

VIRO^{wsi}

Fully Automated Inspection of Brazed and Welded Seams



3D Inspection of Brazed and Welded Seams

VIRO^{ws}i weld seam inspection system

Fully automated, time-saving and cost-efficient seam inspection – this is what characterizes VIRO^{ws}i from VITRONIC. The unique optical inspection system is far superior to a manual visual inspection. It reliably and objectively inspects 100% of the components produced in line with various quality criteria to bring about significant qualitative improvements. VIRO^{ws}i is flexible and can be integrated into existing production lines to create an end-to-end automation chain – from the assembly process to automatic reworking tasks.

» High efficiency

The fully automated 3D seam inspection makes it possible to reduce rejects and conduct cost-effective automatic reworking tasks while also offering comprehensive evaluations as a basis for process optimization and cost reduction.

» Field proven and globally used

Outstanding references show: VITRONIC systems are used by leading companies in the automotive manufacturing and component supply industries around the world. Hundreds of VIRO^{ws}i systems inspect brazed and welded seams in Europe, America and Asia, e.g. on axle components, bodyworks, wheels, seats and exhaust systems.

» Documentation of results

All inspection results are documented and provided for statistical evaluation. The complete documentation simplifies subsequent traceability, as per established quality standards.

» Optimization of the production process

Database-supported evaluation software and visualized statistical functions make it possible to precisely optimize the welding process. Process deviations are detected at an early stage. VIRO^{ws}i therefore contributes to continual process improvements, enhanced component quality and increased productivity.

» Excellent reliability thanks to zero error strategy

VIRO^{ws}i conducts inspections objectively, independently of external influences and in line with individually configurable quality criteria for brazed and welded seams so that defective parts are automatically rejected on the basis of the predefined inspection criteria. The inspection system guarantees you the highest quality in line with your requirements and prevents costly downtime and recall campaigns.

» Use with robot cells

With years of application experience in (project) planning, production, and commissioning, VITRONIC delivers and integrates weld seam inspection systems into flexible robot cells – on request, from a single source. Beyond project acceptance, VITRONIC is your partner and ensures quality, long-term service for all customers.

» Reliability and long service life

VITRONIC brazed and welded seam inspection systems have been installed and successfully used since 1995. They are characterized by their long service lives and continuous, reliable functioning.

VIRO^{wsi} inspects reliably

The latest sensor can record both 2D and 3D images. The objective and efficient inspection system offers a 100% inspection and even works with optimum reliability on flat seams, highly reflective materials such as aluminum and even complex, multi-seam geometries.



Weld seam inspection on a steel component

VIRO^{wsi} inspects even flat brazed and welded seams and highly reflective materials such as aluminum.

Inspection faster than welding

The high scanning speed makes the inspection process considerably faster than the welding one.

Only one inspection station is usually required for several welding stations.

Three-dimensional inspection

VIRO^{wsi} conducts inspections using the same criteria as workers' visual inspections – exactly like the human eye and beyond.

Broad range of inspection criteria, e.g.:

- » weld volume, misalignment, weld width, weld length, excessive convexity or incompletely filled groove
- » throat thickness (a-dimension)
- » holes, burn-through
- » pores
- » depressions
- » undercuts
- » asymmetry of filled weld
- » incompletely filled crater

Inspection of an aluminum weld seam



Fourth generation compact computer and comprehensive software

The fourth generation VIRO^{WSI} inspection system is further enhanced with a sensor, high-performance computer unit and set-up, inspection and evaluation software. The experience gained during our many seam inspection projects has been incorporated into the development of the more compact sensor, the compact, energy-saving computer unit and the intuitive, user-friendly software.

Computer and software – energy-saving, efficient processes

The computer unit uses passive cooling. The compact cabinet dissipates the heat via the surface and two cooling elements on the sides. The system's energy consumption has been reduced by 75%.

Thanks to its compact size with little space requirements, it can be flexibly installed along the production cell.



VIRO^{WSI} computer unit with passive cooling



MIG brazed seams



The enhanced VIRO^{WSI} system has received the Blue Competence Award in recognition of VITRONIC's commitment to sustainable technologies with regard to resource conservation and energy efficiency.

Technical Data	
System (complete)	
Input voltage	120-230 V AC
Mains frequency range	50/60 Hz
Power consumption (without service socket)	150 W
Ambient temperature during operation	5 °C-40 °C
Sensor	
Max. image capture rate	1860 Hz
Measurement area (width)	30 mm
Measurement area (height)	34 mm
Working distance	57 mm
Sensor weight	1,5 kg
Standard inspection speed	100-800 mm/s
Nominal ocular hazard distance (NOHD)	1400 mm
Process interfaces	Dig. IO, Profibus, ProfiNet, Interbus, DeviceNet, EtherNet/IP, CC-Link, CANOpen

Highly versatile and flexible

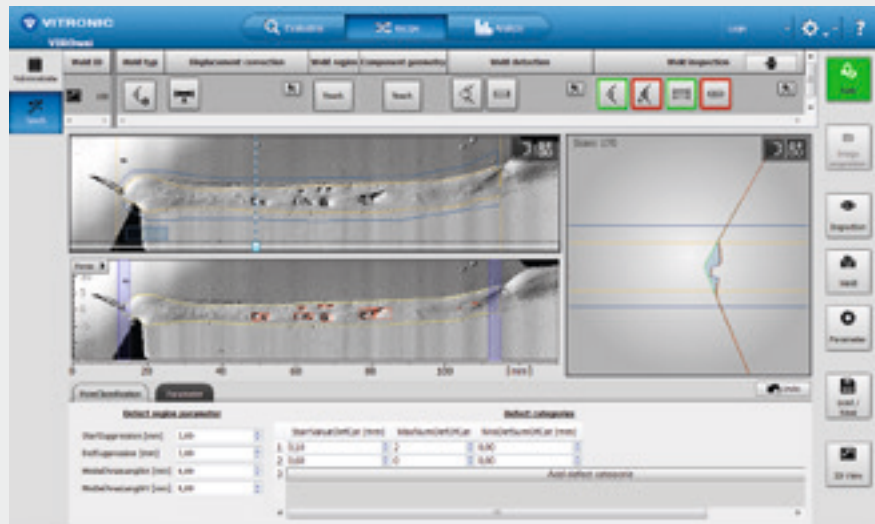
VIRO^{WSI} is a flexible system solution that can be adapted for the broadest range of production uses. On setting up the software, all relevant parameters such as the inspection process, inspection limits and inspection criteria are set on the basis of the individual production requirements.

Graphical, visual and intuitive – the VIRO^{WSI} operating concept

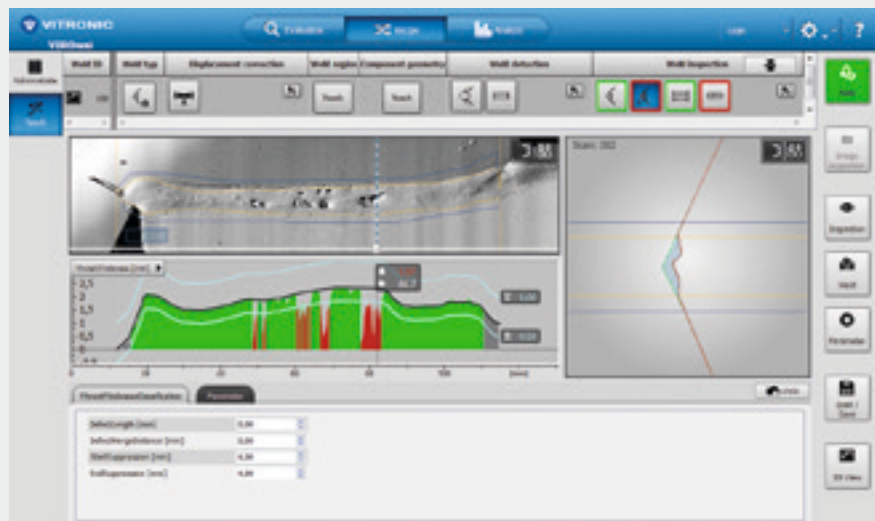
The inspection system's graphical user interface can be intuitively and simply operated and offers quick access to all key information. The inspection process and inspection limits can be conveniently set up and clearly monitored.

VIRO^{WSI} classifies the defects, displays the position and type of defect in detail and creates clearly structured statistics.

Precise 3D images of seam parameters or defects such as pores and holes, as well as numerous relevant inspection results are displayed in an user-friendly manner and are automatically documented and archived.



Inspection criterion teach-in pores



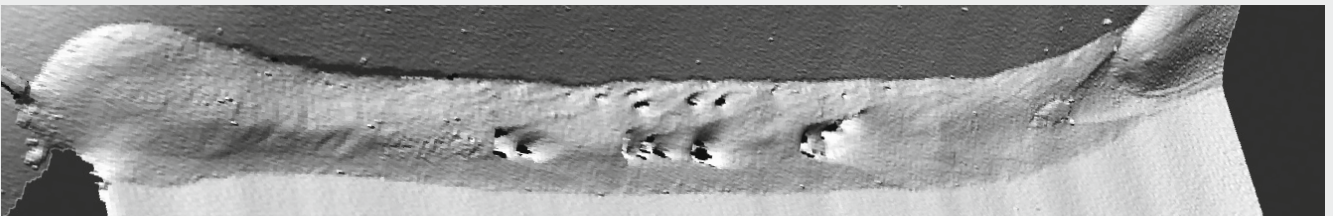
Inspection criterion teach-in a-dimension

Recorded quality

VIRO^{WSI} detects the size and position of all relevant defects. All information will be immediately made available in a logfile and stored in an integrated database based on the seam and component types for subsequent tracking, evaluation and statistics. The detailed inspection results and parameters are therefore documented in full. 3D images can optionally be archived for every component.



Hollow weld with pores



3D view of a hollow weld with pores

The statistics highlight criteria such as the a-dimension and defects such as pores and document the number of defective components during the entire production.



Database-supported analyses and statistics



VIRO^{WSI} conducts three-dimensional inspections of welded seams and enables fully automated reworking tasks

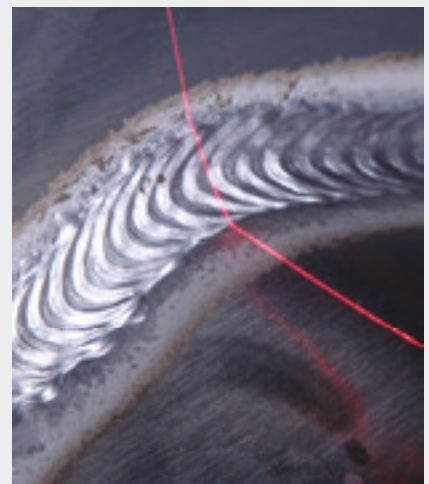
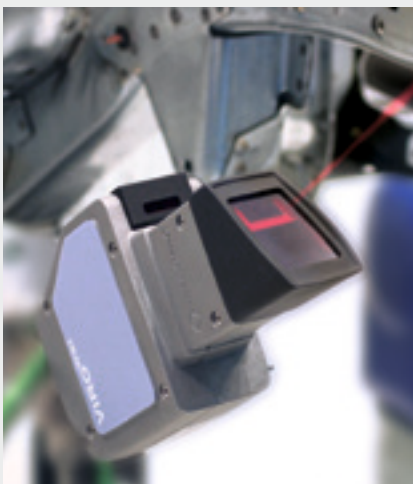
Rapid intervention in the production process

The establishment of individual warning limits and inspection guidelines for brazed and welded seams makes early intervention in the production process possible. Product quality fluctuations and defects are quickly detected.

Pareto analyses quickly identify any potential for production optimization. The parameters for quality inspection can be adjusted during the production process and are automatically applied to the next system cycle. This minimizes costly reworking and scrapping of parts. The 100% inspection ensures that parts are only admitted to downstream manufacturing processes if they are free of defects.

Automatic reworking

The VIRO^{WSI} inspection system clearly visualizes welding and brazed seam faults as well as their position on the component. The inspection results and corresponding image form the basis for any necessary reworking, which can then be conducted quickly and precisely. In addition to manual reworking, automatic and robot-supported reworking is also possible.





VITRONIC worldwide



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We are a medium-sized, owner-controlled German company that operates worldwide. Since the establishment of the headquarter in Wiesbaden in 1984, VITRONIC has offered industrial machine vision systems in the three core sectors of industrial automation, logistics and traffic technology. Our range stretches from standardized to custom-made system solutions.

All products are developed, designed and produced by VITRONIC in Germany. The company is a global leader in the field of industrial machine vision. VITRONIC products are currently used in over 40 countries.

Further to our international subsidiaries, VITRONIC is also represented by numerous sales offices, service sites and partners all around the world. Feel free to contact us – we look forward to hearing about your projects.

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