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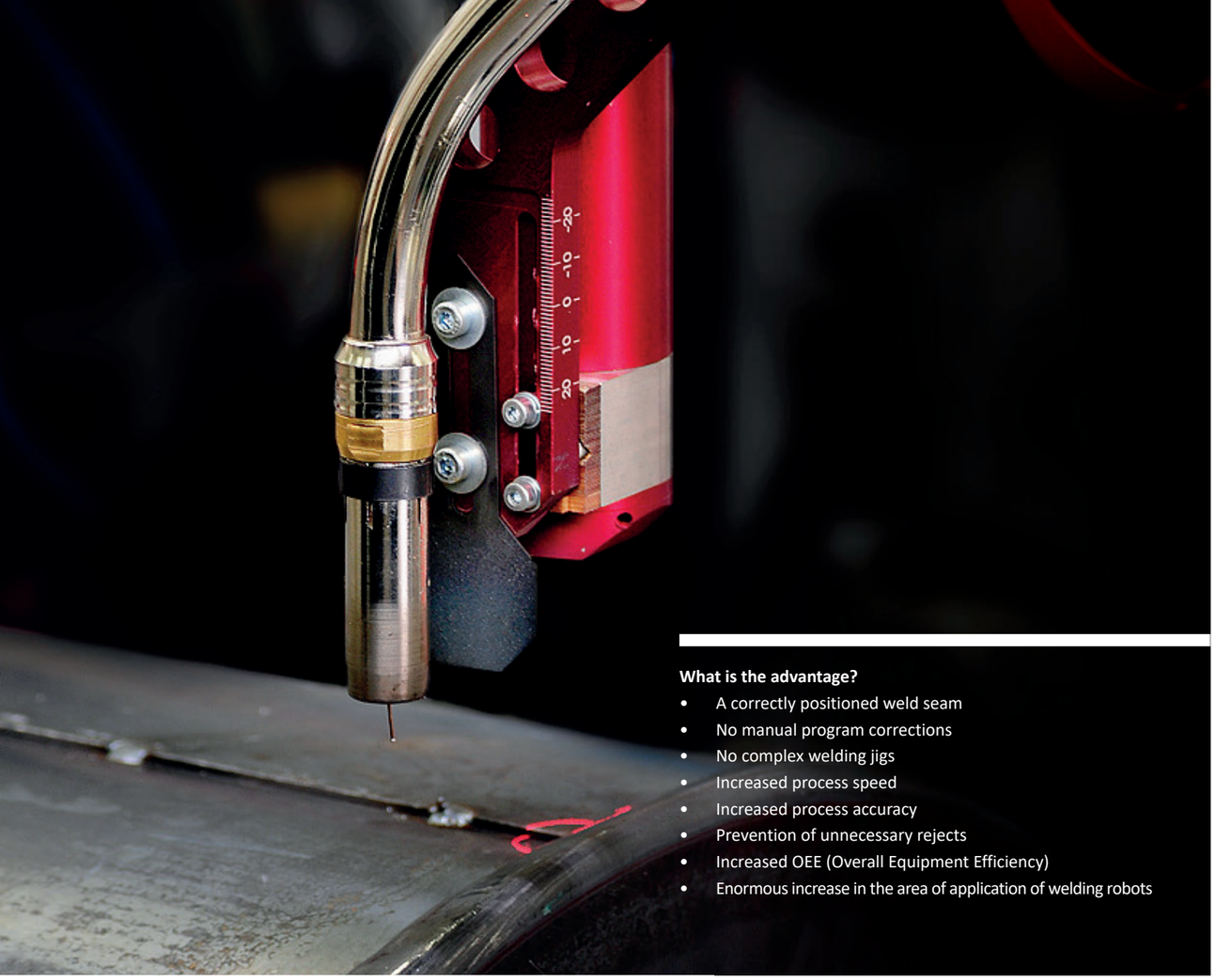
ARC-EYE

ARC-EYE

The ARC-EYE CSS laser sensor offers a solution to an old problem: it creates (environmental) awareness for welding robots. This is possible thanks to a laser camera with circular scanning technology, which produces a 3D image. The ARC-EYE software analyses this image and guides the robot during the welding process. This is particularly advantageous when welding materials where accurate seam tracking on the arc is difficult.

ARC-EYE is Valk Welding's brand name for its optical sensors. The ARC-EYE CSS sensors, both hardware and software, are developed and produced in-house. As a result, Valk Welding guarantees optimal integration of the sensor in the robot system. Full service is also provided by Valk Welding.

Watch our ARC-EYE video here



What is the advantage?

- A correctly positioned weld seam
- No manual program corrections
- No complex welding jigs
- Increased process speed
- Increased process accuracy
- Prevention of unnecessary rejects
- Increased OEE (Overall Equipment Efficiency)
- Enormous increase in the area of application of welding robots

ARC-EYE CSS

ARC-EYE CSS (Circular Scanning Sensor) is a laser sensor system that ensures welding robots follow the weld seam during the welding process. The ARC-EYE CSS laser sensor detects and corrects any dimensional deviation within the scanning range of the laser sensor.

Deviation detection eliminates the need to measure dimensional deviations in advance and correct them manually in the welding program. The ARC-EYE CSS laser sensor searches for the correct welding positions and guides the robot during welding. This makes automated welding more attractive, even for companies dealing with product tolerances that normally make robotic welding impossible. It also reduces the number of rejected products and improves weld quality.

In theory, products presented to the welding robot with an exact fit can be welded directly by the robot. In practice, however, one-sided heat input can cause the material to warp, resulting in anomalous welds during the welding process. Irregular pre-openings and complex shapes also often require corrections.

The strength of the ARC-EYE CSS laser sensor lies in its ability to weld seams and materials with a robot, which is not always possible with classical seam tracking. Here you can think of aluminium, copper, galvanised steel products or small welds such as an overlap seam, I-seam, small V-groove or welds with varying pre-openings.

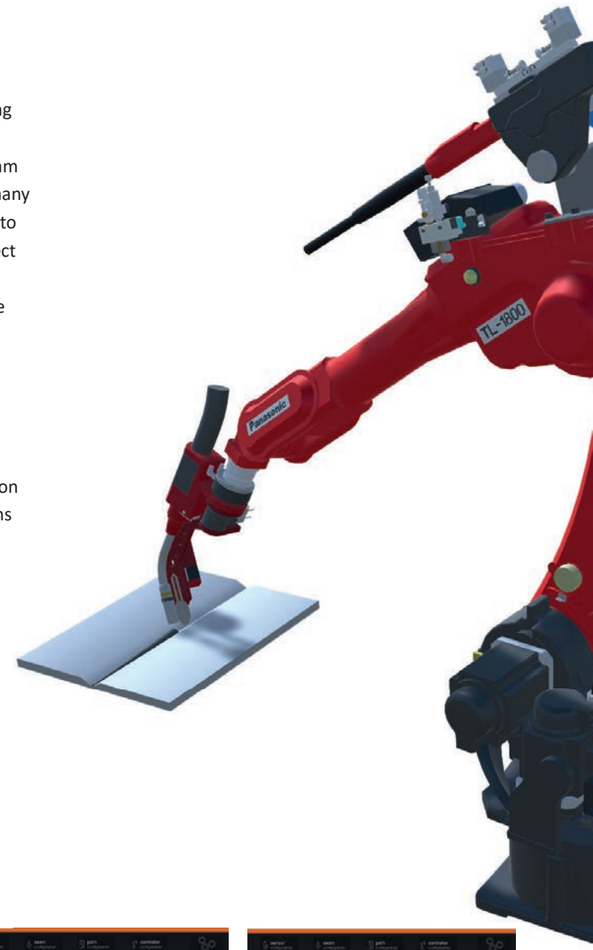
ARC-EYE CSS has far-reaching integration with the Panasonic robot, high signal-to-noise ratio and safe laser class.

Seam-Finding

Prior to the welding process, the ARC-EYE CSS laser sensor creates a 3D image, which can then be used to measure a weld point (including orientation and geometric information). This data can be applied in the robot program. The ARC-EYE CSS laser sensor scans the weld seam with a circular laser scan and can thus detect all deviations, unlike many other cameras. The data is processed by the ARC-EYE CSS processor to position the robot at the correct starting position and with the correct orientation and geometry. The information from the ARC-EYE CSS can also be used for other applications, such as quality control of the product prior to welding.

Seam-Tracking

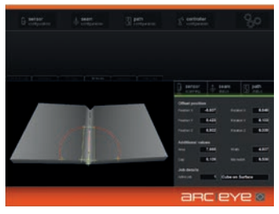
During the welding process, the robot's trajectory is adjusted in real time based on deviations and deformations measured by the laser sensor. This includes position corrections and, if necessary, orientation corrections. As a result, products with complex shapes and deviations can now be welded by the robot without the need for manual corrections or preliminary search routines.



3D Seam-Analysis: *The weld seam is analysed and checked in a 3D view.*

3D Seam-Tracking: *During weld seam tracking, the robot is guided through a 3D scanned landscape.*

3D Seam-Finding: *The vertex is searched and found in one search.*



3D Seam-Finding (start of a weld): *The starting point, direction and dimensions of the V-groove are searched and found in one search.*

ARC-EYE Adaptive

Welding and pendulum parameters can also be adjusted automatically. The ARC-EYE Adaptive Welding plug-in adjusts real-time parameters such as welding speed, welding current, welding voltage, pendulum amplitude and more. This makes even the most complex welds available for robotic welding, even in more difficult materials such as stainless steel or on workpieces with larger and irregular tolerances.

Irregular pre-opening, deviating weld seam preparation or distortion due to the welding process can cause the weld seam geometry (seam shape) to deviate. Even a small geometric deviation can quickly lead to a volume deviation of 40% to 80%. This not only requires much more welding material, but possibly also a different way of welding. With the Adaptive plug-in, the ARC-EYE CSS laser sensor recognises the seam shape and automatically adjusts the welding programme accordingly.

The Adaptive Welding function can be used simultaneously with ARC-EYE CSS weld seam tracking, ensuring optimal position and orientation of the welding torch.

ARC-EYE Adaptive - The robot's ability to automatically adjust the welding parameters to changes in the joint geometry.

In practice

At German KSK Vlassenroot, which among other things produces the crane booms for Liebherr cranes, very strict requirements are imposed on welding due to the high forces on these crane booms. Because assemblies made of cast and rolled parts never fit 100%, they were previously only welded manually. Thanks to the deployment of ARC-EYE CSS and the Adaptive plug-in, KSK Vlassenroot's crane arms are now successfully welded on Valk Welding welding robots. This allows them to guarantee higher and consistent welding quality. Meanwhile, several of the company's customers also wish other parts to be welded in the same way.

Watch some videos showing our ARC-EYE camera in practice here.

The strong connection

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