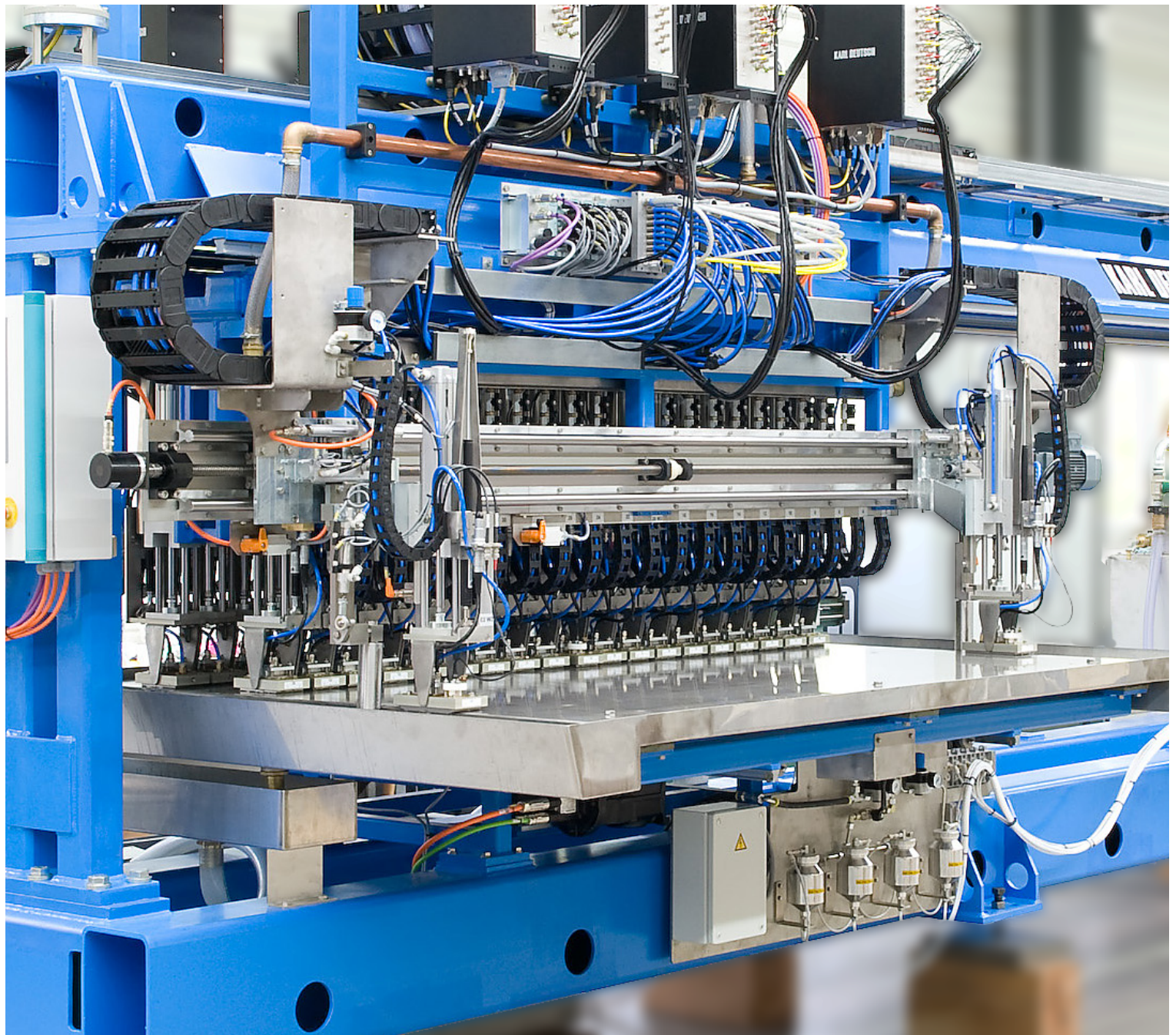




ECHOGRAPH BAPS

Ultrasonic Inspection of Strips and Plates

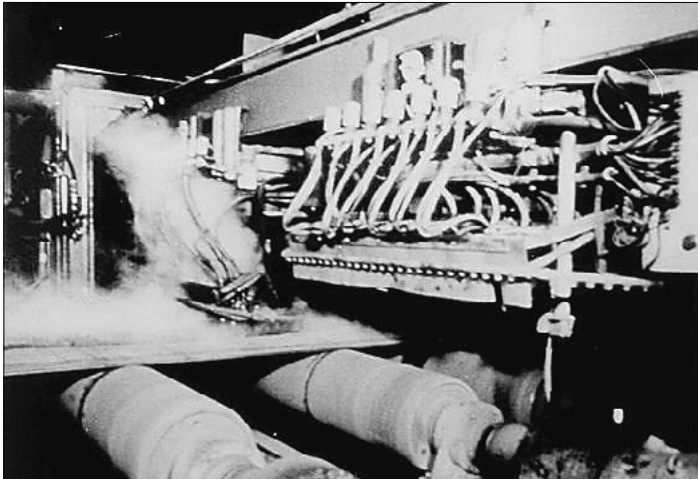
KARL DEUTSCH

ECHOGRAPH BAPS

Ultrasonic Strip and Plate Inspection

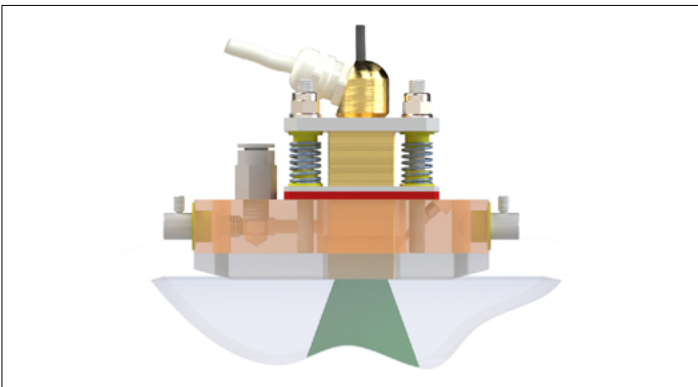
Ultrasonic Strip and Plate Inspection

KARL DEUTSCH has developed ultrasonic testing equipment since 1951 and has shipped the first strip inspection system more than 50 years ago. Many improvements on the ECHOGRAPH-electronics, the robust testing mechanics and the ultrasonic probes have led to our current state-of-the-art. KARL DEUTSCH maintains a strict quality management system according to DIN EN ISO 9001.



Historic strip testing system

Many different probe configurations were implemented so far: The inspection can be carried out in straight test traces or with an oscillating movement of the probes. A common application is the pre-inspection of strips which are later used for the manufacturing of ERW- or HSAW-pipes. The strips are transversally welded together to obtain an endless strip. Within the production line the BAPS testing system is positioned before the strip is formed into a pipe. The testing speed corresponds to the welding speed of the pipe production, i.e. typically 15 – 60 m/s.



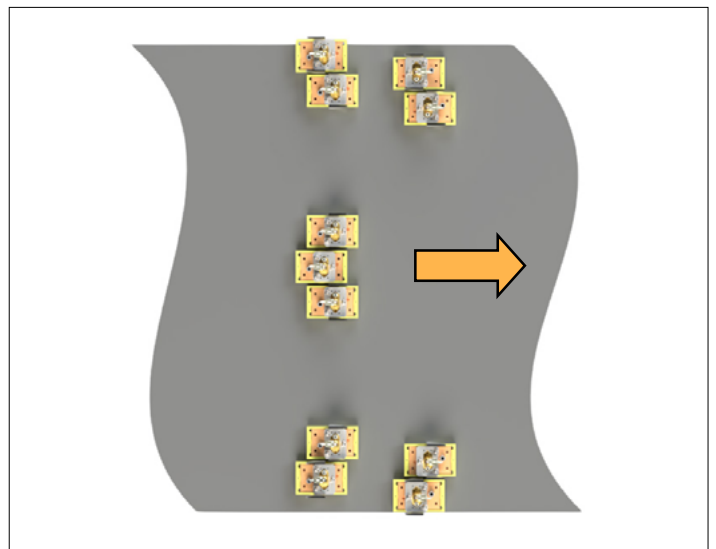
Water gap coupling:

The distance between probe and strip surface is approximately 0.3 mm. To detect defects close to both surfaces, dual-element probes are employed.



Special dual-element probes:

A wide test track of approx. 25 mm is provided by each probe. A special composite piezo-electric material is used for a high testing sensitivity. The testing frequency is typically 4 MHz. The focus point should be optimized for the strip width. In this case, a focus point of 8 mm is used. Other probe types and/or housings are used in accordance with the application.

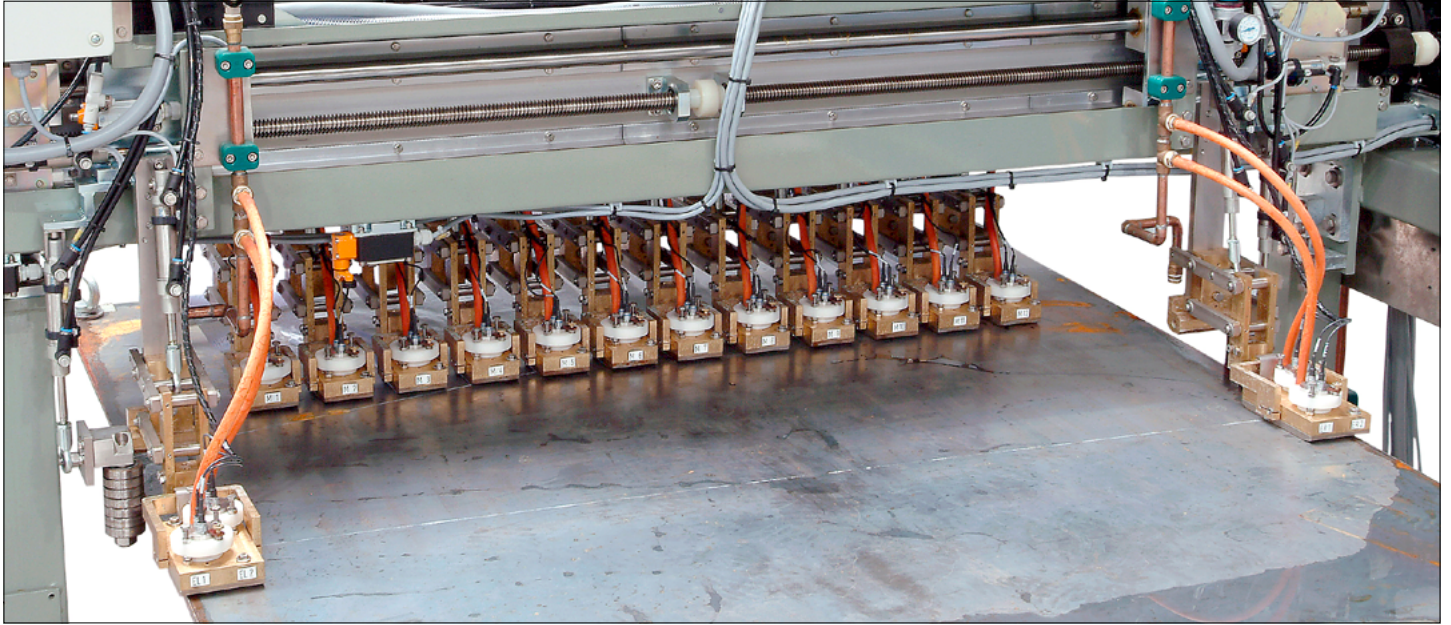


Probe configuration:

Separate probe holders are used for the strip centre and the strip edge. For the strip centre, an ultrasonic coverage of typically 25% and 100% can be chosen while the strip edge is always tested to 100%. The strip edge deserves higher attention, because they are close to the welding zone in a later stage of the pipe production. Depending on the ultrasonic coverage the number of probes and electronic testing channels is selected. As a rule of thumb, 25 mm of the strip width can be tested by one dual-element probe.

ECHOGRAPH BAPS

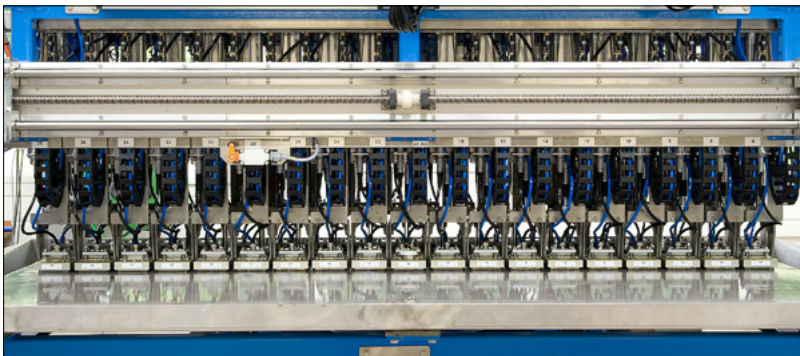
Ultrasonic Strip and Plate Inspection



Narrow strips are fed through the inspection system in a centric manner. Only the probes above the strip are then active. The individual probe holders are pneumatically lowered into the test position. The end of the strip or largely damaged zones within the strip are automatically detected and the probes are lifted into the safety position.

System calibration:

A separate calibration stand is usually provided. The testing mechanics can be moved offline above a calibration plate carrying artificial defects (notches and flat bottom holes). This picture shows a testing system with a coverage of 100 %. The maximum strip width was 1400 mm and a total of 56 channels was used.



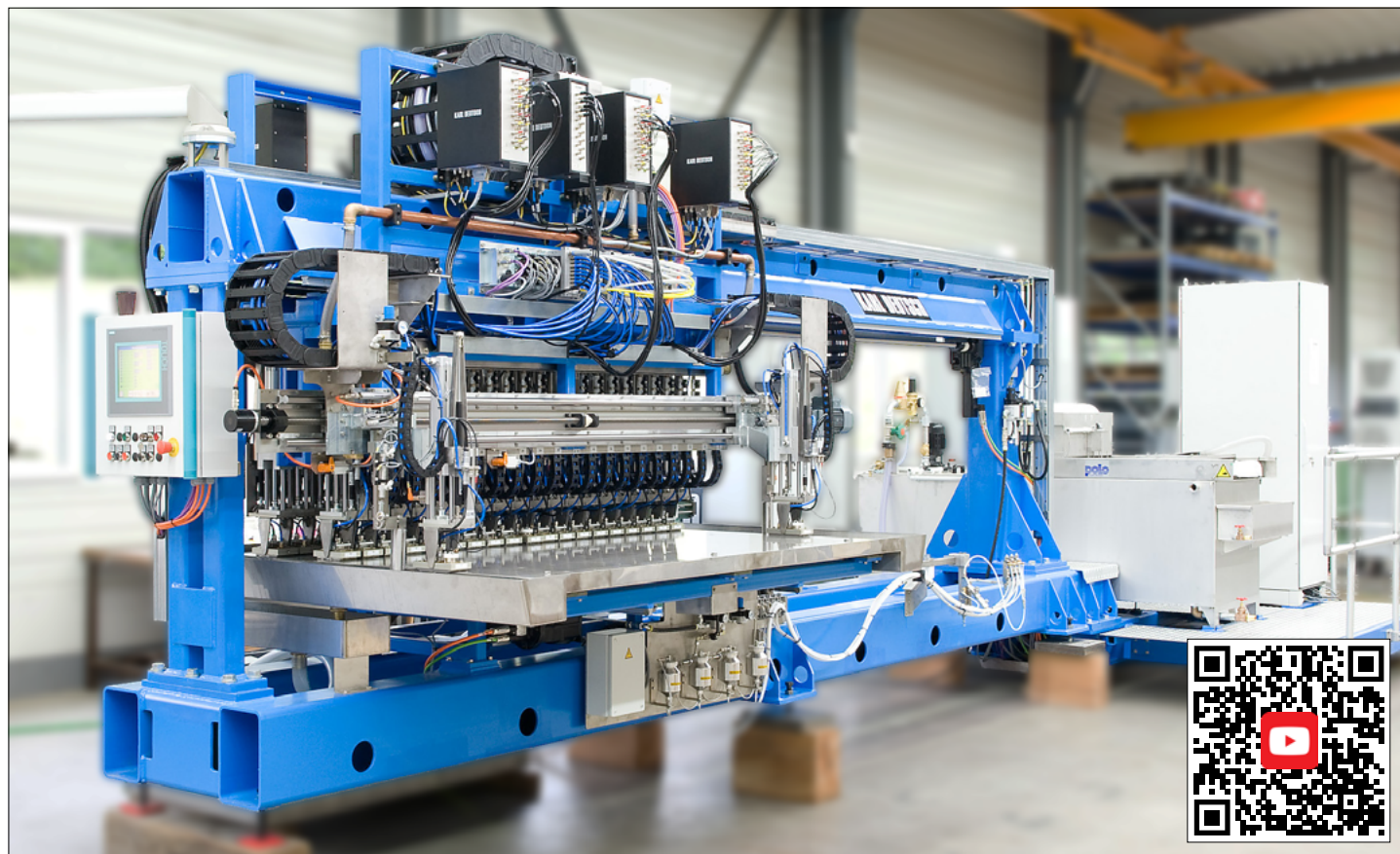
Probe holders for the strip middle: Hardened skids guide the gimble-mounted probes along the strip surface.



The strip edges are separately inspected with a test trace between 25 mm and 50 mm. Rollers which are pneumatically guided along the strip edge allow a precise positioning of the probes. 100 % of the strip edge is covered.

ECHOGRAPH BAPS

Ultrasonic Strip and Plate Inspection



ECHOGRAPH BAPS

Applications	strips, plates
Material	cold- or hot-rolled strips
Width of strip	100 – 2,000 mm
Strip thickness	4 – 40 mm
Waviness	max. ± 20 mm for a length of 2 m
Surface condition	as rolled without loose scale
Temperature	5 – 45 °C
Inspection capabilities	flaw inspection, 3 – 6 FBH, depending on probe type and specification
System options	▪ Differing strip widths and wall thicknesses ▪ Heavy plate testing

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