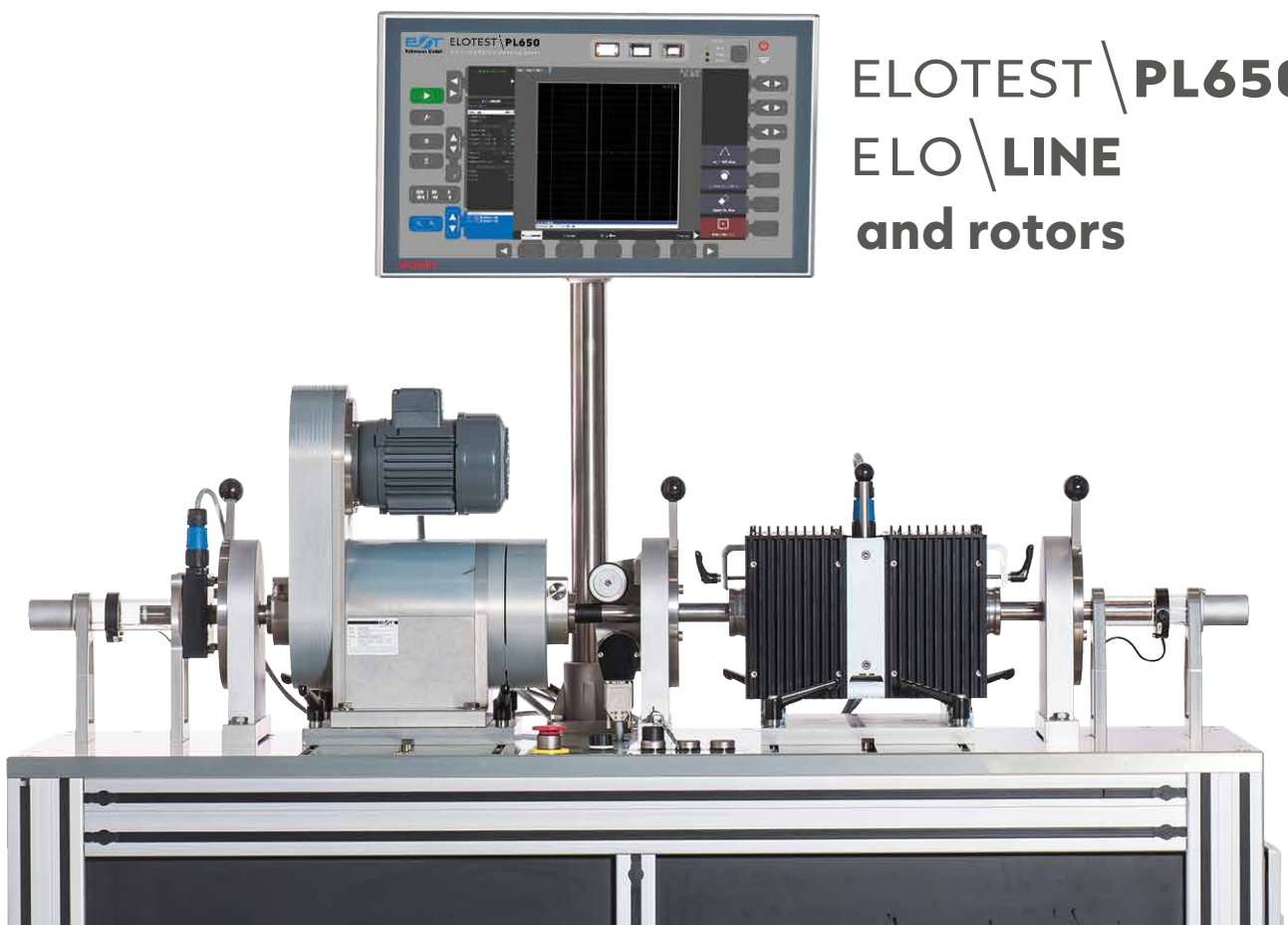


# Eddy Current testing of long products and semi finished products



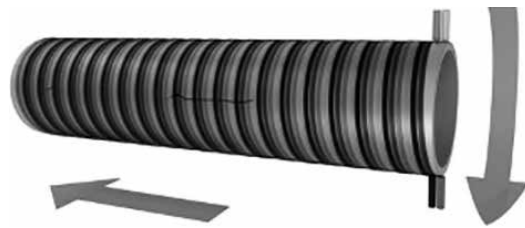
ELOTEST \ **PL650**  
ELO \ **LINE**  
and rotors

# Inspection for longitudinal and transversal defects

Efficient test rotors for a very wide range of dimensions

Smaller diameters are usually inspected by means of stationary rotors in the line. The Eddy Current sensors revolve inside these rotors around the long product being guided through them, so that the surface is inspected in spiral tracks.

High rotational speeds up to a five-digit range are used depending on the required speed of inspection. Protective devices such as an interlock or protective nozzles protect man and machine.



EC130 rotor for test objects of up to a diameter of 130 mm.

## Encircling coils and yokes

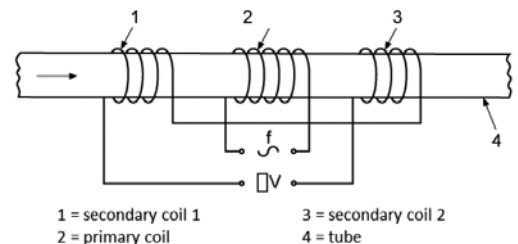
When long products are inspected for circumferential and spot-like defects, they are usually guided through encircling differential test coils of the ULAD type.

The absolute coil also provided makes it possible to detect longitudinal defects such as slot welds in welded pipes or tubes.

Segment coils of the LDA type, which can be adapted individually to special geometries, are generally used to test welding seams.

Ferromagnetic materials are inspected in a magnetizing yoke. The material to be inspected is slightly magnetized, so that any permeability variations are significantly reduced and thus also the noise level.

A constant field demagnetizing system and an individually designed AC demagnetizing system are provided for the demagnetization of the material after inspection. These systems make it possible to almost totally demagnetize material even at a high inspection speed.



Different ULAD coils/schematic

# Sorting tests

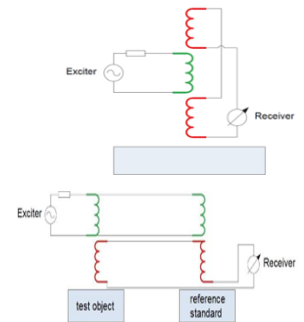
## ULAS coils – to avoid any confusion

Many rods, bars, tubes and pipes look the same from the outside, so that it is impossible to definitely determine optically, whether all products have the same technological properties. The electric and magnetic properties of the test objects can be directly evaluated by using an encircling ULAS absolute test coil, which is integrated directly into the line.

Our range of ULAS coils comprises graded diameters of up to Ø 270 mm, as well as various rectangular coils for profile inspections. Custom-made coils can be produced at any time. Interior or exterior comparison tests are also available, depending on the inspection task.

An interior comparison test requires only one ULAS coil. This type of coil is less vulnerable to temperature changes among the test objects.

Inspections with an exterior comparison test require two separate test coils and a reference piece in the comparison coil. This inspection is more sensitive and hence detects even finer differences in the material. At the same time, it is more vulnerable to temperature changes during the inspection.



ULAS coil in interior or exterior comparison / schematic

# CHANGEOVER TIME

- ▶ **Modular design = versatile & future-proof**  
The modular design of the test instrument makes it possible to retrofit inspections.
- ▶ Only one ELOTTEST test instrument is required for all inspection tasks carried out with a rotor, an absolute or differential encircling coil, with or without magnetization. The settings for all inspection tasks are loaded in one set of parameters.
- ▶ Only one type of channel card is required for all inspection tasks!

# DISTANCE

The distance compensation is used to balance sensitivity fluctuations, which are caused by ovality, unevenness and eccentricity. This is required because the inspection sensitivity decreases, when the distance between the sensor and the test object increases in a radial or axial direction.

# DIAMETER

Long products with a cross-section of > 130 mm rotate under a probe system moving in a longitudinal direction for example. These mechanical systems, similar to a cross-lying bearer, always work with a high number of individual probes in an array, which is connected to the ELOTTEST test instrument via an electronic multiplexer.

# SENSORS

The sensors are selected according to the requirements to be met by the inspection. Differential sensors with distance compensation are used for many tasks. The usual effective width is between 1 and 15 mm. Together with a suitable rotation speed of the coils, a very high throughput can be achieved in continuous operation.

## Overview rotors

Type of rotor	Outside $\varnothing$ mm test object	rpm (standard)	Height (mm)	Length (mm)	Width (mm)	Weight (kg)
EC 15	1,5 - 15	3.000	138	170/253	70	5
EC 40	5 - 40	6.000	454	381	280	54
EC 100	10 - 100	3.000	615	550	510	170
EC 130	10 - 130	3.000	720	570	600	210

List of standard values, rotational speeds up to a five-digit range may be achieved.

## Overview test coils

Test coil	Magnetizing yoke	Demagnetizing yoke	Range
ULAD-1 H-111	M25	GE40	up to 25 mm
ULAD-1 H-35	M40		up to 43 mm
ULAD-1 H-107	M90	GE90	up to 102 mm
ULAD-1 H-103	M170	GE170	up to 178 mm



### TEST INSTRUMENT ELOTEST PL650

- ▷ 16 slots for function modules
- ▷ Types of modules available:
  - ▷ CHM-600 test channel module (one module included in the basic price)
  - ▷ Field bus I/O module with fast quadrature inputs (optional)
  - ▷ 24 V I/O module with fast quadrature inputs (optional)
  - ▷ 8-channel analog I/O module (optional)

### MONITOR DISPLAY

- ▷ Widescreen color TFT display in IPS technology, 1280 x 800 pixel, 256 mm (10.1") diagonal
- ▷ HDMI output for external Full HD monitors (via USB also with touch control)

### CHM-600 TEST CHANNEL MODULE TEST FREQUENCY RANGE

- ▷ 10 Hz - 12 MHz
- ▷ Driver output +/- 10 Vs; max. 1,000 mA
- ▷ Measurement and control of the sensor current
- ▷ Voltage and current controlled operation
- ▷ Continuous monitoring of the emitting coils for wire breaks and shorted coil

### DIGITAL SIGNAL PROCESSING

- ▷ High performance signal processing chain in the FPGA with
  - ▷ a digital sinusoidal signal generator 10 Hz - 12 MHz
  - ▷ a digital sinusoidal signal generator
  - ▷ a digital signal processing chain with
    - ▷ distance compensation without an additional channel (option "Advanced")
    - ▷ a signal filter, HP/LP adjustable independently from 1 Hz - 100 kHz in 29 logarithmic steps per decade
    - ▷ phase adjustment 0-359.5° in steps of 0.5°
  - ▷ Various real time evaluation thresholds, depending on the application and licenses

Please see our ELOTEST PL650 brochure for further information.