

DEFECTOMAT[®] ECM 2.841



- * Low-cost eddy-current module for non-destructive flaw testing
- * Processor-controlled compact unit
- * Simple operation
- * Test pieces sorted into two groups: o.k. / n.o.k.
- * One-dimensional display of measured value by LED bar graph
- * Key-operated switch for locking operating functions

ECM = Eddy Current Module

Features

- ✓ Test frequency selected by plug-in module
- ✓ Frequency range 1 kHz to 3 MHz
- ✓ Vector evaluation
- ✓ Phase-selective component evaluation (optional)
- ✓ Dynamic operation
- ✓ Absolute channel (optional)
Drift compensation included
- ✓ Fine wire testing (optional)
Drift compensation included
- ✓ Can be combined with additional DEFECTOMAT[®] ECM, MAGNATEST[®] ECM and/or STATOGRAPH ECM
- ✓ PC interface to evaluation program eddyWin running with MS WINDOWS[®]
- ✓ Simple integration into existing control cabinets
- ✓ Physically separated interface for the most important control signals for the testing line
- ✓ Mains failure protection by battery backup of the parameter memory

Application

- Non-destructive testing for surface flaws using eddy-current method in accordance with DIN 51 140
- Testing of ferrous, austenitic and non-ferrous material
- Testing of round stock (wires, bars, tubes) or sectional stock
- Use of absolute or differential eddy-current sensor
- Connection of through-type coils, segment coils or scanning coils
- Testing of lamp wires with sensor 2.864

Mode of operation

The test material is moved past the sensor system (through-type coil, segment coil or scanning coil). The test electronics supplies the coils field winding with alternating current of a preset frequency. This produces eddy currents in the test material, and the retroactive effect of these eddy currents on the coils measurement winding are detected.

The differential channel displays changes in the electrical conductivity of the test material with high sensitivity.

Flaws in the form of holes or pits, flaws which are transverse to the throughput direction and short longitudinal flaws are indicated with high sensitivity. Long-drawn-out flaws in the throughput direction supply one start signal and one tail signal. The optional absolute channel indicates the longitudinal flaws over the entire length proportionally to the flaw depth and is suitable for use as an unwelded tube monitor on the welding line for instance.

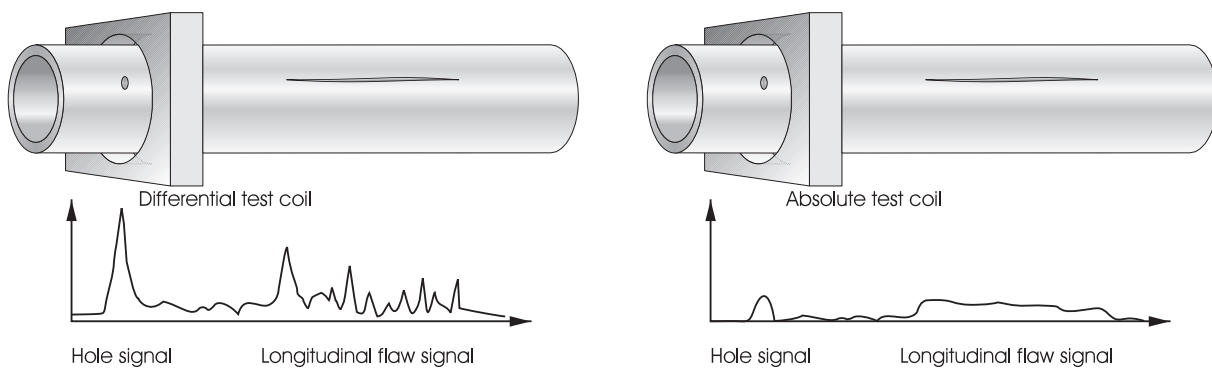


Fig. 1 Characteristic flaw signals of the difference channel (left) and of the optional absolute channel (right)

Construction

In its standard configuration, the DEFECTOMAT ECM consists of the components:

- DEFECTOMAT ECM 2.841
- Frequency module for one fixed frequency
- Mains cable, sensor cable, connecting cable
- Sensor system



The system can be adapted in steps to the respective test situation by adding further components:

- Frequency module for up to 8 selectable frequencies
- Phase adjuster for phase-selective component evaluation
- Absolute channel, drift compensation included
- DEFECTOMAT ECM/LV power amplifier
- Housing 6 HU
- Configuration adapter
- Combination with additional DEFECTOMAT ECM, MAGNATEST ECM and/or STATOGRAPH ECM units
- Remote control and extended display and evaluation by PC program eddyWin

Please refer to separate leaflet „ECM-SYSTEM“, Order No. 107 593 4, for possible combination options.

DEFECTOMAT ECM 2.841

The DEFECTOMAT ECM contains the operating controls, the test channel and the power supply.

- Input keys for user entries
- Key-operated switch for locking operating functions
- LC display for plain-text messages
- LED bar graph for measured value and threshold display
- Individual LEDs to display certain conditions
- Sensor connection socket
- Serial interface to additional ECMs or PCs
- Parallel interface to the testing line (inputs via optocouplers; outputs via relays)
- Analog output socket
- Mains connection socket
- Standard plug-in module 6 HU for 19" cabinets
- Dimensions
approx. 261 x 106 x 313 mm (H x W x D)
- Mass approx. 5 kg

Frequency module

By default the DEFECTOMAT ECM is delivered with a fixed test frequency of 10 kHz. For certain applications it may be equipped with other test frequencies by exchanging the frequency module.

As an option there is a variable frequency module available which allows to switch the test frequency as an operating parameter in the range 1 KHz...3 MHz.

Phase adjuster option

The DEFECTOMAT ECM can operate in „vector evaluation“ mode or optionally in „phase-selective component evaluation“ mode. The plug-in module PHASE ADJUSTER must be installed in the ECM for this purpose. Please specify when ordering.

Absolute channel option

The DEFECTOMAT ECM can be equipped with an absolute channel for specific applications. Drift compensation of zero point signal is included (AUTOTRACK). Please specify when ordering.

DEFECTOMAT ECM/LV

Power amplifier for the DEFECTOMAT ECM 2.841 for specific LF applications with high power requirement

- Connection socket to the DEFECTOMAT ECM 2.841
- Sensor connection socket
- Mains connection socket
- Standard plug-in module for 19" cabinets
- Dimensions approx. 261 x 106 x 313 mm (H x W x D)
- Mass approx. 5 kg

The optional power amplifier DEFECTOMAT ECM/LV is necessary only in some applications, depending on test frequency and sensor system.

| | 3 kHz | 10 kHz | 30 kHz | 100 kHz |
|-----------|-------|--------|--------|---------|
| LMD coils | yes | yes/no | no | no |
| HMD coils | yes | yes | yes/no | no |

Fine wire testing option

The DEFECTOMAT ECM can be configured for the crack detection of lamp wires (\varnothing 0.1...1.5 mm).

Following options are needed:

- Phase adjuster
- Static mode (drift compensation included)
- Frequency module 4 F (1, 2, 5, 10 MHz)

The sensor system 2.864 with diameter 0.3/0.4/0.6/1.0/1.5/2.0 mm is available.

Connecting cable for output amplifier

Connecting cable between DEFECTOMAT ECM and DEFECTOMAT ECM/LV

Analog signal cable (Diode BNC)

Connecting cable to connect an oscilloscope to the analog output of the DEFECTOMAT ECM.

Sensor systems

The sensors designed for DEFECTOMAT E/C/CP/S can be connected to the DEFECTOMAT ECM. Please refer to the corresponding data sheets for a detailed description.

Housing 6 HU

To accommodate one to four ECM modules. Dimensions approx. 290 x 475 x 345 mm (H x W x D).

Configuration adapter

Plug-on module for automatic configuration of the DEFECTOMAT ECM. Stores the configuration data for one application.

Determining the instrument setting

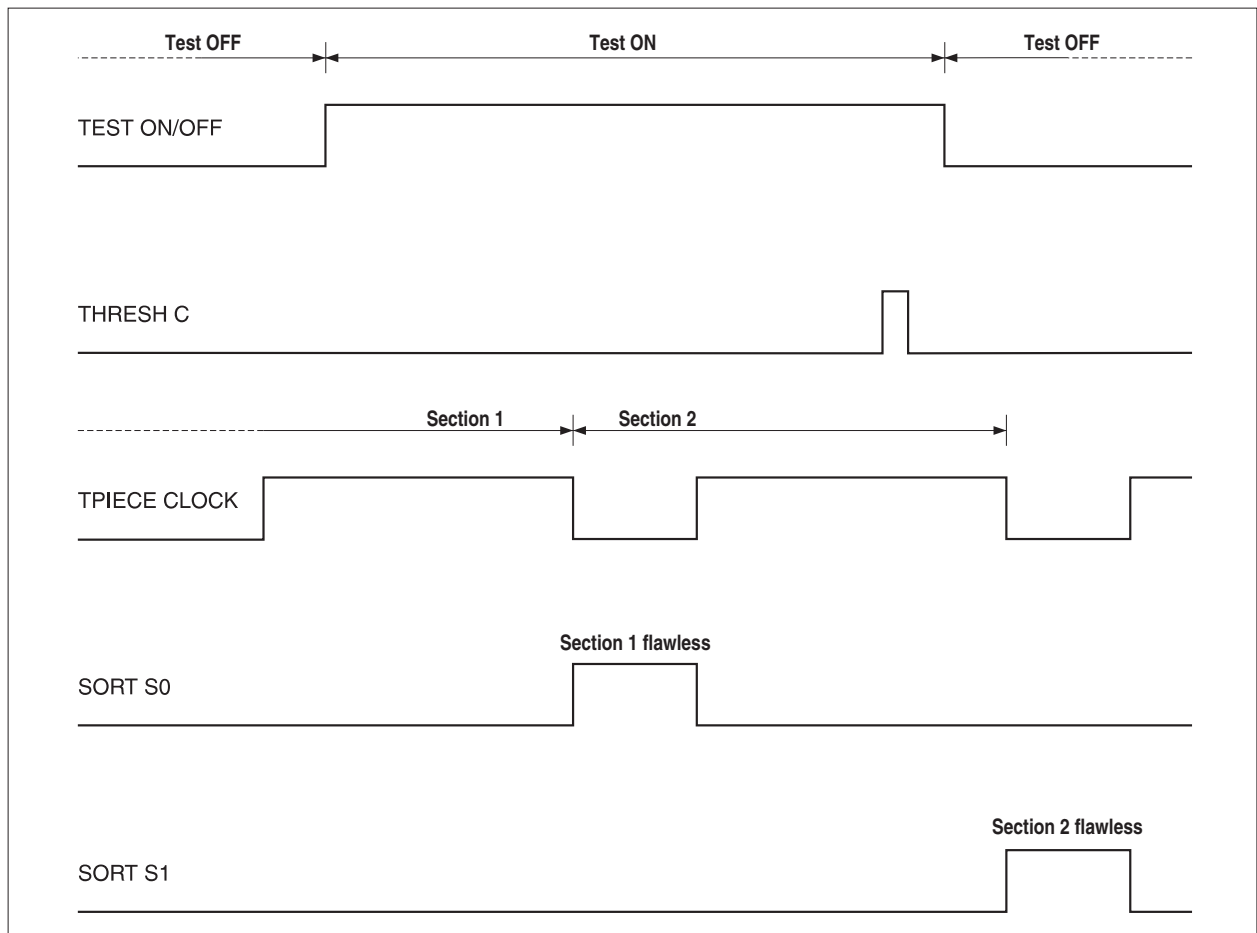
If required, FOERSTER can determine an application-specific instrument setting in its application laboratory and save it on the configuration adapter. Specimen test pieces must be submitted for this purpose.

Test sequence

The ECM's test sequence is controlled by two external signals: TEST ON/OFF and TPIECE CLOCK. TEST ON/OFF controls test release. TPIECE CLOCK controls the evaluation sequence (assignment of flaw signals to test pieces/sections).

The test result is signaled by the ECM to the control by instantaneous signals (threshold transgression THRESH A, THRESH B and THRESH C) on the one hand and by static signals (SORT S0 = flawless test piece/section, SORT S1 = defective test piece/section) on the other. A test piece/section is evaluated as defective if flaw threshold C was exceeded at least once.

Threshold transgressions THRESH A, THRESH B and THRESH C are signaled immediately they occur and for the duration of the threshold transgression by LEDs and by output signals at socket IN/OUT. The sorting signals SORT S0 and SORT S1 are output at socket IN/OUT only when the tail of the test piece/section is reached. The criterion for this is the trailing edge of the input signal TPIECE CLOCK.



Technical data

| | |
|-----------------------------------|---|
| Test frequency | 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz selectable by plug-in module or variable frequency module 8 F: 1...3000 KHz 4 F: 1, 2, 5, 10 MHz |
| Sensor | Difference or absolute coils |
| High-pass filter, low-pass filter | 1 Hz to 16 kHz, 25 steps |
| Testing | Dynamic operation |
| Evaluation mode | Vector evaluation Phase-selective component evaluation (optional) Absolute channel (optional) |
| Microprocessor | for sequence controller, operator prompting, self-test etc. |
| Permitted supply voltage | 115/230 V +10 %, -15 %, 50-60 Hz, 45 VA |
| Operating temperature | +5° to +40 °C |
| Enclosure (DIN 40 050) | IP 30 (ECM without housing) IP 54 (ECM in housing 6 HU) |

Should you have any special problems please contact:

INSTITUT DR. FOERSTER

GmbH & Co. KG
Postfach 15 64
D-72705 Reutlingen
In Laisen 70
D-72766 Reutlingen
Phone +49 (0) 7121/140-0
Fax +49 (0) 7121/140-488
www.foerstergroup.de

Division TS

Test systems for semi finished products
Postfach 15 64
D-72705 Reutlingen
In Laisen 70
D-72766 Reutlingen
Phone +49 (0) 7121/140-270
Fax +49 (0) 7121/140-459
e-mail ts@foerstergroup.de

Division CT

Test systems for component testing
Joseph-von-Fraunhofer-Str. 15
D-44227 Dortmund
Phone +49 (0) 231/97 50 49-0
Fax +49 (0) 231/97 50 49-8
e-mail ct@foerstergroup.de.de



or one of our agencies abroad

Information and illustration may
be subject to change

Order No. 107 522 5
Edition 2002/02
Author Dr. Sievers

Product information

Leaflets

| | |
|-------------------------------------|-----------|
| ECM- SYSTEM and PC software eddyWin | 107 593 4 |
| MAGNATEST ECM 3.621 | 107 513 6 |
| STATOGRAPH ECM 6.421 | 107 521 7 |
| Sensor system S 2.869 | 136 057 4 |
| LMD test coil 2.891.30 | 144 705 0 |
| Weld-seam probe 2.895.01-0602 | 145 005 0 |

Application infos

| | | |
|----------------------------|----------------------------|-----------|
| Eddy Current Crack Testing | Vehicle-Motor Valve Tappet | 137 125 8 |
| Eddy Current Testing | Needle Bearings | 139 394 4 |
| Eddy Current Flaw Testing | Weld-seam in Saw Belt | 139 396 0 |
| | Copper Tube | 146 739 5 |
| | Lamp Wire | 158 509 6 |