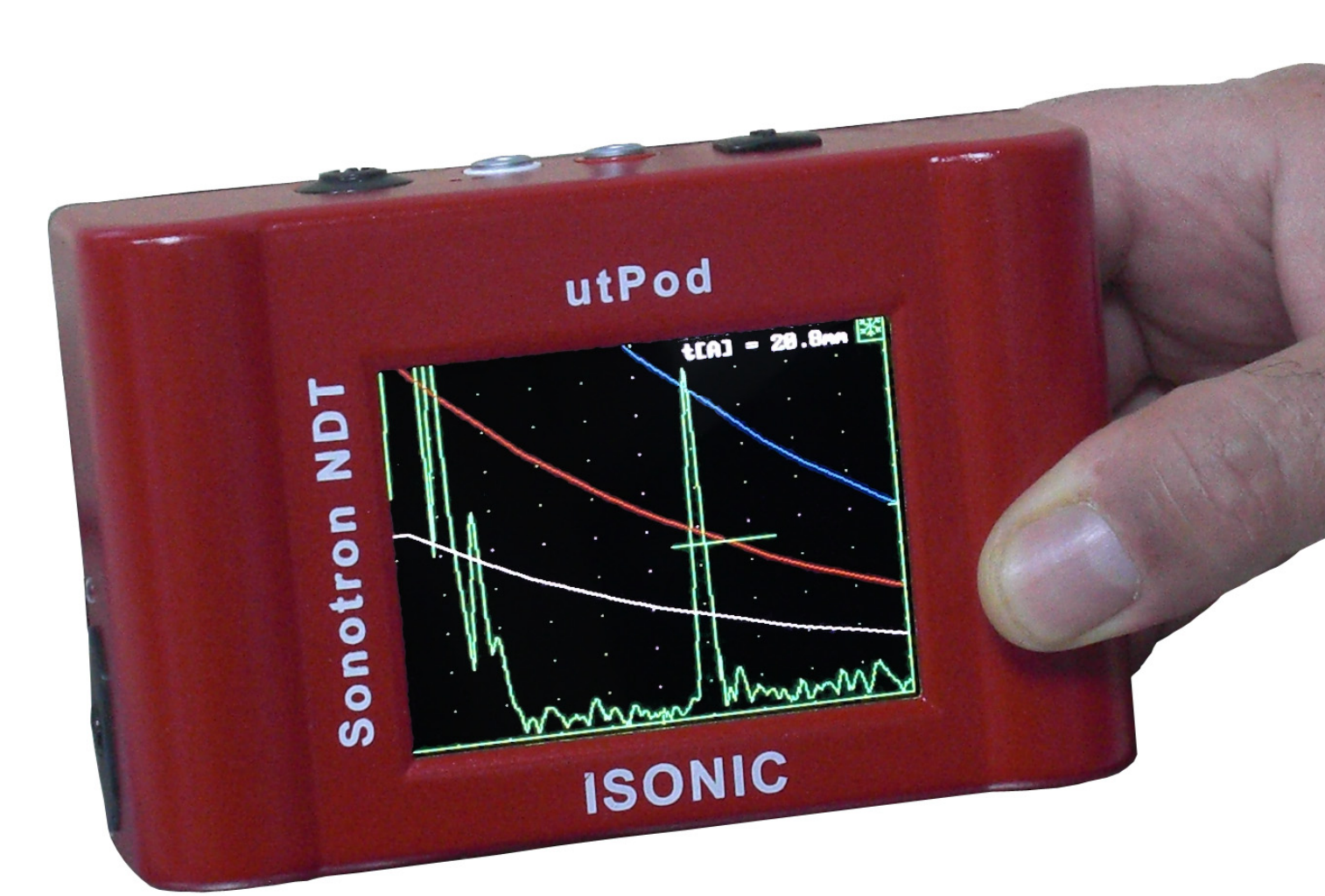
ISONIC utPod

Ultra-Portable Multi-Purpose Ultrasonic Testing Instrument



Operating Manual

Revision 1.18

Sonotron NDT

Sonotron NDT, 4, Pekeris st., Rabin Science Park, Rehovot, Israel, 76702

Sonotron NDT
4, Pekeris str., Rabin Science Park, Rehovot, 76702, Israel
Phone:++972-(0)8-9477701 Fax:++972-(0)8-9477712
http://www.sonotronndt.com

EC Declaration of Conformity

Council Directive 89/336/EEC on Electromagnetic Compatibility, as amended by Council Directive 92/31/EEC & Council Directive 93/68/EEC
Council Directive 73/23/EEC (Low Voltage Directive), as amended by Council Directive 93/68/EEC

We, **Sonotron NDT Ltd.**, 4 Pekeris Street, Rehovot, 76702 Israel, certify that the product described is in conformity with the Directives 73/23/EEC and 89/336/EEC as amended

ISONIC utPod

Ultra-Portable Multi-Purpose Ultrasonic Testing Instrument

The product identified above complies with the requirements of above EU directives by meeting the following standards:

Safety

EN 61010-1:1993

EMC

EN 61326:1997
EN 61000-3-2:1995 /A1:1998 /A2:1998 /A14:2000
EN 61000-3-3:1995

Sonotron NDT
4, Pekeris str., Rabin Science Park, Rehovot, 76702, Israel
Phone:++972-(0)8-9477701 Fax:++972-(0)8-9477712
http://www.sonotronndt.com

EC Declaration of Conformity

Council Directive 89/336/EEC on Electromagnetic Compatibility, as amended by Council Directive 92/31/EEC & Council Directive 93/68/EEC
Council Directive 73/23/EEC (Low Voltage Directive), as amended by Council Directive 93/68/EEC

We, **Sonotron NDT Ltd.**, 4 Pekeris Street, Rehovot, 76702 Israel, certify that the product described is in conformity with the Directives 73/23/EEC and 89/336/EEC as amended

ISONIC utPod LF

Ultra-Portable Multi-Purpose Ultrasonic Testing Instrument Adapted for Low Frequency Ultrasound Applications

The product identified above complies with the requirements of above EU directives by meeting the following standards:

Safety

EN 61010-1:1993

EMC

EN 61326:1997
EN 61000-3-2:1995 /A1:1998 /A2:1998 /A14:2000
EN 61000-3-3:1995

FCC Rules

This **ISONIC utPod / ISONIC utPod LF** multi-functional ultrasonic testing instrument (hereinafter called **ISONIC utPod / ISONIC utPod LF**) has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Safety Regulations

Please read this section carefully and observe the regulations in order to ensure your safety and operate the system as intended

Please observe the warnings and notes printed in this manual

The **ISONIC utPod / ISONIC utPod LF** has been built and tested according to the regulations specified in EN60950/VDE0805. It was in perfect working condition on leaving the manufacturer's premises

In order to retain this standard and to avoid any risk in operating the equipment, the user must make sure to comply with any hints and warnings included in this manual

Exemption from statutory liability for accidents

The manufacturer shall be exempt from statutory liability for accidents in the case of non-observance of the safety regulations by any operating person

Limitation of Liability

The manufacturer shall assume no warranty during the warranty period if the equipment is operated without observing the safety regulations. In any such case, manufacturer shall be exempt from statutory liability for accidents resulting from any operation

Warranty

When used in accordance with the manufacturer's written instructions and under normal operating conditions, **ISONIC utPod / ISONIC utPod LF** is conditionally guaranteed to be free from defects in material and workmanship for a period of 12 months from date of shipment. Second year warranty requires the instrument to be re-certified by Sonotron NDT or by an authorized representative or distributor, within 13 months of the date of purchase. A normal recalibration and re-certification fee will apply. All repair work will be made ex-works at the factory premises or at the premises of authorized representative or distributor provided the defective unit
is returned properly packed with all transportation charges prepaid. Any and all equipment replacement will be at the sole discretion of Sonotron NDT. This warranty shall not apply to equipment subjected to misuse or abuse, improper installation, alteration, neglect, or accident

This warranty is limited to the original purchaser and is not transferable. No other warranty, expressed or implied, is made.

Exemption from warranty

The manufacturer shall be exempt from any warranty obligations in case of the non-observance of the safety regulations
The manufacturer will only warrant safety, reliability, and performance of the **ISONIC utPod / ISONIC utPod LF** if the following safety regulations are closely observed:

- Setting up, expansions, re-adjustments, alterations, and repairs must only be carried out by persons who have been authorized by manufacturer
- The electric installations of the room where the equipment is to be set up must be in accordance with IEC requirements
- The instrument must be operated in accordance with the instructions
- Any expansions to the instrument must comply with the legal requirements, as well as with the specifications for the unit concerned
- Confirm the rated voltage of you're the instrument's external AC/DC converter / charger matches the voltage of your power outlet
- The mains socket must be located close to the instrument and must be easily accessible
- Use only the power cord furnished with the instrument
- Any required cable connectors must be hooked into the casing
- The instrument must be disconnected from external AC/DC converter / charger before opening
- To interrupt power supply, simply disconnect AC/DC converter / charger from the mains
- Any balancing, maintenance, or repair may only be carried out by manufacturer authorized specialists who are familiar with the inherent dangers
- If the instrument has suffered visible damage or if it has stopped working, it must be assumed that it could no longer be operated without any danger. In these cases, the instrument must be switched off and be safeguarded against accidental use
- Do not drop small objects, such as paper clips, into the instrument
- Disconnect the power cord whenever a thunderstorm is nearby. Leaving the power cord connected may damage the instrument or your property
- Do not allow any cables, particularly power cords, to trail across the floor, where they can be snagged by people walking past
- Charge of the battery for the instrument is allowed only with use of the AC/DC converter / charger supplied along with it

Remember this before:

- balancing
- carrying out maintenance work
- repairing
- exchanging any parts

Software

ISONIC utPod / ISONIC utPod LF is a software controlled inspection device. Based on present state of the art, software can never be completely free of faults. **ISONIC utPod / ISONIC utPod LF** should therefore be checked before and after use in order to ensure that the necessary functions operate perfectly in the envisaged combination. If you have any questions about solving problems related to use the **ISONIC utPod / ISONIC utPod LF**, please e-mail to **support@sonotronndt.com**

1. Introduction

Ultra-portable Multi-Purpose Ultrasonic Testing Instrument **ISONIC utPod** uniquely comprises:

- Top Performance Flaw Detector
- All-Functional A-Scan Thickness Gauge
- Simple Corrosion Gauge
- Comprehensive Data Logger

ISONIC utPod is fully controllable from an external PC via USB

ISONIC utPod LF is a modified version of **ISONIC utPod** adopted for the low frequency ultrasound applications. Comparing to **ISONIC utPod** it is characterized by the different frequency band and limits for settling the duration of the initial pulse – refer to the Chapter 2 of present Operating Manual

ISONIC utPod ADL and **ISONUC utPod LF ADL** are the models additonally featured with the *continous automatic data logging function* and docking terminal for integrating the instrument into *autonomously operating inspection systems* – refer to the Chapter 10 of present Operating Manual

2. Technical Data

Operating Modes:	**Flaw Detector** **All-Functional A-Scan Thickness Gauge** **Simple Corrosion Gauge**
Initial Pulse Type:	**Bipolar Square Wave Pulse**
Initial Transition:	**≤5 ns (10-90%)**
Pulse Amplitude:	**Smoothly tunable (12 levels) 60 V … 300 V pp into 50 Ω**
Pulse Duration:	
ISONIC utPod	**50…600 ns for each half wave synchronously controllable in 10 ns step**
ISONIC utPod LF	**50…10000 ns (10 μs) for each half wave synchronously controllable in 10 ns step**
Modes:	**Single / Dual**
PRF:	**15...2000 Hz controllable in 1 Hz resolution**
Gain:	**0...100 dB controllable in 0.5 dB resolution**
Advanced Low Noise Design:	**81 μV peak to peak input referred to 80 dB gain / 25 MHz bandwidth**
Frequency Band:	
ISONIC utPod	**0.2 … 25 MHz Wide Band**
ISONIC utPod LF	**0.03 … 15 MHz Wide Band**
Digital Filter:	**32-Taps FIR band pass with controllable lower and upper frequency limits**
Ultrasound Velocity:	**300…20000 m/s (11.81…787.4 "/ms) controllable in 1 m/s (0.1 "/ms) resolution**
Range:	**0.5...7000 μs controllable in 0.01 μs resolution**
Display Delay:	**0...3200 μs controllable in 0.01 μs resolution**
Probe Angle:	**0…90° controllable in 1° resolution**
Probe Delay:	**0 to 70 μs controllable in 0.01 μs resolution**
Display Modes:	**RF, Rectified (Full Wave / Negative or Positive Half Wave)**
Reject:	**0...99 % of screen height controllable in 1% resolution**
DAC / TCG:	**Multi-curve (up to 4)** **Theoretical – through keying in dB/mm (dB/") factor as used for AWS evaluation, inspection of highly attenuative materials, and the like** **Experimental – through recording echo amplitudes from variously distanced equal reflectors, up to 40 points** **46 dB Dynamic Range, Slope ≤ 120 dB/□s** **Available for Rectified and RF Display**
DGS:	**Standard Library for 18 probes / expandable**
Gates:	**2 Independent Gates**
Gate Start and Width:	**Controllable over the whole range of A-Scan time base settings in 0.1 mm / 0.001" resolution**
Gate Threshold:	**5…95 % of A-Scan height controllable in 1 % resolution**
Signal Evaluation – Digital Readout:	**19 automatic functions / expandable; curved surface / thickness / skip correction for angle beam probes; material velocity and probe delay auto-calibration for all types of probes; AWS / API evaluation**
Freeze:	**Freeze All / Freeze Peak**
Data Storage Capacity:	**At least 100000 sets including calibration dumps accompanied with A-Scans**
Data Logger:	**1D (linear), 2D (X, Y), 3D (X, Y, Z), or 4D (X, Y, Z, retake) array**
Internal Flash Memory:	**2 Gigabytes**
Output:	**USB – calibration and data files transfer to / from PC, generation of inspection reports in editable format and hard copy / full control by PC**
Screen:	**3.2" High Color Resolution QVGA Sun-Readable Active Matrix LCD with an embedded PICASO-GFX2 graphics controller**
Controls:	**Touch Screen**
Power:	**On-board Li-Ion Rechargeable Battery, 6-10 hours continuous operation depending on mode of use** **Mains - External AC/DC converter / charger 100-240 VAC, 40-70 Hz**
Housing:	**IP 67 rugged plastic case**
Dimensions:	**130×84×42 mm (5.12"×3.31"×1.65")**
Weight:	**400 g (0.88 lbs) - with battery**
Hardware Warranty:	**12 months**
Firmware Warranty:	**Lifetime free update with the latest version available for free access at www.sonotronndt.com/support.htm**
ISONIC utPod for PC Software Warranty:	**Lifetime free update with the latest version available for free access at www.sonotronndt.com/support.htm**
Available in three colors:	**Blue, Red, Black**

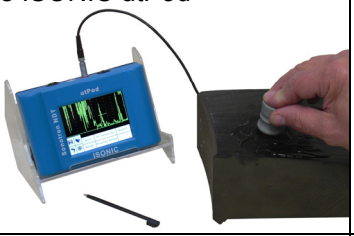
3. ISONIC utPod – Scope of Supply

#	Item	Order Code (Part #)	Note
1	**ISONIC utPod** – Ultra-Portable Multi-Functional Ultrasonic Testing Instrument *Including:* ⇨ Top Performance Flaw Detector with DAC, DGS, TCG, Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, AWS / API Evaluation ⇨ All-Functional A-Scan Thickness Gauge - Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, High Precision ▶ Use of single element probes with / without delay line ▶ Through-Paint / Through Coating Thickness Measurement with use of regular single element probes - no limit on the thickness of paint / coating layer ▶ Far Side Wall Thickness Measurement in tubes with use of regular single element probes ▶ Switchable into the simplest thickness gauge mode (digial readout only) ⇨ All-Functional A-Scan Corrosion Gauge - Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, High Precision ▶ Use of dual element probes ▶ Through-Paint / Through Coating Thickness Measurement with use of regular single element probes - no limit on the thickness of paint / coating layer ▶ Far Side Wall Thickness Measurement in tubes with use of regular single element probes ▶ Switchable into the simplest corrosion gauge mode (digial readout only) ⇨ Comprehensive Data Logger ⇨ Supervisor lock / unlock function ⇨ Full USB Controllability ▶ ISONIC utPod for PC SW package (SW 808012) on the backup USB key: → USB Connection to PC with live large high quality A-Scan / instrument control over USB → Storing Calibrations / A-Scans / Data Logger files directly onto PCs disk drive → Exporting Calibrations / A-Scans / Data Logger files from instrument onto PCs disk drive → Importing Calibrations / A-Scans / Data Logger files from PCs disk drive into instrument → Generating Inspection / Calibration Report - hard copy. PDF file, editable MS Word file → Exporting Data Logger data Into Excel file ▶ Operating Manual on the backup USB key ▶ USB Cable for connection to the PC (S 808014) ▶ Backup USB Key (S 808016) ▶ Integrated Li-Ion Battery Pack (S 808018) ▶ Stylus Stick (S 808020) ▶ External charger with power cable (S 808022) - on-board battery charging ▷ 2 G Internal Memory (SD Card) ▷ 400 g (0.88 lbs) including battery ▷ 12-month warranty for electronics and batteries ▷ Lifetime free firmware upgrade for the instrument through **www.sonotronndt.com** ▷ Lifetime free software upgrade for the ISONIC utPod for PC SW package through **www.sonotronndt.com**	SA 80810	

#	Item	Order Code (Part #)	Note
2	**ISONIC utPod LF** – Ultra-Portable Multi-Functional Ultrasonic Testing Instrument Adapted for Low Frequency Ultrasound Applications *Including:* ⇨ Top Performance Flaw Detector with DAC, DGS, TCG, Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, AWS / API Evaluation ▶ Extended Low Frequency Band - down to 30 kHz: 30 kHz ... 15 MHz ▶ Expanded Range for Initial Pulse Width Tuning: 50 ns ... 10000 ns (10 μs) ⇨ All-Functional A-Scan Thickness Gauge - Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, High Precision ▶ Use of single element probes with / without delay line ▶ Through-Paint / Through Coating Thickness Measurement with use of regular single element probes - no limit on the thickness of paint / coating layer ▶ Far Side Wall Thickness Measurement in tubes with use of regular single element probes ▶ Switchable into the simplest thickness gauge mode (digial readout only) ⇨ All-Functional A-Scan Corrosion Gauge - Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, High Precision ▶ Use of dual element probes ▶ Through-Paint / Through Coating Thickness Measurement with use of regular single element probes - no limit on the thickness of paint / coating layer ▶ Far Side Wall Thickness Measurement in tubes with use of regular single element probes ▶ Switchable into the simplest corrosion gauge mode (digial readout only) ⇨ Comprehensive Data Logger ⇨ Supervisor lock / unlock function ⇨ Full USB Controllability ▶ ISONIC utPod for PC SW package (SW 808012) on the backup USB key: → USB Connection to PC with live large high quality A-Scan / instrument control over USB → Storing Calibrations / A-Scans / Data Logger files directly onto PCs disk drive → Exporting Calibrations / A-Scans / Data Logger files from instrument onto PCs disk drive → Importing Calibrations / A-Scans / Data Logger files from PCs disk drive into instrument → Generating Inspection / Calibration Report - hard copy. PDF file, editable MS Word file → Exporting Data Logger data Into Excel file ▶ Operating Manual on the backup USB key ▶ USB Cable for connection to the PC (S 808014) ▶ Backup USB Key (S 808016) ▶ Integrated Li-Ion Battery Pack (S 808018) ▶ Stylus Stick (S 808020) ▶ External charger with power cable (S 808022) - on-board battery charging ▷ 2 G Internal Memory (SD Card) ▷ 400 g (0.88 lbs) including battery ▷ 12-month warranty for electronics and batteries ▷ Lifetime free firmware upgrade for the instrument through **www.sonotronndt.com** ▷ Lifetime free software upgrade for the ISONIC utPod for PC SW package through **www.sonotronndt.com**	SA 80812	

#	Item	Order Code (Part #)	Note
3	**ISONIC utPod ADL** – Ultra-Portable Multi-Functional Ultrasonic Testing Instrument with Real Time Logger *Including:* ⇨ Top Performance Flaw Detector with DAC, DGS, TCG, Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, AWS / API Evaluation ⇨ All-Functional A-Scan Thickness Gauge - Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, High Precision ▶ Use of single element probes with / without delay line ▶ Through-Paint / Through Coating Thickness Measurement with use of regular single element probes - no limit on the thickness of paint / coating layer ▶ Far Side Wall Thickness Measurement in tubes with use of regular single element probes ▶ Switchable into the simplest thickness gauge mode (digial readout only) ⇨ All-Functional A-Scan Corrosion Gauge - Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, High Precision ▶ Use of dual element probes ▶ Through-Paint / Through Coating Thickness Measurement with use of regular single element probes - no limit on the thickness of paint / coating layer ▶ Far Side Wall Thickness Measurement in tubes with use of regular single element probes ▶ Switchable into the simplest corrosion gauge mode (digial readout only) ⇨ Comprehensive Data Logger ⇨ Automatic Real Time Logger ⇨ Docking Terminal for Integration into Autonomous Automatic Inspection System ⇨ Supervisor lock / unlock function ⇨ Full USB Controllability ▶ ISONIC utPod for PC SW package (SW 808012) on the backup USB key: → USB Connection to PC with live large high quality A-Scan / instrument control over USB → Storing Calibrations / A-Scans / Data Logger files directly onto PCs disk drive → Exporting Calibrations / A-Scans / Data Logger files from instrument onto PCs disk drive → Importing Calibrations / A-Scans / Data Logger files from PCs disk drive into instrument → Generating Inspection / Calibration Report - hard copy. PDF file, editable MS Word file → Exporting Data Logger data Into Excel file ▶ Operating Manual on the backup USB key ▶ USB Cable for connection to the PC (S 808014) ▶ Backup USB Key (S 808016) ▶ Integrated Li-Ion Battery Pack (S 808018) ▶ Stylus Stick (S 808020) ▶ External charger with power cable (S 808022) - on-board battery charging ▷ 2 G Internal Memory (SD Card) ▷ 400 g (0.88 lbs) including battery ▷ 12-month warranty for electronics and batteries ▷ Lifetime free firmware upgrade for the instrument through **www.sonotronndt.com** ▷ Lifetime free software upgrade for the ISONIC utPod for PC SW package through **www.sonotronndt.com**	SA 80814	

#	Item	Order Code (Part #)	Note
4	**ISONIC utPod LF ADL** – Ultra-Portable Multi-Functional Ultrasonic Testing Instrument with Real Time Logger Adapted for Low Frequency Ultrasound Applications *Including:* ⇨ Top Performance Flaw Detector with DAC, DGS, TCG, Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, AWS / API Evaluation ▶ Extended Low Frequency Band - down to 30 kHz: 30 kHz ... 15 MHz ▶ Expanded Range for Initial Pulse Width Tuning: 50 ns ... 10000 ns (10 ms) ⇨ All-Functional A-Scan Thickness Gauge - Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, High Precision ▶ Use of single element probes with / without delay line ▶ Through-Paint / Through Coating Thickness Measurement with use of regular single element probes - no limit on the thickness of paint / coating layer ▶ Far Side Wall Thickness Measurement in tubes with use of regular single element probes ▶ Switcheable into the simplest thickness gauge mode (digial readout only) ⇨ All-Functional A-Scan Corrosion Gauge - Bipolar / Unipolar Square Wave Pulser, 100 MHz Sampling Rate, 100 dB Analogue Gain, High Precision ▶ Use of dual element probes ▶ Through-Paint / Through Coating Thickness Measurement with use of regular single element probes - no limit on the thickness of paint / coating layer ▶ Far Side Wall Thickness Measurement in tubes with use of regular single element probes ▶ Switcheable into the simplest corrosion gauge mode (digial readout only) ⇨ Comprehensive Data Logger ⇨ Automatic Real Time Logger ⇨ Docking Terminal for Integration into Autonomous Automatic Inspection System ⇨ Supervisor lock / unlock function ⇨ Full USB Controllability ▶ ISONIC utPod for PC SW package (SW 808012) on the backup USB key: → USB Connection to PC with live large high quality A-Scan / instrument control over USB → Storing Calibrations / A-Scans / Data Logger files directly onto PCs disk drive → Exporting Calibrations / A-Scans / Data Logger files from instrument onto PCs disk drive → Importing Calibrations / A-Scans / Data Logger files from PCs disk drive into instrument → Generating Inspection / Calibration Report - hard copy. PDF file, editable MS Word file → Exporting Data Logger data Into Excel file ▶ Operating Manual on the backup USB key ▶ USB Cable for connection to the PC (S 808014) ▶ Backup USB Key (S 808016) ▶ Integrated Li-Ion Battery Pack (S 808018) ▶ Stylus Stick (S 808020) ▶ External charger with power cable (S 808022) - on-board battery charging ▷ 2 G Internal Memory (SD Card) ▷ 400 g (0.88 lbs) including battery ▷ 12-month warranty for electronics and batteries ▷ Lifetime free firmware upgrade for the instrument through **www.sonotronndt.com** ▷ Lifetime free software upgrade for the ISONIC utPod for PC SW package through **www.sonotronndt.com**	SA 80816	

#	Item	Order Code (Part #)	Note
5	Table Stand for desktop usage of the ISONIC utPod 	S 808040	Optional Item
6	"Goose Neck" Adaptor 	S 808042	Optional Item
5	Arm Fixture for instrument usage in the field 	S 808044	Optional Item
6	Soft case for ISONIC utPod 	S 808046	Optional Item
7	Ultrasonic probes, fixtures, scanners, cables and other accessories depending on the inspection tasks to be resolved		Optional Items Ultrasonic probes, fixtures, scanners, cables and other accessories from any manufacturer may be used

4. Operating ISONIC utPod

Please read the following information before you use **ISONIC utPod**. It is essential to read and understand the following information so that no errors occur during operation, which could lead damaging of the unit or misinterpretation of inspection results

4.1. Preconditions for ultrasonic testing with ISONIC utPod

4.1.1. General

The correct and effective use of ultrasonic test equipment requires the interaction of three factors:

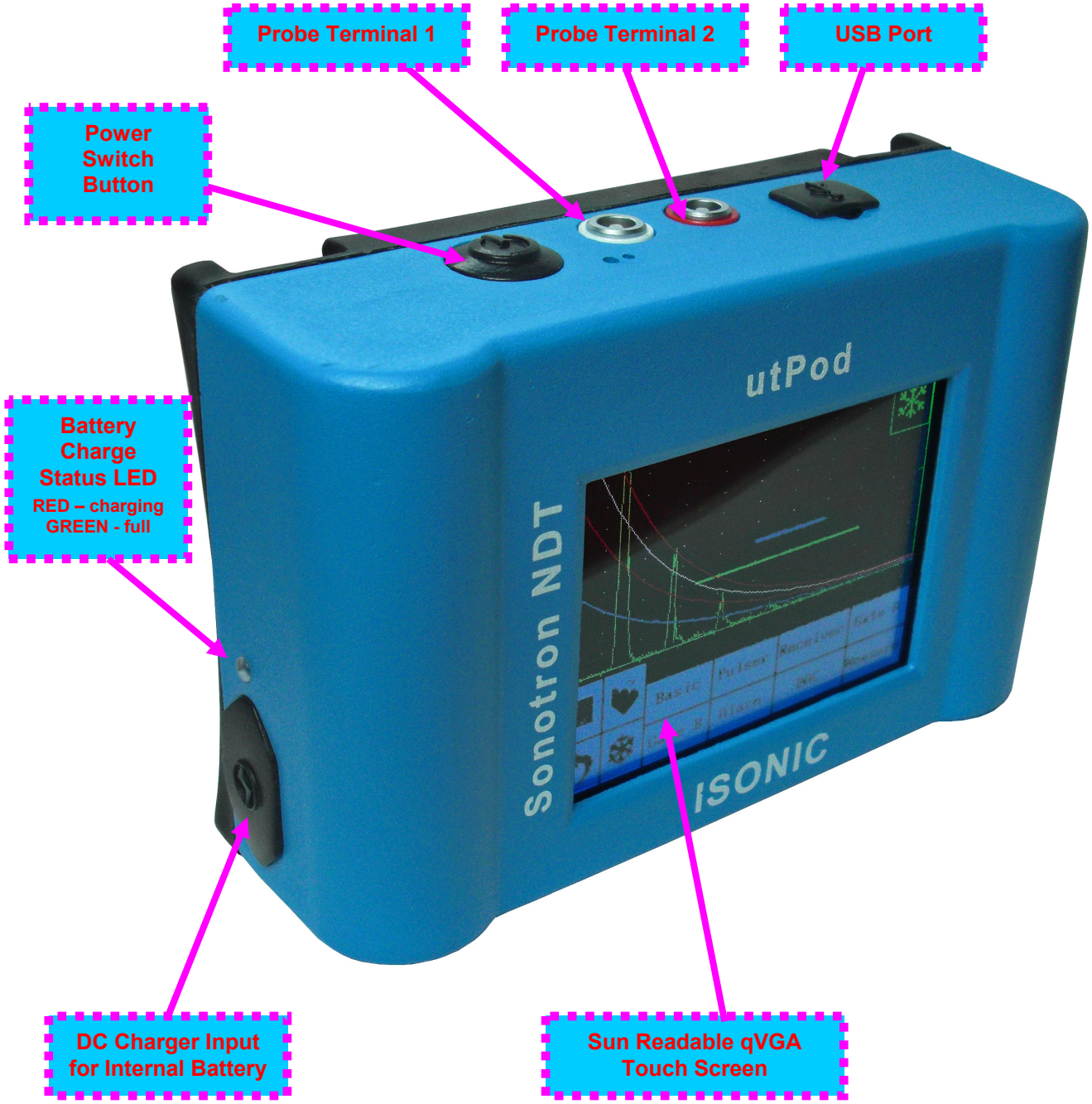
- The test equipment itself
- The specific test applications
- The operator

The purpose of this operating manual will be to give instructions in the basic set-up and functional operation of **ISONIC utPod**. Such information is covered in detail within the manual. Other variable factors, some of which are noted below, and the actions necessary to control them, are the responsibility of the user. Details regarding these factors are beyond the scope of the operating manual

4.1.2. Training

The adequate training of the operators should be provided to assure competence in the operation of the **ISONIC utPod** and in the associated factors. Operator of **ISONIC utPod** must be certified as at least *Level 2 Ultrasonic Examiner*. The operator must understand and provide for interpretation and compliance with the specifications covering its work, generated by such groups as in-house Quality Assurance, Technical Societies, Industry Groups, or Government Agencies

4.2. ISONIC utPod Controls and Terminals

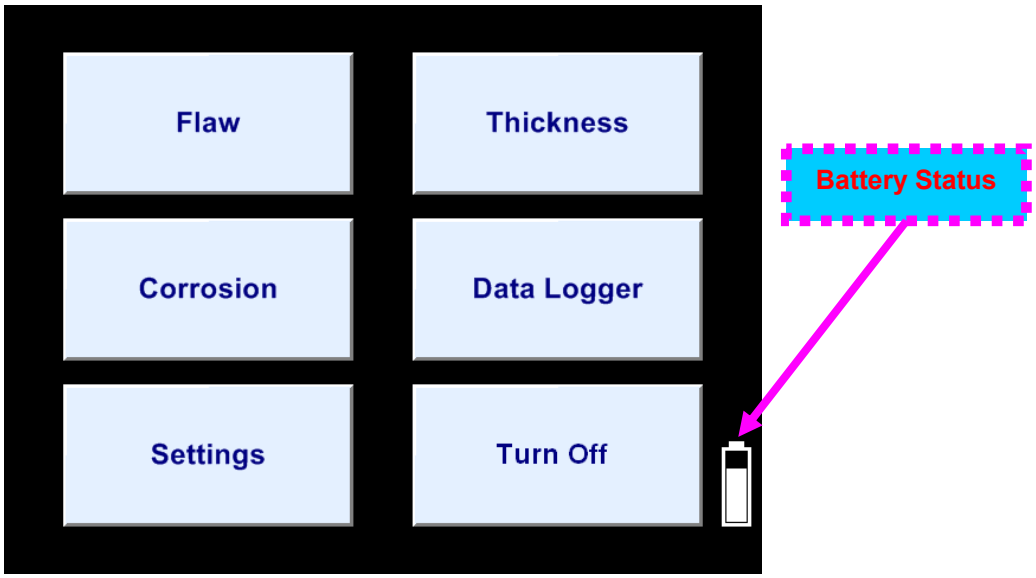


4.3. Turning On / Off

ISONIC utPod is powered by built-in rechargeable battery

To turn **ISONIC utPod** on press on power switch button. An automatic system test and boot-up routine will be executed then indicating the screen as below

Wait until **ISONIC utPod** start screen appears upon boot-up completed:



Click on Flaw to operate **ISONIC utPod** as flaw detector (refer to chapter 5 of the operating manual)

Click on Thickness to operate **ISONIC utPod** as thickness gauge using single element probes (refer to chapter 6 of the operating manual)

Click on Corrosion to operate **ISONIC utPod** as corrosion gauge using dual element probes (refer to chapter 7 of the operating manual)

Click on Data Logger to format data logger of **ISONIC utPod** (refer to chapter 8 of the operating manual)

Click on Settings in order to:

- ⇨ select measurement units (metric or imperial)
- ⇨ select the dialogue language
- ⇨ calibrate touch screen
- ⇨ switching built-in buzzer ON or OFF
- ⇨ setting power saving (sleep mode) parameters
- ⇨ identifying version (release number) of the currently installed firmware

Refer to Chapter 9 of present Operating Manual

To turn **ISONIC utPod** off click on Turn Off or press power switch button during few seconds

5. Flaw Detector Mode

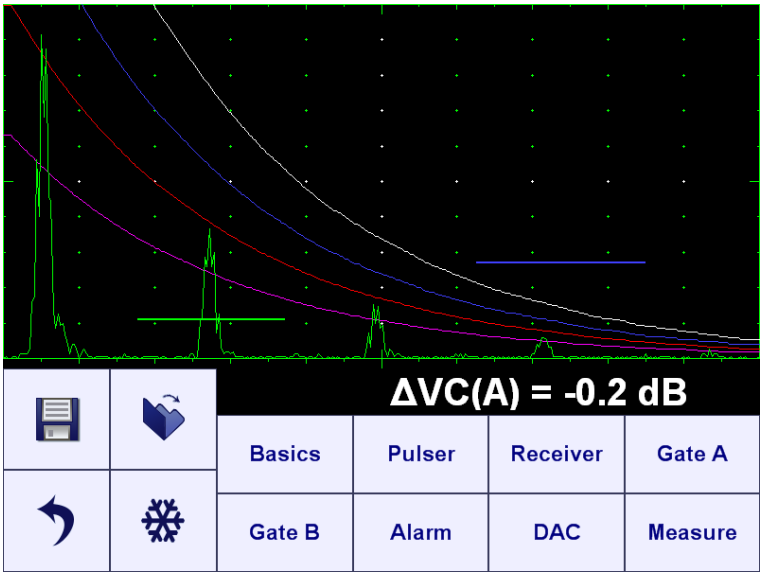
5.1. Top Level Screen

Click on  to store **A-Scan** accompanied with signal evaluation results and calibration set into a file

Click on  to upload **A-Scan** accompanied with signal evaluation results and calibration set from a file

Click on  to freeze / return to live **A-Scan**

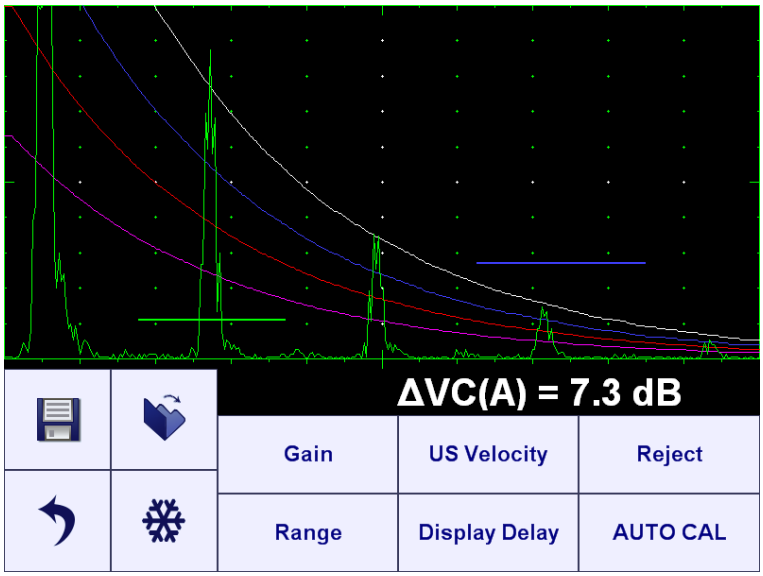
Click on  to return to upper level menu. Current settings of flaw detector will be kept as default then



5.2. Submenu BASICS

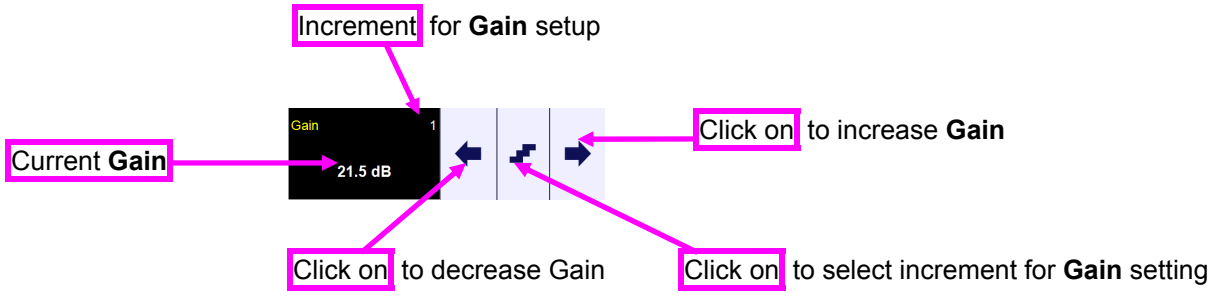
Click on

in the *Top Level Screen* to enter, the screen as below appears



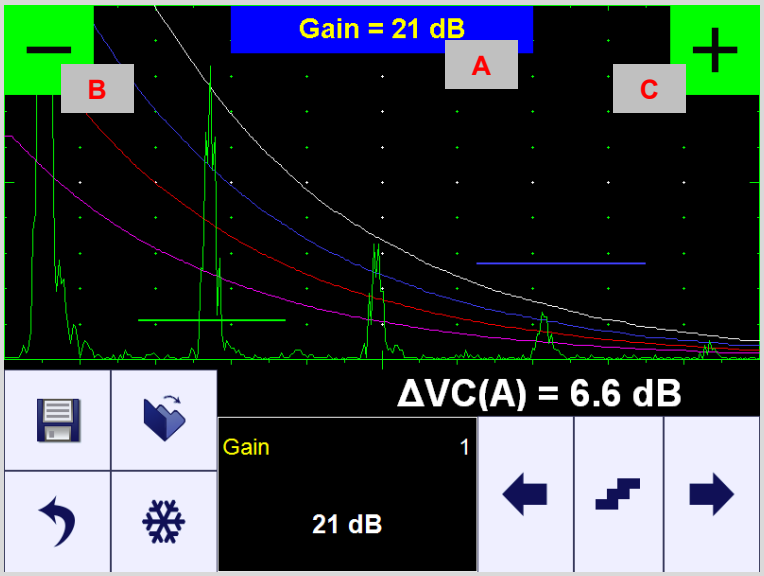
5.2.1. Gain

Click on Gain to control **Gain** setting. The control related to **Gain** setting and possible manipulations are shown below.



The rules as above are applicable to control of all other parameters and modes of **ISONIC utPod**, for manipulation of which there are provided controls of the same type

*The alternative way to display / manipulate of current **Gain** setting:*



Touch area **A** on the A-Scan – the current **Gain** setting appears in that area upon and kept on the top of the screen for several seconds after area **A** untouched

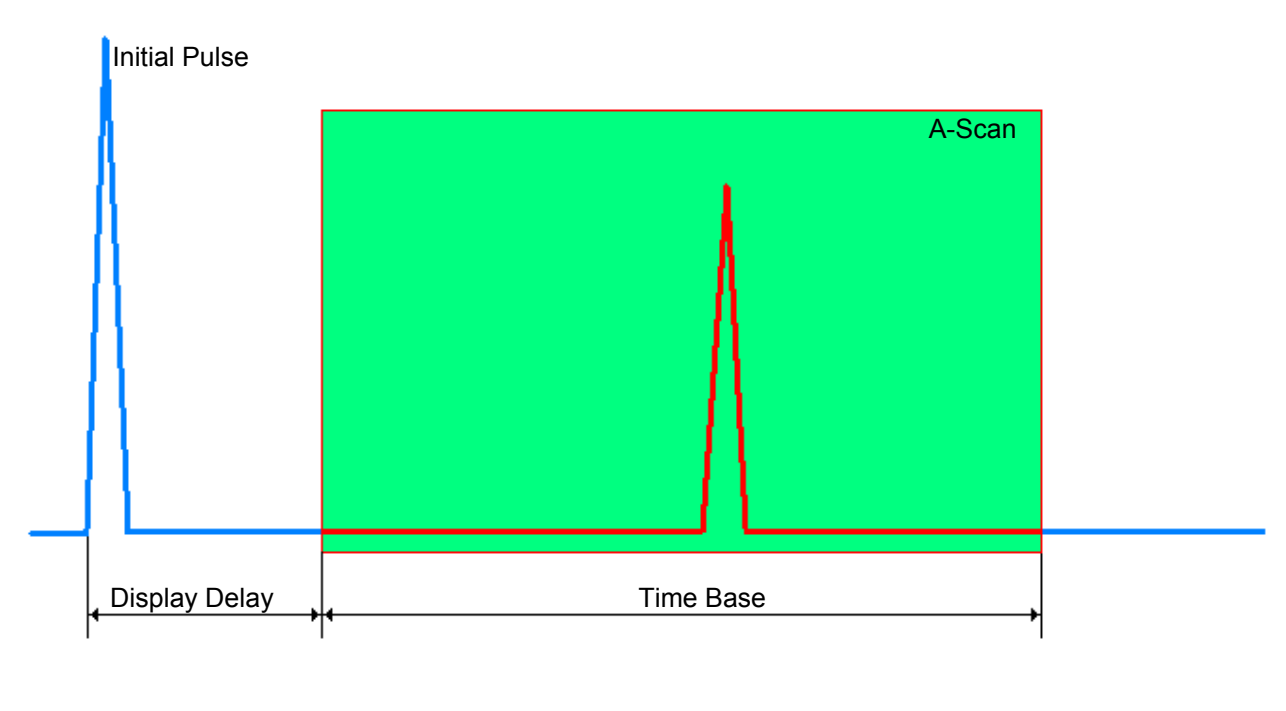
Touch area **B** on the screen and keep the said area touched unit **Gain** decreased to the needful value – the appropriate indication is provided in the area **A** on the A-Scan during all time of such Gain manipulation and kept on the top of the screen for several seconds after area **B** untouched

Touch area **C** on the screen and keep the said area touched unit **Gain** increased to the needful value – the appropriate indication is provided in the area **A** on the A-Scan during all time of such Gain manipulation and kept on the top of the screen for several seconds after area **C** untouched

5.2.2. Display Delay, Range, US Velocity

Click on Display Delay / Range / US Velocity to manipulate **Display Delay** / **Range** / **US Velocity** settings

The illustration of the emitting initial pulse / receiving an echo process, corresponding indication, and meaning of **Display Delay** / **Range** / **US Velocity** is below:

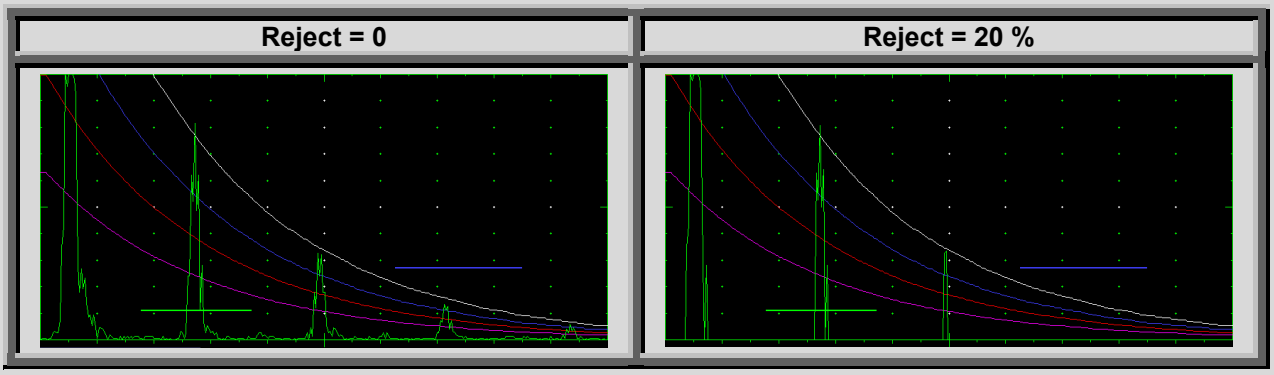


$$Range = 2 \times TimeBase \times USVelocity$$

5.2.3. Reject

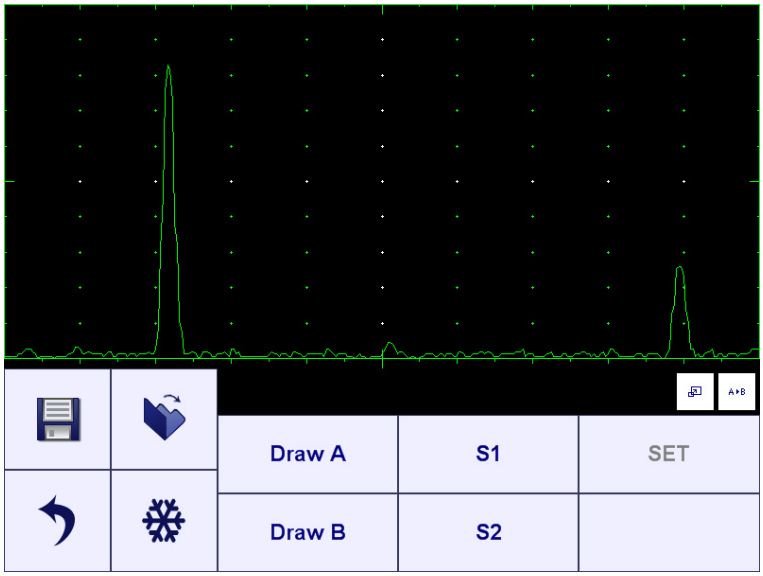
Click on Reject to manipulate **Reject** setting

- **Reject** may be applied to rectified signals only (Rectification = **Full**, **NegHalf**, **PosHalf** - refer to paragraph 5.4.3 of this Operating Manual)
- Signals below **Reject** level (small signals) are suppressed
- Signals exceeding **Reject** level (large signals) are presented on the A-Scan without affecting their original height, while part of large signal below **Reject** level is suppressed

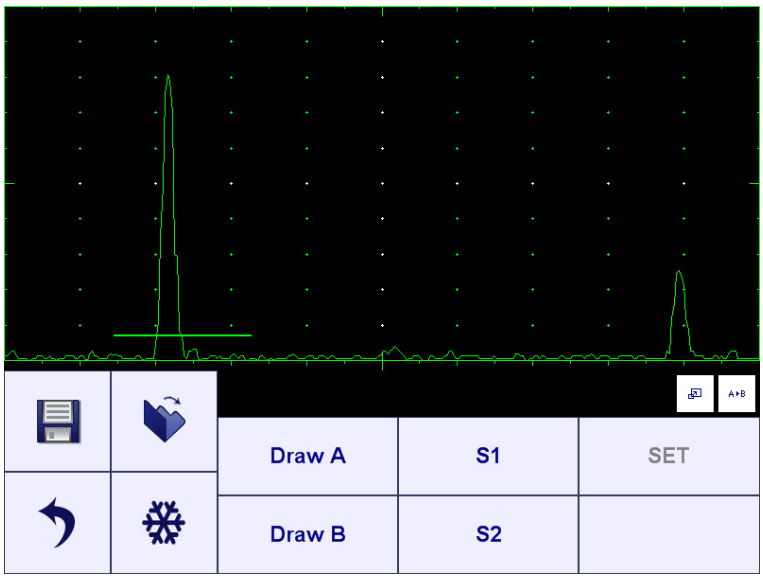


5.2.4. AUTO CAL

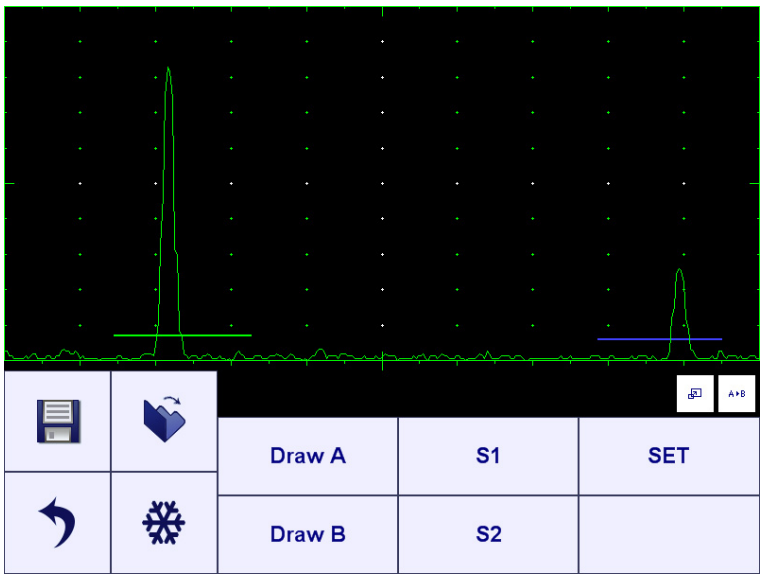
Ultrasonic probe should be placed onto the sample providing receiving of two echoes from reflectors with known material travel distance, the **Range** and **Display Delay** settings to provide appearance of both echoes on the A-Scan. Ob completion click on AUTO CAL to enter to screen allowing automatic calibration of ultrasonic velocity (**US Velocity**) and **Probe Delay**



Click on Draw A and cover first echo by the Gate A (refer to paragraph 5.5.3 of present Operating Manual):



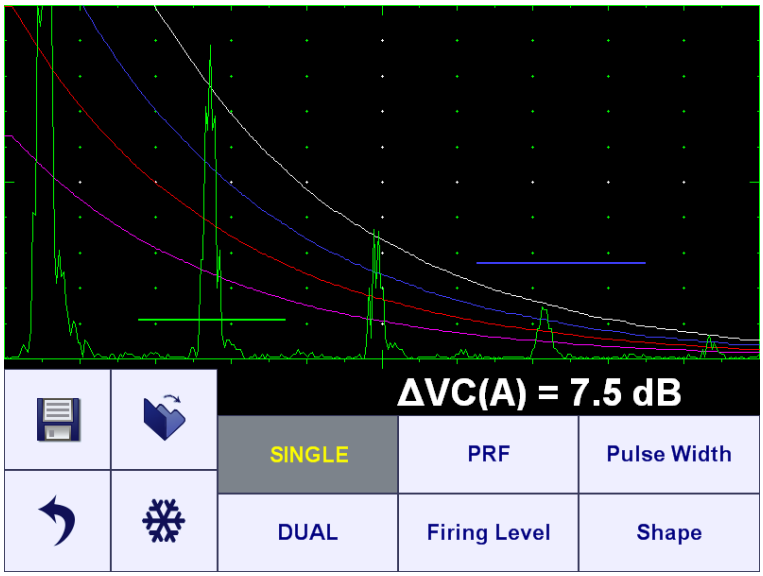
Click on Draw B and cover second echo by the **Gate B** (refer to paragraph 5.5.3 of present Operating Manual):



Click on S1 and key in material travel distance for the first echo then click on S2 and key in material travel distance for the second echo. On completion click on SET - the values of **Probe Delay** and **US Velocity** will be defined by instrument automatically and indicated

5.3. Submenu PULSER

Click on Pulser in the *Top Level Screen* to enter, the screen as below appears



5.3.1. SINGLE / DUAL

There are two Pulser Modes available – **Single** and **Dual**. To switch touch the appropriate button:

SINGLE
DUAL

Single element probe to be connected to Probe Terminal 2 (refer to paragraph 4.2 of the operating manual)

SINGLE
DUAL

Emitting crystal of dual element probe or emitting single element probe to be connected to Probe Terminal 1 (refer to paragraph 4.2 of the operating manual)

Receiving crystal of dual element probe or receiving single element probe to be connected to Probe Terminal 2 (refer to paragraph 4.2 of the operating manual)

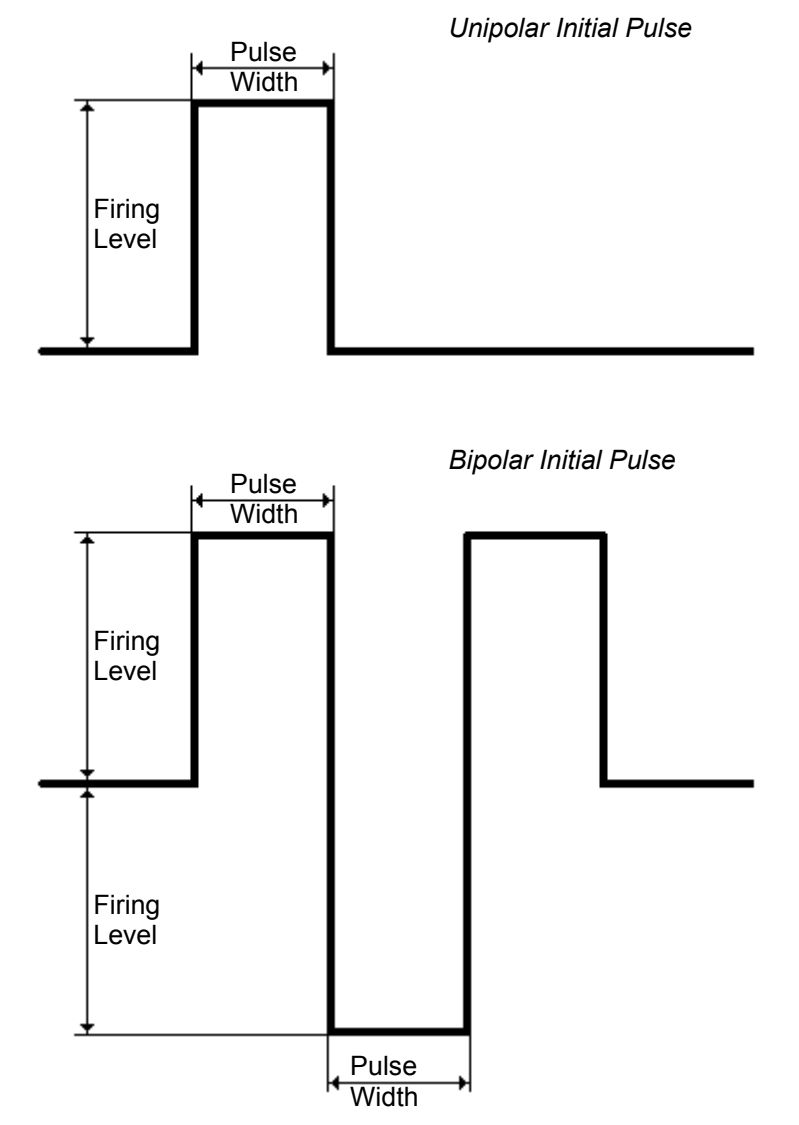
5.3.2. Pulse Repetition Frequency (PRF)

Click on PRF to control **PRF** setting

5.3.3. Initial Pulse: Shape, Duration (Pulse Width), Firing Level

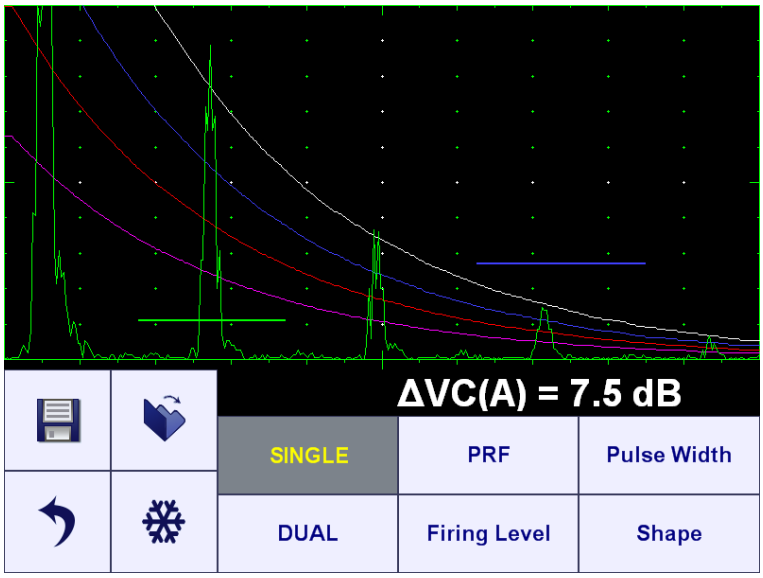
Click on Shape / Pulse Width / Firing Level to manipulate **Shape** / **Pulse Width / Firing Level** settings

- **Bipolar** initial pulse is recommended for most applications
- **Pulse Width** is tunable between 50 ns to 600 ns in 10 ns steps
- **Pulse Width** / **Firing Level** of positive and negative half wave of the bipolar initial pulse are varying synchronously
- There are 12 grades (1 through 12) for setting **Firing Level**



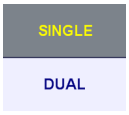
5.4. Sub Menu RECEIVER

Click on Receiver in the *Top Level Screen* to enter, the screen as below appears

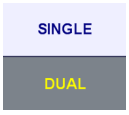


5.4.1. SINGLE / DUAL

There are two Pulser Modes available – **Single** and **Dual**. To switch touch the appropriate button:



Single element probe to be connected to Probe Terminal 2 (refer to paragraph 4.2 of the operating manual)



Emitting crystal of dual element probe or emitting single element probe to be connected to Probe Terminal 1 (refer to paragraph 4.2 of the operating manual)

Receiving crystal of dual element probe or receiving single element probe to be connected to Probe Terminal 1 (refer to paragraph 4.2 of the operating manual)

5.4.2. Filter

Click on Filter to control **Filter** settings

ⓘ

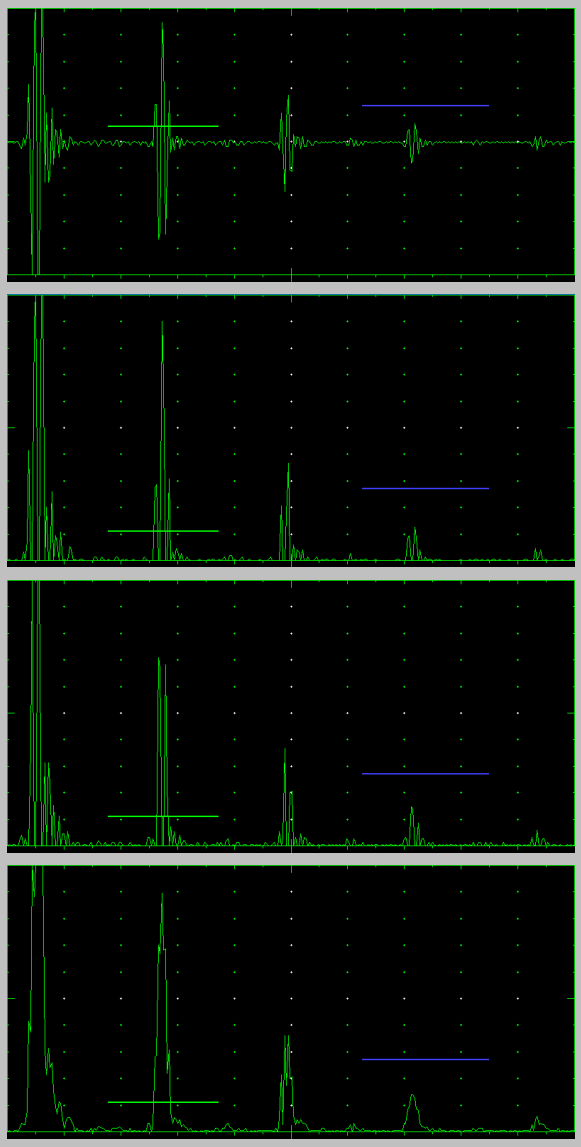
Digital Filter may be switched **ON** / **OFF**
While switched **ON** the following bandpass settings are possible:

ISONIC utPod	ISONIC utPod LF
0.1 … 13 MHz	**0.03…1 MHz**
1 … 3 MHz	**0.1 … 13 MHz**
3 … 5 MHz	**1 … 3 MHz**
5 … 7 MHz	**3 … 5 MHz**
0.5 … 25 MHz	**5 … 7 MHz**

5.4.3. Rectification

Click on Rectification - there are four rectification modes possible

Rectification modes:



RF – not rectified

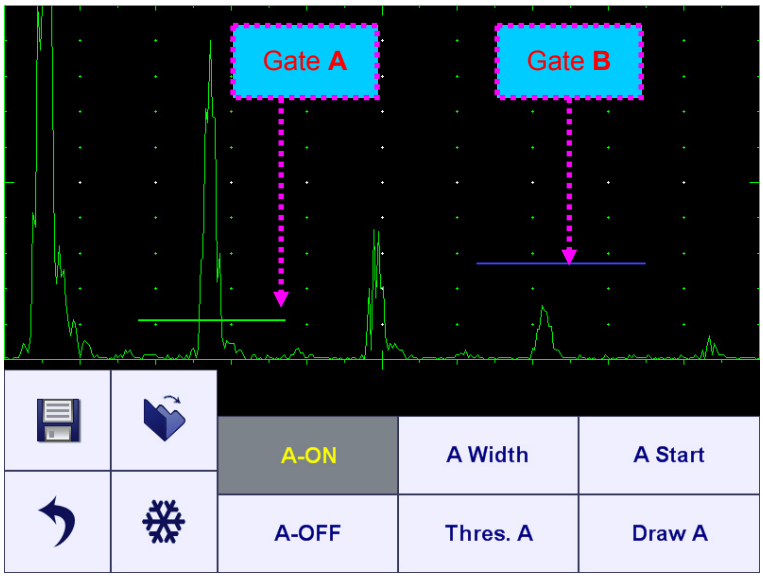
PosHalf – positive half wave rectified

NegHalf – negative half wave rectified

Full – both waves rectified

5.5. Sub Menus GATE A / GATE B

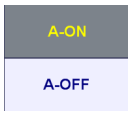
Click on Gate A / Gate B in the *Top Level Screen* to enter, the screen as below appears



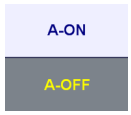
While used as flaw detector **ISONIC utPod** provides 2 independently controllable gates **A** and **B**

5.5.1. Switch Gate ON / OFF

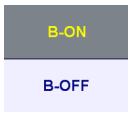
To switch gate **ON / OFF** touch the appropriate button:



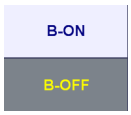
Gate A is **ON**



Gate A is **OFF**



Gate B is **ON**



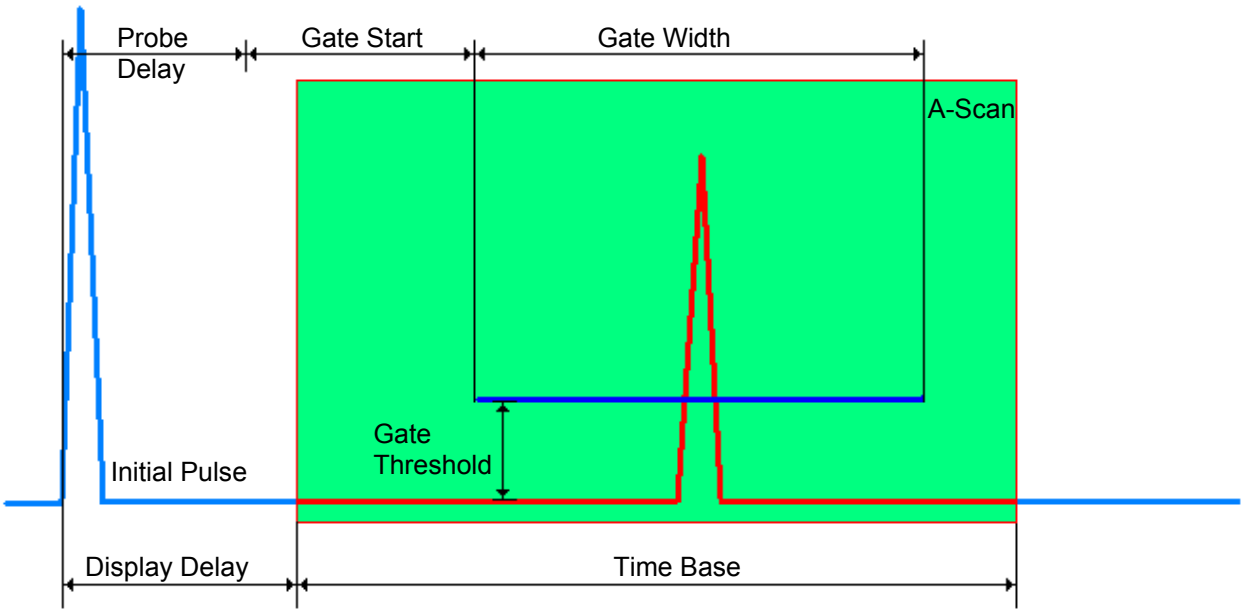
Gate B is **OFF**

5.5.2. Gate Start, Width, Threshold

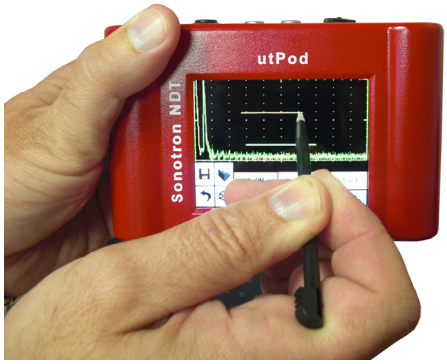
Click on A Start / A Width / Thres. A to manipulate **Start** / **Width** / **Threshold settings** for **Gate A** (or identical buttons for the **Gate B**

ⓘ

In the **ISONIC utPod Gate Start** is counted from the surface of the material, which is determined through keying in **Probe Delay**



5.5.3. Draw Gate



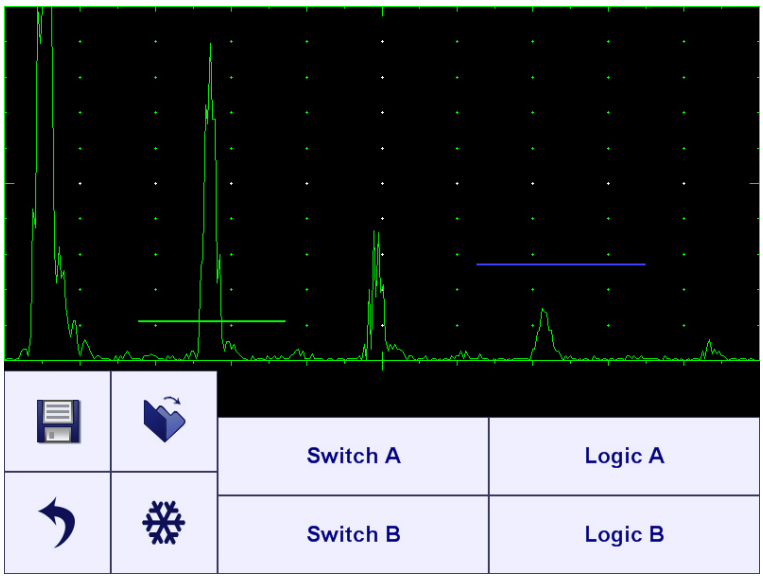
Click on Draw A (or identical button for the **Gate B**) then draw **Gate A** (or **Gate B**) in the new desired position on the **A-Scan**. This way allows redefining all three parameters of the gate quickly

Refer also to the movie at:

http://www.sonotronndt.com/PDF/OM_utPod/MOV/utPod_Draw_Gate.MOV

5.6. Sub Menu ALARM

Click on Alarm in the *Top Level Screen* to enter, the screen as below appears:



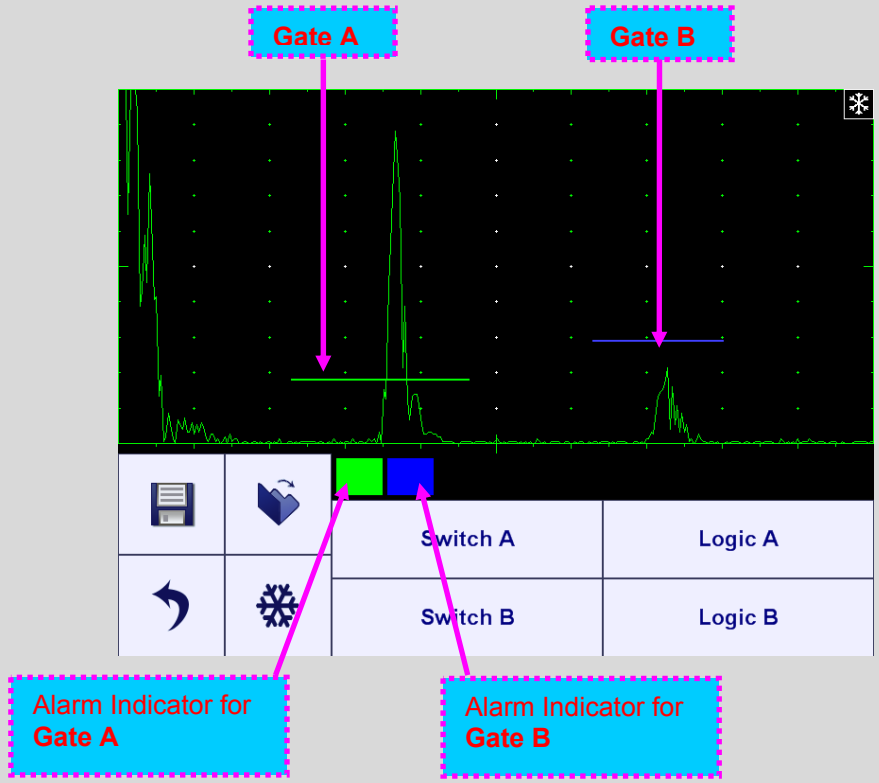
5.6.1. Switch Alarm ON / OFF

To switch **Alarm** for **Gate A** (**Gate B**) **ON / OFF** touch the appropriate button either Switch A / Switch B then provide the desired setting

5.6.2. Alarm Logic

To setup **Alarm Logic** for **Gate A** (**Gate B**) **ON / OFF** touch the appropriate button either Logic A / Logic B then provide the desired setting

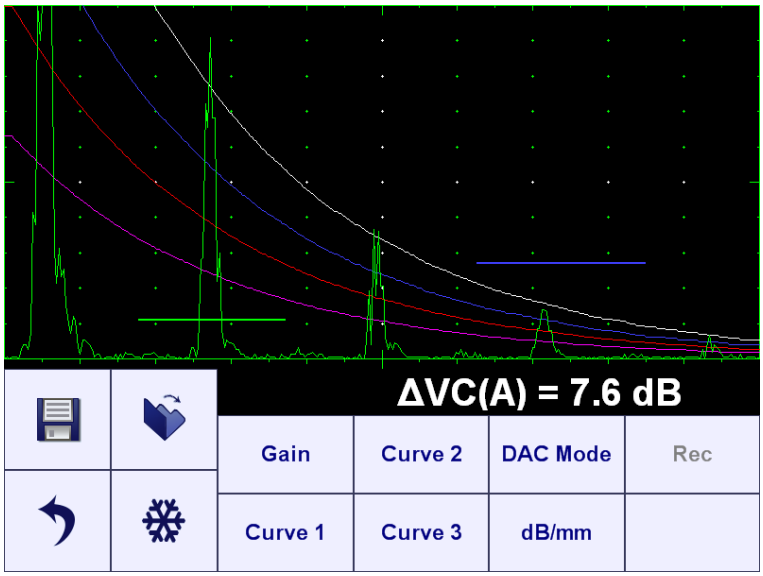
5.6.3. Alarm Example



- There is an echo matching with **Gate A** and exceeding its threshold; the **Alarm Logic** setting for **Gate A** is **Positive** ⇒ **Alarm Indicator** for **Gate A** is active; the audible alarm is generated as well
- There is an echo matching with **Gate B** and not exceeding its threshold; the **Alarm Logic** setting for **Gate B** is **Negative** ⇒ **Alarm Indicator** for the **Gate B** is active; the audible alarm is generated as well

5.7. Sub Menu DAC

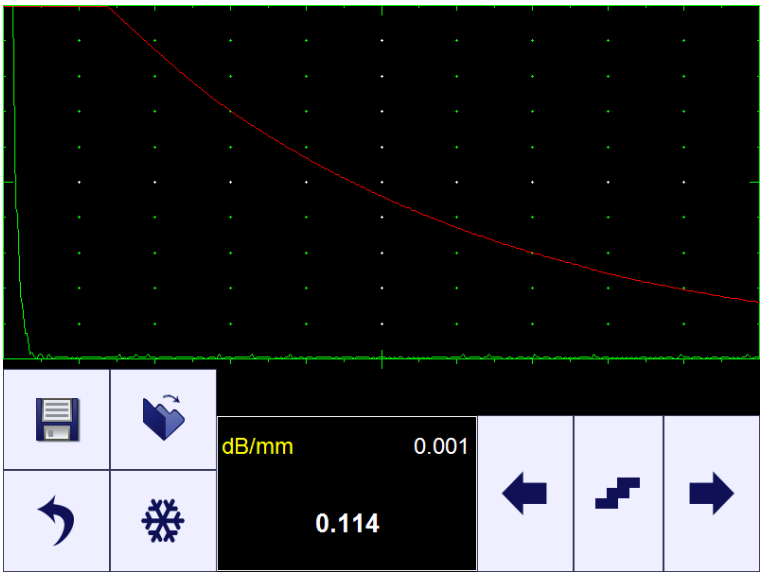
Click on DAC in the *Top Level Screen* to enter, the screen as below appears:



5.7.1. Theoretical DAC – dB/mm (dB/in)

Theoretical **DAC** represents pure exponential law for distance amplitude curve; said law is determined by **dB/mm** (**dB/in**) factor and value of **Probe Delay** - refer to paragraph 5.7.1 of the operating manual: at zero material travel distance (surface) theoretical **DAC** starts at 100% of **A-Scan** height

To enter **dB/mm** (**dB/in**) factor touch dB/mm button then provide the desired setting. To negate theoretical DAC touch dB/mm then reduce **dB/mm** (**dB/in**) factor to **0**



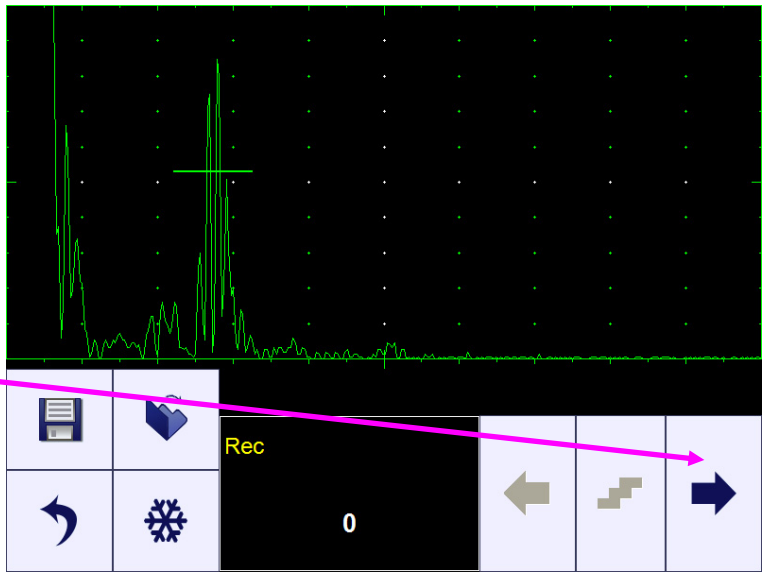
5.7.2. Experimental DAC: recording signals from variously located reflectors

Creating of experimental DAC is allowed upon theoretical DAC negated: **dB/mm = 0** (**dB/in = 0**). To create / modify experimental **DAC** click on 

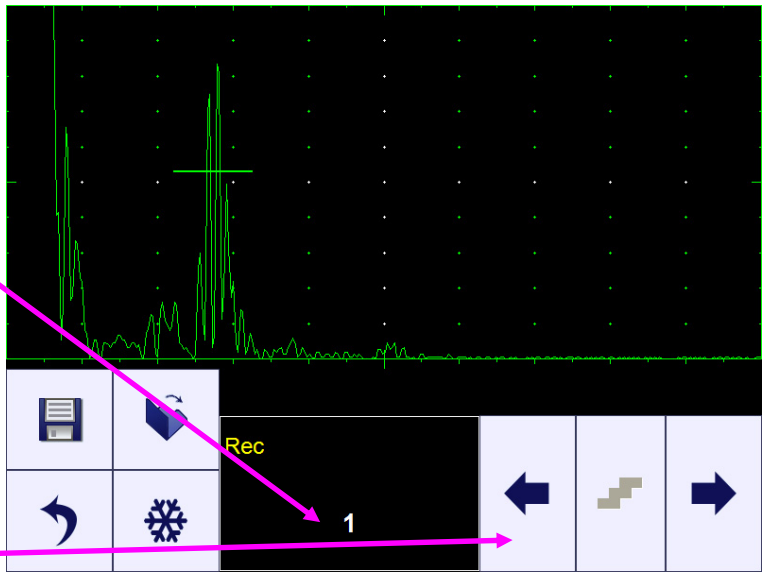
– the **Draw Gate** mode (**Draw A**) is active so it is possible to manipulate **Gate A** over the entire **A-Scan** area

Recording 1st DAC echo

Place probe onto **DAC** calibration block and maximize echo from the reflector closest to the probe (first echo) then place **Gate A** over received signal and capture first *DAC echo* through click on



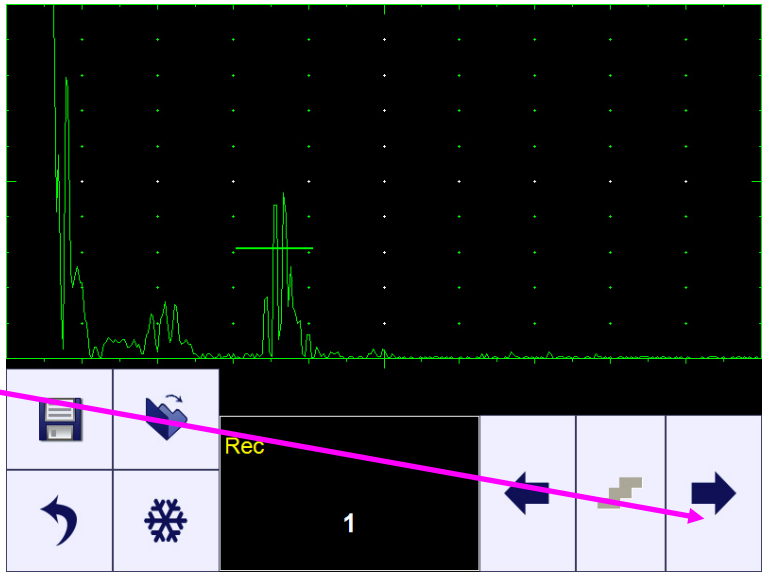
This leads to the recording of the first DAC echo; the total number of stored echoes is indicated accordingly



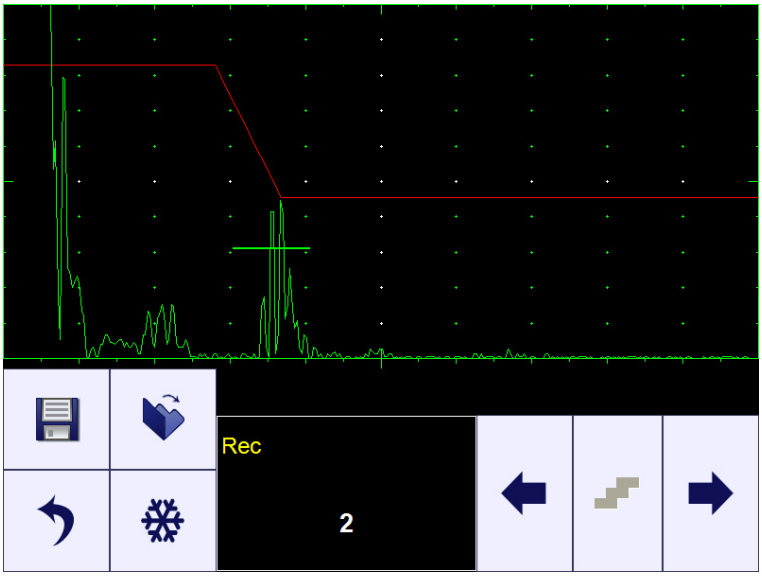
To erase the last recorded echo click on

Recording 2nd DAC echo

Place probe onto **DAC** calibration block and maximize echo from the reflector closest to the probe (first echo) then place **Gate A** over received signal and capture second *DAC echo* through click on

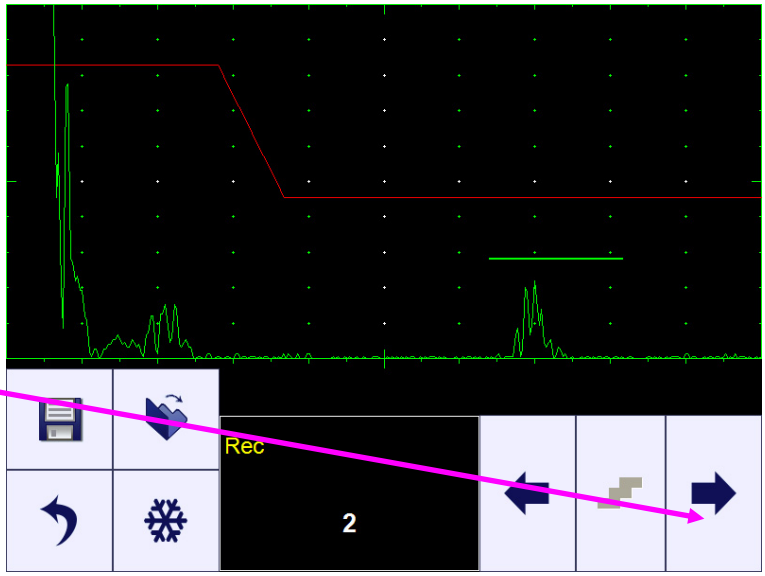


This leads to the recording of the second DAC echo

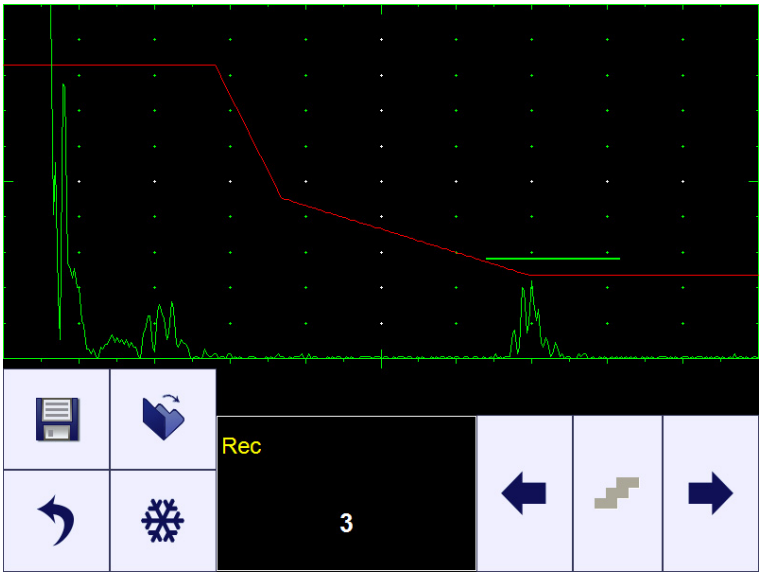


Recording 3rd DAC echo

Place probe onto **DAC** calibration block and maximize echo from the reflector closest to the probe (first echo) then place **Gate A** over received signal and capture third *DAC echo* through click on



This leads to the recording of the third DAC echo

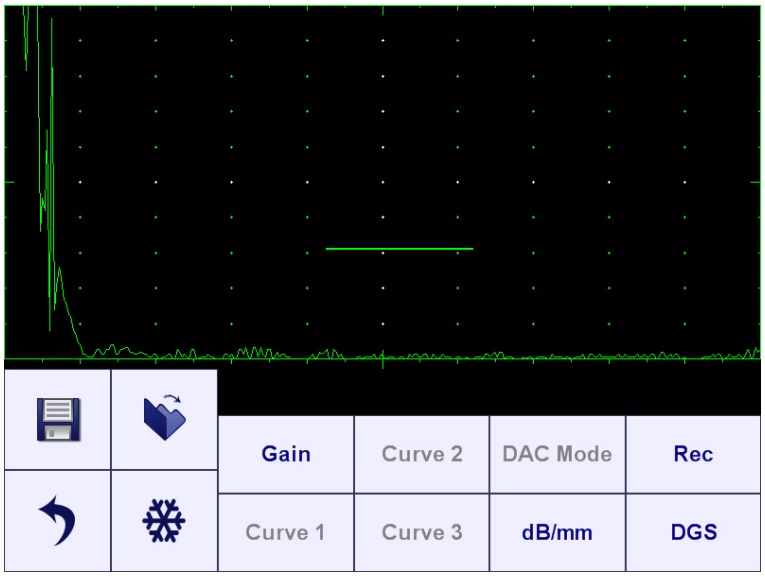


Refer also to the movie at:

http://www.sonotronndt.com/PDF/OM_utPod/MOV/utPod_Creating_a_DAC.MOV

- The highest echo in the **Gate A** will be stored; said echo may either exceed **Gate A** threshold level or not
- Recorded echoes should be higher than 5% and lower than 100% of **A-Scan** height. **Gain** manipulation is allowed whilst creating / modifying a **DAC**
- A total number of up to 40 **DAC** echoes may be recorded one by one by the above described way

5.7.3. DGS

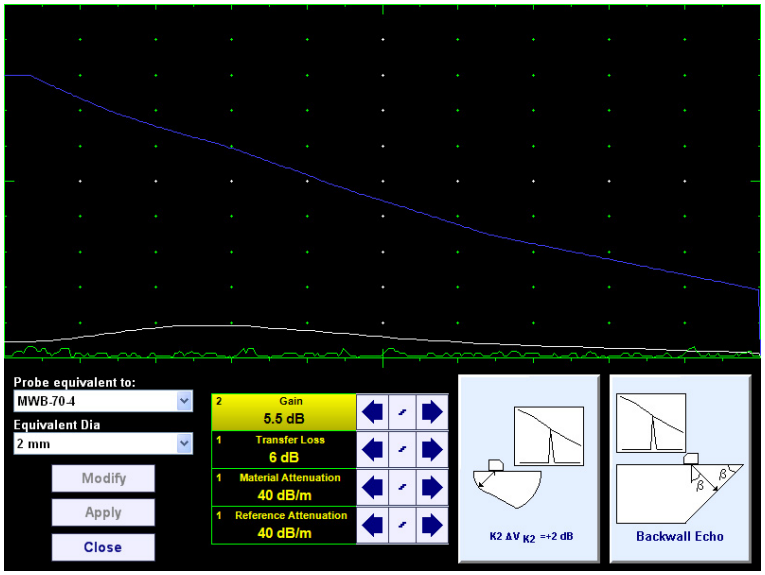


To create **DGS** connect **ISONIC utPod** to PC via USB port. **ISONIC utPod for PC** software should be preinstalled in the computer (refer to chapter 8 of the operating manual)

In the submenu DAC generated on the computer screen by **ISONIC utPod for PC** software click on DGS

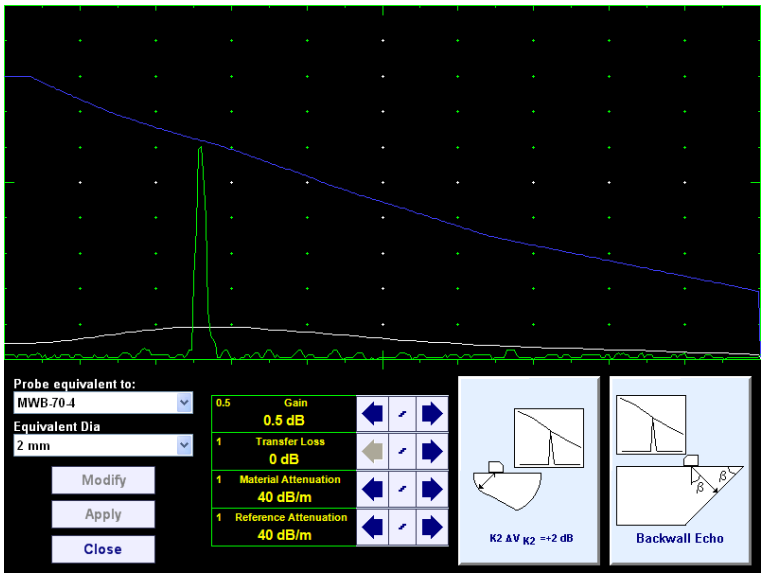
Select **Probe** and **Equivalent Dia** (diameter of the disk shaped reflector – flat bottom hole, FBH). Then enter values of **Transfer Loss**, and **Attenuation** factors for the reference block and material: two lines appear on **A-Scan**:

- blue line represents dependence of the back echo amplitude on the metal travel distance
- white line represents dependence of the FBH echo amplitude on the metal travel distance

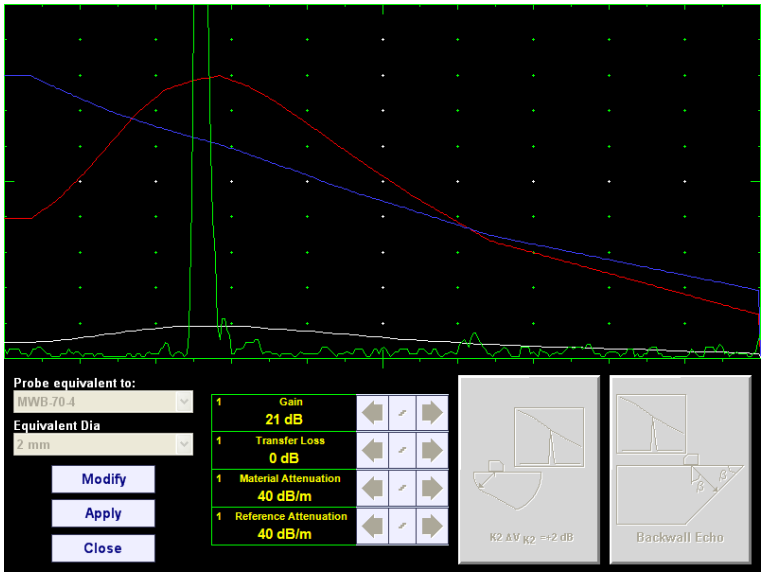


One of two reference blocks may be used to setup **DGS**:

- back echo block inclined according to the probe angle (incidence angle)
- standard block either **K1** (**IIW-1**)or **K2** (**IIW-2**); the type of reference block and reflector are defined in the probe data sheet and reproduced automatically from the **DGS** data base upon probe selection

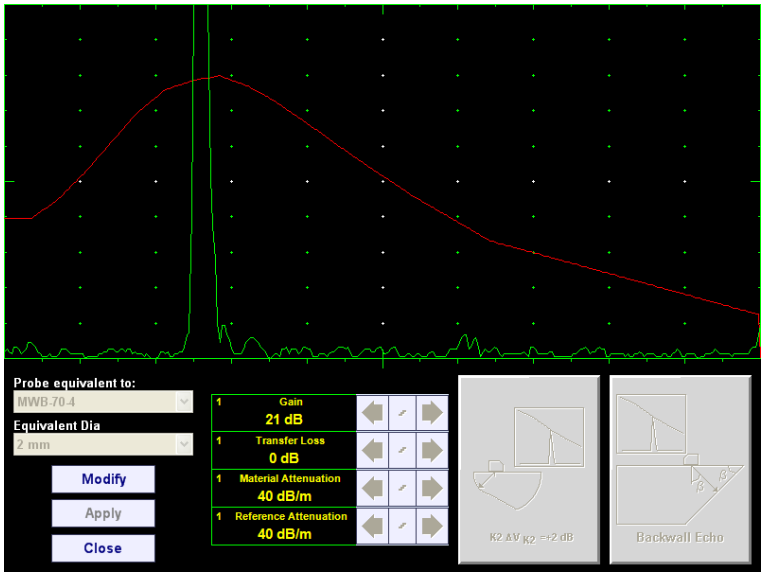


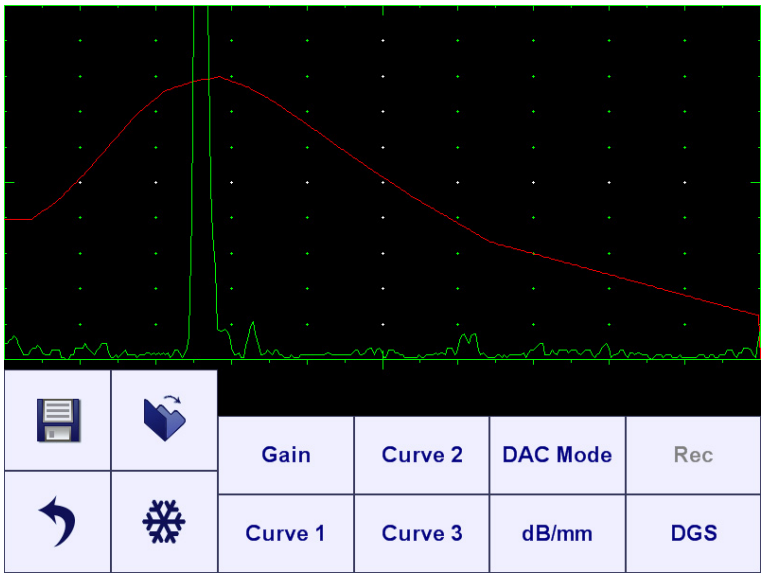
Place probe onto the reference block, obtain echo from the reference reflector and maximize it if applicable (**K1** or **K2** block). Then calibrate **Gain** bringing reference echo amplitude to the blue line level then click on the button indicating the reference block under use



As a result the red line representing dependence of the FBH echo amplitude on the metal travel distance appears at the standard level (80% of A-Scan height for the maximal point) and the required **Gain** setting is provided automatically

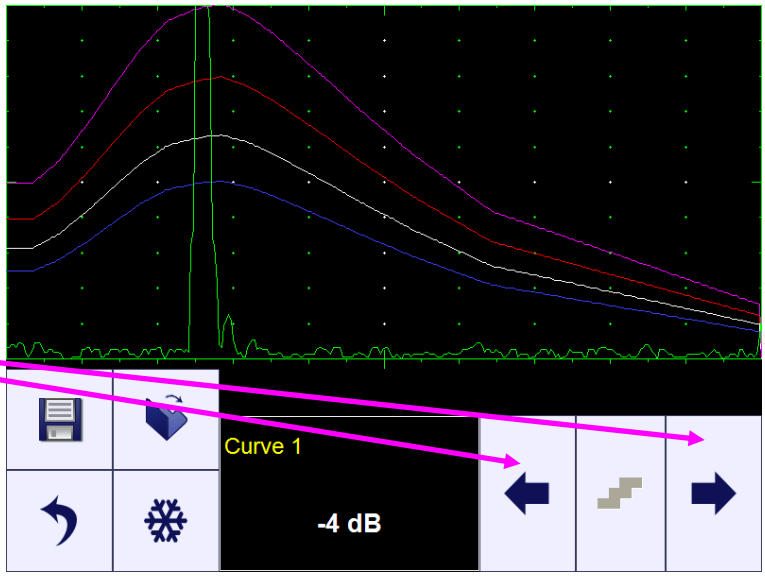
Clicking on Modify returns to the keying in stage. On completion click on Apply then on Close - this will return to **DAC** submenu. The file with just calibrated **DGS** to be stored in the instrument upon





5.7.4. Multi-Curve DAC / DGS

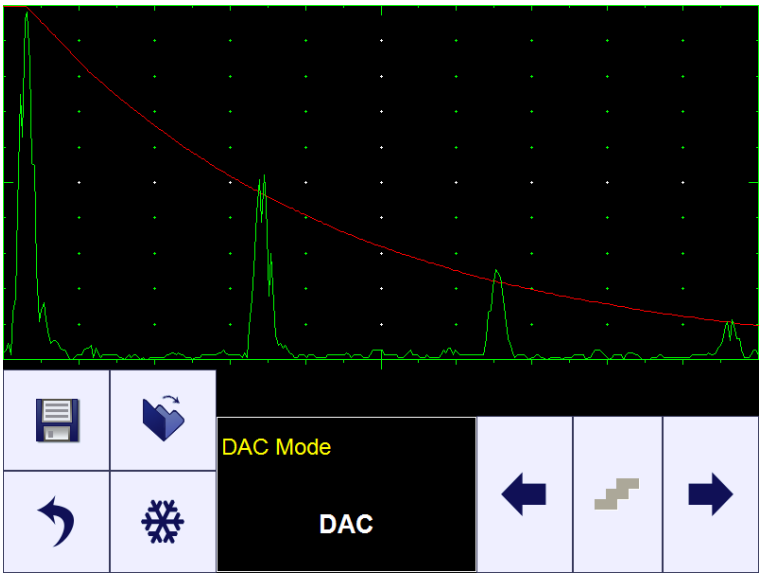
It is possible to add several (up to 3) additional curves to the created main **DAC / DGS** (red). To proceed click on Curve 1 (or on Curve 2, Curve 3) then refer position of the additional curve through click on



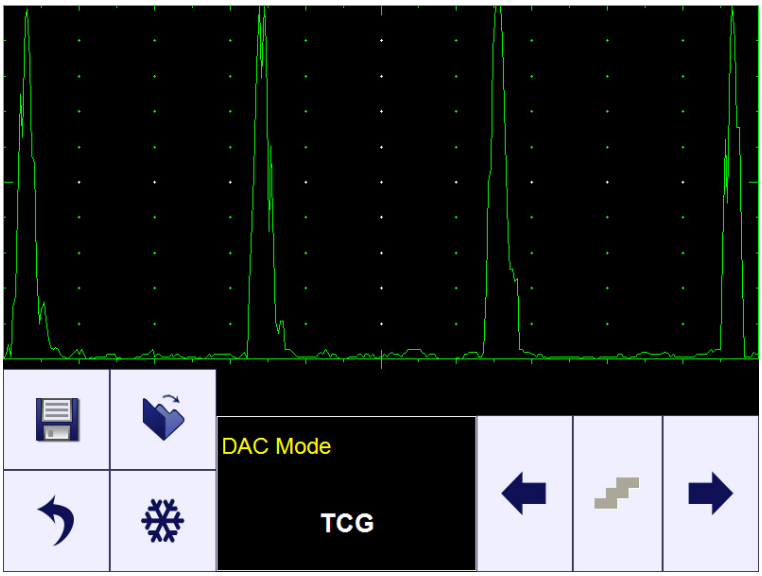
Refer also to the movie at:

http://www.sonotronndt.com/PDF/OM_utPod/MOV/utPod_Creating_a_DAC.MOV

5.7.5. DAC Mode



Since **DAC / DGS** is created it is possible to setup appropriate mode of operation either **DAC**, **TCG**, or **OFF** after clicking on DAC Mode

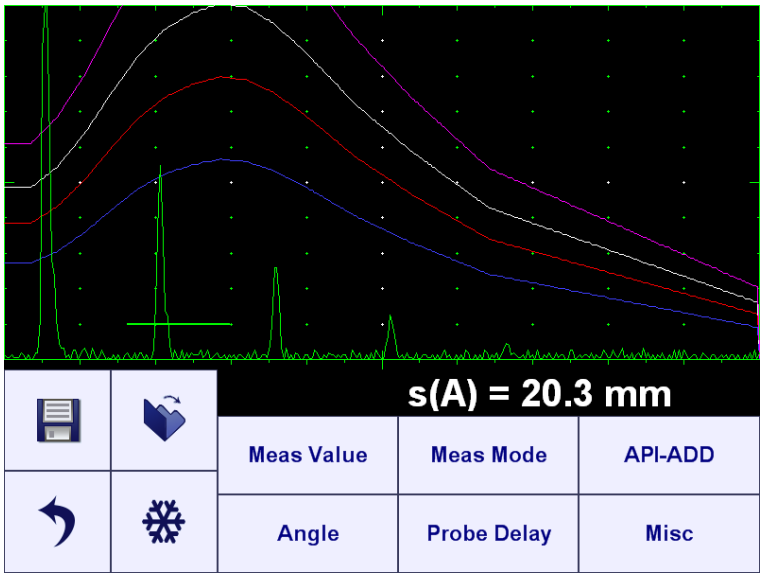


Refer also to the movie at:

http://www.sonotronndt.com/PDF/OM_utPod/MOV/utPod_DAC_TCG.MOV

5.8. Sub Menu MEASURE

Click on Measure in the *Top Level Screen* to enter, the screen as below appears:



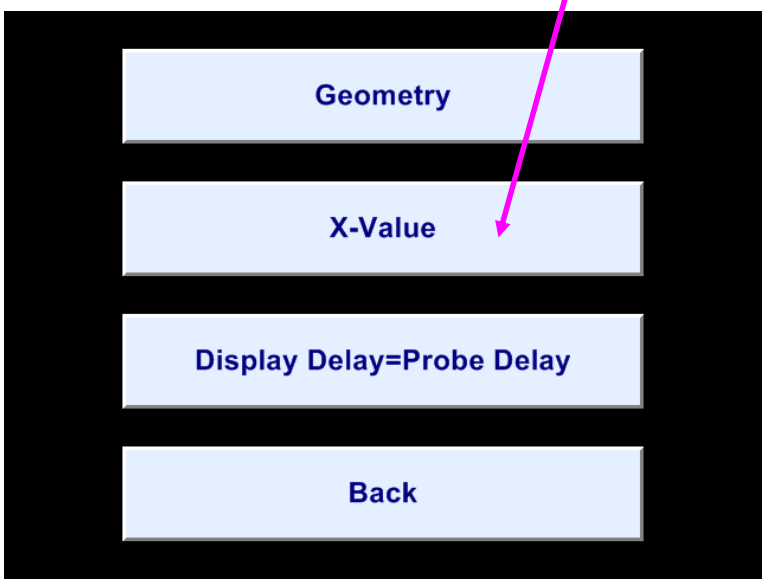
At least one gate either **Gate A** or **Gate B** should be active to proceed with measurements

5.8.1. Probe Delay, Incidence Angle

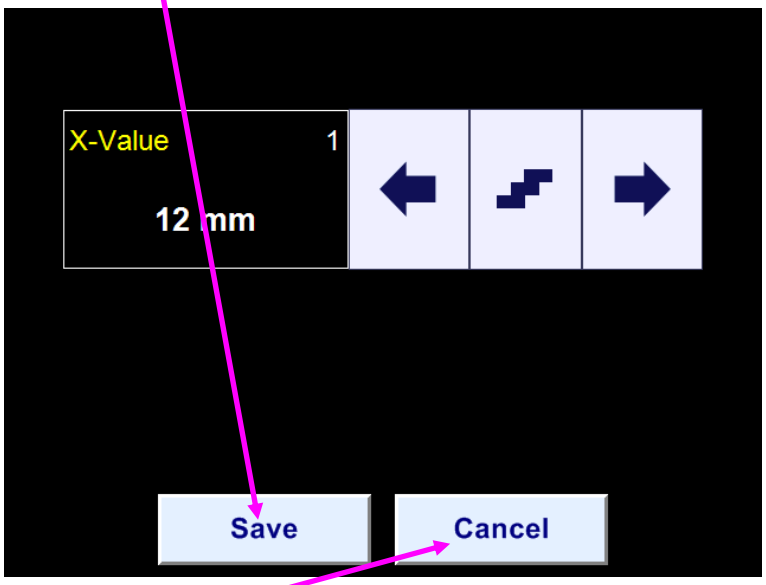
To key in **Probe Delay** / **Incidence Angle** / **X-Value** click on Probe Delay / Angle then provide necessary setting

5.8.2. X-Value

To key in **X-Value** for angle beam probe click on Misc then click on



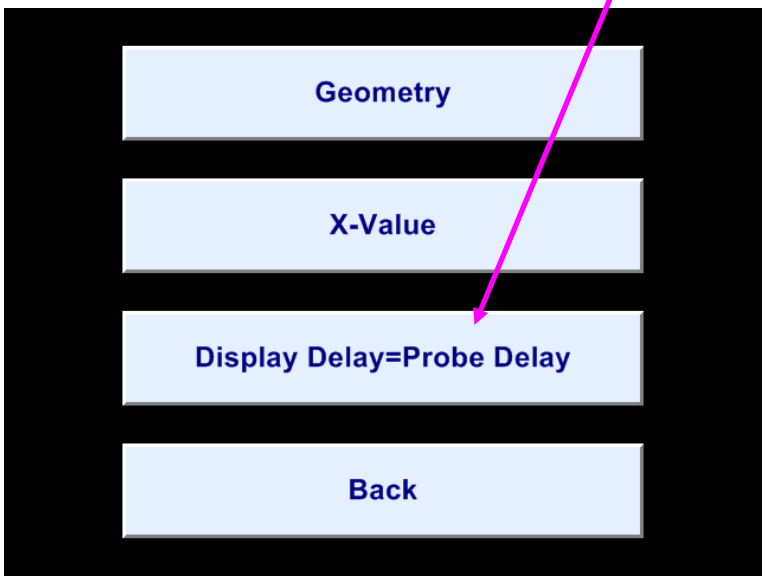
Provide necessary setting and click on then



To negate last setting change click on

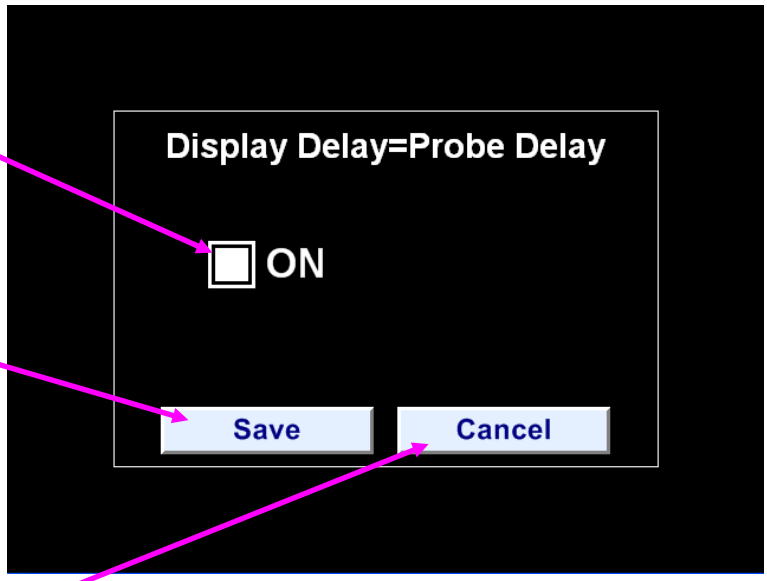
5.8.3. Link Display Delay and Probe Delay Settings

To link / unlink **Display Delay** and **Probe Delay** settings or click on Misc then click on



Then check / uncheck

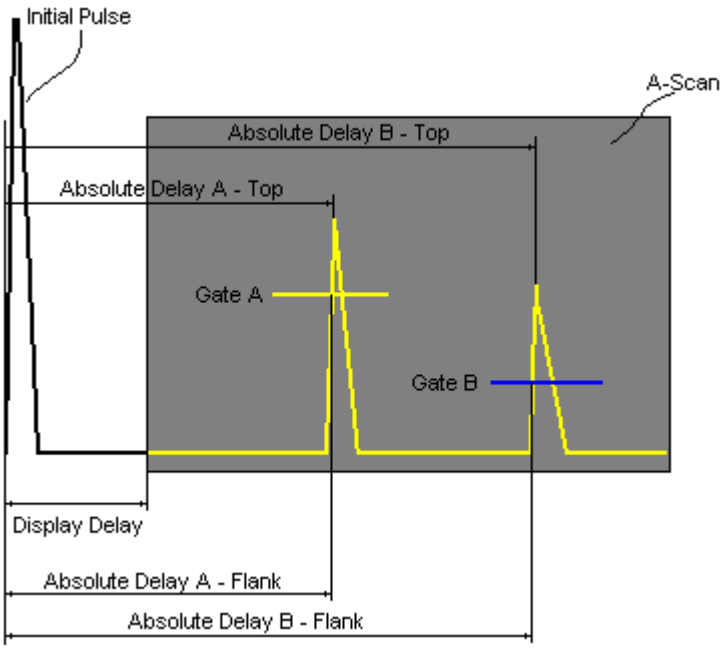
and click on

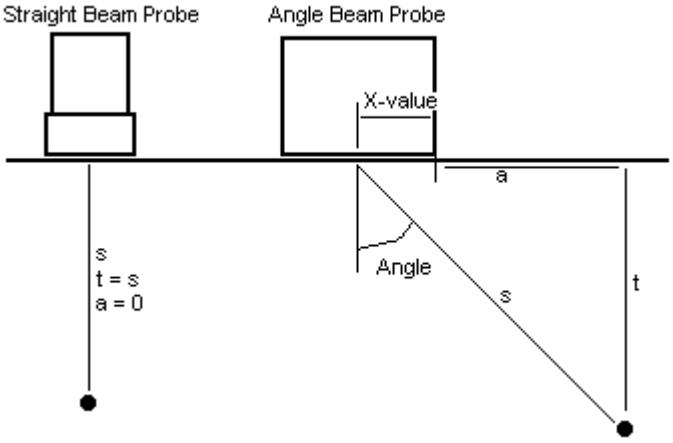


To negate last setting change click on

5.8.4. Value Being Measured

To select mail value for the automatic measurements click on Meas Value then select among the following:





T(A)

Time of Flight - **µs** of an echo matching with **Gate A** measured with respect to **Probe Delay**:

T(A) = Absolute Delay A - Probe Delay

T(B)

Time of Flight - **µs** of an echo matching with **Gate B** measured with respect to **Probe Delay**:

T(B) = Absolute Delay B - Probe Delay

s(A)

Material Travel Distance - **mm** or **in** of an echo matching with **Gate A**:

s(A) = ½ · T(A) · US Velocity

s(B)

Material Travel Distance - **mm** or **in** of an echo matching with **Gate B**:

s(B) = ½ · T(B) · US Velocity

a(A)

Projection Distance - **mm** or **in** of reflector returning an echo matching with **Gate A**, measured respectfully front surface of angle beam probe:

a(A) = s(A) · sin (Angle) – X-Value

a(B)

Projection Distance - **mm** or **in** of reflector returning an echo matching with **Gate A**, measured respectfully front surface of angle beam probe:

a(B) = s(B) · sin (Angle) – X-Value

t(A)

Depth - **mm** or **in** of reflector returning an echo matching with **Gate A**:

t(A) = s(A) · cos (Angle)

t(B)

Depth - **mm** or **in** of reflector returning an echo matching with **Gate B**:

t(B) = s(B) · cos (Angle)

ΔT - **µs**:

ΔT = T(B) – T(A)

Δs - **mm** or **in**:

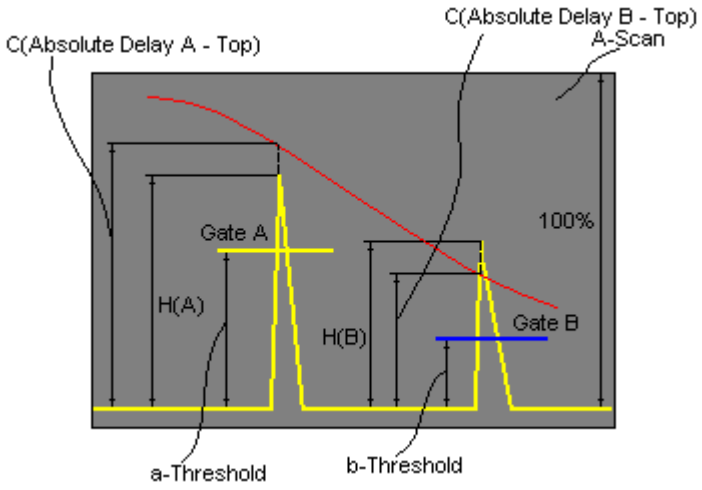
Δs = s(B) – s(A)

Δa - **mm** or **in**:

Δa = a(B) – a(A)

Δt - **mm** or **in**:

Δt = t(B) – t(A)



H(A)

Amplitude - **% of A-Scan height** of an echo matching with **Gate A**

H(B)

Amplitude - **% of A-Scan height** of an echo matching with **Gate B**

V(A)

Amplitude - **dB** of an echo matching with **Gate A** with respect to **aThreshold**:

$$V(A) = 20 \cdot \log_{10} (H(A) / aThreshold)$$

V(B)

Amplitude - **dB** of an echo matching with **Gate B** with respect to **bThreshold**:

$$V(B) = 20 \cdot \log_{10} (H(B) / bThreshold)$$

ΔV - dB:

$$\Delta V = V(B) - V(A)$$

ΔVC(A) (dB to DAC) – dB:

$$\Delta VC(A) = 20 \cdot \log_{10} (H(A) / C (Absolute Delay A\_Top))$$

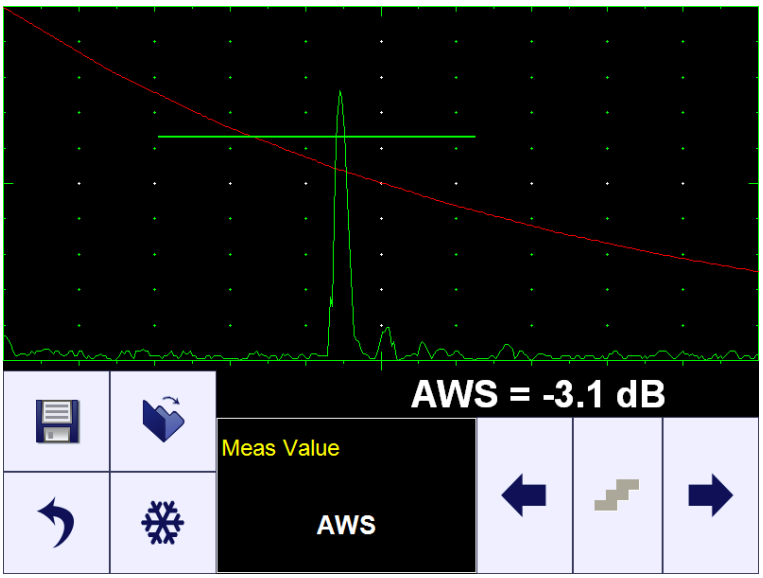
ΔVC(B) (dB to DAC) – dB:

$$\Delta VC(B) = 20 \cdot \log_{10} (H(B) / C (Absolute Delay B\_Top))$$

AWS Defect Rank

In order to activate AWS defect ranking with angle beam probe there is a number of mandatory settings to be provided:

- active theoretical **DAC** of **0.079 dB/mm** (**2 dB/in**) theoretical **DAC** (refer to the paragraph 5.7.1 of the operating manual)
- active **Gate A**
- **Meas Mode = Top** (refer to the paragraph 5.8.5 of the operating manual)
- **USVelocity, Probe Delay, Angle** equal to actual values
- **Gate A = ON**
- **Gain** setup to provide reference signal amplitude of 63% of the **A-Scan** height



It is also recommended (but not mandatory):

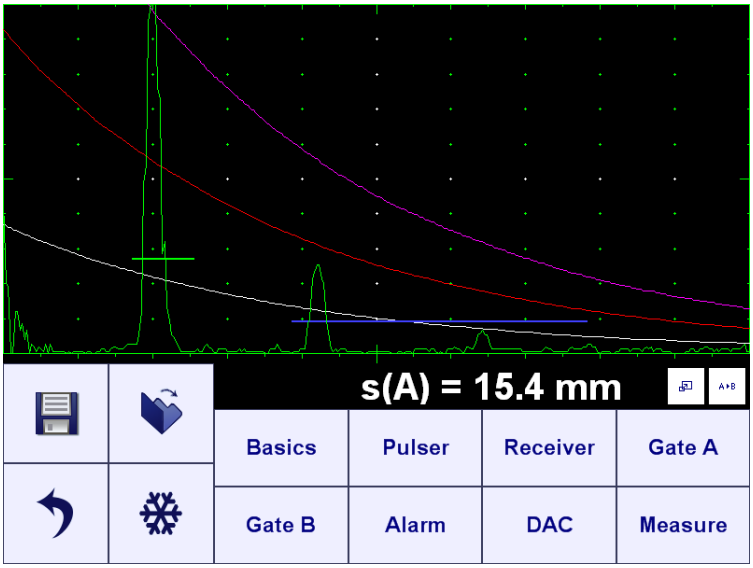
- to setup **Display Delay** equal to **Probe Delay** (refer to paragraph 5.2.2 of the operating manual)
- to setup **Thresh.A** equal to 63% (refer to paragraph 5.5.2 of the operating manual)

Upon completion direct **AWS** rank reading is provided to the maximal echo matching with the **Gate A**

ⓘ

- **ΔVC(A)** (**dB to DAC**) measurements require active **DAC/DGS**
- Amplitude and AWS measurements of echoes may be performed provided their heights don't exceed 200% of **A-Scan** height

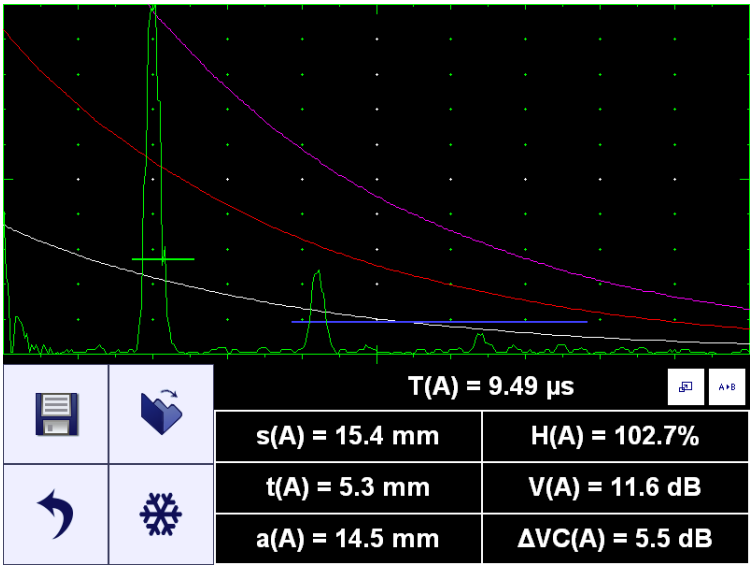
5.8.5. Multiple Gate Measurements

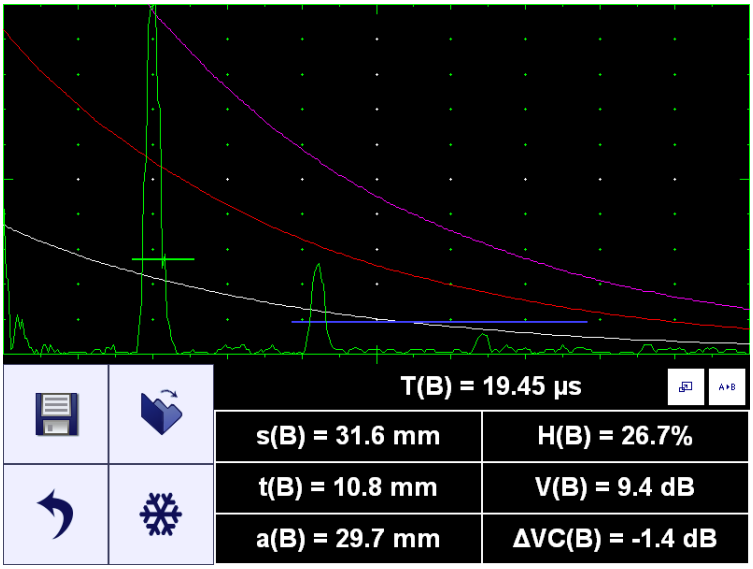


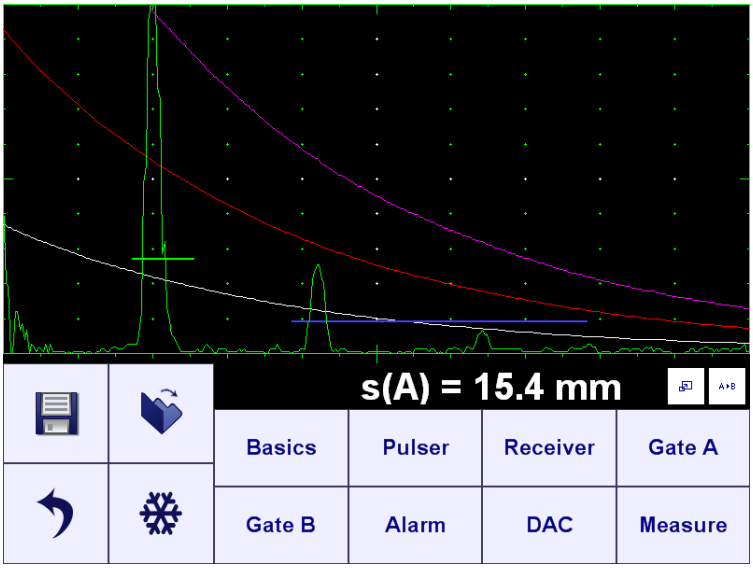
For the **ISONIC utPod** firmware revision 1.35 and later there additional controls available in the digital readout field

Click on  allows reading of all measurements related to either **Gate A** or **Gate B** or Δ'as simultaneously

(selectable through click on ). To return to single value digital readout click on  again or on 

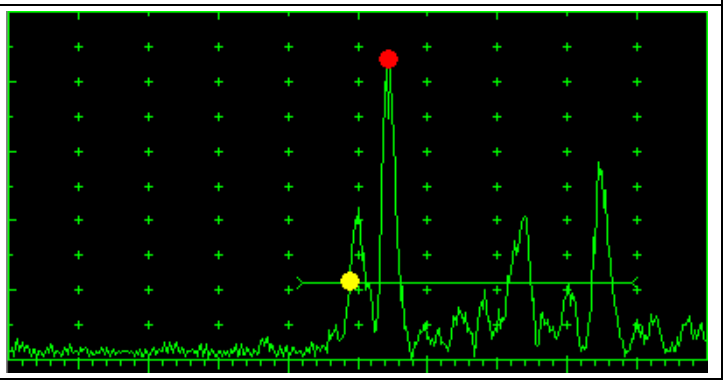
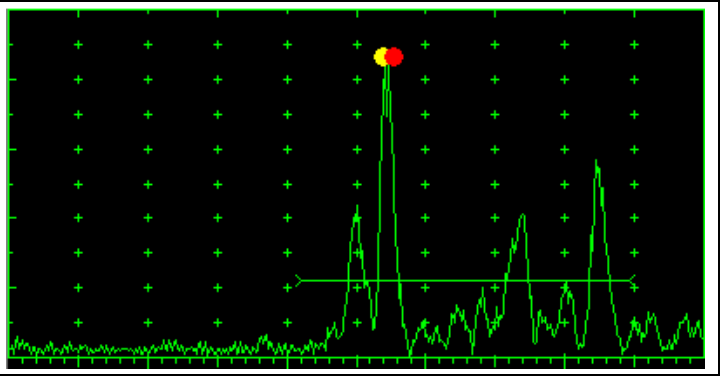






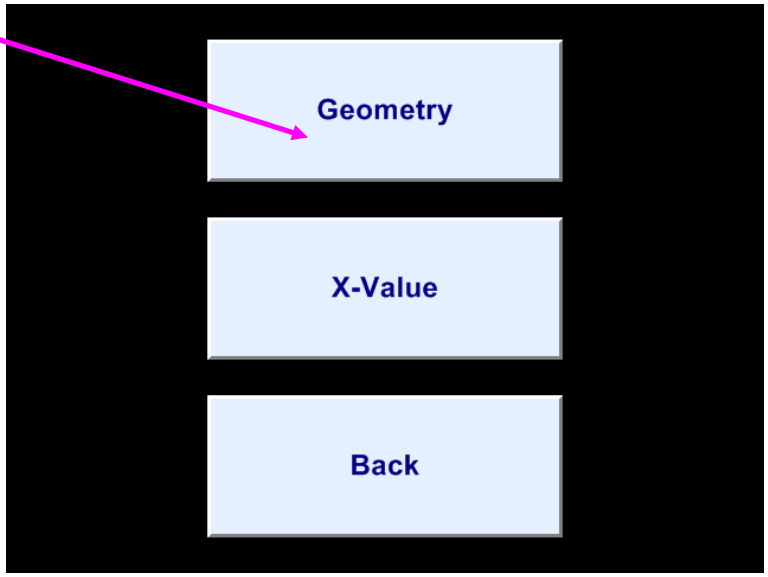
5.8.6. Flank and Top

Click on Meas Mode then select the required mode either **Top** or **Flank**

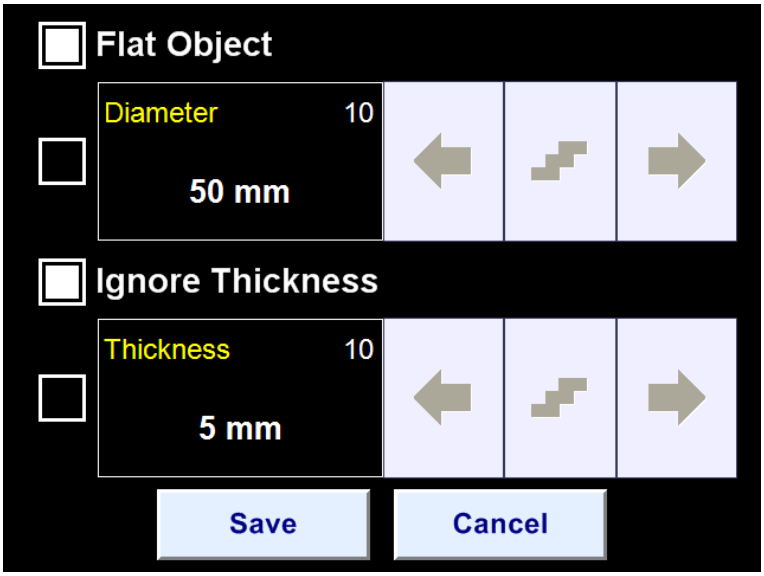
Meas Mode setting	**A-Scan**
Flank ● - **T(A), T(B), s(A), s(B), t(A), t(B), a(A), a(B), ΔT, Δs, Δt, Δa** ● - **V(A), V(B), H(A), H(B), ΔV, ΔVC(A), ΔVC(B), AWS**	
Top ● - **T(A), T(B), s(A), s(B), t(A), t(B), a(A), a(B), ΔT, Δs, Δt, Δa** ● - **V(A), V(B), H(A), H(B), ΔV, ΔVC(A), ΔVC(B)**	

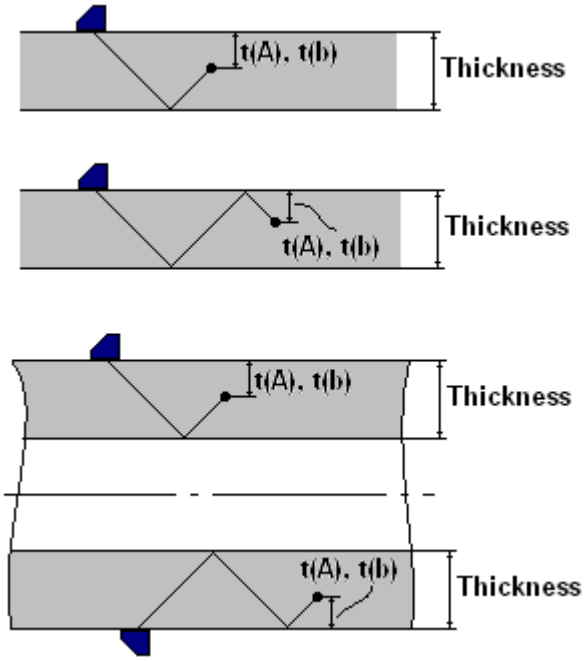
5.8.7. Geometry Corrections

While using angle beam probes the reflector's depth **t(A)** , **t(B)** reading should be corrected depending on material thickness and curvature of the object being tested. To provide necessary correction Misc then click on

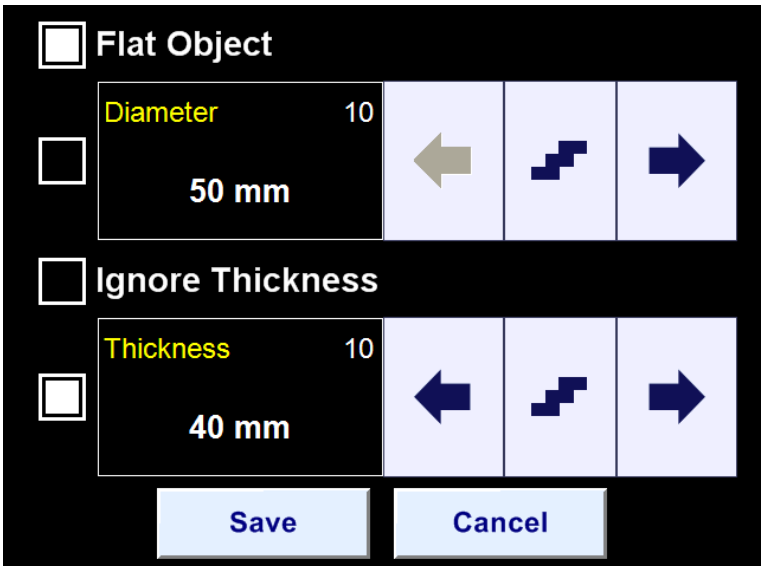


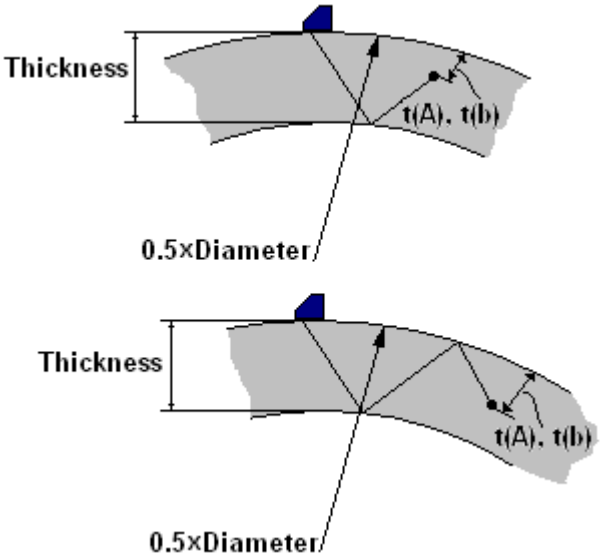
Case 1 represents simplest scheme supposing that scanning is performed above semi-infinite objects whereas coordinates **t(A)**, **t(B)** are determined in accordance with the appropriate sketches, equations, and **A-Scans** shown in paragraph 5.8.3 of the operating manual



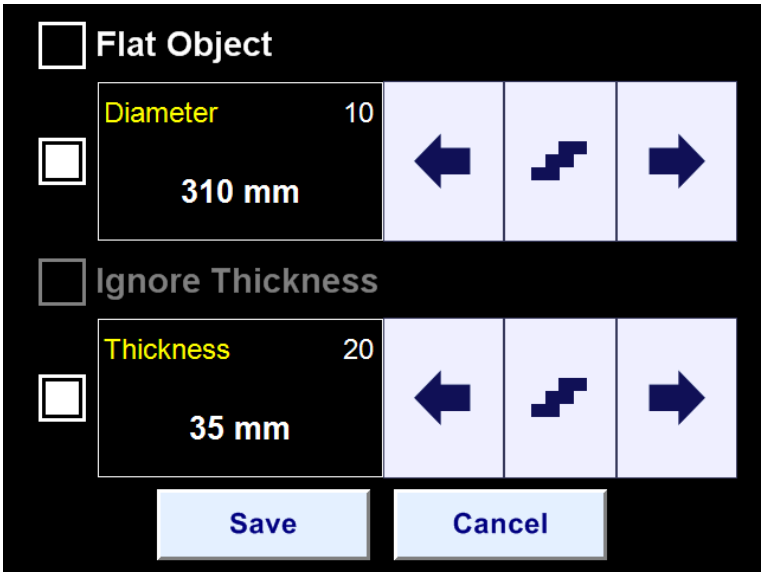


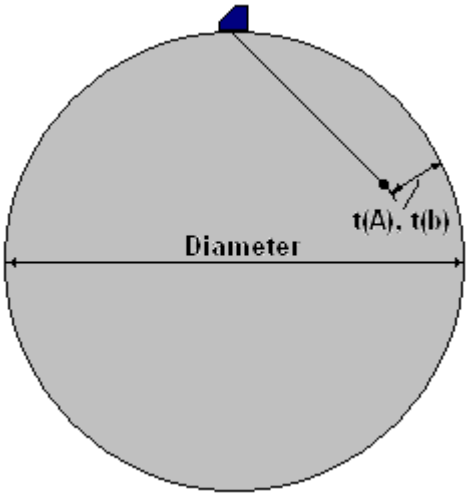
Case 2 represents scanning above plate, or scanning above tubular object longitudinally – thickness of the material should be keyed in to obtain actual **t(A)** , **t(B)** reading



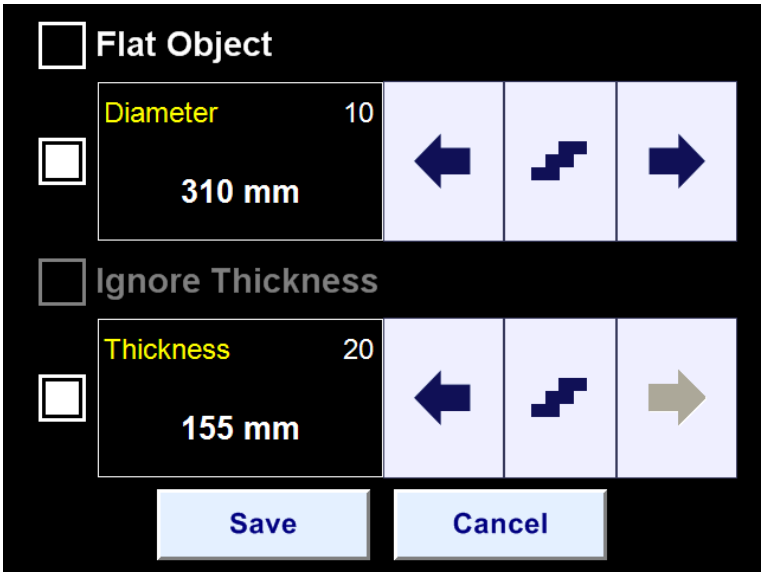


Case 3 represents scanning above curved wall surface circumferentially – the wall thickness and pipe outside diameter should be keyed in to obtain actual **t(A)** , **t(B)** reading





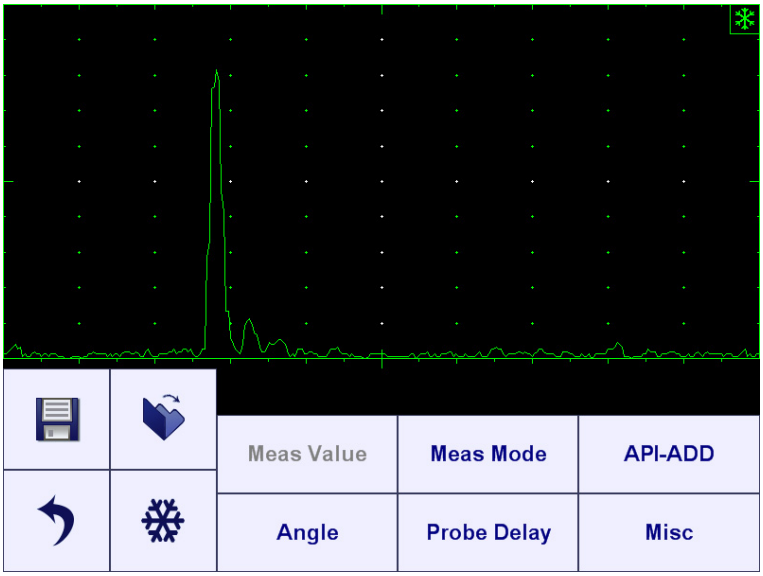
Case 4 represents scanning above solid cylindrical object circumferentially or above spherical object. For such case the diameter of the object being should keyed in and the thickness to be defined as:
Thickness = 0.5×Diameter



On completion new geometry correction settings click on Save

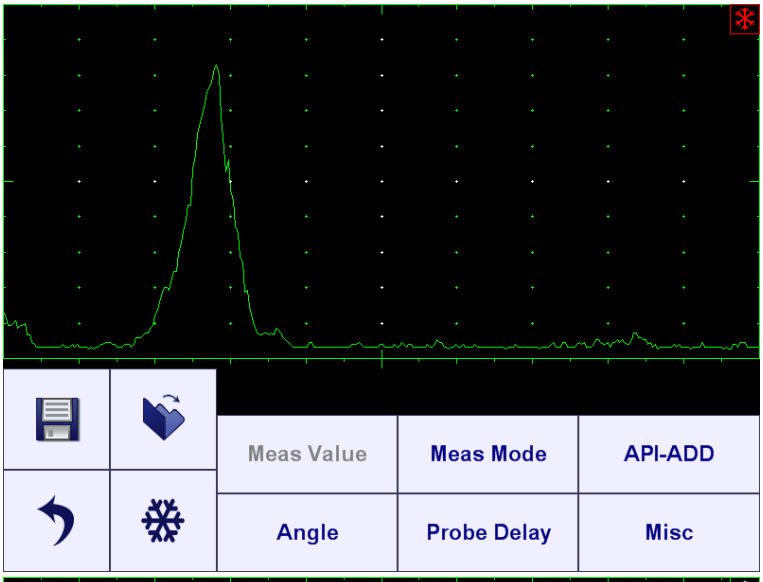
To negate last geometry correction settings click on Cancel

5.8.8. Freeze, Freeze Peak, Locking Peak Envelop

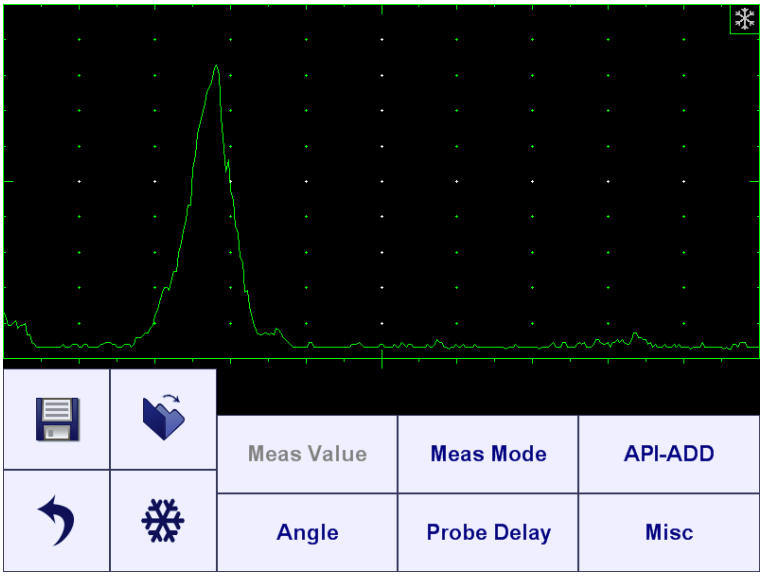


To freeze single **A-Scan** click on - the indicator of the frozen single **A-Scan** appears in the upper right corner of the screen

Clicking on enters into **Freeze Peak** mode allowing capturing of the signal peak envelope



Indicator displays that Freeze peak mode is active. On completing capturing signal peak envelope click on . The color of the said indicator changes upon meaning that further capturing of the envelop is not possible (**Locked Peak Envelop** mode)



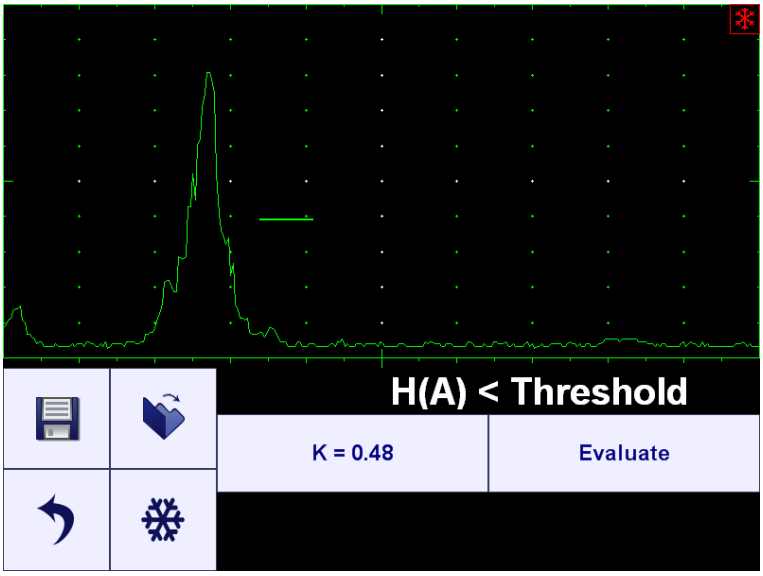
To return to Freeze Peak mode click on

Top return to live **A-Scan**

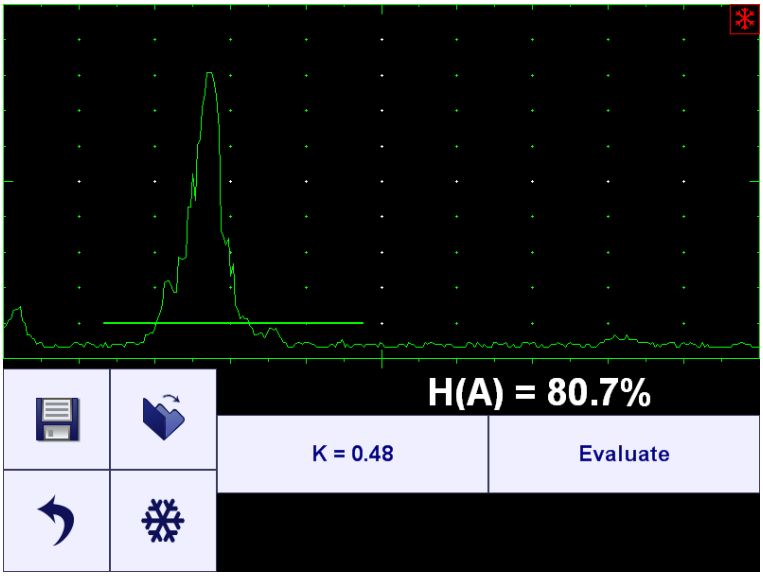
5.8.9. API Evaluation

5.8.9.1. API-Evaluation: Standardization

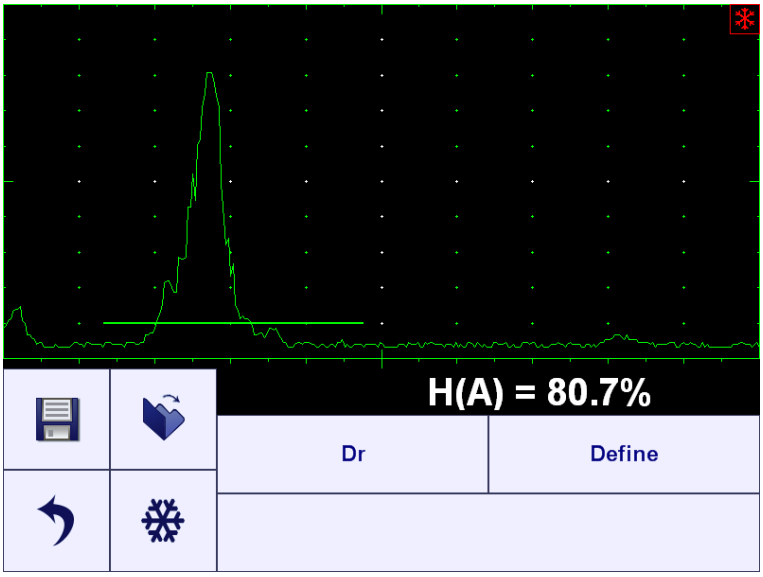
Maximize signal from reference reflector setting it's amplitude between 70 to 90% of the **A-Scan** height then enter into **Freeze Peak** mode as it is described in the paragraph 5.8.6.1 of the operating manual and click on API-ADD – the **Draw Gate** mode (**Draw A**) is active so it is possible to manipulate **Gate A** over the entire **A-Scan** area



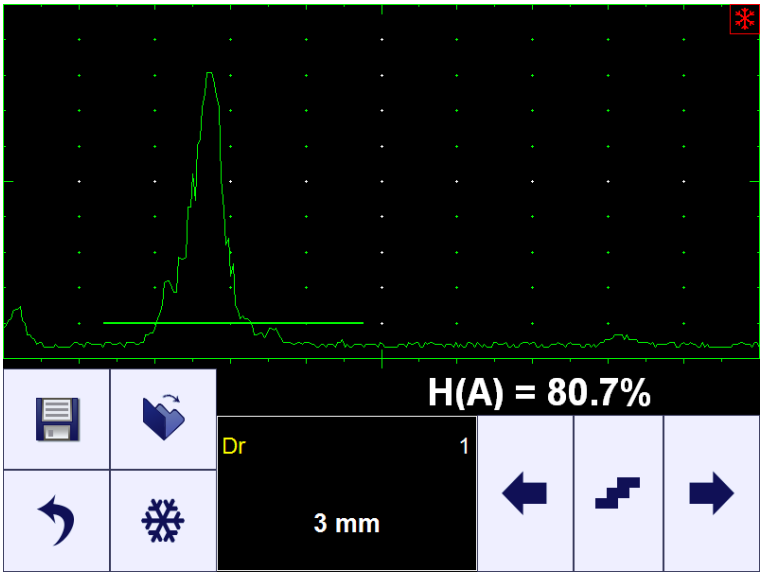
Mark the signal peak envelop then click on K = 0.48 – the capture of that button indicates *k-factor* found for the earlier used reference reflector according to API practice 5UE



Click on Dr to activate control for entering size **Dr** of the reference reflector

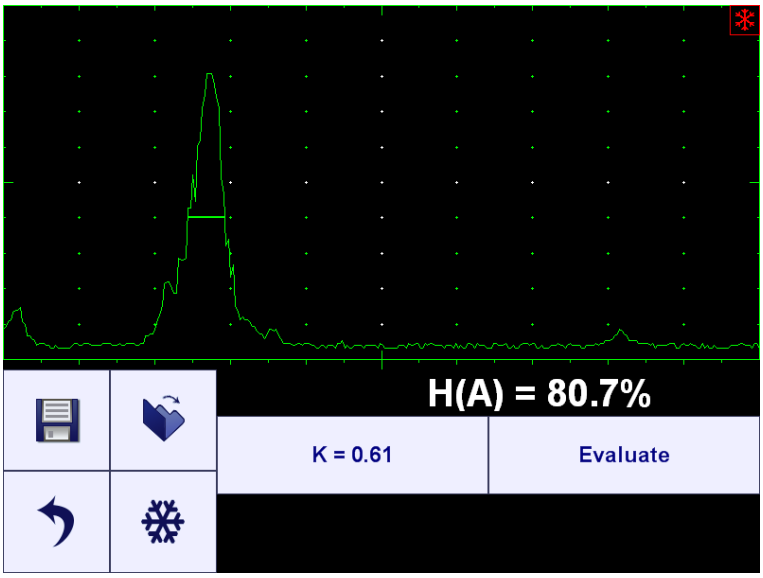


Key in Dr then click on  and on



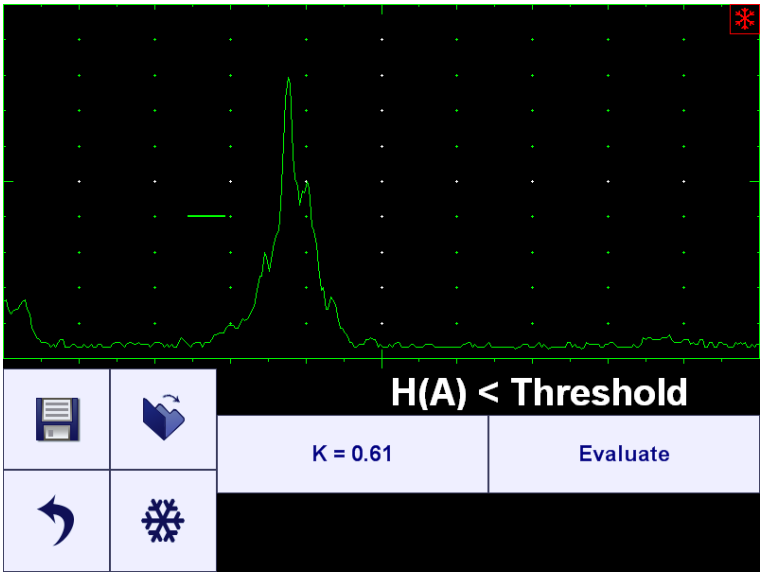
This will redefine k-factor for the new reference reflector and indicate it correspondingly:

. It is possible now to return to live **A-Scan** and continue inspection

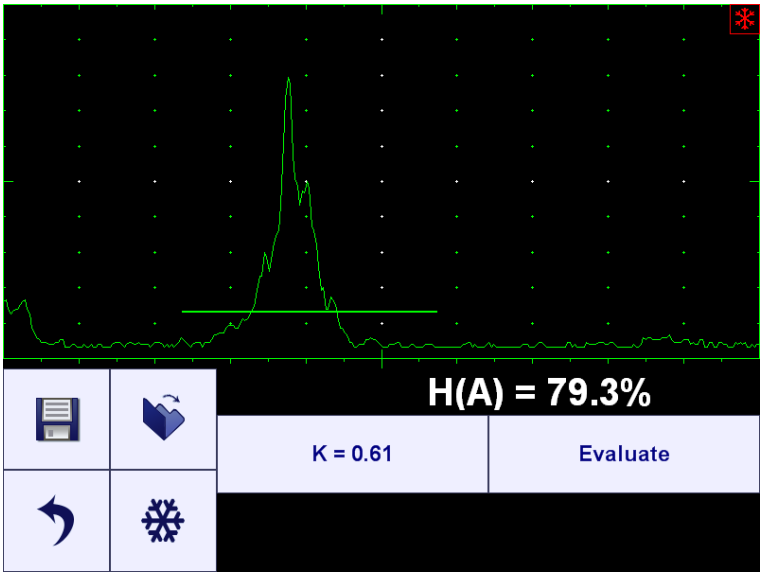


5.8.9.2. API-Evaluation: Sizing Reflector

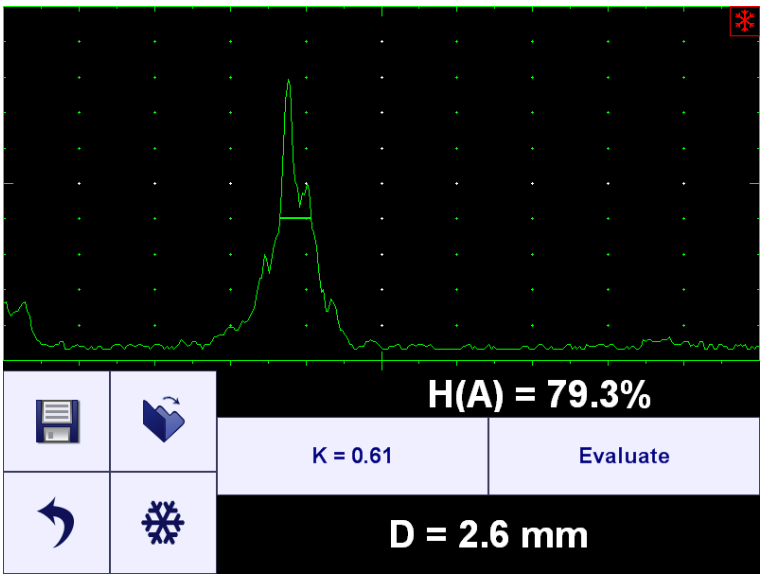
Maximize signal from reflector being evaluated setting it's amplitude between 70 to 90% of the **A-Scan** height then enter into **Freeze Peak** mode as it is described in the paragraph 5.8.6.1 of the operating manual and click on API-ADD – the **Draw Gate** mode (**Draw A**) is active so it is possible to manipulate **Gate A** over the entire **A-Scan** area



Mark the signal peak envelop then click on Evaluate

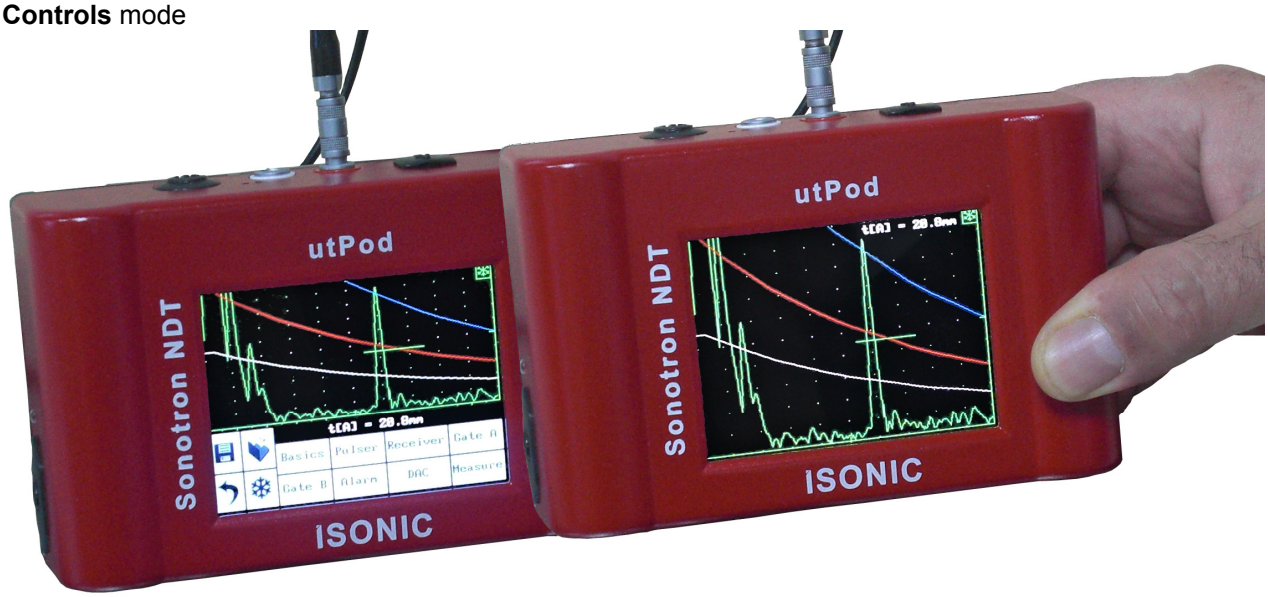


The size **D** of reflector being evaluated according to API 5UE practice will be determined and indicated upon



5.9. Zoom A-Scan

Double click on the **A-Scan** expands it to the full screen area / returns back to the combined **A-Scan + Controls** mode

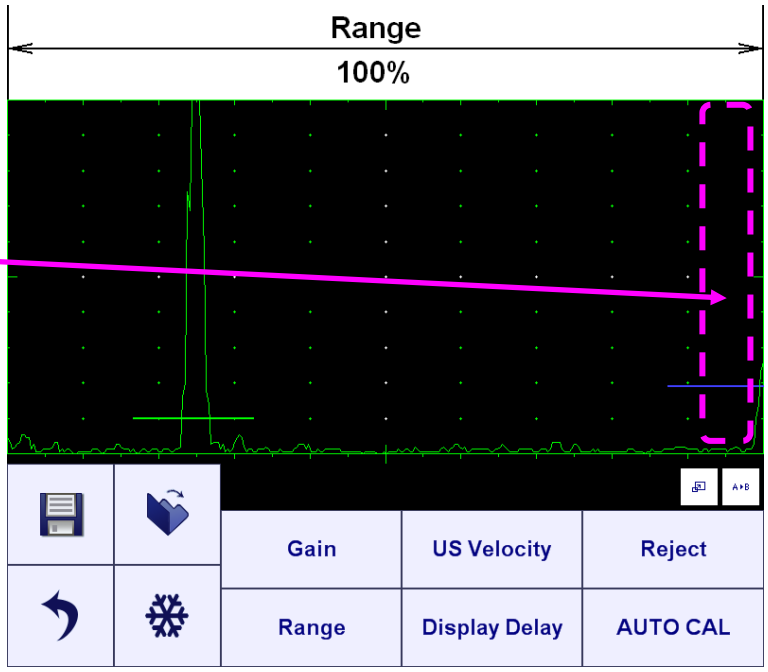


Refer also to the movie at:

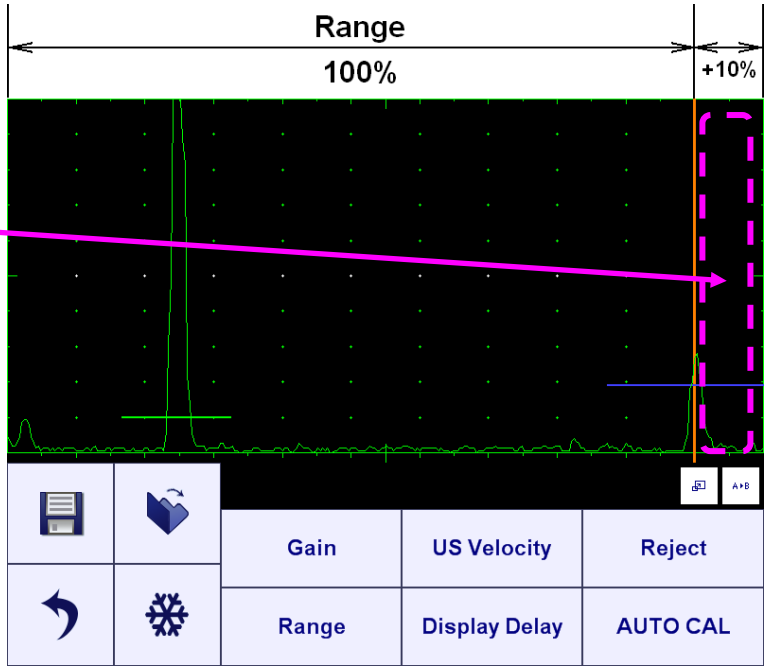
http://www.sonotronndt.com/PDF/OM_utPod/MOV/utPod_A-Scan_Full_Screen.MOV

5.10. 100 / 110 % Range Switch

At the **US Velocity** / **Range** / **Probe Delay** / **Display Delay** calibration stage it may occur the situation when it is necessary to observe completely an echo situated at the end of the A-Scan field. In such case enter to submenu **BASICS** then double click inside the designated area



This will increase current **Range** setting by 10%. To return double click in the designated area or click on any button



6. Thickness Gauge Mode

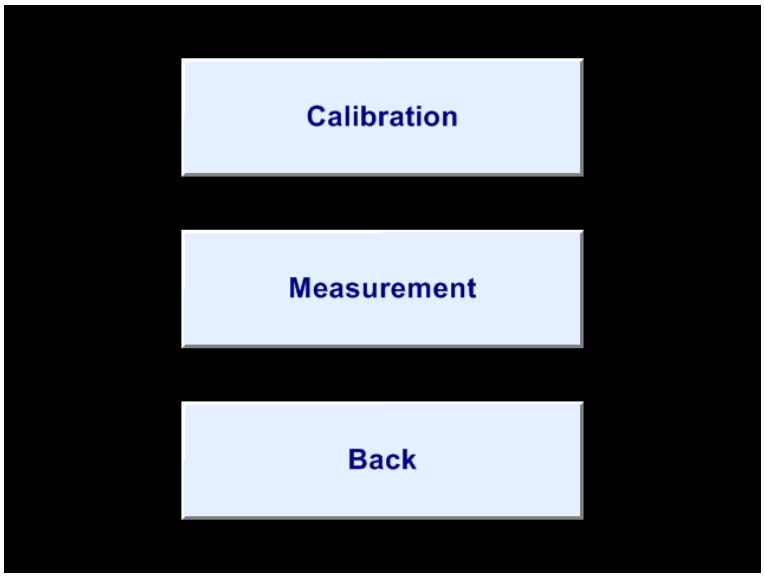
Ultrasonic thickness measurements are the result of the mathematical product of the ultrasonic wave velocity in the material (**USVelocity**) and the transit time of the ultrasonic wave through the material. The transit time is the data obtained by **ISONIC utPod**. The accuracy of ultrasonic thickness measurements depends to a major degree on the **USVelocity**. The value of **USVelocity** depends on characteristics of the material being tested, and is generally independent of the operation of the test instrument

This chapter describes calibrating of **ISONIC utPod** and its internal calculations for the **USVelocity** when it is known, or for finding the **USVelocity** empirically using test blocks of the material, which are accessible for concurrent mechanical thickness measurement. No claim, explicit or implied, is included as to the uniformity of the **USVelocity** throughout any given part or batch of parts. Any non-uniformity of **USVelocity** in the test material may result in erroneous thickness measurements

USVelocity is affected to varying degrees by the temperature of the material being tested. **USVelocity** changes due to temperature variation may affect the material being inspected, and probe as well. When temperature variables are expected, frequent checks must be made to maintain instrument calibration for the changing test conditions

6.1. Thickness Gauge Start Screen

Thickness Gauge mode provides thickness measurements with use of single element probes with / without delay line. On entering **Thickness Gauge** mode the start screen as below appears



Click on Calibration to calibrate thickness gauge

Click on Measurement to proceed with the measurements using ready calibration

Click on Back to return to **ISONIC utPod** start screen

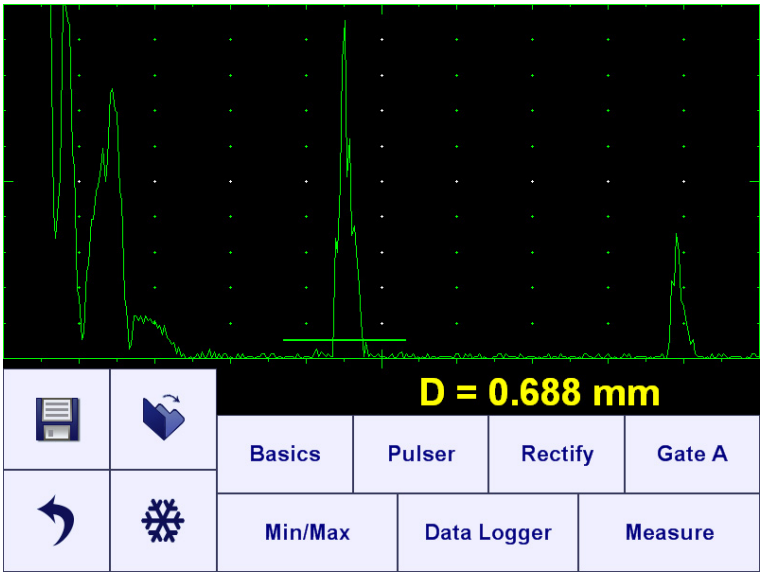
6.2. Calibration – Top Level Screen

Click on  to store **A-Scan** accompanied with signal evaluation results and calibration set into a file

Click on  to upload **A-Scan** accompanied with signal evaluation results and calibration set from a file

Click on  to freeze / return to live **A-Scan**

Click on  to return to upper level menu. Current settings of **Thickness Gauge** will be kept as default the

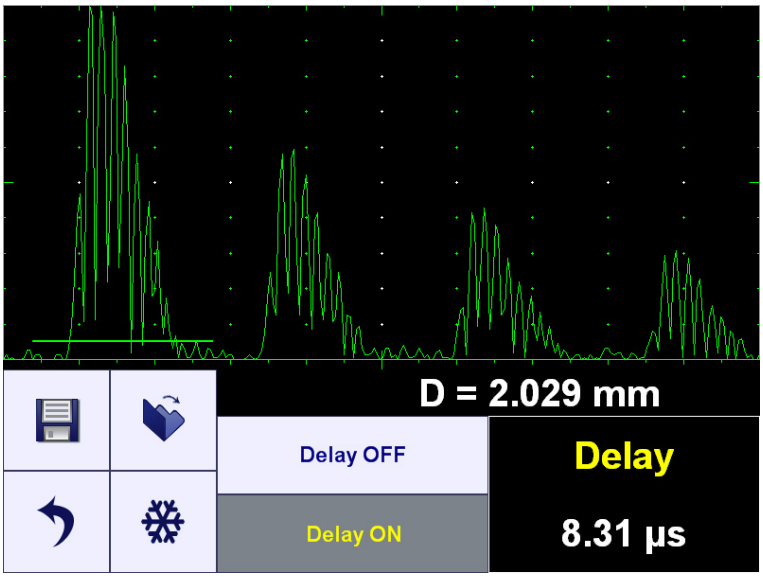


6.2.1. Probes With / Without Delay Line: Measurement Techniques

Click on Measure to designate single element probe used for thickness gauging

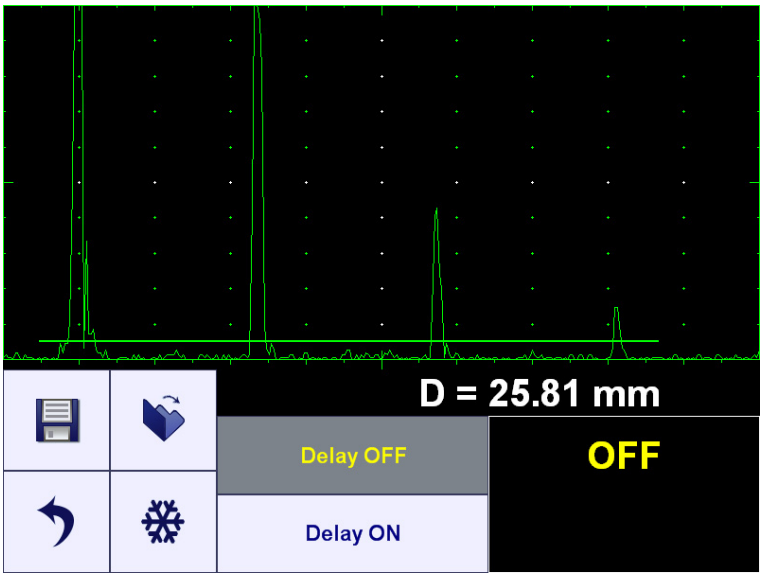
Probe with delay line

Gate A should be placed over the first delay line echo at the lowest possible threshold. The height of first delay line echo height should be raised to 80…100% of **A-Scan** height. The width of **Gate A** after crossing the leading edge of the first delay line echo has no meaning. For each new measurement the instrument defines the *accumulated probe and contact media delay* automatically. Material thickness **D** is determined then automatically through measurement of multiple material back echoes following first delay line echo



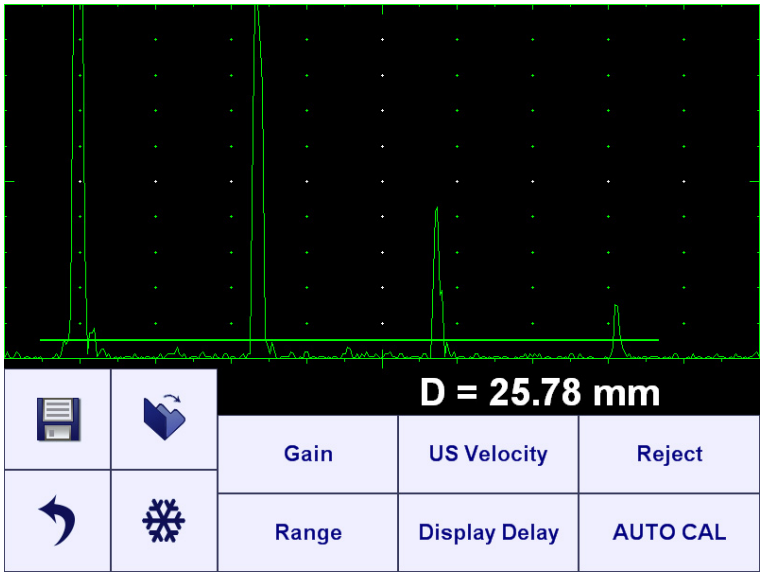
Probe without delay line

Gate A should be placed over at least two material back echoes at the lowest possible threshold. The first material back echo among designated by **Gate A** should be raised to at least 80…100% of **A-Scan** height. Material thickness **D** of the material is determined through measurement of multiple material back echoes



6.2.2. Submenu BASICS

Click on Basics in the *Top Level Screen* to enter, the screen as below appears:



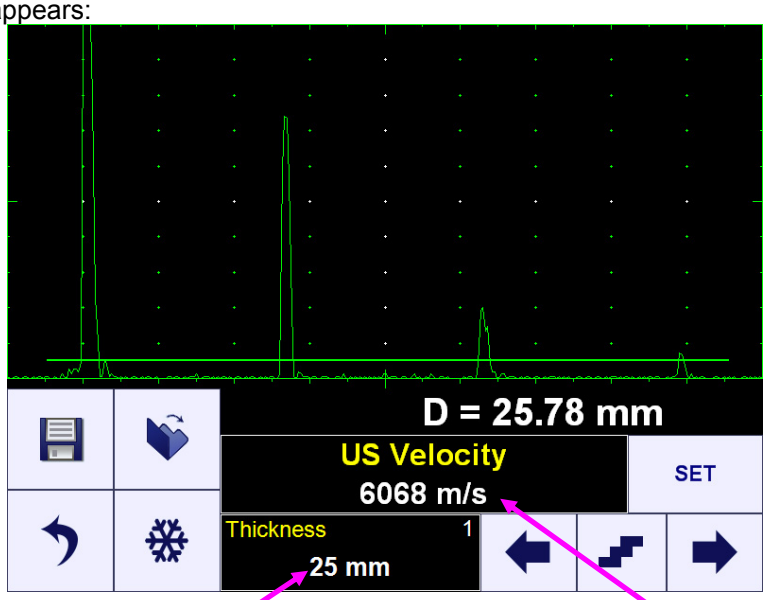
6.2.2.1. Gain, USVelocity, Reject, Range, Display Delay

Refer to paragraphs 5.2.1 through 5.2.3 of the operating manual to control these settings. Also please refer to the notes below:

Setting	Probes with Delay Line	Probe Without Delay Line	Note
Gain	To provide height of the first delay line echo reaching at least 80…100% of **A-Scan** height	To provide height of the maximal material back echo in the sequence of at least two back echoes covered by **Gate A** reaching at least 80…100% of **A-Scan** height. It is also necessary that at least one back echo to follow the maximal one within the **Gate A**	**Pulse Width**, **Firing Level**, **Shape** settings defined through submenu **PULSER** also have the influence on the measurement results and should be calibrated along with **Gain**
USVelocity	To be equal to the ultrasound velocity in the material	To be equal to the ultrasound velocity in the material	Refer also to paragraph 6.2.2.2 of the operating manual
Reject	This setting has no influence on the measurement result just on the signal observation on the **A-Scan**	This setting has no influence on the measurement result just on the signal observation on the **A-Scan**	none
Display Delay and Range	To provide observation of the first and second delay line echoes on the **A-Scan** for the probe not contacted to the material	To provide observation of at least two material back echoes for the highest thickness and of the first back echo for the lowest thickness within entire intended thickness measurements range	none

6.2.2.2. Automatic Calibration

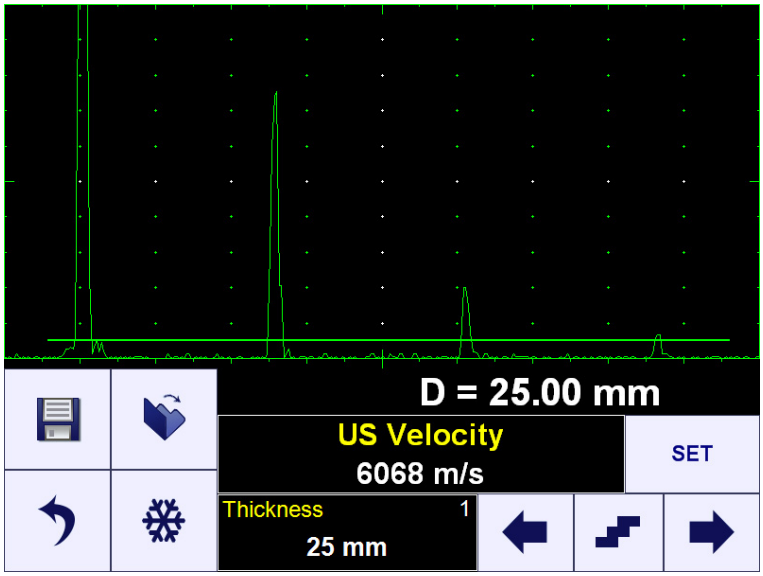
Place probe onto the sample of material with known thickness allowing receiving of several back echoes, then provide gating (**Gate A**) according to paragraph 6.2.1 of the operating manual, then click on AUTO CAL, the screen as below appears:



Key in the Thickness of the material, on which calibration is performed

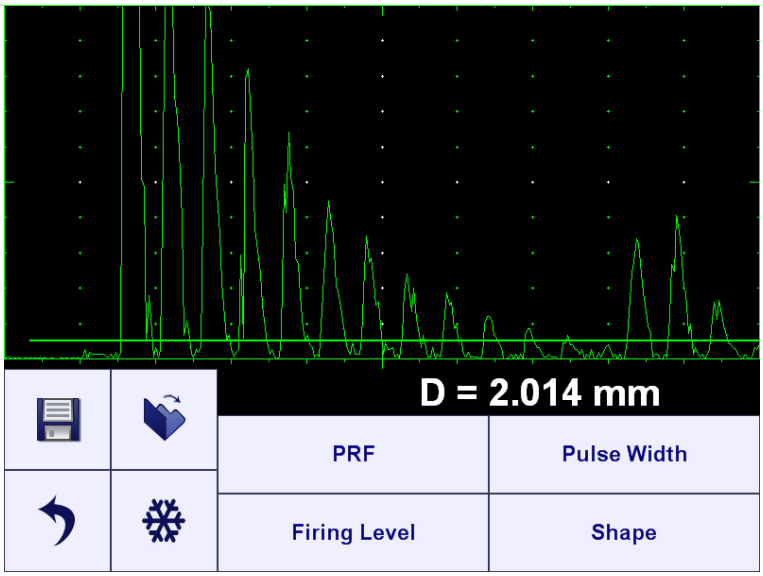
The corresponding **USVelocity** value is defined and displayed automatically

Click on SET to use automatically found **USVelocity** value as default, as a result the precise material thickness result is displayed:



6.2.3. Submenu PULSER

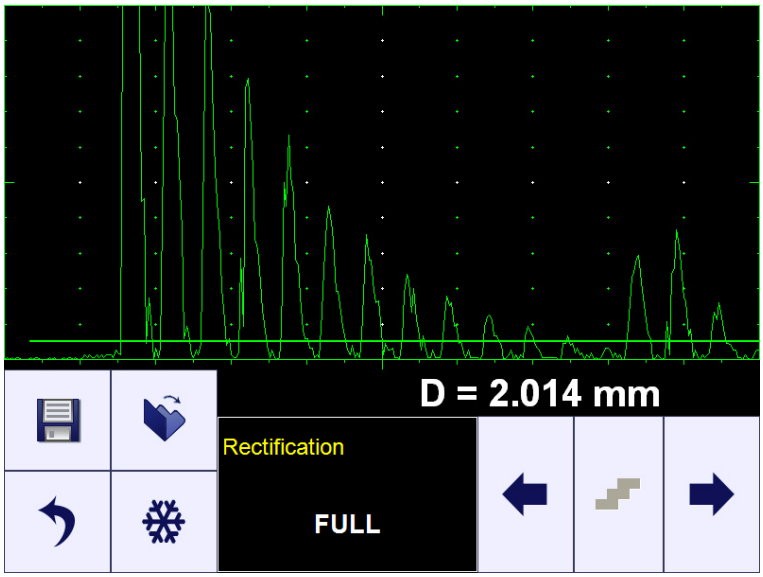
Click on Pulser in the *Top Level Screen* to enter, the screen as below appears:



Pulser is permanently setup to Single while in the **Thickness Gauge** mode, to control other parameters refer to paragraphs 5.3.2, 5.3.3, and 6.2.2.1 of the operating manual

6.2.4. Submenu RECTIFY

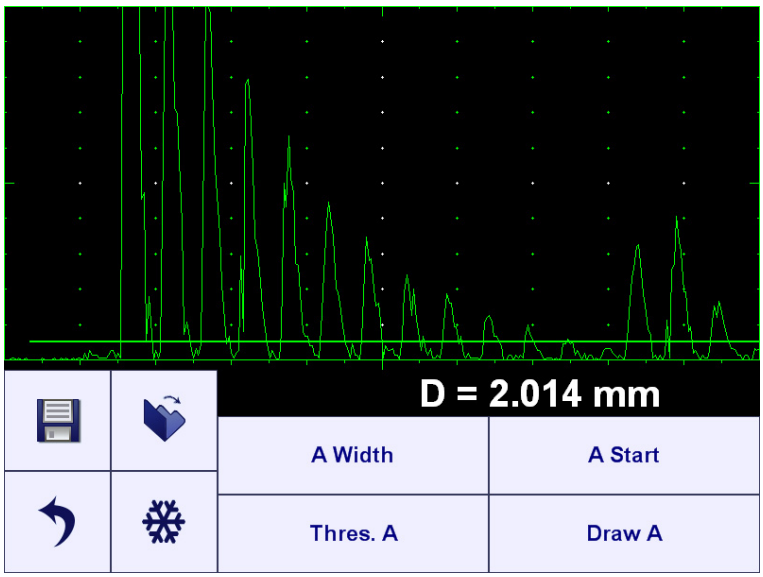
Click on Rectify in the *Top Level Screen* to enter, the screen as below appears:



Refer to paragraphs 5.4.3 and 6.2.2.1 of the operating manual

6.2.5. Submenu GATE A

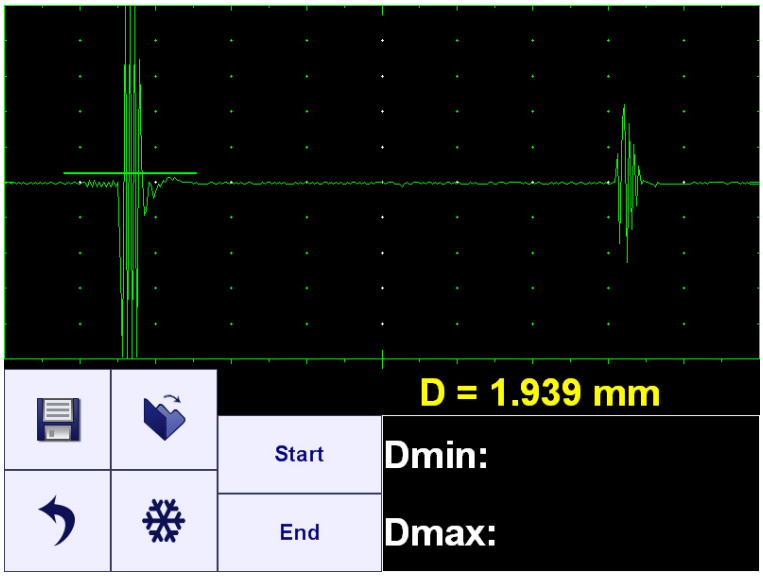
Click on Gate A in the *Top Level Screen* to enter, the screen as below appears:



Gate A is permanently switched ON, for other settings refer to paragraphs 5.5.2, 5.5.3, and 6.2.1 of the operating manual

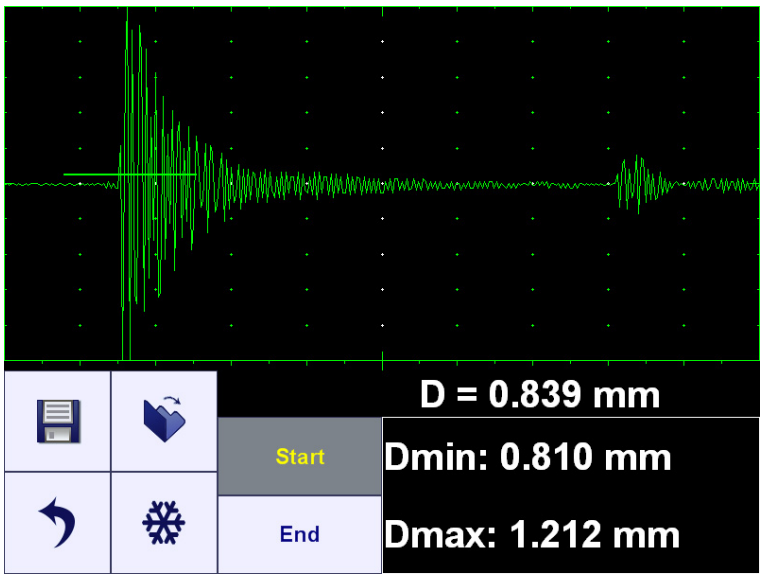
6.2.6. Min / Max

This function allows finding minimal / maximal thickness for the series of thickness measurements performed either through point-by-point placement of the probe onto or scanning over material, click on Min/Max to proceed, the screen as below appears:



Click on Start to begin a series (scanning) then perform thickness gauging

On completion series (scanning) click on End, both minimal and maximal thickness values among measured are indicated:



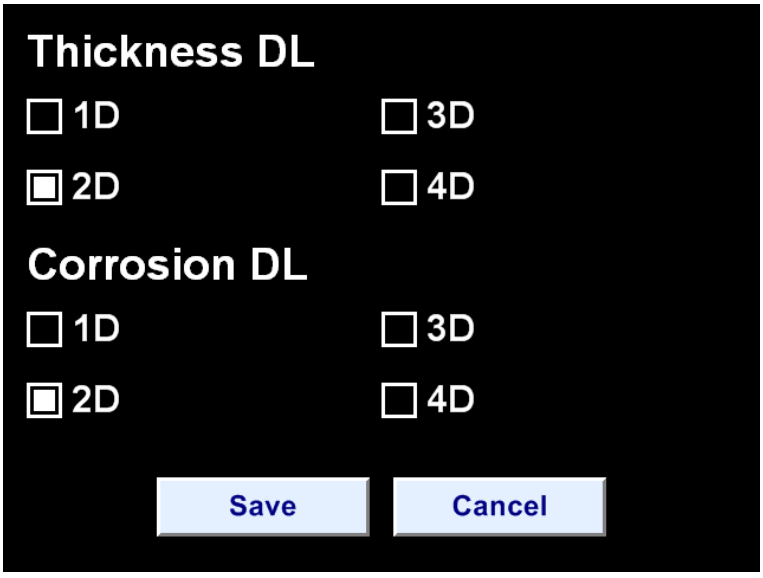
6.2.7. Data Logger

6.2.7.1. Defining Format of the Data Logger

In the **ISONIC utPod Start Screen** (refer to paragraph 4.3 of the operating manual) click on Data Logger

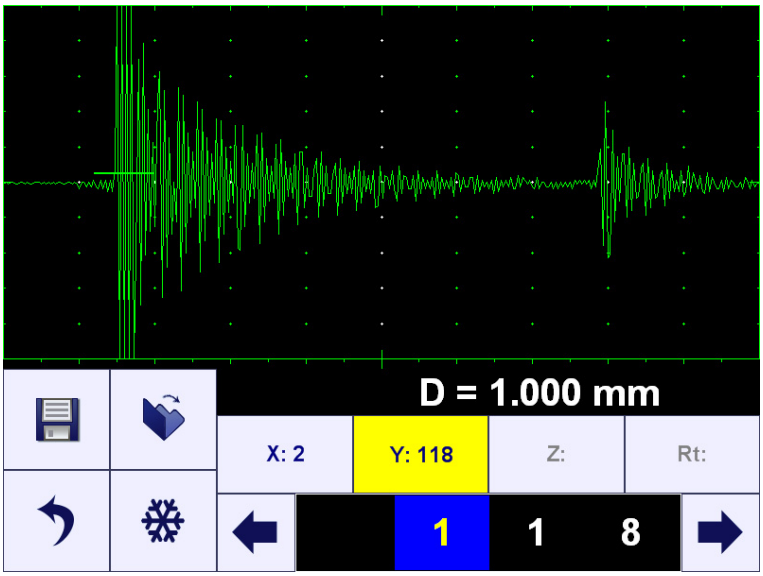
Click on the format selected for the data logger files for **Thickness Gauge** and / or **Corrosion Gauge** then click on Save

To negate the last data logger format changes click on Cancel



6.2.7.2. Filling Data Logger with Measurements Results

Click on Data Logger to start capturing of the thickness reading within entire series of measurements into a database file



1 through 4 characters determine the address of cell for storing *single point measurement* (thickness reading **D** accompanied with **A-Scan**); each character is accompanied with the numerical value. For example for **2D** data logger format will consist of 2 characters **X** and **Y**, each with the number. To select the character, for which the numerical address should be modified click on it (this highlights the selected character) then change the numerical value through clicking on either or . It should be noted that in order to accelerate the access to the selected cell every digit composing numerical value may be accessed directly through clicking on it – the selected digit is highlighted)

To store *single point measurement* into the cell click on

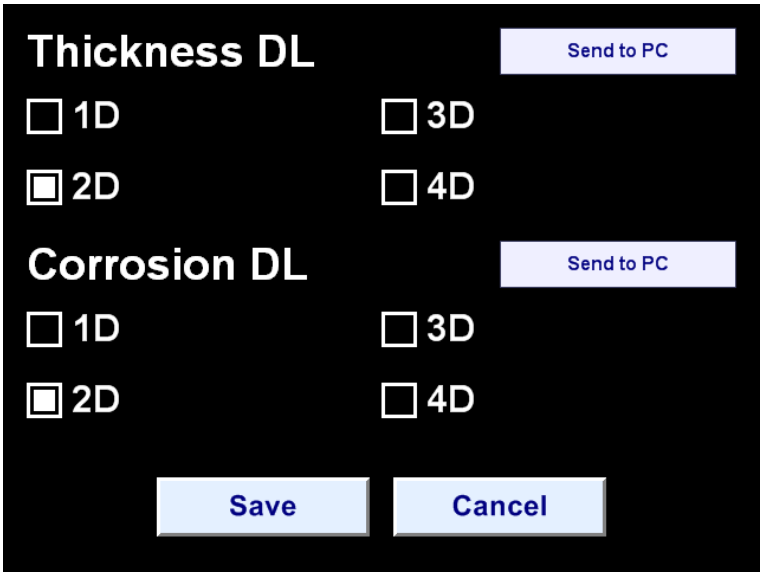
Free cell is represented by the following **save / open** controls:

Cell already filled with *single point measurement* is represented by the following **save / open** controls:

To preview *single point measurement* stored in the cell click on

To overwrite *single point measurement* stored in the cell with a new one click on

6.2.7.3. Exporting Data Logger File from ISONIC utPod to Computer



Connect **ISONIC utPod** to computer and run **ISONIC utPod for PC** SW (refer to chapter 8 of the operating manual). In the **ISONIC utPod** start screen appearing on the computer's screen click on Data Logger

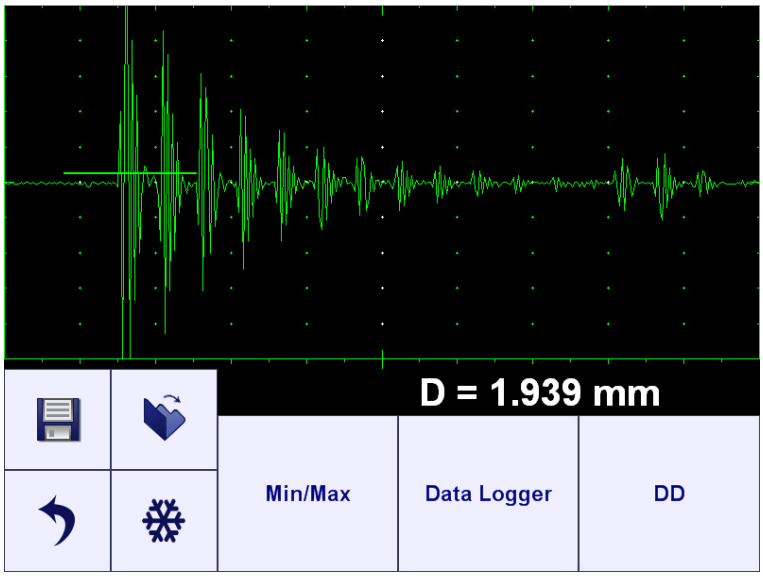
In the next screen appeared click on Send to PC

6.2.7.4. Emptying Data Logger Memory

With reference to paragraph 6.7.2.1 select any new format for the data logger differing from the currently active then click on Save. On completion return to the desired format and click on Save again

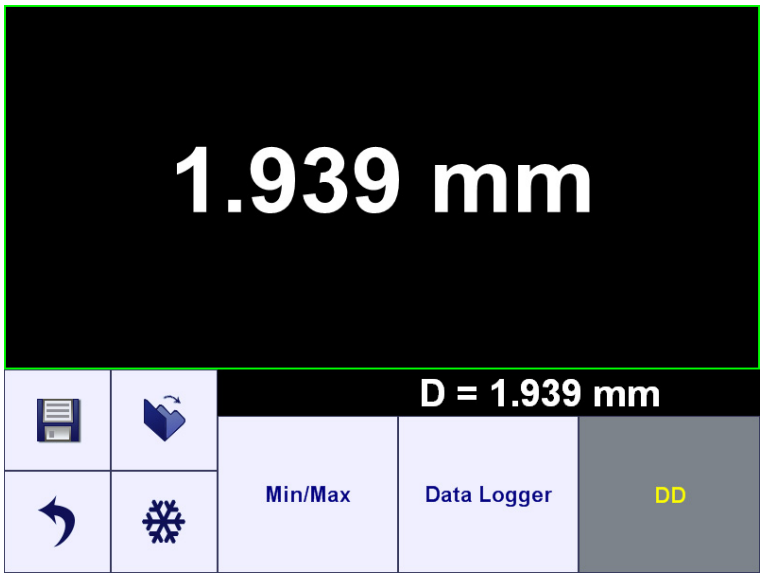
6.3. Measurement

Whilst Measurement screen is active there is no further calibrations possible:



6.3.1. Pure Digital / Combined Thickness Display

Click on /  to switch to pure digital / combined A-Scan + Digital thickness display



6.3.2. Min/Max

Refer to paragraph 6.2.6 of the operating manual

6.3.3. Data Logger

Refer to paragraph 6.2.7 of the operating manual

6.4. Zoom A-Scan

Refer to paragraph 5.9 of the operating manual

7. Corrosion Gauge Mode

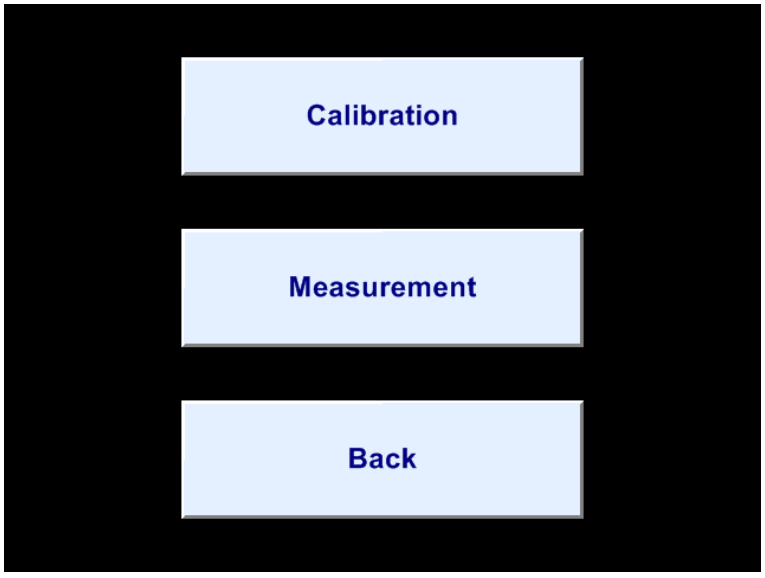
Ultrasonic thickness measurements are the result of the mathematical product of the ultrasonic wave velocity in the material (**USVelocity**) and the transit time of the ultrasonic wave through the material. The transit time is the data obtained by **ISONIC utPod**. The accuracy of ultrasonic thickness measurements depends to a major degree on the **USVelocity**. The value of **USVelocity** depends on characteristics of the material being tested, and is generally independent of the operation of the test instrument

This chapter describes calibrating of **ISONIC utPod** and its internal calculations for the **USVelocity** when it is known, or for finding the **USVelocity** empirically using test blocks of the material, which are accessible for concurrent mechanical thickness measurement. No claim, explicit or implied, is included as to the uniformity of the **USVelocity** throughout any given part or batch of parts. Any non-uniformity of **USVelocity** in the test material may result in erroneous thickness measurements

USVelocity is affected to varying degrees by the temperature of the material being tested. **USVelocity** changes due to temperature variation may affect the material being inspected, and probe as well. When temperature variables are expected, frequent checks must be made to maintain instrument calibration for the changing test conditions

7.1. Corrosion Gauge Start Screen

Corrosion Gauge mode provides thickness measurements with use of dual element probe (twin crystal probe). On entering **Corrosion Gauge** mode the start screen as below appears



Click on Calibration to calibrate thickness gauge

Click on Measurement to proceed with the measurements

Click on Back to return to **ISONIC utPod** start screen

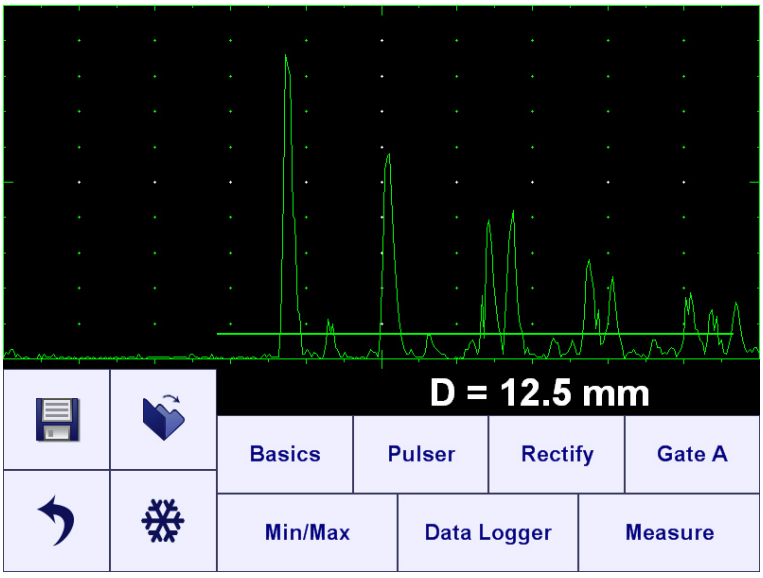
7.2. Calibration – Top Level Screen

Click on  to store **A-Scan** accompanied with signal evaluation results and calibration set into a file

Click on  to upload **A-Scan** accompanied with signal evaluation results and calibration set from a file

Click on  to freeze / return to live **A-Scan**

Click on  to return to upper level menu. Current settings of **Corrosion Gauge** will be kept as default the

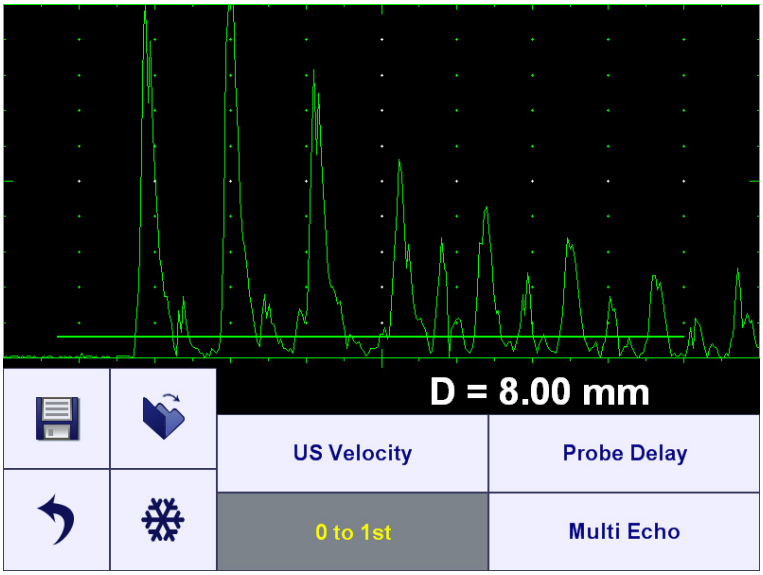


7.2.1. Measurement Techniques

Click on Measure to select measurement technique applied

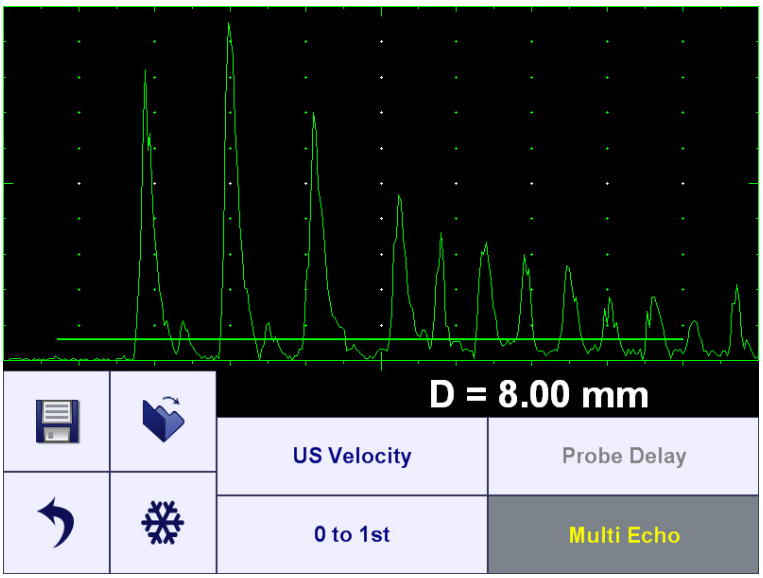
Zero to 1st

Material thickness **D** is determined through measurement of the first echo crossing **Gate A**. The amplitude of this echo should be raised to at least 80…100% of **A-Scan** height at the calibration stage. The correct value of **Probe Delay** should be either keyed in manually (click on Probe Delay) or defined and entered automatically – refer to paragraph 7.2.2.2 of the operating manual



Multiecho

Material thickness **D** is determined through measurement of multiple back echoes whilst **Gate A** covers at least two of them. The maximal back echo among the designated should be raised to at least 80…100% of the **A-Scan** height. It is also necessary that at least one back echo to follow the maximal one within the **Gate A**
Multiecho is recommended for *through-paint* and *through-coating* measurements

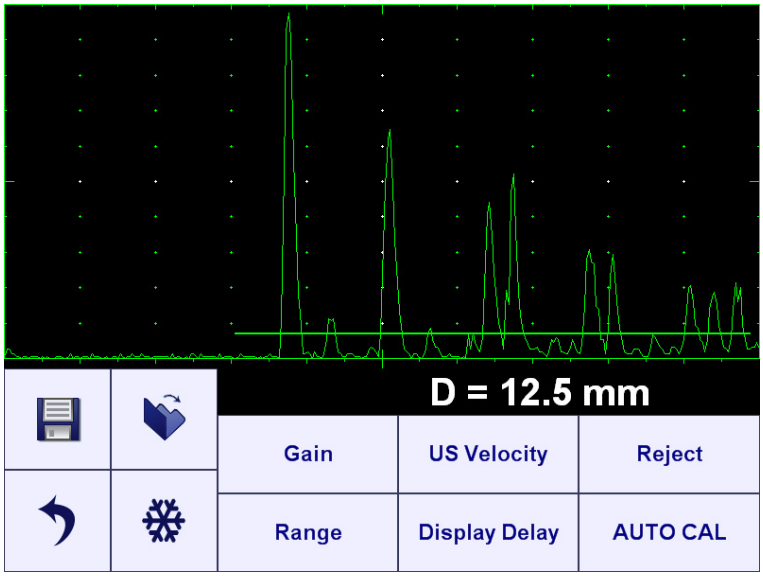


ⓘ

In order to avoid imperfect results the suitability of dual element probe for multi-echo measurements on the required material in certain thickness range should be checked in advance

7.2.2. Submenu BASICS

Click on Basics in the *Top Level Screen* to enter, the screen as below appears:



7.2.2.1. Gain, USVelocity, Reject, Range, Display Delay

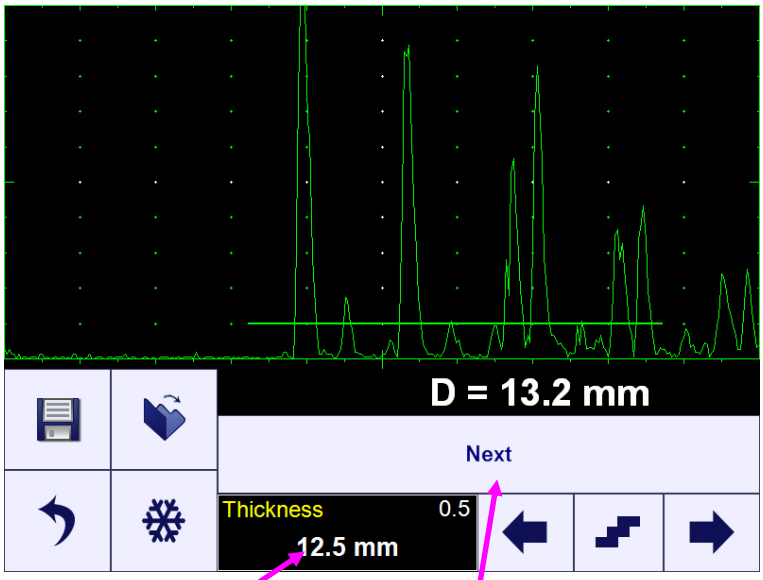
Refer to paragraphs 5.2.1 through 5.2.3 of the operating manual to control these settings. Also please refer to the notes below:

Setting	Zero to 1st	Multiecho	Note
Gain	To provide the height of first material back echo crossing **Gate A** reaching at least 80…100% of the **A-Scan** height	To provide height of the maximal material back echo in the sequence of at least two back echoes covered by **Gate A** reaching at least 80…100% of **A-Scan** height. It is also necessary that at least one back echo to follow the maximal one within the **Gate A**	**Pulse Width**, **Firing Level**, **Shape** settings defined through submenu **PULSER** also have the influence on the measurement results and should be calibrated along with **Gain**
USVelocity	To be equal to the ultrasound velocity in the material	To be equal to the ultrasound velocity in the material	Refer also to paragraph 7.2.2.2 of the operating manual
Reject	This setting has no influence on the measurement result just on the signal observation on the **A-Scan**	This setting has no influence on the measurement result just on the signal observation on the **A-Scan**	none
Display Delay and Range	To provide observation of the first material back echo within entire on the **A-Scan** within entire intended thickness measurements range	To provide observation of at least two sequential back echoes (first and second) for the highest thickness and of the first back echo for the lowest thickness within entire intended thickness measurements range	none

7.2.2.2. Automatic Calibration

Zero to 1st

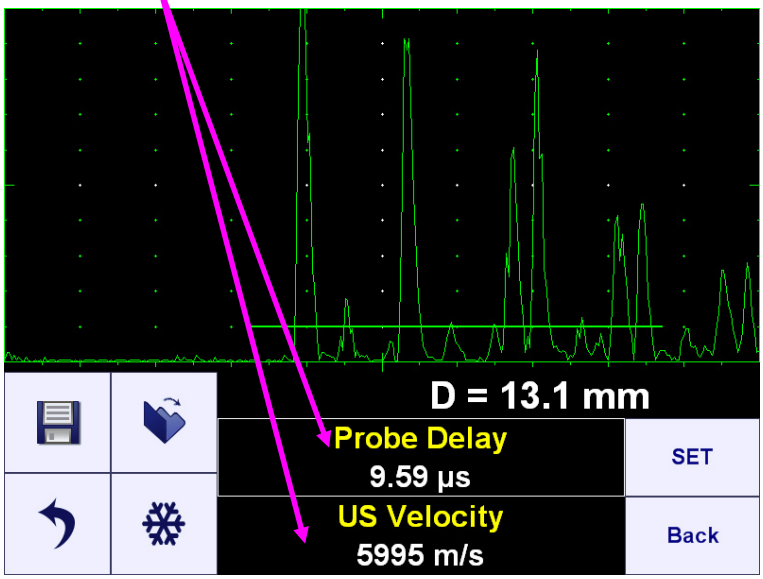
Place probe onto the sample of material with known thickness allowing receiving of several back echoes, then provide gating (**Gate A**) according to paragraph 6.2.1 of the operating manual, then click on AUTO CAL, the screen as below appears:



Key in the Thickness of the material, on which calibration is performed

Click on upon completed

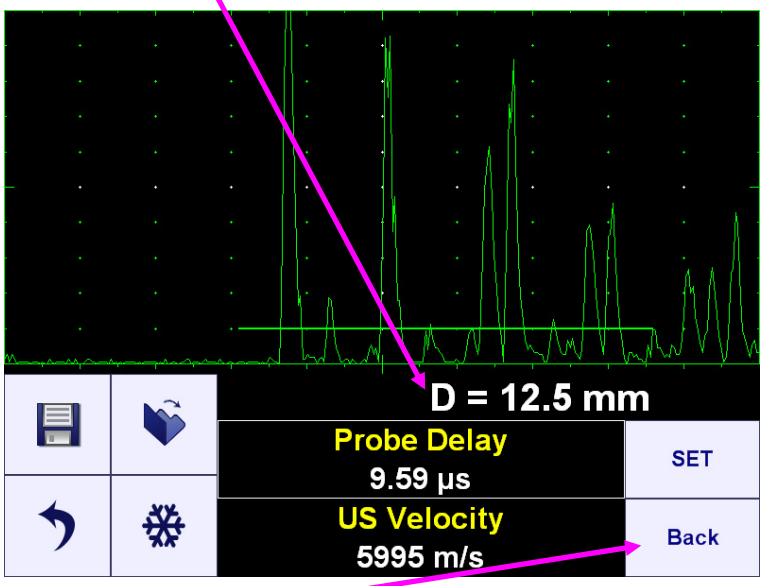
Click on SET to use automatically determined **USVelocity** and **Probe Delay** value as default:



Multiecho

Refer to paragraph 6.2.2.2 of the operating manual

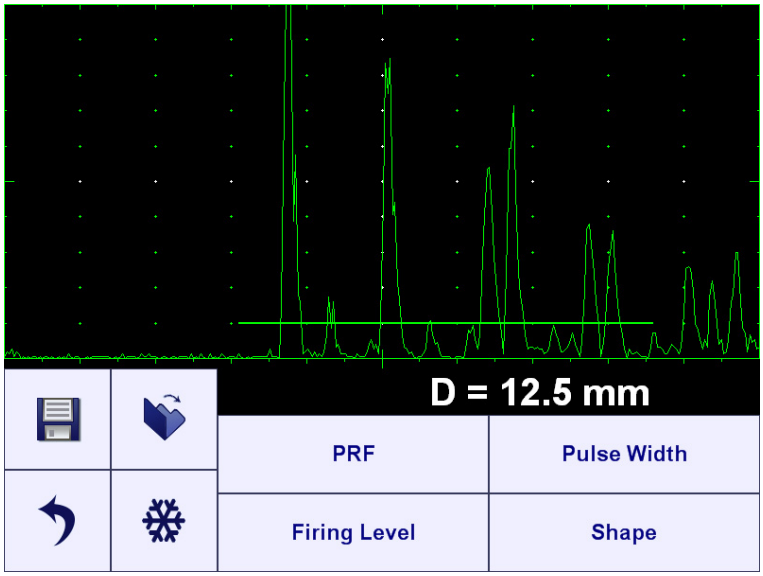
As a result the correct material thickness result is displayed:



To return to the upper screen click on

7.2.3. Submenu PULSER

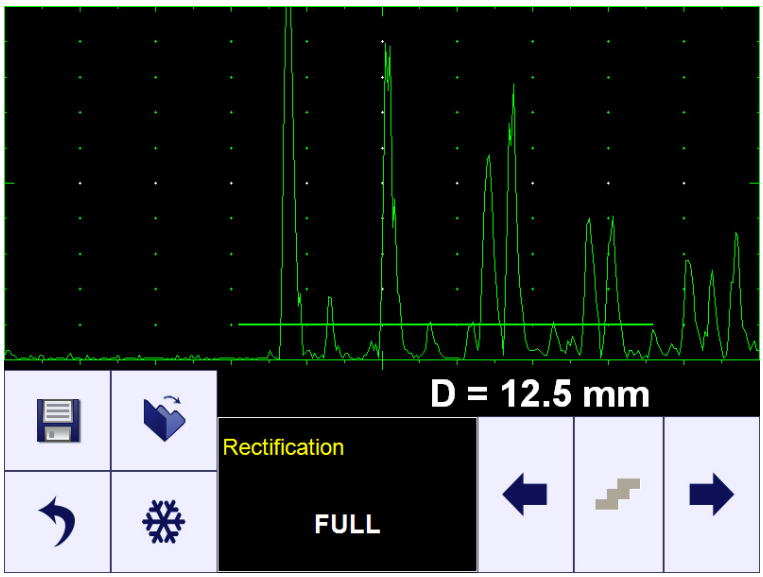
Click on Pulser in the *Top Level Screen* to enter, the screen as below appears:



Pulser is permanently setup to **Dual** while in the **Corrosion Gauge** mode, to control other parameters refer to paragraphs 5.3.2, 5.3.3, and 7.2.2.1 of the operating manual

7.2.4. Submenu RECTIFY

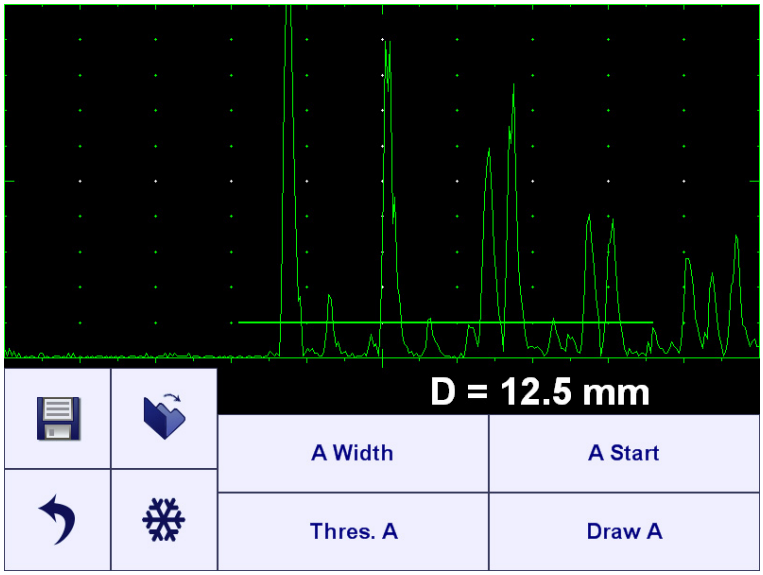
Click on Rectify in the *Top Level Screen* to enter, the screen as below appears:



Refer to paragraphs 5.4.3 and 7.2.2.1 of the operating manual

7.2.5. Submenu GATE A

Click on Gate A in the *Top Level Screen* to enter, the screen as below appears:



Gate A is permanently switched ON, for other settings refer to paragraphs 5.5.2, 5.5.3, and 7.2.1 of the operating manual

7.2.6. Min / Max

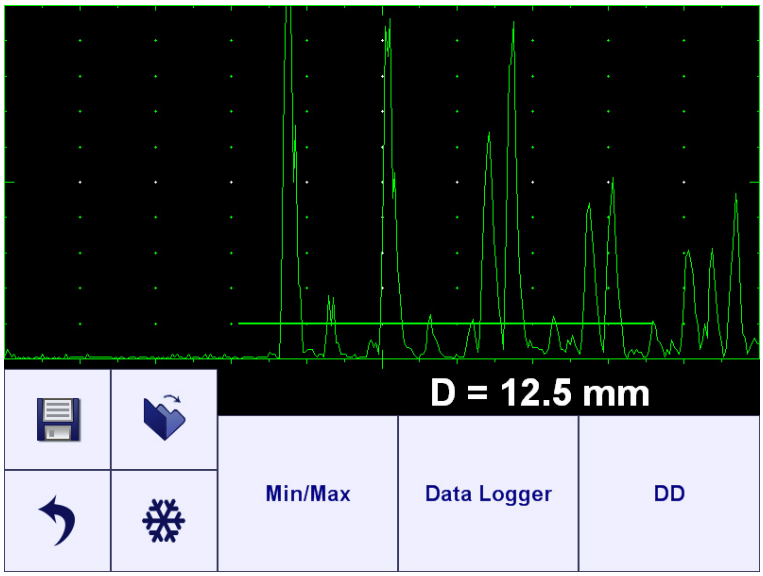
Refer to paragraph 6.2.6 of the operating manual

7.2.7. Data Logger

Refer to paragraph 6.2.7 of the operating manual

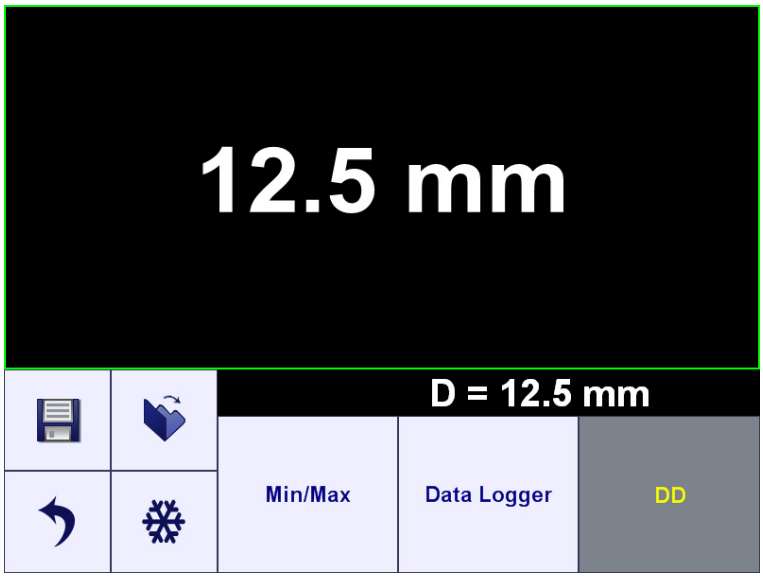
7.3. Measurement

Whilst Measurement screen is active there is no further calibrations possible:



7.3.1. Pure Digital / Combined Thickness Display

Click on /  to switch to pure digital / combined A-Scan + Digital thickness display



7.3.2. Min/Max

Refer to paragraph 6.2.6 of the operating manual

7.3.3. Data Logger

Refer to paragraph 6.2.7 of the operating manual

7.4. Zoom A-Scan

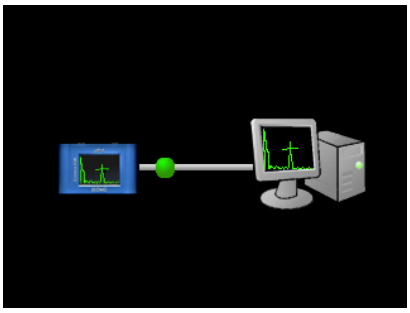
Refer to paragraph 5.9 of the operating manual

8. ISONIC utPod for PC SW Package

8.1. ISONIC utPod – Connection to Computer

Install **ISONIC utPod for PC** SW package into computer. The setup files are located on the USB thumb drive delivered with the instrument. Alternative it is possible to download **ISONIC utPod for PC** software setup pack at: http://www.sonotronndt.com/support.htm

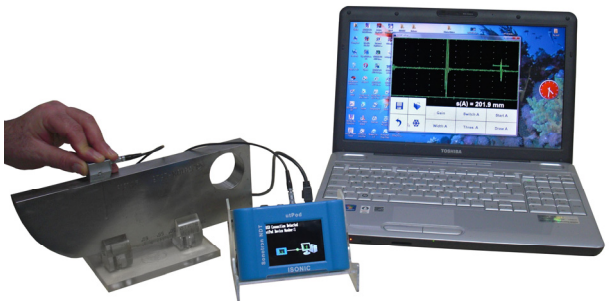
Turn **ISONIC utPod** on then connect it to USB port of the computer with the installed **ISONIC utPod for PC** SW package – use cable delivered with the instrument; the following screen is generated by **ISONIC utPod**:

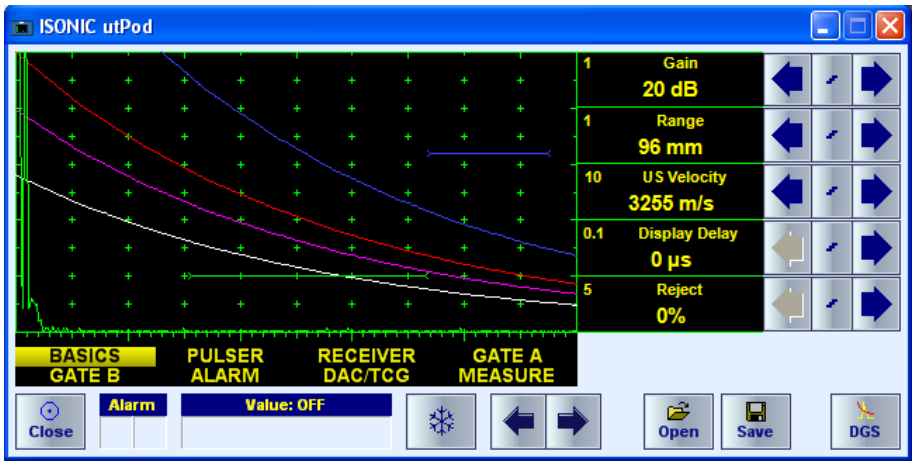


Upon connection established start **ISONIC utPod for PC** software

8.2. ISONIC utPod Instrument Control

ISONIC utPod for PC software allows full control of the instrument through the **Instrument-Like Operating Surface** as it is described in the chapters 4 through 7 of the present operating manual. While connected to computer **ISONIC utPod** it is fully controllable with use of mouse and keyboard; the live **A-Scan** and readings are reproduced on the computer screen. For the experienced users especially for those who practice with high-end **ISONIC** series instruments and systems (**ISONIC 2005, STAR, 2020, 2006, 2007, 2008, 2009 UPA Scope, 2010, AUT 16, AUT 32, PA AUT**) it may be useful to switch to **ISONIC Classic User Interface**. For that purpose mode left mouse double click on the **A-Scan** when in **Flaw Detector** mode:





To return to the **Instrument-Like Operating Surface** double left mouse click on the **A-Scan**

9. Miscellaneous

9.1. Settings

In the **ISONIC utPod Start Screen** (refer to paragraph 4.3 of the operating manual) click on 

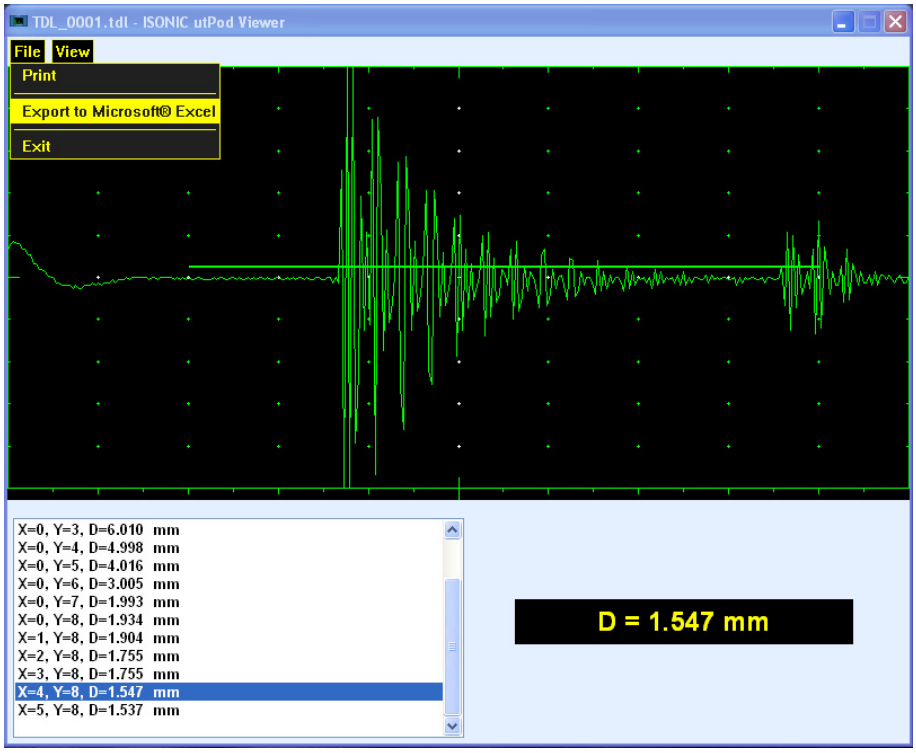
in order to:

- ⇨ select measurement units (metric or imperial)
- ⇨ select the dialogue language
- ⇨ calibrate touch screen
- ⇨ switching built-in buzzer ON or OFF
- ⇨ setting power saving (sleep mode) parameters
- ⇨ identifying version (release number) of the currently installed firmware

9.2. ISONIC utPod Viewer

This software utility being a part of **ISONIC utPod for PC software** allows viewing of files captured by **ISONIC utPod** instruments in the PC and creating inspection reports in the forms of hard copy or editable format (PDF, DOC, etc depending on standard software such as MS Office, PDF-Writer, etc installed in the computer)

Data logger data may be previewed upon exported from **ISONIC utPod** to PC. For each data logger cell thickness reading is presented along with corresponding **A-Scan** independently on instrument settings during the measurements either pure digital display or combined with **A-Scan**. This allows justifying of every reading:



Pure thickness readings from the data logger file are exportable MS Excel® spreadsheet provided that MS Excel® is installed in the computer (MS Office® 2010 and the like)

9.3. ISONIC utPod Firmware Update

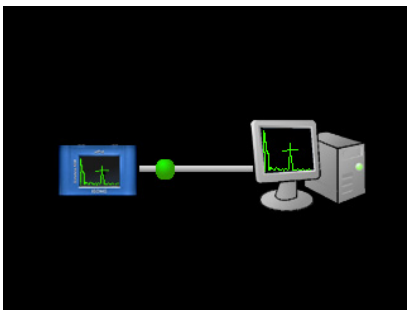
To download free distributable **ISONIC utPod Firmware Updater** enter to http://www.sonotronndt.com/support.htm in the Internet then download file **utPodUpdater.zip** into computer. Unzip file **utPodUpdater.exe** from the downloaded zip-file into a separate directory in the computer

9.3.1. Prior to Updating

In order to run **ISONIC utPod Firmware Updater** in a PC it is necessary to install **ISONIC utPod for PC** software package and to run it establishing USB communication between computer and the instrument at least once. Otherwise **ISONIC utPod Firmware Updater** will not be able to operate

Prior to starting **ISONIC utPod Firmware Updater**:

- Switch on the computer
- Ensure that internal battery **ISONIC utPod** is fully charged or connect **ISONIC utPod** to external charger, which plugged into the mains
- Switch on **ISONIC utPod** being updated
- Ensure that **ISONIC utPod Instrument** SW in the PC is switched off
- Ensure that **ISONIC utPod Viewer** SW in the PC is switched off
- Connect **ISONIC utPod** to the computer via USB and ensure that the following screen is produced by the instrument:

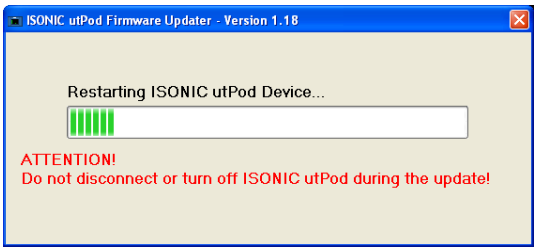


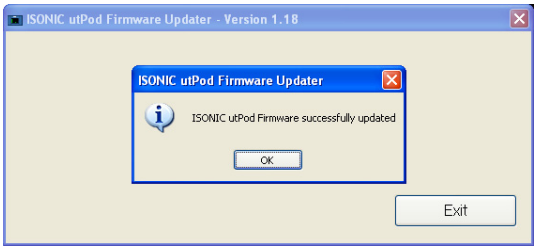
9.3.2. Updating ISONIC utPod Firmware

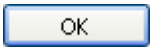
Double click on **utPodUpdater.exe** – the screen as below appears:

Click on 

to start the update process – the sequence of following screens appears during the automatic process – just wait and do not disconnect the instrument from the computrer:



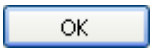


On receiving last screen click on 

then on 

- the update is completed

The attempt to run update on the **ISONIC utPod** with the up to date firmware on board will result appearance of the following screen:

Just click on on 

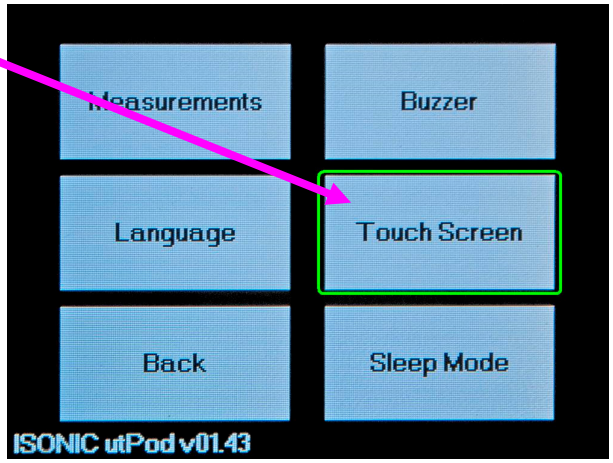
then on 

then

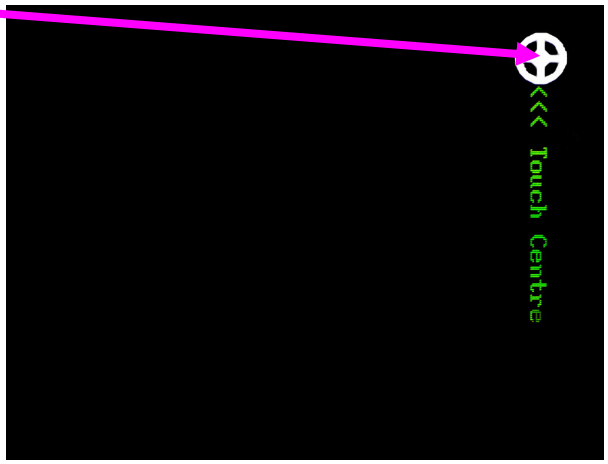
9.4. Touch Screen Calibration

In the **ISONIC utPod Start Screen** (refer to paragraph 4.3 of the operating manual) click on 

then click on

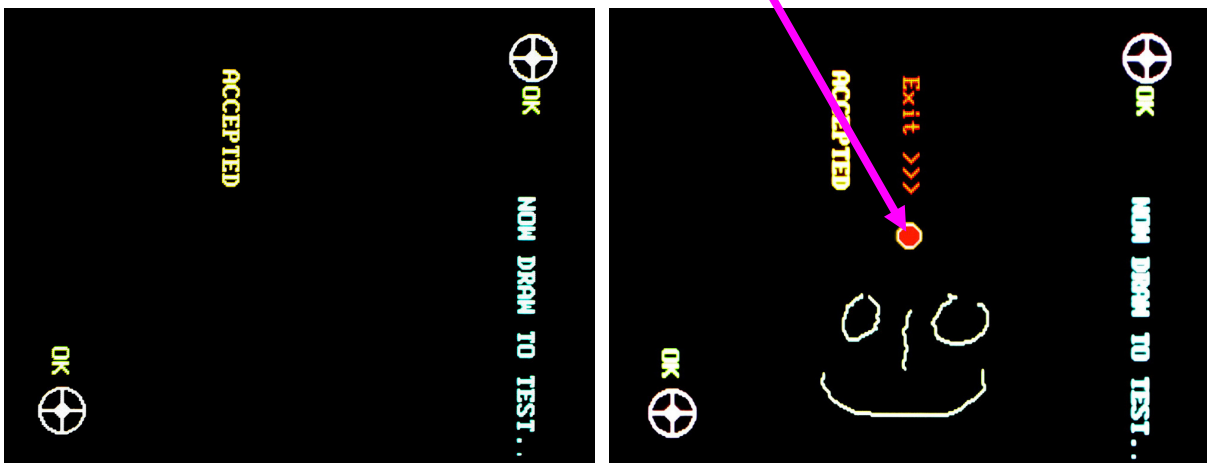


touch the center



touch the center

Draw something on the screen to test the accuracy then click on

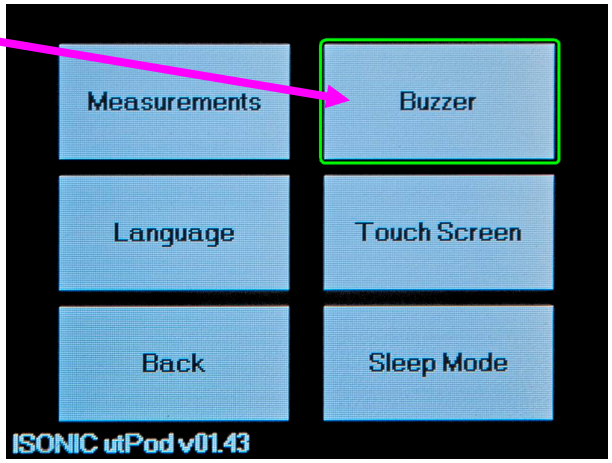


Next touching of the screen will return to the **Settings** menu

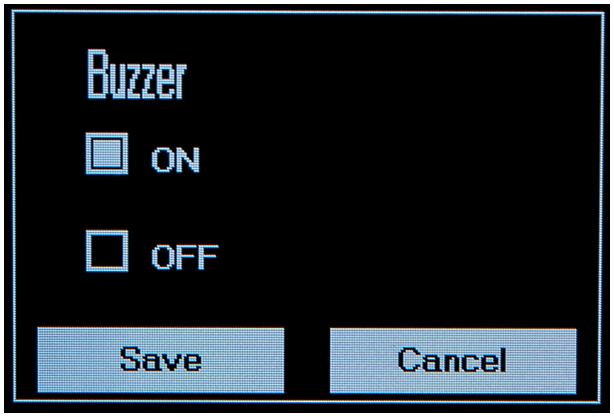
9.5. Built-In Buzzer ON/OFF

In the **ISONIC utPod Start Screen** (refer to paragraph 4.3 of the operating manual) click on 

then click on



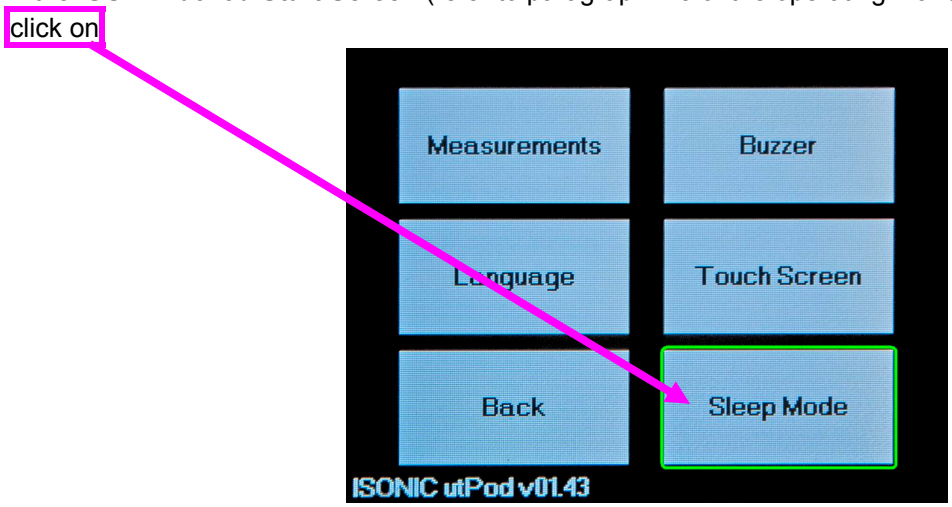
then check the desired option



9.6. Blank Screen – Sleep Mode

In the **ISONIC utPod Start Screen** (refer to paragraph 4.3 of the operating manual) click on 

then click on



then check the desired option

10. ISONIC utPod Real Time Logger

10.1. General

Real-Time Logger is a time-of sale optional feature of **ISONIC utPod** allowing automatic recording of TOF measurements. The following prerequisites are required in order to use the Real-Time Logger feature:

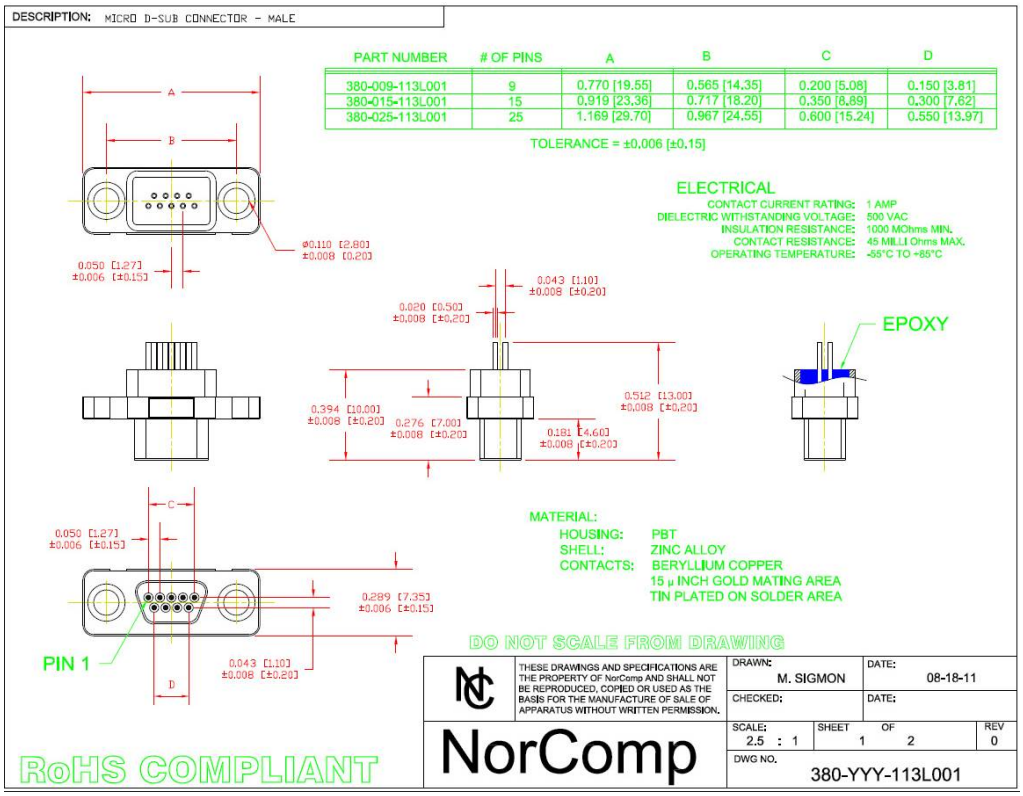
- **ISONIC utPod** instrument with **Real-Time Logger** pre-burned at the time of sale
- **ISONIC utPod Firmware** version 1.56 (date of release Dec 17, 2013) or later
- **ISONIC utPod for PC Software** version 2.8 (date of release Dec 16, 2013) or later

10.2. Docking Terminal

Comparing to regular **ISONIC utPod** unit the instruments equipped with the **Real Time Logger** option are featured with the **Docking Terminal** instead of DC Charger input

Docking terminal allows keeping the instrument encapsulated into some device, for example PIG (Pipe Inspection Gauge), robotic scanner for tank shell thickness gauging and the like so the full control of the instrument, 9VDC powering, and charging of the internal battery are possible through one connector only

Docking terminal Micro D-Sub connector is described below



The pin-out of the Docking terminal is

Pin #	Function	Type
1	Switch#	in
2	utPod_Present	out
3	Chg_Done#	out
4	DC_9V	PWR_IN for an external battery or AC/DC adaptor
5	NC	leave unconnected
6	USB_5V	PWR_IN
7	GND	Ground
8	USB_D-	IO
9	USB_D+	IO

For turning **ISONIC utPod** On/Off pin 1 should be held low for 500 ms (0.5 s) or until pin 2 changes it's state

The output signals on pins 2,3 should be buffered from the outer system via FET gates or by other means to prevent damage to the utPod in case of failure

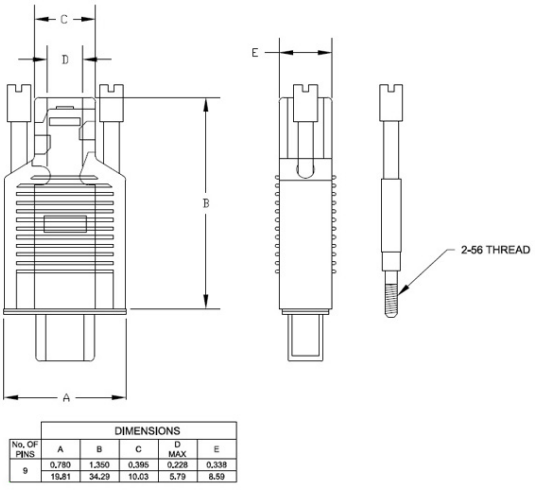
The 9V voltage source ground should be connected to pin 7 through a ferrite bead to reduce possible noise

Pins 6-9 conduct the USB connectivity and should be connected to a shielded cable, using a twisted pair for pins 8 and 9

ISONIC utPod instruments equipped with the **Real-Time Logger** are supplied with the modified external charger S 808024 and docking terminal cable S 808026. At the instrument side it is equipped

Docking Terminal Cable S 808026

Instrument end

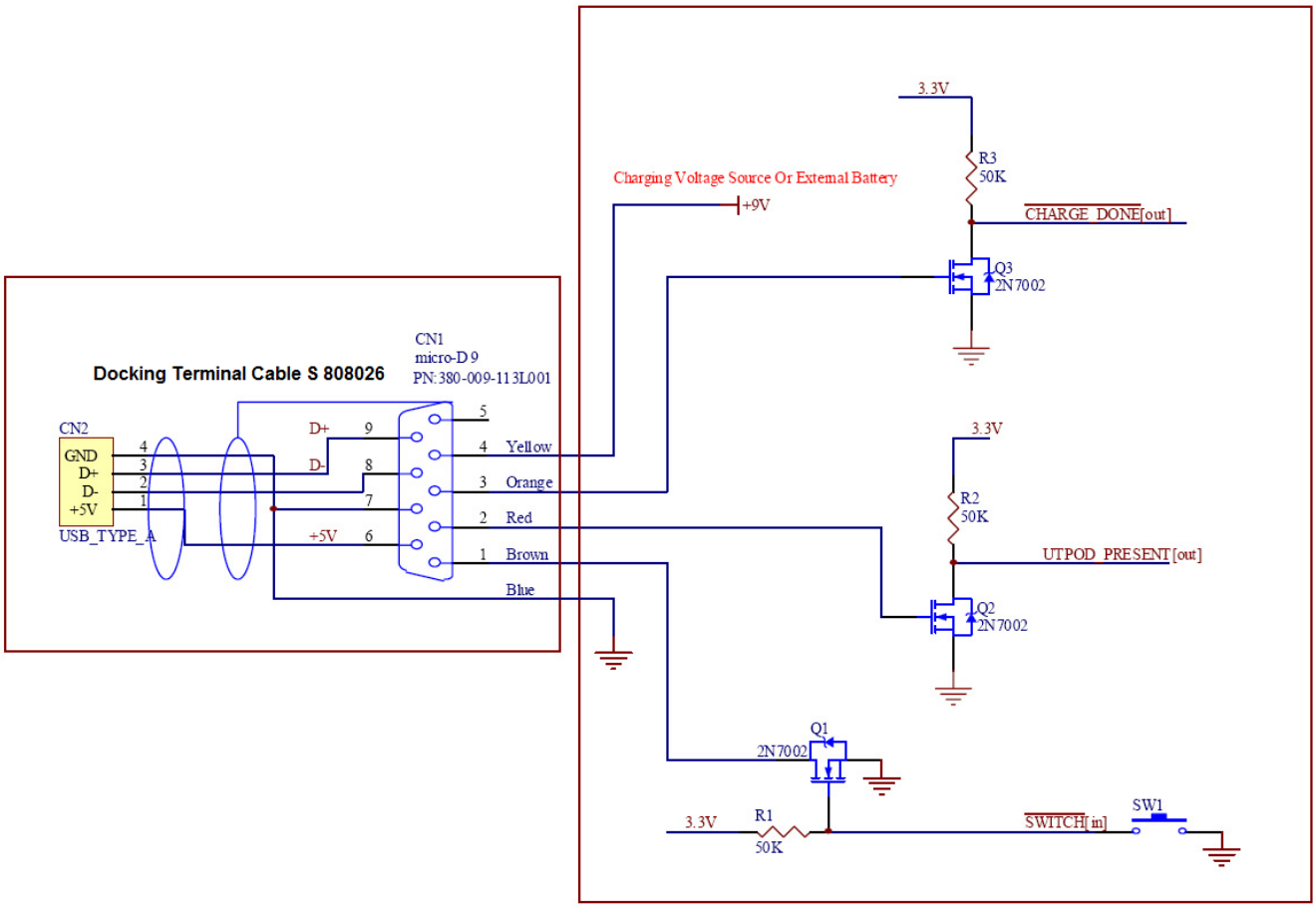


No. OF PINS	DIMENSIONS				
	A	B	C	D MAX	E
9	0.780	1.350	0.395	0.228	0.338
	19.81	34.29	10.03	5.79	8.59

Opposite end – USB and free wires according to the table below

Wire Color	Function
Brown	Switch#
Red	utPod_Present
Orange	Chg_Done#
Yellow	DC_9V
Green	NC
Blue	GND

Reference connectivity design is shown below

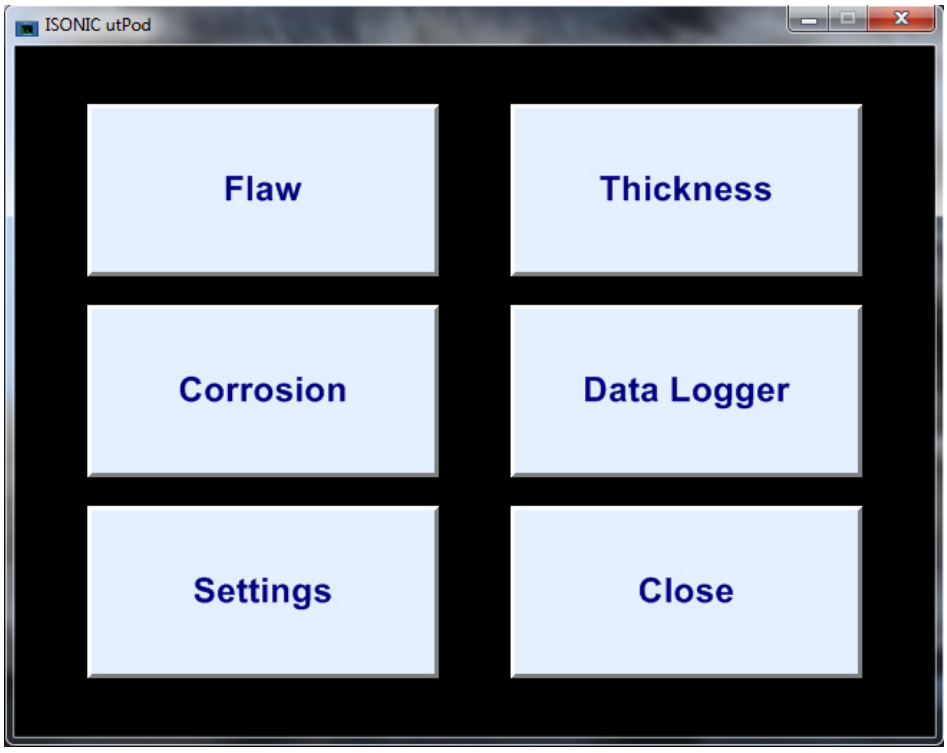


10.3. Operating Real Time Logger

10.3.1. Calibration

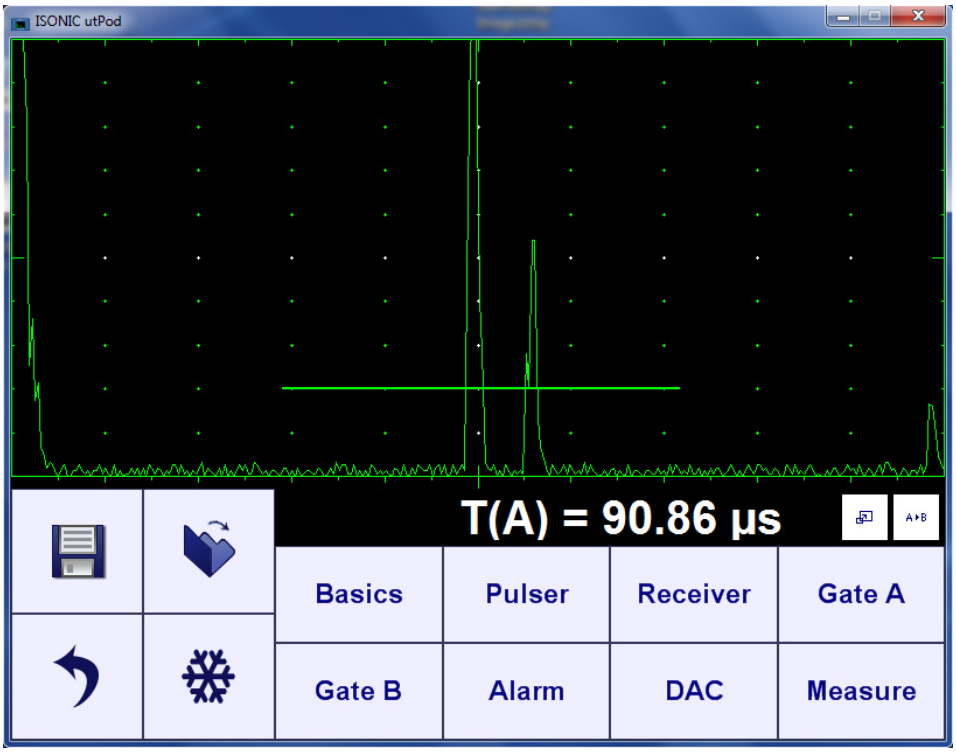
Switch the instrument ON and connect to the computer using its USB cable or Docking Terminal Cable

In the computer start **ISONIC utPod for PC** software, upon software started click on 

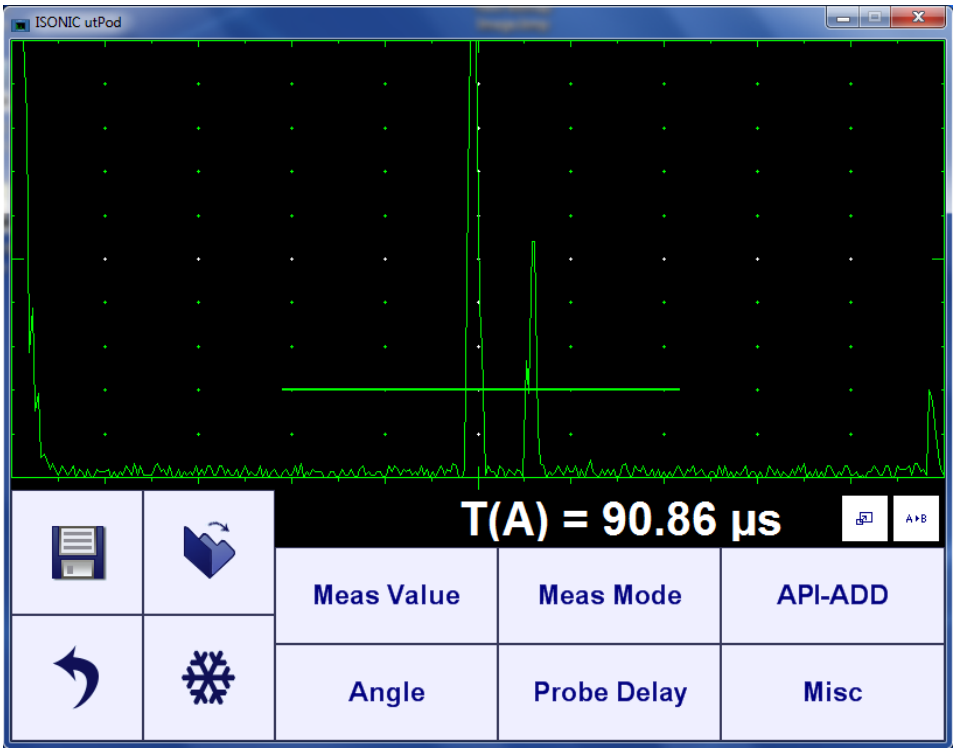


Calibrate the instrument:

- Setup initial pulse (Firing Level, Width), Gain and Filter of the receiver, the time base (Display Delay and Range) to provide clear observation of the first and second back wall echoes (or interface echo and first back wall echo) within entire predicted range of their variations. It is recommended to bring the second back wall echo to 50…80% level of FSH
- Activate **Gate A** and set it up to cover the entire time slot for the appearance of the first and second back wall echo (or interface echo and first back wall echo) within entire predicted range of their variations
- Click on Measure



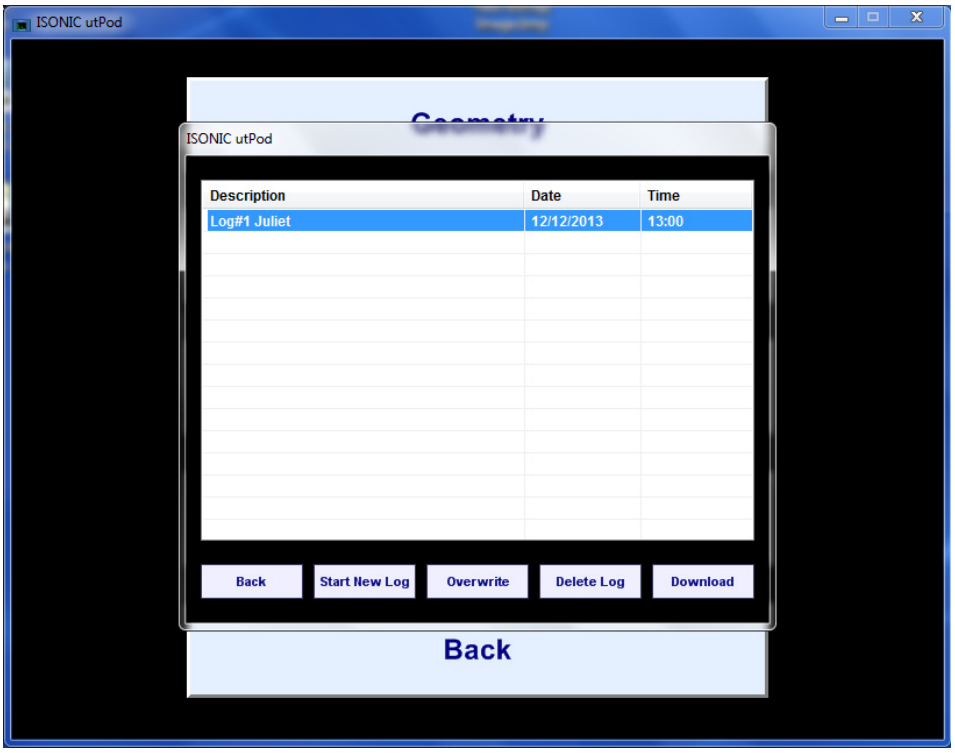
On completing calibration click on



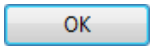
Then click on 

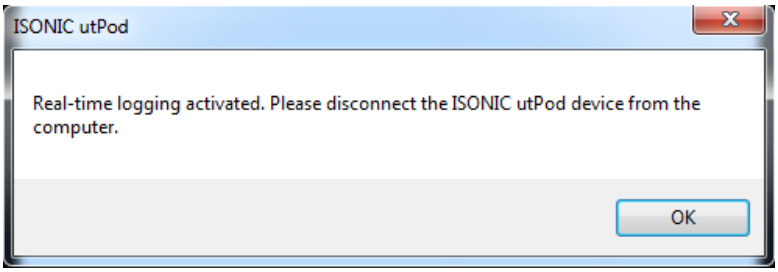
10.3.2. New Real Time Log Record

The **Real-Time Logger Screen** appears. **ISONIC utPod** may hold up to 30 *Real Time Log records*

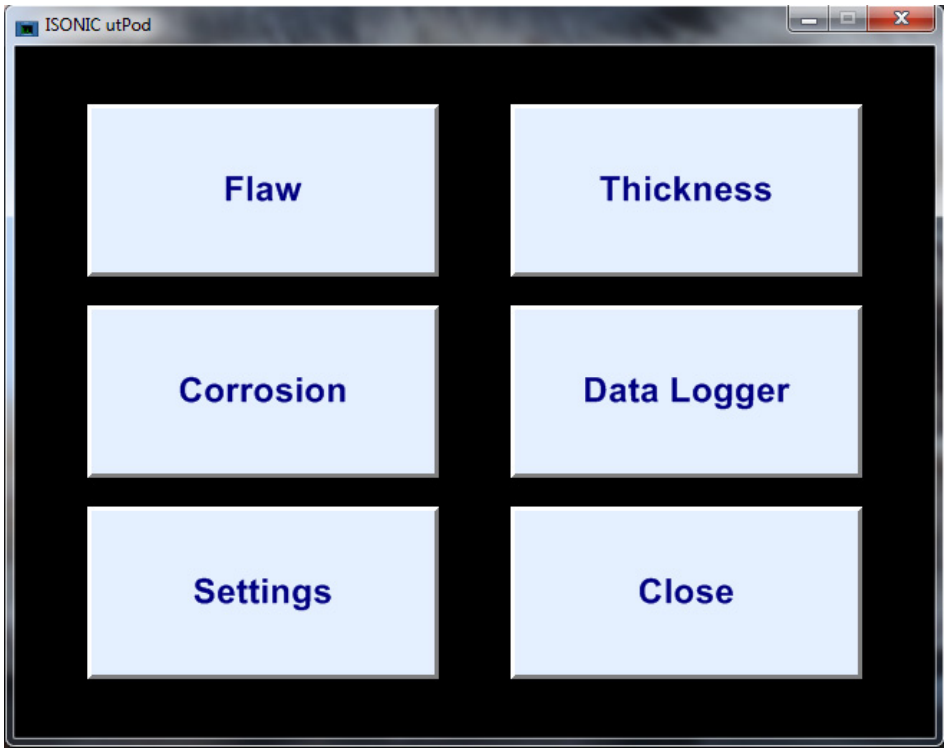


To activate new log click on **Start New Log** then enter the name (description) of the new log and click on **OK**

Then click on 



This will return to the **ISONIC utPod for PC** start screen



10.3.2.1. Start Logging

To start logging disconnect the instrument from the computer. A soon as disconnected the instrument blanks the screen and performs measurements every 20 ms regardless of PRF setting. The following data is logged:

- Time of flight for the first back wall echo (or interface echo): **T(A)**
- Delay of the second back wall echo counted from the first back wall echo (or delay of the back wall echo counted from the interface echo): **ΔT(A)**

The measurement results are recorded into the new log

10.3.2.2. Interrupt Logging Until it Started

Click on any button except 

in the **ISONIC utPod for PC** start screen the confirm in the appeared dialogue box

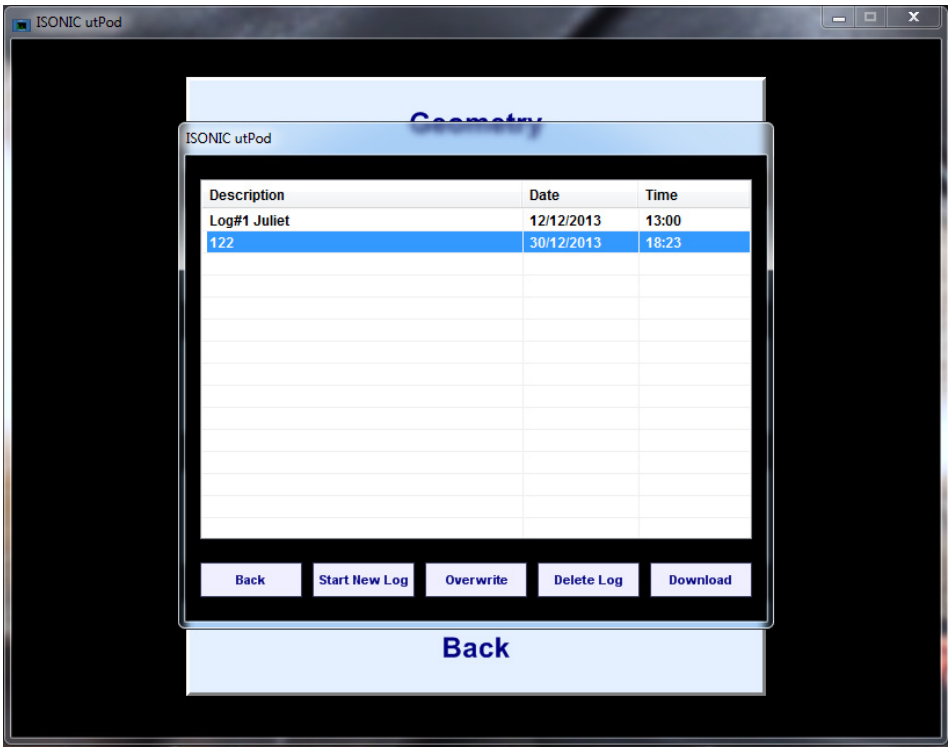
10.3.2.3. Finish Logging

The logging continues until one of the following occurs:

- the internal battery of the instrument is emptied whilst there is no external DC source connected to the docking terminal
- the instrument is turned off by pressing the power switch button and holding it for 2 seconds
- the instrument is reconnected to computer using USB cable

10.3.3. Overwriting Existing Log Record

Select the log record to overwrite then click on Overwrite and proceed further according to paragraph 10.3.2 of this Operating Manual



10.3.4. Delete Existing Log Record

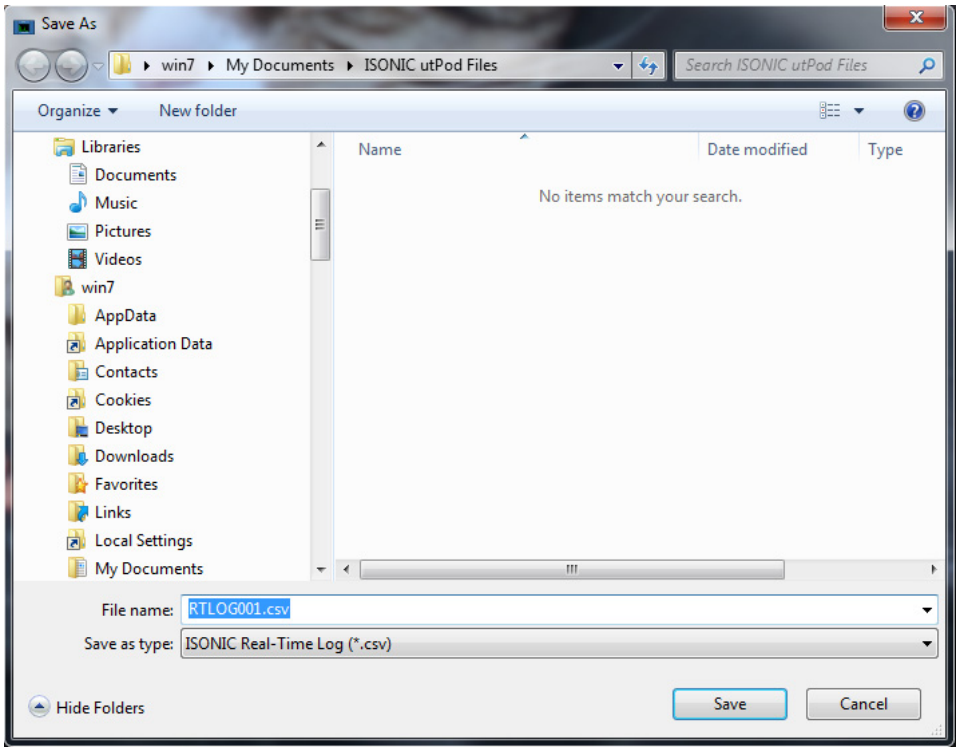
Select the log record to overwrite then click on Delete Log

10.3.5. Download Log Record into Computer

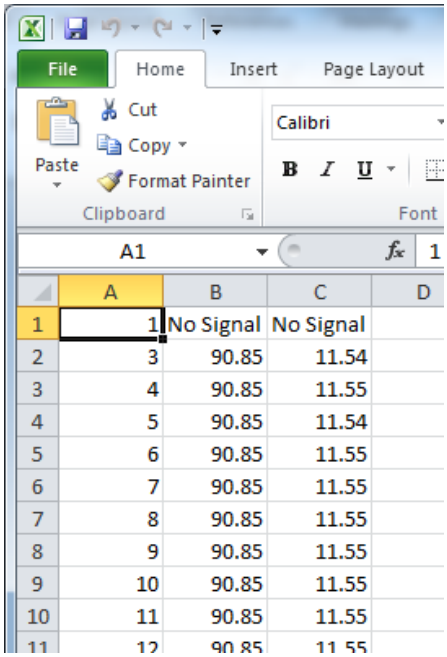
Select the log record to overwrite then click on Download

The log may have very large size so allow time for downloading them. If, for any reason, ISONIC utPod disconnects from PC during the download, the download will be resumed from the point where it was stopped

Upon download completed the **ISONIC utPod for PC** software opens standard dialogue asking for the file name and storage location:



The standard MS Windows® **csv**-file will be created. It may be open using various MS Office® and other software, for example MS Excel®, and processed accordingly:



The data is sorted into 3 columns:

Column A – record #

Column B – **T(A)** as defined in the paragraph 10.3.2.1 of this Operating Manual, in **µs**

Column C – **ΔT(A)** as defined in the paragraph 10.3.2.1 of this Operating Manual, in **µs**

No Signal record means there were no reading taken due to absence of the signal crossing the **aThreshold** level

Harsh Inspection Site?...
ISONIC utPod

Sonotron NDT

www.sonotronndt.com