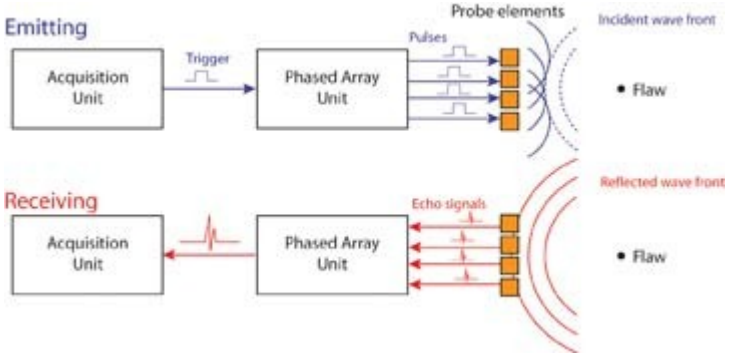
OmniScan MX PA

Phased Array Inspection

Phased Array Technology



Phased array technology generates an ultrasonic beam with the capability of setting beam parameters such as angle, focal distance, and focal point size through software. Furthermore, this beam can be multiplexed over a large array. These capabilities open a series of new possibilities. For instance, it is possible to quickly vary the angle of the beam to scan a part without moving the probe itself. Phased arrays also allow the replacement of multiple probes and even mechanical components. Inspecting a part with a variable-angle beam also maximizes detection regardless of the defect orientation, while optimizing signal-to-noise ratio.

Benefits of Phased Arrays

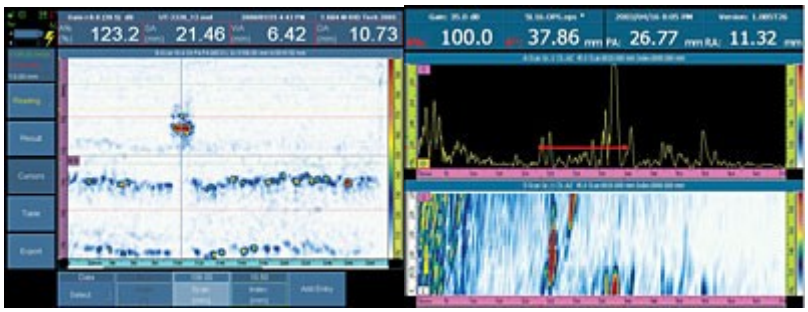
Phased array technology offers the following capabilities:

- Software control of beam angle, focal distance, and spot size
- Multiple-angle inspection with a single, small, electronically-controlled multielement probe
- Greater flexibility for the inspection of complex geometry

- High-speed scans with no moving parts

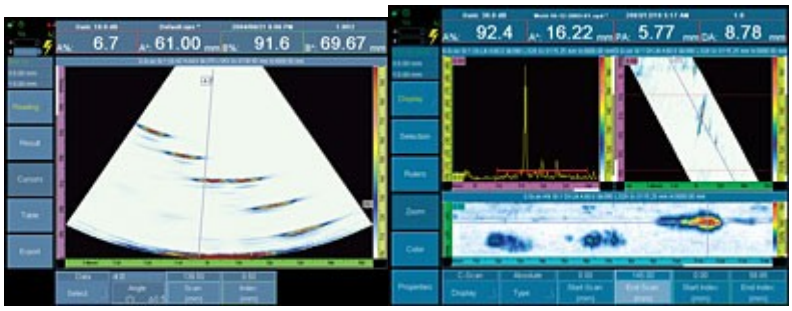
Phased Array Software

Full-Featured A-Scan, B-Scan, and C-Scans



OmniScan PA builds upon the OmniScan UT feature set and offers full-featured A-, B-, and C-scan displays.

Full-Featured Sectorial Scan



- Real-time volume-corrected representation
- Higher than 20 Hz refresh rate (up to 40 Hz)

Advanced Real-Time Data Processing

- Real-time data interpolation to improve spatial representation of defects during acquisition of data
- User-selectable high- and low-pass filters to enhance A-scan and imaging quality
- Projection feature allows the operator to view vertically positioned A-scan simultaneously with sectorial scan image.

Calibration Procedures and Parameters

All calibration procedures are guided by a step-by-step menu using Next and Back navigation.

Wizards for Groups and Focal Laws

- The Group Wizard allows you to enter all probe, part, and beam parameters, and generate all focal laws in one step instead of generating them with each change.
- The step-by-step approach prevents the user from missing a parameter change.
- Online help gives general information on parameters to be set.

Multiple-Group Option

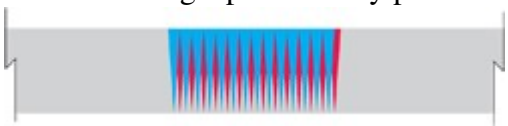
It is now possible to manage more than one probe with two different configurations: different skews, different scanning types, different inspection areas, and other parameters.

Possible Configurations for Multiple-Group Inspection

A Use one single phased array probe of 64 or more elements and create 2 different groups:

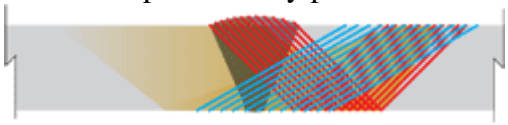
- Linear scan at 45° to cover the upper part using skips on the bottom surface
- Linear scan at 60° to cover the lower part

B Use one single phased array probe of 64 or 128 elements and create 2 different groups



- Linear scan at 0° at low gain
- Linear scan at 0° at higher gain

C Use one phased array probe of 64 or 128 elements and create 3 different groups:



- Linear scan at 45° to cover the upper part using skips on the bottom surface
- Linear scan at 60° to cover the lower part
- Sectorial scan from 35° to 70° to increase probability of detection

D Use two phased array probes of 16 or 64 elements and create 2 different groups:

- Sectorial scan from 35º to 70º for inspection from left side of the part using skips on the bottom surface
- Sectorial scan from 35º to 70º for inspection from right side of the part using skips on the bottom surface

Phased Array Module Specifications*

Overall dimensions	244 mm x 182 mm x 57 mm (9.6 in. x 7.1 in. x 2.1 in.)
Weight	1 kg (2.2 lb)
Connectors	1 OmniScan connector for phased-array probes 2 BNC connectors (1 pulser/receiver, 1 receiver for conventional UT) (BNC not available on models 32:128)
Number of focal laws	256
Probe recognition	Automatic probe recognition and setup
Pulser/Receiver	
Aperture	16 elements*
Number of elements	128 elements
Pulser	
Voltage	80 V per element
Pulse width	Adjustable from 30 ns to 500 ns, resolution of 2.5 ns
Fall time	Less than 10 ns
Pulse shape	Negative square wave
Output impedance	Less than 25 Ω
Receiver	
Gain	0-74 dB maximum input signal 1.32 V p-p
Input impedance	75 Ω
System bandwidth	0.75-18 MHz (-3 dB)
Beam forming	
Scan type	Azimuthal and linear
Scan quantity	Up to 8
Active elements	16*
Elements	128

Delay range transmission	0-10 µs in 2.5-ns increments
Delay range reception	0-10 µs in 2.5-ns increments
Data acquisition	
Digitizing frequency	100 MHz (10 bits)
Maximum pulsing rate	Up to 10 kHz (C-scan)
Acquisition depth	29 meters in steel (L-wave), 10 ms with compression. 0.24 meter in steel (L-wave), 81.9 µs without compression
Data processing	
Number of data points	Up to 8000
Real-time averaging	2, 4, 8, 16
Rectifier	RF, full wave, halfwave +, halfwave -
Filtering	Low-pass (adjusted to probe frequency), digital filtering (bandwidth, frequency range)
Video filtering	Smoothing (adjusted to probe frequency range)
Data storage	
A-scan recording (TOFD)	6000 A-scans per second (512-point 8-bit A-scan)
C-scan type data recording	I, A, B, up to 10 kHz (amplitude or TOF)
Maximum file size	Limited by memory size
Data visualization	
A-scan refresh rate	Real-time: 60 Hz
Volume-corrected S-scan	Up to 40 Hz
Data synchronization	
On time	1 HZ-10 kHz
On encoder	On 1 or 2 axes
Programmable time-corrected gain (TCG)	
Number of points	16 (1 TCG curve per channel for focal laws)
Alarms	
Number of alarms	3
Conditions	Any logical combination of gates
Analog outputs	2