AUTOSCAN 2400

Quality Assurance of Cast Iron Components
Autoscan 2400 is a state of the art digital ultrasonic nodularity control system for industrial application in the cast iron industry, uniquely offering the dry coupled ultrasonic measurement capability.

The system is suitable for manual or in-line spot testing of components of known thickness. This is achieved by using a customised transducer and delay line.

Autoscan 2400 combines all the functionality of an outstanding flaw detector together with specific add-ins customised for the application. The system can therefore meet the requirements for any set up, with live A-scan signal presentation and direct reading of acoustic velocity.

Alarm and value analog output allows integration into a variety of in-line systems for automatic control through a choice of different communications methodologies.

**AUTOSCAN 2400 SYSTEM**

Nodularity control through velocity measurement is an established practice in plants manufacturing cast iron structural components. The aim being to measure the relative percentages of grey and ductile iron in a given part.

Currently, the general practice is a manual or automatic spot test with oil coupling, but a much higher efficiency and lower overall process cost is achieved by using dry coupling, as utilised in the Autoscan 2400.

**Advantages of the Autoscan 2400 over alternative products include**

- Full process automation and control
- Precise and consistent transducer placement
- Dry-coupled transducer avoids couplant/oil contamination of part
- Reduces cost by eliminating couplant and cleaning
- Durable ‘IP67’ instrument enclosure
- Choice of digital or analogue outputs
- Direct read out of velocity
- User programmable alarm limits

**ULTRASONIC FLAW DETECTOR**

The Autoscan 2400 has been developed from the Sonatest SS240 digital flaw detector.

This proven full-featured flaw detector has been sold to more than 50 countries. When not required for in-line use, the Autoscan 2400 can be used as a portable flaw detector for a variety of industrial applications.
To optimise the performance of the Autoscan 2400 a specific series of transducers has been developed. The result is medium damped straight beam probes for dry coupling nodularity control with frequencies of 2 and 5MHz available as a standard. These are available as top or lateral mount microdot connectors. Suitable collars can be bought to attach the different delay lines.

Any particular application can be catered for. Depending on the thickness range of the component at the test area, there are a range of state of the art delays of differing dimensions available: interchangeable spherical, rounded tip cylindrical or thin flat.

The specific design of the delay has been developed for optimum coupling, acoustic impedance matching and durability under challenging mechanical and environmental testing conditions on rough casting surfaces. A set of spare delay lines is included with the standard Autoscan 2400 package.

**BENEFITS & FEATURES**

**ADDED FUNCTIONS**
The unit is mains powered, with a front proportional output connector and a velocity measurement mode function, allowing both on-screen display of the measured acoustic velocity value and an analogue or digital output. Alarm threshold setting for acoustic velocity is possible.

**SET-UP AND SYSTEM INTEGRATION**
The system can be easily integrated into current and new production lines for automatic nodularity control, transmitting the relevant output signals to the relevant PLC or visual indicators (ie. a lightbox) or to a networked or independant digital control system.

**CUSTOMER SUPPORT**

The Autoscan 2400 instrument is supplied with a standard two year warranty. For an additional cost the warranty can be extended to five years through the Autocover policy. Autocover includes free calibration to manufacturers specification at the ends of year 1,2,3 and 4. Software can be upgraded free of charge throughout the five years. AtlantisNDE is happy to advise on installation and integration issues or provide this as an additional service.

**STANDARD PACKAGE**

Autoscan 2400 Nodularity Control Instrument
CAST2 or CAST5 Transducer with Delay Line
Mains Power Unit
Set of Spare Delay Lines

[www.atlantisnde.com](http://www.atlantisnde.com)
**Test range**
5mm to 20,000mm (0.25-800in) at steel velocity. Variable in 1,2,5, sequence, or continuously in 1mm (0.05in) increments

**Velocity range**
1,000m/s to 9,999m/s continuously variable

**Probe Zero**
0 to 999.99 s continuously variable

**Delay**
Calibrated delay from 0mm to 10,000mm in 0.05mm steps at steel velocity (0-400in. in 0.002in steps)

**Gain**
0 to 110dB. Adjustable in 0.5, 2, 6, 14 and 20dB steps. Direct access

**Test Modes**
Pulse echo and transmit/receive

**Pulsar**
Square-wave pulse, 185V peak amp, 40ns-250ns linked to frequency

**P.R.F.**
Select between 35, 63, 150, 250, 500, & 1,000Hz

**Update Rate**
60Hz (NTSC Mode); 50Hz (PAL Mode)

**Rectification**
Full wave, positive or negative halfwave and unrectified rf

**Frequency Range**
Four (4) narrow bands centered at 1 MHz, 2MHz, 5MHz and 10MHz. Wide band 1.5 to 15MHz (-6dB)

**System Linearity**
Vertical ±1% Full Screen Height (FSH). Amplifier accuracy ±0.1dB. Horizontal ±0.4% Full Screen Width (FSW)

**Reject**
50% suppressive reject. LED warning light when selected

**Units**
Metric (mm), inches (in) or microseconds. Selected from menu

**Display**
High brightness Colour TFT LCD panel. Eight colour scheme options. Brightness variable up to 350cd/m2.LCD: monochrome LCD, with switchable backlight. A-Scan area 255 x 200 pixels. Total display area 102.7 x 77.0mm, 320 x 234 pixels

**Gate Monitor and Alarms**
Two fully independent gates for echo monitoring and thickness measurement. Start and width adjustable over full range of unit, amplitude variable from 0 to 100% FSH. Bar presentation. Positive or negative triggering for each gate with visual and audible alarms. Operator defined alarm thresholds (upper and lower limits of acoustic speed) in velocity measurement mode.

**Gate expansion**
Expands range to width of Gate 1

**Measurement Modes**
There are 6 modes: Signal monitor, Depth and amplitude of first signal in gate, T-Min mode for holding minimum thickness reading, Echo-to-echo distance measurement, Trigonometric display of beam path, surface distance and depth of indication Gate to Gate. Resolution to 0.01mm (0.001in) for distance measurement, or 1% FSH for amplitude measurement. Large display of measurement at top of A-Scan display. Measurement mode selectable between peak and flank. All measurement functions available in unrectified rf mode.

**Velocity Measurement**
Direct reading on screen of the acoustic velocity for a given thickness.

**A-Scan Memory**
Maximum of 100 waveforms stored with complete panel settings. Waveforms may be recalled on display, printed or transferred via RS232 serial interface

**Panel Memories**
Twenty stores for retaining calibrations

**Thickness Logging**
Storage for 2,000 thickness readings configured into Block/Location/Number. Calibration settings stored with each Block. Maximum number of Blocks is 14. Unlimited Location/Number values, maximum combination of 2,000 readings. Readings may be reviewed, edited and printed as required.

**Reference Waveform**
This menu displays a waveform from one of the A-Log stores as a reference or fingerprint in a Colour different from the active display highlighting differences from the reference.

**DAC**
DAC curves may be entered and digitally drawn on the display. Reference, -6dB, -12dB, -14dB curves may be selected. DAC curve selected acts as gate for alarm outputs and height measurement in DAC +dB. DAC parameters stored with Panel Memory. Curves comply with ASME and European Standards.

**TCG**
Time Corrected Gain curves may be entered and digitally drawn on the display. The dynamic range of the T.C.G. is 40dB. T.C.G parameters are stored in panel, A-Log and memory.

**AWS**
The AWS mode is used when inspecting welds in accordance with the American welding Society's Structural Welding Code, ANS/AWS D1.1-94 to automatically calculate the Indication Rating as defined by the code.

**Auto-Cal**
Provides automatic calibration from two echoes

**Notes**
Alphanumeric-labeling for panel and A-Log allows the user to enter Notes for storage with A-Scans.

**X-Offset**
Allows the surface distance to be calculated from the front of the probe with X-offset being the distance from the index point to the front of the probe.

**Special Functions**
Display freeze for capturing current A-Scan image. Peak memory for echo-dynamic pattern determination in accordance with BS3923. Help key for instant operator guidance on using the Autoscan2400.

**Help Key**
For instant operator guidance on using the Autoscan2400

**Waveform Smoothing**
Gives a smooth signal envelope similar to the video filtering in analogue equipment.

**Outputs**
Full bi-directional serial interface to transfer parameters, thickness readings and waveform memories. Composite video, full PAL or NTSC compatibility. Two analogue pro portional programmable output signals (front panel) for connection to external equipment, such as a light alarm device. RF (80mVpp) and trigger outputs.

**Power**
Lithium-Ion sealed battery pack. Typically 8 hours operation on colour display model at medium display brightness, more on LCD. Mains power (220V) for continuous operation.

**Charger**
Universal mains input 85-260 volts AC.

**Probe Sockets**
LEMO 01 (factory option) or BNC.

**Environment**
IP67

**Keypad Membrane, with lock key function**
(except for gain control).

**Temperature**
Operating: -10 to +55°C (14 to 131°F) Survivable: -20 to +70°C (-4 to 158°F) Storage: -40 to +75°C (-40 to 167°F) Survivable: -20 to +70°C (-4 to 158°F)

**Size**
255 x 145 x 145mm (10.0 x 5.7 x 5.7in)

**Weight**
2.5Kg (5.5 lbs.) with Li-ION cells.