PROline SCAN 6-Axis-Ultrasonic Inspection System

Multi-Axis Immersion and Bubbler Technique Inspection System for Laboratory and Production

- 1-8 ultrasonic tests channels
- Up to 6 motion axis
- Manipulator axis X, Y, Z, A, B
- Turntable or bar rotator W
- Universal
- Precise
- User-friendly

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System Highlights

The flexible, powerful and imaging multi-axis system allows precise ultrasonic testing such as weld, wall thickness and volume testing of rotationally symmetric and plane-parallel components with immersion and bubbler technique.

This allows a flexible mastering of demanding tasks. Area scans can be done as spiral, comb, meandering, random and continuous scan.

The user-friendly software controls the inspection process and provides information such as start, stop, good or bad signals, and statistics up to the graphical representation of the ultrasonic amplitude, time of flight or signal combinations. In addition to the A-scan synchronized to encoder signals, imaging line and multi-line scans (B-, C- and D-scans) are shown in colour and stored if requested.

The automatic evaluation, the report generation and the result archiving saves time and creates test reliability.

Optional equipment for individual test solutions

- Water circulation, filtering, temperature control
- UV sterilization
- Safety light barrier
- Bubbler incl. pump
- Sequence control and programming of automation processes
- Barcode reader
- Report generator
- RAID system for program and data backup
- Two S-ATA hard drives in removable frame
- CANbus or Profinet interface
- and many more

PROline\textsuperscript{SCAN} was designed for laboratory operation and for production-accompanying series monitoring.

PROline\textsuperscript{SCAN} is equipped with the ultrasonic flaw detector PROline\textsuperscript{USB} and inspection software PROline\textsuperscript{PLUS}.
**PROlineSCAN** 6-Axis Ultrasonic Inspection System

Technical Data – Standard Inspection System

| Component spectrum | • Rotation symmetrical components (turntable design)  
|                    | • Max. diameter 300 mm* for examination from the side and 550 mm* when tested from above  
|                    | • Max. weight approx. 25 kg  
|                    | • Plane-parallel components when using a support table  
|                    | • Max. size approx. size 550 x 550 x 400 mm* |

**Ultrasonic hardware PROlineUSB**  See overleaf or brochure for technical data on PROlineUSB ultrasonic flaw detector

**Ultrasonic software PROlinePLUS**  • Operator-friendly and multi-purpose software for safe inspection  
|                    | • Automatic evaluation of inspection results, generation of inspection reports and result archiving  
|                    | • Encoder synchronized A-scan display, ultrasonic amplitude and time of flight measurement  
|                    | • Line- and area scan (spiral-, comb-, meander-, random-, endless scan)  

(for more information please refer to the brochure inspection software PROlinePLUS)

**Construction**  The PROlineSCAN inspection system includes the precise multi-axis scanning mechanism incl. controls, either for rotationally symmetric or plane-parallel components, the PROlineUSB ultrasonic inspection device and the PROlinePLUS software for the recording and evaluation of the inspection data

**Dimensions**  • Outer dimensions of the system: (WxDxH) 1660 x 1200 x 2363/2570 mm**  
|                    | • Total weight of the system: approx. 650 kg  
|                    | • Scan range (X, Y, Z): 600 x 700 x 400 mm* |

**Water tank**  Stainless steel tank with large viewing window, 600 x 600 x 600 mm

**Mechanics**  Motorized X, Y, Z-axis (ball screw), W-axis (turntable style)

**Testing**  • Immersion testing using pulse-echo and through-transmission technique  
|                    | • Bubbler technique using application-specific bubbler with integrated ultrasonic probe  
|                    | • Test speed of X, Y: 150 mm/s and 100 mm/s, W: 50 rev/min  
|                    | • Repeatability < 0.05 mm  
|                    | • Resolution 0.01 mm/0.01° |

**Probe manipulator**  Mechanical A-B-inspection probe manipulator; tilt angle A=60°, B=200°, optionally motorized driven

**Probes**  1–20 MHz immersion probes with UHF connection, alternative connection options are given

**Turntable**  • Turntable with universal component clamping and manually synchronized centering and clamping of the component by a hand crank  
|                    | • Component support position on the ground about 100 mm*  
|                    | • Turntable clamping device with an internal clamping diameter of 40-550 mm and an outer clamping diameter of 2-300 mm  
|                    | • Maximum loading capacity: approx. 25 kg max. component diameter 550 mm* |

**Control cabinet**  Switch cabinet for controls and electrics adapted at the scanner frame

**Data recording**  Encoder synchronized A-scan display in color gradations, line and multi-line scan display (B-, C- and D-scan), ultrasonic amplitudes- and time of flight measurement, combination scans

**Extras**  Storage areas around the water tank as well as an optional calibration shelf for reference standards used

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* All component descriptions are non-binding guide values, the maximum dimensions depend on the particular inspection set and therefore on the corresponding defined space.

** With the door open
## Technical Data

### Pulser
- **Pulse repetition frequency per channel**: 1 up to 10,000 Hz
- **Pulse repetition frequency overall**: max. 10,000 Hz
- **Pulse output**: adjustable in 38 steps
- **Max. pulse amplitude**: 160 V/250 V
- **Pulse fall time**: < 5 ns at 50 W
- **Single pulse width**: 20 – 500 ns
- **Pulse width resolution**: 10 ns
- **Pulse shape**: square wave negative
- **Number of channels**: PE: 1 - 8
  TR / TT: 1 - 4
- **Channel isolation (PE/TR)**: > 65 dB @ 5 MHz
- **Channel triggering**: internal and external

### Receiver
- **Receiving amplifier**: linear, broadband, voltage controlled
- **Calibrated gain**: 80 dB(hardware compensated)
- **Linearity**: +/- 1 dB
- **Input voltage**: 0,35 mVp-p – 2 Vp-p
- **Frequency band width**: 0,2 - 25 MHz (-3 dB)
- **Input dynamics**: 100 dB (regulated)
- **Attenuation**: none
- **Operation mode**: PE, TR, TT
- **Filter**: digital via software

### Calibration
- **Range**: 0,01 – 640 μsec
  100 MSPS
  0,01 – 2560 μsec
  25 MSPS
- **Delay**: 0,01 – 640 μsec
  100 MSPS
  0,01 – 2560 μsec
  25 MSPS
- **Resolution**: 10 ns
- **Waveform**: full wave, positive, negative, RF

### Gates
- **Hardware gates**: 4 (overlapping), master gates, triggered on event
- **Software gates**: 4 more
- **Delay and range**: 0,1 - 640 μsec 100 MSPS
- **Resolution**: 10 ns
- **Amplitude detection**: positive, negative or absolute
- **Alarm threshold**: positive or negative
- **Interface echo triggering**: depends on threshold

### Digitizing
- **A/D converter type**: sampling converter
- **Digitizing depth**: 14 Bit
- **Sampling rate**: 100 MSPS

### Hardware depth compensation
- **Dynamic range**: 0 – 80 dB
- **Supporting points per channel**: up to 1024
- **Amplitude resolution**: 0,25 dB
- **Range**: full reception range
- **DAC steps**: 30 ns
- **Step resolution**: 10 ns (first step)
- **Sampling rate**: 20 dB/30 ns

### Interfaces
- **Customized I/O's**: 2 – 4 inputs*
  (0 – 24 V),
  2 – 8 outputs*
  (Open-Collector)
- **Predefined I/O's**: 2 inputs
  (0 – 24 V),
  1 output*
  (Open-Collector)
- **PC interface**: USB 2.0

### Speed of data acquisition
- **Data transfer rate**: 30 MByte/s
  (depending on channel)

### HOST Computer (minimum requirements)
- **Port**: USB 2.0
- **CPU**: depends on application
- **RAM**: depends on application
- **Hard disk**: depends on application
- **Operating system**: WIN XP/WIN 7, 32 Bit

### General
- **Power supply unit**: 100 – 240 VAC/12 VDC
- **Power consumption**: 20 W (max.)
- **Operating temperature**: 5 °C up to 50 °C
- **Splash water protection**: IP 65
- **Dimensions**: w x h x l
  189 x 58 x 195 mm
  (7,44 x 2,28 x 7,67”)
- **Weight**: approx. 2,5 kg

*Depends on model

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