Electrode Inspection Line

DATASHEET

Comprehensive Output Control of Graphitized Electrodes

Purpose

The line is designed for final inspection of graphitized electrodes up to 816 mm in diameter and 3600 mm in length. It performs non-contact optical geometry control of the electrode body and threaded sockets, weighing, electrical resistivity measurement, and ultrasonic velocity measurement in the longitudinal direction. Dynamic Young's modulus is calculated additionally.

Key Features

• Two laser measuring units for thread and end-face control, mounted on rails to adapt to electrode length (1500–3600 mm).
• Five-axis positioning system with conoscopic laser sensors.
• Separate weighing, resistivity and ultrasonic station (Weight-ER).
• Automatic adaptation to electrode size without changeover for Ø400–800 mm; changeover ≤10 min for the full range.
• Electromechanical drives (ball screws) as standard.
• Climate-controlled enclosure (20 °C ±4 °C) with graphite dust filtration and slight overpressure.
• Cycle time ≤300 s.

Measured Parameters and Accuracies

Parameter	Range / Value	Accuracy
Electrode diameter	350–816 mm	±0.1 mm
Electrode length	1500–3600 mm	±1 mm
Thread pitch diameter	200–432 mm	±0.015 mm
1/2 cone angle	9°27′44″–9°28′41″	±17″ (Ø800–500); ±20″ (Ø500–350)
Nipple seat roundness (60° arc)	—	≤0.01 mm
Thread pitch	6.35 / 8.47 mm	±0.007 mm (adjacent); ±0.005 mm (accumulated)
Socket depth / thread length	155–320 mm	±0.1 mm
End-face flatness (concavity)	0.02–0.05 mm	±0.01 mm (convexity not allowed)
Coaxiality of socket and electrode axis	—	≤±0.2 mm (tolerance); ±0.1 mm (measurement)
Weight	200–3500 kg	±15 kg
Electrical resistivity	2–10 μΩ·m	±0.1 μΩ·m (target)
Ultrasonic velocity	—	±1.5 %
Dynamic Young's modulus	5–35 GPa	≤1.5 %

Utilities

Electrical: 20 kW, 400 V, 50 Hz.
Compressed air: 1.95 m³ per cycle at 5 bar (20 % reserve). Average consumption at 5 min cycle ≈ 0.75 Nm³/min.
Air quality: ISO 8573-1 [7:5:4].

Scope of Supply (main items)

Input and output racks, laser thread/end-face units (2), body scanning unit, Weight-ER station, transport system inside the enclosure, operator panels, signal columns, calibration gauges and standards, spare parts for commissioning, operating and repair documentation, software with open code.