

ScanMaster

Automated Ultrasonic Inspection of Submerged Arc Welded Pipe

AS-200S SERIES WELD INSPECTOR



*High-speed, precision inspection machines for
detection, evaluation and documentation of
flaws in submerged arc-welded pipe*

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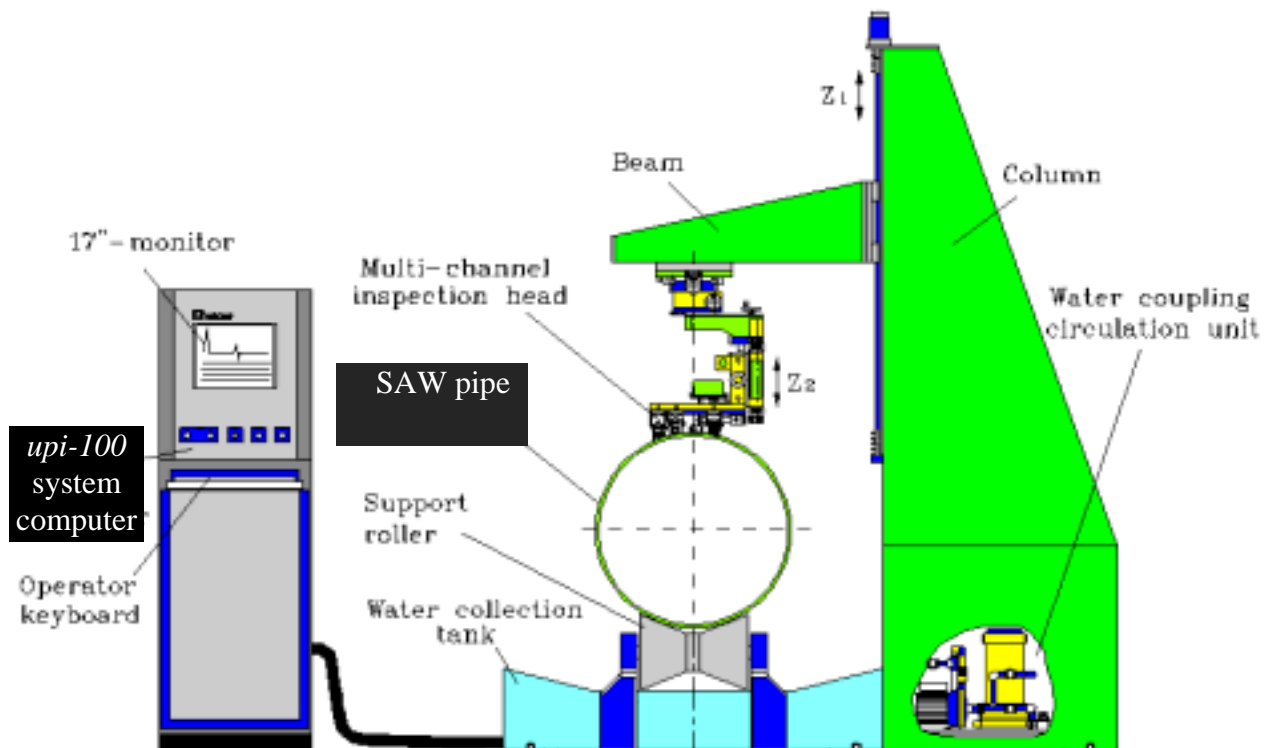
PRODUCT DESCRIPTION

<i>Introducing the AS-200s Series</i>	The AS-200s Series 'Weld Inspector' is intended for high-speed ultrasonic inspection of longitudinal or spiral submerged arc welded (SAW) pipe. The machine is installed for continuous on-line inspection, directly downstream from the welding head, or alternatively, is located off-line for the final inspection of cut pipe after hydrostatic testing. Off-line mechanics include pipe conveyor with synchronized pipe rotator for precise scanning of the weld line.
<i>Suitable test parts</i>	Process or conveyor-fed welded pipe from 600mm (24in) to 2000mm (80in) diameter and from 3mm (1/8in - AA) to 35mm (1½in - EE) wall thickness.
<i>Inspection technique</i>	Contact inspection with water coupling, using transducer bubblers and hardened replaceable wear shoes.
<i>Inspection mechanics</i>	Column or gantry-supported multi-channel inspection head, with vertical, axial and rotational adjustment for each pipe diameter and weld pitch. The basic inspection head accommodates four independently adjustable transducer bubblers and wear shoes, for operation in the 'K' or 'X' inspection configuration to detect longitudinal and transverse flaws and confirm continuous ultrasonic coupling. Additional probes and ultrasonic channels are added for enhanced flaw detection and classification in heavy-wall pipe.
<i>Weld seam tracking</i>	Selection of contact or non-contact motorized weld-seam tracking mechanism maintains the inspection head to within +/- 1.5mm (0.06") of centerline alignment.
<i>Transducers</i>	RSA Series shear wave transducers, with frequencies in the range from 2 to 5MHz selected according to flaw sensitivity requirement for the inspected pipe wall thickness. Transducers are aligned and fixed in the water coupling bubblers with easy-to-use quick-disconnect fasteners.
<i>Inspection of pipe ends</i>	Special end fixture for detection of delaminations on pipe ends. Applied after hydrostatic testing.



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Inspection of pipe wall	Optional mechanical fixtures for detection of flaws in the pipe wall. 20 to 100 percent volumetric coverage, per customer specification.
upi-100 ultrasonic hardware	Multi-channel upi-100 rack-mount ultrasonic instrument with built-in Pentium CPU and RPP programmable pulser preamplifiers for all channels. The basic instrument configuration includes six channels, with expansion capacity to 16 channels for enhanced flaw detection in heavy-wall welds. One to four operator-selected hardware gates per channel, with one or two alarm threshold levels per gate.
ScanMaster AS-200 inspection software	AS-200 production-line inspection software for on-line flaw detection and evaluation. AND/OR/NOR inspection algorithm combines ultrasonic signals from one or more gates for on-line event classification. Event alarming can be displayed on-screen and used to operate digital I/O.
Output interface	System is supplied with a standard dual-port or optional eight-port output interface used for flaw marking by paint and for the operation of other devices, such as visual and auidial alarms.
Operator control console	35U environment-proof control cabinet. Ultrasonic signal and flaw displays on 19" TFT screen.
Test reports	A test report documenting inspection results can be automatically produced at the end of each inspection sequence. Standard or tailor-made test reports. The report lists the detecting channel, gate and threshold level (1 or 2), position, strength (signal amplitude) and length along the weld line for each detected flaw.
Remote Communication	LAN communication with a host computer or remote data processing station, providing maximum flexibility for the automation of inspection and data analysis and archiving procedures.



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SUMMARY INSPECTION SPECIFICATIONS

Pipe dimensions	Process or conveyor-fed welded pipe from 600mm (24in) to 2000mm (80in) diameter and from 3mm (1/8in - AA) to 35mm (1½in - EE) wall thickness.
Inspection technique	Contact inspection with water coupling, using transducer bubblers and hardened, replaceable wear shoes.
Number of inspection channels	Four to sixteen channels as per inspection specification. One or two hardware gates per channel, with one or two operator-selected threshold levels per gate. Channels can be configured in 'K' or 'X' combined pulse-echo and pitch-catch configuration.
Transducers	RSA Series shear wave probes, 2, 2.25, 4 and 5MHz, with effective beam width (-6dB) of 6mm (1/4in) at the weld line. Selection from 45, 60 and 70deg angle of propagation (in steel) for each channel, dependent on wall thickness. Elevated temperature (ET) option for on-line inspection on pipe surfaces to 120deg C (220deg F).
Inspection coverage	100 percent of weld volume to within 12mm (1/2in) of pipe end, dependent on number of probes and inspection frequency for each wall thickness and pipe diameter.
Temperature range	Part surface temperature in the heat-affected zone to 120deg C (220deg F).
Flaw detection	Flaw detection to API Spec. 5L and 5CT, or as otherwise specified by the customer.
Inspection (feed) rates	Linear inspection speed along the weld line to 1000mm/sec (20in/sec).
Inspection resolution	Typically 0.3-0.5mm (0.01-0.02in) resolution along the weld line, with a per-channel PRF of 1-1.5KHz at a 1000mm/sec (20in/sec) linear inspection speed.
On and off-line inspection	Integration of inspection mechanics immediately downstream of the welding head. Complete off-line inspection mechanics, including pipe conveyor and synchronized rotator for inspection after hydrostatic testing.
Inspection of pipe wall	Fixtures and transducers for 20 to 100 percent of wall volume, according to customer specification.
Flaw marking	Flaw marking using waterproof paint. One or two colors for one or two gated alarm levels. Accuracy - +/- 10mm along part length.
Transducer set-up time	Typically 30 minutes for each new pipe diameter and/or wall thickness for a four-probe system.
Report documentation	Automatic report presentation with each inspection, with list of flaws indicating detecting channel, gate and threshold level, position, and signal strength.
Networking	Optional networking of the <i>upi-100</i> instrument for direct communication with a host computer or remote data processing station, providing maximum flexibility for automation of inspection and data analysis procedures. Several communication protocols are offered for application-specific control and reporting tasks. High-speed reporting of critical inspection results is useful for near real-time analysis of problems on the production line.

* Specifications are subject to change without notice.

Corporate Offices

ScanMaster Systems (IRT), Ltd.

5B Ha'Nagar St., Neve Ne'eman B
Hod Ha'Sharon 45800, Israel

Phone: 972-9-7475400

Fax: 972-9-7475444

e-mail: sales@scanmaster-irt.com

Web site: www.scanmaster-irt.com

IRT•ScanMaster Systems, Inc.

319 Garlington Road, Suite B4
Greenville, SC 29615, USA

Phone: (864) 288-9813

Fax: (864) 288-9799

e-mail: irtinc@irtscanmaster.com

