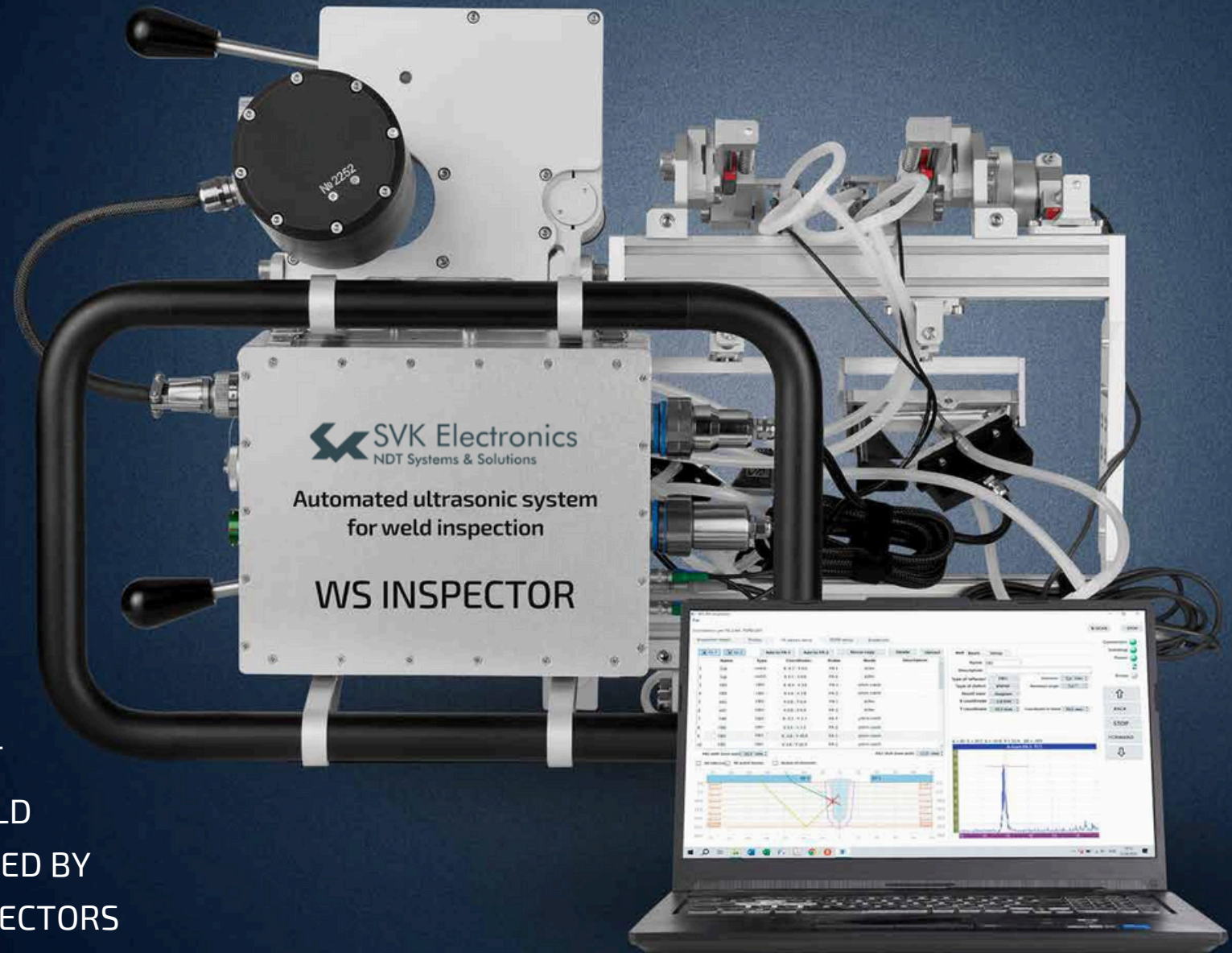


# WS INSPECTOR

## Automated Girth Weld Inspection System

 **SVK Electronics**  
NDT Systems & Solutions



**NEW**

ROBUST, LIGHTWEIGHT  
AND RELIABLE FOR FIELD  
APPLICATION DEVELOPED BY  
INSPECTORS, FOR INSPECTORS



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SVK Electronics  
AUTOMATIC ULTRASONIC FLAW DETECTOR  
WVS INSPECTOR  
MODEL 20-12-B



## Advantages



**High Inspection Accuracy:** Ensures precise and reliable inspection of weld using advanced data acquisition techniques and real-time data processing methods.



**Real-time Data Processing and Analysis:** Complete real-time data processing and analysis in real-time, ease of defect detection and classification.



**User-Friendly Interface:** The control computer provides intuitive software tools for system configuration, data analysis, and reporting, enhancing user experience and productivity.



**High Performance:** Rapid scanning speeds of up to 100 mm/sec, automated platform with the intelligent drive system, ensures stable and precise scanning in every position on the pipe.



**Wide Range of Applications:** Easily adapted to various inspection requirements, various pipe diameters and thicknesses, allowing for different configurations and transducer setups.



**Autonomy and Mobility:** Doesn't require constant connection to an external power source.



**Ease and Flexibility in Setup:** Intuitively and easily assembly and configuration.



**Reduced Downtime:** Quick-release battery mechanisms and indicators facilitate easy monitoring and replacement, minimizing system downtime during inspections.



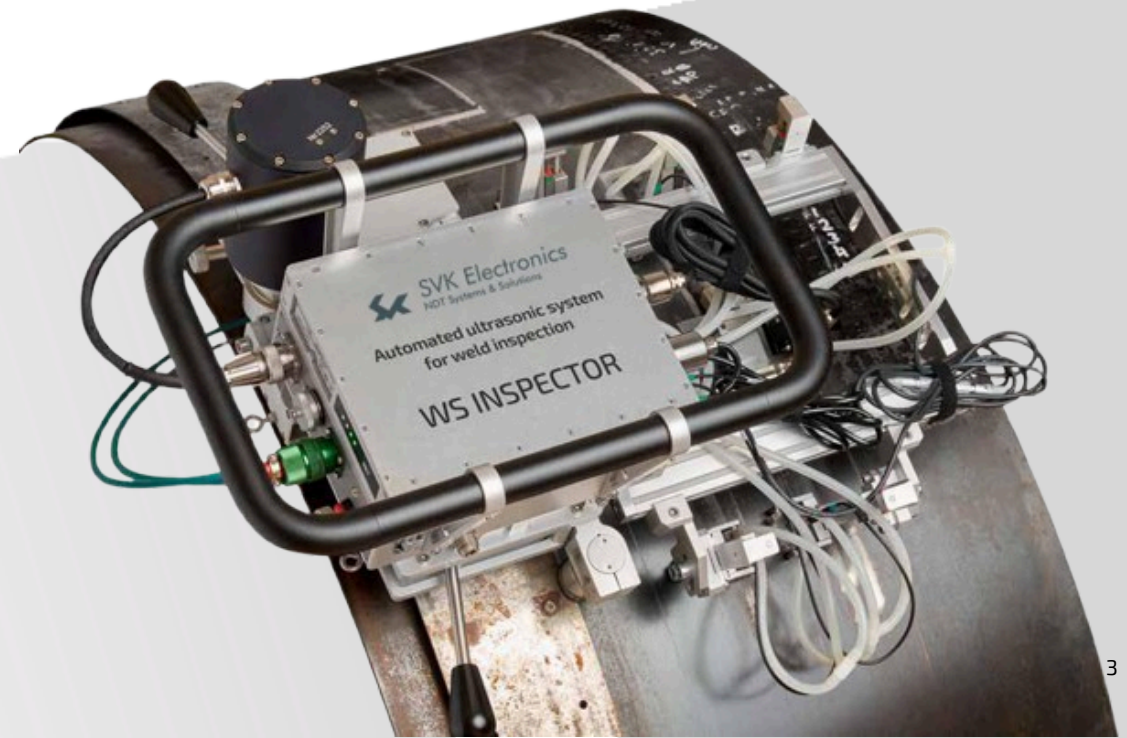
**Cost Savings:** The water distribution unit reduces contact liquid consumption, resulting in cost savings over time.



**Lightweight System Design:** The system is engineered for ease of use and portability.

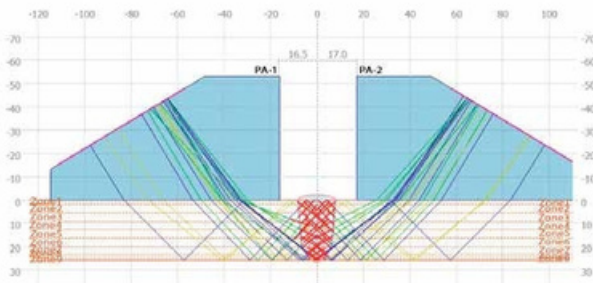


**Durability:** Withstand harsh environments, rugged construction and all-weather operation capabilities.



## Automated Inspection according to ASTM E-1961 Standard Combination of UT techniques

Simultaneous Scanning with Various UT Control Schemes: Pulse-echo, pitch-catch, TOFD.



### Phased Array (PA) Technology and zone

**discrimination:** Allows creation of individual ultrasonic beams for each weld zone using only 2 PA transducers, focusing on areas with most frequent defects. Each inspection zone corresponds to each weld pass (every 1–3 mm). Special channels setup for volumetric defect detection (volumetric channels).

Simultaneous Use of **Phased Arrays and Time-of-Flight Diffraction (TOFD):** Ensures comprehensive detection of defects of different orientations, with TOFD providing information on defect sizes throughout the weld volume, giving max information about weld condition.

**High Spatial Resolution with PA Method:** Used for scanning welds and detecting defects such as cracks or inclusions within the material.

### TOFD Method for Evaluating Defect Sizes and

**Geometry:** Based on measuring the time of sound wave propagation, providing information on defect sizes and depths.

The system configuration guarantees precise positioning of transducers on the surface of the pipe.

### System Versatility

- Types of Welds: CRC-Evans, J-bevel, V-bevel, double V, X, and others.
- Pipe Diameter: 530–1420 mm (dn 500–1400), optionally <500 mm.
- Steel Thickness: 6–60 mm.

- Scanning Speed: Up to 100 mm/sec.
- Operating Temperatures: –30 to +50 °C.
- Material Compatibility: From standard carbon steel to complex materials.
- Types of Defects: Lack of fusion, incomplete penetration, presence of pores, burn-through, melted zone undercut, geometric mismatch, cracks, surface projections, foreign inclusions, etc.

### Wide Selection of Transducers

- WS Inspector supports a wide range of transducers in the frequency range from 1.25 to 10 MHz, including any PA and TOFD configurations. Transducers can vary in frequency and element pitch size (1, 1.5, 2, etc.). Custom PA configurations are available upon request, including different element counts and transducer apertures.



## System Architecture

The system architecture is designed in such a way that it does not require an external power source and can operate in fully autonomous mode — all components of the system have built-in batteries to ensure their functionality. All batteries can be quickly removed and easily replaced.

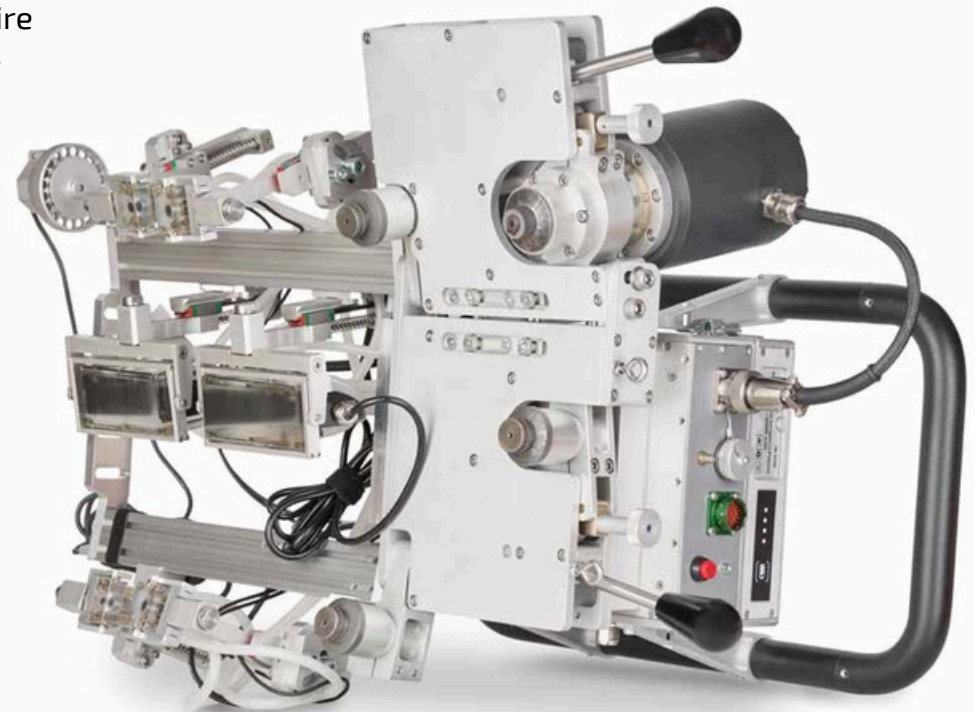
## System Assembly

- Platform -> Motor -> Water Distribution unit -> UT Acquisition unit -> Battery -> Frame System
- Weight: 17 kg
- Connection to the control computer via a connection cable (up to 30m)
- Calibration Block
- Guiding Belt
- Couplant Supply System: 5 kg
- Handle for convenient scanner transportation (on the scanner)

The WS Inspector system represents a comprehensive solution providing high efficiency and reliability in inspection.

## Automated Platform

- Easily adjustable platform with varying suspension and electric motor for various diameters of pipe.
- Four pressure wheels for stability, including one driving wheel.
- Intelligent drive system with feedback function ensures speed stability in every position on the pipe.
- Universal design allows for different system configurations.
- Additional carabiners for cable support reducing strain on connectors, thus extending the system's lifespan and cable integrity.
- Levers for securing the scanner on the belt, adjustable for various band widths (80–120 mm).



## Mounting Frame for Transducers with Installation Suspensions

- Universal mounting unit for various transducer number.
- Standard configuration offers 7 suspension blocks: 2 x PHASED ARRAY transducers and 2 x TOFD groups of 2 transducers with frequency and prism angle options, 1 x encoder.
- 1 path sensor for defect coordinates with calibration function for diameter.
- Each block equipped with spring-loaded suspension and adjustable pressure for precise positioning.



## Water Distribution Unit

- Ensures uniform distribution of contact liquid.
- Reduces contact liquid consumption compared to conventional pumps.

## High-end Ultrasonic Data acquisition and processing unit

- Light and compact.
- Installed directly on the platform for minimized cable length (better SNR and signal quality) and weight.
- Equipped with high-precision equipment and real-time data processing.
- Reliably fixed on the platform.
- Full processing of received data in real-time.
- Data transfer through Ethernet (or WiFi optional)
- No cooling required.
- Quick-release battery with charge level indicators on the unit helps monitor the charge level and quickly replace it if necessary to ensure system functionality throughout the shift.
- External charger and spare battery are included.



## Configuration

- Options: 16:128 (optional 32:128).
- Supports parallel operation of 2 x PA transducers + 4 UT / TOFD channels.
- Pulse-echo, pitch-catch, and TOFD techniques.
- Parallel A/D conversion.
- Real-time digital phasing and superimposing of PA elements signals no multiplexing.
- Digital recording of each signal.
- Free settling of emitting and receiving aperture.
- Hardware/software synchronization.
- **Standard scanning speed:** up to 6–9 m/min.
- **Operating temperature range:** –35 °C to +50 °C.
- Rugged IP65-sealed case mountable on scanner.
- **Operation temperature:** –30 °C to +60 °C.
- **Battery:** with quick replacement option, up to 6 hours of autonomous operation.
- **Dimensions (W x H x D):** 11 x 24 x 20 cm (with battery) (battery 5 x 24 x 20).
- **Weight:** 6 kg with battery.



## Couplant Supply System

- Special system with built-in pump, filtration system, water container and battery.
- Couplant saving intelligent distribution system (the average consumption for the weld diameter 1420 mm approx. 0,5–1 Ltr).
- Adjustable water delivery volume.
- Controlled via built-in keypad.
- Quick-release battery for over 10 hours of operation.
- Tank: stainless steel, 30-liter capacity, providing average contact liquid delivery throughout the shift.

Aquadrive: Intelligent couplant distribution system

System with built-in pump, filtration, water container and battery



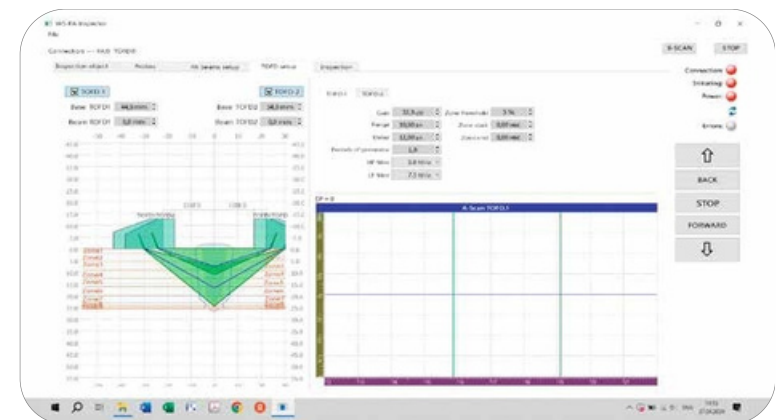
## Control Computer

The control computer serves as the central hub for configuring, managing, and analyzing data obtained during inspections. It offers a suite of software tools for tailoring system settings, overseeing operations, and conducting thorough data analysis.

## System Configuration Software

This software allows users to finely tune system parameters such as channels and beams configuration, sensitivity levels, weld discrimination and geometric settings. It includes specialized utilities to simplify equipment setup, like:

- Weld Constructor
- Control Zones Configurator
- Scanner Configurator
- Automatic Beam Configurator for generating focal laws
- Database of Standard Reflector with Sizes for each inspection zone
- Calibration block design
- Guidance through calibration and sensitivity adjustments





## Data Analysis and Reporting Software

Visual representation of inspection results is provided through amplitude diagrams or V-Scans, depending on channel types. The software presents inspection results as Strip Charts, incorporating color and amplitude markers for swift and visually comfortable interpretation.

The amplitude diagram contains additional color-coded diagram for signal position analysis in each zone. For TOFD, standard A-scan and grayscale diagrams are utilized. Advanced features include an intelligent beam path formation system, enabling virtual cross-sections of inspected welds.

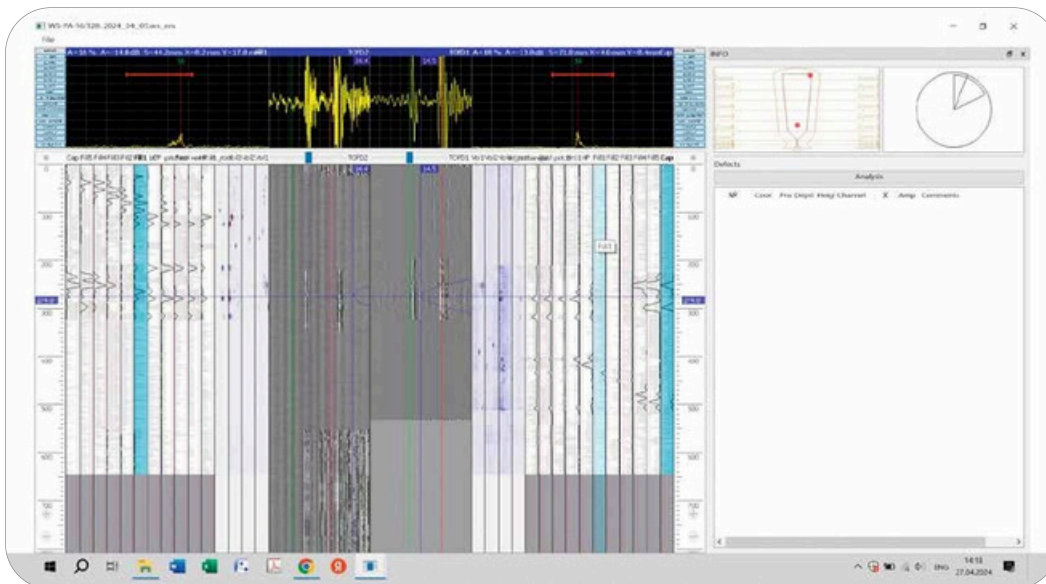
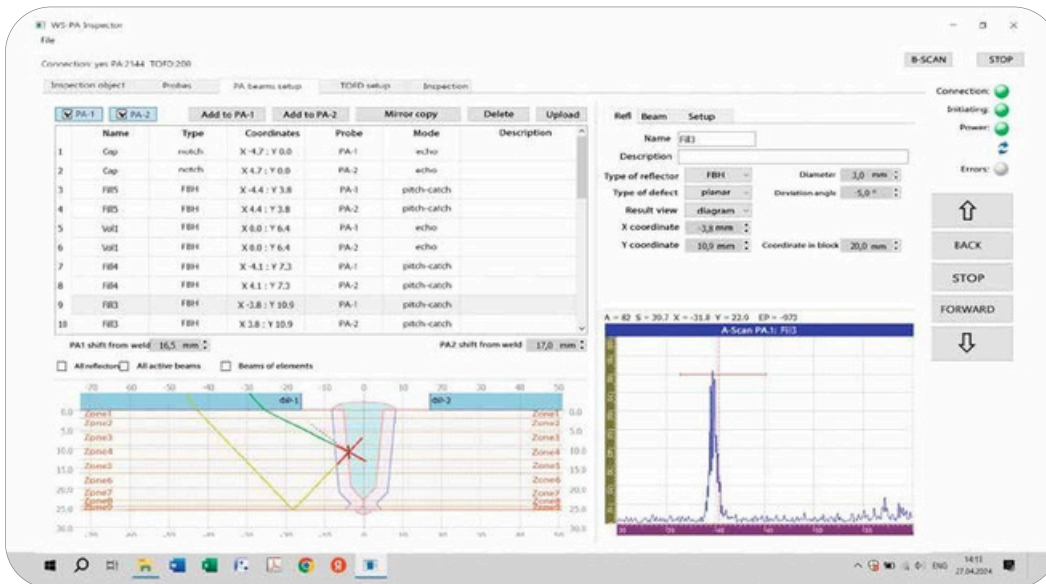
Automated defect coordinate and estimated length determination function, the results can be also verified by the operator to confirm the inspection results.

The results can be seamlessly exported to popular formats like Word and Excel for further analysis.

The software allows adjustment of registration parameters after inspection for signal analysis considering the actual geometry of the inspected weld.

There are capabilities for post-processing with various sets of analysis parameters. The settings can be changed for reanalysis in post-processing.

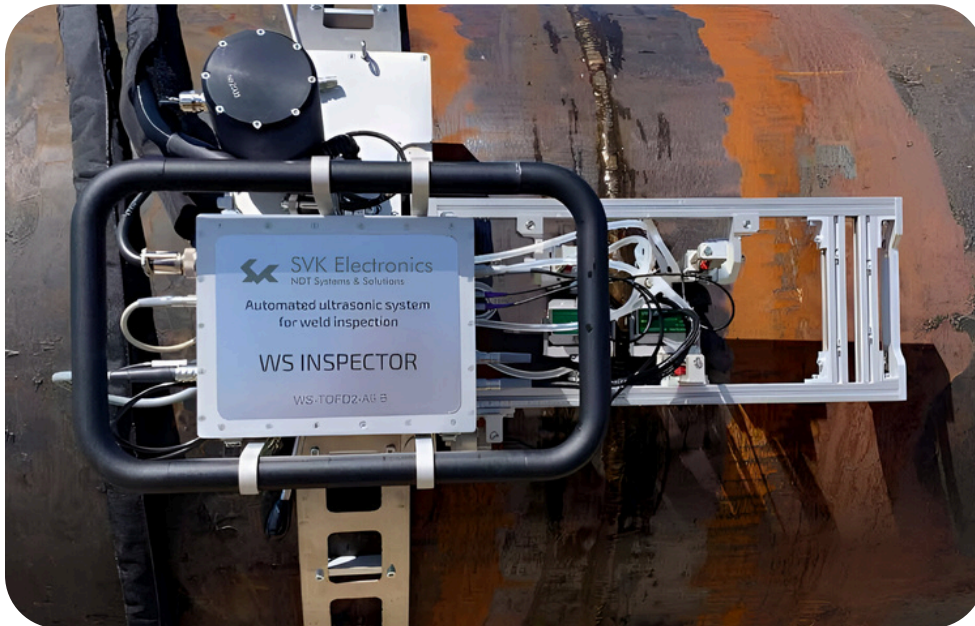
Results of the inspection can be used for engineering assessment of the resource.



## Additional Features

**Calibration Block:** Offers flexibility with options for custom-made blocks or the utilization of customer-provided blocks.

**Guiding Belt:** Supplied as part of the kit, with provisions for customers to use their own belts upon agreement.



## Standards Compliance

The system adheres to ASMT E-1961 requirements for weld inspections, ensuring quality and reliability in all assessments.

## WS Inspector Specification



<b>Size</b>	Full scanner w 50 x h 30 , length depends on the size of attached frame Acquisition unit
<b>Weight</b>	Full scanner 17 kg Acquisition unit 6 kg
<b>Pipe diameter range</b>	530–1420 mm (dn 500–1400) <500 mm optional
<b>Scanning speed</b>	Adjustable (up to 100 mm/sec)
<b>Operating temperature</b>	–30 °C to 50 °C
<b>IP Rate</b>	IP 65
<b>Cable length</b>	30 m
<b>Connectivity</b>	Ethernet / WiFi (optional)
<b>Voltage</b>	Internal battery power
<b>Power consumption</b>	360 W
<b>Warm-up time</b>	No
<b>Connectors</b>	2 Amphenol (PA ) 8 LEMO (conventional UT)
<b>GPS</b>	Optional
<b>Techniques</b>	Zone Discrimination, PA, TOFD, Pulse-Echo



Automated ultrasonic system  
for wall inspection  
**UIS INSPECTOR**  
UIS-CP2-41-B

W 316  
L 12 1



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