



ARTIO™



USER GUIDE

1 DISCLAIMER & LEGAL

While attempt and intention has been given to ensure ARTIO is a scientific instrument of industrial-grade, the demonstration version of ARTIO is made available strictly for research, demonstration and evaluation purposes. This document only highlights some basic usage and safety information. THORNETIX Pty Ltd takes no responsibility or liability for any damage or loss of any kind that may arise out of the possession, use, misuse, storage, transportation, or any other situation whatsoever.

This document is intended to be informational only, it shall not be disclosed to or shared with any third party, nor published anywhere without the express prior written consent of THORNETIX Pty Ltd.

The hardware unit, accessories and/or any software made available are for evaluation purposes. The recipient of the hardware, software and/or accessories shall not make available the items to any 3rd party without the express written consent of THORNETIX Pty Ltd.

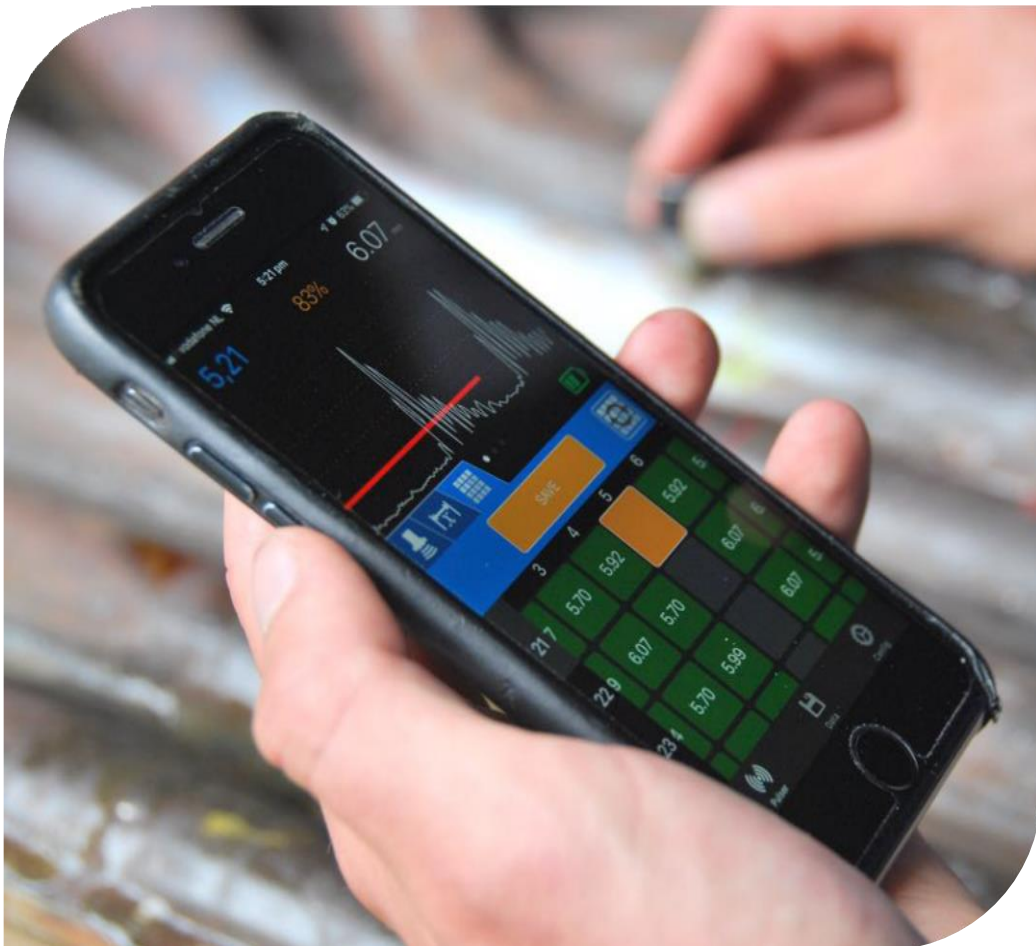
By receiving the unit and/or operating the application the user agrees to the terms and method of operation detailed herein.

2 OVERVIEW

ARTIO™ is a wearable wireless ultrasonic inspection system that is aimed at industrial corrosion monitoring / thickness testing applications.

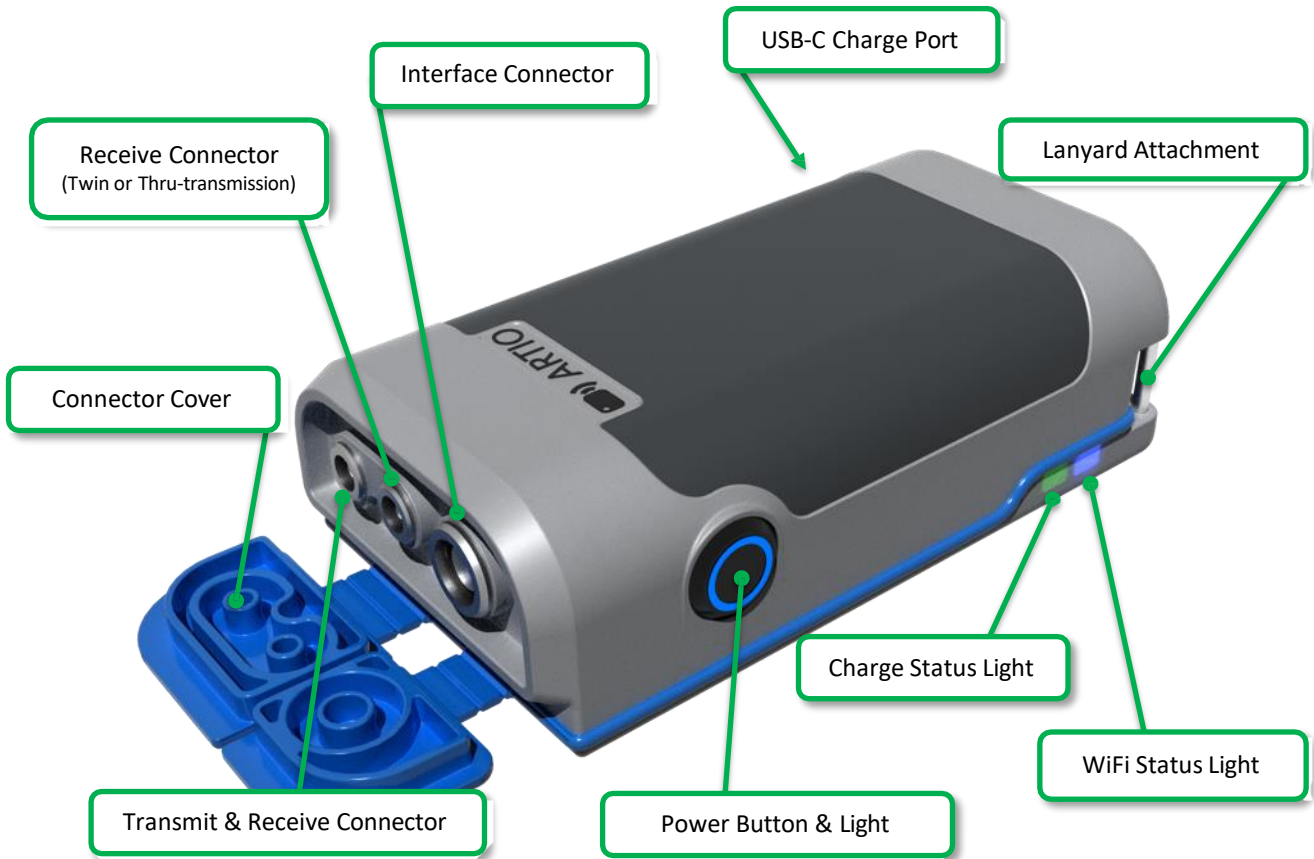
The system comprises of a hardware ultrasound acquisition unit and smartphone app. Raw ultrasonic data from the acquisition unit is transmitted to the smartphone app via wireless connection for processing, display and recording.

The smartphone app has an inbuilt database which stores and manages the data for ease of collection, reporting and export.



3 HARDWARE

1. ACQUISITION UNIT FEATURES



3.2 TECHNICAL SPECIFICATIONS*

Pulse Width:	0.5 to 18MHz
Digitiser:	8 bit
A-Scan Refresh Rate:	Up to 60Hz
Gain:	80dB
Battery:	Endurance: 3.5-4Hrs (Continuous use)
Charge Port:	USB-C
I/O Connector:	1 x Quadrature encoder or 1 x clicker button
Enclosure:	Designed for IP67, <200 grams
Data Communication:	WiFi
Control Interface:	iPhone App (iOS 13.5 and later iPad / iPod)
Display Modes:	A-Scan, B-Scan & Time of Flight
Data Storage:	Available Phone memory
Survey Setup Wizard:	1D, 2D & Boiler grid formats
Certification:	CE (EU) & EN Ultrasonic norms (ISO16831:2012)

**Final specifications may vary as the product is delivered.*

3.3 SAFETY AND CARE

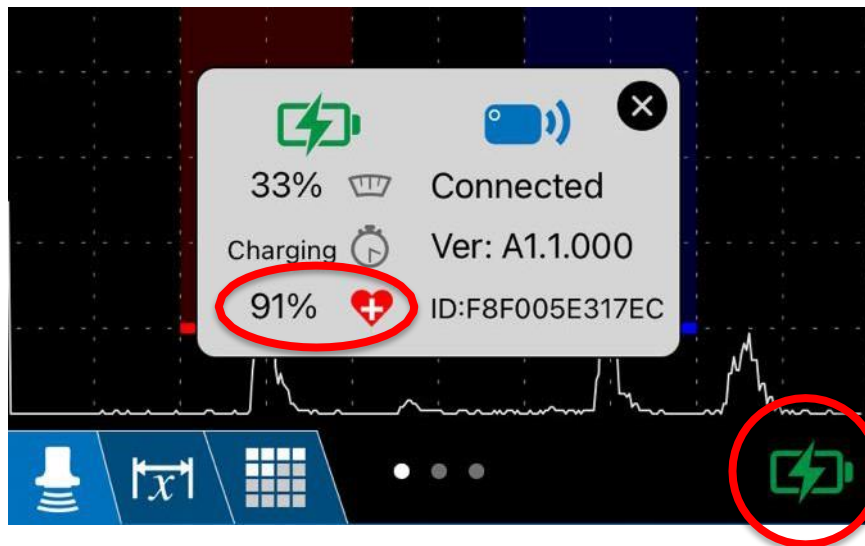
ARTIO has an internal Lithium-Ion battery that is not user accessible or serviceable. Care should be taken to ensure that the battery is not over heated or used outside of its safe operating temperatures.

During use (when the unit is powered on), the hardware will automatically shut down if the internal temperature rises above the safe limits.

Condition	Safe Temperature Range
Charging	0 to +45°C
Discharging (In use)	-10 to +60°C
Storage	-20 to +30°C

Over time, the battery will gradually lose its maximum capacity and should be replaced. The health of the battery is displayed in the **STATUS** window on the **PULSER** page of the smartphone App. The STATUS window can be opened by tapping on the battery icon.

The unit should be returned to the manufacturer when the battery health displays “Replace”. This could occur in approximately 500 charge cycles or 2-3 years, depending on usage as well as operating and storage temperatures.



DO NOT EXPOSE THE UNIT TO HIGH TEMPERATURES. The unit could be damaged and there is risk of fire if the unit is not kept at the correct temperature range. Store the unit in a shaded place, never leave the unit in direct sunlight for a prolonged period.

DO NOT DISPOSE OF THE UNIT, return it to the manufacturer.

DO NOT IMMERSE THE UNIT IN WATER.

4. LIGHT INDICATORS

ARTIO has 3 Light indicators on the side of the enclosure.

1) Power Button:

- The ring around the button's outer surface will glow blue when the unit is powered on.
- If the light fails to turn on, or if the unit turns on then off almost immediately, then the battery is fully discharged or the unit has detected a hardware fault and has shut itself down.

2) Charge Status Light:

- The light will turn Red when charging.
- The light will turn Green to indicate the battery is fully charged.
- The light will be off when no charger is connected.

3) WiFi Status Light:

- When the unit is first turned on, the WiFi light will pulse blue, to indicate that the network is created and available to connect.
- The light will turn solid blue when the smart device is connected to the network.
- The light will flash white when the user saves a thickness reading.
- When updating the firmware, the light will blink purple quickly.

5. INTERFACE CONNECTOR

ARTIO has an interface connector, through which it can be coupled with external accessories such as an encoder or “clicker” button for saving readings without having to touch the screen.

6. INGRESS PROTECTION

ARTIO is designed to be compliant with the IP67 ingress protection level. That is; Protection against the effects of immersion in water between up to 1Metre depth for up to 30mins.

Each of the connectors in ARTIO that are exposed to the external surface, are rated to at least IP67. ARTIO features rubber connector covers in order protect the connectors from particulate fouling.

7. WIFI CONNECTION

Connection with ARTIO is made via a WiFi network which is created by the acquisition unit.

To connect with ARTIO, follow these steps:

- 1) Power the acquisition unit **ON** and wait for the WiFi status light to pulse blue.
- 2) Using the camera of the smartphone, read the QR code on the back of the acquisition unit and tap on the notification to automatically setup and connect to the WiFi network.
Or;
- 2) From the smartphone's WiFi menu, selected the **ARTIO-1.XXX** network SSID and enter in the following password: **1234567890**
- 3) Launch the ARTIO smartphone app.

8. FIRMWARE UPDATE

From time to time, a new firmware version will be released. It is highly recommended to update the smartphone app and firmware to the latest version as soon each may become available, in order that the system remains stable and has the latest features and bug fixes.

To update the firmware, follow these steps;

- 1) Make sure that the unit is powered on and connected to the smartphone app
- 2) Make sure that the battery has more than 20% power or the unit is confirmed to be charging via the USB-C cable.
- 3) Navigate to the **CONFIG** tab of the smartphone app and tap the **UPDATE** button.
- 4) The app will ask you to confirm before proceeding.
- 5) The WiFi status light will blink purple quickly until the update is complete, it will then make an audible sound and re-boot itself.
- 6) The app will also give a confirmation message once the update is successfully completed.

If the update is unsuccessful, power down the unit and close the smartphone app, then restart and reconnect everything and try the above process again.

The firmware version can be found in the **STATUS** window shown in section 3.3.

4 ARTIO APP

1. General

The ARTIO App is made available through Apple’s App Store, the user will be given a username and password where they can login on their device and operate the app and hardware unit.

For authorised users a link and instructions on how to download the ARTIO App will be made available to the official point of contact.

THORNETIX Pty Ltd will make available updates to the app and Hardware Firmware form time to time. It is highly recommend to update as soon as these become available, to take advantage of the latest improvements and features.

We intend to work closely will all of our users to implement the best features and fixes any bugs that may arise. Within the App “Config” page, there is a feedback email mechanism through which we welcome all users’ feedback about, bugs, functionality, features, comments and criticisms.



5 MANUAL CALIBRATION

1. General

A 2-point calibration should be performed in order to calibrate the system before use. A 2-point calibration adjusts the system and probe combination for the range required to be inspected.

In order to perform a 2 point calibration, the user must adjust the **VELOCITY** and **DELAY** settings to match the probe and material being used.

Once calibrated, the unit will provide accurate measurements in the range that was calibrated on, while the **VELOCITY, DELAY** and measurement mode settings remain unchanged.

2. General Setup

- 1) Plug the probe cable(s) into the Lemo-00 connector(s) on the front of the ARTIO unit.
- 2) Set the probe type to **TWIN** or **SINGLE** as needed.

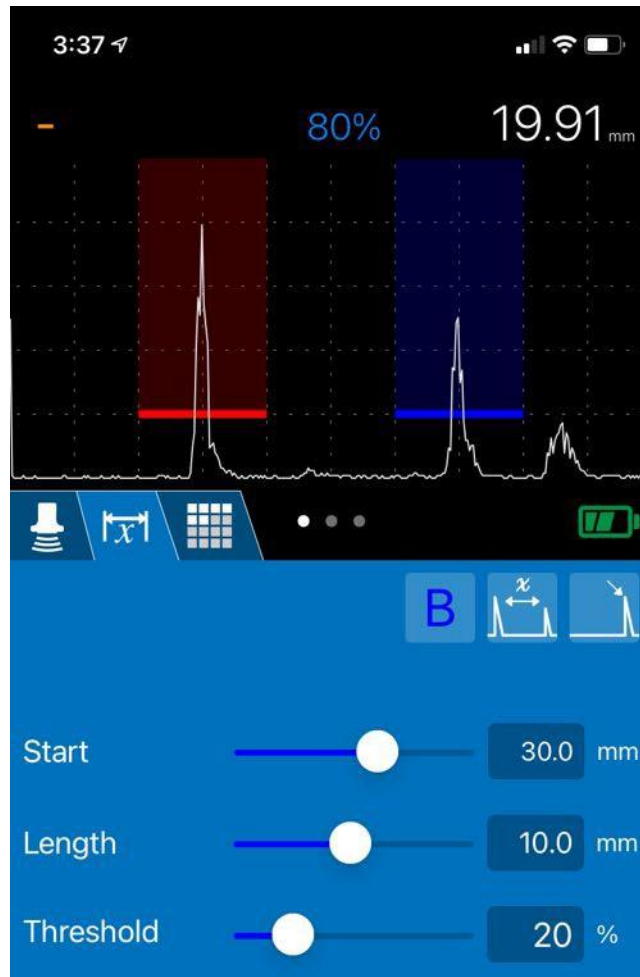


- 3) Prepare a stepped wedge or other calibration block with at least 2 different dimensions, that represents the thickness range expected during the inspection.

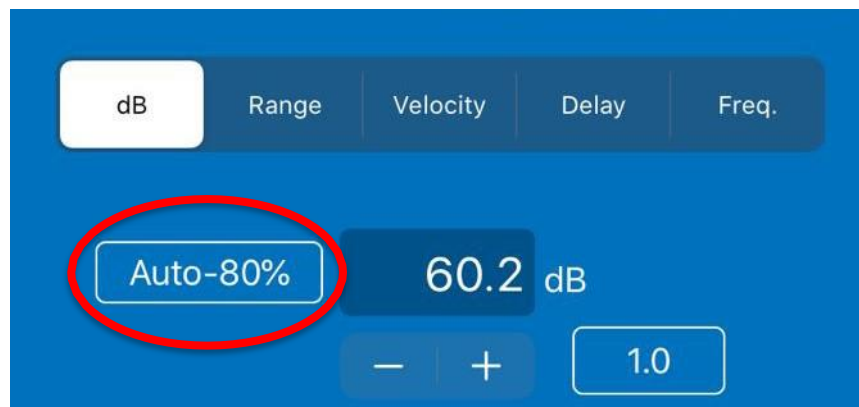
3. Velocity Calibration

- 1) Place the probe (and couplant) onto the calibration block thickness step which represents the upper thickness range that is expected.
- 2) Set the **RANGE** to that which shows the first and second back-wall echo's on the screen comfortably.

- 3) Using the sliders and gate select buttons, place the **A GATE** over the first echo and the **B GATE** over the second echo. The **THRESHOLD** value should be around 20% full screen height. *Note: Automated gates may be enabled for probes that exhibit low noise.*



- 4) Adjust the 1st backwall echo to approximately 80% screen height using the **dB** function.



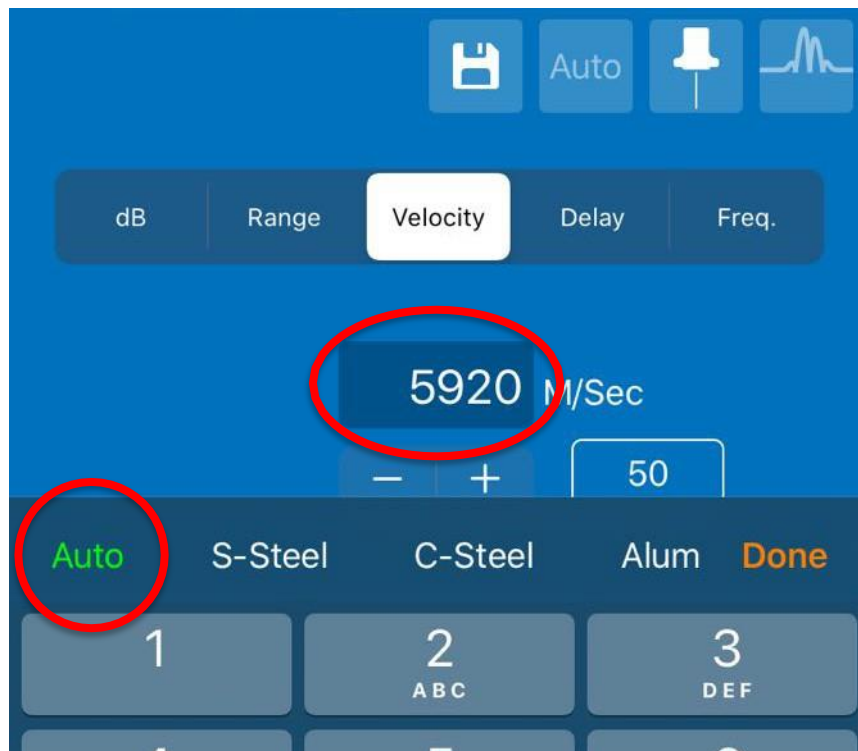
- 5) On the gate's tab, set the gate mode to **ECHO-ECHO**

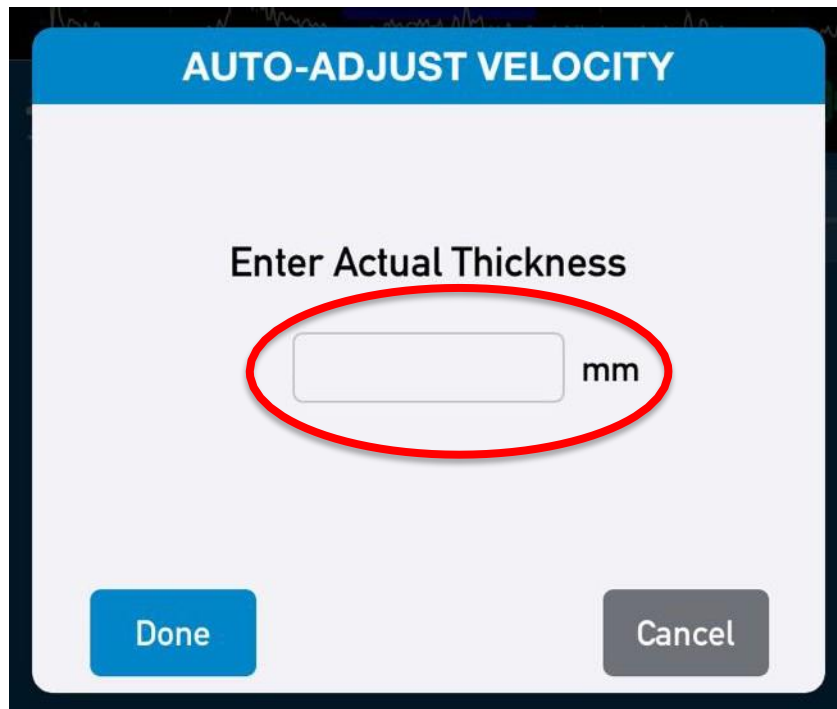


- 6) Set the Measurement mode to **EDGE** or **PEAK** as desired.



- 7) Select the **VELOCITY** parameter and edit the velocity value. Select **AUTO** from the keyboard assistant bar then type in the correct thickness into the assistant window.

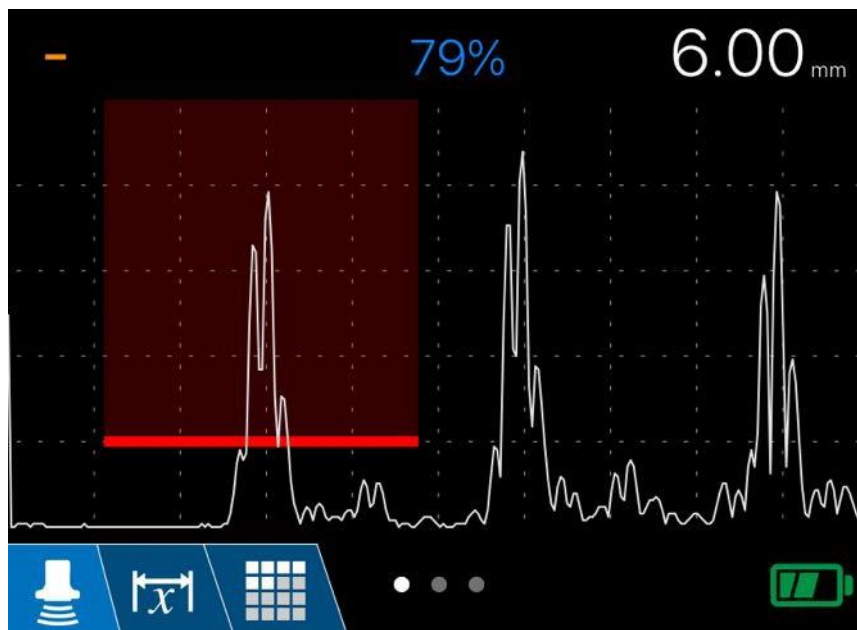




8) Select Done. **VELOCITY** calibration is complete.

4. Delay Calibration

- 1) Place the probe (and couplant) on the block thickness that represents the lower thickness range that is expected in the particular inspection to be performed.
- 2) Move the **A GATE**, by using the start slider, to cover the signal, above the baseline grass. *Note: Automated gates may be enabled for probes that exhibit low noise.*
- 3) Adjust the 1st backwall echo to approximately 80% screen height using the **dB** function.

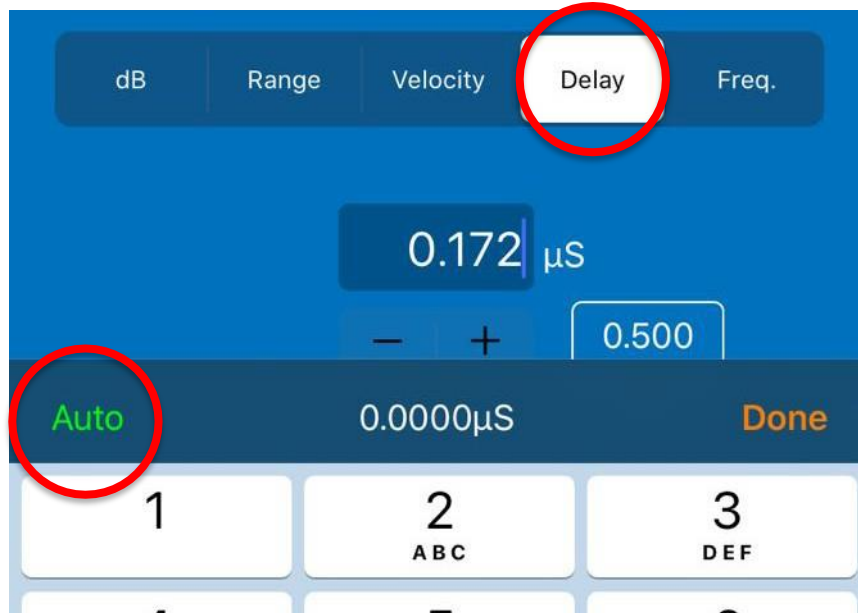


- 4) On the gate control tab, set the gate mode to **TIME OF FLIGHT**



- 5) Using the sliders and gate select buttons, place the **A GATE** over the first echo. The threshold value should be around 20% full screen height. *Note: Automated gates may be enabled for probes that exhibit low noise.*

- 6) Select the **DELAY** parameter on the pulser tab to edit the value. Select **AUTO** from the assistant bar then type in the correct thickness into the assistant window.



- 7) **DELAY** calibration is complete.

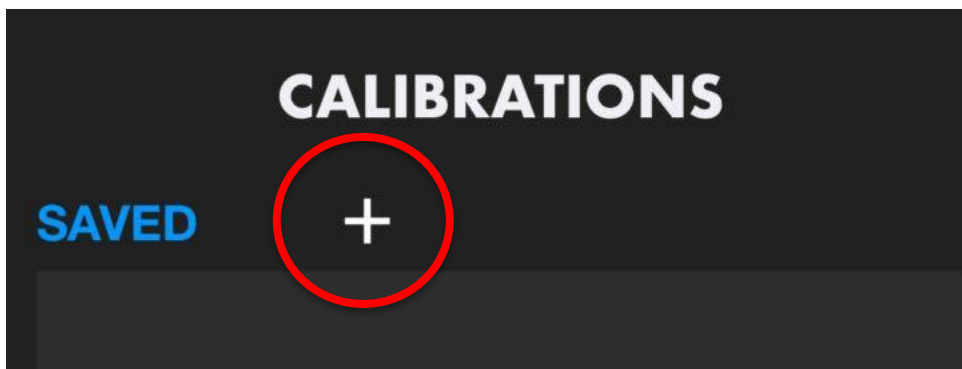
5.5 Saving A Calibration

Once a calibration is complete, the user can save the calibration and recall it for later use.

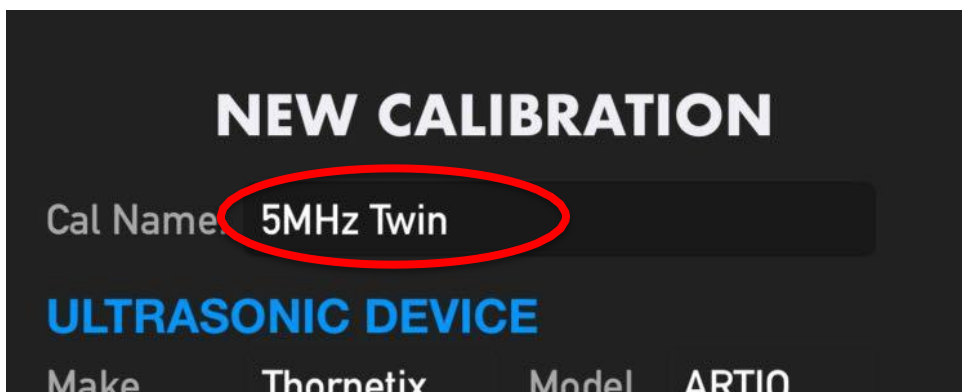
- 1) Select the Calibrations button on the pulser tab of the main page



- 2) Select the "+" add calibration button



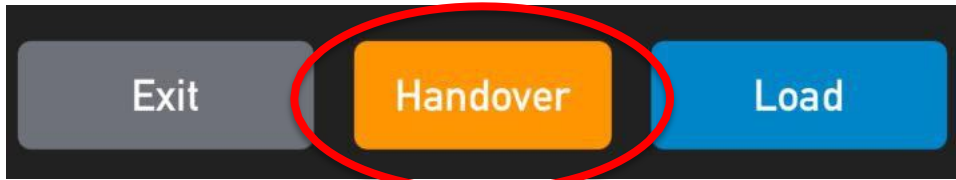
- 3) Give the calibration a unique name and press save. Enter in other calibration details such as probe and calibration block details if desired.



6. Handover

ARTIO has a unique capability in that it can couple with 3rd party inspection systems such as the Holinspect[®] by Quasset[®]. This mode is called Handover Mode and is activated as an advanced feature. Please contact Thornetix for details on how to add this additional feature to your user account.

- 1) Navigate to the calibration page, detailed above in section 5.5
- 2) Select a saved calibration from the list then tap “Handover”. This will program the calibration parameters directly to the hardware unit. When the 3rd party system is connected, ARTIO will stream waveforms, thickness readings and other information to the new host system. See the user guide for the 3rd party host system for further details.



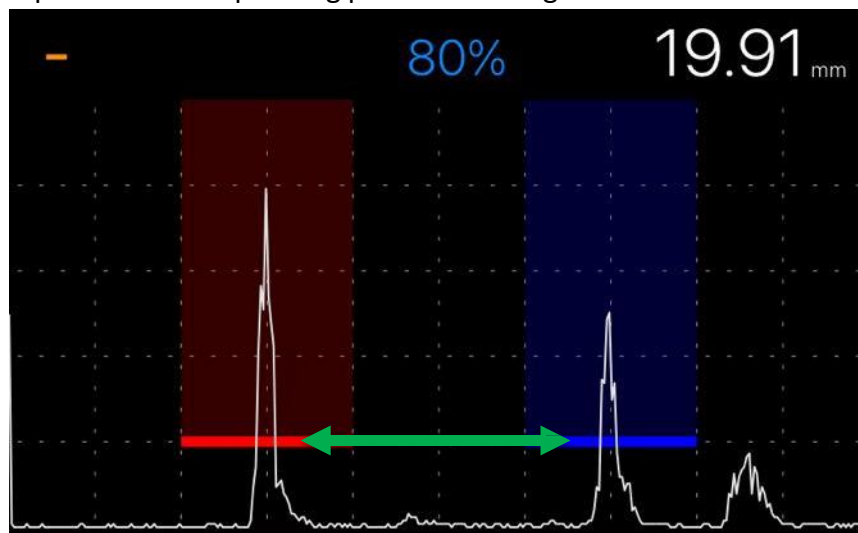
6 INSPECTION

1. General

Once the unit is calibrated, it can be used for the collection of thickness measurement data.

The measurement readings are taken from signals that are present within the gate's regions. Once calibrated, place the gate(s) broadly to cover the anticipated thickness range. *Note:* For best accuracy, the amplitude of the signal(s) should be similar to that used when calibrating.

- **PEAK** mode: the signal(s) should be less than 100% screen height and within the lower threshold of the gate(s)
- **EDGE** mode: The measurement is taken from the first point of the signal that reaches gate lower threshold. The threshold should be on the same level/part of the signal used when calibrating and on the equivalent corresponding parts of each signal.




EDGE Mode gate threshold setup.

The same measurement mode (**PEAK**  or **EDGE** ) used during calibration shall be used when performing inspections to maintain the calibration validity.

When taking a measurement, the echo should be adjusted to approximately 80% screen height in order to get the most accurate results.

6.2 Coated surfaces

Using the **ECHO-ECHO**  gate mode, readings taken will be exclusive of coating thickness.

Service

We offer unparalleled NDT equipment calibration and repair services in Canada, renowned for our professionalism and expertise. Our facility boasts an impressive range of capabilities, unmatched by any other service provider. With extensive manufacturer contacts, we ensure your equipment fleet stays operational in the field.

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For more information on any of these products please visit

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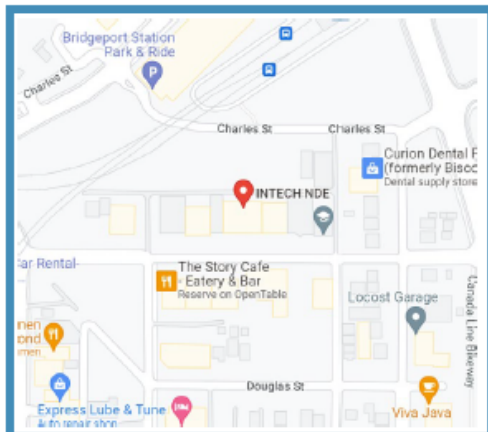
Email: Sales@intechnde.com

Call any of 3 location below:

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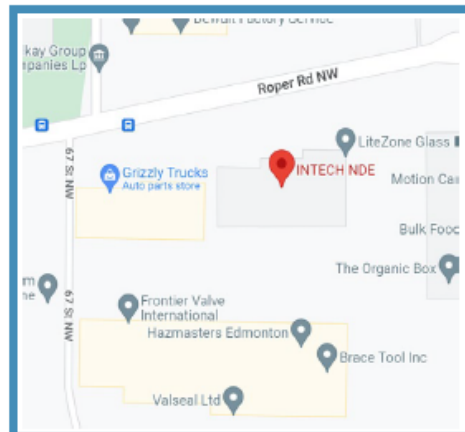
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