

PORTABLE EDDY CURRENT FLAW DETECTOR **VD3-81 EDDYCON**



CE MARKING

- EN 13860-1 Compliant
- EN 13860-2 Compliant



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PURPOSE

VD3-81 eddy current flaw detector Eddycon is referred to the testing and evaluation means. It is intended for manual testing by eddy current technique for the presence of surface and subsurface defects, such as discontinuity of the material (cracks, overlaps, holes, fine cracks, etc.)



IT IS APPLIED IN THE FOLLOWING BRANCHES OF INDUSTRY:

- **AIRCRAFT** - testing of aeronautical engineering parts (wheel disks, covering, turbine blades, multilayered constructions, holes of various kinds etc.).
- **OIL-AND-GAS** - testing of pipelines, turbine blades of gas-distributing station (GDS), pressure vessels, etc..
- **CHEMICAL** - testing of pipelines, industrial tanks etc.;
- **POWER** - testing of steam generator pipes by inner bobbin eddy current probes(I/D ECP), collectors etc.;
- **ENGINEERING** - testing of rods, wire, metalwares, forming rolls, sheet metals etc.;
- **RAIL TRANSPORT** - testing of rail components and car units (parts of wheel pair and axlebox unit, load trolley, refrigerated carriages and coaches, automatic coupler etc.)

FLAW DETECTOR ADVANTAGES



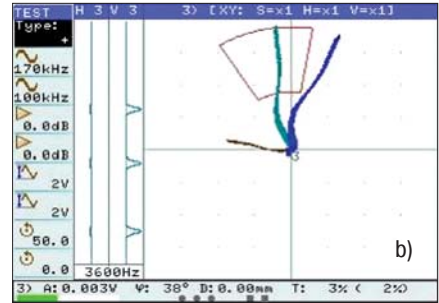
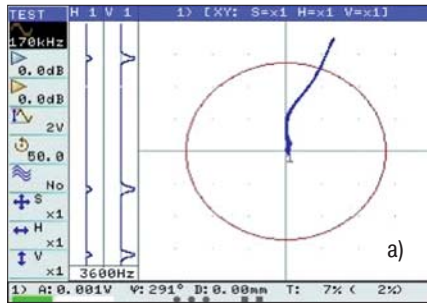
- Possibility of tuning out from the influence of operating lift-off and inhomogeneity of electromagnetic properties testing material.
- Storage of a great number of setups and testing results in the flaw detector memory.
- Special-purpose software.
- Mode of two-way connection with PC via USB port (for inputting the information from the flaw detector memory into PC and possibility of this data printing as well as setups loading from PC into the flaw detector memory).
- Possibility of conditional defect depth and length evaluation.
- Sound and color ALARM system.
- Operation simplicity due to the intuitive interface.
- Small mass and dimensions parameters.

FLAW DETECTOR DISTINCTIVE FEATURES

- Color high-contrast TFT display.
- ALARM system: 4 three-color LEDs, sound alarm.
- Possibility of operation in two-frequency mode.
- Simplified procedure of instrument calibration on calibration blocks.
- Possibility of encoder and eddy current rotary scanner connection.
- Possibility of rapid measurement of the signal/noise ratio.
- USB slave.

TECHNICAL SPECIFICATION AND SERVICE FUNCTIONS OF THE INSTRUMENT

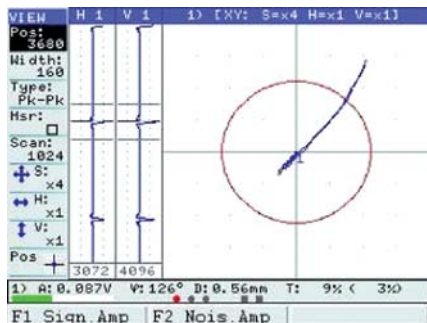
- The possibility of defects detection with the depth _____ from 0,1 mm and opening _____ from 0,002 mm.
- Operating frequency setup range _____ from 50 Hz to 12 MHz.
- Generator output voltage (double amplitude) _____ from 0,5 V to 6 V.
- Adjusted gain range _____ 30 dB.
- Adjusted preamplifier range _____ 40 dB.
- Signal phase change (range of signal rotation from 0 to 360 with a step of 0,1; 1, 10).
- Samples frequency _____ up to 8 kHz.
- Digital signal filtering (there are 5 filter types: Lowpass, Highpass, Bandpass, Differential, Averaging).
- Eddy current signal display: a) complex plane (XY) - allows to detect defects among interferences by analyzing the signal waveform; b) generation of two channel maturing can be used for suppression of interfering factors and reduction of their influence on testing results (for mixing an operator can choose one of 5 algorithms: addition, subtraction, addition with horizontal inversion, addition with vertical inversion and multip).
- Two modes of instrument operation: day mode - is used when operating in dimly lit places with insufficient visibility; night mode - is used when operating in places with bright lighting, to increase the display contrast.



- Time of flaw detector operation mode setup -- up to 1 minute.
- Autozap function (adjustable time of screen clearing in 0.1 s and 0.5 s, 1 s, 2 s, 3 s, 4 s).
- Built-in clock and calendar.
- Screen backlight and screen brightness control.
- Congestion control of input channel.
- Storage battery discharge level indication.
- Possibility of eddy current rotary scanner connection for the testing of openings and special-purpose scanners.
- Possibility of connection and operation of ECPs of the following types:
 - Differential ECP.
 - Differential ECP connected according to the bridge scheme.
 - Differential ECP of transformer type with grounded centerpoint.
 - Differential ECP of transformer type.
 - Absolute (parametric) ECP.
 - Absolute ECP of transformer type.
- User-friendly multi-language interface.
- Time of continuous flaw detector operation with the fully charged storage battery - at least 5,5 hours.
- Total average life at least 10 years.
- Flaw detector is powered from the built-in storage battery with rated voltage 12 V and rated capacity of 2700 mA * h.
- Weight of flaw detector with a storage battery - no more than 0.8 kg.
- Overall dimensions of flaw detector - no more than 188 mm x 107 mm x 78 mm.

EXAMPLES OF FLAW DETECTOR APPLICATION

TESTING OF BOLT HOLES WITH THE HELP OF EDDY CURRENT ROTARY SCANNER

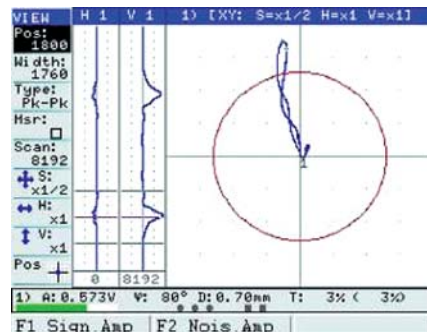


Signal projection (view) from a natural defect such as a crack with depth of 0.56 mm in the aircraft wheel bolt-hole.



Circular scan permits an operator to locate the defect in the hole.

CASTING TESTING

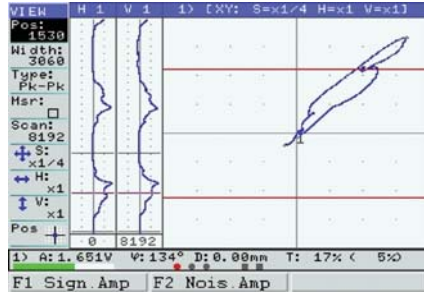


Fatigue crack 0,7 mm deep detected during testing of 18 -100 model bolster.



Application of special-purpose SS170K13DAO and SS340K09DAO probes in protective cases together with ALARM units and digital signal processing will allow to eliminate the influence of interfering factors such as roughness, edge effect, ECP separation from the testing object surface etc.

• **TESTING OF VARIOUS PURPOSE PIPELINES**

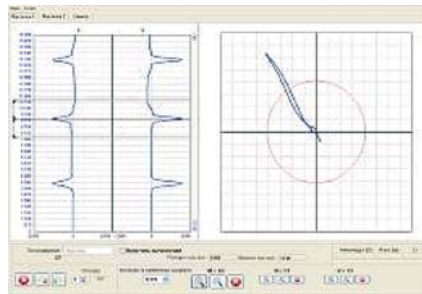


Signals of stress-corrosion defect are obtained by VD3-81 flaw detector Eddycon from the main gas pipeline section through the layer of insulation covering thickness of 6 mm.



Application of VD3-81 flaw detector Eddycon for conduction of main or confirmatory body testing will enable to evaluate the pipe damage level and its further operability.

• **SOFTWARE**



Specialty application - dependent software for processing of VD3-81 universal eddy current flaw detector testing Eddycon results serves for functionality extension and instrument operation ease increase. This program provides operation with the data stored on PC.

Main advantages of program application are:

- An intuitive interface.
- Convenient view of testing results by each frequency channel (Frequency № 1, Frequency № 2 and Mix.).














- Possibility of creation and storing of electronic records.
- Data output on the detected defect, namely:
 - Coordinate position of the defect in the defectogram;
 - Amplitude and phase of the signal.
 - Flaw depth.
- Formed electronic report contains all basic data of conducted testing, namely:
 - Information about the organization, NDT division and an operator who conducted the testing.
 - Denomination of the testing object;
 - All flaw detector setups at the inspection moment.
 - Signal parameters from the defect (amplitude, phase, flaw depth).
 - Flaw signal in the complex plane and on the string diagramms.
 - The date of testing.
- By agreement with the Customer there is a possibility to create other forms of reports.

MAIN TECHNICAL SPECIFICATIONS

- Frequency range _____ kHz _____ from 0,05 to 12000.
- Gain _____ dB _____ 70.
- Probe supply voltage _____ V _____ 0,5, 1, 2, 4, 6.
- Filter _____ Hz _____ Lowpass from 1 to 4000; _____ Highpass from 1 to 4000; _____ Bandpass filter; Differential; Averaging.
- Sampling rate _____ 8000.
- Connected ECP _____ differential and absolute ECP.
- Digital zoom _____ from 1/16 to 16, with a step of 6 dB.
- Phase rotation _____ degr. _____ from 0 to 360.
- ECP connector _____ 2-pin LEMO, 4-pin LEMO.
- Signal trace time _____ Sec _____ 0,1; 0,5; 1; 2; 3; 4.
- Display _____ Color TFT.
- Screen resolution _____ pixel _____ 320 x 240.
- Screen size _____ inch _____ 2,756 x 1,969.
- _____ mm _____ 70 x 50.
- Defect alarm (alarm) _____ Circle, Threshold, Sector, Cut-off.

- Signal display modes _____ Complex plane - X(y); Time scan - X(t), Y(t); _____ Double-frequency mode.
- Memory for setups and testing results storage _____ 1 Gb of memory. _____ 1 defectogram occupies - 6 Mb. _____ 1 setup occupies - 0,00355 Mb.
- Multi-frequency operation _____ 2 - frequency multiplexing. _____ Independent control of both frequencies. _____ Signals mix for unwanted effects rejection.
- Battery _____ Storage battery Ni-MH 12V/2700 mA h.
- Operation time from the battery _____ hour _____ at least 5,5 hours.
- Operating temperatures _____ °C _____ From -10 to +40.
- Protection from environmental impact _____ IP 65.
- Overall dimensions _____ 188 x 107 x 78.
- Weight with storage battery _____ kg _____ no more than 0,8 kg.

ECPs FOR AIRCRAFTS TESTING

| No. | NAME AND APPEARANCE | SIZE OF OPERATING SURFACE, MM/INCH | OVERALL DIMENSIONS, MM/INCH | NOTE | FIELD OF APPLICATION |
|---|---|------------------------------------|-----------------------------|---|---|
| ECP for surface defects detection | | | | | |
| 1. | SU1.8M3.2x64DSS1 - Shielded Centre frequency - 1.8 MHz  | ∅ 3,2/.125 | ∅ 9,6 x 64/.38 x 2.5 | Spherical operating surface R1,6 | Detection of surface defects in aluminum, titanium and magnum alloys |
| 2. | SU1.8M3A3.2x12.5DSS1 - Shielded Centre frequency - 1.8 MHz  | ∅ 3,2/.125 | ∅ 9,6 x 64/.38 x 2.5 | Spherical operating surface | |
| 3. | SU1.8M5A3.2x12.5DSS1 - Shielded  | ∅ 3,2/.125 | ∅ 9,6 x 64/.38 x 2.5 | Spherical operating surface R1,6 | |
| 4. | SU1.5M3DS1 - Unshielded Centre frequency - 1.5 MHz  | ∅ 3/.118 | ∅ 12,5 x 76/.5 x 3 | Spherical operating surface R1,5 | |
| 5. | SU1.5M3DS02 - Unshielded Centre frequency - 1.5 MHz  | ∅ 3/.118 | ∅ 12,5 x 76/.5 x 3 | Spherical operating surface R1,5 | |
| 6. | SS1.5M05DA0 Centre frequency - 1.5 MHz  | ∅ 5/.197 | ∅ 13 x 35/.51 x 1.38 | Planar operating frequency. Ceramic protector. | |
| 7. | SS650K06DA0 Centre frequency - 650 kHz  | ∅ 6/.24 | ∅ 13 x 35/.51 x 1.38 | Planar operating frequency. Ceramic protector. | |
| 8. | SS400K07DA0 Centre frequency - 400 kHz  | ∅ 7/.26 | ∅ 13 x 35/.51 x 1.38 | Planar operating frequency. Ceramic protector. | |
| ECP for subsurface defects detection | | | | | |
| 9. | SS170K13DA0 Centre frequency - 170 kHz  | ∅ 13/.51 | ∅ 13 x 35/.51 x 1.38 | Planar operating frequency. Ceramic protector. | Detection of subsurface defects in aluminum alloys. Testing of primary elements of structure under the cover in 2-3 layer. |
| 10. | SS50K15DA0 Centre frequency - 50 kHz  | ∅ 15/.59 | ∅ 15 x 35/.59 x 1.38 | | |
| ECP for defects in holes detection | | | | | |
| 11. | RO1.7M5A"X" "DFD0 Centre frequency - 1.7 MHz  | from ∅ 3.1/.12 to 25.4/.122 ±1 | – | Flexible ECP for semi-automated testing | Detection of surface defects in aluminum, titanium and magnum alloys |
| 12. | RO1.7M5A"X" "DRD0 Centre frequency - 1.7 MHz  | from ∅ 3.1/.12 to 25.4/.122 ±1 | – | Rigid ECP with semi-automated testing | |
| 13. | RO1.2M5A"X" "DFA0 Centre frequency - 1.5 MHz  | from ∅ 3.1/.12 to 25.4/.122 ±1 | – | Flexible ECP for manual testing | |

• Possibility to produce other ECP types by the customer request.

Note - Teflon tape is used to protect the ECP operating surface.

¹ ECP nominal diameter; ²ECP nominal diameter; ³ECP nominal diameter.



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