Multi-channel, imaging inspection device for the conventional ultrasonic testing, mechanized, automated with immersion or bubbler technique

**PROline**

Ultrasonic inspection devices and systems for laboratory and production (Industry 4.0)

Inspection systems and services from a single source

We will be pleased to advise you
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PROline^USB ultrasonic inspection device
Multi-channel, imaging inspection device for the conventional ultrasonic testing
mechanized, automated | immersion technique or bubbler technique

PROline inspection solutions
VOGT Ultrasonics provides a complete integrable ultrasonic inspection solution for the mechanized and automated ultrasonic inspection in the laboratory or in the production. The solution consists of the PC-supported and high-performance PROline^USB inspection device, the corresponding inspection and evaluation software and if needed an inspection mechanics.

Flexible application fields
PROline^USB was designed for the integration into production processes. VOGT uses the device and the software in its own inspection systems. It also suits for the modernization of existing systems. It is suitable for Industry 4.0 and able to communicate with a superior customer system via e.g. Profinet or other SPS interfaces. PROline^USB supports the following ultrasonic operation types: puls-echo, sender-receiver and sound transmission.

Optimale Signalqualität
PROline^USB is designed for the rough industry environment. With a size of 189x195 mm and a weight of 2.5 kg it is compact and also able to be positioned in direct proximity to the probe in order to achieve an optimal signal quality. The device is IP65 protected and allows an operating temperature up to 50°C.

Easy scaling
PROline^USB offers 1 – 8 ultrasonic channels. It is possible to run several ultrasonic devices cascaded and synchronous. If needed the component can be analysed with a high amount of probes. This minimizes the cycle time.

100% suitable to cycles and standards
PROline^USB assumes the 100% fully automated, production accompanying ultrasonic inspection. The automated inspection result evaluation with ISO-conformable documentation saves time and gives inspection safety. This allows the usage of operators without expert knowledge.

Fast digital communication
PROline^USB possesses (model-depending) several inputs and outputs which allow a fast communication with external periphery: up to 4 free definable inputs and outputs and up to 4 additional signal outputs for cover oversteppings as well as a start and stop signal input for ultrasonic measurements.

Up to six rotary-pulse-generator connections make it possible to allocate the exact position of the recorded ultrasonic data.

Optional all A-scans, only A-scans with event or only cover data can be transferred to the inspection software and be evaluated offline.

We offer you a LWL extension for the USB interface to guarantee an undisturbed usage over a long distance.

Intuitive Softwarebedienung
While developing the PROlinePLUS inspection and evaluation software the focus laid on a simple handling and a clear inspection result display. The software is modular designed - you only use and pay for what you need.

The evident structure enables a safe handling of the inspection technique after a small training effort.

Weitere Funktionen
- production accompanied
- stand-alone | inline
- labour inspections
- modular software design
- OK/not OK sorting with gates
- line-scan | area-scan | raster-scann
**PROlinePLUS Ultrasonic inspection software**

Modular designed inspection and evaluation software for PROline ultrasonic devices and systems.

**PROlinePLUS** is an operator-friendly inspection software for imaging display and evaluation of ultrasonic inspection data of the PROline inspection device family. Its feature is the reduction of complexity with a focus on a clear presentation of the inspection results. It is also possible, if needed or wanted, to generate an automated evaluation of the results. This means a short period of vocational adjustment for a reliable handling with the inspection technique. The software pushes the PROline inspection device to an efficient, PC-supported inspection system with a Windows interface for the mechanized and automated ultrasonic inspection in production areas as well as a stand-alone solution for laboratory applications.

The software structure is modular. This allows the adaption to fulfill the requirements of the user: From simple good / bad evaluation with I/O's up to complex imaging ultrasonic inspection as a part of a fully automated production line in terms of industry 4.0.

**Basic software**

The basic software consists out of following program parts: system configuration, operator administration and ultrasonic instrument software.

**Ultrasonic Instrument Software**

The instrument software provides the ultrasonic signal display as well as adjustment of ultrasonic parameters, e.g.

- Sound path
- Acoustic velocity
- Amplifying and TGC
- Frequency
- Gates (hard- and software gates)
- Digitalization rate

This program part can be extended with additional inspection and evaluation modules.

**System Configuration**

This program is used for system-wide setups. Especially the inspection hardware is defined and configured. Hardware components (inspection channels, motors, controls etc.) will be assigned to single inspection applications in terms of inspection stations which are operated with the ultrasonic inspection device.

The software provides a channel mapping, I/O's and rotary pulse generator are allocated to logic channels and allow a permutation without hardware changes in the wire connection.

**Operator administration**

In the operator administration passwords and password changes as well as determination of authorizations for the software modules are defined.
Software modules

Inspection data record and display

The inspection data record can be made as a line or area scan depending on the chosen module.

In the inspection plan definition all relevant inspection system parameters are adjusted. It is possible to define an inspection plan by the following adjustment possibilities:

- Determination of index and scan resolution, determination of inspection area etc.
- Definition of inspection data evaluation (Online/Offline)
- Determination of ultrasonic files for inspection plans
- Determination from easy to complex inspection processes
- Activation of switching outputs for sorting or indication of components depending on the inspection result

By the module inspection ultrasonic inspection data will be recorded in a defined way with the determined measurement equipment. It realizes the imaging online presentation of inspection data. The inspection data presentation is customizable to the application. In general the following variations are available:

- A-Bild (ultrasonic HF-Scan)
- Line-Scan
- Area-Scan
- Amplitude- and runtime evaluation
- Wall thickness measurement

The Controlscript allows the communication with external periphery. You can write your own script. We likely train you to do so. On request we offer you a standard sequence control or create a customized solution for you. In the basic configuration time and monitor lines are available. If needed additional plugins for the sequence control and modules like Profinet interface and the activation of further interfaces are available.

I/O incl. logic

If hardware is used for measurement which has digital inputs or digital outputs, this software module shows the activated inputs and outputs.

It is possible to configure or add logics. A logic is a logical term which allows operating a desired output when this term accures. A connection of the display variations by inputs and outputs is possible. This allows to define the following inspection plans:

- Threshold value exceedance = output signal
- Optical display on the screen for a good/bad evaluation
- Threshold value exceedance = output signal for the following automated OK/not OK component sorting

Inspection data evaluation - Online / Offline

The inspection data evaluation is made online (directly during the inspection) and/or offline (at a later point of time according to the recorded data). The inspection data are evaluated manual or automated. The PROlinePLUS software saves the inspection data in a “free readable” and general file format.

The following evaluation possibilities are available, depending on the chosen module:

- Visual evaluation of the A-Scan with or without optical switching output
- Line-scan presentation with good/bad evaluation according threshold value exceedance, optional with report area evaluation
- Area-scan presentation, color-coded without or with automated evaluation

We also adapt inspection report output according to your requirements and wishes.

We are happy to advice you. Together we compile the optimal PROlinePLUS software package according to your needs.

Intelligent A-Scan

This module allows the storage of all A-Scans depending on events like a threshold exceedance. This reduces data volume and increases the speed of the system.

Software development kit

With the software development kit the operator is able to access the ultrasonic parameters as well as the ultrasonic raw data in order to continue processing with his own software.

Fig. Area-Scan display
Fig. Line-Scan display with evaluation
Fig. inspection data evaluation - Raster-Scan
Fig. PROlinePLUS sample inspection report
**Pulser**
- Pulse repetition frequency per channel: 1 up to 10,000 Hz
- Pulse repetition frequency overall: max. 20,000 Hz
- Pulse amplitude: adjustable in 38 steps
- max. Pulse amplitude: 160 V / 320 V* 
- Pulse fall time: < 5 ns at 50 Ω
- Pulse width resolution: 20 ns
- Pulse shape: square wave negative
- Number of channels: PE: 1 - 8*; SE/DS: 1 - 4*
- Channel triggering: internal and external

**Digitizing**
- Digitizing depth: 14 Bit
- Sampling rate: 100 MSPS

**Hardware depth compensation**
- Dynamic range: 0 - 80 dB
- Supporting points per channel: bis 1024
- Amplitude resolution: 0,1 dB
- 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)
- 4 - 8 outputs* (Open-Collector)
- Predefined I/O`s: 2 inputs (0 - 24 V)
- 1 outputs (Open-Collector)
- Rotary encoder: 4x RS422 (opto isolated)
- PC interface: USB 2.0
- Connection for ultrasonic inspection probes: Lemo 00, Buchse
- Isolated 5V supply

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

**HOST-Computer**
- Port: USB 2.0
- CPU: at least i5 DualCore**
- RAM: at least 4GB**
- Hard disk: at least 500 MB**
- Operating system: WIN 7

**General**
- Power supply unit: 100 - 240 VAC/12 VDC
- Power consumption: 20 W (max.)
- Operation temperature: 5° - 50° C
- Splash water protection: IP65
- Dimensions (w x h x l): 189 x 58 x 195 mm
- Weight: approx. 2.5 kg

* Depends on model  ** Minimum requirements, application-specific

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ISO 9001 and DIN EN 9100