QUALITY CONTROL

IN-LINE SCANNER

When rotor production requires thorough magnetic field control, in-line scanners offer a fast and convenient solution. Integrated into a magnetization bench or used separately, they enable rapid, detailed inspections, providing OK/KO feedback decisions and comprehensive data for further analysis.

IN-LINE SCANNER

INTRODUCTION

The traditional quality control of permanent magnet rotors is based on measuring the total flux using windings in the magnetization coil. This method is fast and does not slow down production but provides only partial information. Internal displacement of the magnets can alter the magnetic field, making a complete surface scan of the rotor necessary.

The system improves measurement accuracy compared to total flux analysis alone, without impacting productivity, thanks to existing automation.

KEY BENEFITS

- Higher accuracy: detects the magnetic field distribution, identifying anomalies.

- Integration with automated lines: utilizes existing movements for rotation and axial advancement.

- Efficiency: the scanning process is faster than the interval between two magnetization cycles, avoiding delays.

DESCRIPTION

The system is a compact unit featuring an IPC, acquisition unit, gaussmeter, and PLC for Profinet communication.

- Provides laboratory-grade parameters directly in line, improving quality control without human intervention.

- Accepts quality limits for various parameters (peak field, skew angles, harmonics, RMS values) and immediately delivers an OK/NOK result.

- For rotors with multiple stacks, it uses multiple probes to reduce measurement time while preventing phase errors.

- Includes an automatic periodic verification procedure using fake rotors or master samples, ensuring long-term reliability.

IN-LINE SCANNER HARDWARE

HIGHLITGHS

QUALITY CONTROL

- Deep and fast quality control for 100% production
- Full traceability of the rotor's characteristics in the assembly line
- High angular resolution (up to 80.000 points/revolution)
- Wide set of control parameters for acceptance criteria

CYCLE TIME

- Typical timing: 5 s/revolution (regardless the number of used probes), including calculation and data availability towards the line
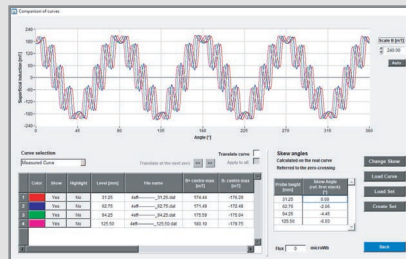
SOFTWARE

- Full control and communication with the line through Profinet protocol
- Possibility to use the offline version of software for post processing and analysis
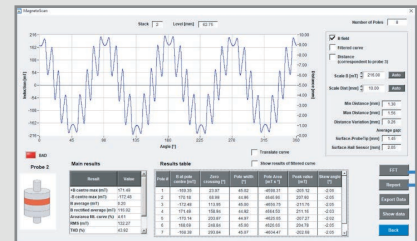
IN-LINE SCANNER SOFTWARE LANTHANUM

Main page
with clear view of the process

Complete rotor evaluation
Stack comparison and skew angle

Full details of single stack scan

Lanthanum is a powerful software solution designed for automatic measurement management and a range of useful features, including report printing, database management, statistical analysis, and more.

Lanthanum controls and manages measurements using our in-line scanner. The software enables automatic data collection, which is then save into a file. The operator only needs to select the parameters before the measurement begins—Lanthanum takes care of the rest. By setting different distances and axial measurement levels, the software automatically performs all scans, processes the data, and presents the results in detailed 2D or 3D graphs.

FEATURES

TYPE OF MEASUREMENT	• Rotational scan, single or multiple
SETTING OF MEASURING PARAMETERS	• Manual or automatic settings of parameters. The final list of parameters is shown in the main page • Possibility to change graphical parameters, scansion speed and calibrate coefficient • Limit setting, with possibility to have alarms and/or notifications • Laser control of the distance between sample and Hall probe
DATA ELABORATION	• Curve comparison: Fourier Analysis through Fast Fourier Trasform (FFT) algorithm • Math elaboration to calculate parameters such as zero crossing, pole width, slopes, area, etc • Poles out of specification are marked in red with alarms and/or notifications • Measure of skew angle
PRINTING A REPORT	• Print reports containing data and graph, or only a text containing only data • 2D or 3D graph generation
DATA BASE AND FILE SEARCHING	• Database of measuring files with fast search options, ordering selection, etc • Compatible with spreadsheet programs, such as Microsoft Excel™ • Data files saved in binary and txt format
RESULTS	• Angle-induction diagram, Bmax, Bmin, positive and negative average, total average angular shift, harmonic distortion, FFT and more advanced results

TECHNICAL SPECIFICATIONS

GENERAL

MAX ANGULAR RESOLUTION	80000 points/revolution (0.0045°)
MAGNETIC FIELD RANGE	0 - 2 T
GAUSSMETER ACCURACY	0.1% reading + 0.5% probe linearity + 0.2 mT
GAUSSMETER OFFSET	±0.25 mV
MIN MEASURING DISTANCE	0.8 mm (recommended: > 1 mm)
LASER DISTANCE RANGE	0.2 – 10 mm, resolution 10 μm
PLC	S7-1200
PC	Simatic IPC477E 15'' Touch, with Windows 10 IoT Enterprise 64 bit
EXTERNAL CONNECTIONS	2 USB, 2 Lan, 1 encoder, 1 laser, 3 Hall probes
COMMUNICATION PROTOCOL	Profinet
ELECTRICAL	230 VAC, 50/60 Hz, 16 A absorption
DIMENSIONS	600 x 800 x 256 mm
WEIGHT	60 kg - 133 lb
ENVIRONMENT	Indoor, temperature range 15-35 °C, humidity 65% max

ITALY HQ

Via G. Ferrari 14, 20014, Nerviano

+39 0331 589785

italy@elettrofisico.com

USA

40 Engelwood Dr., Lake Orion, MI

+1 248 340 7040

usa@elettrofisico.com

CHINA

Suit 2605, 360 Chang Shou Lu, Shanghai

+86 136 7195 1275

china@elettrofisico.com

VIETNAM

8th floor Anh Minh Building, Hanoi

+86 136 7195 1275

vietnam@elettrofisico.com