1000W

Supply required:

230V AC 50Hz

Consumption:

KOWOLUX 4 - 1000 VA

KOWOLUX 4S - 2000 VA

Dimensions (L x H x D):

270 x 230 x 150mm

Weight:

KOWOLUX 4 - 5,25 kg

KOWOLUX 4S - 5,4 kg



## Means of radiation control and provision of radiation security

Influence of an ionizing radiation on an organism is basic kind of danger to the personnel at the radiographic control. Everyone can be convinced of safety of conditions at performance of works by means of a dosimeter. The dosimeter is intended for detection and estimation by means of the sound and light signal system of density of a stream of radiation, measurement of an exposition doze of x-ray radiation. Measurement is done during work of the x-ray device in a place of work of the operator and after x-raying of welded seam before removal of the x-ray device.

### **3.4 Dose and Doserate Meter X 5 C**

- ☐ PTB-approved dose rate meter for measuring gamma radiation and X-rays
- ☐ measuring size: ambient dose equivalent rate  $H^*(10)$
- ☐ large digital indication of measured values on LC display (illuminable)
- ☐ selectable dose rate or dose indication with integration time
- ☐ additional quasi-analog dose rate indication (3,5 decades, logarithmic bar graph)
- ☐ indication of peak and average dose rate value
- ☐ 4 free programmable dose and dose rate alarm thresholds
- ☐ automatic or manual storage of dose and dose rate values together with date and time
- ☐ evaluation/indication of residual time for staying in the current radiation field with regard to the maximum allowed dose
- ☐ switchable acoustic single-pulse indication
- ☐ clear menu-driven operator guidance for easy operation, partly secured by password
- ☐ storage of set parameters also when device is switched off or during battery replacement
- ☐ continuous self testing and monitoring ensures high reliability
- ☐ compact, metallized housing made of high impact-proof plastic (easy to decontaminate), sealed for submersion up to 1 m depth (IP 67)
- ☐ power supply by 9V battery 6LR61 or alternatively by 9V accumulator (option)
- ☐ EMC-screened
- ☐ RS-232 interface
- ☐ - extending the measuring range up to 10 Sv/h
- ☐ - detecting alpha, beta and gamma radiation
- ☐ - measuring in liquids
- ☐ - measurements at "hard-to-get-to" places
- ☐ automatic probe identification



#### **PTB-approved dose rate measuring range:**

1,0 mSv/h - 20 mSv/h

#### **Dose rate indication range:**

0 mSv/h - 20 mSv/h

#### **Dose indication range:**

0 nSv - 10 Sv

#### **Energy range:**

40 keV - 1,3 MeV

#### **Dose rate alarm thresholds:**

4, free programmable, 1 mSv/h - 20 mSv/h

#### **Dose alarm thresholds:**

4, free programmable, 1 mSv - 10 Sv



**Temperature range:**

-30°C up to +60°C

**Dimensions / Weight:**

(152 x 82 x 39) mm

**3.5 Tape with enclosed dispenser**

For 40mm wide tapes

Drum with hand-reel. Tape secured in drum and fitted with hook at loose end.

*Size:*

220 x 190 x 80mm

*Weight:*

kg



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**3.6 Radiation warning pennant**

*Size:*

254 x 318 x 318mm

**3.7 Apron protecting from radiation****Materials and accessories for carrying out of the radiographic control of welded connections****3.6 X-ray film KODAK INDUSTREX**

It is especially contrast. It allows to reveal the smallest defects. Kodak perfectly approaches for use in areas where the highest quality of received roentgenograms is required.

**Automatic machine for development KODAK INDUSTREX M 35**

KODAK INDUSTREX M35 is super compact machine for development of the desktop type, capable to provide all advantages of automatic processing of photographic materials.

Time of cycle 8 minutes

Speed: 76 cm/minute.

Max. size of film: 35 x 43 cm

Tank for developer: 7,8 L

Tank for a fixer: 7,8 L

Tank for washing: 7,8 L

Charge of water: 1 L/minute.

Feed: 220V, 50 Hz, 16 A

Dimensions (mm): 1250x670x550

Weight: 90 kg

Distinctive features of the machine:

High speed of processing

Infra-red system of drying  
Easy in operation  
Absence of noise

### **3.8 KODAK INDUSTREX DEVELOPER 2x20L**

Concentrate of developer in canisters, five liters each, packed by two in carton box. Each canister is intended for preparation of 20 liters of a working solution. Consumption, roughly, 0,66 liters of ready solution on 1m of the processed film.



### **3.9 KODAK INDUSTREX FIXER 2x20L**

Concentrate of a fixer in canisters of five liters, packed by two in a carton box. Each canister is intended for preparation of 20 liters of a working solution. Consumption, roughly, 1,2 liters of ready solution on 1 square meter of the processed film.

### **3.10 Cutting roller torch for x-ray film KW-TRIO-3919**

#### ***TECHNICAL CHARACTERISTICS***

Length of cuttings, mm-480  
Height of stops, leaf - 15  
Type of knife - disk  
Clip of paper - automatic  
Protection of hands - safe cutting block  
Fixing of knife – exist  
Marking of ruler - mm/inches  
Sizes, mm 370x656x100  
Weight (kg) - 4,04



### **3.11 FEDREX Lead numeral tapes**

Hard wearing, double-stitched, glass fibre reinforced tapes that are dimensionally accurate: certified to -0,005% and +0%. Supplied with numerals at 10cm intervals and arrows at 5cm intervals. Tapes over 10m long have numerals at 20cm intervals and arrows at 10cm intervals. Supplied in a bag complete with declaration of conformity. Each tape is identified with a unique serial number.



### **3.12 Signs for marks**

Signs are set of lead letters and figures, they are intended for numbering and marking of radiographic pictures at industrial radiographic control. Application of signs considerably facilitates decoding and processing of results of the radiographic control, and also search of the necessary picture in archive. Signs are made of an alloy, effectively weakening radiation. Made from tinted, toughened plastic with a slit at the top for use with a carrier strip. Letters, numbers and symbols.



### **3.13 Standard single envelope cassettes**

Flexible, light-tight plastic cassettes made from black PVC with self-sealing "velcro" tapes at the loading end. Available in the following standard sizes: 9 x 12cm, 10 x 24cm, 10 x 40cm, 10 x 48cm, 13 x 18cm, 15 x 40cm, 18 x 24cm, 18 x 43cm, 24 x 30cm, 30 x 40cm, 35 x 43cm.



### **3.14 Fluorometallic intensifying screens**

Significantly reduce exposure time without sacrificing contrast. Type 308, for use with X-rays 80 to 300keV, selenium and ytterbium.

Fluorometallic SMP 308, 10 x 40cm

Fluorometallic SMP 308, 10 x 48cm

Fluorometallic SMP 308, 30 x 40cm

Fluorometallic SMP 308, 70mm x 1m

Other sizes and types for higher energy work available.



SMP

### **3.15 Gamma exposure calculator, SCRATA Mk. VII**

Pocket sliderule design. For calculating the correct exposure time for radiography with Iridium-192, Cobalt-60 and Ytterbium-169.



### **3.16 Standards of sensitivity** (indicators of quality of the image)

Standards of sensitivity allow to supervise quality of carrying out of the radiographic control. Material of standards: steel, copper, aluminium, titan.



### **3.17 PRESSIDENT Embossing Machine**

The system replaces conventional lead markers, enabling strings of identification letters and numbers to be embossed onto a self-adhesive, radio-opaque tape. On the processed radiograph, the characters appear as darker images against a lighter background.



### **3.18 FEDREX splash proof processing unit**

For installation in mobile darkrooms. The main housing is made of polypropylene and has fittings for a drain to left or right. A mounting bracket is welded along the back and spacers are supplied for screwing the unit to a wall. There are five PVC tanks, each with a clampdown lid. Fittings are made of stainless steel.

*Tank volume:* 5 x 22,5 litre

*Film length:* max. 48cm



*Film width:* max. 30cm

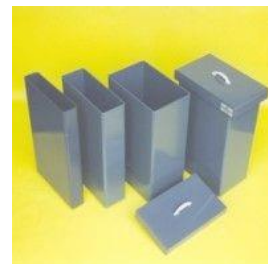
*Floor area:* 1082 x 664mm

*Height:* 680mm

*Weight:* 47,5 kg (empty)

### **3.19 Rectangular tanks**

All tanks take sheet films up to 35cm wide and 48cm long. FEDREX PVC 10 tanks also accept roll films on spirals up to 5m long. The tanks can be used as replacements in FEDREX FP-2, FP-3 and TP-3 processing units.



### **3.20 FEDREX Stainless Steel Spirals**

10 spirals can be processed in an FP-3R, TP-3, PU 105, PU 105L processing unit or FEDREX PVC 10 tank.

- Stainless steel spiral 60mm x 3m
- Stainless steel spiral 60mm x 5m
- Stainless steel spiral 70mm x 3m
- Stainless steel spiral 70mm x 5m
- Stainless steel spiral 100mm x 3m
- Stainless steel spiral 100mm x 5m



### **3.21 FEDREX actinic film marker**

The film marker is used to transfer information that has been written or typed on a piece of paper to an industrial or medical X-ray film. The housing contains a light source and electronic regulator assembly. The top plate of the housing acts as a film stage. Towards the rear of the film stage, there is an aperture, covered by opal glass. The light source is located directly below the aperture. Above the aperture is a hinged flap, lined with foam rubber. When the flap is pressed down, the light source illuminates for a predetermined length of time.



### **3.22 Glow-Bright Safelight**

Compact unit, specially intended for smaller, site darkrooms. Safe illumination provided by LEDs plus a narrow band filter. Guaranteed not to fog any type of industrial X-ray film. Intensity regulator makes this model suitable for use with many other, more light sensitive, films. Ingress protection to IP65 (IEC 60529).



*Size:* 130 x 110 x 85mm

*Supply required:* 230V AC 50Hz

*Consumption:* 1W typical

### 3.22 Hours-alarm clocks

Red light flashes during countdown period. An alarm sounds when the set time has elapsed. Can be used free standing or wall mounted.

*Size (H x W x D):*

290 x 235 x 85mm

*Weight:*

530g



### IIW reference radiographs to ISO 5817

*Reference radiographs for assessment of weld imperfections according to ISO 5817: Interpretation of arc-welded butt joints in steel (2nd edition, 2005)*

For evaluation of butt welds in steel.  
Contains 60 cards, each with a radiograph, one or two macrographs showing a cross-section of the weld and photographs of the face and root side of the weld. The type of defect (imperfection) and the severity (Quality Level) are given together with the welding and radiographic parameters. The A4 size cards are presented in a ring binder.



## VISUAL METHOD OF CONTROL

Non destructive control starts from visually-measuring control. The visually-measuring control is done by using of optical systems with formation of light beams reflected from a product surface. In comparison with other methods of non destructive control the visual control is easy to apply and it is rather inexpensive, it can be carried out and it is often carried out without any equipment and it is done with the use of the simplest measuring means. Besides, this control method is a reliable source of exact information on conformity of welded products to specifications.

### 3.23 Zeiss X-ray Viewing Goggles

These goggles, from Europe's leading lens manufacturer, offer superb optical performance. 1.4x magnification at a free working distance of 200mm.

*Size:*

195 x 60 x 210mm

*Weight:*

110 g



### 3.24 FEDREX Measuring Magnifier

A pocket magnifier with 7x magnification which can be fitted with a wide variety of graticules. It comes with a No. 8 graticule as standard which has a 0 - 20mm scale in 0,1mm divisions.



### 3.25 Welding gauge

It is intended for an operative estimation of parameters of welded seams and the details prepared for welding, at the visually-measuring control



## ULTRASONIC METHOD

### Ultrasonic inspection:

Ultrasonic inspection is based on ability of ultrasound to overspread in material of controllable product and to be reflected from internal defects and borders of materials.

### Ultrasonic thickness measurements:

The main purpose of acoustic devices for measurement of control object sizes is measurement of thickness of pipe walls, reservoirs, tanks and other products, access to which is available only from one side.

### 3.21 Ultrasonic thickness measurer Panametrics 26 MG with transducer D791

The 26MG-XT has some additional measurement features that are not found in the Model 26MG. Affordable and easy- to-use, this pocket-size ultrasonic thickness gauge offers great performance features: Automatic Probe Recognition, Fast Min Mode, Gain Adjust, High Temperature capabilities, Hi-LowAlarm, Freeze Mode, and Material Sensitivity Optimization, just to name a few. Its color-coded, direct-access keypad reduces the number of key presses necessary to activate features. The splash proof, impact-resistant case will make this easy-to-operate instrument a durable and reliable tool for a variety of inspection environments.



- Standard Measurement Range: 0.020 - 19.999 inches (0.50 - 508.0mm)
- Resolution up to 0.001" (0.01mm)
- Automatic Probe Recognition automatically adjusts internal parameters and corrects for V-path error
- Compatible with a wide variety of Dual Element Transducers ranging in frequency from 2 to 10MHz
- Fast Mode rapidly captures and recalls minimum thickness at Fast Rate of 20 measurements per second
- Min Mode captures and retains minimum thickness
- High Temperature capabilities
- Gain Adjust
- Material Sensitivity Optimization
- Freeze Mode
- Differential Mode
- Hold/Blank Mode
- Zero Compensation for thermal transducer drift
- Hi-Low Alarm
- Battery: 2 AA Alkaline batteries
- Low Battery Indicator

- Battery Saver: Auto Power Off/Continuous On
- Receiver Bandwidth: 1 - 15MHz (-3dB)
- LCD with Electroluminescent Backlight.
- Keypad is sealed and color coded with tactile and audible feedback
- Inches/millimeters selection
- Operating Temperature: -10 deg C to +50 deg C
- Size: 2.55 x 5.05 x 1.14 inches (64.8 x 128.7 x 29mm)
- Weight 8.5 oz. (0.24kg)

### *ORDERING INFORMATION*

Model 26MG-XT Digital Ultrasonic Thickness Gauge. Including:

- D790-SM Dual Element Transducer, 5.0MHz, 0434 inch (11mm) tip, temp range -5 deg F to 932 deg F (-20 deg C to 500 deg C)

A full range of substitute probes (transducers) is available.

- Test Bar
- Couplant
- Wrist Strap
- Protective Carrying Pouch
- Carrying Case
- Instruction Manual
- Two Year Limited Warranty

### *OPTIONAL ACCESSORIES*

- MG-XT/EW (Extended Warranty)
- D-12 Gel Type Couplant, 12 oz. (0.35liter)
- E-2 Ultratherm High Temperature Couplant, up to 1000 deg F, 2 oz. (0.06 liter)
- F-2 Medium Temperature Couplant, up to 540 deg F, 2 oz. (0.06 liter)
- MG-XT/RS232 (RS232 Upgrade)
- 2214E 5-Step Testblock, 1018 steel, English Units: .100", .200", .300", .400", .500" (also in metric)
- 2213E 5-Step Testblock, Aluminum, English Units: .100", .200", .300", .400", .500" (also in metric)

### **3.22 Ultrasonic fault detector EPOCH LT**

The new Panametrics-NDT EPOCH LT is the lightest, thinnest flaw detector you've ever seen. This is a handheld digital flaw detector that is just 1.5 inches (38 mm) thick. Packed in a 2.35 lbs (1 kg) package the EPOCH LT gives you a fast display update rate at a minimum 60 Hz, automated transducer calibration, a numeric datalogger, and many other measurement features. The EPOCH LT is the perfect solution when you need to perform quick, basic flaw detection in difficult field conditions or demanding production environments.

Features:

- Light, ergonomically designed (2.35 lbs./1.0 kg)



- Fast, minimum 60 Hz electronics update rate
- High-power NiMH battery
- Large, bright, high-resolution LCD with full/split screen views
- Automated transducer calibration
- Display freeze holds waveform and soundpath data
- Soundpath data viewable in inches, millimeters, or microseconds
- Peak memory feature
- RF display mode
- Alarms, threshold positive/negative, or minimum depth
- Numeric datalogger
- EMAT probe compatibility (E110-SB)
- Standard DAC and TVG

### ***Software Options***

The EPOCH LT's versatility is enhanced by several application-specific software options that can be remotely activated after you have acquired the unit. No need to return the unit to the factory!

- Advanced DAC/TVG
- API 5UE
- Square Wave Pulser
- AWS D1.1 and D1.5
- Onboard DGS/AVG
- Expanded memory
- Low PRF
- Echo-to-Echo thickness measurement
- Extended range
- GageView™ Pro

### ***EPOCH LT Specification***

**Liquid Crystal Display:** 320 pixels (W) x 240 pixels (H)

**Display Update Rate:** Minimum 60 Hz

**Sensitivity:** 100 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 Material Velocity

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

**Units:** English, Metric, or Microseconds

**Material Velocity:** 0.025 to 0.6000 in/msec (635 to 15240 m/S)

#### **Range:**

- Standard 0.16 inch to 200 inches (4 mm to 5,000 mm)
- Optional 0.038 inch to 400 inches (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° increments

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

**Pulser Type:** Negative spike excitation and optional tunable square wave

**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:** 0.3 MHz to 20 MHz at -3 dB

**Test Modes:** Pulse Echo, Dual, or Thru-Transmission

**Operating Temperature:** -10°C to 50°C (14°F to 122°F)

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

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

**Battery:** Internal Rechargeable NiMH battery pack rated at 6 V at 3000 mAh

**Battery Operating Time:** 5-6 hours nominal. 2 hours typical recharge time

**Keypad:** English or International symbols

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

**USB High Speed Communications Port**

**Dimensions:** 9.375" H x 5.45" W x 1.5" T

238 mm x 138 mm x 38 mm

**Weight:** 2.35 lbs. (1.0 kg) with battery

**PC Requirements:** Compatible with Microsoft® Windows XP and Microsoft Windows 2000

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

**Numeric Datalogger**

- Stores up to 100 calibrations and 2000 thickness measurements.

Optional Extended memory stores up to 500 calibrations and 10000 thickness measurements

## LIQUID PENETRANT METHOD

Control by getting through substances is a kind of non destructive control. Its basic principle is penetration of special liquids to discontinuities on control object surface with the purpose of their detection.

Liquid penetrant inspection is intended for detection of surface and pass thru defects in control objects, definition of their location, extent (for extensive defects like cracks) and orientations on a surface. It allows supervising objects of any sizes and forms, made of black and nonferrous metals and alloys, plastic, glass, ceramics, and also other firm not ferromagnetic materials.

This kind of control allows diagnosing objects of any sizes and forms, made of black and nonferrous metals and alloys, plastic, glass, ceramics, and also other firm not ferromagnetic materials.

Liquid penetrant control is applied also to the objects made of ferromagnetic materials if their magnetic properties, form, kind and location of defects do not allow to achieve demanded sensitivity by magnetic particle control method or if it is not allowed to apply magnetic particle control method according to the conditions of object operation.

Necessary condition of revealing of defects like material non integrity by liquid penetrant methods is presence of not polluted cavities and other substances having exit to objects surface and depth of distribution, which significantly exceeds width of their opening.

*It is possible to conduct the above-stated control by means of following indicative liquids and auxiliary substances:*

**3.27 Penetrant DR-51** is high sensitivity, water-washed off.

Control of welded seams, moulding, hammering and extrusion of metal and nonmetallic materials, The flash point above 100 ° C, resists to washing away from defects.

**3.28 Developer D-100** - Waterless developer with spirit basis. It is applied only by dispersion from aerosol packing, white pigment substances create a background for bright indication of defects;

**3.29 Cleaner DR-60** - Cleaner on the basis of hydrocarbon. It is applied to all color penetrants DR-51 Sherwin, excellently clears surface and deletes surpluses of penetrants DR-51.

### **MAGNETIC PARTICLE METHOD**

Magnetic particle method is applied for detection of surface and undersurface defects in objects of various form and sizes made of ferromagnetic materials. With its help can be revealed cracks of various origin, shatter cracks and declines, lacks of penetration of welded connections and other defects with opening width of few micrometers. The method can be used for the control of objects with not magnetic covering.

*For these purposes we offer:*

#### **3.30 Magnetic ticks Parker Series B-310**

The B-310 Contour Probe is a lightweight (6 lbs.) Magnetic Inspection Yoke designed to perform magnetic particle inspections quickly and reliably, and with greater versatility. The overall length of the unit is only 7.25".

The B-310 Mini Contour Probe provides great flexibility and reduced size.

- Units are available in 115, 230, 42-48 VAC and 4-12 VDC
- All units may be CE certified

One year repair/replacement guarantee

- When required, the B-310 may be operated from the optional DC-300 pulsed DC power supply to provide intense DC magnetic fields
- The reversible strain-relief feature allows the power cord to enter from the rear or top of the unit permitting greater access to small work areas
- As with all Parker Contour Probes, the B-310 has fully adjustable legs permitting the AC magnetic field to be applied to the precise area of inspection

### **SPECIFICATIONS**

Physical 73/4H × 71/4W × 21/8D

Line Voltage Single Phase- 115 VAC

50/60 Hz

Line Current -4 A

Duty Cycle 2 minutes on – 2 minutes off

Weight- 6 lb (2.73 Kg)

Construction Polyurethane-filled glass/nylon housing

8 foot / 3 wire power cord

Span - 0-9 in. across poles

## Electro spark method

### **3.31 Elcometer 236 /30**

The Elcometer 236 holiday detector is perhaps one of the most advanced holiday detectors on the market today. Supplied in a convenient transit case for moving around the jobsite, the Elcometer 236's soft carry case allows the probe handle and wide range of accessories to be attached making the Elcometer 236 ideal for field, site or laboratory inspection.



- Digital display of output voltage and current rate
- There are two kinds of device with voltage 15 kV and 30 kV with full regulation of output voltage
- Audio and visual signal system
- Easy in use
- Adjustable sensitivity
- Big range of gauges
- Прибор поставляется со щеточным датчиком
- Device has small weight of 1,8 kg
- Device is reliable in work, completely portable, it is delivered in a portable bag

## Temperature Control and Air Parameters

### **Testo 825-T2, the infra-red thermometer with laser index and an acoustic alarm signal**

Testo 825-T2 is universal, high-speed infra-red thermometer with laser index and acoustic alarm signal. Because of big measuring range from -50 up to +400°C the device is appropriate both for use by service experts and in industry.



### **3.32 EISEMANN Type 7400 High Protection (or analog)**

Casing with integrated tank and fuel gauge, 1 three-phase current CEE socket (16 A), 1 alternative current CEE socket (32 A), 1 protective contact socket (16 A), all waterproof, 4-pol. therm./magn. cutout, running time counter. Delivery H7400E incl. battery.



## **4. ACCESSORY EQUIPMENT and INSTRUMENTS**

### **4.1. Set of bench work tools in case**

It is intended for use during electric works.

It includes:

1. Pliers.
2. Adjustable pliers.
3. Nippers lateral, length 160 mm.
4. Nippers frontal, length 200 mm.
5. Wrench, max. opening 19 mm.
6. Wrench, max. opening 30 mm.
7. Hammer with wood handle 200 g.

8. Knife for taking out cable isolation.
9. Knife for taking out isolated isolation.
10. Screwdriver T-type flat 1,0x6,5.
11. Screwdriver T-type crossed #2.
12. File flat with handle.
13. File three-edged with handle.
14. Case (plastic).

#### **4.2 Fire extinguisher**

#### **4.3 Medical first-aid kit**

#### **4.4 Metal junk LO-24**

#### **4.5 Shovel LKO-2**

### **5 SET OF USER DOCUMENTS**

#### **5.1 Laboratory operations manual**

#### **5.2 Certificate of origin**

#### **5.3 Equipment operations manual**

#### **5.4 Vehicle log book.**

Please send requests to the e-mail: [sales@vitaldrive.net](mailto:sales@vitaldrive.net); [vitald@cytanet.com.cy](mailto:vitald@cytanet.com.cy) ;  
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