

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



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



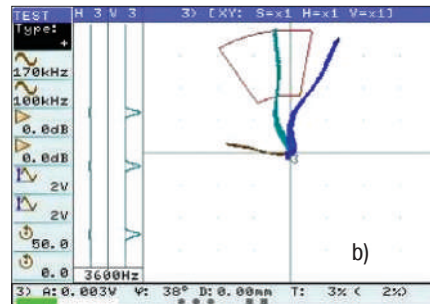
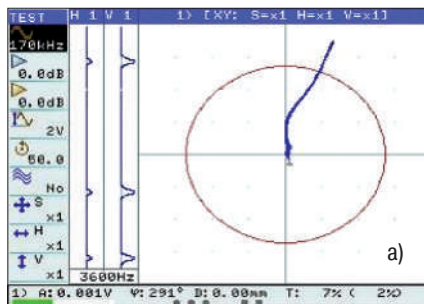
- Possibility of tuning out from the influence of operating liftoff of testing object electromagnetic properties inhomogeneity;
- Storage of a great number of setups and testing results in the flaw detector memory;
- Special-purpose software;
- Mode of two-way connection with PC via USB port (for inputting 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 ratio signal/noise;
- USB slave;

TECHNICAL SPECIFICATION AND SERVICE FUNCTIONS OF THE INSTRUMENT

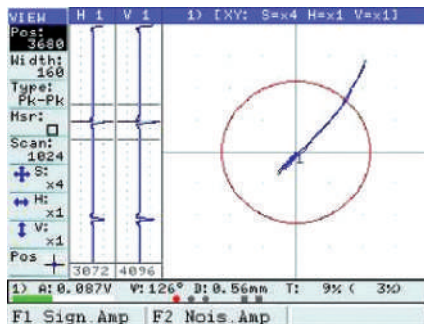
- The possibility of defects detection with the depth - from 0,1 mm and opening - from 0,002 mm;
- Operating frequency setup range - from 50 Hz to 12 MHz;
- Generator output voltage (double amplitude) - from 0,5 V to 6 V;
- Adjusted gain range - 30 dB;
- Adjusted preamplifier range- 40 dB;
- Signal phase 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.

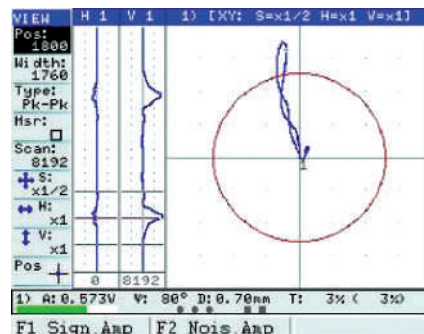


Signal projection (view) from a natural defect such as a crack with depth of 0.56 mm in the aircraft wheel bolt-hole.



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

CASTING TESTING

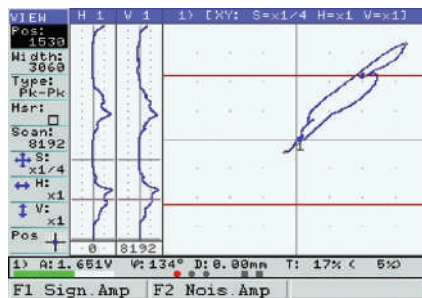


Fatigue crack 0.7 mm deep detected during testing of 18 -100 model bolster.



Application of special-purpose PN-12- MDP- 01 and PN-09-MDP-01 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

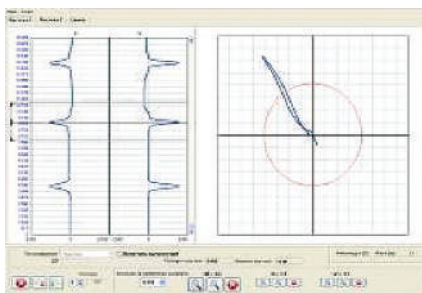


Signals of stress-corrosion defect are obtained by VD3-81 flaw detector Eddycon from the main gas pipeline section through the layer of insulation covering thickness of 6 mm.



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:




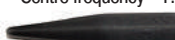




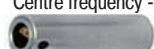
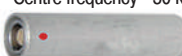



- An intuitive interface;
- Convenient view of testing results by each frequency channel (Frequency № 1, Frequency № 2 and Mix.);

- 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 diagrams;
 - 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 | • Signal display modes _____ Complex plane -X(y); Time scan - X(t), Y(t);
Double-frequency mode |
| • Gain _____ dB _____ 70 | • Memory for setups
and testing results storage _____ 1 Gb of memory. |
| • Probe supply voltage _____ V _____ 0,5, 1, 2, 4, 6 | 1 defectogram occupies - 6 Mb;
1 setup occupies - 0,00355 Mb; |
| • Filter _____ Hz _____ Lowpass from 1 to 4000;
Highpass from 1 to 4000;
Bandpass filter; Differential; Averaging; | • Multi-frequency operation _____ 2 - frequency multiplexing;
Independent control of both frequencies;
Signals mix for unwanted effects rejection; |
| • Sampling rate _____ 8000; | • Battery _____ Storage battery Hi-MH 12B/2700 mA h; |
| • Connected ECP _____ differential and absolute ECP | • Operation time
from the battery _____ hour _____ at least 5,5 hours; |
| • Digital zoom _____ from 1/16 to 16, with a step of 6 dB | • Operating temperatures _____ C° _____ From -10 to +40; |
| • Phase rotation _____ degr. _____ from 0 to 360 | • Protection
from environmental impact _____ IP 65 according to GOST 14254; |
| • ECP connector _____ 2-pin LEMO, 4-pin LEMO | • Overall dimensions _____ 188 x 107 x 78; |
| • Signal trace time _____ Sec _____ 0,1; 0,5; 1; 2; 3; 4 | • Weight
with storage battery _____ kg _____ no more than 0,8 kg. |
| • Display _____ Color TFT | |
| • Screen resolution _____ pixel _____ 320 240 | |
| • Screen size _____ inch _____ 2,756 x 1,969 | |
| _____ mm _____ 70 x 50 | |
| • Defect alarm (alarm) _____ Circle, Threshold, Sector, Cut-off | |

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 	Ø 3,2/.125	Ø 9,6 x 64/.38 x 2.5	Spherical operating surface R1,6	Detection of surface defects in aluminum, titanium and magnum al- loys
2.	SU1.8M3A3.2x12.5DSS1 - Shielded Centre frequency - 1.8 MHz 	Ø 3,2/.125	Ø 9,6 x 64/.38 x 2.5	Spherical operating surface	
3.	SU1.8M5A3.2x12.5DSS1 - Shielded 	Ø 3,2/.125	Ø 9,6 x 64/.38 x 2.5	Spherical operating surface R1,6	
4.	SU1.5M3DS1 - Unshielded Centre frequency - 1.5 MHz 	Ø 3/.118	Ø 12,5 x 76/.5 x 3	Spherical operating surface R1,5	
5.	SU1.5M3DS02 - Unshielded Centre frequency - 1.5 MHz 	Ø 3/.118	Ø 12,5 x 76/.5 x 3	Spherical operating surface R1,5	
6.	SS1.5M05DA0 Centre frequency - 1.5 MHz 	Ø 5/.197	Ø 13 x 35/.51 x 1.38	Planar operating frequency. Ceramic protector.	
7.	SS650K06DA0 Centre frequency - 650 kHz 	Ø 6/.24	Ø 13 x 35/.51 x 1.38	Planar operating frequency. Ceramic protector.	
8.	SS400K07DA0 Centre frequency - 400 kHz 	Ø 7/.26	Ø 13 x 35/.51 x 1.38	Planar operating frequency. Ceramic protector.	
ECP for subsurface defects detection					
9.	SS170K13DA0 Centre frequency - 170 kHz 	Ø 13	Ø 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 	Ø 15	Ø 15 x 35/.59 x 1.38		
ECP for defects in holes detection					
11.	RO1.7M5A"X¹ "DFD0 Centre frequency - 1.7 MHz 	from Ø 3,1 to 25.4/.122 1	—	Flexible ECP for semi-automated testing	Detection of surface defects in aluminum, titanium and magnum alloys
12.	RO1.7M5A"X² "DRD0 Centre frequency - 1.7 MHz 	from Ø 3,1 to 25.4/.122 1	—	Rigid ECP with semi-automated testing	
13.	RO1.2M5A"X³ "DFA0 Centre frequency - 1.5 MHz 	from Ø 3,1 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; ² ECP nominal diameter; ³ ECP nominal diameter.



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