

EDDYCUS® PRO-II ECA

EDDY-CURRENT ARRAY INSPECTION SYSTEM FOR CARBON FIBER MATERIALS

The high-frequency eddy-current array system utilizing EddyCus® Pro II series can solve many NDT problems. This powerful and modular system is especially suitable for integration into a production line for automatic inline non-destructive inspection of flat materials. It measures contactless without damaging the material and acquires integral information of the conductivity state in real time while maintaining high resolution. This performance is possible by combining several eddy current channels with sensor-integrated multiplexers and a powerful edge server for data analysis.

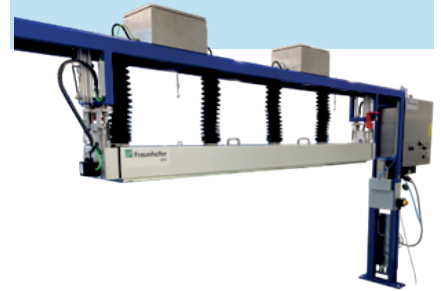
The system can be used to characterize individual layers of carbon fiber and thin layers regarding layer thickness, electrical resistance, and other quality properties.

Applications

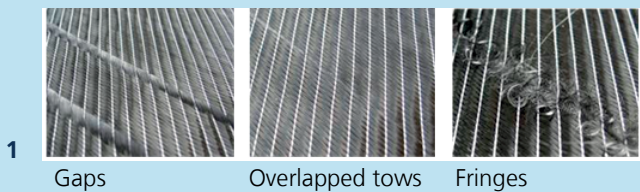
- Inline production monitoring up to 101" width during the production of NCF plies (gaps, undulations, ply build-up, inclusion of foreign material) especially in hidden and non-visible layers
- Inline monitoring of layer and wall thicknesses and electrical layer resistance of high and low conductive layers on wafers, battery-foils, conductive coatings on glass and plastic in nanometer resolution

Characteristics

- Cascadable system with channel multiplex rate of up to 100 KS/s
- Consisting of 4 EddyCus® Pro II devices and 12 array sensors
- Up to 25 MHz eddy-current excitation frequency with integrated multiplexer
- Maximum pixel resolution: 0.853 mm
- ATEX-compliant for zone 21
- Temperature compensation
- Data analysis and system control through included edge server
- Optional Ethernet-based OPC-UA for smart factory applications
- Analogue and digital I/O for communication with production line
- Algorithms for automated calibrations especially for inhomogeneous and anisotropic materials like NCF (Non-Crimp-Fabrics)



- 1 Possible defects during NCF production.
- 2 101" width eddy-current C scan.
- 3 EddyCus® Pro II ECA measurement bar for 101" inspection width, stacked sensor arrays.



1 Gaps 2 Overlapped tows 3 Fringes



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| Category | Characteristics | Value |
|-----------------------------|--|--|
| General | Dimensions (L, W, H) | 5500 x 2220 x 300 mm |
| | Weight | 270 kg |
| | Operating temperature and humidity range | 5...50 °C @ 75 % relative humidity (non-condensing) |
| | Maintenance | sensor detachable from stand |
| Interface | Power supply | 230 V AC, max 500 W |
| | Pressured air requirement | 4 bar – 10 bar |
| | Trigger input | incremental encoder input |
| Measurement system | Eddy-Current channels | 4* |
| | Signal frequency | up to 25 MHz |
| | Analog gain | 20 dB to 60 dB |
| | Array sensors | 12 @ 101" inspection width* |
| | Vertical sensor channels | 256 per array, 3072 in total* |
| | Horizontal sensor channels | 64 per array, 768 in total* |
| | Image resolution | 0.853 mm in width |
| | Inspection speed | 6 m/min at max. resolution, higher speeds possible if lower resolution suffices* |
| Testing capabilities | Gaps / overlaps of NCF plies +/- | 0.25 mm accuracy |
| | Angular orientation of NCF plies | +/- 0.1 ° accuracy |
| | Undulations, plie build-ups and other anomalies in NCF plies | detectable above 1 cm ² |
| | Foreign object (metallic) in low conductive materials | detectable above 0.25 mm ² |
| | Layer and wall thickness of thin films | 10 nm – 10 µm accuracy, depending on conductivity of material |
| | Additional inspection tasks | can be developed on customer request |

| | | |
|--------------------------|--|---|
| Edge server | Dimensions (L, W, H) | 600 x 800 x 2000 mm standard control cabinet |
| | Hardware | High performance 8-core industry PC, 32 GiB RAM, SSD drive* |
| | Connection to measurement system | Ethernet, +24 V DC |
| | Storage for measured data | network drive, S3* |
| | Interface for factory integration (optional) | OPC-UA |
| | Options for communication with production line | digital I/O, OPC-UA, Ethernet-based communication* |
| Software | Windows-based software which controls the system, runs data analysis and stores results, can also be used for offline analysis | |
| | Support for different measurement profiles from which up to 4 can be used at the same time | |
| | Creation of analysis PDF reports | |
| | Managed .NET SDK based on .NET 4.8 available which may be used for custom applications | |
| System conformity | The EddyCus® PRO II system meets all relevant requirements of DIRECTIVE 2014/34/EU | |
| | ATEX Zone 21 compliant | |

* The given values can be tailored to meet the customers' requirements.



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