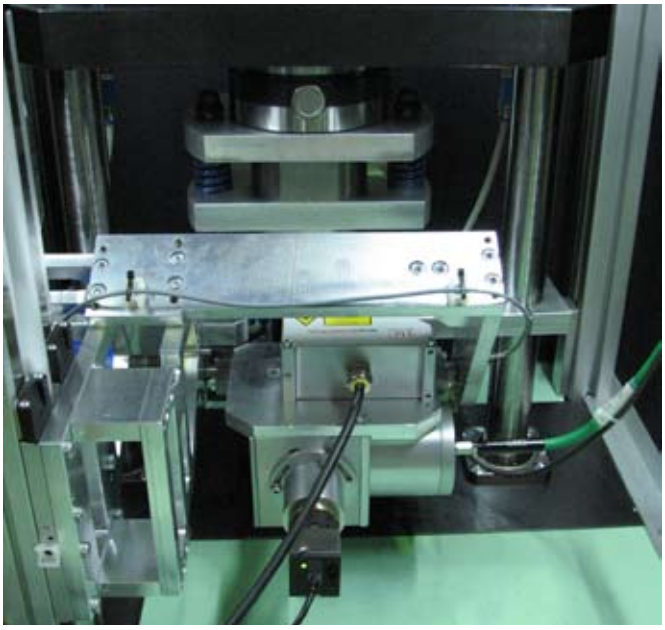
Calculation of welded sheets on gas valves

The quality of automated welding processes is critically dependent on the precise positioning of the welding head and the weld seam under the welding head. Even the smallest deviation can greatly influence the resulting weld: time-consuming quality control, manual reworking or even rejection of the part creates unnecessary delays and costs to that company. Therefore, possible causes of error in the automated welding process must be limited as far as possible in order to keep process quality high and to minimise costs.

Weld seams are usually placed between two work pieces or parts that can be freely positioned to one another. Without the use of a measurement system, precise positioning of the welding head can only be guaranteed by the exact positioning of the two parts relative to each other and under the welding head. Yet even small production deviations of the two parts can cause defects in the welding process.

The 2D/3D scanCONTROL 2810 profile sensor provides a simple and reliable solution to this problem and also provides very precise positioning of the weld seam for difficult surfaces. In the application above, the position of the scanCONTROL sensor to the valve is initially measured eight times. Using this data, the laser welding head is accurately positioned for the seam. In a second step, the welding head is guided along the welded sheet so that any errors produced due to inaccurate part tolerances can largely be eliminated.

The company Elster GmbH is using the scanCONTROL 2810 to position a laser welding head on valves with very shiny surfaces. scanCONTROL is also located directly above the lens of the laser welding head. Initially, each part is traversed once by the sensor for two different weld seams. Using the serial interface, the position vector output from scanCONTROL is used directly to position the laser welding head to the welded sheet. An accuracy of 0.15mm is achieved for the complete system; the repeat accuracy of the position of the weld seam itself is accurate to 0.03mm. Therefore, the long term stability of the welding process is ensured and reworking and rejection costs are eliminated.

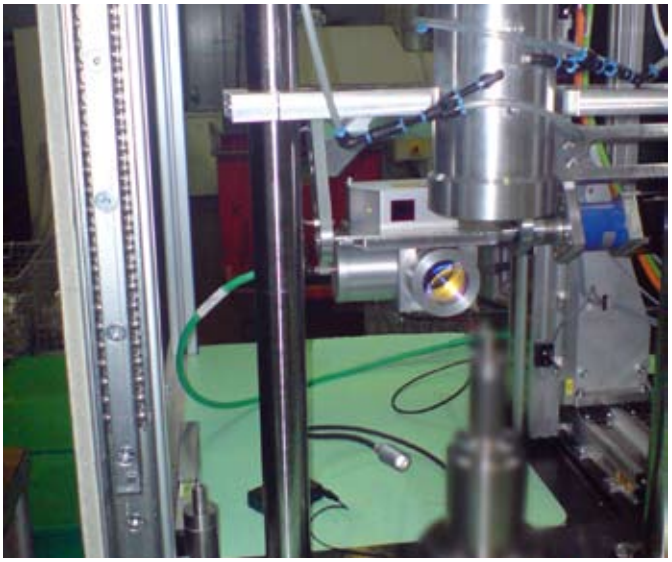


Requirements for the measuring system

- Complete system accuracy of 0.15mm
- Repeat accuracy of the weld seam position 0.03mm

Ambient conditions

- Clean and dust-free industrial environment

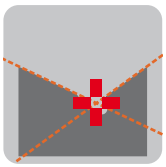


System design:

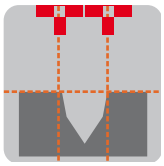
- scanCONTROL 2810-25 mounted on movable holder for the adjustment of the distance and the lateral tilt angle
- Valve position output via the serial interface
- Changeover of the parameter sets using serial interface

Decisive benefits for the customer:

- High-precision determination of the seam position
- Reliable measurements on reflective surfaces



Intersection



Seam position