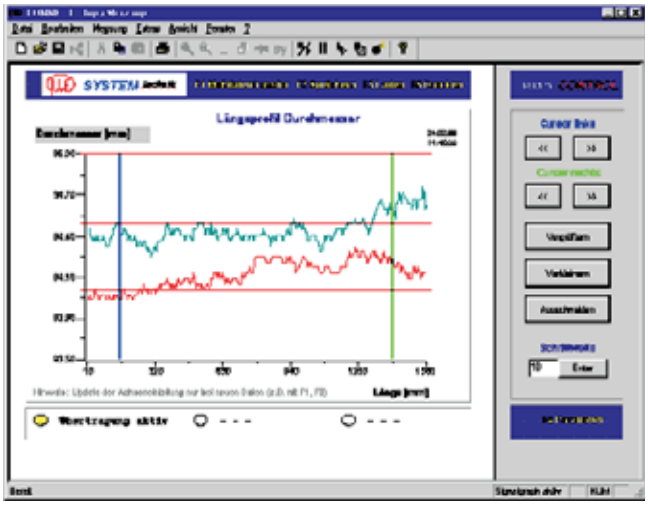
Acquisition of the internal diameter of tubes

An important criterion for the quality or the wear of tubes in industrial applications is the dimensional conformance of the internal diameter over the complete length. Where high demands are made on accuracy, a quick and reliable recording of the data must be ensured, because, for example, wear measurements must be carried out in the chemical industry on pipes which are already installed, i.e. with the plant shut down.

Two pairs of sensors record two tracks offset by 90° in one measurement step.

Through the calculation of the opposing sensor signals the absolute position of the Molch with respect to the center of the pipe is irrelevant - the roller guides are only used for coarse guidance.



Iconnect

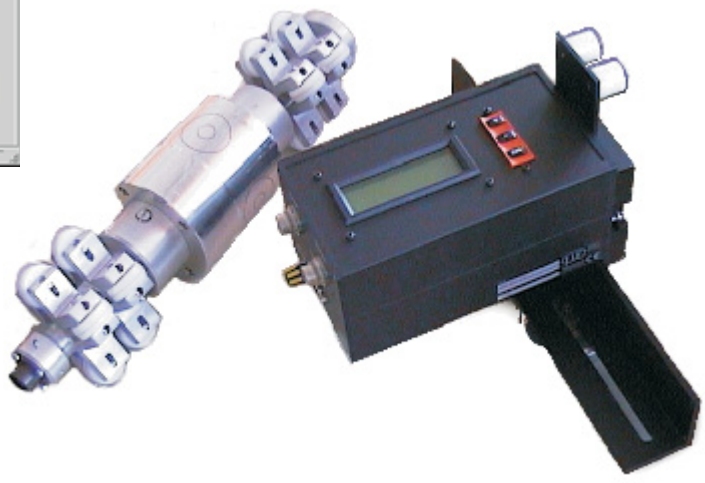
Measurement process:

The measurement head is pushed into the pipe or, with vertical pipes, lowered down under its own weight. The diameter values and the distance passed are acquired and recorded during the return process. The signal is displayed as the diameter over the length of the pipe and tolerance violations are indicated.

Individual areas can be cut out or enlarged for more precise observation. The profile can be saved and printed out for documentation purposes. Based on the available diameter profile, damaged pipes or pipe segments can be replaced and no preventative replacement of pipes is then required.

System set-up:

- Molch
- Evaluation electronic unit (optional).
- Notebook Pentium 200 MHz.
- Measuring card NI DAQ 516 (PCMCIA).
- Windows 95, 98 or NT4.0 operating system.
- ICONNECT (graphical development system).



Application

Reasons for the system selection:

- On-site evaluation possible (Notebook).
- Exact, non-destructive inspection.
- Rugged mechanical design in conjunction with easy operation.
- Suitable for all electrically conducting materials without additional adaptation (metals, alloys,...)
- Fastest possible realization of the software concept using ICONNECT with high flexibility.
- Software adaptations possible without problem due to the graphical user interface of ICONNECT which is simple to operate, also by the customer.

Measurement system requirements:

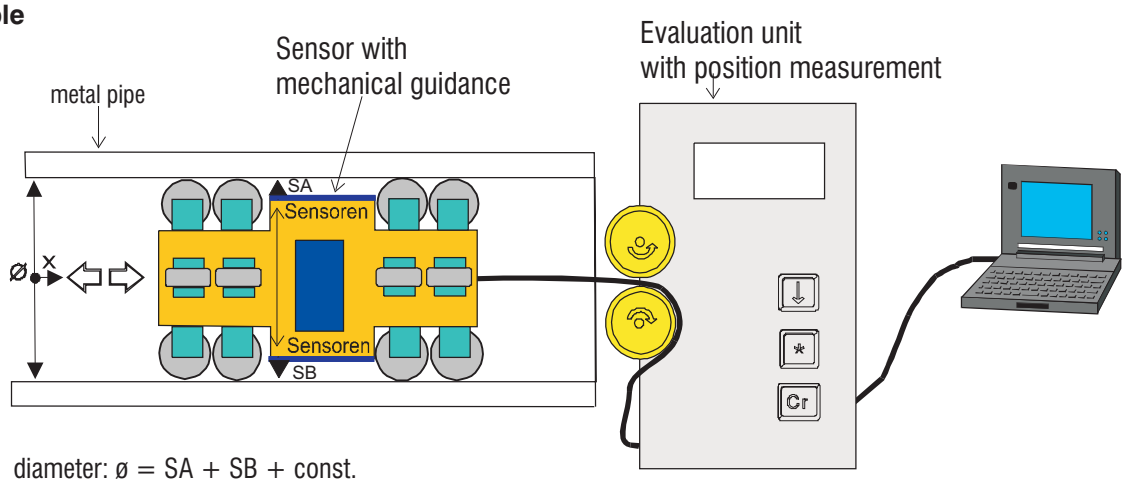
- Measurement range: 10 mm
- Accuracy: 0.1 mm
- Resolution: 0.05 mm
- Bandwidth: 100 Hz
- Min. nominal width of pipe: 53 mm
- Max. measurable pipe length: 20 m
- Max. speed: 1 m/s

Ambient conditions:

- Temperature: 5 - 60° C
- Medium: Air
- Target: Electrical conductor
- Interference fields: To IEC 1000-4-1

Electromagnetic compatibility (EMC):
Accord. to EN 50 081-2 and EN 50 082-2

Principle



diameter: ø = SA + SB + const.

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