# da Vinci Delta

## ULTRASONIC FLAW DETECTOR

### Silent Features

► IP67 sealing compliance.

► Test Range: 2.5mm to 10 meters. (Steel)

► Measurement resolution of 0.01mm.

► Auto Calibration / Two point calibration.

► Thro` Coating thickness measurement.

► Dynamic DAC, TCG, DGS/AVG features and AWS software.

► Tuned amplifier for better performance.

► Probe frequency up-to 20MHz for testing on low thickness and better sensitivity.

► Encoded B-scan and C-scan for imaging are are available.

► PRF value can be reduced to 4Hz for large test objects to avoid phantom echoes.

► Frequency down to 250 KHz (0.25 MHz) for checking composites and highly attenuative material.

► RF display for better measurement accuracy and FLAW characterization.

► High-end Ultrasonic imaging for corrosion mapping and TOFD for replacing radiography testing.

► Flash drive upto 8GB and USB port for Communication.

## Specification of 'da Vinci' delta

Test Range : 2.5mm to 10 meter (0.100 in to 400 in) (longitudinal waves in steel). Fine mode is adjustable in minimum step of 0.01mm (0.001in).

Velocity : 1000 met. /sec to 15000 met. /sec (40 in/millisecond to 600 in/millisecond). In Hot key mode it has pre-set values. Fine mode it is adjustable in step of 1met/sec.(1in/millisecond).

Delay : Variable from -10 to 2000mm (-0.3 to 30 inches).

Gain : 100 dB calibrated gain adjustable in 0.1, 0.5, 1, 2, 6 or 12 dB step.

Rejection : 0 to 100% FSH with Led indicator.

Rectification : Full-wave rectified, Half wave - ve, Half wave + ve, and RF mode.

Frequency : It has tuned amplifier with four bands: a) 0.2MHz to 1MHz b) 0.5MHz to 4MHz c) 0.8MHz to 8MHz d) 2MHz to 20MHz

Linearity Deviation : Vertical ±3% Horizontal: ±0.5%.

Test Modes : Pulse echo and Transmit/Receive.

Transmitter : Transmission pulse negative spikes. (Pulse rise time<10ns) and with Selectable high (300 Vp) or low (250 Vp) power.

Damping : Damping high/low is selectable. (High= 45Ω, Low=345Ω).

Connectors : BNC or LEMO size-1 factory optional

Freeze/ Peak Freeze : A-scan Freeze, Peak freeze, echo dynamic balance available. In peak freeze it holds peak amplitude pattern which is useful for angle beam probing to to locate peak signal.

Monitor : Dual gate with threshold adjustable in 1% of the screen height with +ve/-ve, Gate expand Interface trigger modes.

Gate Expand : expands range to width of the gate.

A-scan Memory : 500 trace patterns can be stored which can be recalled, printed, or transferred to PC via USB (with NOTE/DETAIL). Unlimited No of A-scan can be directly stored in USB disk with auto file naming.

B-scan Memory : 50 B-scan can be stored (with NOTE/DETAIL) which can be recalled, or transferred to PC via USB. Unlimited no of B-scan can be directly stored in USB disk with auto file naming.

Calibration Set-up : 50 different calibration set-ups can be stored and recalled.

T-LOG : 20000 reading can be stored in 20 different files. Five different types of file templates for file creation. Sored reading can be transferred to PC via USB.

DAC : Dynamic DAC curve can be digitally plotted (smooth parabolic curve) on screen with selectable additional offset curves from 0 to 14 dB in 0.1dB selectable steps. DAC curve can be set as a flow monitor gate. DAC curve curve can be plotted using minimum 2 to maximum 10 points.

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| TCG | : After plotting DAC , TCG( Time corrected Gain) can be activated. This brings All echo signals to equal height irrespective of depth. |
| AWS | : Built-in Software for evaluation of defect in accordance with AWS standard. |
| DGS | : Defect size evaluation based on 18 predefined probe data and one custom Probe set-up per memory location. Defect size is directly displayed in ERS Value(Equivalent Reflector Size). |
| Digital Readout | : Thickness/Depth can be displayed in digital readout when using a normal probe and sound path, Surface Distance and depth of echo signals of GATEa /GATEb are directly displayed when angle probe is in use. Measurement point scan be selected to be peak or flank. Echo height, ERS value, dB diff of DAC/DGS curve to signal height, Echo height respect to DAC in terms of percentage or in dB can be measured, T-minimum, Travel-distance can be measured when encoder is connected and time of travel during Freerun B-scan . |
| Measurement Unit | : Metric or British unit of measurement is selectable. |
| Software | : dVaSoft Interface software for transferring A-scan / B-scan/ T-LOG from Da Vinci to PC. Is supplied with da Vinci delta. |
| Printer Attachment | : USB printer (PCL3 compatible) can be directly attached to da Vinci alpha for printing of stored A-scan waveform with calibration data and note detail. |
| Display | : High brightness active matrix colour TFT LCD display. Display area 320×240 Pixel (117×88mm). Five different colours and Grid scheme options. colour leg facility for angle probe for easy interpretation of skip distance. |
| Full Screen | : By pressing enter key for a few seconds A-scan will be displayed in Full screen area. |
| Reference A-Scan | : Reference A-Scan pattern of standard test object can be saved and recalled in background for easy comparison during testing. |
| Video Output | : VGA video signal output for monitor/projector connection. |
| PRF | : 4Hz TO 500Hz. Selection in 10 scalable steps. PRF can go down up to 4Hz When PRF is selected to 1 and maximum achievable coupled to range when PRF is selected to 10. |
| Update Rate | : 60Hz |
| Color coded B-scan | : In real time display color coded B-scan as well as live display A-scan. captured B-scan gets stored in external USB pen drive. |
| TOFD Display | : In real-time RF A-scan and TOFD D-scan. After collecting data, stored data or A-scan pattern can be reviewed using cursor. |
| Recording | : Free run or with positional encoder for actual location. |
| Record | : 1000mm test length with collection step of 1mm. Each A-scan with |

Length                     500 point depth.

I/O port            : Optical encoder can be connected to 'da Vinci 'delta for positional detail.
                       It can be used for Encoded B-scan.

Data Storage  : Each Scan file is stored in external USB storage device with auto file naming.

Power              : Lithium-Ion battery pack 10.8 VDC, 7.8 AH, gives 8 hours continuous
                       Operation from fully charged battery. Battery with the charge indicator/fuel
                       gauge indicator. da Vinci delta can also operate on 6 nos of C type dry cells.

Battery            : Input volt 100 to 240VAC / 50 Hz.
Charger

Temperature  : 0 to 55$^{o}$C.

Size                 : 170×260×110mm (H×W×D).

Weight            : 2.1Kg with battery.


## TOFD Data analysis software features:

- For improvement of near and far surface resolution lateral and backwall echo can be removed.
- TOFD data linearization.
- Straightening of TOFD data using apex matching technique or by manually shifting of A-scan is possible.
- Contrast setting of D-scan image is possible for easy interpretation.
- Defect marking on D-scan image.
- D-scan data zooming control.
- All A-scan can be exported to excel for further analysis.
- Multiple file joining and splitting if file is possible.