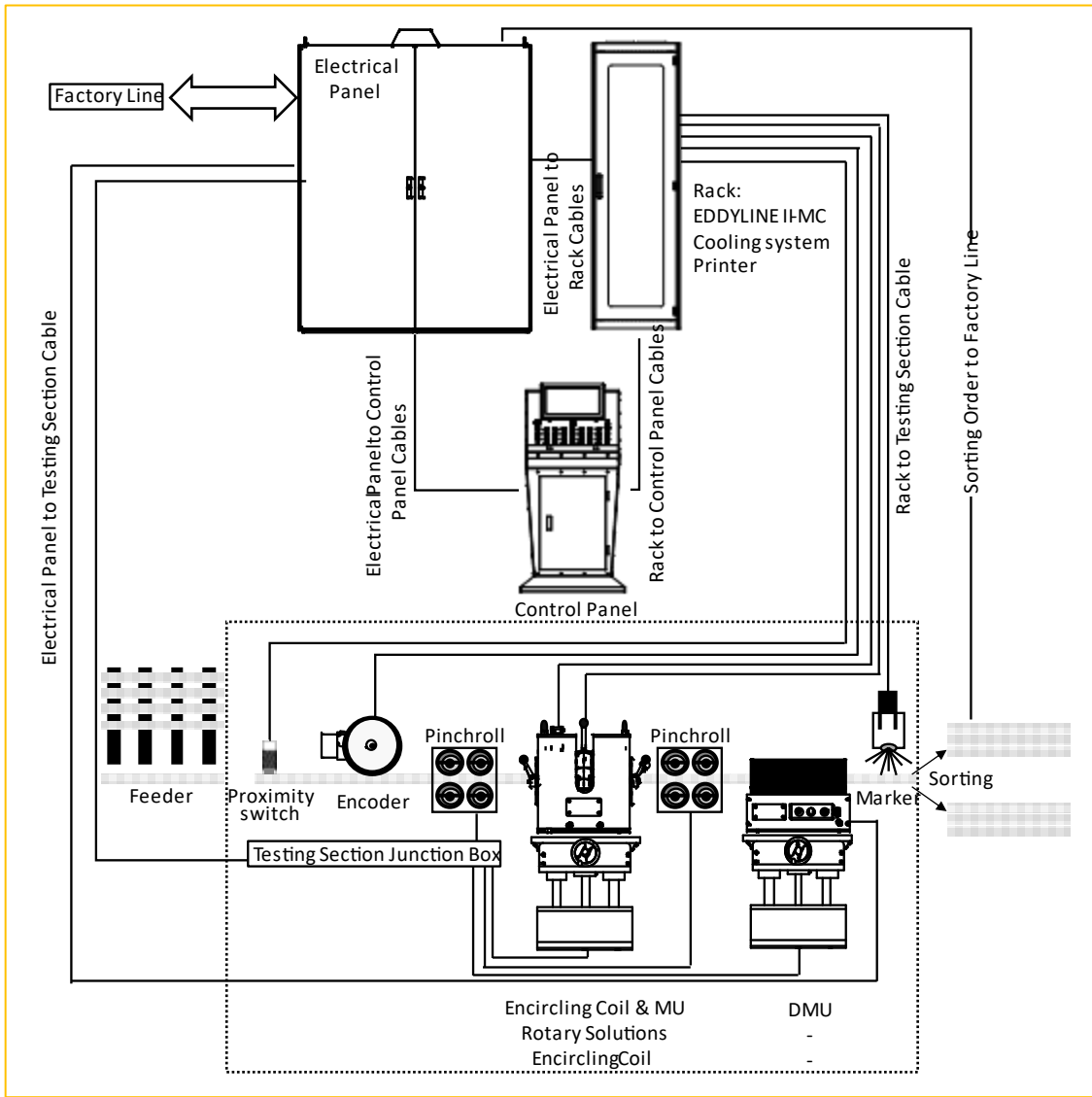


- Automated inspection line
- Easy integration and Modular
- Sharing data with MES
- Reporting
- Versatile application
- High-speed operation
- Data-driven quality control

Tubes/Bars (Offline)

Testing Section to Meet Innovative NDE Solutions

System Parts



INTELLIGENT CONTROL FOR SUPERIOR OPERATION

Control Panel is the central command center for the entire eddy current testing line. It incorporates a user-friendly interface with a 15-inch display for real-time data visualization, system monitoring, and operator control. Key features include:

15" Intuitive Touchscreen Interface

Use the touchscreen to set up parameters and to access testing and reporting options quickly

Testing Section Control Items

Emergency Button, Line Speed Volume, Mode Selector Switch (Automatic/Manual/Idle), Reset Button, Error Indicator, Start/Stop, Test line Adjustor control, Manual Testing Options, ...

Connection to Electrical Panel and Rack

data communication for optimal performance and minimized downtime



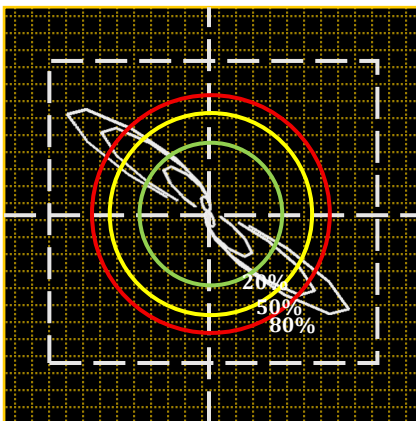
Automated Control: Seamlessly integrates with the testing line for automated operation, including pre-programmed test sequences and automatic parameter adjustments.

Enhanced Safety: Incorporates robust safety features such as emergency stop buttons, safety interlocks, and alarm systems to ensure operator safety and equipment protection.

Data Acquisition and Analysis: Collects and displays real-time testing data, enabling operators to monitor the inspection process and identify potential issues.

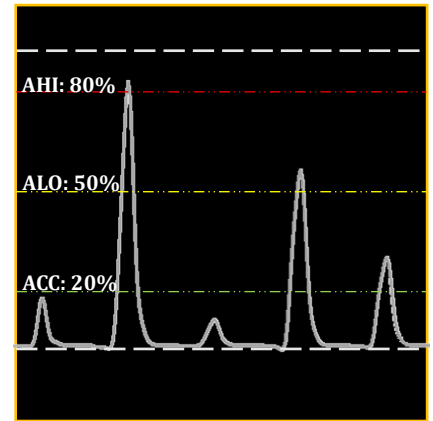
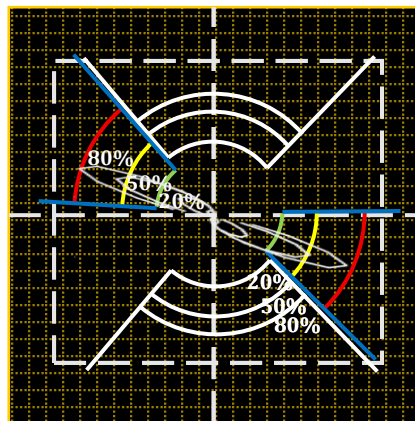
User-friendly Interface: Provides an intuitive interface with clear and concise displays for easy operation and system monitoring.

Real-Time Displays



Impedance Plane

The Eddyline II boasts advanced features for eddy current testing, including two impedance planes (one for each channel) that graphically display the relationship between resistance and reactance of the test coil. This helps in analyzing material properties and detecting defects. Additionally, it includes circular masks to evaluate signal amplitude and sector masks to differentiate signals based on phase angles, enhancing the accuracy and reliability of the inspection process.

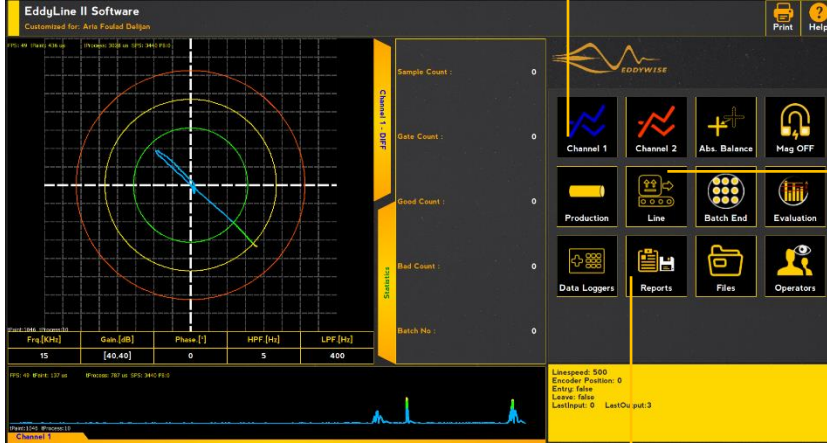


Sweep Mode

This is based on time or position, providing a dynamic view of the inspection area. It also includes a gain feature for sorting, which enhances the ability to differentiate between various signal strengths, ensuring precise and efficient inspections.

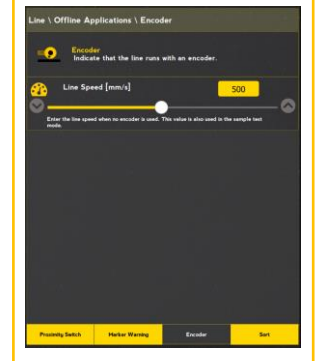
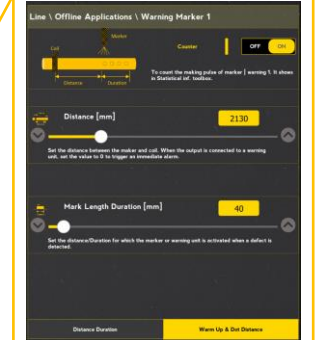
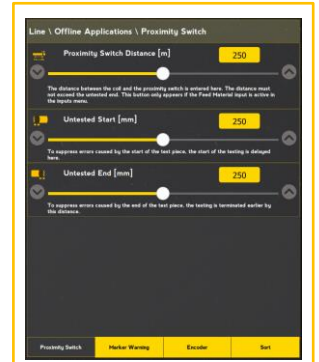
Channel Parameters

Eddyline II simplifies channel parameter setup with an intuitive interface. Clear icons and straightforward adjustments for gain, frequency, phase, filtering, and masking empower users to quickly optimize tests for various applications and materials



Line Parameters

Eddyline II software offers a function to define line parameters, enabling communication with external devices and achieving desired results. This function encompasses various applications, including marking and warning signals, saw distance and encoder settings for inline operation, proximity switch distances and untested zones for offline operation, and saw distance, feed length, and station/reject part counts for stop-and-go applications.



Reporting

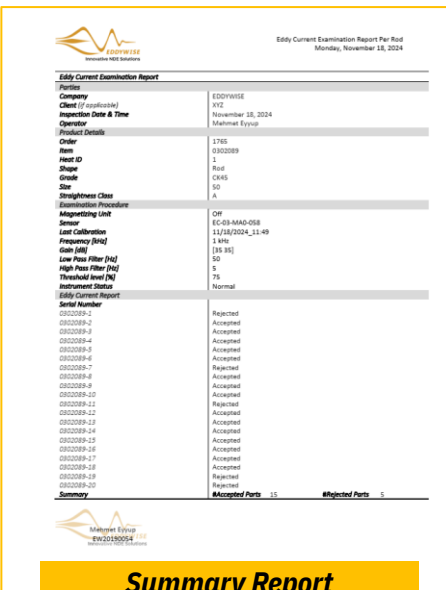
The EddyLine II system incorporates robust reporting capabilities to ensure comprehensive quality control and facilitate data-driven decision making. We recommend generating two types of reports:

- Inspection Reports:** Capture critical information for each unit, including inspection date/time, operator identification, product details (part number, material), test methods used, equipment details (including calibration records), and detailed test results (e.g., defect locations, measurements images).
- Summary Reports:** Aggregate data from detailed reports for defined periods (e.g., shifts, batches). These reports summarize key performance indicators (e.g., defect rates, pass/fail rates), identify trends and patterns, and enable statistical analysis to support continuous improvement initiatives.

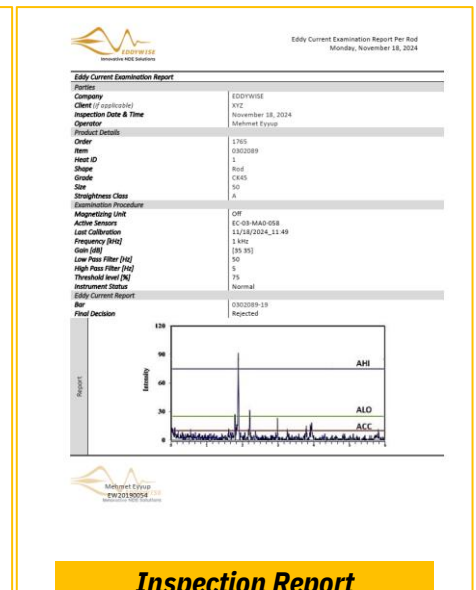
Furthermore, both detailed and summary reports can be automatically exported in various formats (e.g., .csv, .xlsx, .pdf) for seamless integration with Manufacturing Execution Systems (MES) or other data analysis tools, enabling real-time data analysis and improved efficiency in quality control processes.



Reports



Summary Report



Inspection Report

EddyLine II – Rack Features

Magnetizing Unit



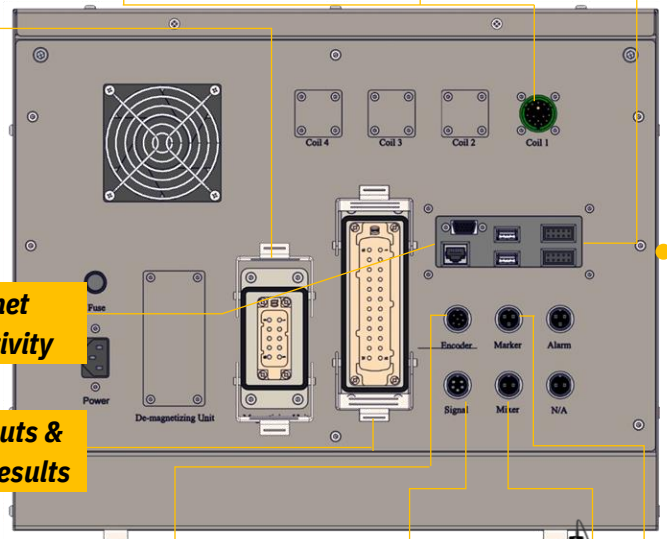
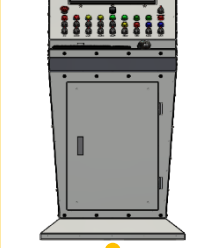
Rotary Solutions



Encircling Coils



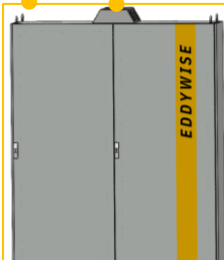
Control Panel



EddyLine II Back Panel

Ethernet Connectivity

I/O Outputs & Sorting Results



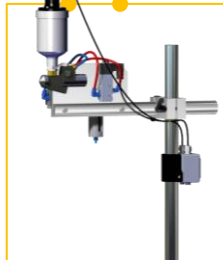
Electrical Panel



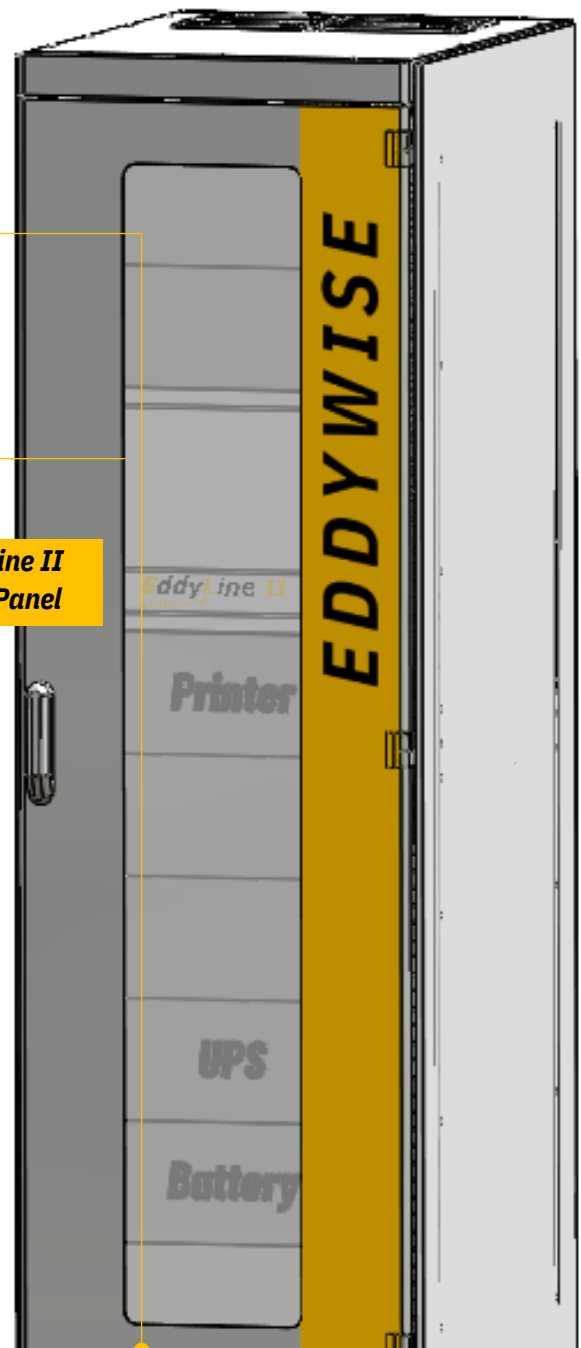
Encoder



Alarm/Warnings



Marker



Industry 4.0 - Connected Inspection System



MES Integration:

Stream real-time data to MES for predictive maintenance, proactive quality adjustments, and improved overall equipment effectiveness.



Remote Access:

Securely access and control the system from any location with internet connectivity.



Data Storage:

Utilize robust data storage solutions to ensure data security, facilitate centralized management, and enable efficient data access and retrieval.



Data-driven Dashboards:

Visualize key performance indicators (KPIs), identify root causes of defects, and optimize production processes based on real-time and historical data.



Open API:

Integrate seamlessly with smart sensors, robotics, and other Industry 4.0 technologies through an open API.

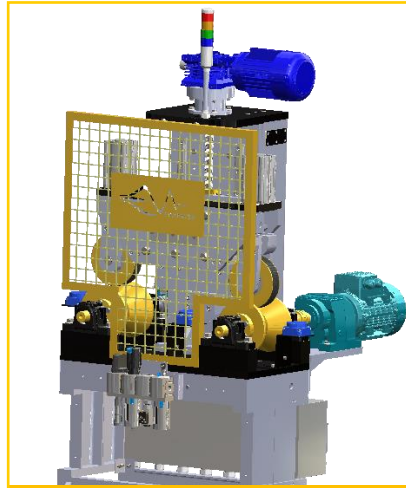


Predictive Maintenance:

Leverage data analytics to predict potential equipment failures, allowing for proactive maintenance scheduling and minimizing downtime.

Pinchroll

Pinchroll are critical components in eddy current testing systems, ensuring accurate and reliable inspection results. They play a vital role in controlling the movement of the test piece through the inspection zone, ensuring consistent speed, precise positioning, and the ability to move the material both forward and backward as needed. Both Pinchroll types are designed to handle a range of test piece sizes and weights, with Type C suitable for smaller diameters (20-100 mm) and lighter loads (up to 800 kg), while Type G accommodates larger diameters (70-200 mm) and heavier loads (up to 2 tons). Each type utilizes two independently driven rollers powered by AC motors with gearboxes, ensuring precise control over material movement.



Type C - 1t



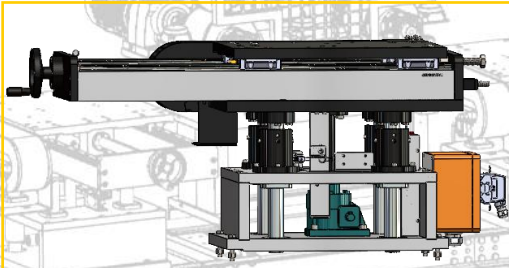
Gate - 2t

A linear guide with a lead screw mechanism facilitates height adjustments, accommodating varying test piece diameters. Type C employs a C-type clamp, while Type G utilizes a gate-type clamp, both providing secure and reliable clamping for accurate material handling.

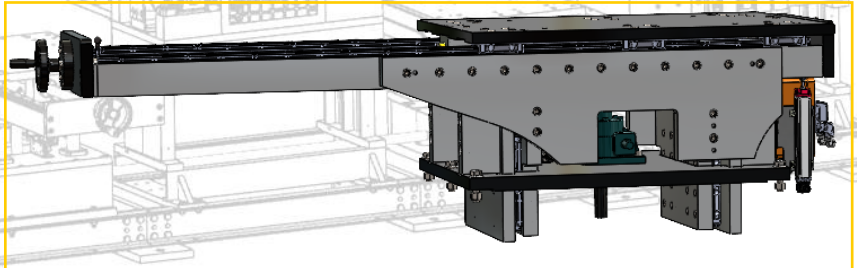
Adjustable Table

In eddy current testing, adjustable tables are essential for precise sensor positioning, ensuring accurate alignment with the test piece. They automate height adjustments through a control panel, bringing the sensor close to the desired position, with final manual adjustments by an operator for precision. These tables maintain axis symmetry between the coil and test piece while preventing collisions with guides or sensors, ensuring reliable testing conditions.

The Adjustable Table 1t-yz and 2t-yz models are designed to accommodate a wide range of test piece dimensions and weights. The 1t-yz model is designed for smaller diameter test pieces (20-100 mm) and lighter loads (up to 800 kg), while the 2t-yz model accommodates larger diameters (70-200 mm) and heavier loads (up to 2 tons).



1t-yz



2t-yz

Chassis

The chassis is the load-bearing framework of EddyWise Testing Sections, supporting all instruments and mounting to the foundation. It features modular sections for pinch rolls and adjustable tables, with 600 mm width for 1t testing sections and 800 mm width for 2t testing sections.

Available Models

CHS-600-PMP: 1T testing for 20-100 mm diameters (1 desk), two pinchrolls sections and one adjustable table section.

CHS-600-PMPMPM: 1T testing for 20-100 mm diameters (3 desks), three pinchrolls sections and three adjustable table sections.

CHS-800-PMPM: 2T testing for 70-200 mm diameters (2 desks), two pinchrolls and two adjustable tables.



Electrical Panel

The electrical panel is the heart of the eddy current testing system, ensuring reliable and safe operation. It incorporates advanced components to deliver optimal performance

High-efficiency Inverters: Optimize energy consumption by precisely controlling motor speeds, reducing energy waste, and lowering operating costs.

Robust Circuit Protection: Adjustable MCCBs safeguard against overloads and short circuits, enhancing system reliability and minimizing downtime.

Superior Noise Suppression: Advanced EMI filters eliminate electromagnetic interference, ensuring signal integrity and preventing data corruption.

Intelligent Control: Integrated PLC automates control sequences, facilitates data exchange, and supports predictive maintenance for proactive system upkeep.

Enhanced Safety: Redundant safety interlocks, emergency stop buttons, and safety guard monitoring ensure operator safety and prevent equipment damage.

Advanced Features and Customization

The EddyWise electrical panel is designed for maximum efficiency and adaptability, featuring:

24V/10V Power Supplies: Provide consistent voltage regulation for PLCs and testing section components.

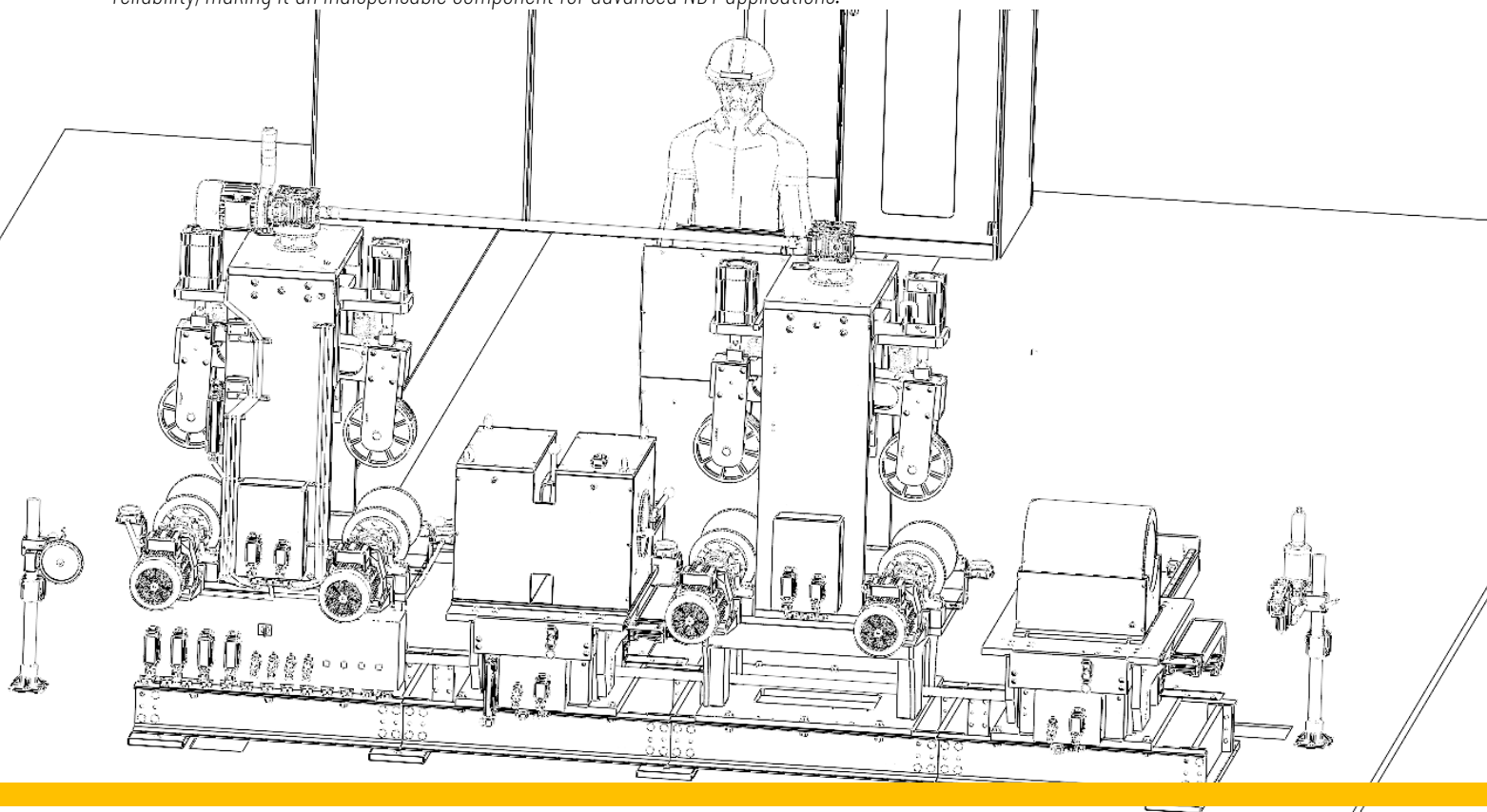
Isolator Cards: Protect PLCs from signal interference, ensuring reliable operation.

8-Channel Relay Cards with LED Indicators: Enable real-time status monitoring and control of high-voltage circuits.

Three-Phase Monitoring Device: Tracks voltage, current, frequency, and power factor for optimal power quality.

Customizable Configurations: Tailored to specific testing section requirements, with variations in inverters, MCCBs, EMI filters, and I/O setups.

These advanced features contribute to a highly reliable and efficient electrical system, maximizing uptime, minimizing operational costs, and ensuring a safe and productive working environment. Regular maintenance and inspection are emphasized to ensure long-term functionality and reliability, making it an indispensable component for advanced NDT applications.



Encoder

Accurate and reliable eddy current testing hinges on precise tracking of the test piece's position. The Encoder fulfills this critical function, enabling accurate defect location, marking, and sorting.

Our innovative encoder system utilizes a spring-loaded arm with a utilizing encoder wheel, ensuring accurate position tracking without contacting or exerting pressure on the test piece. This design guarantees reliable operation across a wide range of test piece speeds and sizes, making it suitable for demanding industrial environments.

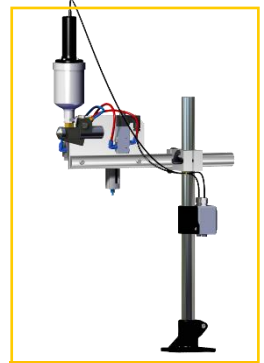


With Stand

Marker

Accurate defect identification is paramount in eddy current testing. The Marker plays a crucial role by precisely marking defects, enabling efficient analysis and subsequent corrective actions.

Our marking system utilizes an industrial spray gun with an adjustable nozzle for precise and consistent marking. It features a fast response time to keep pace with high-speed production and employs quick-drying inks/paints to minimize production delays. This robust system ensures accurate defect identification, contributing to improved product quality and reduced downtime.

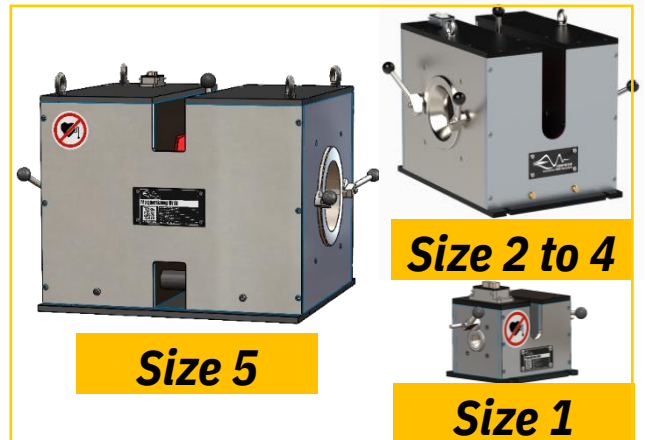


One Nozzle

Magnetizing Unit

The Magnetizing Unit is a crucial component in the eddy current testing of ferromagnetic materials. In these materials, inherent magnetic properties can interfere with eddy current signals, reducing testing accuracy and sensitivity. The Magnetizing Unit overcomes this challenge by applying a strong magnetic field to the test object prior to the eddy current inspection.

This pre-magnetization significantly improves testing accuracy by minimizing the influence of material permeability on the eddy current signals. By effectively suppressing these magnetic effects, the Magnetizing Unit enables more reliable detection of subsurface defects and enhances the overall accuracy and sensitivity of the eddy current testing process for ferromagnetic materials.



De-Magnetizing Unit

The Demagnetizing Unit is essential for accurate eddy current testing of ferromagnetic materials. Following magnetization, the Demagnetizing Unit removes residual magnetism from the test piece, ensuring accurate and reliable test results. Key features include:

Efficient Demagnetization: Effectively removes residual magnetism, ensuring accurate eddy current test results.

Versatility: Adaptable to various material sizes and testing speeds.

Robust Construction: Incorporates high-quality components for reliable and long-term operation. This critical component ensures that the test piece is in a suitable magnetic state for accurate eddy current inspection, contributing to the overall accuracy and reliability of the entire testing process.



Up to 360 mm

Encircling Coil

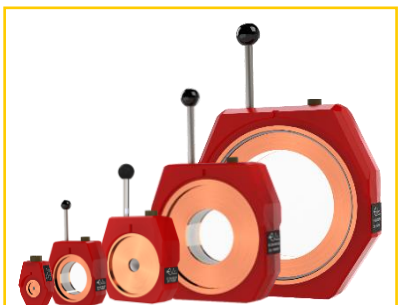
Encircling coils are fundamental to eddy current testing, inducing and detecting eddy currents within the test piece. Our encircling coils feature "smart sensors" with embedded chips that store crucial sensor data, enabling traceability and facilitating system calibration.

Absolute Coils: Detect longitudinal defects and material characteristics.

Differential Coils: Optimized for detecting small discontinuities and transverse defects.

Combinations: Utilize both absolute and differential windings, offering enhanced sensitivity and versatility for detecting a wider range of defects, including both longitudinal and transverse issues.

This combination of advanced sensor technology and versatile coil configurations ensures accurate and reliable eddy current testing across a wide range of applications.



Size 1 to 5

Testing Section Specifications

Testing Section

Power Supply: Total Harmonic Distortion: THD<3%, Voltage: 380-400 V AC, Voltage: 380-400 V AC, Frequency: 50/60 Hz.

Rated power: 20.5 kW (TSO-MU-70-200), 18.5 kW (TSO-DG-20-100), 26.5 kW (TSO-RMU-20-100)

Ambient Temperature: -5 to 45°C

Dimensions: TSO-MU-70-200: 4000x2203x2248, TSO-DG-20-100:2700x1956x1680, TSO-RMU-20-100: 5101x1956x1680

Maximum time to change test piece size: 5 MIN

Electrical Plan

Types: EP-0-022 (TSO-MU-70-200), EP-0-121 (TSO-DG-20-100), EP-0-033 (TSO-RMU-20-100)

Features: Inverters, MCCB, EMI filter, Network type advanced slim PLC, 24V/10V power supply, Isolator card, 8-channel with LED signaling relay card, three-phase monitoring

Dimensions: 1160x470x2180

Pinch Roll

Types: TSO-MU-70-200 (Gate - 2t): PR-0G-2t- IN, PR-0G-2t- MID, PR-0G-2t- OUT, TSO-RMU-20-100 and TSO-DG-20-100 (Type C-1t): PR-TC-1t - IN, PR-TC-1t - MID, PR-TC-1t - OUT

Features:

Adjustable Height mechanism linear guide with lead screw, Test piece deviation per length: 1.5 mm per meter.

Clamping mechanism:

Gate - 2t: Gate with pneumatic jack,

Type C-1t: C-Type with Pneumatic Jack

Dimensions: TSO-MU-70-200 (Gate - 2t):1400x1350x2007, TSO-RMU-20-100 and TSO-DG-20-100 (Type C-1t): 760x1300x1810

Adjustable Table

Types: TSO-MU-70-200 (2t-yz): AT-HS-2t-R, AT-HS-2t-S
TSO-RMU-20-100 and TSO-DG-20-100 (1t-yz): AT-HS-1t-R, AT-HS-1t-S

Features: Adjustable Height mechanism (z-direction): Jack Screw with lead screw, Adjustable Height mechanism (y-direction): Linear Guide with lead screw and slider lock

Dimensions: TSO-MU-70-200 (2t-yz): 1800x660x600
TSO-RMU-20-100 and TSO-DG-20-100 (1t-yz): 972x600x460

Chassis

Types: TSO-MU-70-200: CHS-800-PMPM, TSO-RMU-20-100: CHS-600-PMPMPM, TSO-DG-20-100: CHS-600-PMP

Features:

CHS-800-PMPM: This model has four 1000 mm-longitudinal sections designed for mounting two pinch rolls and two Adjustable Tables.

CH-600: Two sizes in longitudinal, 700 mm and 1000 mm for mounting pinch roll and adjustable table, respectively.

Dimensions: CHS-800-PMPM: 4000x196x1000, CHS-600-PMP: 2700x137x800, CHS-600-PMPMPM: 5100x137x800

Control Panel

Types: TSO-MU-70-200 (2t-yz): CP-0-022

Features: Emergency button, Line speed volume knob, Mode selector switch (Automatic mode, Manual mode, and Idle mode), Reset button, Error indicator light, CLAMP indicator light, Calibration indicator light, Line ready indicator light, Power indicator light, Manual accept button, Start button, Stop button, Clamping diameter adjustment switch, Adjustable table sliding controls (up to 4), Part request button, Manual reject button, Manual reverse button, Manual forward button, Table height adjustment switch, Pinch roll clamping control switch (two per each pinch roll), 15-inch LED display

Dimensions: 670x743x1320

Rack

Types: R-0-MU (TSO-MU-70-200), R-0-DG (TSO-DG-20-100), R-0-RMU (TSO-RMU-20-100)

Features: Eddy current instrument (MU, Grade Sort, and/or FluxRoto) and/or dimension measurement instrument, USB Port, RS232 port, inputs: an encoder, marker, magnetizing unit, a proximity switch, a coil or/and probe sensor, and/or a dimension device), housing of 42-unit IP42 cabinet with industrial cooling system.

Dimensions: 42 unit

Cables

Types: Pinchroll to junction box cables, Adjustable table to junction box cables, Electrical panel to junction box cables, Coil cable, Magnetizing unit cable (if required), De-magnetizing unit cable (if required), Marker cable, Mixer cable, Encoder cable, Power cable, IO cable, Rack to control panel cable, Electrical panel to control panel.

Features: Use good quality cables and connectors that are durable, reliable, and compatible with the network devices.

The selected cables and connectors can handle the network signals' required bandwidth, voltage, and current without causing attenuation, distortion, or noise.

Marker

Types: one nozzle (MA-24-991-a), two nozzles (MA-24-992-a)

Power Supply: 5-24 VDC

Resolution: 500 Pulse/rev, 1 mm/pulse

Features: Fast response, short drying time of paint or ink, paint mixer (CA-XX-ME2-MA), marker control unit (MA-CU2-99X-a), marker paint gun (MA-P-99X-a), marker stand (ST-001-MA), connected to EddyLine II using marker cable (CA-XX-ME2-MA) and mixer cable (CA-XX-ME3-MA)

Encoder

Types: EN-01-TTL- 500

Power Supply: 5-24 VDC

Resolution: 500 Pulse/rev, 1 mm/pulse

Features: with an encoder pulley (EN-01-P), encoder stand (ST-001-EN), connected to EddyLine II using encoder cable (CA-XX-ME6-EN)

Testing Section Specifications

Magnetizing Unit

Types: 1-15 mm: MU-01-220-5, 5-50 mm: MU-02-220-5, 19-87 mm: MU-03-220-5, 76-158 mm: MU-04-220-5, 144-230 mm: MU-05-220-5.

Features: Using for inspection of ferromagnetic materials with encircling coils, Holder of an encircling coil, Magnetic flux density will reach to value 0.7 mT at distance 0.5 m.

Guide sleeve support, Adaptor support, and adjustable power supply can be provided per order. connected to EddyLine II using a Magnetizing unit cable (CA-XX-H10-MU)

De-Magnetizing Unit

Types: 0.1-15 mm: DMU-035-AC, 5-55 mm: DMU-070-AC, 19-92 mm: DMU-110-AC, 90-122 mm: DMU-150-AC, 90-175 mm: DMU-200-AC, 168-230 mm: DMU-260-AC, and $D > 260$ mm: DMU-360-AC

Features: They use an alternating/direct electric current to generate a magnetic field that opposes the original magnetization of the material. Customized based on diameter.

Connected to the Electrical panel using a De-Magnetizing unit cable (CA-XX-H04-DMU).

Coil Holder

Types: 1-15 mm: CH-01-999-E, 5-50 mm: CH-02-999-E, 19-87 mm: CH-03-999-E, 76-158 mm: CH-04-999-E, 144-230 mm: CH-05-999-E.

Features: Using for inspection of non-ferromagnetic materials with encircling coils, grade sorting of materials, and acts as Holder for encircling coils.

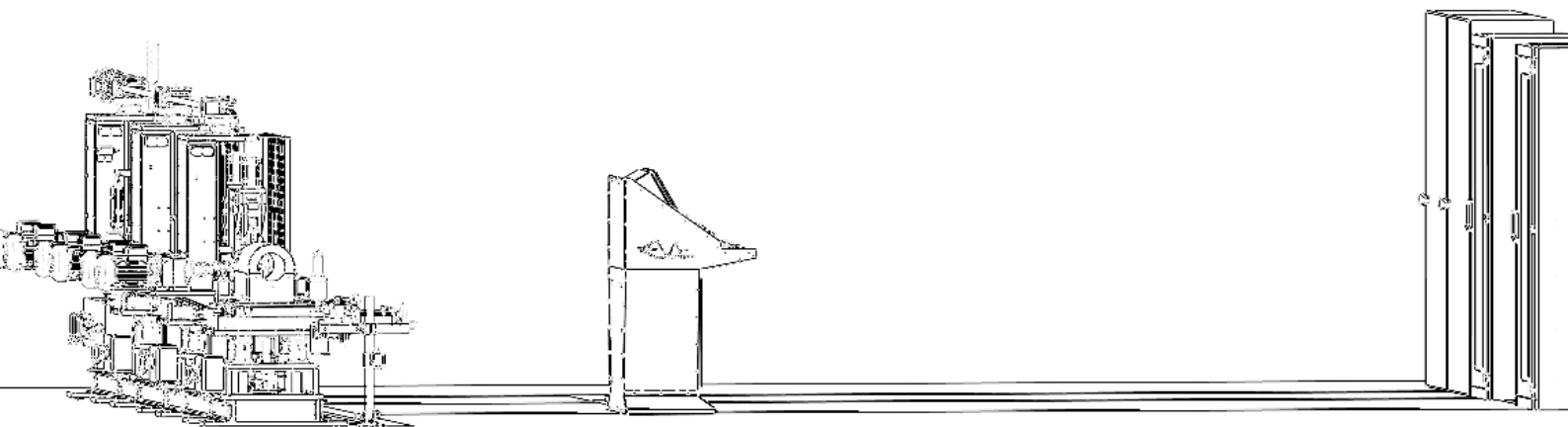
Encircling Coil

Types: MA: Multi-differential winding & absolute winding, NA: Normal-differential winding & absolute winding, MO: Multi-differential winding without absolute winding, NO: Normal differential winding without absolute winding, AA: Absolute Winding without differentials, OA: Simple Absolute Winding, ON: Simple Normal-differential Winding, OM: Simple Multi-differential Winding.

Coil Size: 1-15 mm: EC-01-cdf-xyz, 5-50 mm: EC-02-cdf-xyz, 19-87 mm: EC-03-cdf-xyz, 76-158 mm: EC-04-cdf-xyz, 144-230 mm: EC-05-cdf-xyz; where, xyz indicates the nominal diameter of the coil, the value of which depends on the test piece diameters, cd is encircling coil types, and f is frequency number.

Frequencies: 0: 1kHz - 20kHz 1: 10kHz - 50kHz 2: 20kHz - 100kHz 3: 50kHz - 200kHz 4: 100kHz - 500kHz. Other frequency range can be customized per order.

Features: it can be mounted in magnetizing unit or encircling coil holder.



EddyLine II Specifications

Eddy Current Specifications

Sensor Types: Absolute and Differential in either bridge or reflection configuration. The instrument is fully compatible with EDDYWISE probes.

Sensor Connectors: 15 Pins Military

Frequency Range: 10 Hz to 2 MHz

Gain: 0 dB to 90 dB in 0.1 or 1 dB increment

Rotation: 0° to 359.9° in 0.1° or 1° increment

Sweep: Variable from 0.005 s to 10 s per division

Filters:

Low-pass: 0 Hz to 1000 Hz

High-pass: off or 2 Hz to 1000 Hz

Continuous null (Low-Freq. HP filter): 0.2 Hz, 0.5 Hz, 1.0 Hz

Probe Drive: HIGH (20 V) into 100 Ω.

Display Erase: 0.1 s to 60 s

Available Alarm Types: 3 simultaneous alarms. POLAR (circle), SECTOR (pie), SWEEP (time-based)

A/D Resolution: 16 Bits

Number of Channels: 1 Differential +1 Absolute

Signal Resolution: 16ksps

Applications

Field of Application: tube, bar, wire, strip, cable sheathing, extruded sections: (roll forming, tube mills, drawing machines) for any metal section (ferrous or nonferrous)

Max Speed: 300 m/min

Production Lines:

Inline (Welding Lines)

Offline (Tubes/Bar)

Stop and Go (Cold Forming)

Continuous (Drawing Lines)

Coil Monitoring

Break and Disconnect Monitoring: Yes

Short Circuit Monitoring: Yes

Smart Sensor: Yes

Data Processing

Signal Processing and Defect Evaluation:

Signal evaluation with masks and 3 alarm thresholds:

Circular mask

Mirrored sector masks

2 pair/channel Mirrored sector masks with the remainder

Test Results:

Compilation on 3 levels: Test piece (or section for continuous applications), batch, shift

Hardware

Screen: 10.1" diagonal color display for normal configuration. Without screen for testing section configuration (15" display available on control panel)

Input: Touch Screen, Knob, Keypad, Standard Keyboard

Data Storage: SSD

Shielded Housing: Yes

Power requirements: 90-250 VAC / 50 Hz to 60 Hz / 1000W

Dimension (Width × Height × Depth): 440 mm × 350 mm × 610 mm

Weight: approx. 35 kg

Software

User interface:

Touchscreen operation using icons

Multitasking real-time operating system

Archiving of testing parameters for later retrieval

Sample test mode: testing of individual lengths for quality control checks and parameter verification

Software in English

Online help for each menu, available in English

Password-protected supervisor level for adjusting basic testing parameters and locking parameter access in the main level

Reporting Software

Data Logger: Recording/viewing signals and data (opt.)

EDDYWISE Viewer: Graphic display of defect locations and defect statistics.

Data Transfer: Standard LAN: Ethernet (TCP/IP)

Input and Output Terminals

General Inputs: 8× Opto-Isolated Inputs

General Outputs: 4× N.O./N.C Outputs

Special Outputs:

Marker (Delayed)

Alarm (Undelayed)

Signal Tower Light

Color Mixer

Encoder: Incremental Rotary Encoder

External Display: 1×VGA interface for external monitor

Network: 1× Ethernet (TCP/IP)

USB: 2× USB connectors

Environmental Conditions

Operating temperature: 0°C to 50 °C (32°F to 122°F)

Internal cooling unit: Fan cooling

IP rating: Designed to meet the requirements of IP40.

Magnetization Control Unit

Mode of Operation: DC

Power Control: Auto Tuning



Website: <http://www.eddywise.com/>

EDDYWISE NDT

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Offline Testing Section

_Brochure_EN_LTR_DOC250128498

Digital File Prepared in Türkiye

Doc. no.: DOC250128498 Rev. 3