

ScanMaster

High-Speed, Full-Body Ultrasonic Inspection of Thick-Walled Tubulars

AS-280 SERIES TUBE INSPECTOR



*High-speed, precision inspection machines for
detection, evaluation and documentation of
flaws in large, thick-walled tubulars*

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PRODUCT DESCRIPTION

Introducing the AS-280 Series	AS-280 Series machines are intended for high-speed, high-sensitivity and repeatable ultrasonic inspection of large, thick-walled tubulars. Employing a unique dual-servo drive rolls and servo-driven inspection robot, inner and outer wall surface cracks and internal flaws from the near-surface to inner wall are detected and evaluated directly from the operator control console.
Suitable test parts	Extruded tubulars with lengths to 13000mm (45ft), O.D. from 150 to 1200mm (6" to 48") and wall thickness to 250mm (10"). Ground surface finish ensures sensitive and repeatable inspections.
Inspection technique	Contact inspection with water coupling, using transducer bubblers and hardened, replaceable wear shoes.
Flaw detection	Internal flaws - from 0.8mm (No.2) diameter flat-bottomed hole (FBH) at 2.5mm (0.100") to 250mm (10") depth. Other detection sensitivities per customer request. Surface cracks – depths from 2 percent wall thickness, inner and outer surfaces.
Inspection (feed) rates	Surface inspection speeds to 600mm/sec (24in/sec). Axial inspection index to 25mm (1") per revolution of the tube, dependent on beam overlap requirements and tube diameter.
Surface coverage	100 percent to within 12mm (0.5in) of the tube ends.
Inspection robot (Z-axis) and operator cab (Xa-axis)	Rugged, beam-mounted inspection robot, including inspection head with three multi-channel transducer manipulators. Beam height is pre-positioned according to inspected tube diameter. Inspection robot is fixed to the track-mounted operator cab, which tracks the tube axially over its whole length. The air-conditioned cab houses the ultrasonic electronics and system control console. All motion axes are servodrive, including digital motion control for precise positioning and display.



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Multi-channel transducer manipulators	Each manipulator includes transducers for simultaneous longitudinal, axial and circumferential shear inspection, as well as wall thickness verification. Three identical manipulators operate in tandem, to maximize the inspection pitch or lead. Transducers are individually coupled to the tube surface to ensure smooth and uninterrupted coupling in the presence of local bowing (lack of straightness), out-of-roundness and local grinding and other pre-inspection surface irregularities.
Transducers	CSA, RSA, TDN and T2DN Series contact transducers designed for machine-controlled contact inspection of extruded and forged parts. These include T-R probes with excellent near-surface resolution and shear wave probes with superior penetration and resolution properties, to 900mm (36in) depth in steel.
upi-50 ultrasonic hardware	Network-integrated multi-channel upi-50 rack-mount ultrasonic instruments with built-in Pentium CPU. Housed in the operator cab. Includes one RPP programmable pulser preamplifier for each channel.
Motion control	IRT's MAC servo drive hardware, with encoder feedback, RF noise suppression circuitry, and ScanMaster motion control software, for precise, repeatable positioning of all axes. Motion control hardware and system electrical panel installed in air-conditioned environment-proof control cabinet.
Cab-mounted operator control console	Includes control panel with pushbuttons and 'smart' knob, and two 19" color displays, for simultaneous monitoring of system parameters and ultrasonic A-scan signals and alarm outputs.
Set-up of inspection parameters with ScanMaster software	Virtually unlimited hard-disk storage of ultrasonic set-up files. To initiate a tube scan, operator calls up the required ultrasonic file, dials in required surface inspection speed, inspection pitch or lead and tube diameter. Software calculates the tracking speed and automatically positions the inspection head at the near tube end to initiate the tube scan. Dual-threshold, screen-programmable gated alarms for all ultrasonic channels. Dynamic backwall gate for flaw detection in the near-surface of undulating tube wall thickness.
Report generator	Customized reporting format designed to customer specifications. Display of data and parameter fields, such as ultrasonic set-up files, captured and stored A-scan records, spectral content of probes (FFT), and lists of flaws detected according to ScanMaster classifiers. Equivalent KSR (FBH) sizes. Inspection reports produced automatically or on demand.
Remote communication	LAN communication with a host computer or remote data processing station, providing maximum flexibility for the automation of inspection and data analysis, archiving procedures and periodic software backup.
Rolls for calibration tubes (Wb-axis)	Separate, parallel drive rolls for calibration tubes. Used for verification of ultrasonic set-up parameters in an efficient, timesaving operation.



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PERFORMANCE ENVELOPE

Axis	Motion Envelope	Speed Range	Resolution	Repeatability	Accuracy	Backlash	Min. Motion
	mm (in)	mm/sec (in/sec)	mm (in)	±mm (±in)	±mm (±in)	±mm (±in)	mm (in)
Xa	13m (45ft)	2.5-125.0 (0.1-5.0)	1.0 (0.10)	3.0 (0.10)	0.2 (0.01) ⁴	< 3.0 (0.10)	2.5 (0.10)
Xb ¹	±100 (±4)	2.5-100.0 (0.1-4.0)	0.1 (0.01)	0.2 (0.01)	0.2 (0.01)	< 0.2 (0.01)	0.2 (0.01)
Wa ²	Continuous	2.5-600.0 (0.1-24.0)	(0.04)	1.0 (0.05) ³	0.2 (0.01)	< 1.0 (0.05) ³	1.0 (0.04) ³
Wb ²	Continuous	2.5-600.0 (0.1-24.0)	(0.04)	1.0 (0.05)	0.2 (0.01)	< 1.0 (0.05)	1.0 (0.04)
Z	1200 (60)	2.5-30.0 (0.1-1.2)	(0.01)	0.2 (0.01)	0.5 (0.02)	< 0.2 (0.01)	0.2 (0.01)

¹Auxiliary axis for precise positioning of the inspection head. ²All measurements refer to the tube surface. ³With tube load of 10T. ⁴Per m (40in) length.

* Specifications are subject to change without notice.

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