OLYMPUS

Your Vision, Our Future

Model 38DL PLUS Operation Training

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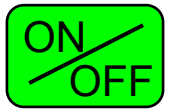
Click on the links below to go directly to the corresponding slide. (Please Note: you have to be in slide show mode for the links to work.)

Power Up



The On/Off key is used to turn the 38DL PLUS on and off.

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Model 38DL PLUS
Dual Element Do-ZERO

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Do-ZERO for Standard Dual Transducers

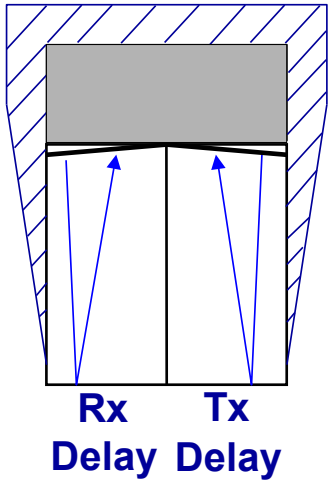
Uncouple the transducer and make sure the tip is free of any couplant layer.

Press

2nd F then **CAL ZERO** (Do-ZERO)

Note: The [2nd F], [Zero] can be pressed any time the transducer is uncoupled to update the Zero offset.

"Do-ZERO" allows the gage to recognize the transducer for optimal setup. It will also measures the time of flight through the transducer to compensate for transducer wear and changes in temperature.



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Do-ZERO for THRU-COAT Transducers

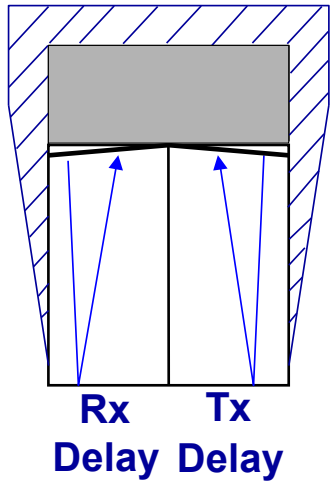
Uncouple the transducer and make sure the tip is free of any couplant layer.

"Do-ZERO" allows the gage to recognize the transducer for optimal setup. It will also measures the time of flight through the transducer to compensate for transducer wear and changes in temperature.

Press: **2nd F** then **CAL ZERO** (Do-ZERO)

Use [←], [→] to turn THRU-COAT On or Off, Press [Enter]
Press [Enter] on "OK" to complete the Do-ZERO

Note: The [Zero] can be pressed at any time the transducer is uncoupled to update the Zero offset or to turn THRU-COAT On or Off.



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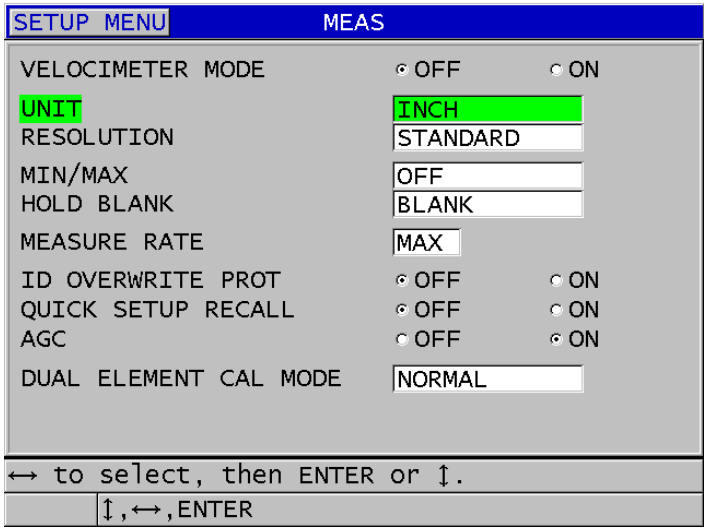
Selecting Measurement Units and Resolution

Press: SP MENU **SETUP MENU**

Allows the user to set Measurement Units and Resolution



Use [🡻],[🡹] to highlight the Measurement setup then press [ENTER]

Use [🡻],[🡹] to select “units” or “resolution” and [🡸],[🡺] to change the setting, then press [Meas]

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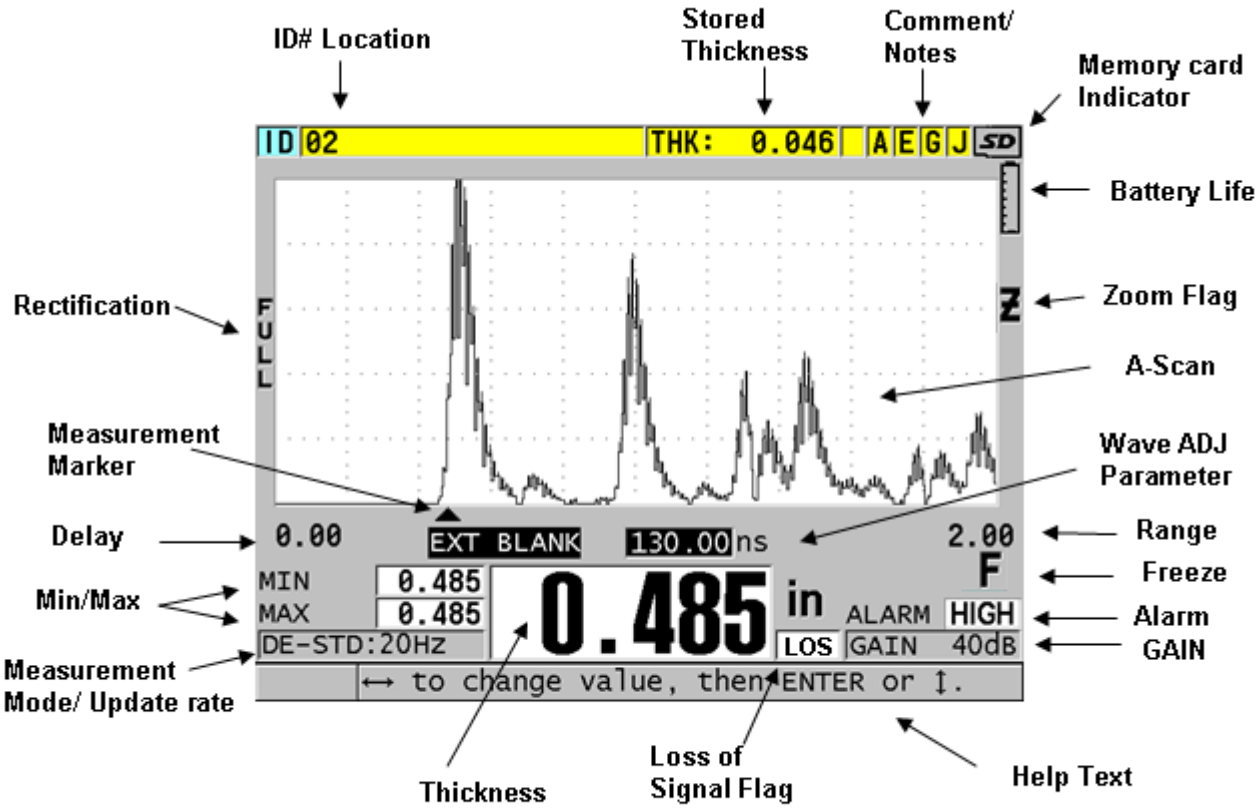
Main Screen



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Model 38DL PLUS
Calibration Standard Dual Transducers

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Standard Dual Element Cal Velocity

Couple transducer to the thick sample press:

VEL

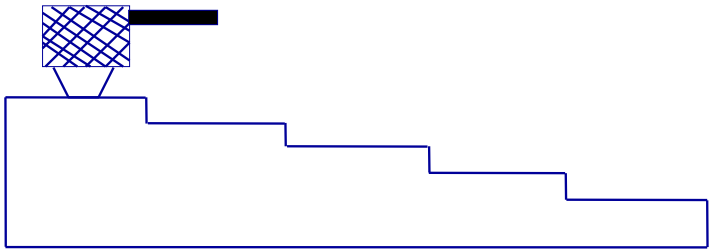
CAL VEL

Allows the user to calibrate for the speed of sound of the material to be tested. Usually done on a sample representing the maximum of the measurement range.

Once reading is steady press:

ENTER

Uncouple the transducer and enter the known thickness



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Standard Dual Element Cal Zero

Couple transducer to the thin sample press:

Do-ZERO

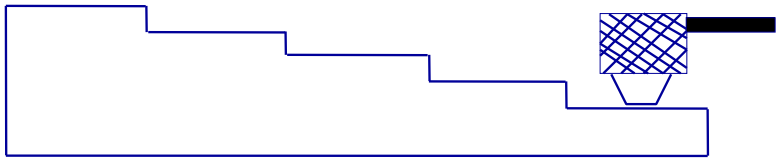
CAL ZERO

Once reading is steady press:

ENTER

Uncouple transducer and enter the known thickness. Then press the [MEAS] key to complete the calibration.

A subtracted time measurement is used to compensate for the transit time through the delay line in the transducer and the couplant layer. Cal Zero is usually done on a sample representing the minimum of your measurement range.



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Model 38DL PLUS
THRU-COAT Calibration

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THRU-COAT Cal Velocity

Couple transducer to the thick sample press:

VEL

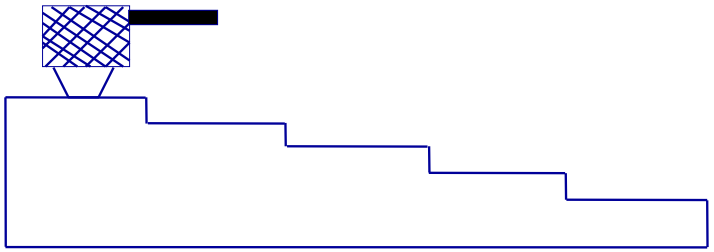
CAL VEL

Allows the user to calibrate for the speed of sound of the material to be tested. Usually done on a sample representing the maximum of the measurement range.

Once the reading is steady press:

ENTER

Uncouple the transducer and enter the known thickness



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THRU-COAT Cal Zero

Couple transducer to the thin sample press:

Do-ZERO

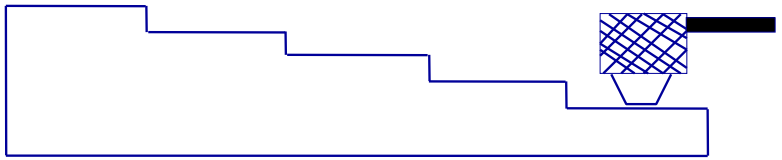
CAL ZERO

Once reading is steady press:

ENTER

Uncouple transducer and enter the known thickness. Press the [Meas] key to complete the calibration or press the [CAL VEL] key to calibrate for the velocity of the coating.

A subtracted time measurement used to compensate for the transit time through the delay line in the transducer and the couplant layer. Cal Zero is usually done on a sample representing the minimum of your measurement range.



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Coating Calibration

Couple transducer to a sample with known coating thickness press:

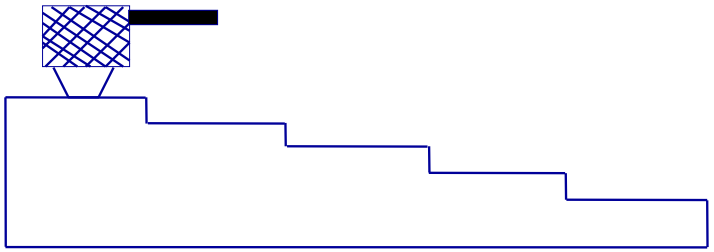
VEL

CAL
VEL

Allows the user to calibrate for the speed of sound of the of the coating material. It is not necessary to calibrate for the coating if the coating value is not being displayed or if the accuracy of the coating thickness is of less importance.

Once reading is steady press:

ENTER



Uncouple the transducer and enter the known coating thickness
Press [MEAS] to complete the calibration

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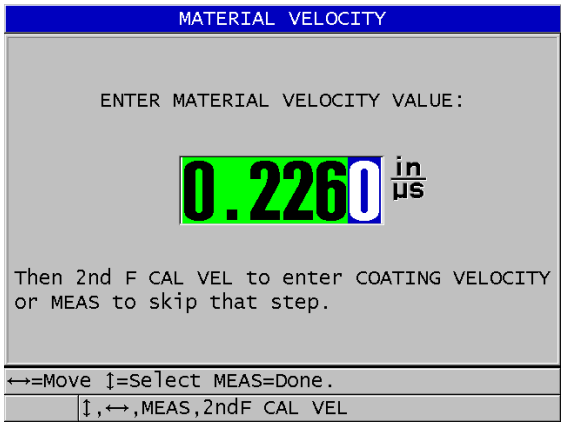
Directly enter the velocity in THRU-COAT Mode

Press

2nd F then **CAL VEL** (VEL)

Allows the user to directly enter the velocity of the material to be tested. When using THRU-COAT the velocity of the coating can also be entered.

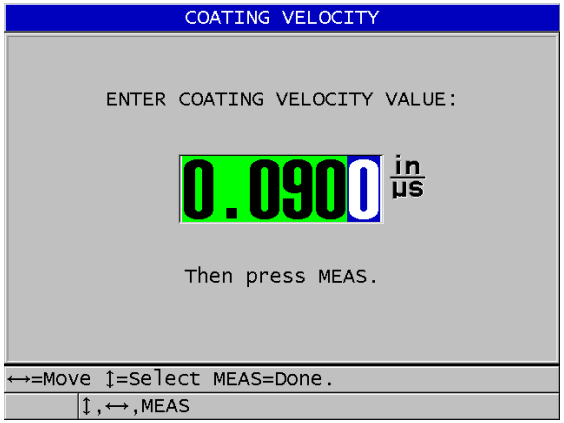
The current velocity will be displayed. Use the arrow keys to enter the know velocity. Then press [MEAS]



Press

2nd F then **CAL VEL** (VEL) again

The current coating velocity will be displayed. Use the arrow keys to enter the know velocity. Then press [MEAS]



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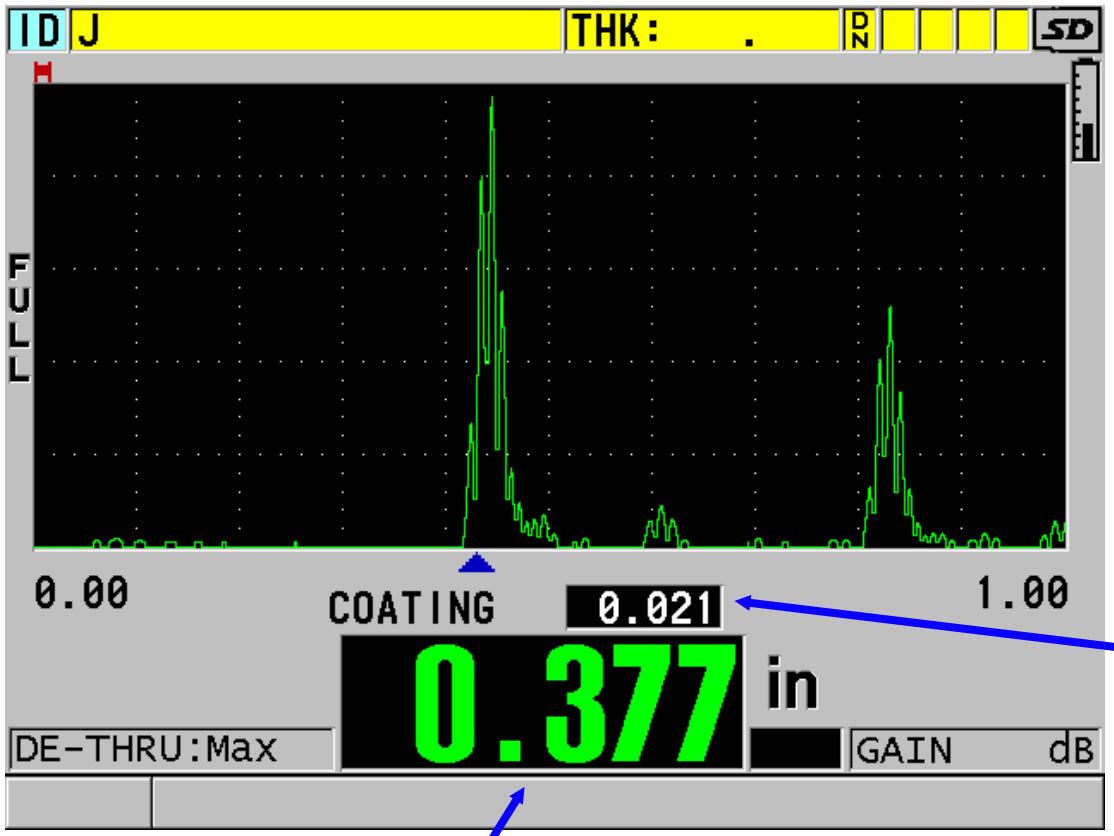
THRU-COAT Measurement Screen



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Model 38DL PLUS Calibration of Single Element Transducers

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Single Element Transducer/Setup Selection

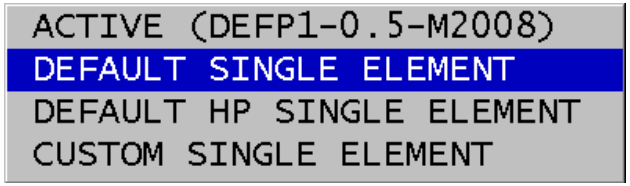
The 38DL PLUS has 21 preset default single element transducer setups stored in its permanent memory and up to 35 user defined custom setups can be entered .

To select a default transducer setup press

REF VALUE

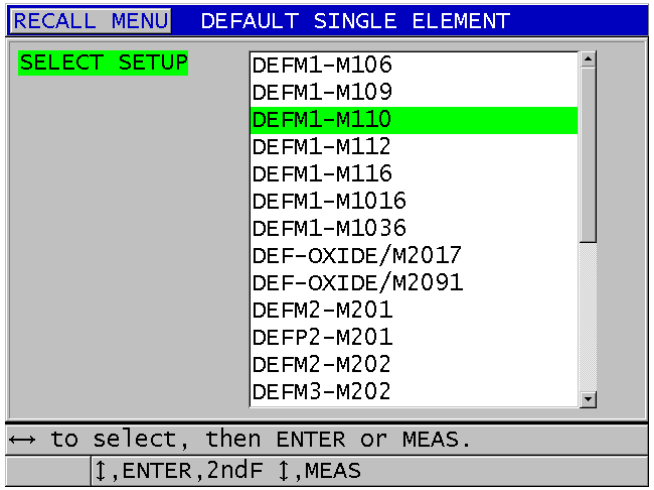
XDCR RECALL

Then use the [[↓],[↑] keys to select from the available lists and press [ENTER]



Then use the [↓],[↑] keys to select a transducer setup and press the [MEAS] key to recall the setup and return to the measure mode.

The user can select one of the default transducer setups or any of the user defined custom setups.



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Single Element Cal Velocity

Couple transducer to the thick sample and press:

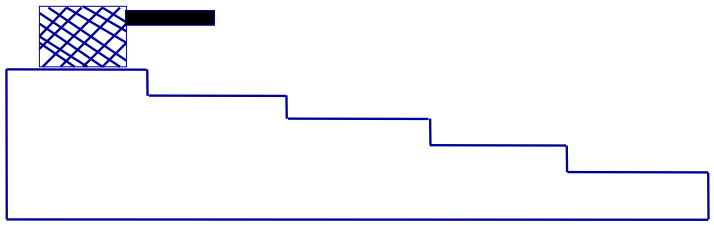
VEL

CAL
VEL

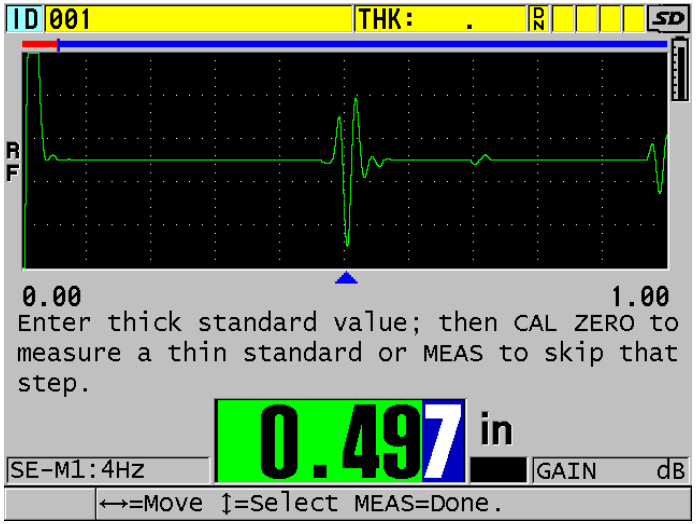
Once reading is steady press:

ENTER

Uncouple the transducer and enter the known thickness use in the [🡻,🡹 🡸, 🡺] keys



Allows the user to calibrate for the speed of sound of the material to be tested. Usually done on a sample representing the maximum of the measurement range.



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Single Element Cal Zero

Couple transducer to the thin sample press:

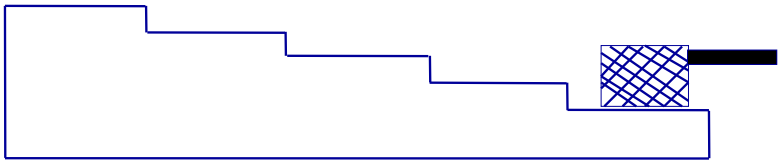
Do-ZERO

CAL ZERO

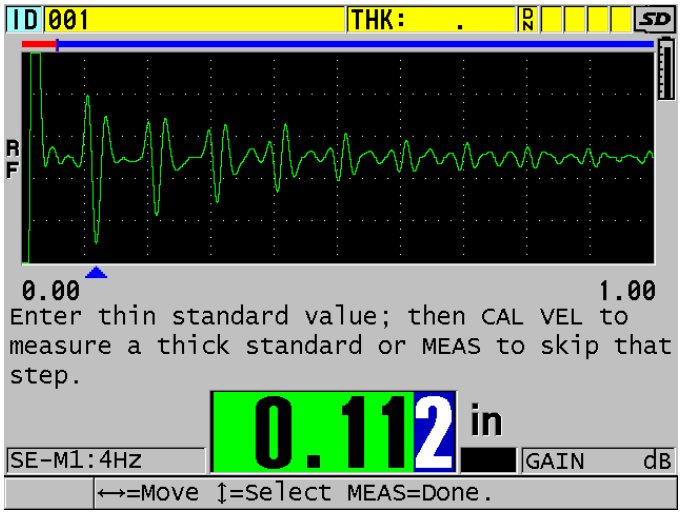
Once reading is steady press:

ENTER

Uncouple the transducer and enter the known thickness use in the [🡻,🡹 🡸, 🡺] keys



A subtracted time measurement used to compensate for the transit time through the delay line in the transducer and the couplant layer. Cal Zero is usually done on a sample representing the minimum of your measurement range.



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Model 38DL PLUS

Instrument Lock with Programmable Password

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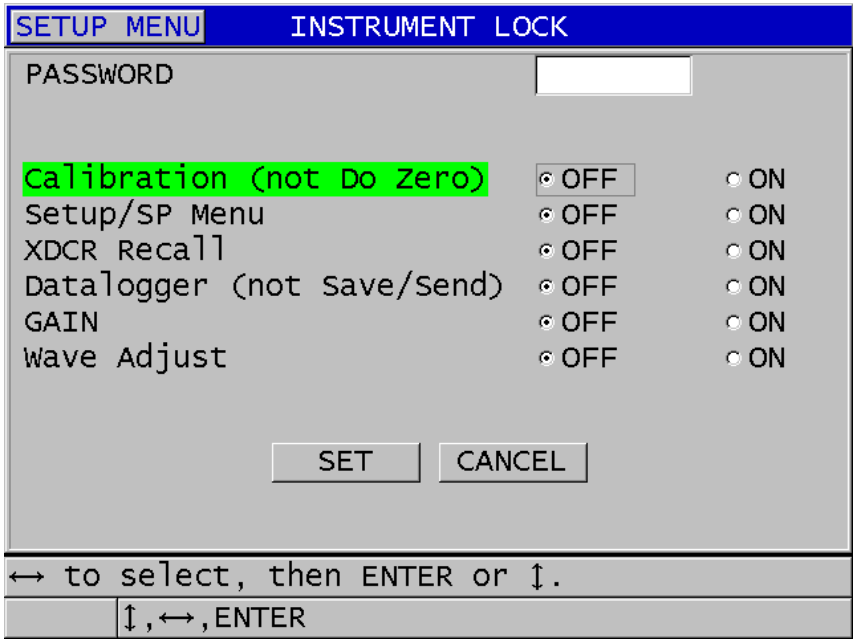
Instrument Lock with Programmable Password



The instrument lock on the 38DL PLUS allows the user to lock advanced features and functions so that they are not accidently altered or changed.

A password can be set so that the locked functions can not be unlocked without knowing the password

The following functions can be locked

- Calibration
- Access to Setup Menu and SP Menu
- Transducer Recall
- Datalogger (except for the save key)
- The ability to adjust the gain
- Waveform adjustment parameters

Note: If the user forgets the password please contact Olympus for the master password.

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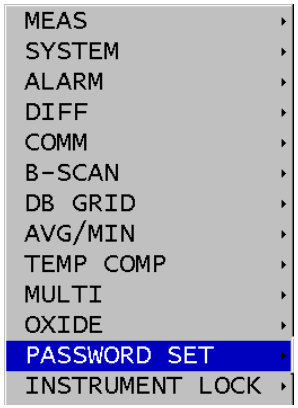
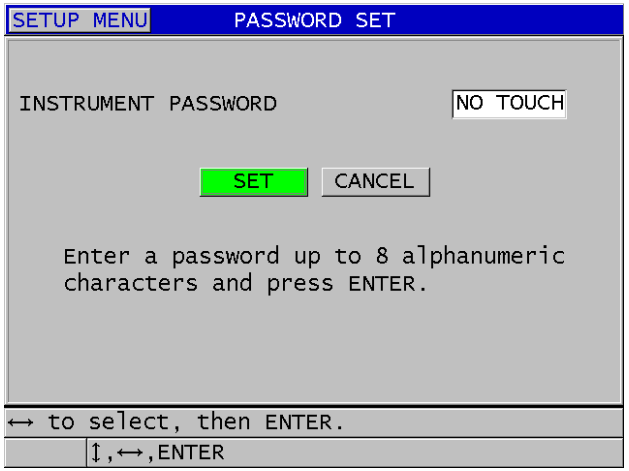
Instrument Lock, setting a Password

Press **SP MENU** **SETUP MENU**



Then use the [[↓],[↑] keys to select Password Set and press [ENTER]

Setting a password is an optional feature and the 38DL PLUS can be locked with out a password.



Use the editing functions to enter a password and press [Enter] use the [←, →]keys to select set and press [ENTER].

Note: If the user forgets the password please contact Olympus for the master password.

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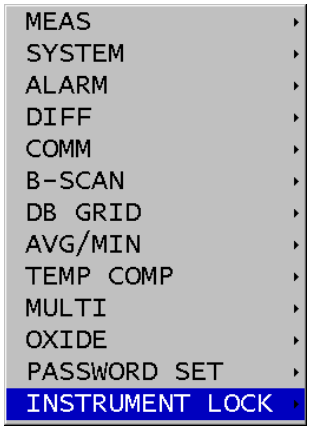
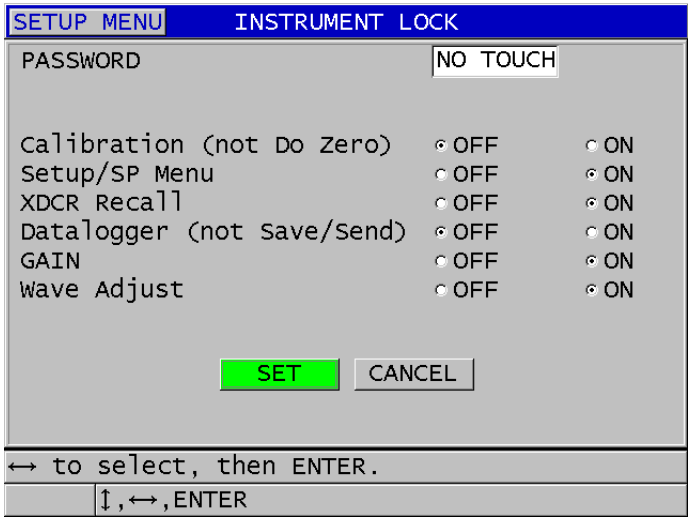
Instrument Lock with without Password

Press **SP MENU** → **SETUP MENU**



Then use the [🡻],[🡹] keys to select Instrument Lock and press [ENTER]

If a password has been set then the password must be entered in the Instrument Lock screen before any of the functions can be used. If a password has not been set then the password area will be grayed out.



Use the editing functions to enter a password and press [Enter] use [🡻],[🡹] keys to select the a function to lock and [🡸, 🡺] lock and unlock it. Highlight set and press [ENTER] to activate the lock

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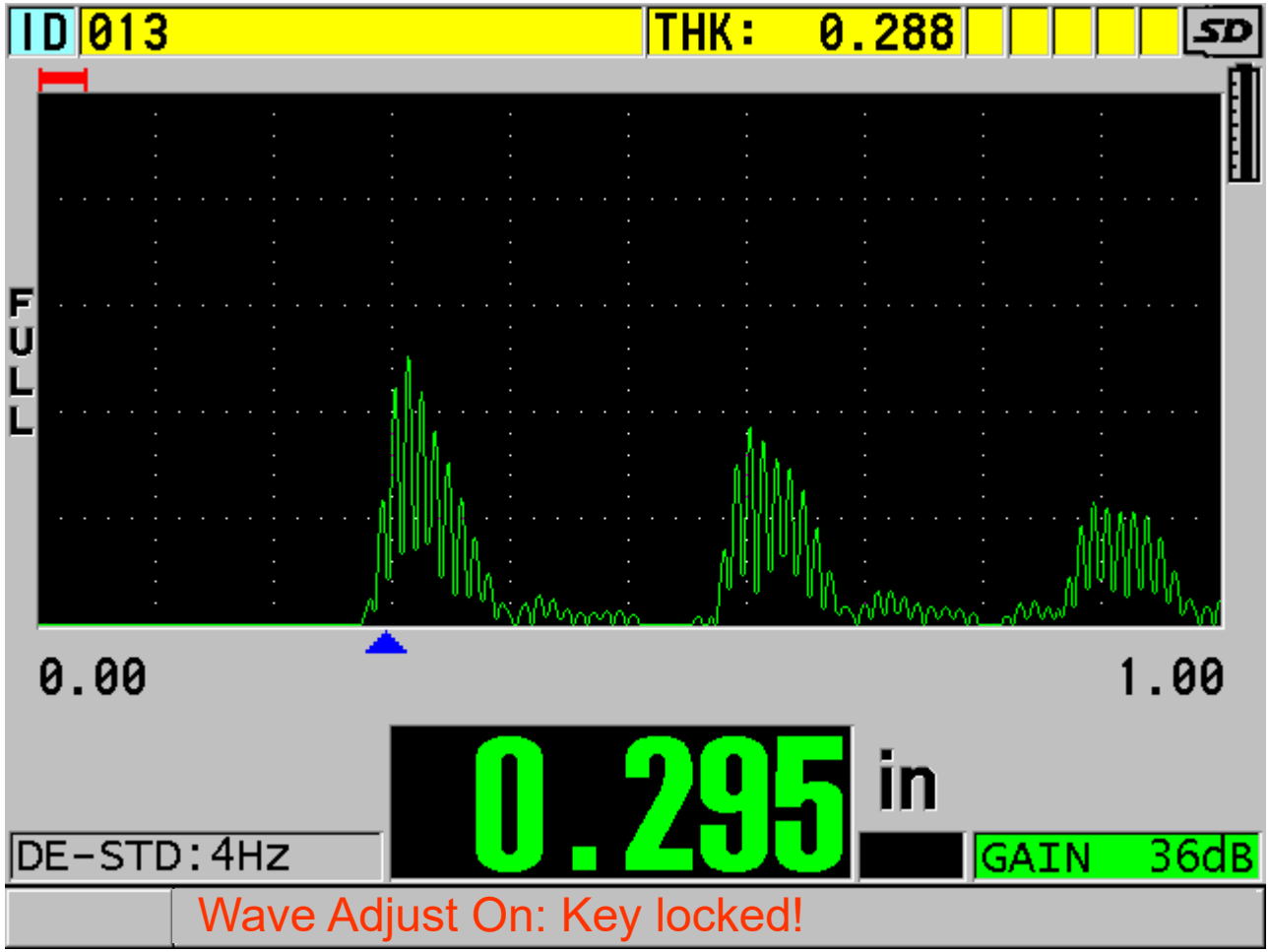
Example of a locked function



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Model 38DL PLUS
Using the EMAT Transducer

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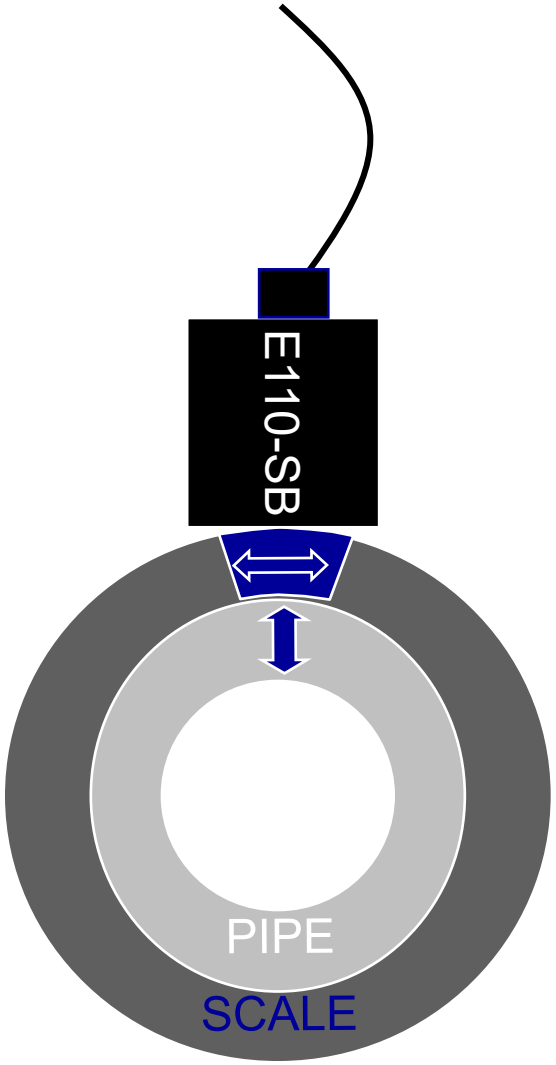
EMAT Transducer



An EMAT (Electro Magnetic Acoustic Transducer) uses the Magnetostrictive principle to generate shear wave sound energy in ferrous metals that are externally coated with high temperature oxide scale.

The EMAT transducer does not require the use of ultrasonic couplant. If the scale is not fully bonded to the surface of the steel, the shear wave sound energy will not be transmitted into the metal.

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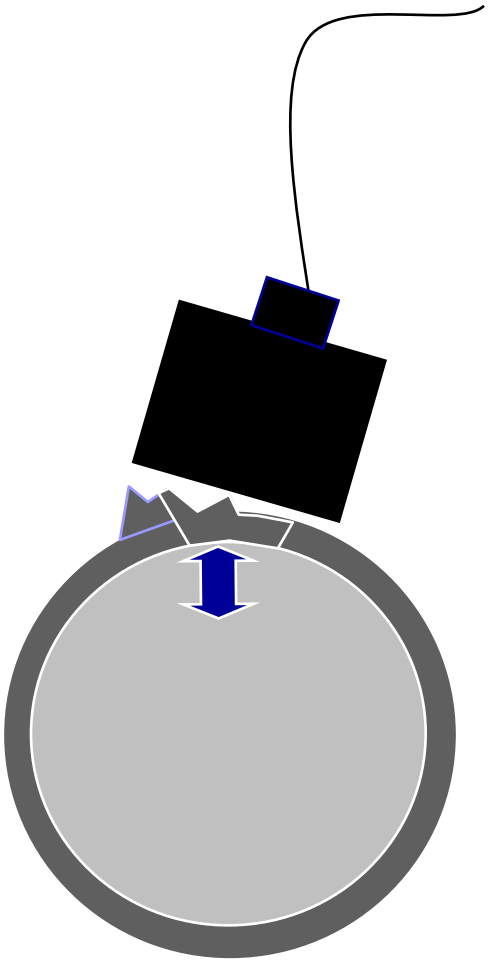
EMAT Transducer



- EMAT transducers are designed to be a quick way of determining the approximate wall thickness without removing the external oxide scale.
- The E110-SB EMAT transducers generate shear sound waves in the steel material.
- The EMAT transducers create a non-focused signal and is designed to give a good estimate of the remaining wall thickness (+/-0.010 in or +/-0.25 mm)
- EMAT transducers are relatively insensitive to small internal pits.
- The minimum capability is approximately 0.080 in. (2.0mm)

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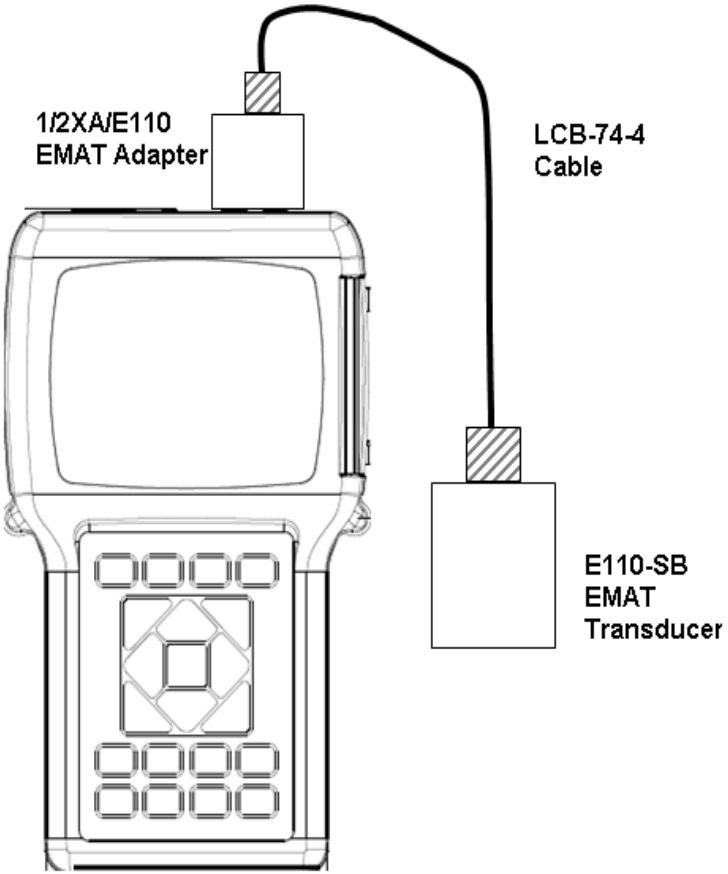
Connecting the E110-SB EMAT Transducer



The 1/2XA/E110 filter adapter must be plugged in to the transducer connectors located at the top of the 38DL PLUS. The E110-SB can then be connected to the 1/2XA/E110 adapter box using a standard Lemo to BNC cable. (LCB-74-4)

The 38DL PLUS will automatically recall the default setup for the E110-SB (EMAT) transducer when the Adapter and E110-SB is plugged in. The gage is now ready to take thickness measurements of steel that is coated with external scale using the default setup.

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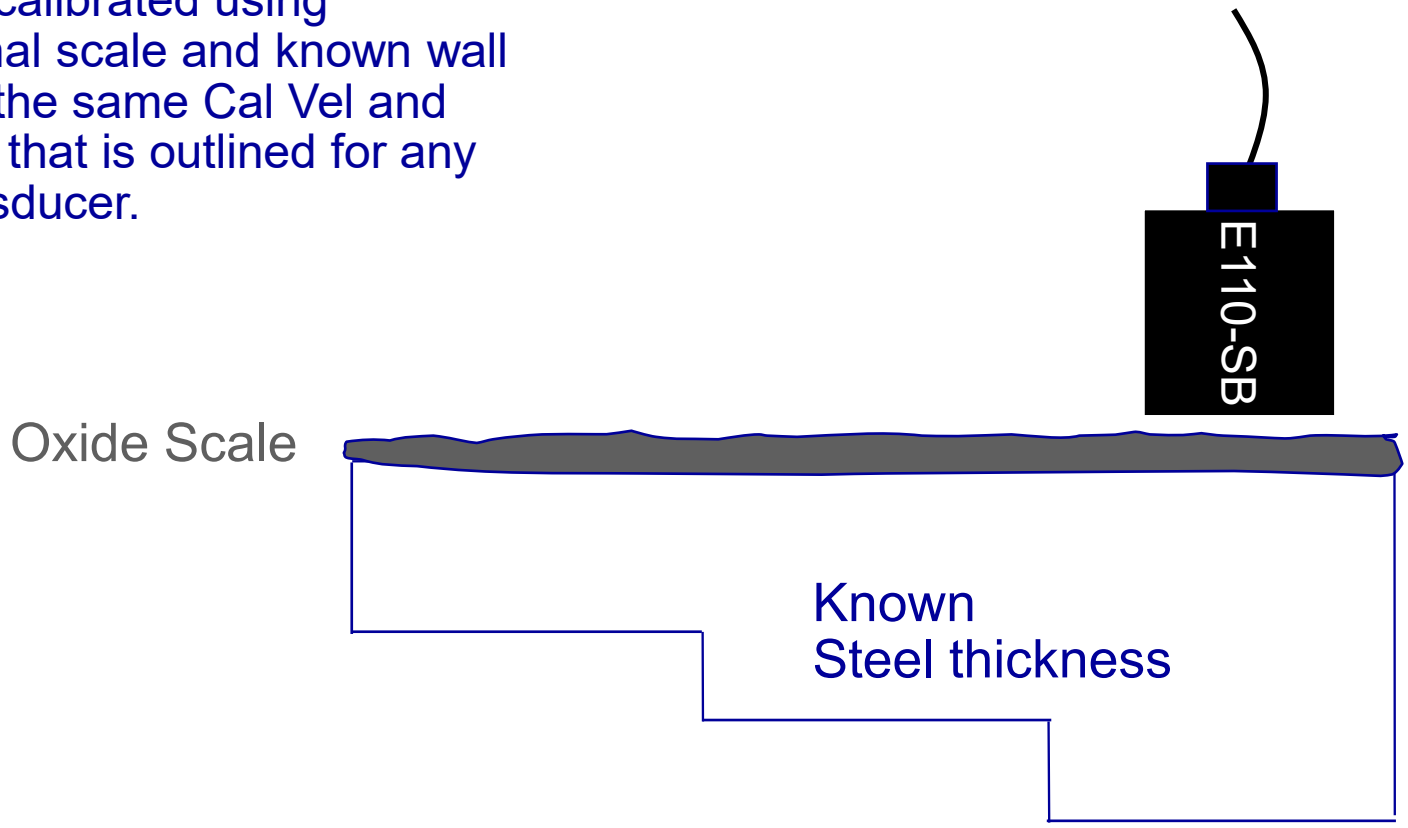
EMAT Transducer Calibration

For best accuracy it is recommended that the 38DL PLUS be calibrated using samples with external scale and known wall thickness. Perform the same Cal Vel and Cal Zero procedure that is outlined for any single element transducer.



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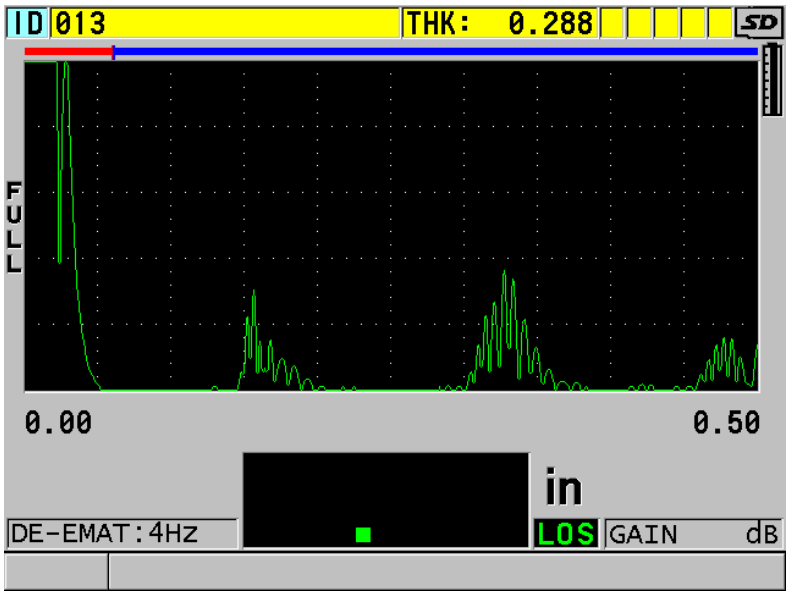
Using Gain with the EMAT Transducer

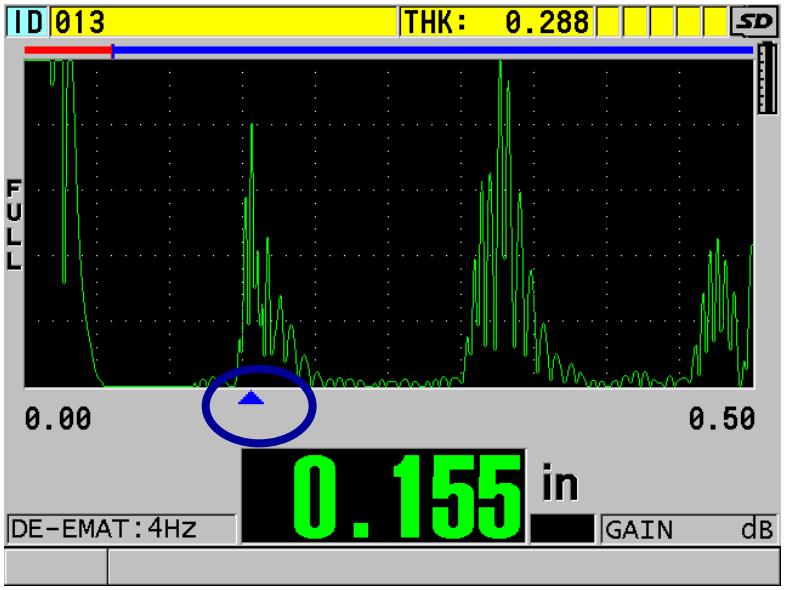
When using the EMAT transducer it will often be necessary to adjust the gain level in order to make proper echo detection. This is due to the variation in signal amplitude caused by changes in the external oxide thickness and surface conditions.

Press 

then Use the [↑],[↓] keys to adjust the Gain Value



Gain too low echo not detected



Gain set properly set for echo detection

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Waveform Controls

- A-Scan Range Adjust
- Delay Adjust
- Echo Detection for Dual Transducers
- Freeze Mode
- Zoom Mode
- Display Brightness Adjust
- Manual Gain Adjust for Dual Transducers
- Extended Blank for Dual Transducers

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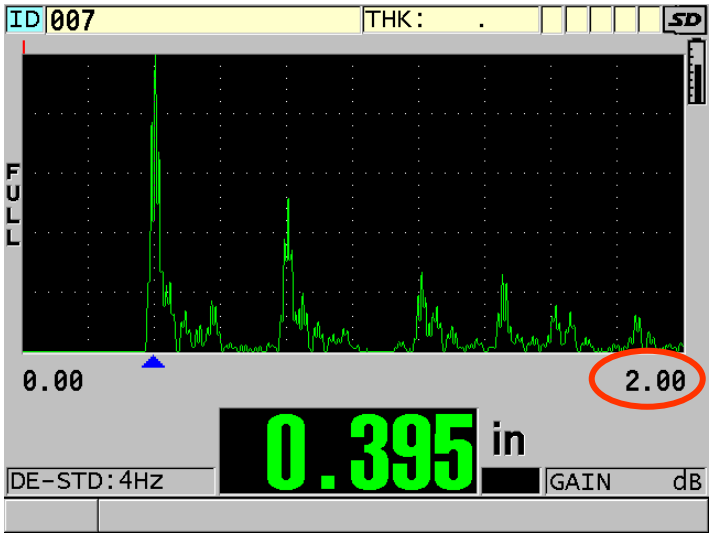
A-Scan Range Adjust

Press DELAY / RANGE

Successive presses of the [RANGE] key toggles through the different ranges.

Allows the operator to cycle through the fixed ranges of the waveform display. The range should be set so that the echo from your thickest material will be on screen.



Note: Adjusting the range will not affect calibration. There are fixed display ranges for each transducer type depending on transducer frequency.

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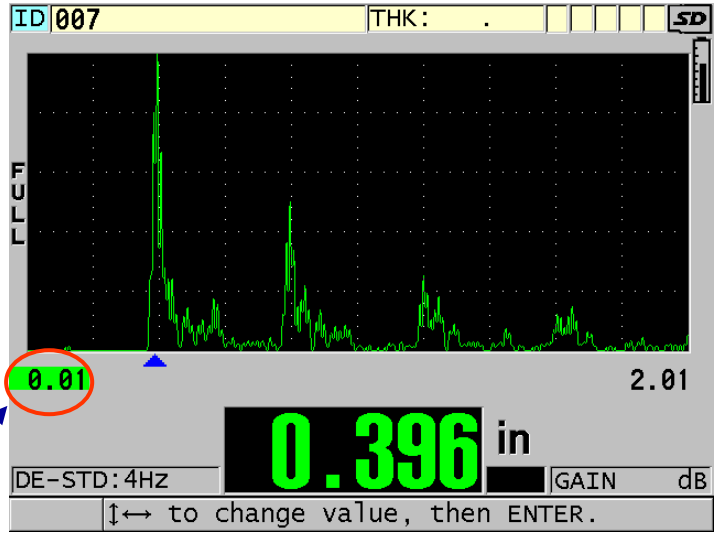
Delay Adjust

- Press

2nd F then **DELAY** **RANGE**

Then use the [🡐],[🡒] To adjust the waveform delay

The delay function is used to adjust the beginning (left side) of the waveform. The user can delay a portion of the signal off screen so they can view the important part of the waveform in greater detail.



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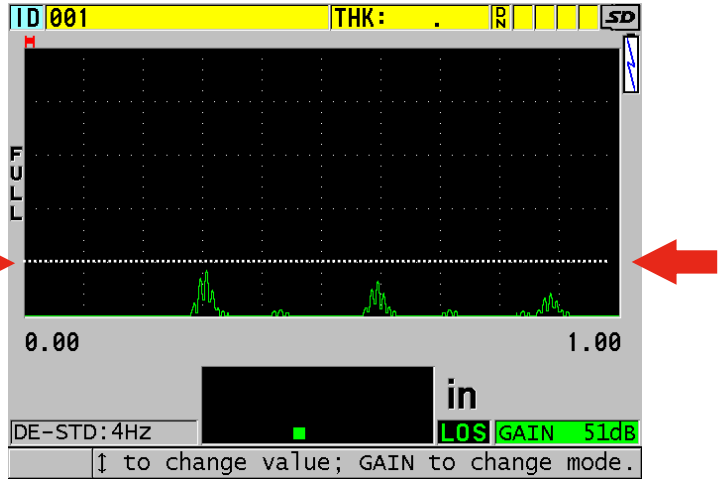
Echo Detection with Dual Element Transducers

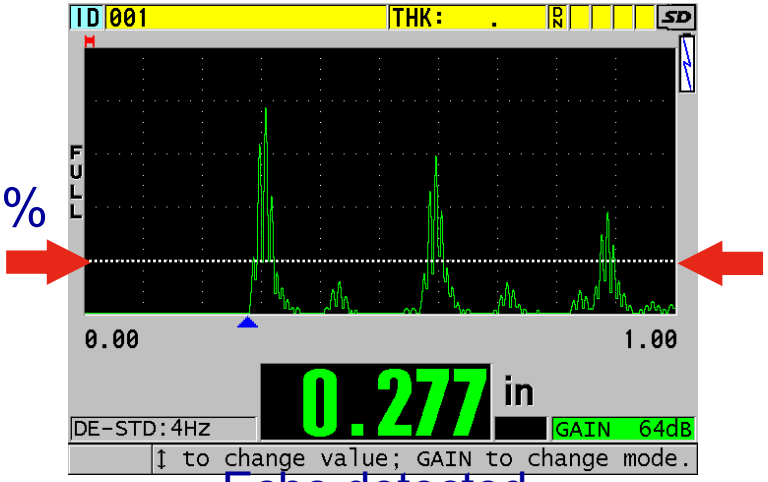
20%



Echo not detected

Echoes must be greater in amplitude than 20% of screen height in order to be detected.

20%



Echo detected

Note: The detection threshold is not the measurement point. Measurements are made using Algorithms and DSP and are independent of amplitude.

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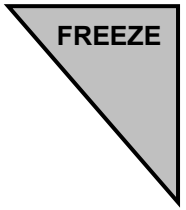
Freeze Mode

Press: 

Press [FREEZE] again to return to a live measurement display.

Freeze allows the user to freeze both the waveform and thickness display, once the [FREEZE] key is pressed. The display can be reset by pressing the [FREEZE] key again or by pressing the [SAVE] or [MEAS] keys.

Note: The Freeze function is useful for high temperature applications. This function can be used to limit the transducer contact time and prevent overheating the transducer. Freeze is also used in conjunction with Min/Max mode to prevent capturing false couplant readings.

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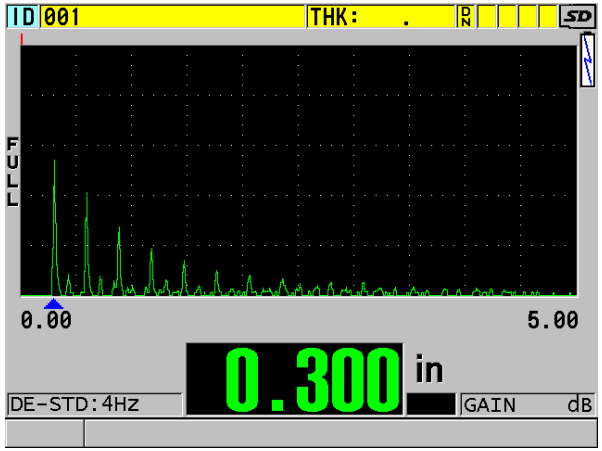
Zoom, Single and Dual Element, Mode 1

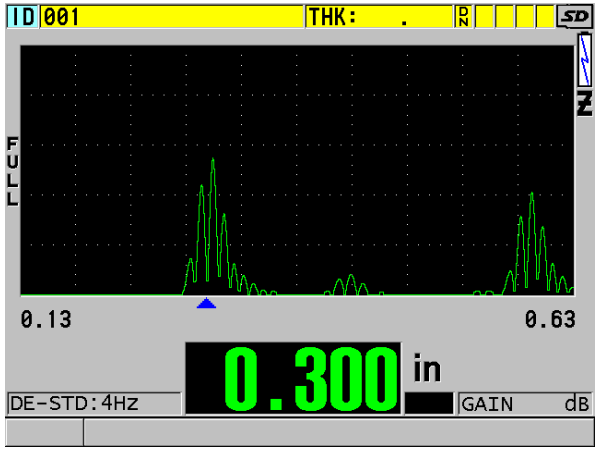
Press E-TO-E **ZOOM**

Zoom centers the measured echo on the waveform display. The Zoom will automatically track the measured echo and assure that it remains in the center 60% of the screen.

Press [ZOOM] again to return to the previously set range.



Un-Zoomed Waveform



Zoomed Waveform

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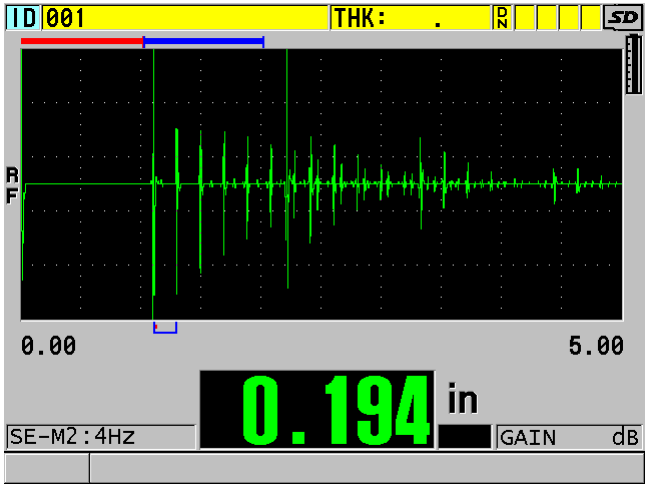
Zoom, Single Element, Mode 2

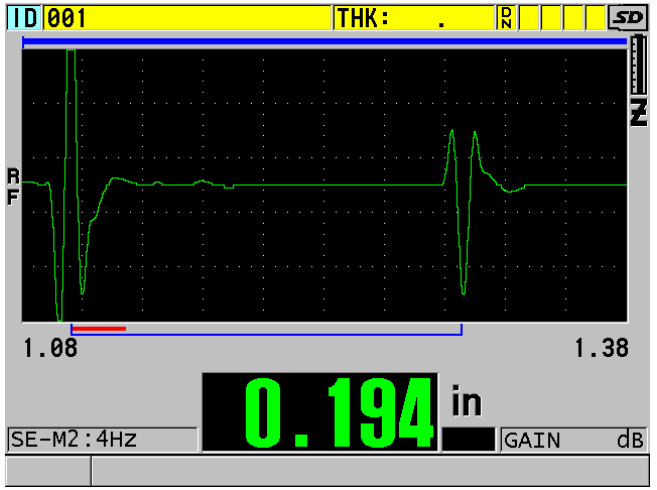
Press E-TO-E **ZOOM**

Press [ZOOM] again to return to the previously set range

Zoom will adjust the range and delay so the interface echo is placed at 10% screen width. The user can adjust the range and the gage will maintain the position of the interface echo.



Un-Zoomed Waveform



Zoomed Waveform

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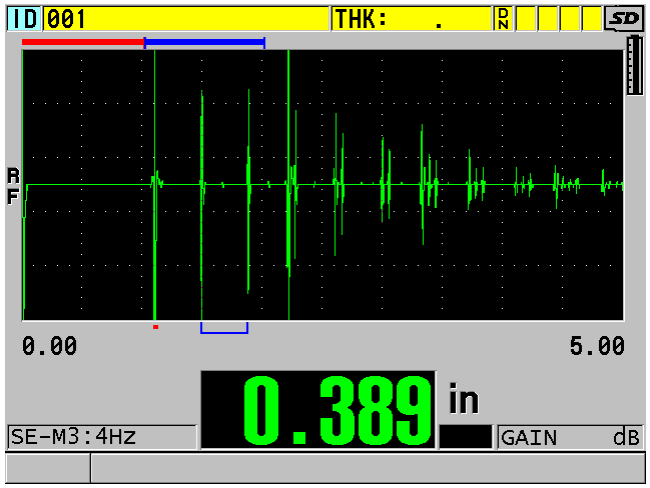
Zoom, Single Element, Mode 3

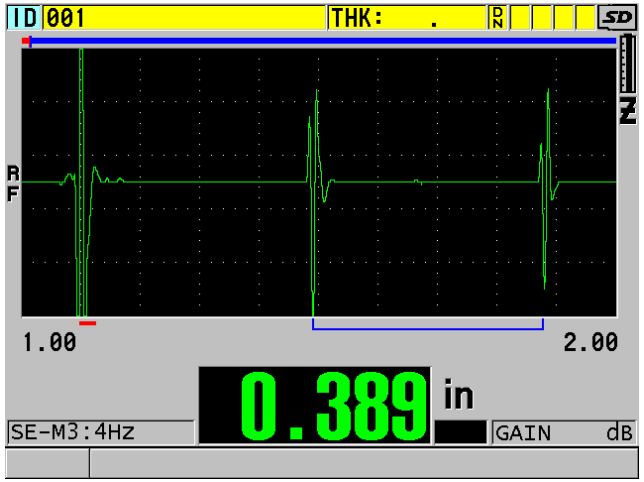
Press E-TO-E **ZOOM**

Press [ZOOM] again to return to the previously set range

Zoom will adjust the range and delay so the interface echo is placed at 10% screen width. The user can adjust the range and the gage will maintain the position of the interface echo.



Un-Zoomed Waveform



Zoomed Waveform

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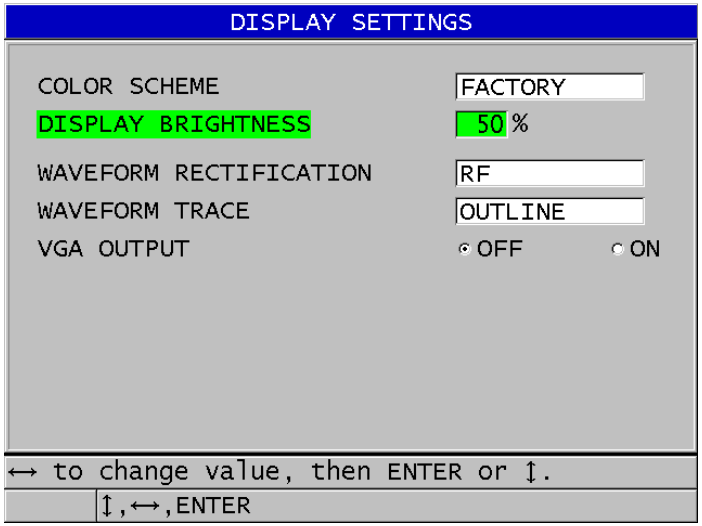
Display Brightness Adjust

Press **DISPLAY**

Allows the user to adjust the contrast of the display for optimum viewing in any lighting condition.

Use [↑],[↓] [←],[→] to highlight Display Brightness

Then use [←],[→] To select between 0, 25, 50, 75 and 100%



Note: Higher display brightness settings will decrease battery life battery:
4Hz and 0% brightness is 16 hours
4Hz and 100% 12.5 hours

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Manual Gain Adjust Dual Element Transducers

Press 

Allows the operator to adjust the receiver Gain in 1 dB increments. Once an echo is above the 20% detection point, adjusting gain will not effect the calibrated accuracy.

Then use [↑],[↓] adjust

Pressing the [GAIN] key twice prior to adjusting the gain will recall the last set gain value.

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Extended Blank for Dual Element Transducers

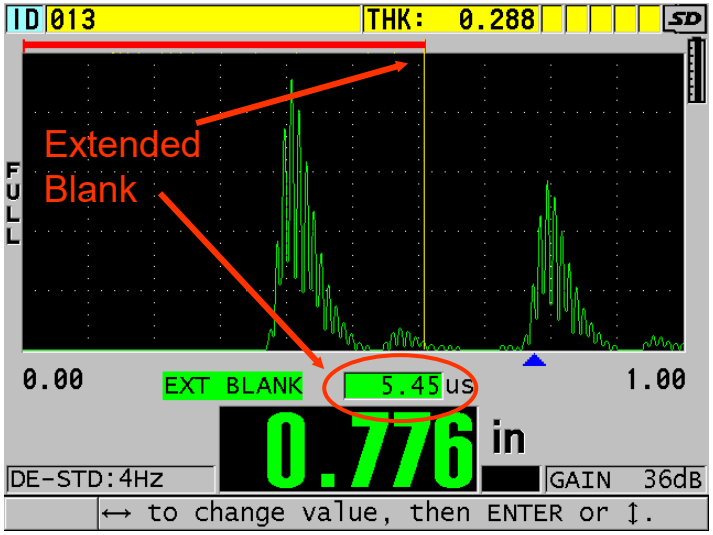
Press WAVE ADJ

Then use [↑],[↓]

Allows the operator to extend a blank from the sound entry point to the max of the displayed range.

To select EXT BLANK

Then use [←],[→] to adjust



Note: When the extended blank is set, the gage will measure to the first valid echo after the end of the blank.

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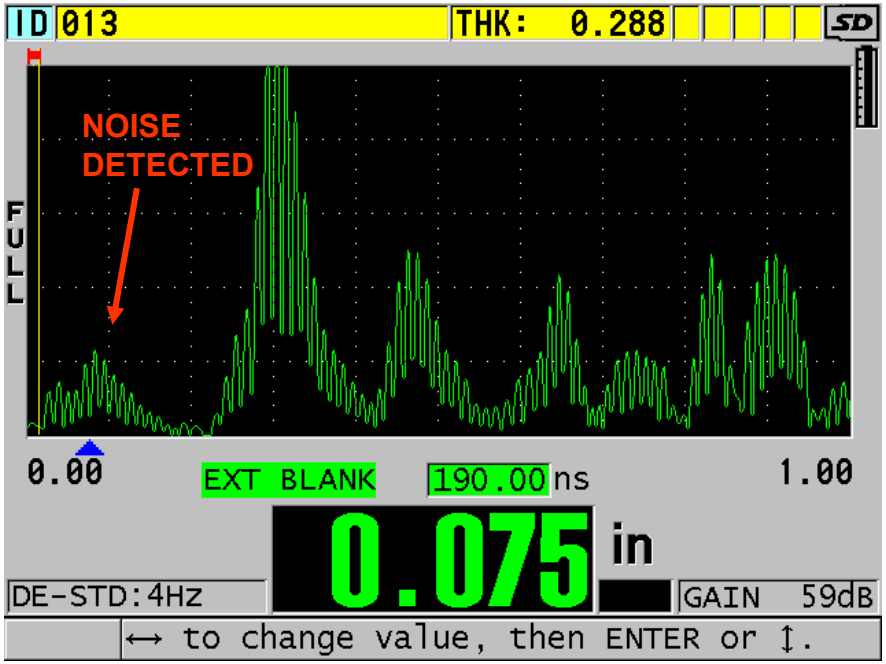
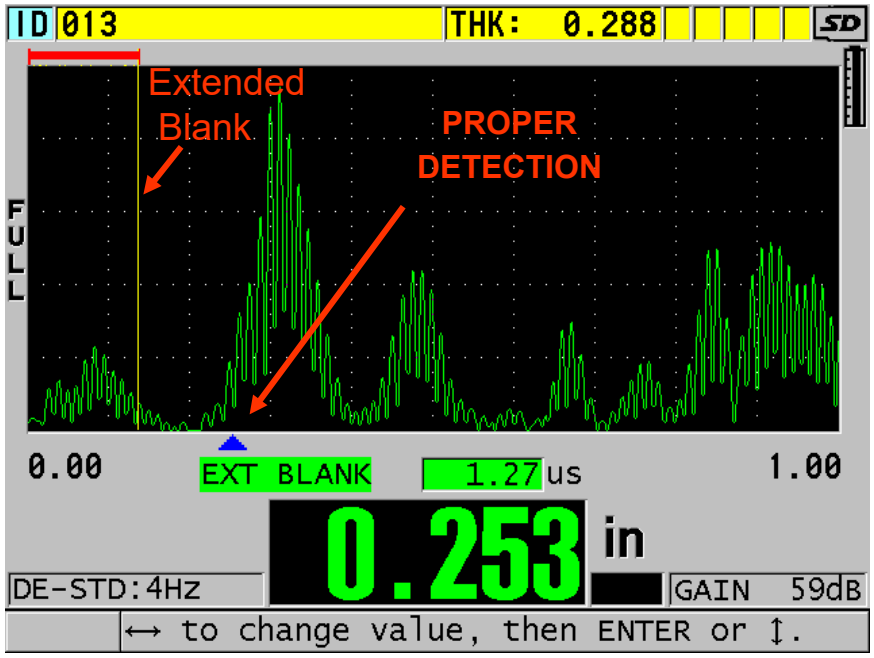
Extended Blank



Gage reading noise signal above detection point.



Extended Blank set correctly. Gage making proper back wall detection.

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Model 38DL PLUS
Echo-to-Echo Mode

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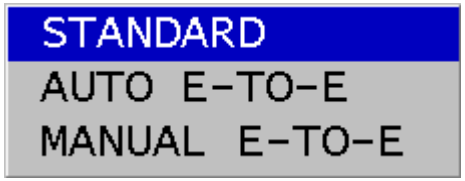
Echo-to-Echo with Dual Element Transducers

Press **2nd F** then **E-TO-E ZOOM**

Use the [↑],[↓] keys to select the measurement mode and press [ENTER]



The Echo-to-Echo function allows the 38DLPlus to make thickness readings between multiple backwall echoes. This function can be used to measure the true metal thickness on most painted and coated materials.

Note: To ensure that the gage will make accurate readings in both Echo-to-Echo and Standard Mode it is necessary to perform a Cal Vel and Cal Zero in the mode you plan to work in and a Cal Zero in the alternate measure mode.

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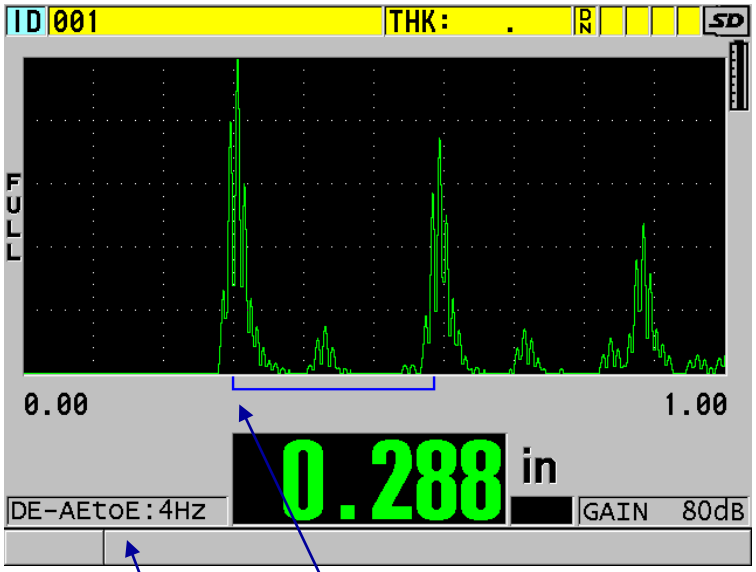
Auto Echo-to-Echo, Dual Element Transducers



Echo-to-Echo marker

AEtoE: Auto Echo-to-Echo
MEtoE: Manual Echo-to-Echo

The 38DLPlus will automatically make thickness measurements between the highest amplitude backwall signal and the second highest amplitude backwall signal. The normal 20% echo detection rules do not apply to Automatic Echo-to-Echo measurement mode.

Note: The standard detection marker is replaced with a bracket drawn between the two measured echoes.

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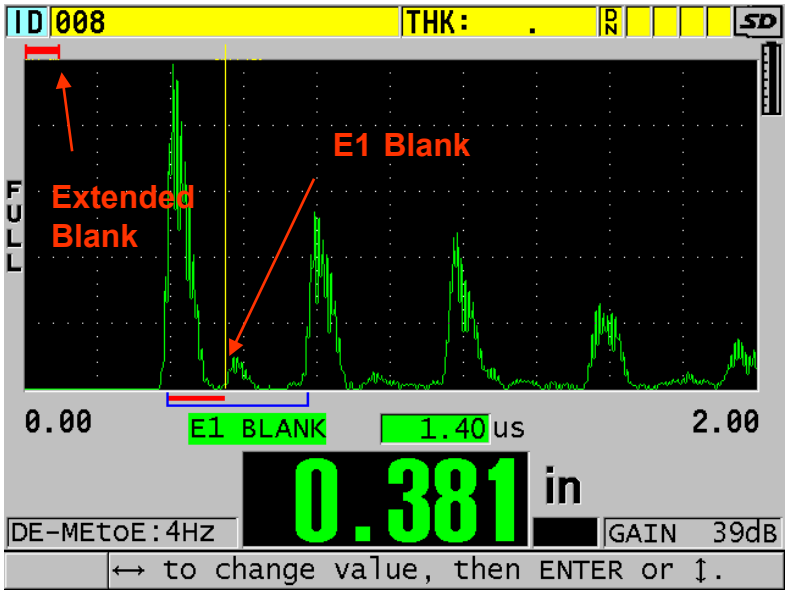
Manual Echo-to-Echo, Dual Element Transducers



The user controls signal detection by adjusting the receiver gain and two blanking gates. The gage will automatically detect the highest amplitude echo and the next signal.

Press the [WAVE AD\J] key then use the [🡅],[🡇] keys to select between Gain, Extended Blank and E1 Blank Use [🡄],[🡆] to adjust the parameter

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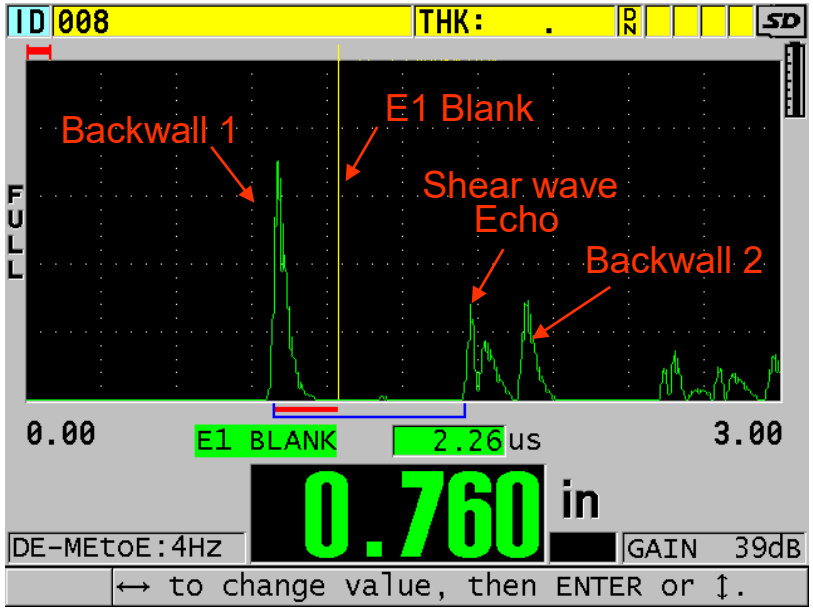
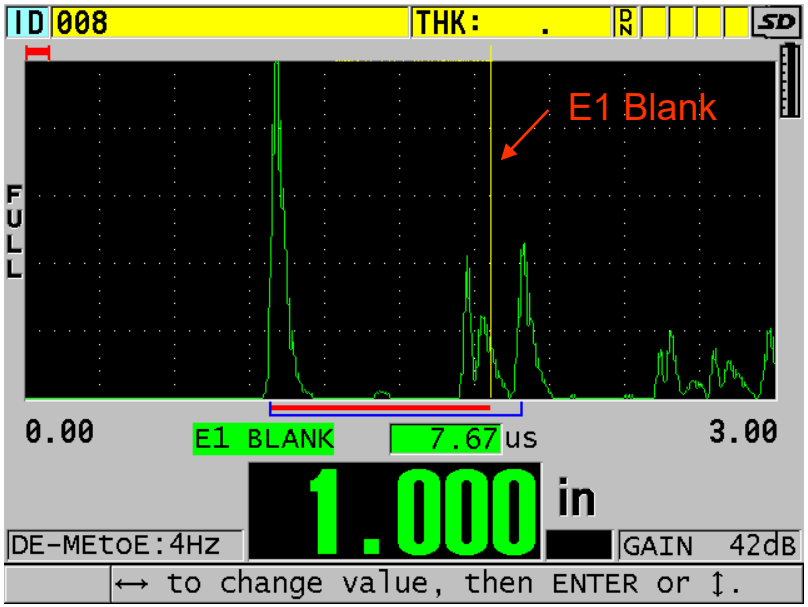
Echo-to-Echo Measurement Tips



Improper detection using
Manual Echo-to-Echo



Proper detection using
Blank adjustment

Note: Shear wave echoes can cause Echo-to-Echo measurement problems with the D790 in the thickness range of .600”-1.00”. We recommend using the D797 for the thicker Echo-to-Echo measurements or D7906 in Echo-to-Echo or in THRU-COAT mode. The delay material of the D7906 reduces shear wave echo propagation

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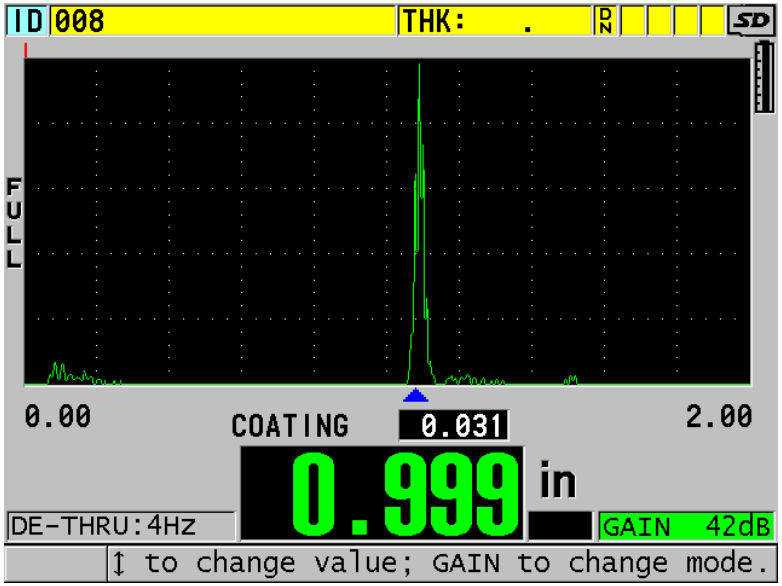
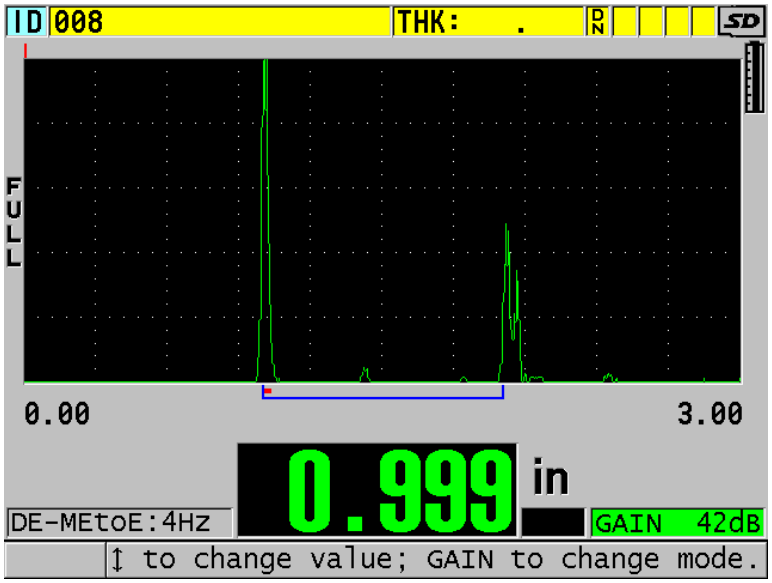
D7906 in THRU-COAT or Echo-to-Echo Mode



D7906 in Thru-Coat mode
on a 1.00 test block



D7906 in Echo-to-Echo mode
on a 1.00 test block

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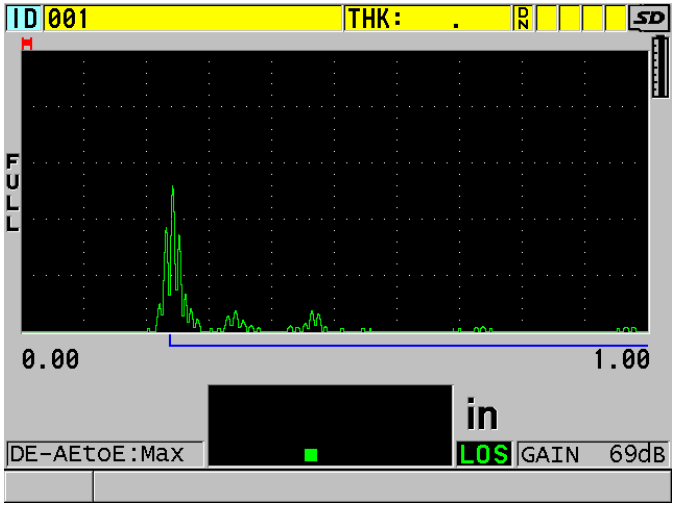
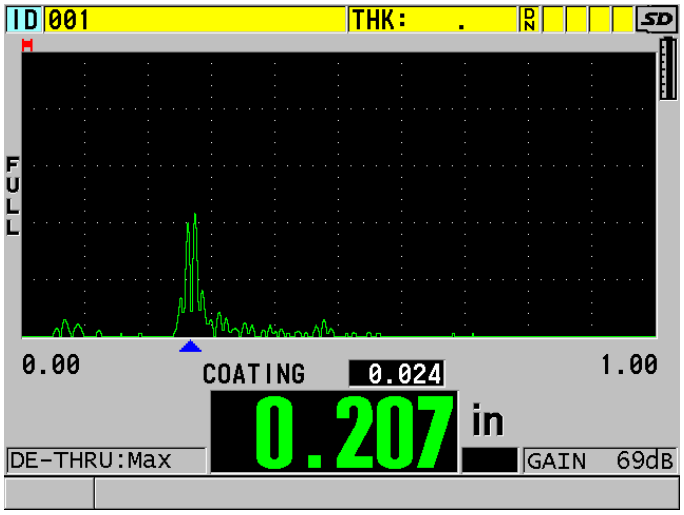
Echo-to-Echo, No Multiples



No reading with Echo-to-Echo on a heavily corroded sample



Thru-Coat on a heavily corroded sample

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Model 38DL PLUS
Temperature Compensation Feature

Temperature Compensation Feature

The sound velocity in steel changes approximately 1% per 100^0F (55^0C) change in temperature as recommended by ASME Standard E 797-95.

$$\text{Compensated Thickness} = \frac{\text{Time of Flight} * V0(1+k(T1-T0))}{2}$$

V0= Velocity at Calibration
T0= Temperature at Calibration
T1= Temperature at Measurement
k= Temperature coefficient

k is typically -0.0001 for (^{0}F) and -0.00018 for(^{0}C)

Note: k can be determined for a given material by plotting velocity vs. temperature and using a straight line interpolation

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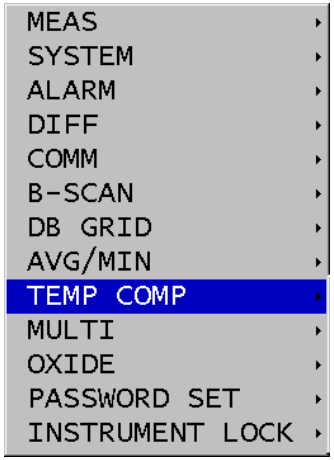
Temperature Compensation Setup

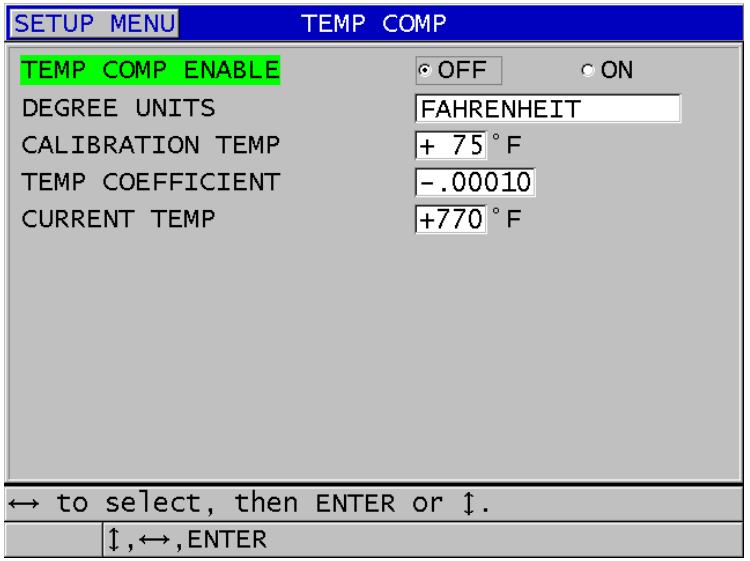
Press **SP MENU**

SETUP MENU

Use the [🡻],[🡹] to highlight “Temp Compensation” then press [ENTER]



Temperature compensation allows the 38DL PLUS to compensated for the change in sound velocity due to temperature. The sound velocity of carbon steel changes about 1% per 100 ^{0} F (55 ^{0} C)



Use the [🡻],[🡹] or [ENTER] to select a parameter and [🡸, 🡺] to change a the parameter to editing the temp or coefficient the [🡻,🡹, 🡸, 🡺] to edit and [ENTER] to accept edit.

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Temperature Compensation Setup

Enable: (OFF or On)
Turns Temperature Compensation ON or OFF

Degree Units: User selects temperature units (Fahrenheit or Celsius)

Calibration Temp: Temperature of the calibration standard.

Temp COEF: Enter Temperature Coefficient
-0.00001 for Fahrenheit (Represents 1% per 100 ^{0}F)
-0.00018 for Celsius (Represents 1% per 55 ^{0}C)

Note: Users can enter custom temperature coefficient if desired

Current Temp: User enters or inputs (Auto) current temperature at measurement point

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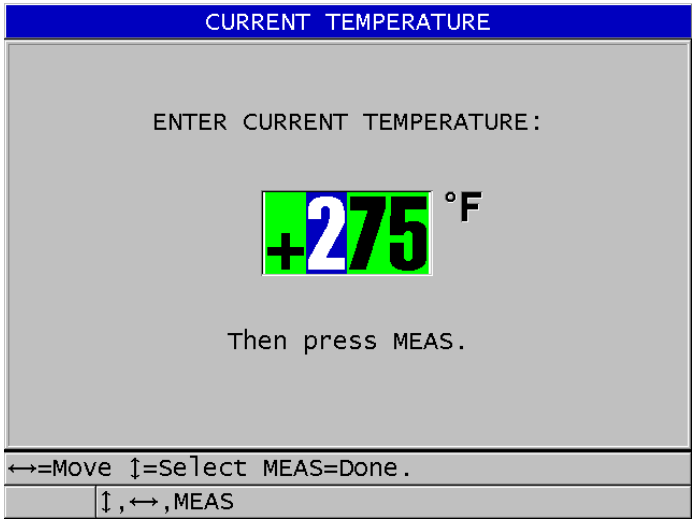
Temperature Compensation Mode

When Temperature Compensation is activated and in the measure mode

Press **2nd F** Then **REF VALUE** **XDCR RECALL**



Enter the temperature at the measurement point and press [MEAS]

Note: Current temperature will remain as set until changed by user.

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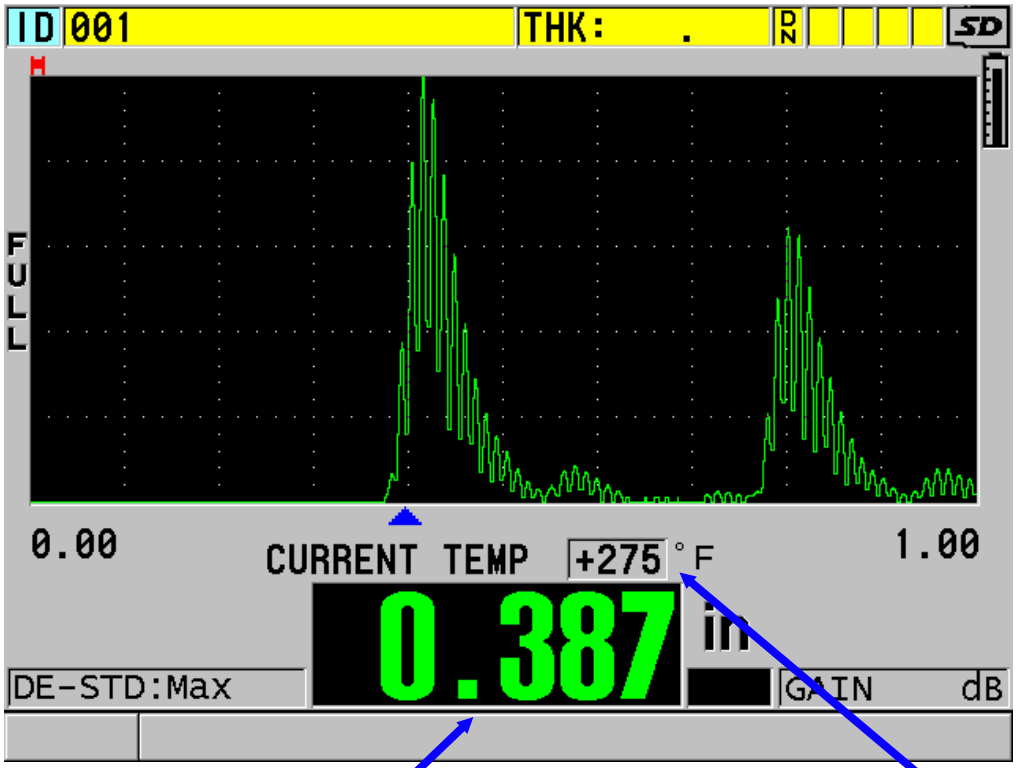
Temperature Compensation Mode



Temperature compensated thickness

Current Temp Entered by user

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OLYMPUS

Model 38DL PLUS
Min/Average Setup

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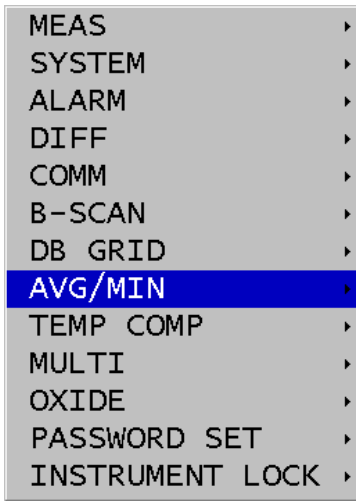
Min/Average Setup

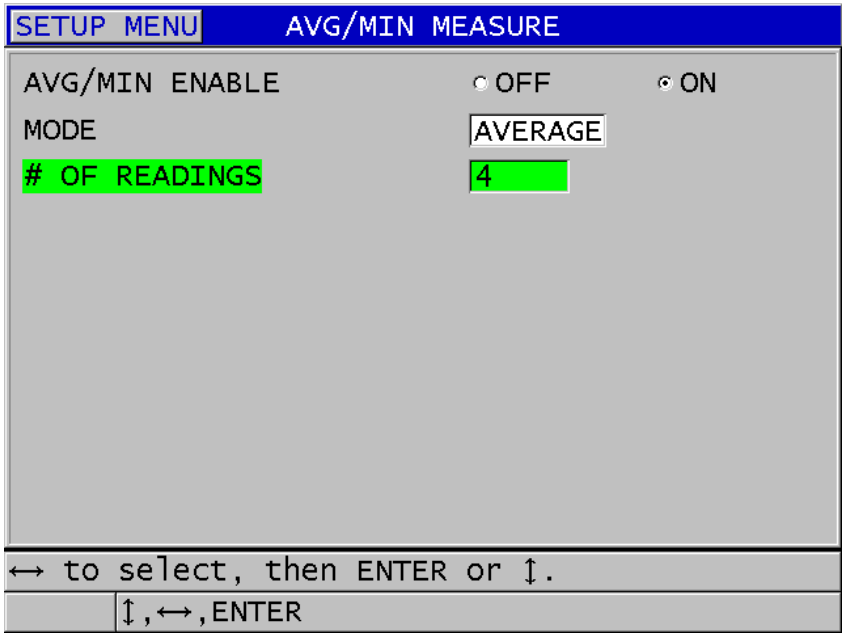
Allows user to save the Minimum or Average of 2, 3 or 4 thickness readings

Press **SP MENU**

Use the [🡻],[🡹] to highlight "AVG/MIN" then press [ENTER]



Use the [🡻],[🡹] to highlight "AVG/MIN" then press



Use the [🡻],[🡹] to select a parameter and [🡸],[🡺]to change the setting

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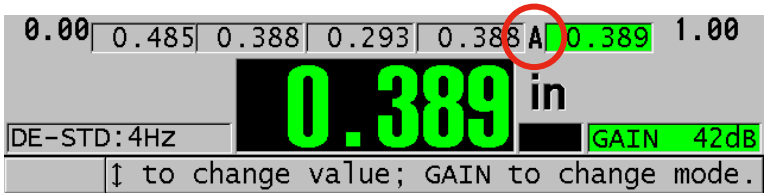
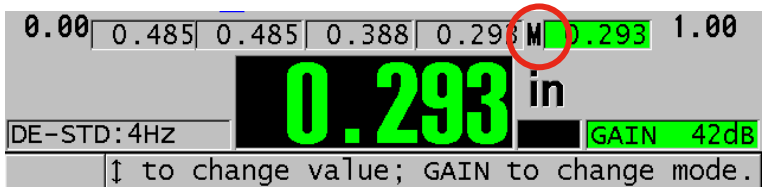
Min/Average Setup

Enable:	(OFF or On) Turns Min/Average Mode on or off
Mode:	**AVG:** Calculates the average of the specified # of successive thickness measurements. **MIN**: Calculates the minimum of the specified # of successive thickness measurements.
# of Readings :	User selects the number of thickness readings in the Min or average mode. (The user can select 2, 3 or 4)



"A" indicates Average Mode



"M" indicates Minimum Mode

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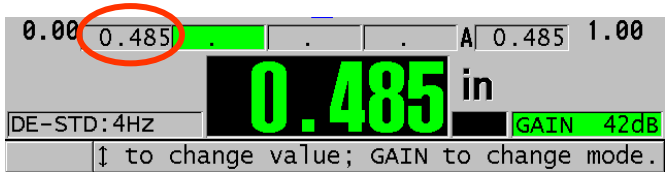
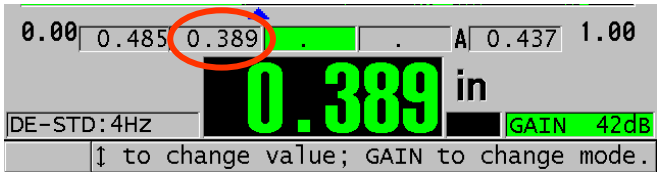
Min/Average Operation

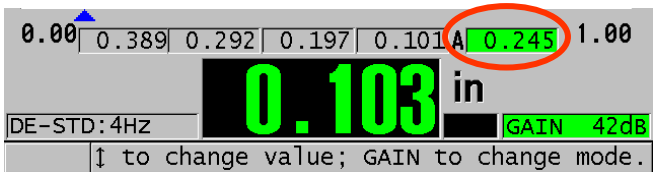
Press [SAVE] to capture the current reading and move to the next location



[SAVE] →



Pressing [SAVE] when the Min or Average box is highlighted will save the Min or Average value to the datalogger →



Note: Pressing the [MEAS] key will clear all Min/Avg boxes. Using the [← or →] keys allows the user to move to any of the Min/Avg boxes and the value can be replaced by pressing the save key.

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Model 38DL PLUS
B-Scan Mode

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38DL PLUS B-Scan

- Non-encoded B-Scan
- Draws thickness profile of wall thickness
- Shows live A-Scan while updating B-Scan
- Marks minimum or maximum thickness while scanning
- Select scan directions
- Marks areas of LOS (loss of signal)
- Allows user to review all thickness values on stored B-Scan
- Can store up to 10,000 reading per B-Scan

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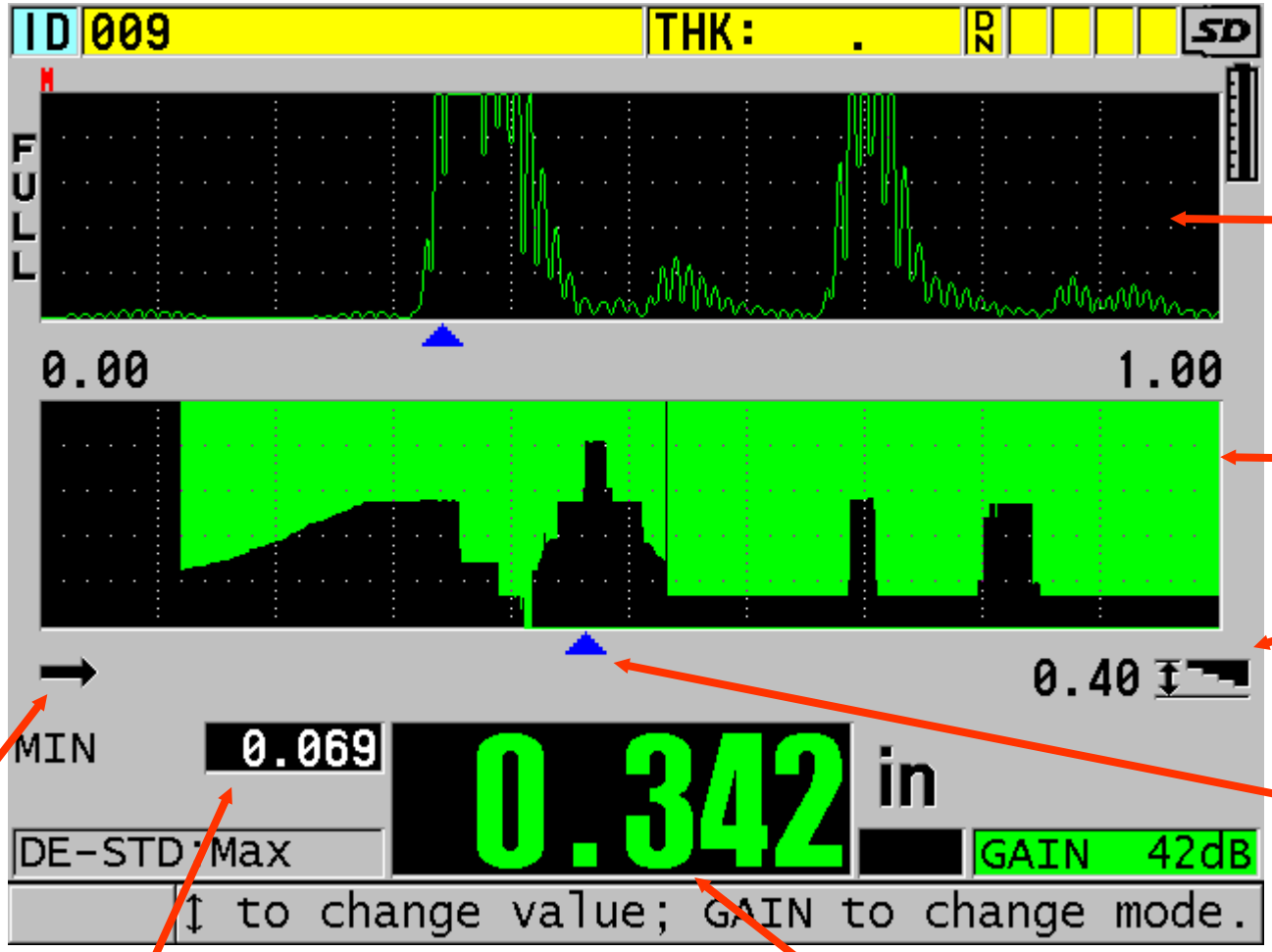
Live B-Scan Display Overview



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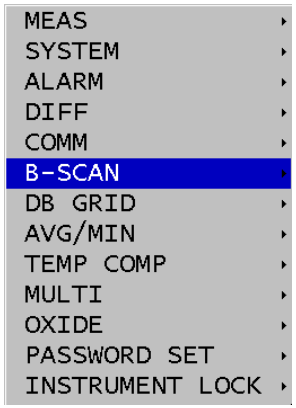
B-Scan Setup

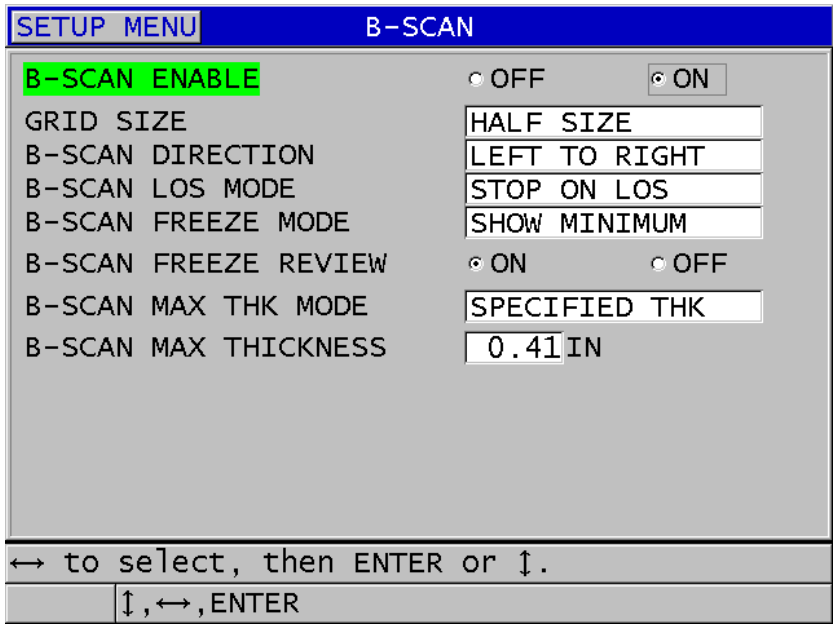
SP MENU

Press **SETUP MENU**



Use the [🡻],[🡹] to highlight “B-Scan” then press [ENTER]

Used to activate B-Scan and set B-Scan parameters.



Use the [🡻],[🡹] to select a parameter and [🡸],[🡺] to change the setting

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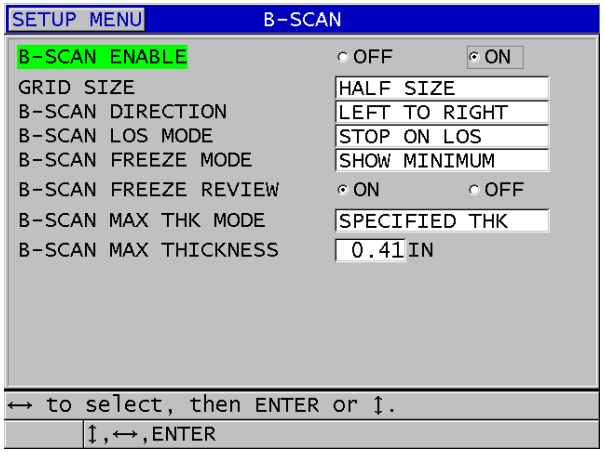
B-Scan Setup



Use the [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter.
Press [MEAS] to return to the measure mode with B-Scan active.

Option: (None, B-Scan or DB GRID)
Setting Option to None turns B-Scan and DB Grid off

B-Scan Size: Full or Half, Half shows A-Scan and B-Scan

B-Scan Direction: (Right to Left or Left to Right)
Determines the direction that the data will be updated or drawn on the screen.

B-Scan LOS Opt: (Stop or Continue)
Determines how the B-Scan will operate when an LOS occurs.

B-Scan Freeze Opt: (Min, Max or Current)
Determines which waveform and reading is displayed when the [FREEZE] key is pressed during a scan.

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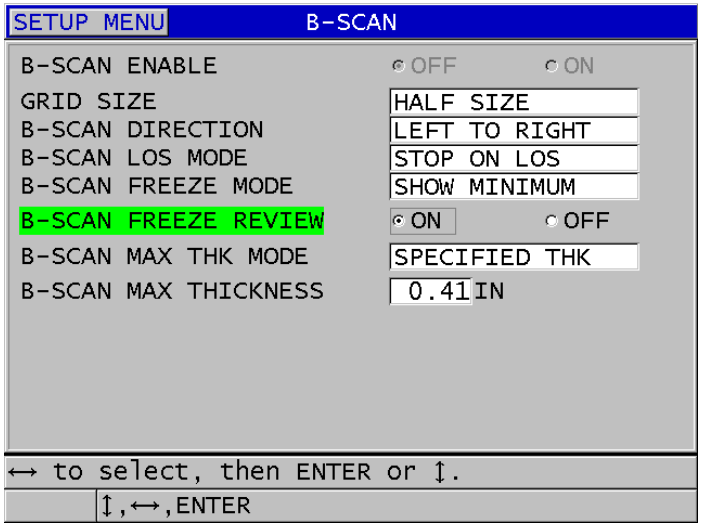
B-Scan Setup



B-Scan Freeze Review: (On or Off)
Allows user to review the B-Scan thickness value when the [FREEZE] key is pressed

B-Scan Max Thk Opt: (A-Scan or Specified Thk)
Determines the vertical scale of the B-Scan

B-Scan Max Thickness: (When “Specified Thk” is selected above)
Allows user to input a fixed value for the B-Scan range

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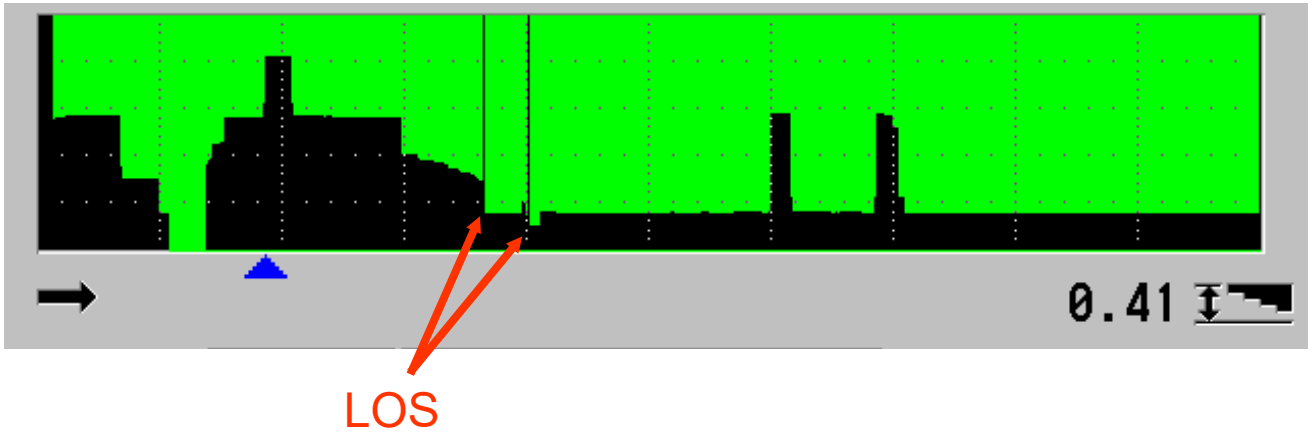
B-Scan “LOS” Opt set to “STOP”



B-Scan will stop updating when an LOS occurs. The B-Scan will start updating again when the next valid thickness reading is detected.

Note: If a valid thickness occurs after an LOS, a LOS marker indicating the position of the LOS will be inserted into the B-Scan.

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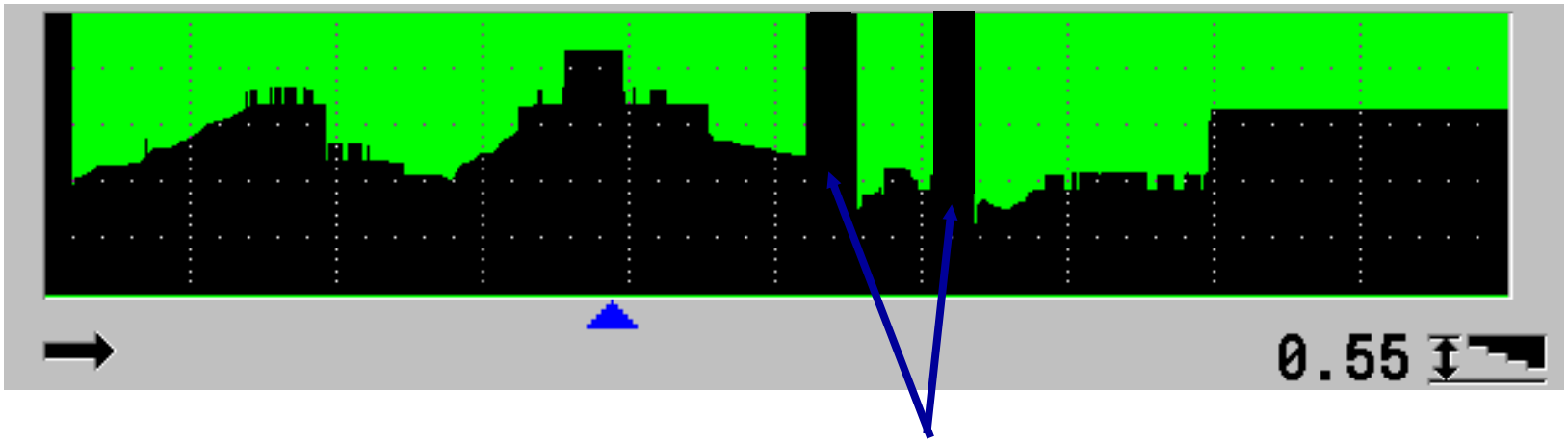
B-Scan “LOS” Opt set to “CONTINUE”



LOS Regions

B-San will continue to update even if a LOS occurs

Note: An LOS thickness is indicated as a blank thickness

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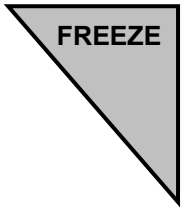
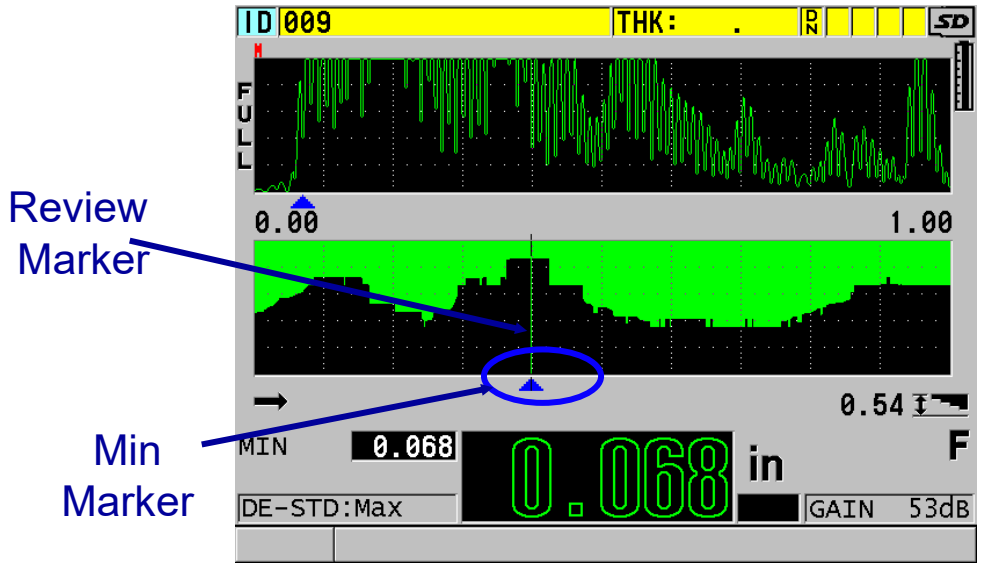
B-Scan Freeze Review

While collecting B-Scan data:

Press 

A vertical line (Review Marker) will appear to indicate the location of the displayed thickness.

This will be either the Minimum, Maximum, or current thickness depending on the freeze option selected.



The unit will display both the thickness and the waveform of the held minimum or maximum.

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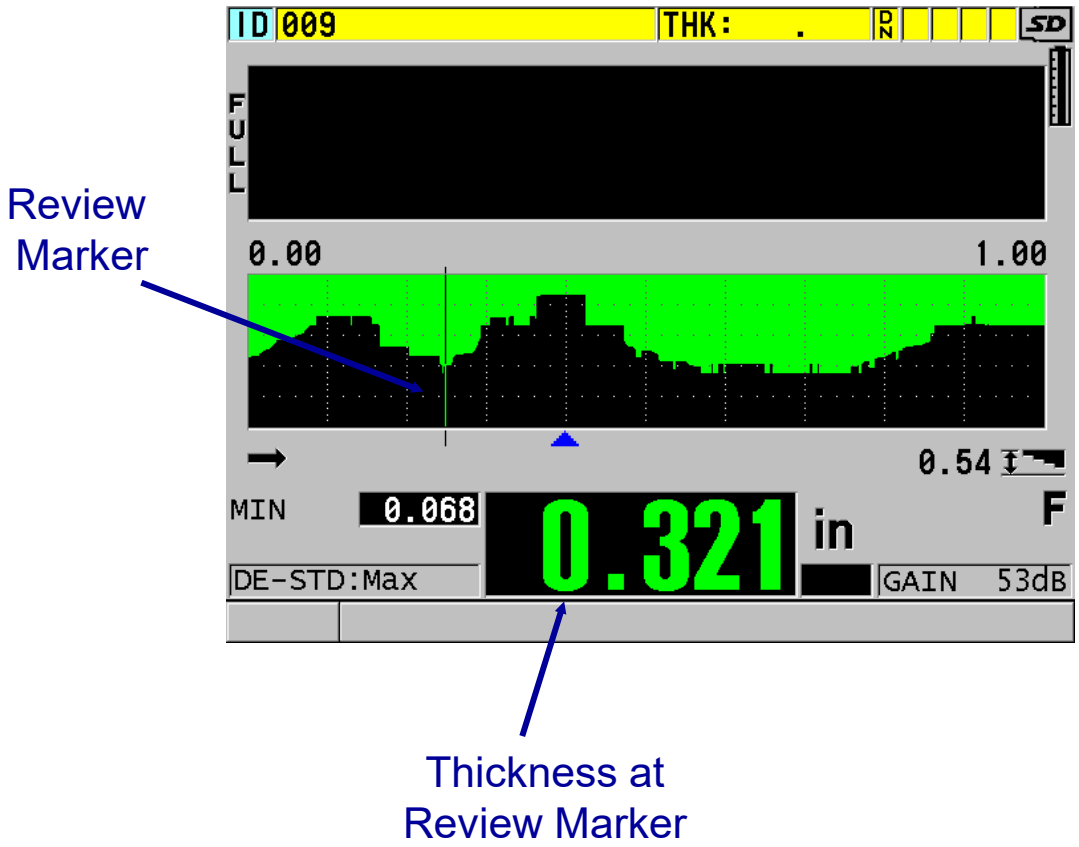
B-Scan Freeze Review

Pressing
[←],[→]

Moves the Review Marker to either the left or the right of the scan.

During review, the gage will always display the thickness at the Review Marker location.



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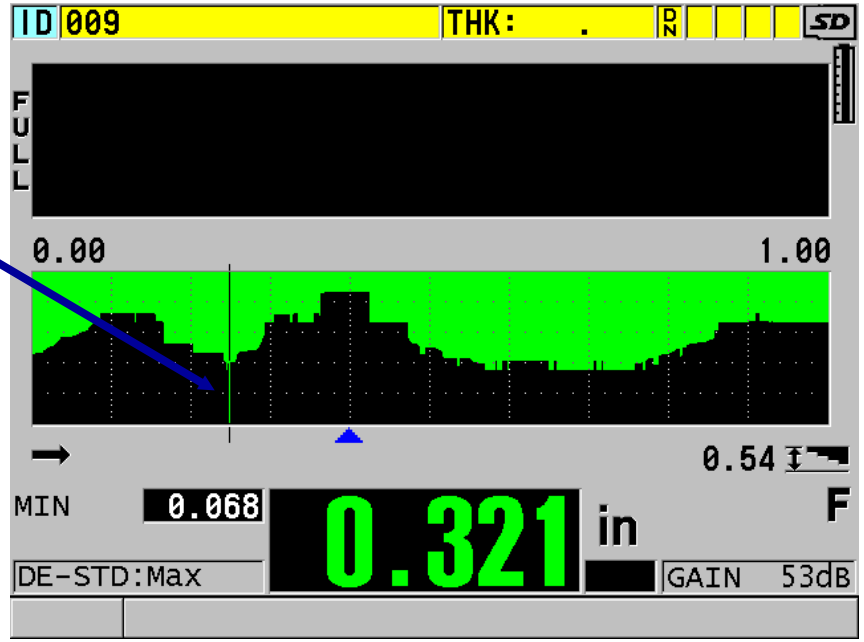
Saving Thickness Readings in Freeze Mode

While B-Scan is Frozen (Freeze Review On)

Press **WAVEFORM**
SAVE
SEND

Review Marker



To save a thickness reading at the position of the Review Marker. The user can save the Min or Max thickness value by pressing the [SAVE] key when the Min or Max is displayed.

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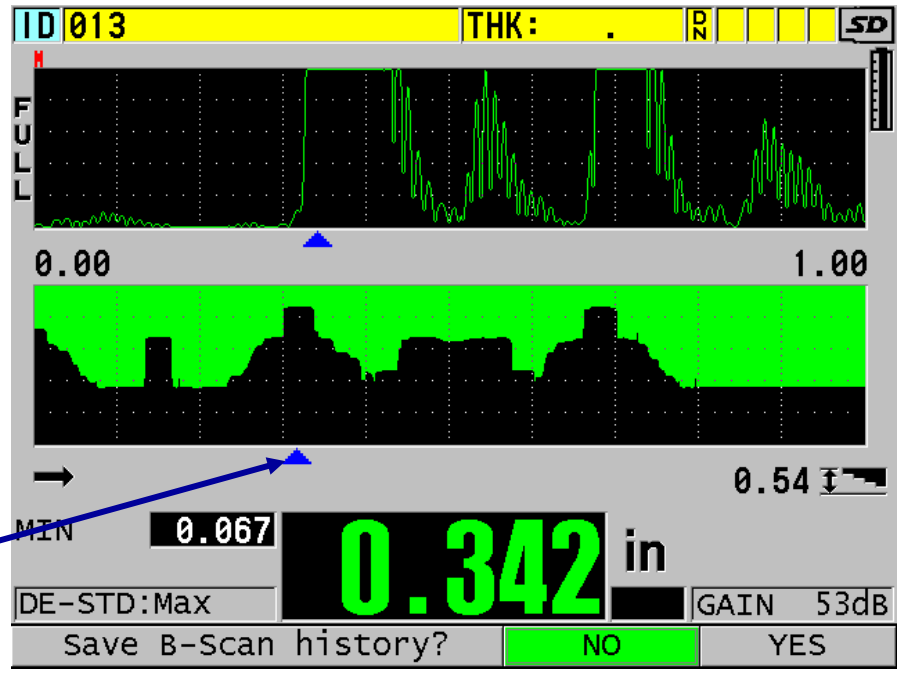
Saving B-Scan Screen or Entire B-Scan

Saving the Min or Max A-Scan Along with the Held B-Scan

While B-Scan is Frozen, and the Min or Max is displayed:

Press **2nd F** then **WAVEFORM** (SAVE / SEND)

Use [←],[→] to select NO to save only the current B-Scan screen or Yes to save the entire B-Scan up to 10,000 thickness and Press [ENTER]



Min Marker location

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Additional Gage Features

- Differential
- Reduction Rate Alarms
- Measurement Update Rate
- Min/Max Mode
- Alarm Mode

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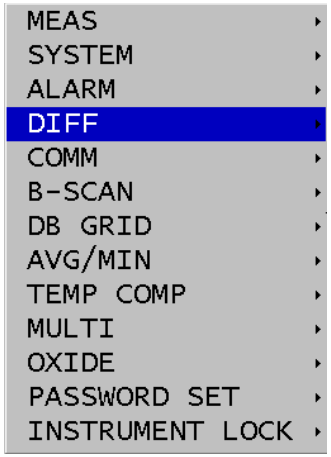
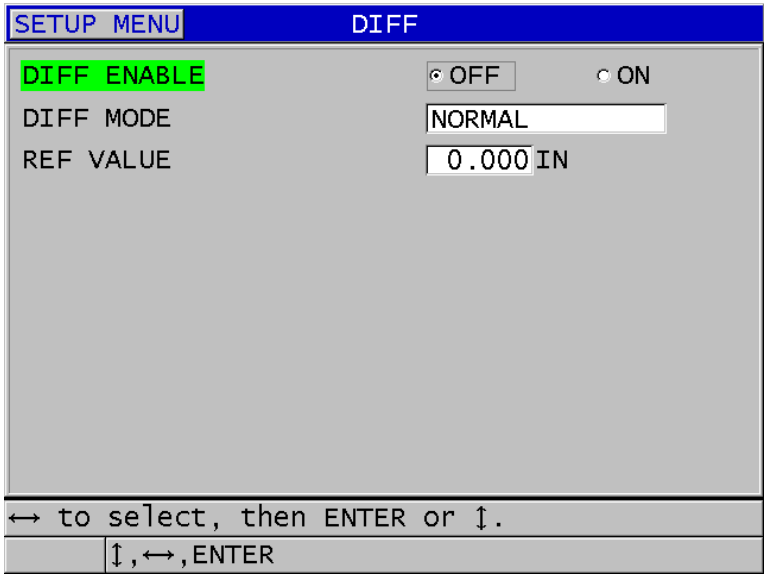
Differential Mode

Press **SP MENU** → **SETUP MENU**

Displays the measured thickness deviation from the differential set point.

Use the [🡻],[🡹] to highlight “DIFF” then press [ENTER]





Use [🡸],[🡺] to turn Diff Mode On or Off then press [ENTER].
Use [🡸],[🡺] to select Displayed Diff type then press [ENTER].
Enter Diff value and press [MEAS] to return to the Differential measure mode.

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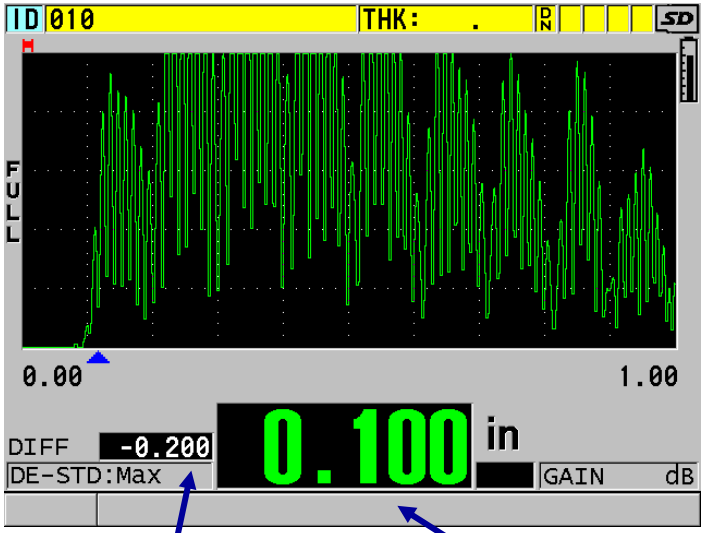
Differential Mode Normal

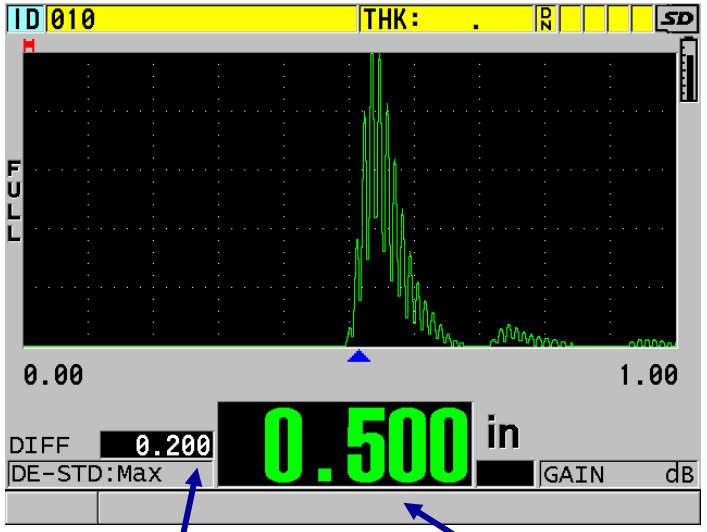
Normal Differential Displays both the actual live thickness and the absolute deviation from the differential reference value

Diff Reference Value of 0.300 in.



Normal Differential Display

Actual Thickness



Normal Differential Display

Actual Thickness

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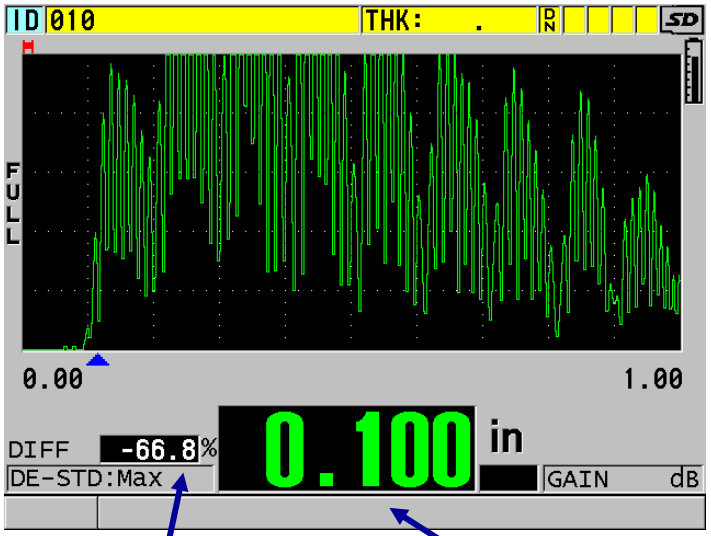
Differential Mode % Ratio

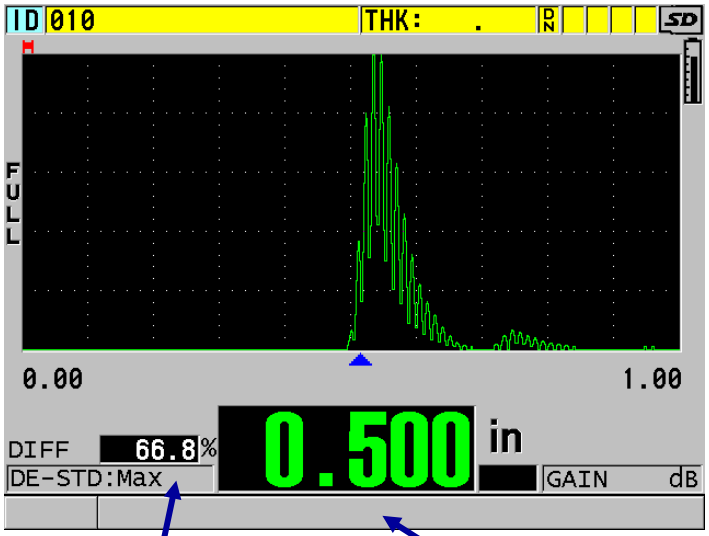
% Ratio Differential Displays both the actual live thickness and the % deviation from the differential reference value

Diff Reference Value of 0.300 in.



% Differential Display

Actual Thickness



% Differential Display

Actual Thickness

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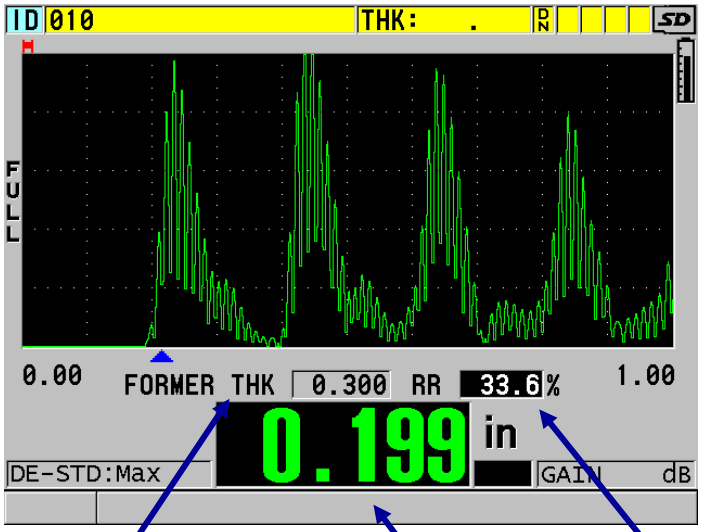
Differential Mode Reduction Rate

Reduction Rate Differential is a special %Differential mode used in application of metal forming or bending. It displays the former reference value, the actual live thickness and the % deviation from the former value reference value. The user can select to display the actual thickness or the % reduction in large fonts

Former Reference Value of 0.300 in.

Thickness in large font

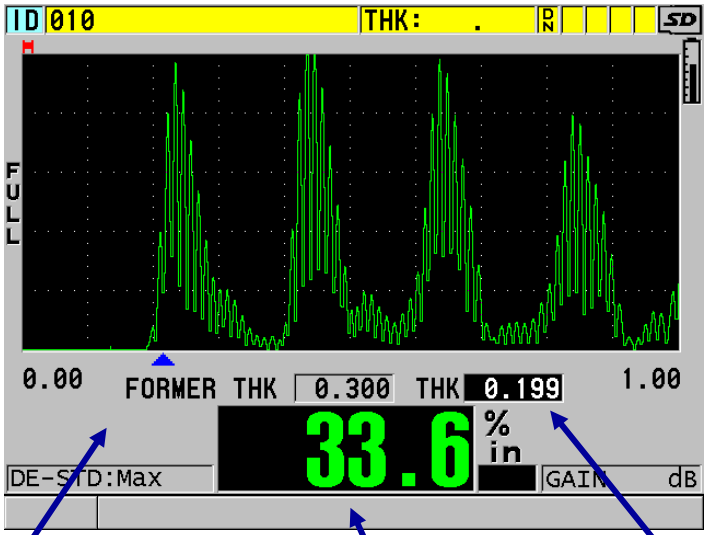


Former/Reference

Actual Thickness

% Differential Display

Reduction Rate in large font



Former/ Reference

% Differential Display

Actual Thickness

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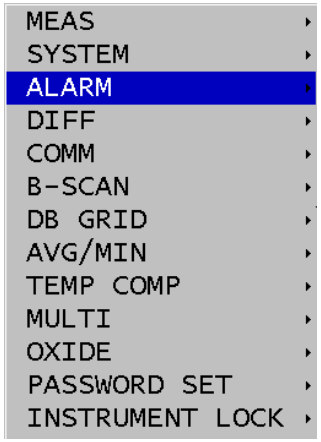
Reduction Rate Alarms

While Reduction rate is active

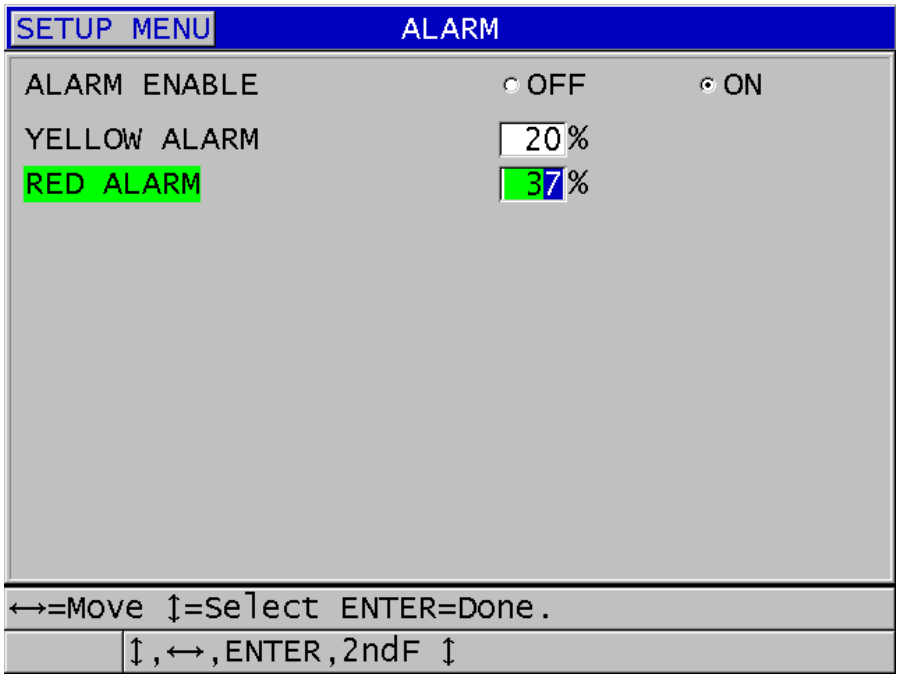
Press SP MENU

SETUP MENU

Use the [🡻],[🡹] to highlight “Alarm” then press [ENTER]



If Reduction Rate is active the user can set the alarms values. These are set in the alarm setup menu. The user can define a Yellow and Red Alarm set points



Use [🡸],[🡺] to turn Alarm Mode On or Off then press [ENTER].
Use [🡻,🡹, 🡸, 🡺] to edit the Yellow Alarm then press [ENTER].
Use [🡻,🡹, 🡸, 🡺] to edit the Yellow Alarm then press [ENTER].

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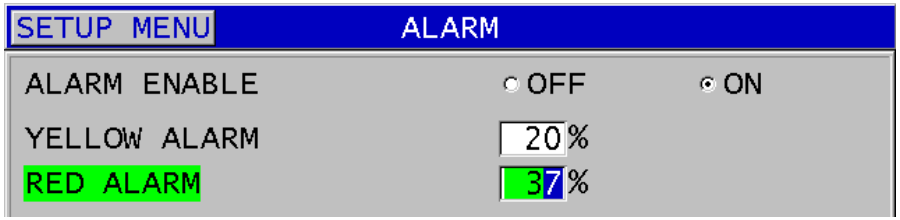
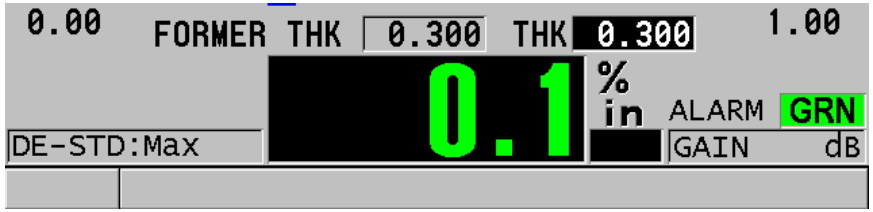
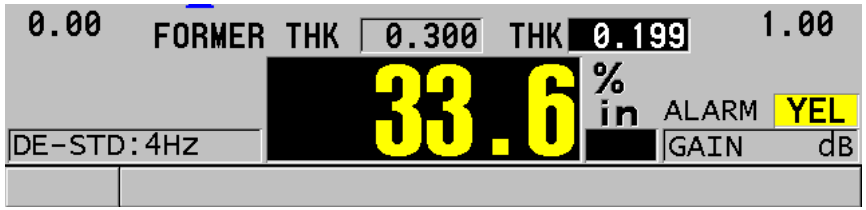
Reduction Rate Alarms

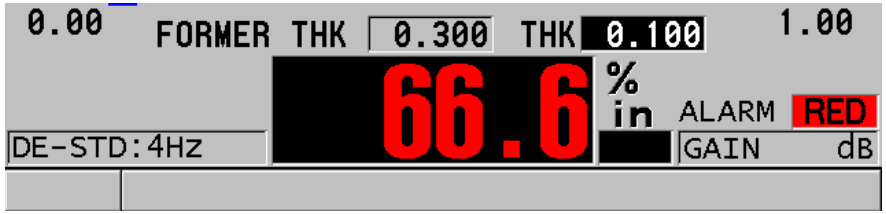




Reduction rates of 0-19.9% is a Green alarm condition



Reduction rates of 20-36.9% is a Yellow alarm condition



Reduction rates of 30-Greater is a Red alarm condition

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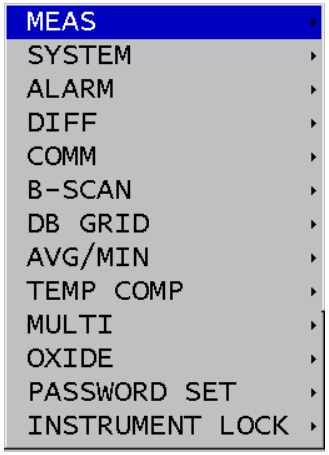
Measurement Update Rate

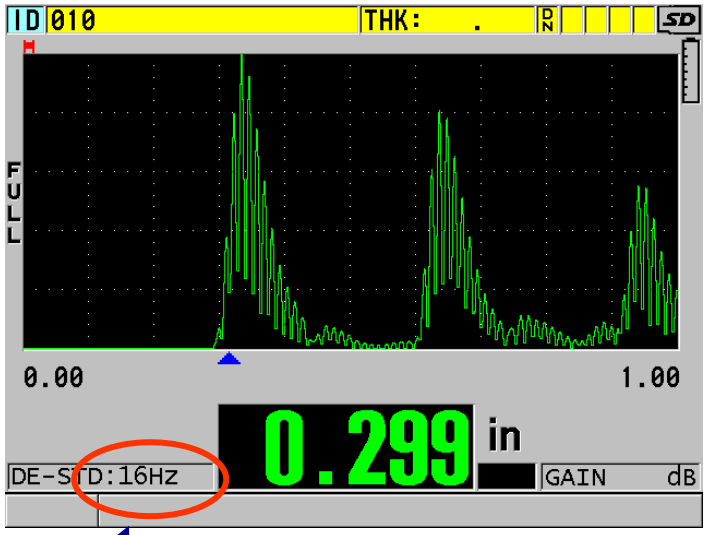
Press **SP MENU** **SETUP MENU**

Use the [🡻],[🡹] to highlight “Meas” then press [ENTER]



Use the [🡻],[🡹] to highlight “Measurement Rate”, press [ENTER] then use the [🡸],[🡺] to change Measurement rate and press [ENTER]

Allows the user to select the display measurement update rate. The user can select between (4, 8, 16, 20Hz or Max (approx 30 Hz).



Measurement Update Rate

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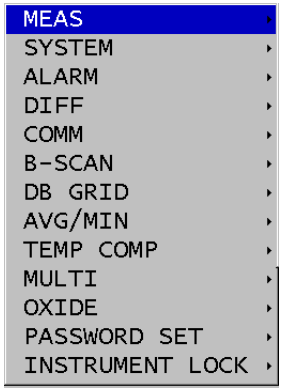
Min/Max Mode

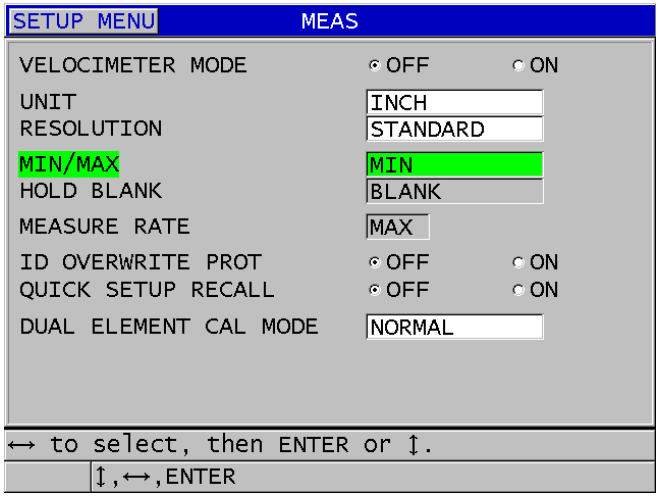
Press **SP MENU** → **SETUP MENU**

Use the [🡻],[🡹] to highlight “Meas” then press [ENTER]



Use the [🡻],[🡹] to highlight “MIN/MAX Measure Rate” then use the [🡸],[🡺] to change between (OFF, MIN, MAX or Both) then press [MEAS]

These two functions will allow the gage to scan and hold the Minimum, Maximum or Both Min and Max thickness and waveform. Any time the Min/Max modes are engaged, the gage will automatically go into Max Measurement update rate.



Note: The [FREEZE] key can be used in conjunction with the Min/Max to eliminate the possibility of capturing false couplant readings. Pressing [MEAS] will reset the Min/Max.

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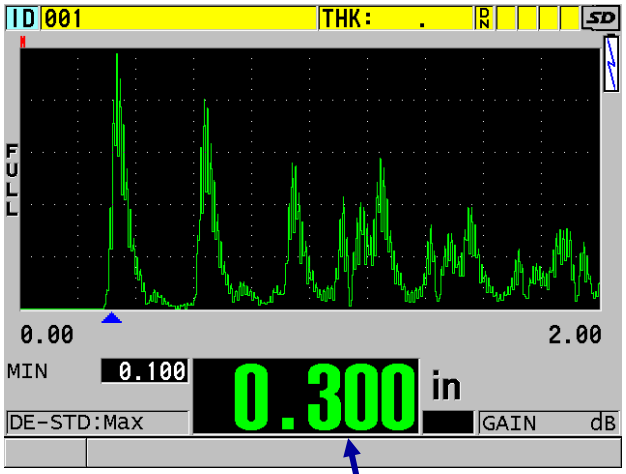
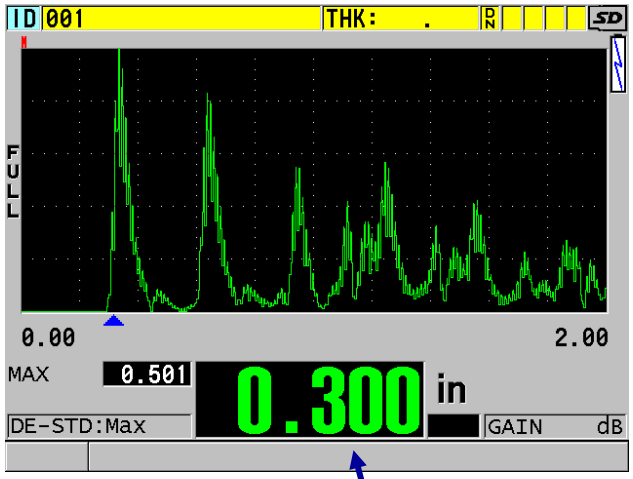
Min/Max Mode



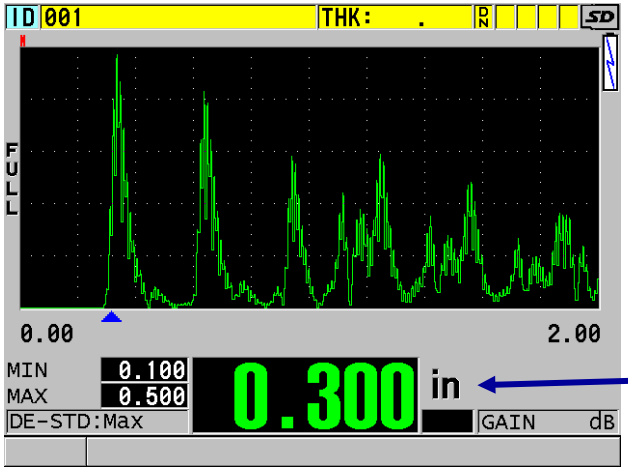
Held Minimum

Active Thickness



Held Maximum

Active Thickness



Held Min/ Maximum

Active Thickness

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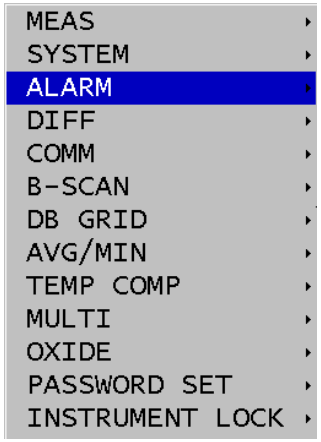
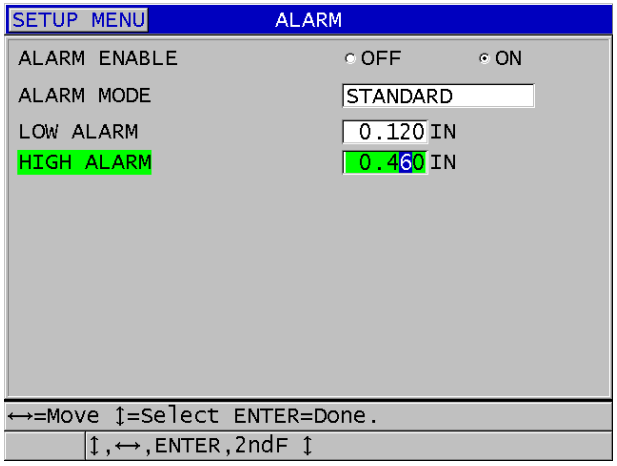
Alarm Mode *Standard Low and High Alarm Mode*

Press **SP MENU** **SETUP MENU**

Allows the operator to set High and Low alarm set points. The gage will give both audible and visual alarm indicators.

Use the [🡻],[🡹] to highlight “Alarm” then press [ENTER]





Use the [🡸],[🡺] to turn enable OFF or On and press [ENTER]
Use the [🡸],[🡺] to select alarm mode (Standard or Previous) and press [ENTER]
Use [🡸,🡺,🡻,🡹] edit the Low alarm value and press [ENTER]
Use [🡸,🡺,🡻,🡹] edit the High alarm value use press [MEAS]

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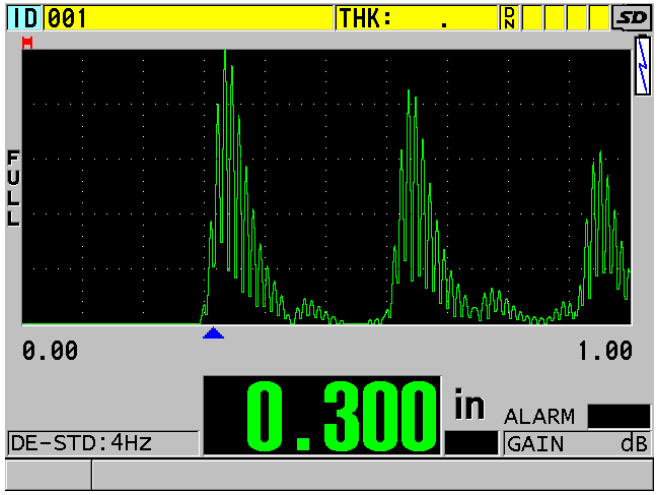
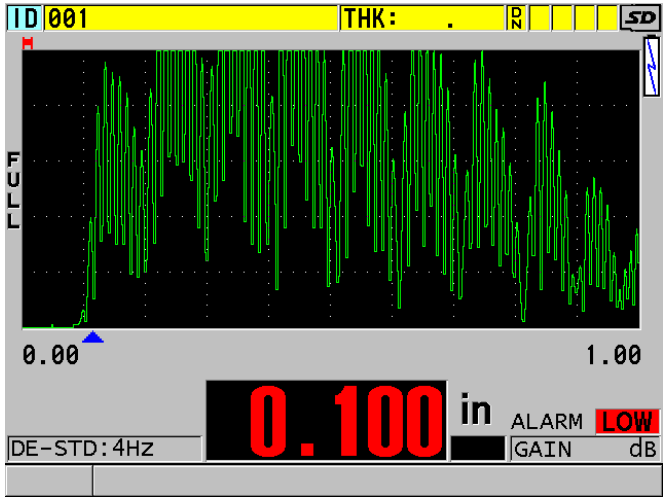
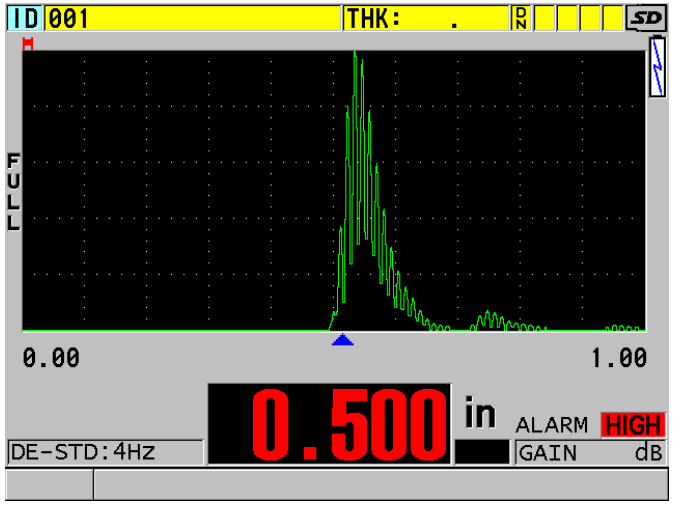
Alarm Mode *Standard Low and High Alarm Mode*







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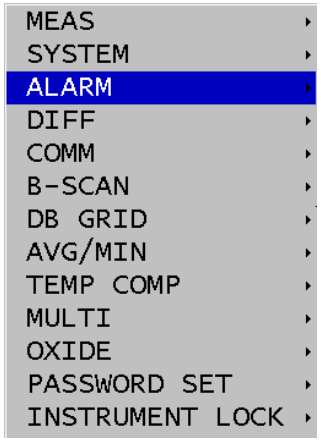
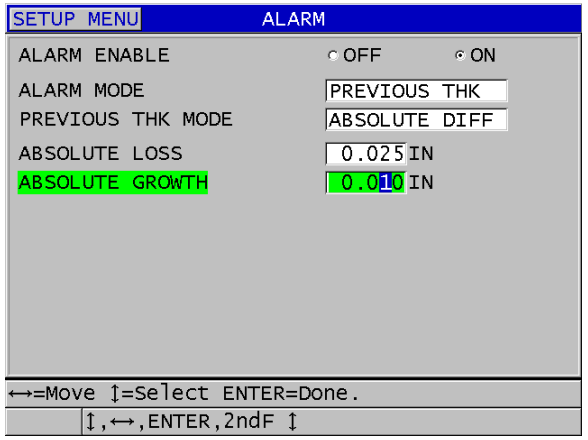
Alarm Mode *Absolute Previous Thickness Alarm Mode*

Press **SP MENU** **SETUP MENU**

Use the [🡻],[🡹] to highlight “Alarm” then press [ENTER]

Allows the user to compare current live thickness values to previously stored thickness values at each ID# location, for the purpose of detecting large wall losses or growths.





Use the [🡸],[🡺] to turn enable OFF or On and press [ENTER]
Use the [🡸],[🡺] to select alarm mode (Standard or Previous) and press [ENTER]
Use the [🡸],[🡺] to select Previous Thickness mode (Absolute or %) and press [ENTER]
Use [🡸,🡺,🡻,🡹] to edit the absolute Loss alarm value and press [ENTER]
Use [🡸,🡺,🡻,🡹] to edit the absolute Growth alarm value then press [MEAS]

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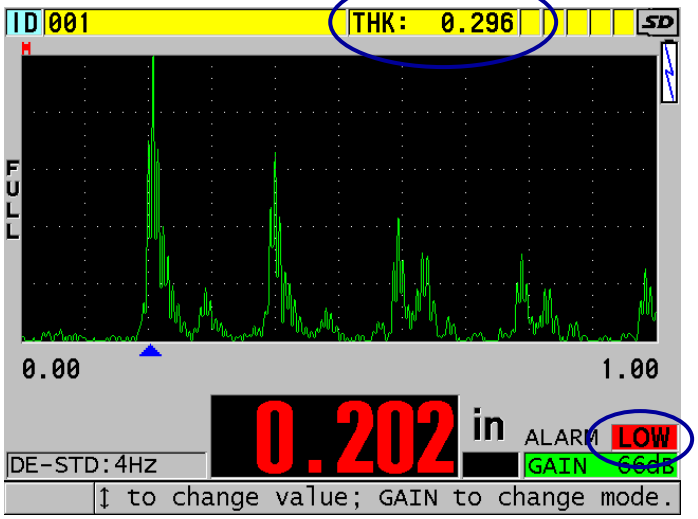
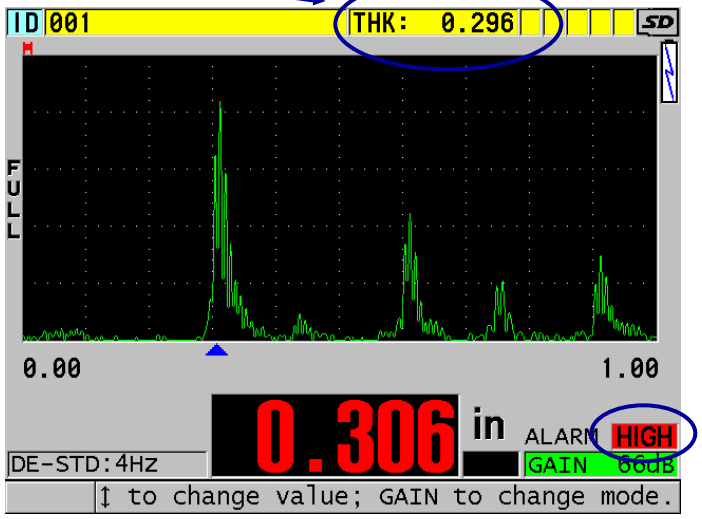
Alarm Mode

Previous Thickness – Absolute Differential

Previous thickness



Current thickness is more than .050” thinner than the previous reading.



Current thickness is more than .010” thicker than the previous reading.

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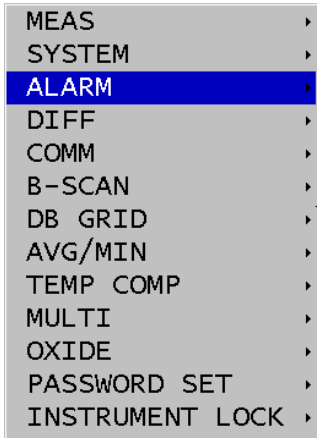
Alarm Mode

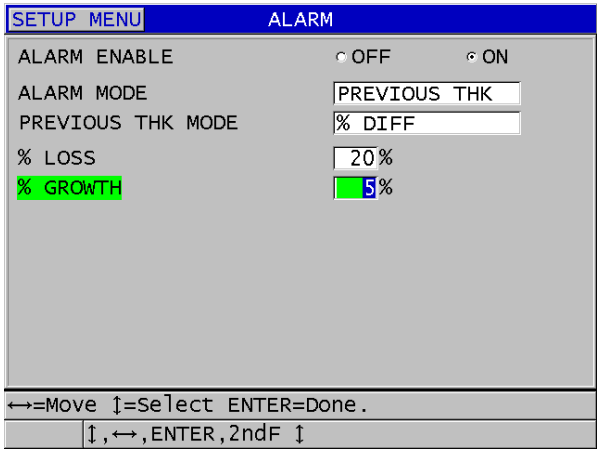
Previous Thickness – Percent Differential

Press **SP MENU** → **SETUP MENU**

Use the [🡻],[🡹] to highlight “Alarm” then press [ENTER]

Allows the user to compare current live thickness values to previously stored thickness values at each ID# location, for the purpose of detecting large wall losses or growths. The user can set a % Loss or % Growth from the previously stored thickness.





Use the [🡸],[🡺] to turn enable OFF or On and press [ENTER]
Use the [🡸],[🡺] to select alarm mode (Standard or Previous) and press [ENTER]
Use the [🡸],[🡺] to select Previous Thickness mode (Absolute or % DIFF) and press [ENTER]
Use [🡸,🡺,🡻,🡹] to edit the % Loss alarm value and press [ENTER]
Use [🡸,🡺,🡻,🡹] to edit the % Growth alarm value then press [MEAS]

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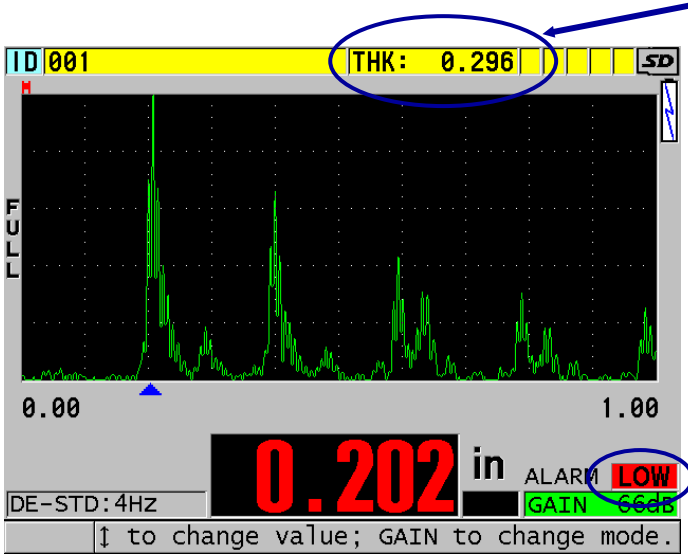
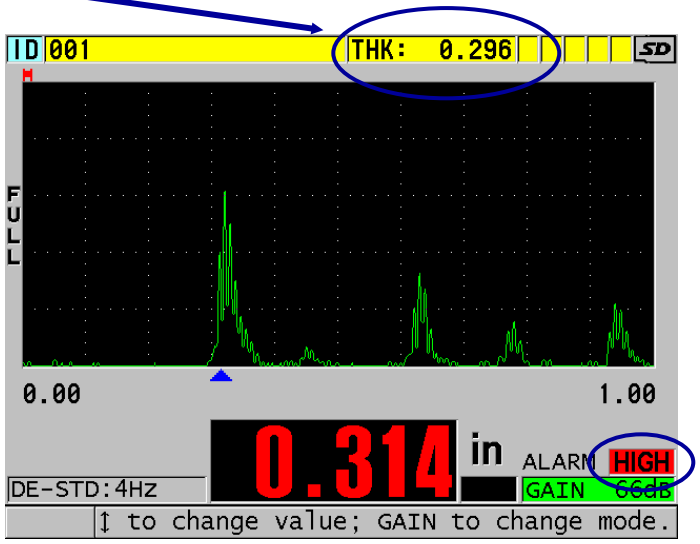
Alarm Mode

Previous Thickness – Percent Differential

Previous thickness



Current thickness is more than 20% thinner than the previous reading.



Current thickness is more than 5% thicker than the previous reading.

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B-Scan Alarm Mode

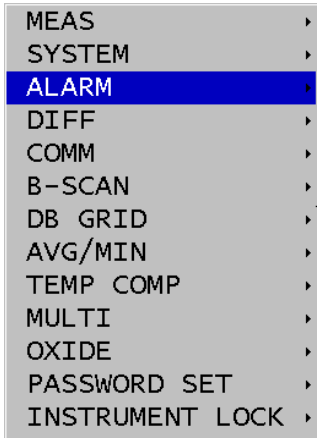
B-Scan must be active to set the B-Scan Alarm

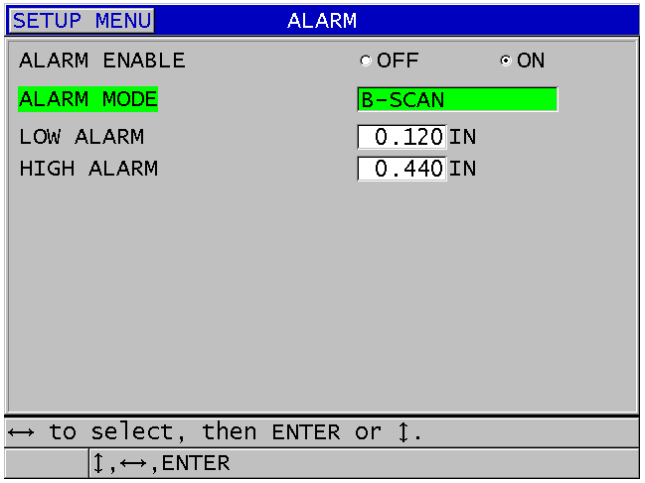
Allows the user to set High and Low alarms for the B-Scan option. High and low alarm lines will be shown on the B-Scan.

SP MENU

Press **SETUP MENU**

Use the [🡻],[🡹] to highlight “Alarm” then press [ENTER]





Use the [🡸],[🡺] to turn enable OFF or On and press [ENTER]
Use the [🡸],[🡺] to select alarm mode (B-Scan) and press [ENTER]
Use [🡸,🡺,🡻,🡹] to edit the Low alarm value and press [ENTER]
Use [🡸,🡺,🡻,🡹] to edit the High alarm value then press [MEAS]

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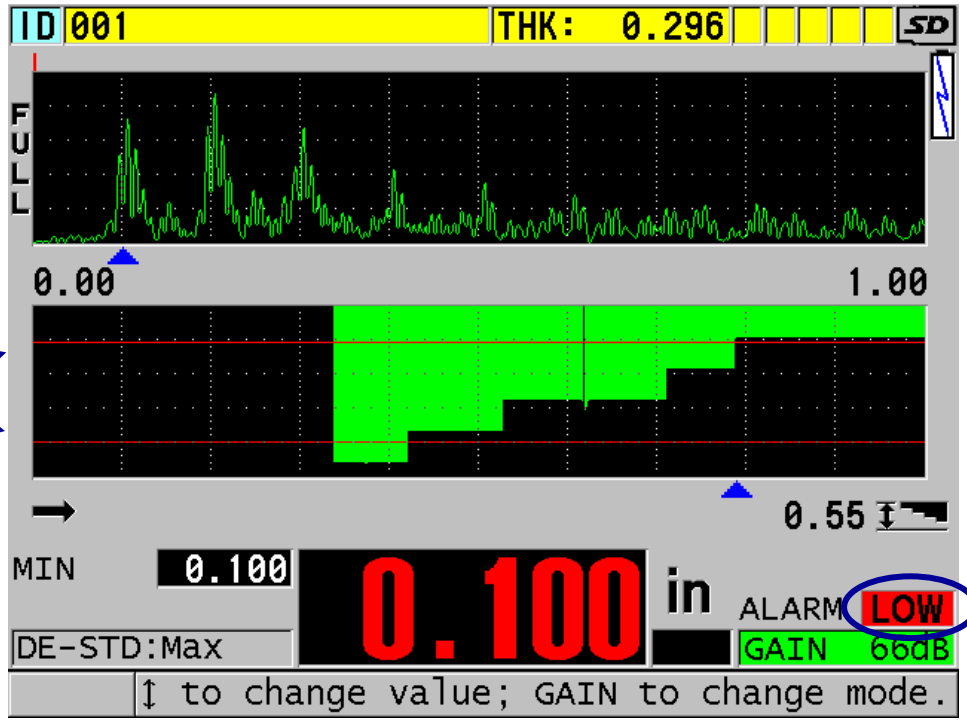
B-Scan Alarm Mode



Low/High Alarm Lines

Alarm Flag

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OLYMPUS

38DL PLUS Datalogger

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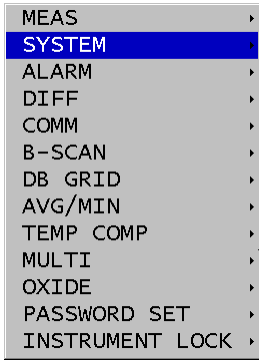
SelectableText Editing Modes

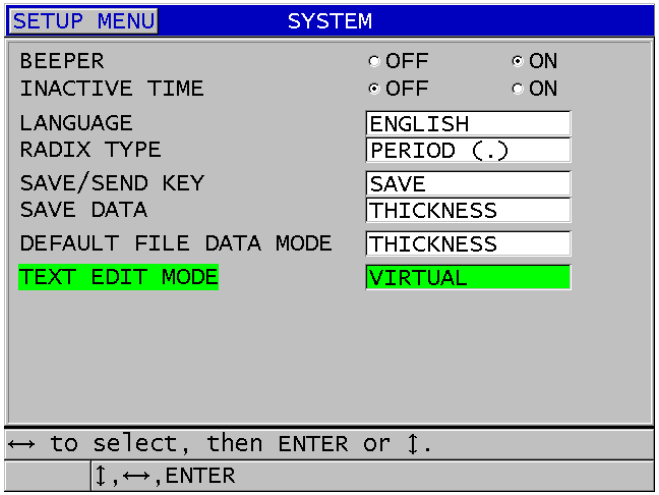
Press **SP MENU** → **SETUP MENU**

Use the [↓],[↑] to highlight “System” and press [ENTER]



Use the [↓],[↑] to highlight Text Edit Mode and [←,→] to select between Virtual and Traditional then press [MEAS]

The 38DL PLUS has two text editing modes: the new Virtual Keypad and the traditional text editing that was available on our older generation thickness gages.



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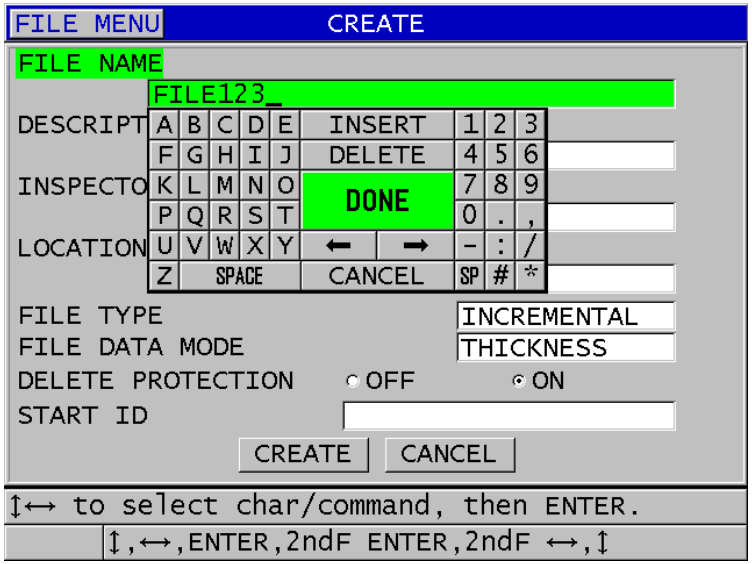
Virtual Keypad Text Editing

When Virtual Keypad text editing mode is selected the 38DL PLUS will display a virtual keypad. This allows the user to interface with the entire of text in one field.



Use the [🡻,🡹,🡸,🡺] to high light a character and press [Enter] to add it to the text line. Highlight “DONE’ or press [2nd F], [🡻] to end the text editing and move to the next line.

Note: When an outer character is highlighted pressing the arrow to move outside the Virtual keypad will cause the character on the opposite side of the Virtual keypad to highlight. This keypad wrap around allows the user to quickly navigate through the character selection.

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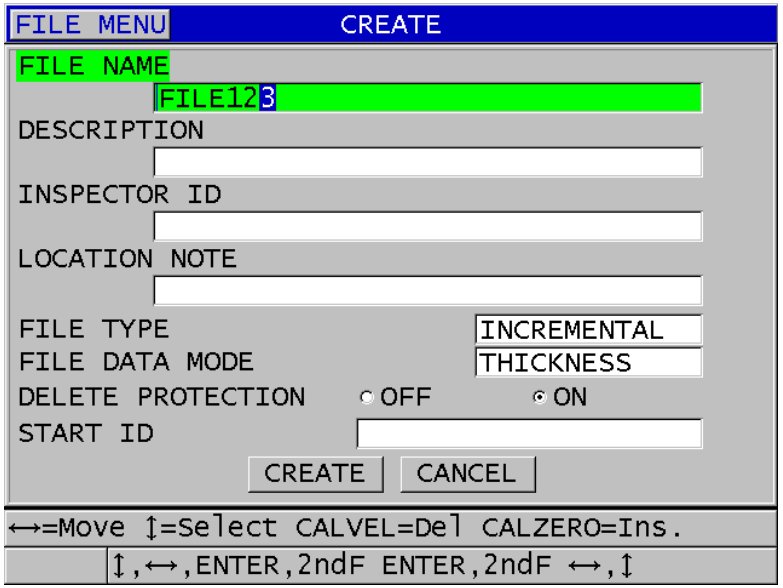
Traditional Text Editing

When Traditional test editing mode is selected the user uses the [🡻,🡹] key to select the character (letters, Numbers and punctuation) and [🡸,🡺] to move the curser. Pressing [ENTER] to complete the editing.



Note:
[🡹] key starts ABCD….#-…983210
[🡻] Key starts 0123…#-… ZYX
[🡺] moves the curser to the right
[🡸] moves the curser to the left
[ENTER] complete the editing.

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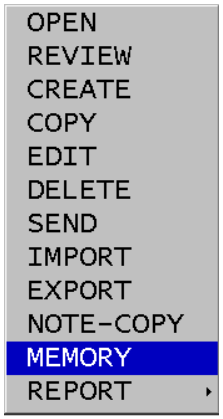
Datalogger Memory

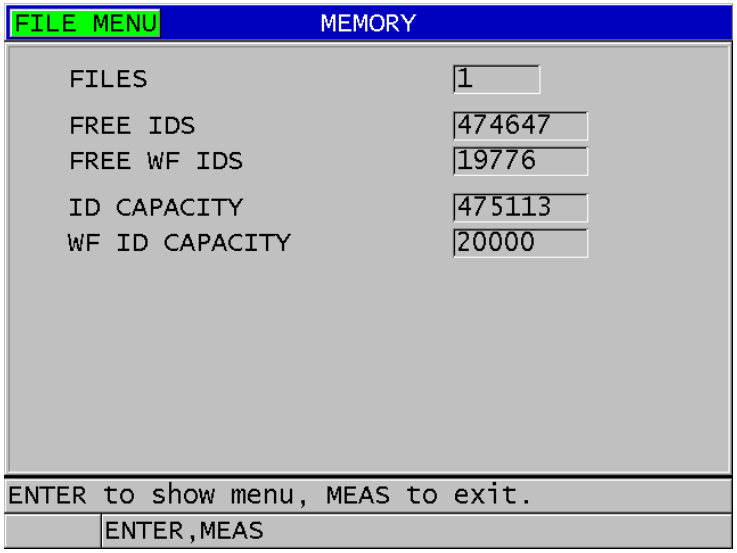
Press CLR MEM **FILE**

Use the [🡻],[🡹] to highlight “Memory “ then press [ENTER]



Displays Datalogger Information:

- Current number of files
- Remaining ID space
- Remaining waveform space



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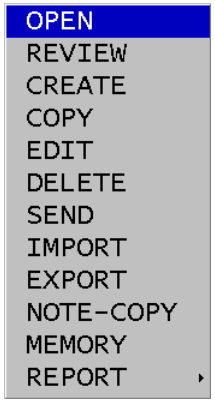
File Open

CLR MEM

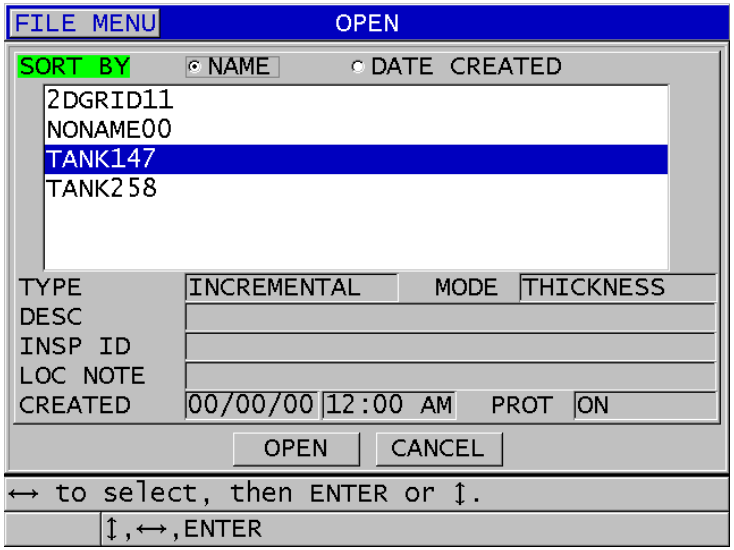
Press **FILE**

Then [🡻],[🡹] to select “Open” then press [ENTER]



Use [🡸,🡺] to select sort by Name or Date then press [ENTER]
Use [🡻],[🡹] to select the File then press [ENTER]
Use [🡸,🡺] to select Open or Cancel and [ENTER]

Allows the user to open a previously created or downloaded file.



Note: The corresponding file header will be shown as you change your file selection.

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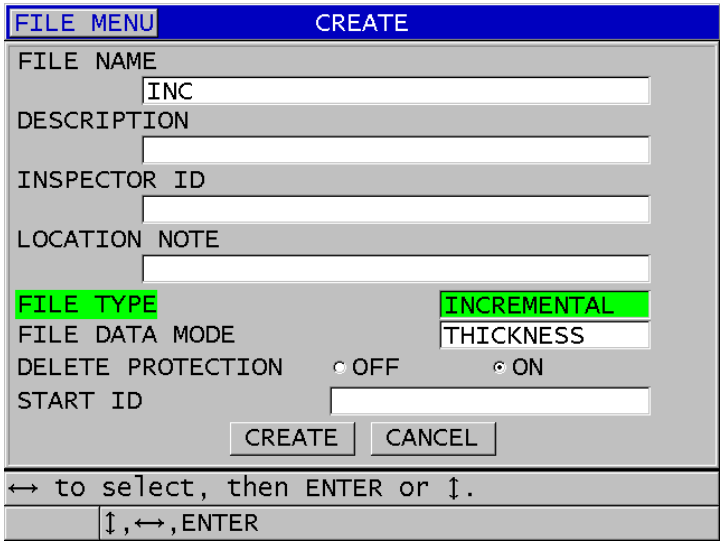
File Create

Allows the user to create files. The 38DLPlus has nine standard file formats.

Press CLR MEM **FILE**

Then [↓],[↑] to select “CREATE” then press [ENTER]



Use the editing functions to enter:
File name (Required)
Description (Optional)
Inspector ID (Optional)
Location (Optional)

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File Data Mode

The 38DL PLUS has 10 File Data modes. The user needs to select the correct data mode for the type of data that will be stored in the file using the [←,→]

- Thickness: Store standard single element, Dual element and Echo-to-Echo measurements
- THRU-COAT: Stores THRU-COAT measurements both the coating and metal thickness
- Temp COMP: Stores Temperature compensated Thickness and Temperature setting
- Oxide Layer: For optional Oxide software stores Tube and Internal oxide thickness
- Velocity: Stores velocity values when using velocity mode
- Time of Flight: Stores Time of Flight values when using Time of Flight mode
- Reduction Rate: Stores Actual thickness and Reduction % when using Reduction Rate Mode
- Soft Contact For optional Multilayer software, stores Sagittal Height, Radius and Thickness of lens
- %Total Thickness: For optional Multilayer software, stores thickness and % of total thickness readings
- Min/Max: Stores both Min and Max thickness as a single ID#

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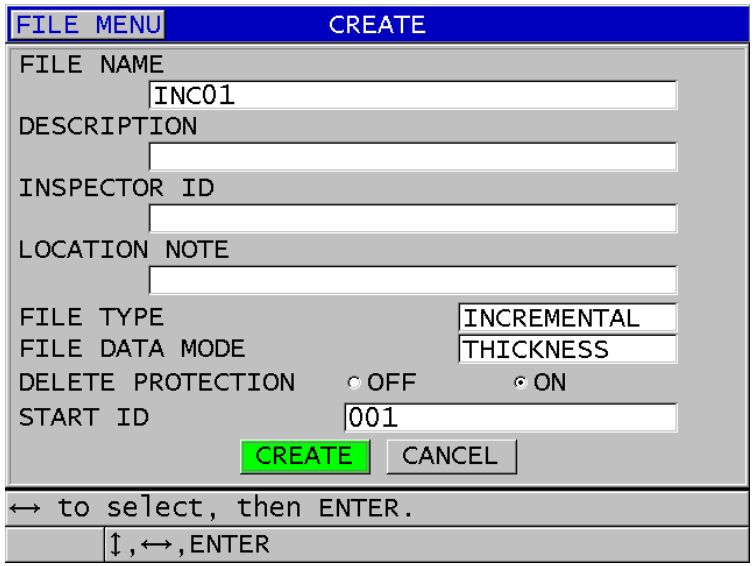
Incremental File



Incremental files will start at the entered point and increment from the right when the save key is pressed.

Example:

001
002
003
.
.
.
999

Enter the starting ID# using the editing controls then press [ENTER]. Use [🡐],[🡒] to choose [Create] then press [ENTER]

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Incremental File

Example 1

ID# 001 (Press SAVE)
Next ID# 002 (Press SAVE)
Next ID# 003 (Press SAVE)
Thru
Last ID# 999

Example 2

ID# ABC-A98 (Press SAVE)
Next ID# ABC-A99 (Press SAVE)
Next ID# ABC-B01 (Press SAVE)
Thru
Last ID# ABC-Z99

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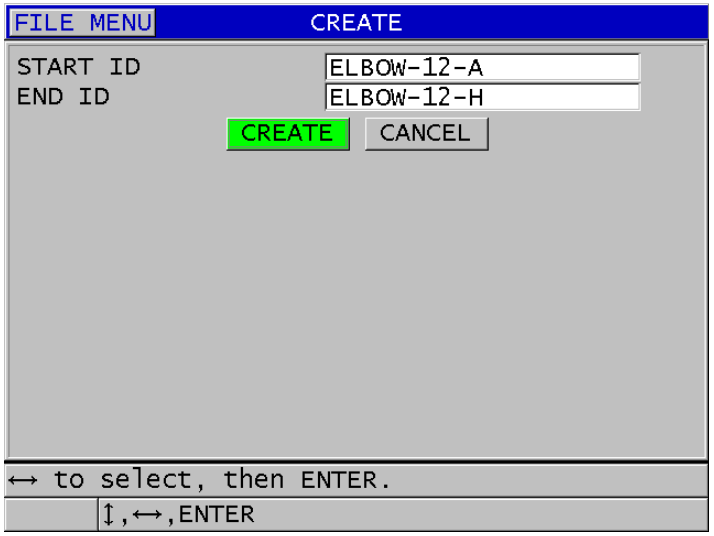
Sequential File

A sequential file starts at ID# 1 and increment until ID# 2. ID's will increment in alphanumeric order from the right.

Select Sequential File type, thickness mode and file protections and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER].



Example:
ELBOW-12-A
ELBOW-12-B
ELBOW-12-C
ELBOW-12-D
.
.
.
ELBOW-12-H

Enter all parameters using the editing controls then press [ENTER]. Use [🡐],[🡒] to choose [Create] then press [ENTER]

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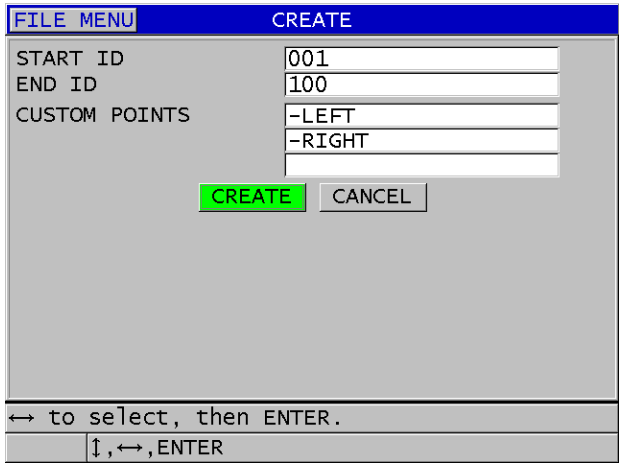
Sequential File with Custom Points

Select Sequential + Custom PT File type, thickness mode and file protections and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER].

A sequential with custom point file starts at ID#1 and increments to ID#2 with a repeated custom point list attached to each ID# point.



Enter each parameter use the editing controls then press [ENTER]. Use [2nd F], [🡓] or press [ENTER] on a blank custom point to exit custom point. Choose [Create] then Press [ENTER].

Example:
001- LEFT
001- RIGHT
002- LEFT
002- RIGHT
003- LEFT
.
.
.
100- RIGHT

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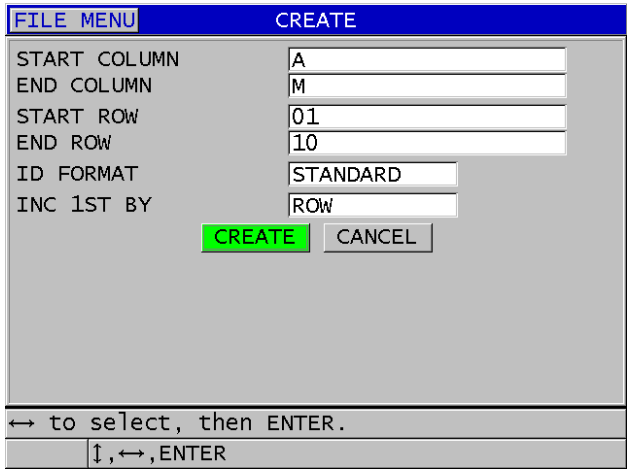
2D Grid File (Standard)

Allows the user to build two-dimension grid files by defining the starting column and row as well as ending column and row. The user can also chose the direction that the file will increment.

Select 2D GRID File type, thickness mode and file protections and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER].



Enter all parameters using the editing controls then press and select Standard for ID format and press [ENTER]. Use [🡐],[🡒] to choose [Create] then press [ENTER].

Example:

A01
B01
C01
D01
A02
B02
.
.
M10

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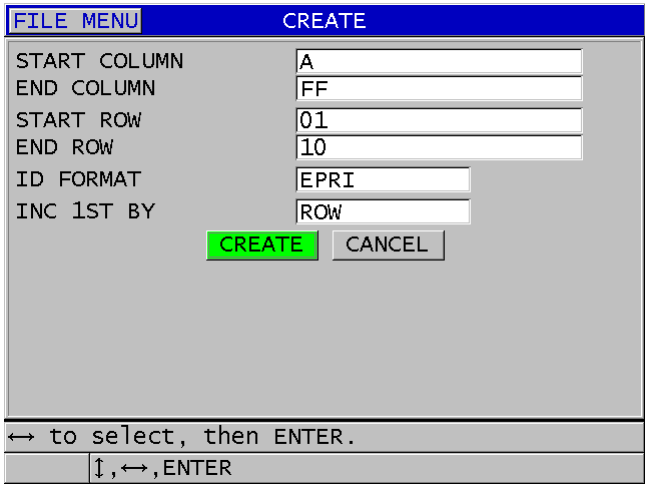
2D Grid File (EPRI Format)

Select 2D GRID File type, thickness mode and file protections and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER].

Allows the user to build two-dimension grid files by defining the starting column and row as well as ending column and row. The user can also choose the direction that the file will increment. EPRI files use double letter columns, for columns past Z.



Enter all parameters using the editing controls then press and select EPRI for ID format and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER] and enter header information then choose {Done or Cancel}.

Example:

A01
B01
C01
.
Z10
AA01
AA02
.
FF10

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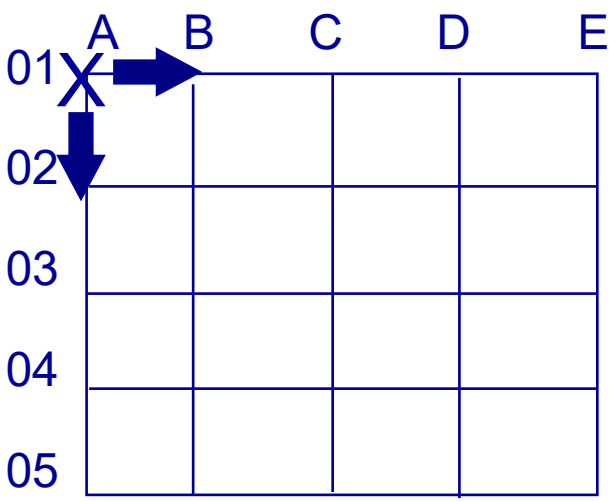
2D Grid File (Standard)

EXAMPLE:

First ID# TANK-A01

Last ID# TANK-E05



Increment by: Row	Increment by: Column
TANK-A01	TANK-A01
TANK-A02	TANK-B01
TANK-A03	TANK-C01
TANK-A04	TANK-D01
TANK-A05	TANK-E01
TANK-B01	TANK-A02
TANK-B02	TANK-B02
⋮	⋮
TANK-E05	TANK-E05

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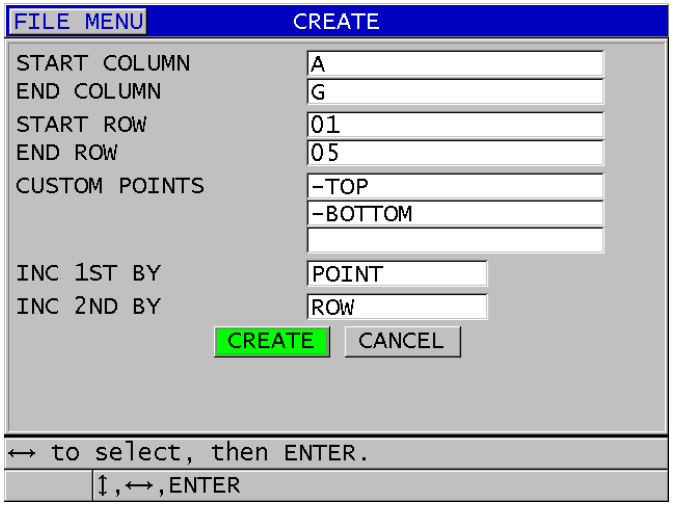
2D Grid File with Custom Points

Allows to user to build three-dimension grid files by defining starting/ending column and row. A custom list of included points may also be entered. The user can also choose the order in which the parameters increment.

Select 2D +Custom PT File type, thickness mode and file protections and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER].



Example:
A01- TOP
A01- BOTTOM
A02- TOP
A02- BOTTOM
.
.
.
G05- BOTTOM

Enter each parameter using the editing controls then press [Enter]. Use [2nd F], [🡓] or press [ENTER] on a blank line to exit custom point. Choose [Create] and then press [ENTER].

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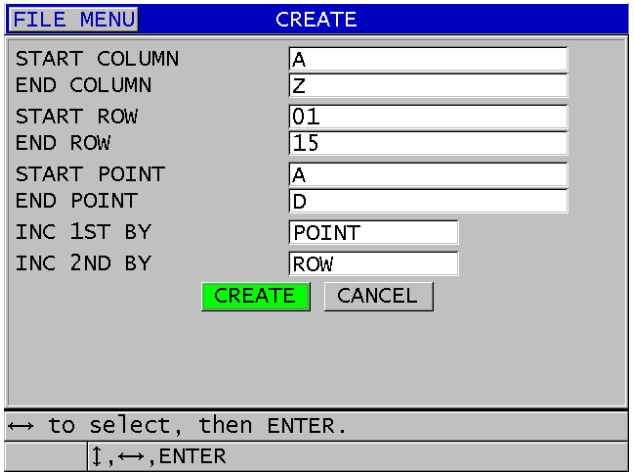
3D Grid File

Allows the user to build three-dimension grid files by defining the starting and ending Column, Row, and Point. The user can also choose the order in which the parameters increment.

Select 3D Grid File type, thickness mode and file protections and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER].



Example:

A01A
A01B
A01C
A01D
A02A
.
.
.
Z15D

Enter all parameters using the editing controls then press [ENTER]. Use [🡐],[🡒] to choose [Create] then press [ENTER].

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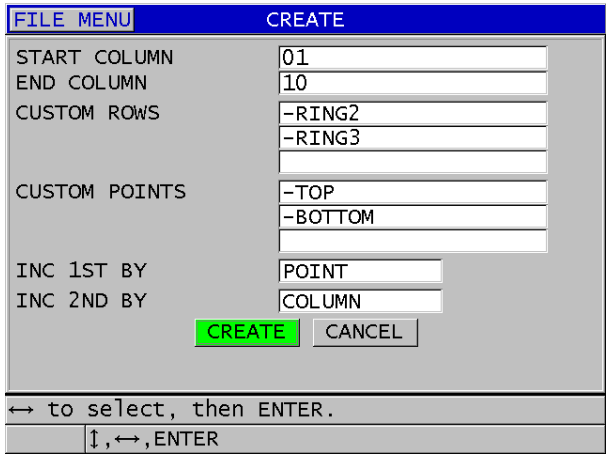
3D Custom File

Allows the user to build three-dimension grid files by defining starting and ending column, a custom set of rows, and a custom set of points. The user can also choose the order in which the parameters increment.

Select 3D Custom File type, thickness mode and file protections and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER].



Example:

01-Ring1-TOP
01-Ring1-BOTTOM
01-Ring2-TOP
01-Ring2-BOTTOM
01-Ring3-TOP
01-Ring3-BOTTOM
.
.
.
10-Ring3-BOTTOM

Enter all parameters using the editing controls then press [ENTER]. Use [🡐],[🡒] to choose [Create] then press [ENTER].

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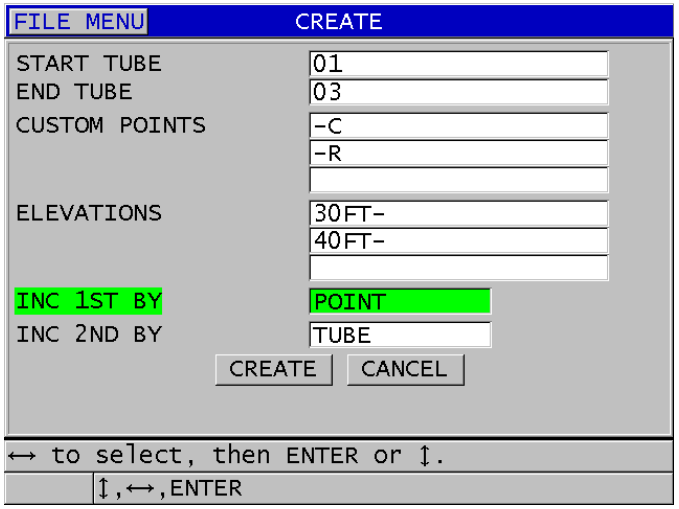
Boiler File

Select Boiler File type, thickness mode and file protections and press [ENTER]. Use [🡐],[🡒] to choose [CONTINUE] then press [ENTER].

Allows to user to build three-dimension boiler files by defining the starting and ending tube as well as custom points and elevations. The user can also choose the order in which the parameters increment.



Enter each parameter using the editing controls then press [ENTER]. When in Custom Point or Elevation use [2nd F], [🡓] or press [ENTER] on a blank line to exit the parameter. Choose [Create] and the [ENTER]

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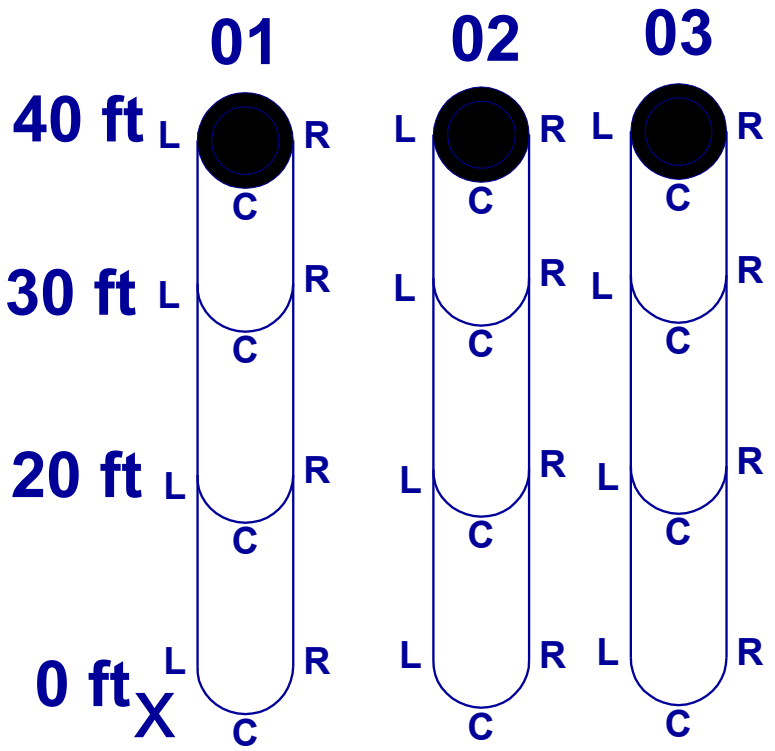
Boiler File

EXAMPLE:

Fist ID# 0FT-01A

Last ID# 40FT-03C



Increment by:
Point, Tube, Elevation

0ft-01-L
0ft-01-C
0ft-01-R
0ft-02-L
0ft-02-C
0ft-02-R
:
:
:
40ft-03C

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ID# Entry/Edit

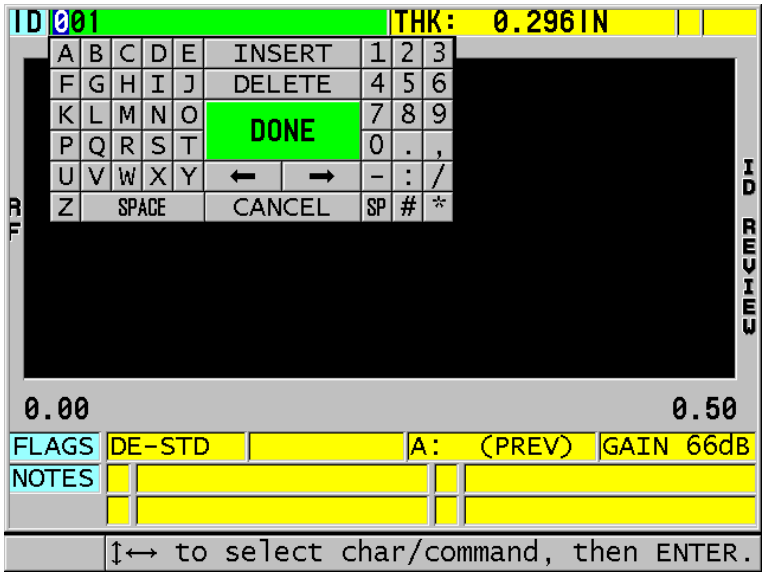
Press

NOTE

ID# Twice

The gage will enter the ID Edit mode Use the editing function to edit the ID# using arrow keys. Press the [ENTER] key while done is highlighted to jump to the edited ID# and return to ID# review or the [MEAS] key to return to the measurement mode at the edited ID# location

ID# ‘s can be 16 characters with letters, numbers, alphanumeric and (, / * . # - space)



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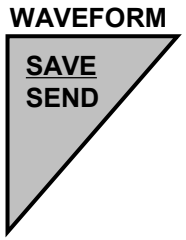
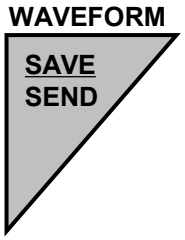
Saving Thickness Readings/Waveforms

Press 

Saves the thickness reading or thickness readings and waveforms at the current ID# location.

While getting a steady reading or while a held frozen reading is displayed.

Press **2nd F** then 

To save both Thickness Readings and Waveforms

Note: The [SAVE/SEND] key can be programmed as a SAVE or SEND function. The SAVE/SEND key can be set to automatically save both thickness readings and waveforms when the SAVE/SEND key is pressed. Configure the SAVE/SEND key in System Set Up Menu.

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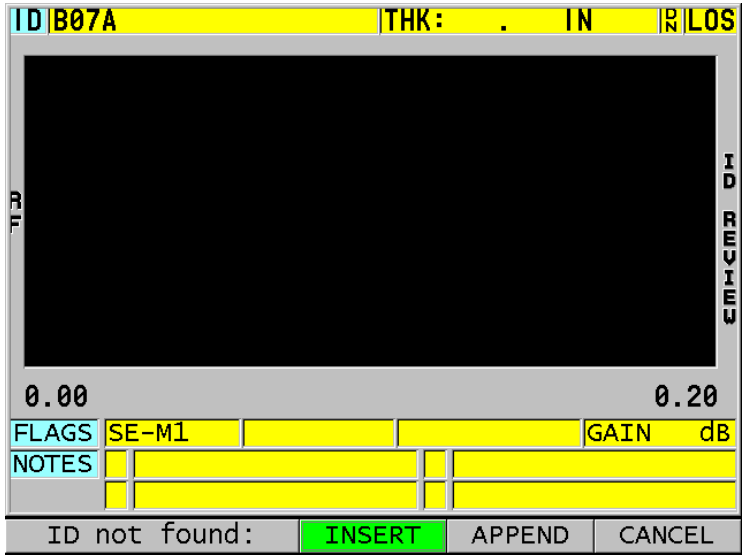
Insert/Append ID# into a File

Press

Note:

ID# Twice

Use the standard editing controls to enter the new ID location. Then press the [ID#] key or [MEAS] key.



Use [←],[→] to select and press [ENTER]

The user can insert a new ID# and reading into an existing file or append a new ID# and reading which will be add at the end of the entire file.

Appended ID#'s will be add to the end of the entire file.

Inserted ID#'s will be inserted before the last active ID# prior to leaving the measure mode.

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ID Review

Press

Note:

ID#

Then use [🡻],[🡹]

Using the up and down keys will move through ID# in the open file.

Allows the user to slew through the entire file and review stored data.

Note: The user can jump [2ndF] [🡻] to jump to the first ID# in a file or or [2ndF],[🡹] to jump to the last ID# in a file.

Note: The user can jump to a specific ID# location in the file by using the ID# edit function.

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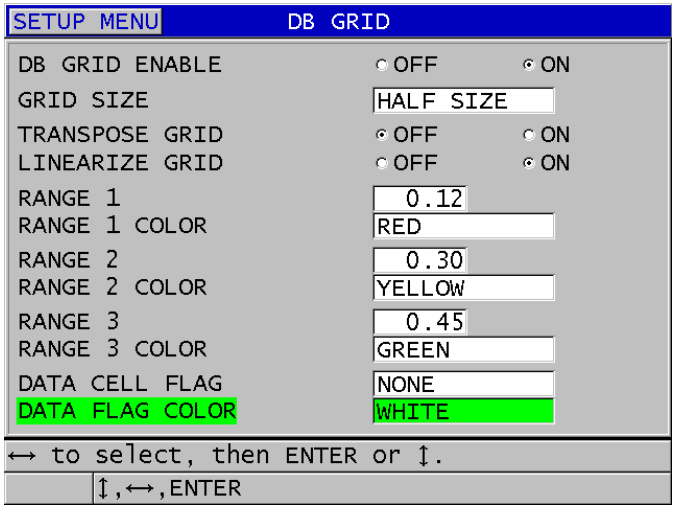
Grid View

Press: SP MENU

SETUP MENU

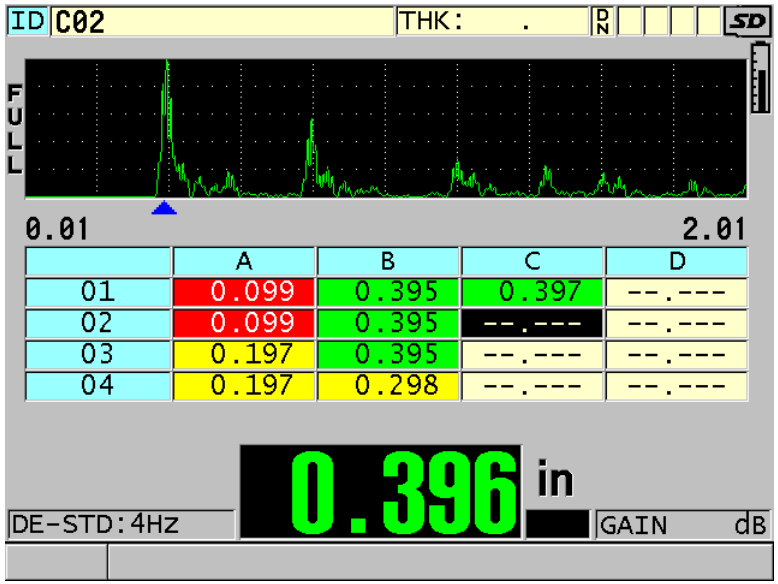
Then use [🡻],[🡹] to highlight

DB Grid and press [ENTER]



use [🡻],[🡹] to highlight a parameter and [🡸],[🡺] to change the parameter
Use the arrows key to edit color ranges and Press [ENTER] to end the range entry. Press [Meas] to return to the measure screen

Grid view allows the user to view grid file in a grid format and assigned us to three color ranges. The user can select to Shows half waveform/Grid file Full Grid, No A-Scan and also select to Reverse rows or columns, Transposed grid View grid in linear form and set Data Flag



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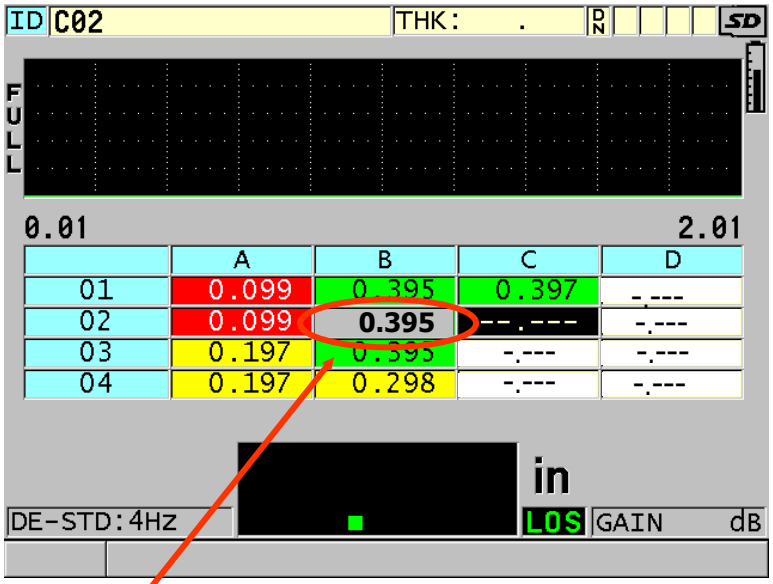
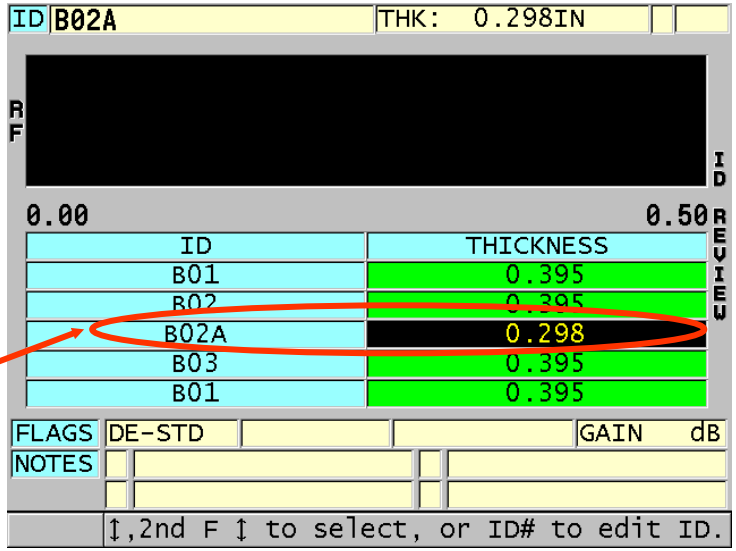
Grid View Inserted Points

If an ID# has been inserted into a Grid file then can not be displayed in normal grid View. If there are inserted reading in at a grid location the cell will be displayed with a gray background indicating that there are inserted points at the grid location. Pressing [Zoom] on a grid point with inserted readings will cause the grid to expand into a linear format showing the inserted points. Pressing zoom again will return back to the standard Grid view.



Inserted points



Inserted points

Expanded view

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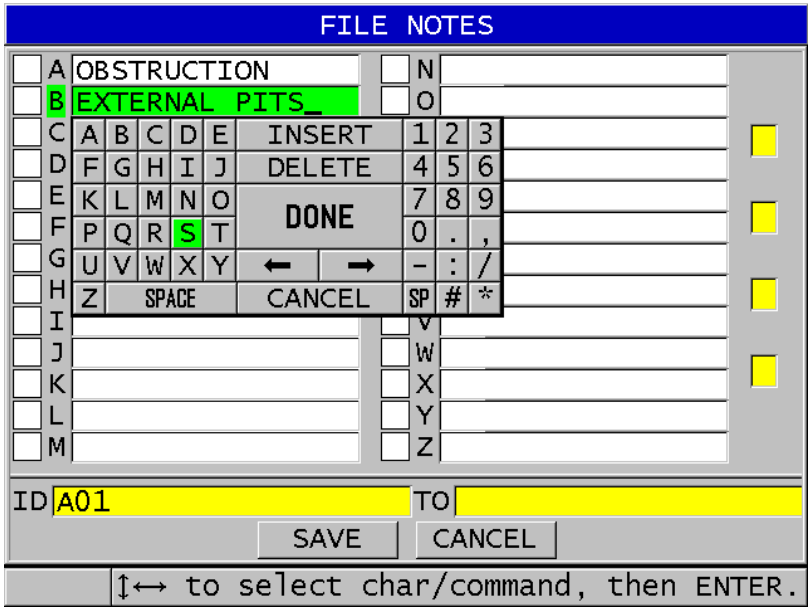
Creating Notes (Comments)

Press **2nd F** then **NOTE ID#**

Use [🡻],[🡹] to to select comment letter, then press [🡸],[🡺] to edit or add comment. Follow standard editing rules to enter comments.

The user can define up to 26 comments that are assigned letters A-Z. Each comment can be up to 16 characters long. Comment lists can be built from the keypad or downloaded from the interface program.



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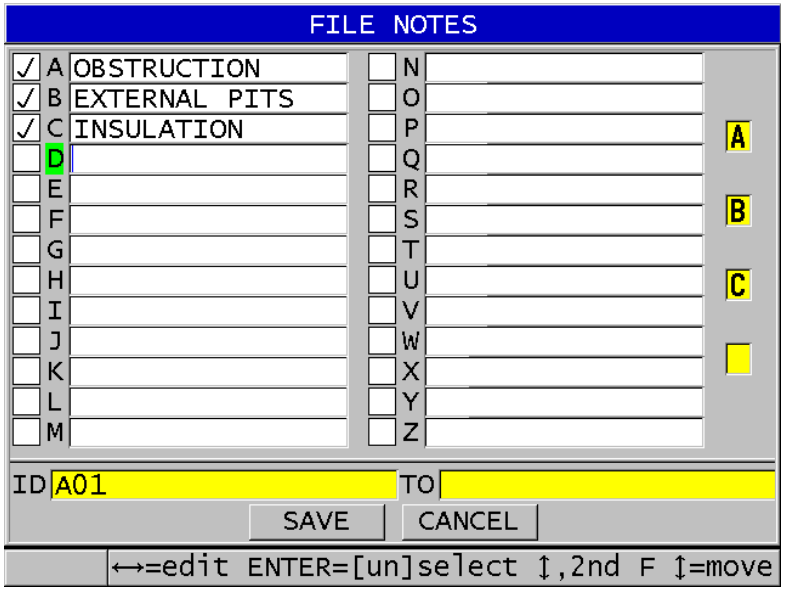
Adding Comments to the Current ID# Location

Press **2nd F** then **ID#**

NOTE

Up to four comments can be saved with each ID#. A thickness reading can be saved along with the comments or the comments can be saved without a thickness reading.



Use [🡻],[🡹] to highlight the comment letter you want to use, then press [ENTER] to select/un-select the comment. Press [MEAS] after comments are selected and choose and the next time the [SAVE] key is pressed the comments will be saved with the current ID#.

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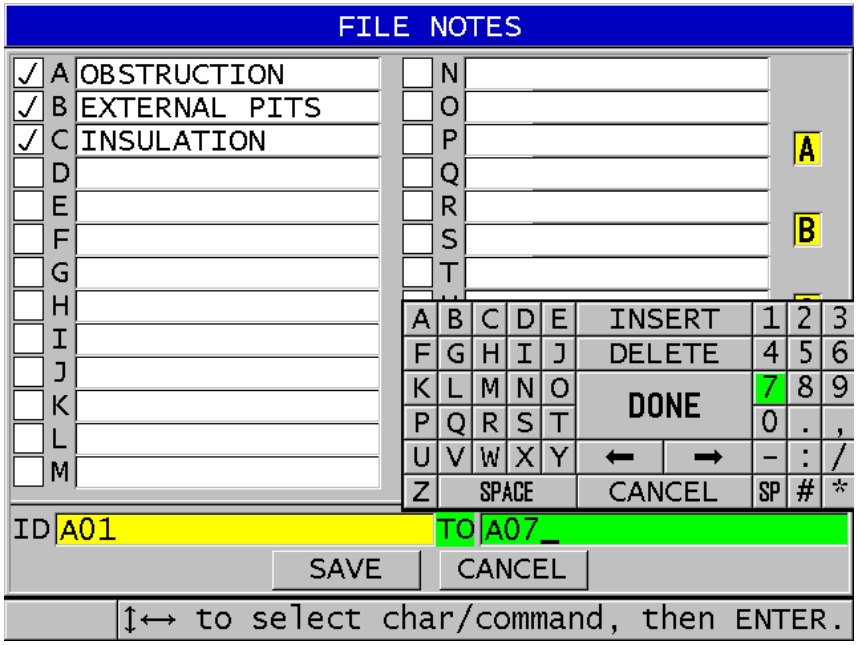
Adding Comments to a Range of ID# Locations

Press **2nd F** then **ID#**

NOTE



Up to four comments can be saved with each ID#. A thickness reading can be saved along with the comments or the comments can be saved without a thickness reading.

Use [🡻],[🡹] to highlight the comment letter you want to use, then press [ENTER] to select/un-select the comment. Press [2ndF], [🡻] after comments are selected and edit the start ID# location and then edit the ending DD# location. Use the [🡸],[🡺] to highlight [SAVE] and press [ENTER]. The comments selected will be save to the range of ID#'s.

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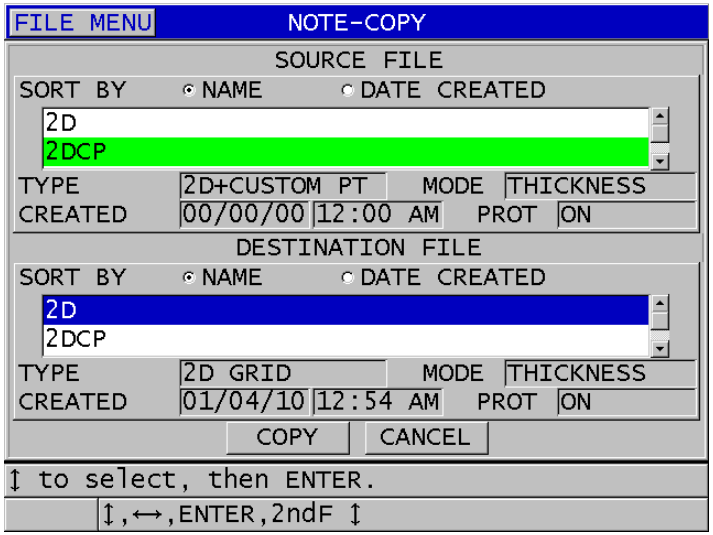
Note Copy

Press CLR MEM **FILE**

Allows the user to copy a comment code list from one file to another selected file.

Use [🡻] to select “Note-Copy” and press [ENTER].



Use [🡸],[🡺] to select sort option and press [ENTER] then use [🡻],[🡹] to select the source file then press [ENTER]. Use [🡸],[🡺] to select sort option and press [ENTER] Use [🡻],[🡹] to select the destination file then press [ENTER] and press [ENTER] while “Copy” is highlighted.

Note: If a Note table is copied to a file with Note’s already stored, the new copied Note: table will overwrite the notes previously stored.

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OLYMPUS

38DL PLUS Sending, Printing and Deleting Data

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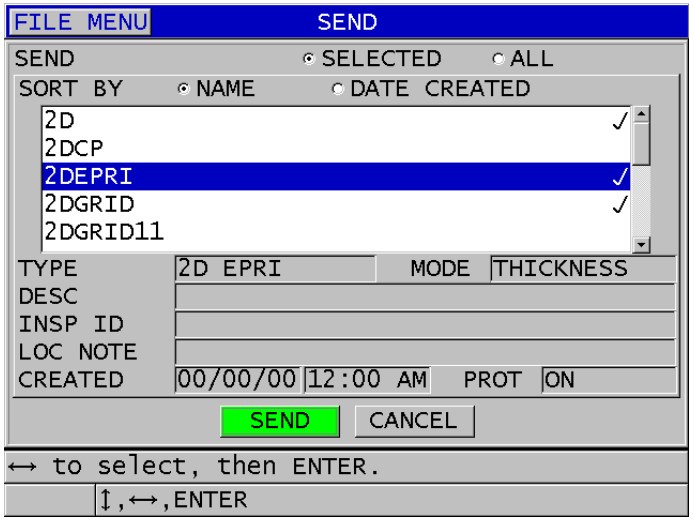
Sending a File or Multiple Files (RS-232 only)

Press CLR MEM **FILE**

Allows the user to send a single file, multiple files or all files to a computer or printer via RS-232. This is function is not used with GageView.

Use [🡻],[🡹] to select “Send” then press [ENTER]
Use [🡸],[🡺] to select selected or All and press [ENTER]
Use [🡸],[🡺] to select sort option and press [ENTER]
Use [🡻],[🡹] to select the file then press [ENTER] to mark it
Press [2ndF] [🡻], once files are selected
Use the [🡸],[🡺] to highlight “SEND” and press [ENTER] to send the marked files.



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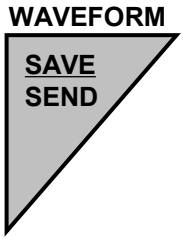
Sending/Printing a Range of a File (RS-232 Only)

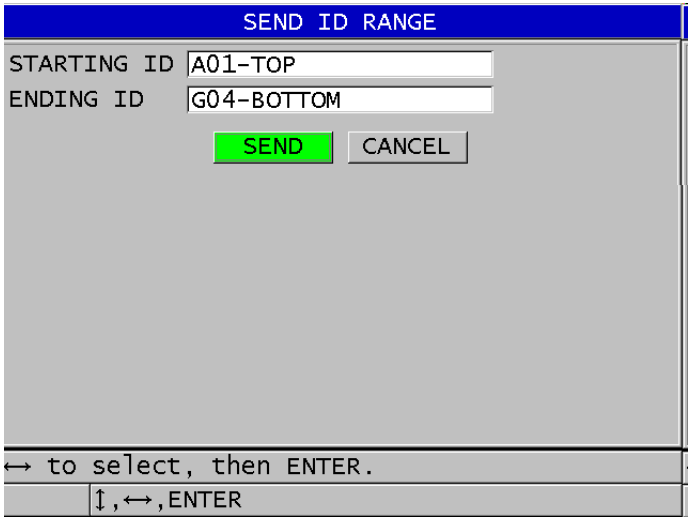
Note: Connector type must be set to RS-232 Press and Send/Save must be set to "SEND"

Press and hold



Until the range send screen appears on the display

Allows the user to send a range of data in a file or the entire file to a printer or computer.



Use the editing function to edit the first ID# in range and press [ENTER].
Use the editing function to edit the Last ID in range and press [ENTER].
use [←],[→] to select "Send" or "Cancel" then press [ENTER].

Note: This send function can only be used on the current/active file.

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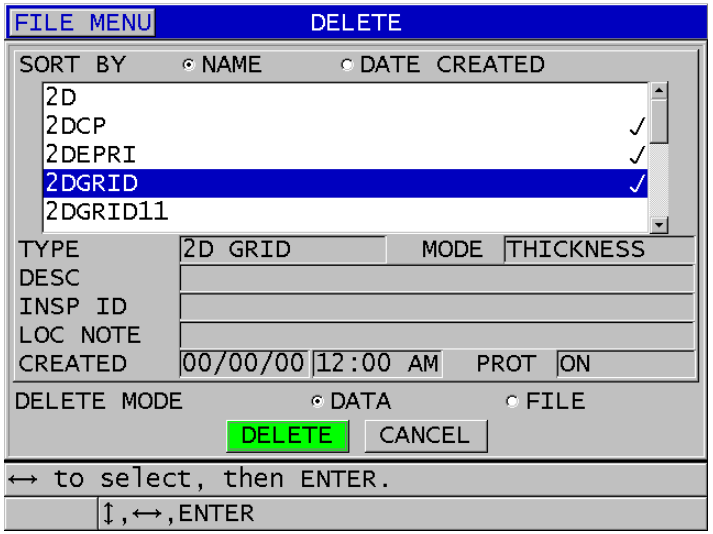
Deleting Files

Press: CLR MEM **FILE**

The user can delete a file or multiple files and can choose to delete the thickness data only or the entire file. Deleting the thickness data only will leave the ID# file structure.

Use [🡻],[🡹] to select “Delete” then press [ENTER]



Use [🡸],[🡺] to select sort by Name or Date and press [ENTER]
Use [🡻],[🡹] to select the file then press [ENTER] to mark it
Press [2ndF] [🡻], once files are selected
Use the [🡸],[🡺] to highlight DATA or FILE and press [ENTER]
Use the [🡸],[🡺] to highlight “DELETE” and press [ENTER] to delete the marked files.

Note: Only files that are not delete protected can be deleted

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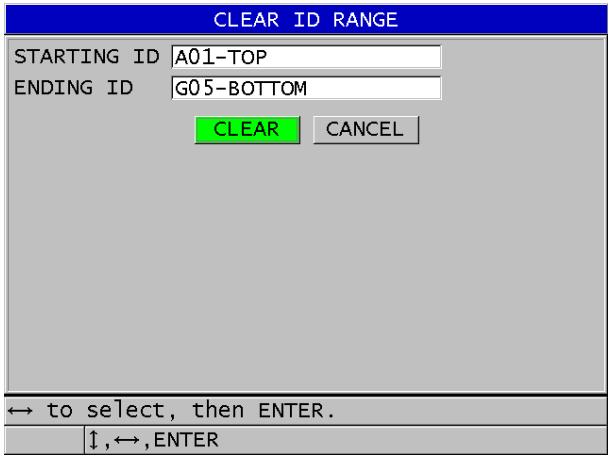
Deleting a range of data in a file

Press:

2nd F then **CLR MEM** **FILE**

The Clear ID Range screen will appear on the display

Allows the user to Clear/Delete a range of data in a file or the entire open file. Both ID# and thickness will be deleted in Incremental and Sequential files. Only the thickness values will be deleted in Grid and Boiler files.



Use the editing function to edit the first ID# in range and press [ENTER].

Use the editing function to edit the last ID# in range and press [ENTER].

Use [←],[→] to select “CLEAR” or “Cancel” then press [ENTER].

Note: This delete function can only be used on the current/active file.

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Deleting Single Thickness Readings

Press:

NOTE

ID#

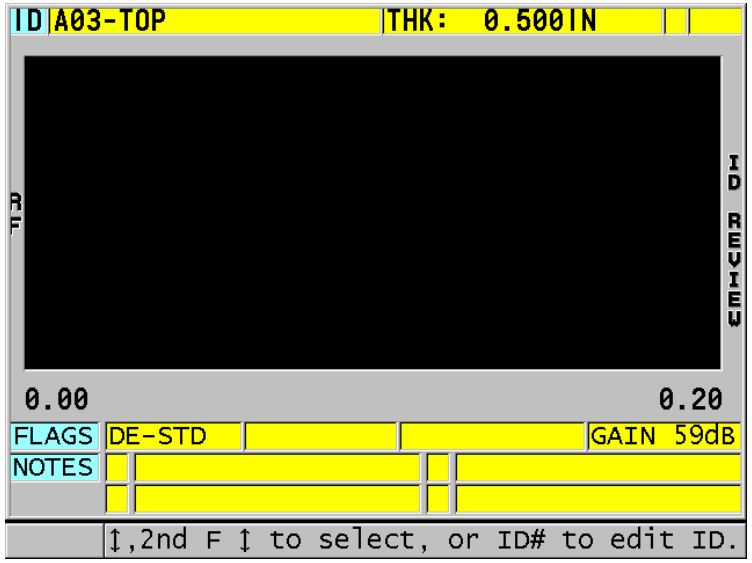
Use [↓],[↑] keys or editing function to highlight the ID# to delete

Press:

2nd F then CLR MEM **FILE**

Will delete the ID# and the thickness reading (and/or waveform)

Allows the user to delete a single ID# point and it's associated thickness reading (and/or waveform). This will also remove the ID# from the datalogger.



Note: If you want to replace a thickness reading (and/or waveform) simply edit to the ID# point in the file and press the [SAVE/SEND] key and save over the old reading.

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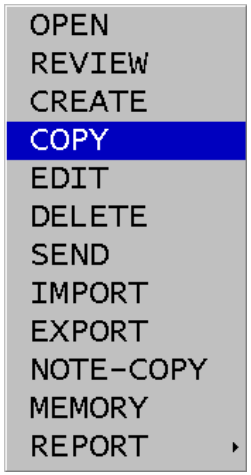
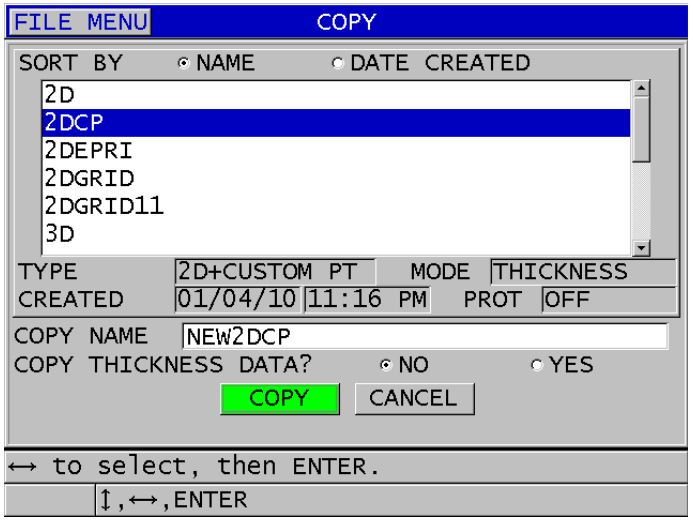
File Copy

Press: CLR MEM **FILE**

Allows the user to copy a file or the format of a file to another file. This is a quick way to create multiple files with the same structure.

Use [🡻],[🡹] to select “Copy” then press [Enter]





Use [🡸],[🡺] to select sort option and press [ENTER] then use [🡻],[🡹] to select the file to copy then press [ENTER]

Use the editing functions to enter a file name for the new file then press [ENTER]

Use [🡸],[🡺] to select Copy Data Yes or No and press [ENTER] while “Copy” is highlighted.

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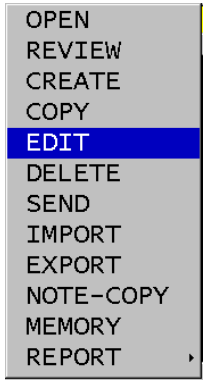
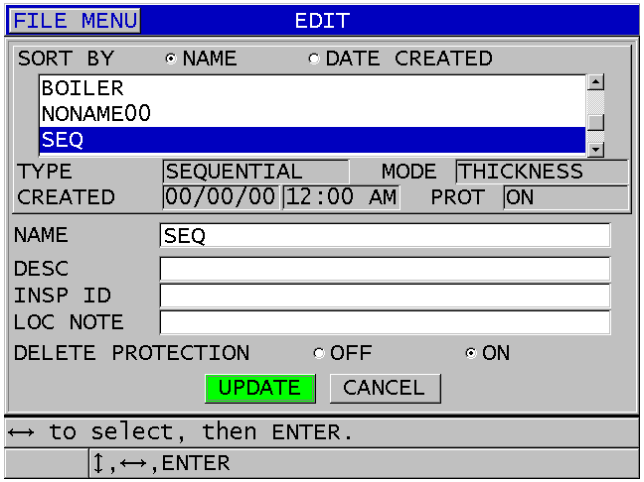
File Edit Rename (non grid files)

Press: CLR MEM **FILE**

Allows the user to edit the file header and turn delete protection On/Off .

Use [🡻],[🡹] to select “Edit” then press [Enter]





Use [🡸],[🡺] to select sort option and press [ENTER] then use [🡻],[🡹] to select the file to edit then press [ENTER]

Use the editing functions to edit the a File Name, Description, Inspector ID and Notes, press [ENTER]

Use [🡸],[🡺] to change the file delete protection to On or Off and press [ENTER]

Use [🡸],[🡺] to highlight UPDATE and press [ENTER]

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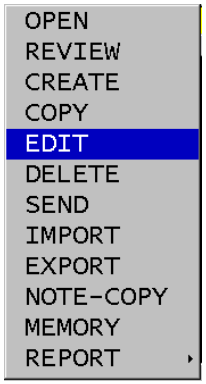
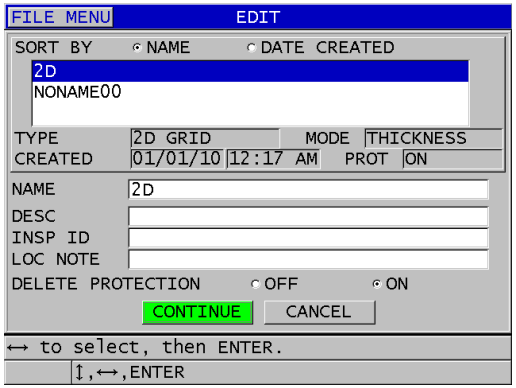
File Edit Rename (Grid and Boiler Files)

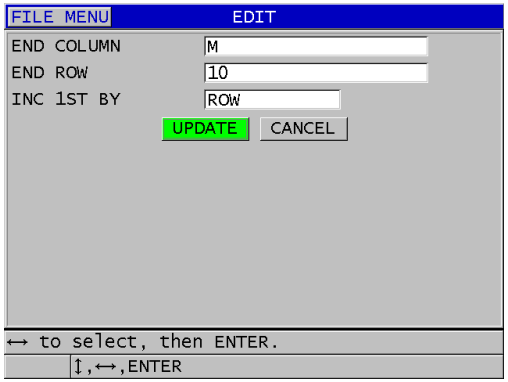
Press: CLR MEM **FILE**

Allows the user to edit the file header, add Rows or columns to grid files and change the incrementing direction.

Use [🡻],[🡹] to select “Edit” then press [Enter]







Use [🡸],[🡺] to select sort option and press [ENTER] then use [🡻],[🡹] to select the file to Edit then press [ENTER]

Use the editing functions to edit the a File Name, Description, Inspector ID and Notes and press [ENTER]

Use [🡸],[🡺] to change the file delete protection to On or Off and press [ENTER]

Use [🡸],[🡺] to highlight Continue and press [ENTER]

Use the editing functions to edit the End Column, End Row and Incrementing Directions and Press [ENTER]

User the [🡸],[🡺] to highlight Update and press [ENTER]

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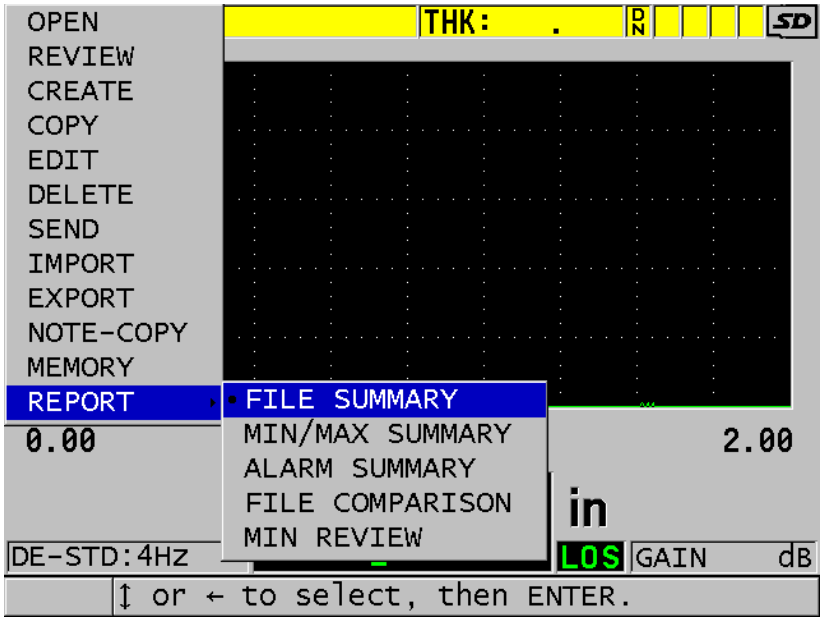
File Reports

Press: CLR MEM **FILE**

Use [🡻],[🡹] to select “Reports” then press
Use the [🡸],[🡺] enter the Report selection box
Use [🡻],[🡹] select a report and press [ENTER]

Allows the user to generate four different reports on the display of the 38DLPLUS.



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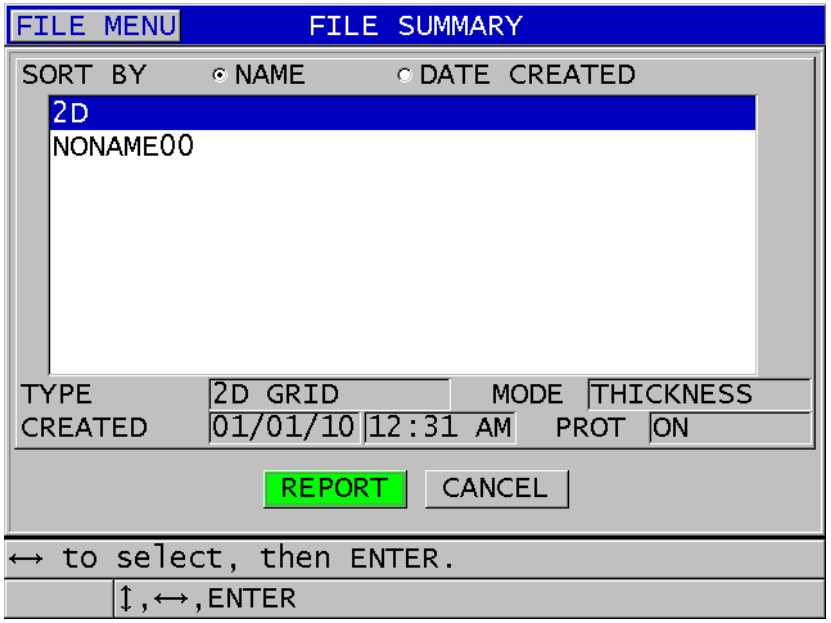
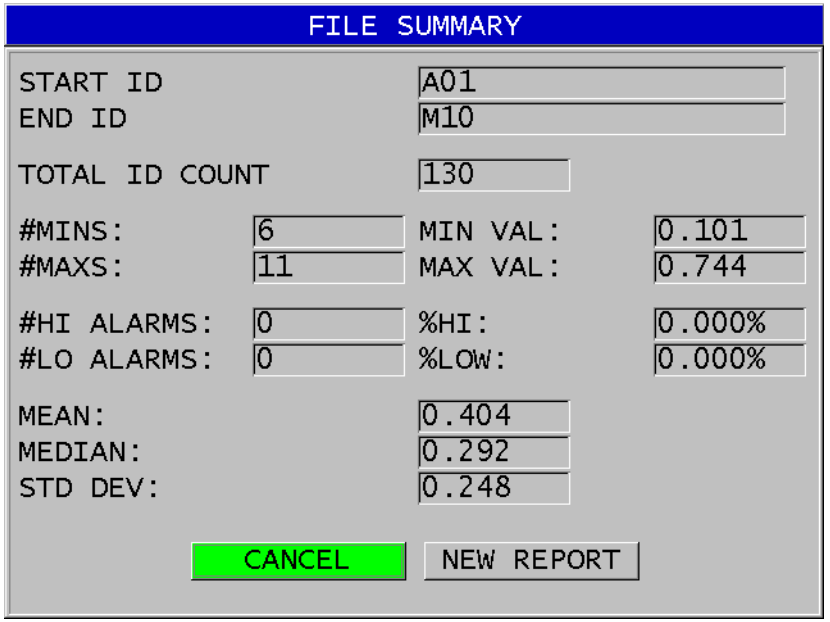
File Reports

File Summary

Use [←],[→] to select the sort option and press [ENTER
Use [↓],[↑] to select a file then press [ENTER]
Use [←],[→] to select report and press [ENTER]. And the statistics will be displayed.

This report will give a statistical summary of the selected file.





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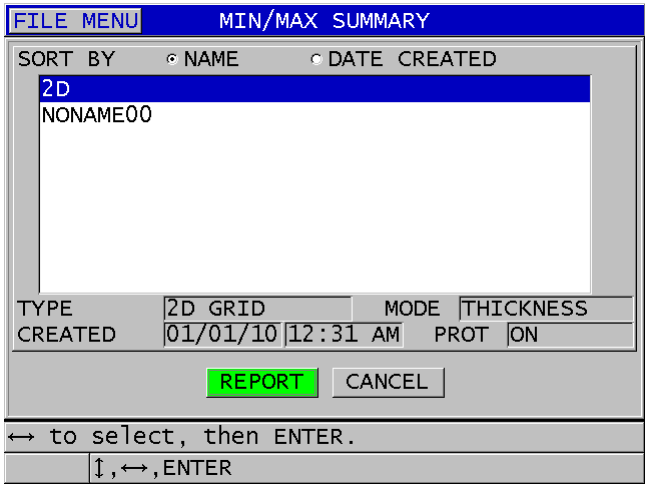
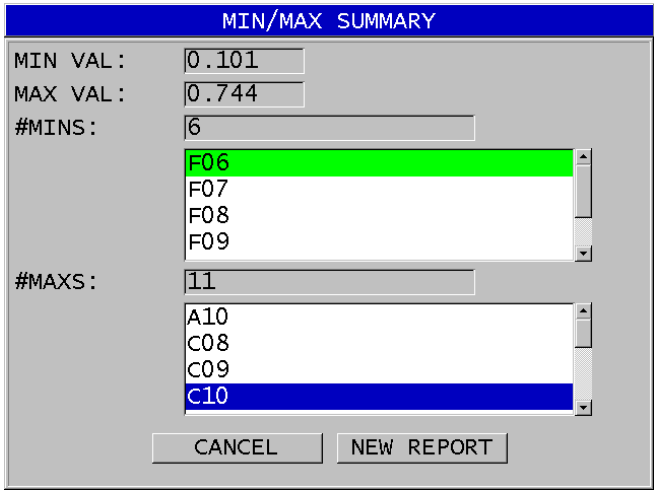
File Reports

Min/Max Summary

Use [🡐],[🡒] to select the sort option and press [ENTER Use [🡓],[🡑] to select a file then press [ENTER]
Use [🡐],[🡒] to select report and press [ENTER]. And the Min/Max Summary will be displayed.

This report lists the minimum and maximum thickness readings and their location for the selected file.





Use [🡓],[🡑] to scroll through the individual minimum ID locations. Press [ENTER] then [🡓],[🡑] to scroll through the maximum ID locations, press [ENTER].
Use [🡐],[🡒] to select Cancel or New Report and press [ENTER].

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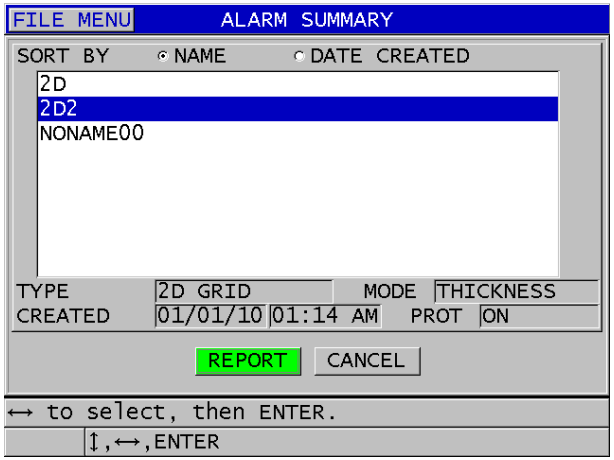
File Reports

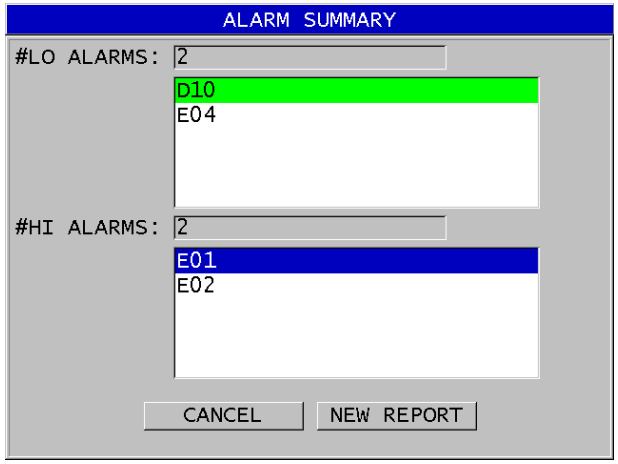
Alarm Report

Use [🡐],[🡒] to select the sort option and press [ENTER] Use [🡓],[🡑] to select the file then press [ENTER]. Use [🡐],[🡒] to select report and press [ENTER].



Use [🡓],[🡑] to slew through the Low Alarm ID's and then press [ENTER], use [🡓],[🡑] to scroll through the High Alarm ID's and press [ENTER]. Use [🡐],[🡒] to select Cancel or New Report and press [ENTER].

This report allow the gage to list the ID# of all the high and low alarm location for the selected file.



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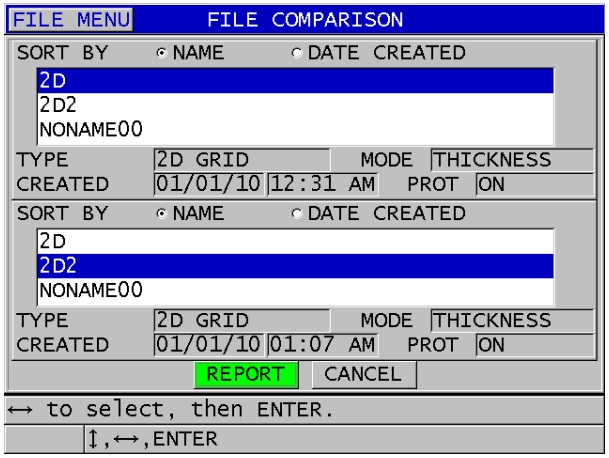
File Reports

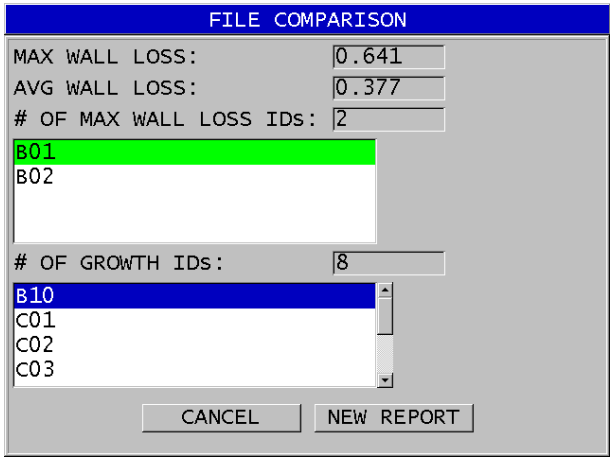
File Comparison

Use [🡐],[🡒] to select the sort option and press [ENTER Use [🡓],[🡑] to select the Reference file then press [ENTER]. Use [🡓],[🡑] to select the Comparison file then press [ENTER]. Use [🡐],[🡒] to select report and press [ENTER].



Use [🡓],[🡑] to slew through ID's with the maximum wall loss. Press [ENTER] then use [🡓],[🡑] to scroll through any ID's that show wall growths then press [Enter]. Use [🡐],[🡒] to select Cancel or New Report and press [ENTER].

This report will compare the two selected files and show the maximum wall loss and locations, average wall loss, and the locations of any wall growths.



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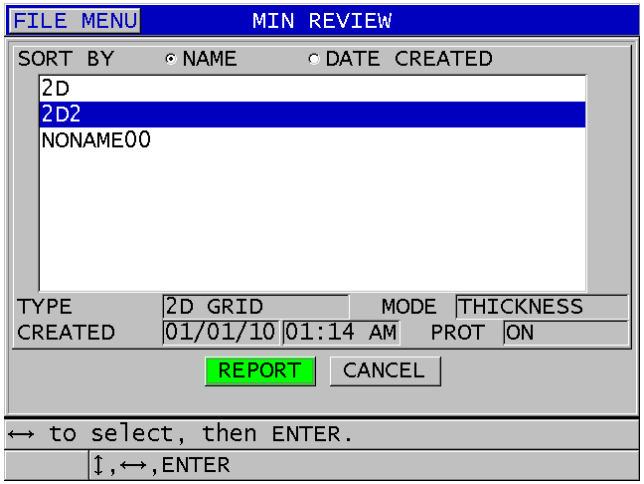
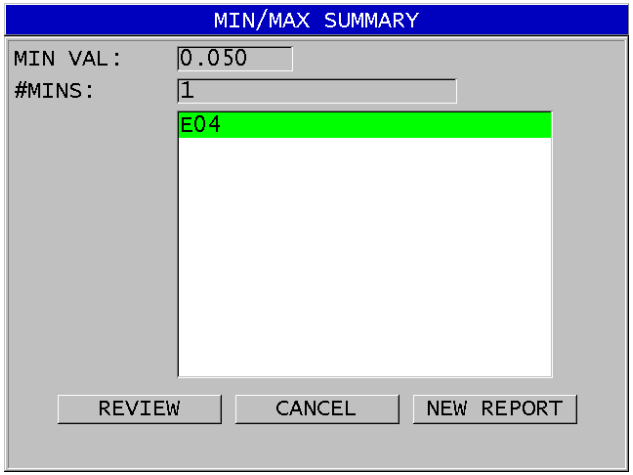
File Reports

Min Review

Use [←],[→] to select the sort option and press [ENTER] Use [↓],[↑] to select the file then press [ENTER]. Use [←],[→] to select report and press [ENTER].

This report lists all the ID# that have the minimum thickness value in the selected file. It also gives the user the choice to review/retake the readings at those locations by moving through the list of minimum locations.





Use [↓],[↑] to slew through ID's with the Minimum wall thickness. Press [ENTER] Use [←],[→] to select Review, Cancel or New Report and press [ENTER].

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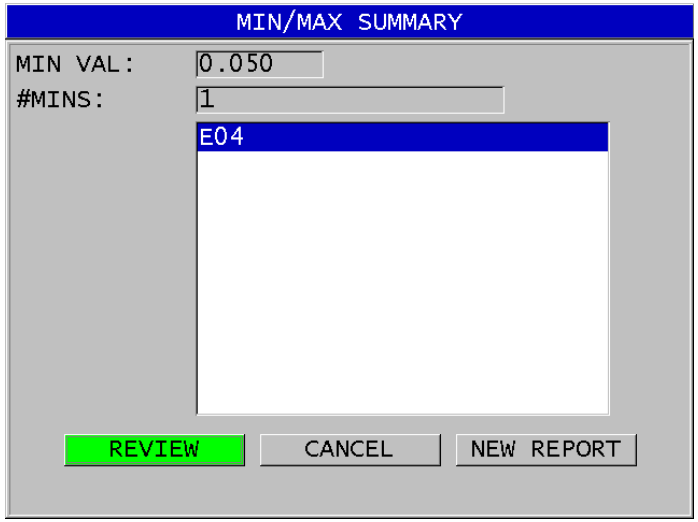
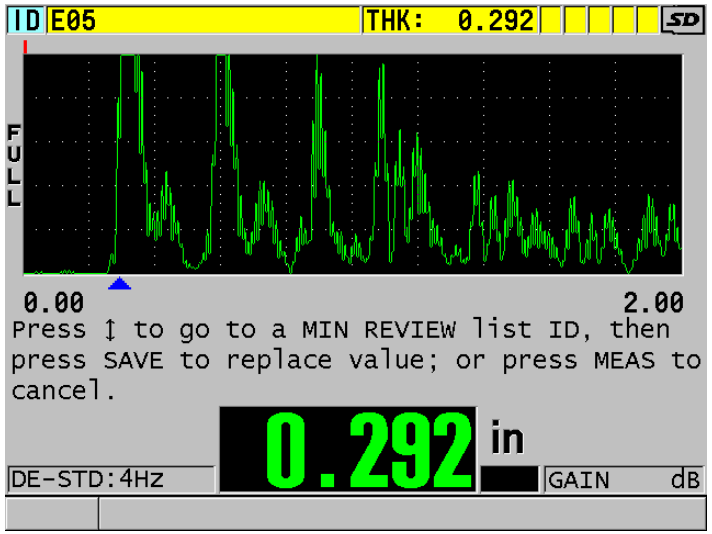
File Reports

Min Review (REVIEW)





Use [🡻],[🡹] to jump to the next min ID# location the user can verify the reading to replace the current thickness reading or press [MEAS] to cancel the Min Review

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38DL PLUS Setup Menu

- Measurement
- System
- Communication
- Display

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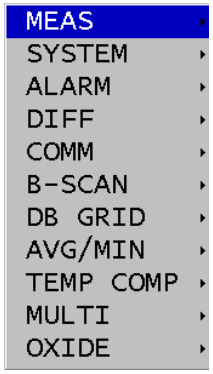
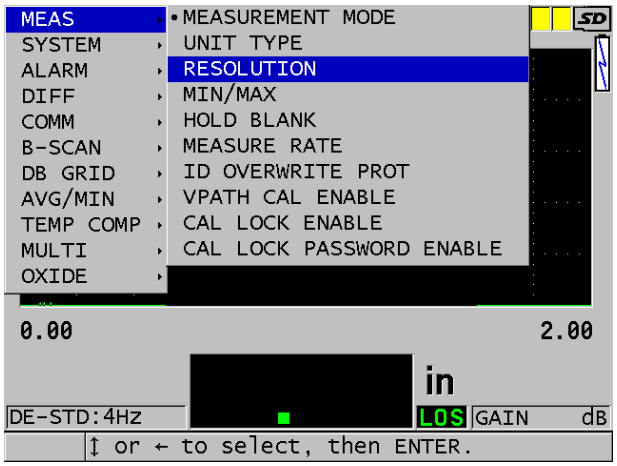
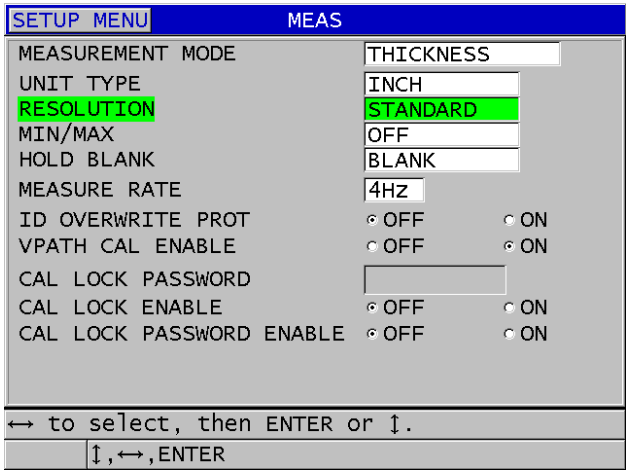
Setup Menu

Press: SP MENU

Used to change the setup parameters . By scrolling down the setup menu list the sub parameters are visible and the user can navigate directly to any setup parameter.







Use [🡻],[🡹] to highlight the setup type then press [ENTER]

Use [🡻],[🡹] to highlight the setup type then Use [🡸],[🡺] to enter the setup menu [🡻],[🡹] to select parameter and then press [ENTER]

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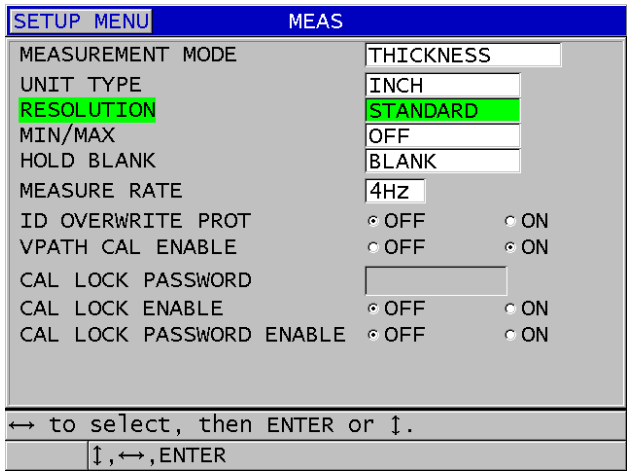
Measurement Setup



Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter.

Measurement Mode:	Thickness, Velocity or Time of flight
Unit Type:	Inches or Millimeters
Resolution:	Standard 0.001in. 0.01 mm Low 0.01 in. or 0.1 mm High 0.0001 in. or 0.001 mm (optional)
Min/Max:	Off, Min, Max or Both
Hold/Blank:	Hold: Holds last reading, Blank: Blanks last reading
Measurement Rate:	4Hz, 8Hz, 16Hz, 20Hz or Max (approximately 30 Hz)

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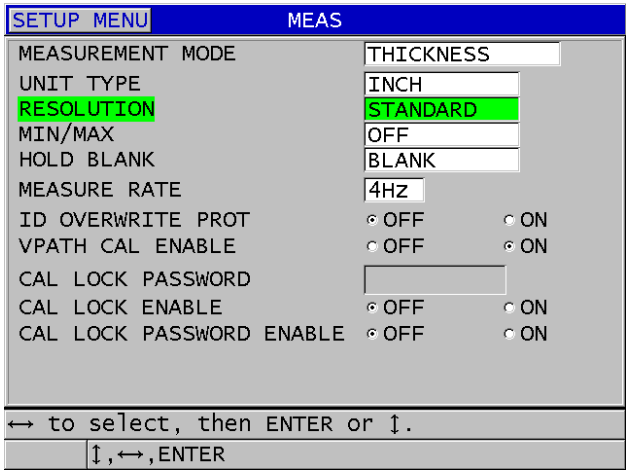
Measurement Setup Continuation



Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter.

ID Overwrite Protection:	On or Off
V-Path Calibration:	On or Off
Cal Lock Password:	User entered Cal Lock password
Cal Lock:	On or Off
Cal Lock Password Enable:	Supervisor Lock – On or Off

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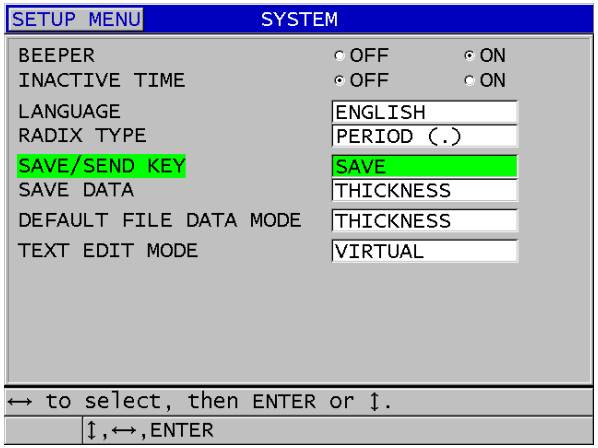
System Setup



Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter

Beeper:	Controls audio feedback - On/Off
Inactive Time:	Controls auto power off - On/Off
Language:	Select Menu Language
Radix Type:	Select period or comma to separate decimal point
Save/Send Key:	Sets the function of Save/Send Key to SAVE or SEND
Save Data:	Programs Save/Send Key to Save Thickness or THK and waveform
Default File Data Mode:	Set the Default File data mode
Text Edit Mode:	Set Editing Mode Virtual Keypad or Traditional Slewing

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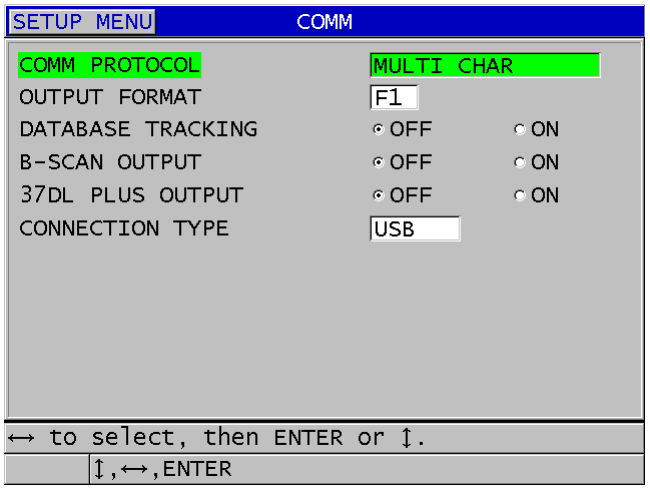
Communication Setup



Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter

COMM Protocol:	Set remote commands to Multi Character or Single
Output Format:	Select F1-F10
DBase Tracking	Tracks Setup from pervious inspection On or Off
B-Scan Output:	Output or not output B-Scan data
37DL PLUS Output:	Mimics the 36DL PLUS output
Connection Type:	USB or RS-232

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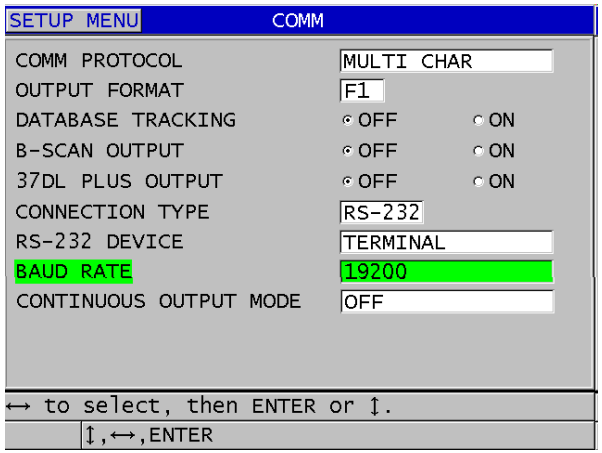
Communication Setup (RS-232)



Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter.

RS-232 Device:	Printer, Terminal (PC), Bar Code Reader, Digital Caliper, Fischer Gage
Baud Rate:	1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200
Continuous Output:	Off, On, 5 Sec Average or 10 Sec Average

Note: The following RS-232 parameters are fixed at the values below:
Data Bits: 8
Stop Bits: 1
Parity: None

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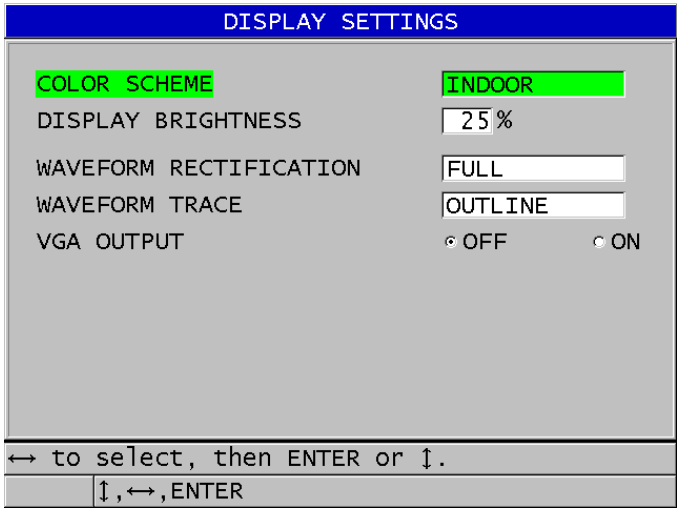
Display Setup



Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter

Color Scheme:	Sets display colors scheme to Indoor or Outdoor
Display Brightness:	Set brightness of display backlight 0%, 25%, 50% or 100%
Waveform Rectification:	Full, Half +, Half -, or RF
Waveform Trace:	Outline or Filled in
VGA Output:	Off or ON

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38DL PLUS SP Menu

- Clock Setup
- Language
- Gage Resets
- Diagnostic Tests
- Status

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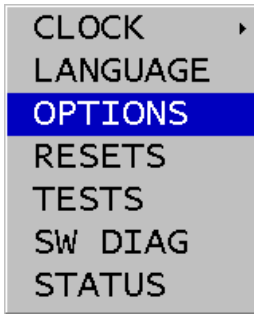
SP Menu

Press:

2nd F Then **SETUP MENU** (SP MENU)



Use [🡻],[🡹] to highlight the SP Menu Item then press [ENTER]

The SP Menu is used to change the instrument parameters that are not often adjusted and to activate software options and to run diagnostic instrument tests.

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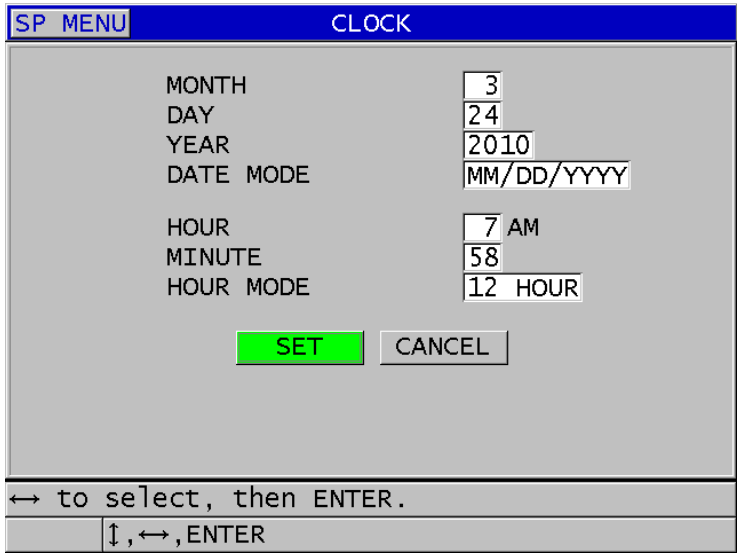
Clock Setup



The user can set the time and date. And the 38DL PLUS will use this to date to stamp the files in the datalogger.

Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter

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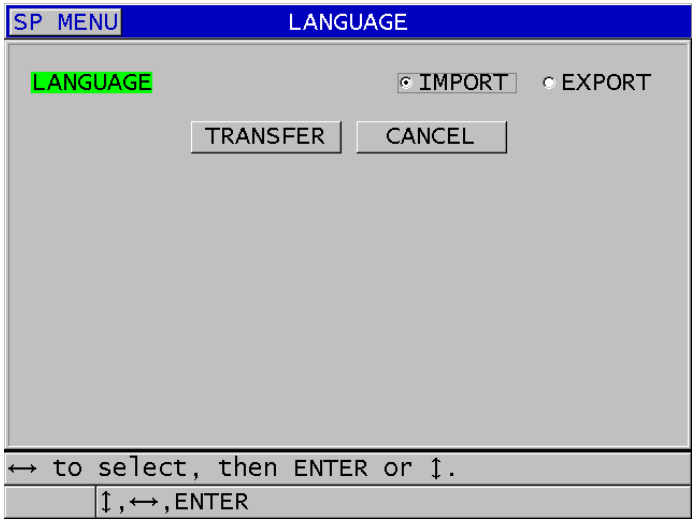
Language



The user can import custom language files from the external Micro SD memory card or export a file to be translated and converted into a language file in the gage.

Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter

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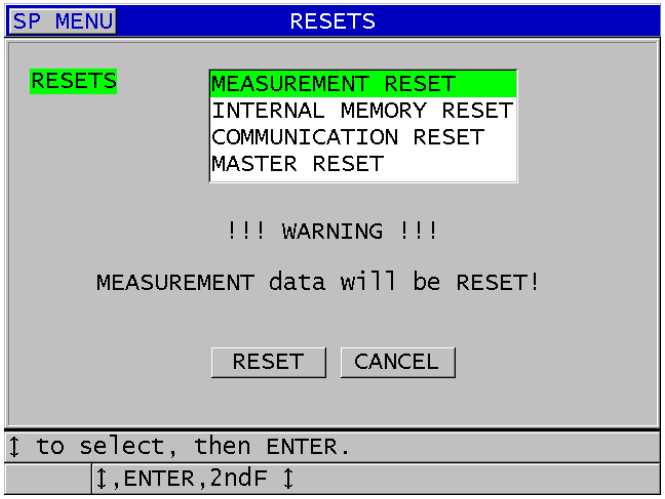
Gage Resets



Gage Resets is used to reset the gage back to factory default conditions. The user can choose to perform a Measurement, Internal Memory Communications or Master Reset.

Use [🡻],[🡹] to highlight the Reset type and press [ENTER] Then press [🡸],[🡺] to highlight Reset and press [ENTER]

Measurement Reset:	Restores default measurement parameters
Internal Memory Reset:	Clears and resets the internal memory card
Communications Reset:	Restores default communication parameters
Master Reset:	Performs all of the above resets

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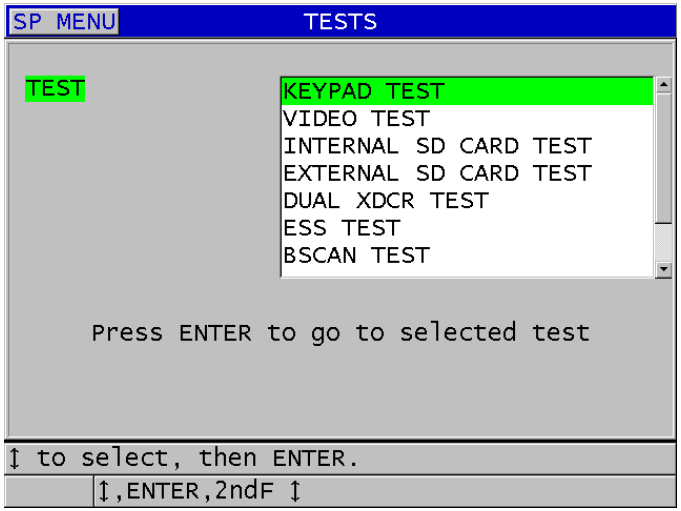
Diagnostic Tests



Use [🡻],[🡹] to highlight the diagnostic test and press [ENTER]

Diagnostics is the gages self test mode. This allows the operator to run through software, keypad display, and hardware diagnostic tests.

Note: The following tests are not designed for use by the user and are part of our manufacturing tests:
ESS test
B-Scan Test
Battery Test
One Wire test

Keypad Test:	Test to make sure each key is working
Video Test:	Test each pixel on the display
Internal SD card Test:	Test the Internal SD memory card
External SD card Test:	Test the Internal SD memory card
Dual XDCR Test:	Reports RX and TX time of flight from Dual element transducer

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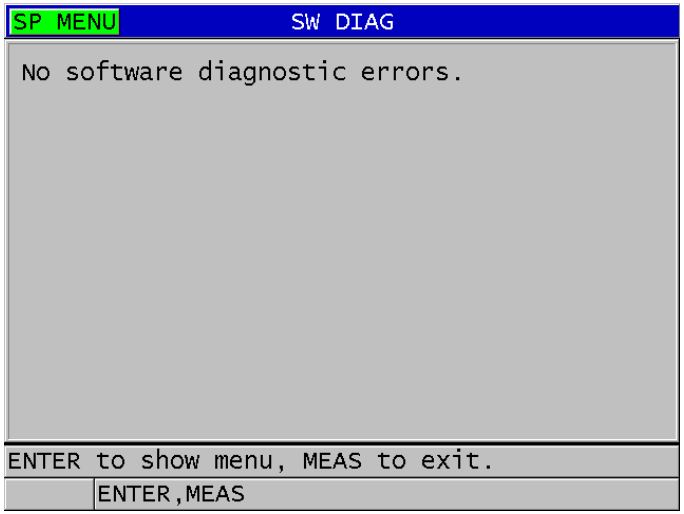
Software Diagnostic Test



Software diagnostic test reports and software error messages will be found under this tab .

Press [MEAS] to exit the SW Diagnostic test.

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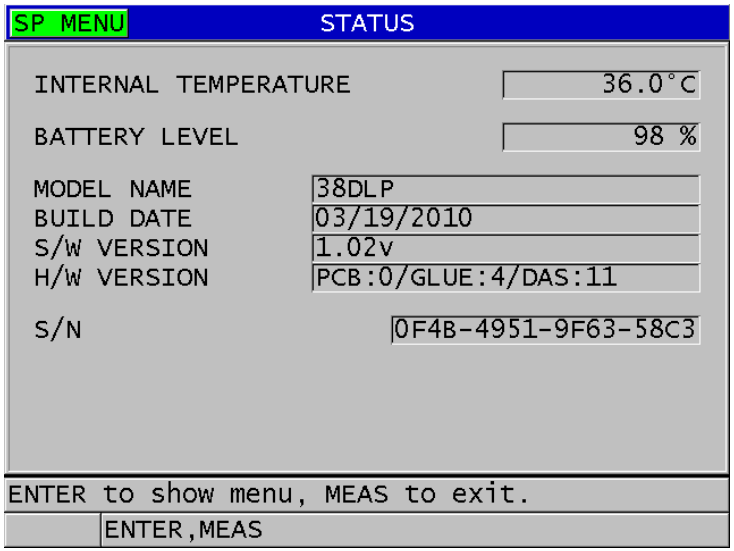
Status



The status report lists the information about the instrument including: internal temperature, current battery level, software version and hardware version of the 38DL PLUS.

Press [MEAS] to exit the Status Test

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38DL PLUS
Single Element Internal Setup and Transducer Adjustment

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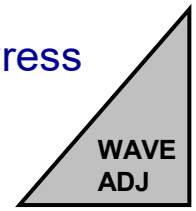
Setup Adjust for Single Element Transducers

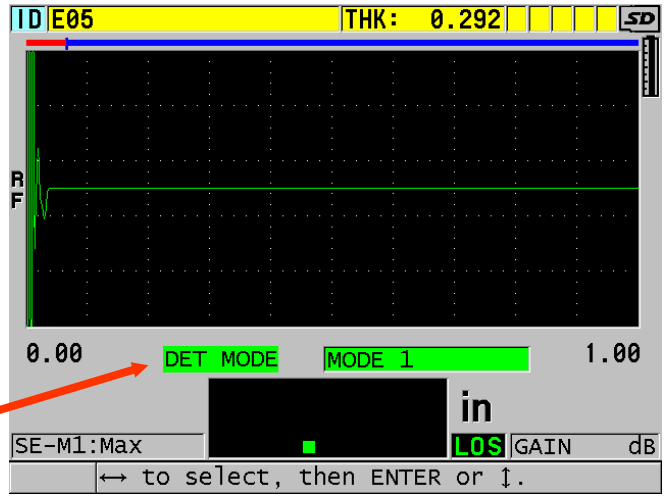
Allows the user to adjust the pulser, receiver, detection and blanking parameters.

Press



Caution: Making adjustments to the Setup Parameters should be made by a qualified individual who is familiar with ultrasonics and the use of the 38DL PLUS. Adjustments made using this feature can affect the measurements.

Use [↓],[↑] to highlight the parameter and [←],[→] to change the parameter



Adjustment Parameter

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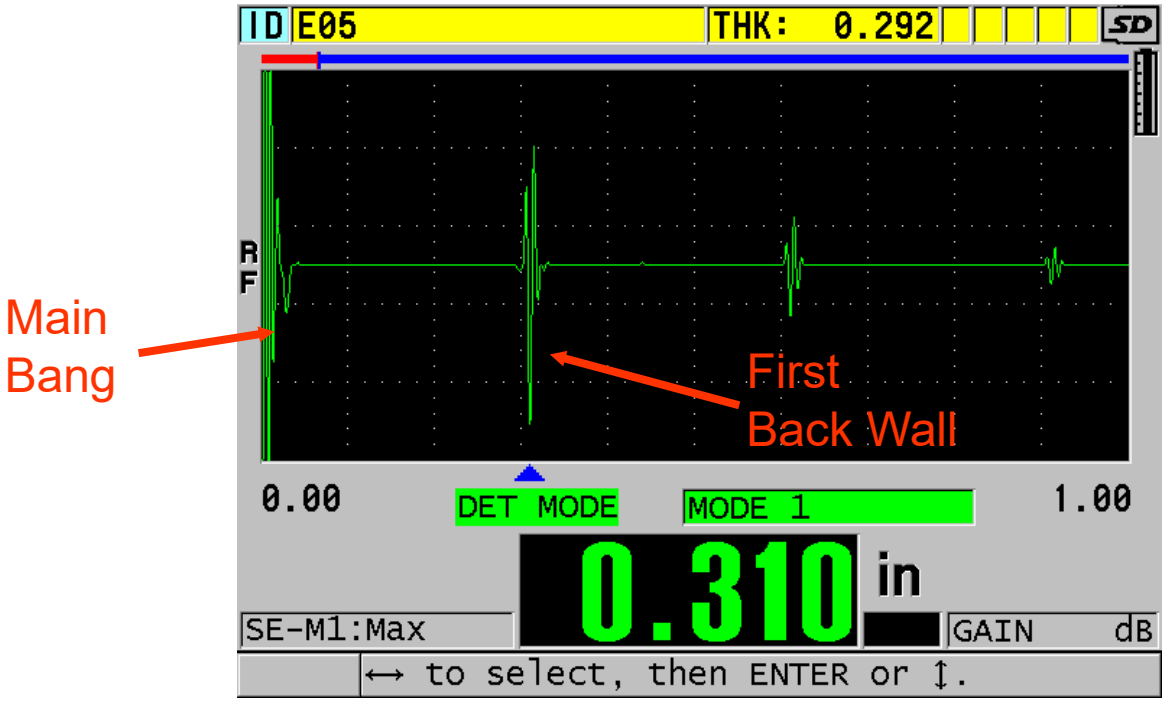
Mode 1

Mode 1 measures the time of flight between the Main Bang and the first back wall echo, using direct contact transducers.



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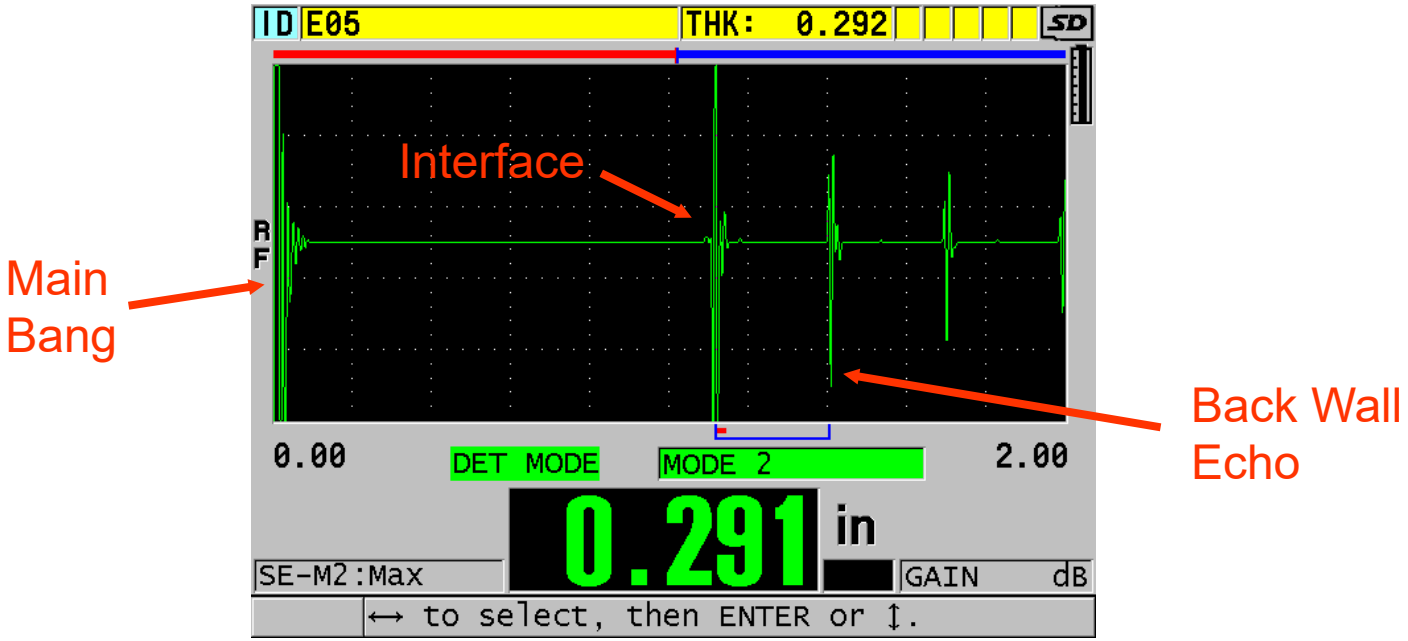
Mode 2

Mode 2 measures the time of flight between the interface (or delay line) echo and the first back wall echo, using delay line or immersion transducers.



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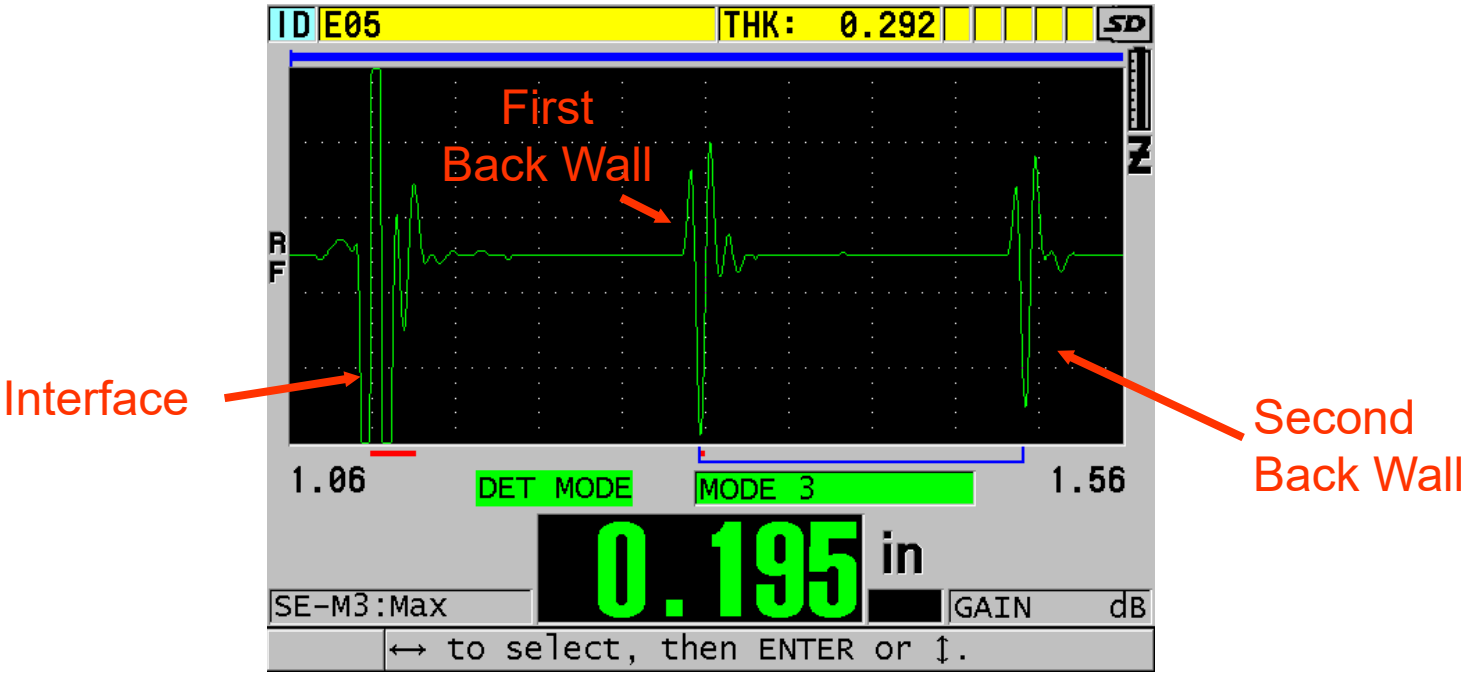
Mode 3

Mode 3 measures the time of flight between one back wall echo to the next back wall echo, using delay line or immersion transducers.



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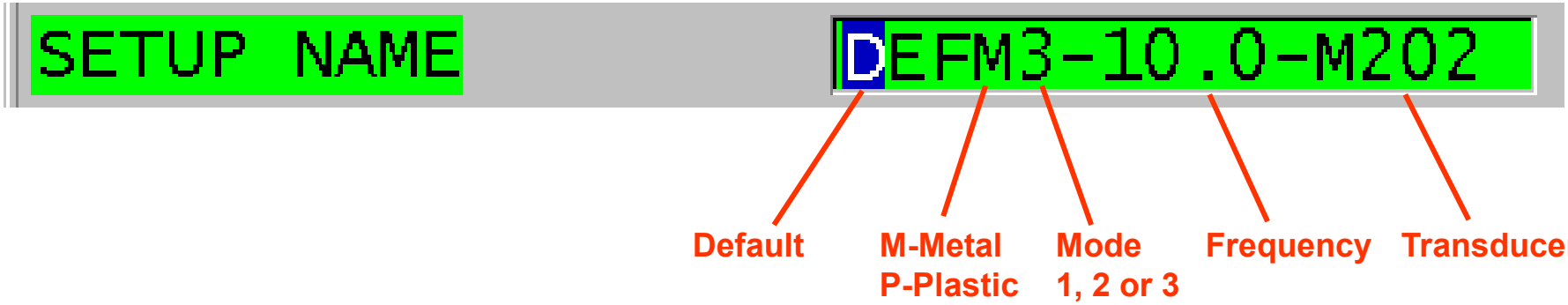
Setup Name



- Default or user defined name that identifies the application setup that is currently selected
- Limited to 16 alphanumeric characters

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Measure Type

- For most single element transducer the Meas Type will be set to standard. Standard is for Standard Mode 1, Mode 2 and Mode 3 measurements.
- First Peak is a special algorithm to measure the first peak of a group of several peaks on either the positive or negative side of the waveform. Common uses would be for gel coat on fiberglass measurements or bolt elongation.
- Oxide Layer is a special measurement type used for displaying the thickness of boiler tubes and internal oxide at the same time. This feature is only available when the optional oxide software is activated
- Barrier is a special measurement algorithm used to measure the thickness of the barrier layer thickness in multi-layer plastic material. Typical applications are plastic fuel tanks, bottle preforms .

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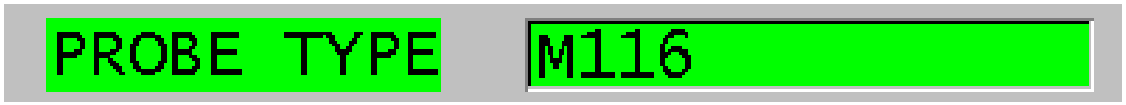
Probe Type



- Indicates the transducer type selected in the active setup
- Probe type selected should match the frequency of the transducer being used.
- Probe type sets the digital filters
- Probe type sets the pulse width of the square wave pulser
- Probe type sets the damping

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Pulser Power

- Indicates the voltage used to drive the transducer that is selected
- Affects the amount of energy going into the transducer and the size of the Initial pulse
- Select between 60, 110, 150 and 200 volts

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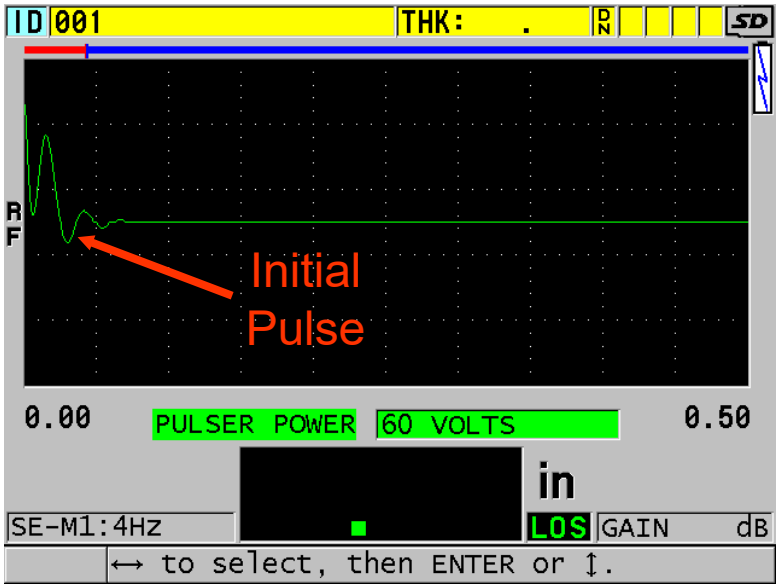
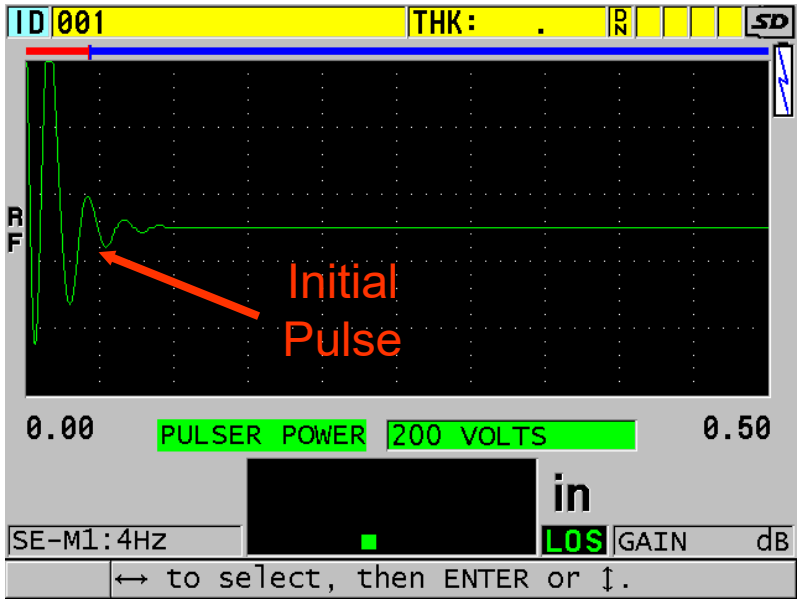
Pulser Power



Pulser power set to 60 volts shows a smaller initial pulse



Pulser power set to 200 volts shows a larger initial pulse

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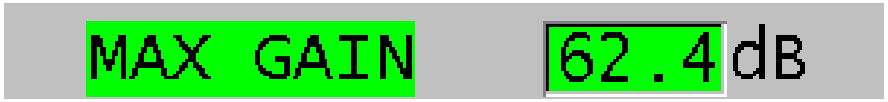
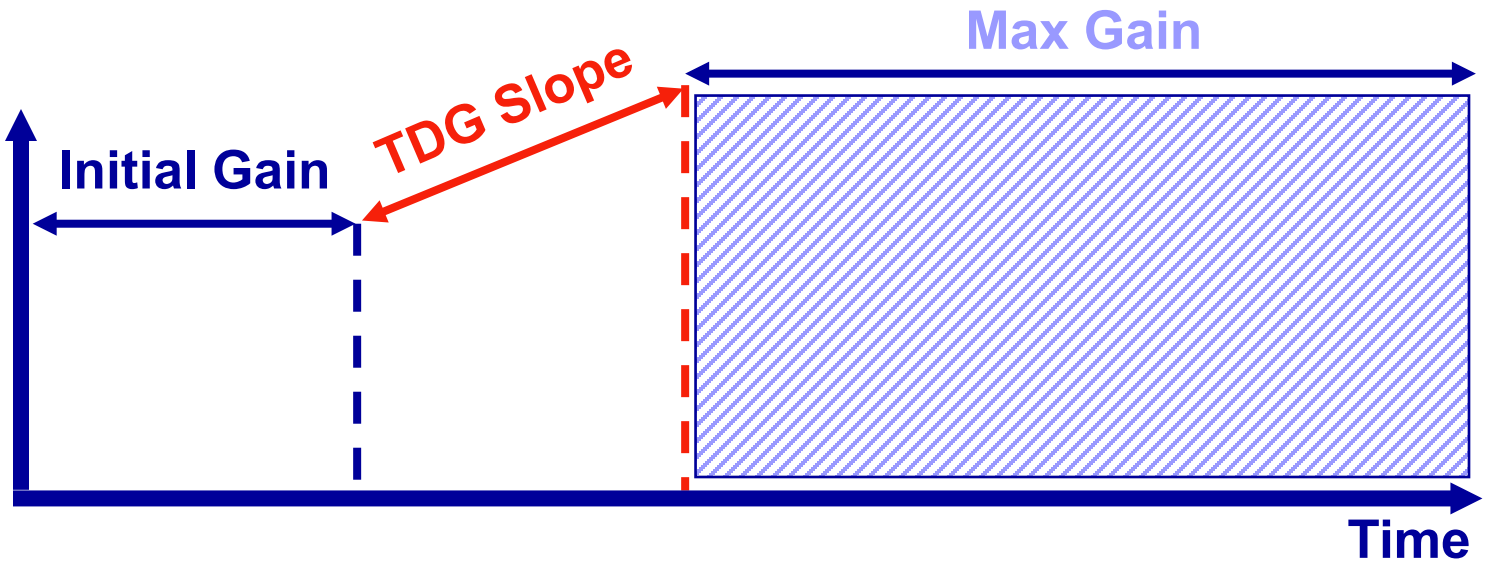
Max Gain



- Indicates the maximum (time dependent) receiver gain selected
- Max Gain can never be lower than Initial Gain
- Max Gain has a maximum value of 99.0dB
- Max Gain is used to amplify echoes that are further out in time



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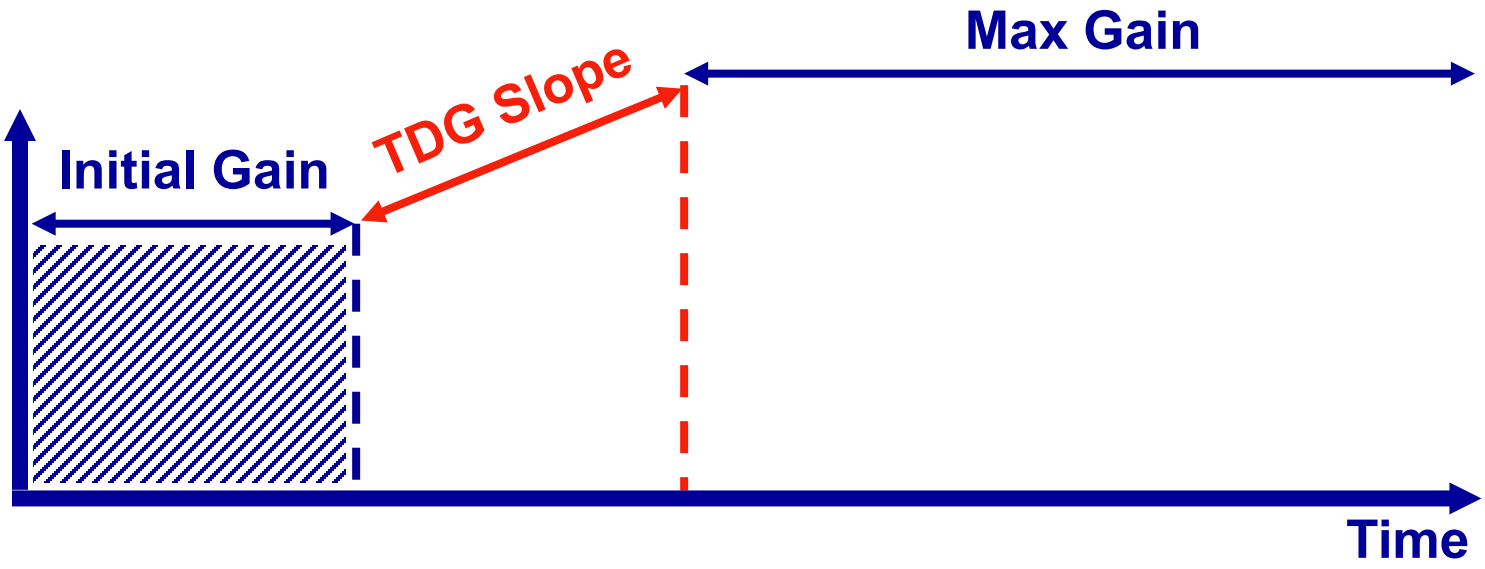
Initial Gain

- Indicates the initial (time dependent) receiver gain selected
- Amplifies echoes close to the Main Bang or Interface Echoes
- Initial Gain starts at time zero and extends to:
  - Main Bang Blank in Mode 1
  - The end of the Interface Blank in Mode 2 and Mode 3



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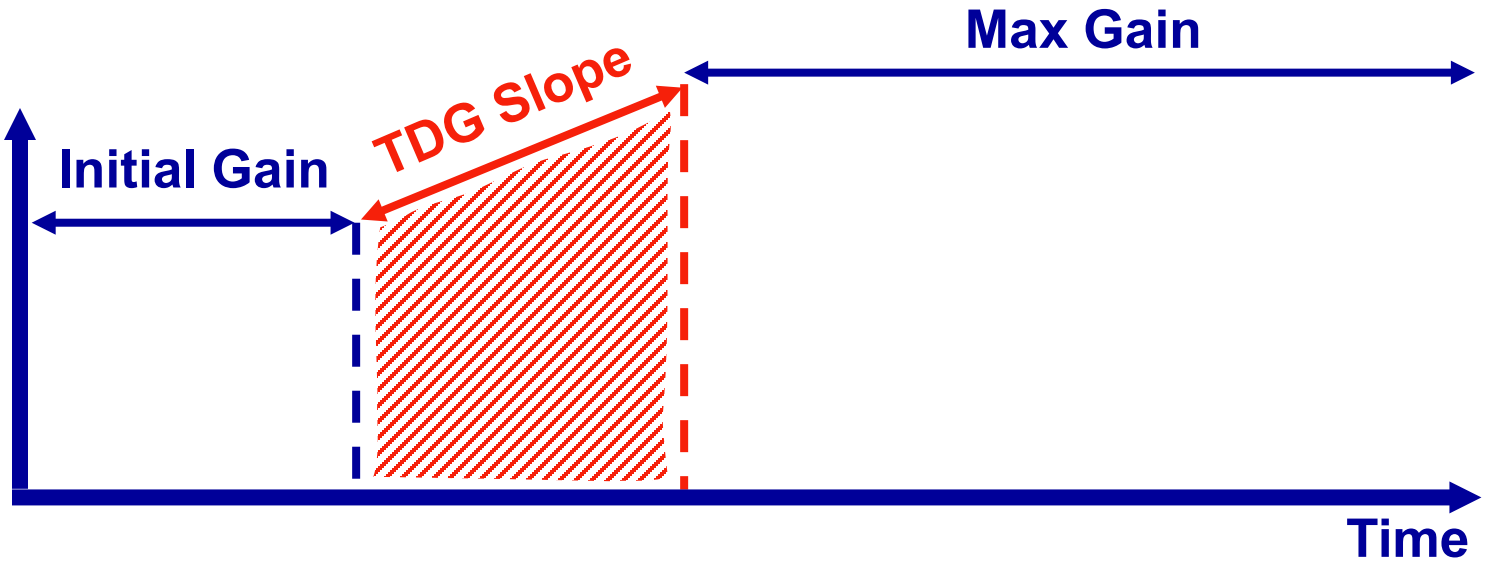
TDG Slope

- The rate of increase of the receiver gain (time dependent) from Initial Gain to Max Gain
- Slope can help suppress reflections from grain structure or fibers
- Slope can be adjusted from 0.0dB to 26.52 dB/µSec
- The point in time that the gain starts to slope is:
  - The Main Bang Blank in Mode 1
  - The End of the Interface Blank in Mode 2 and Mode 3



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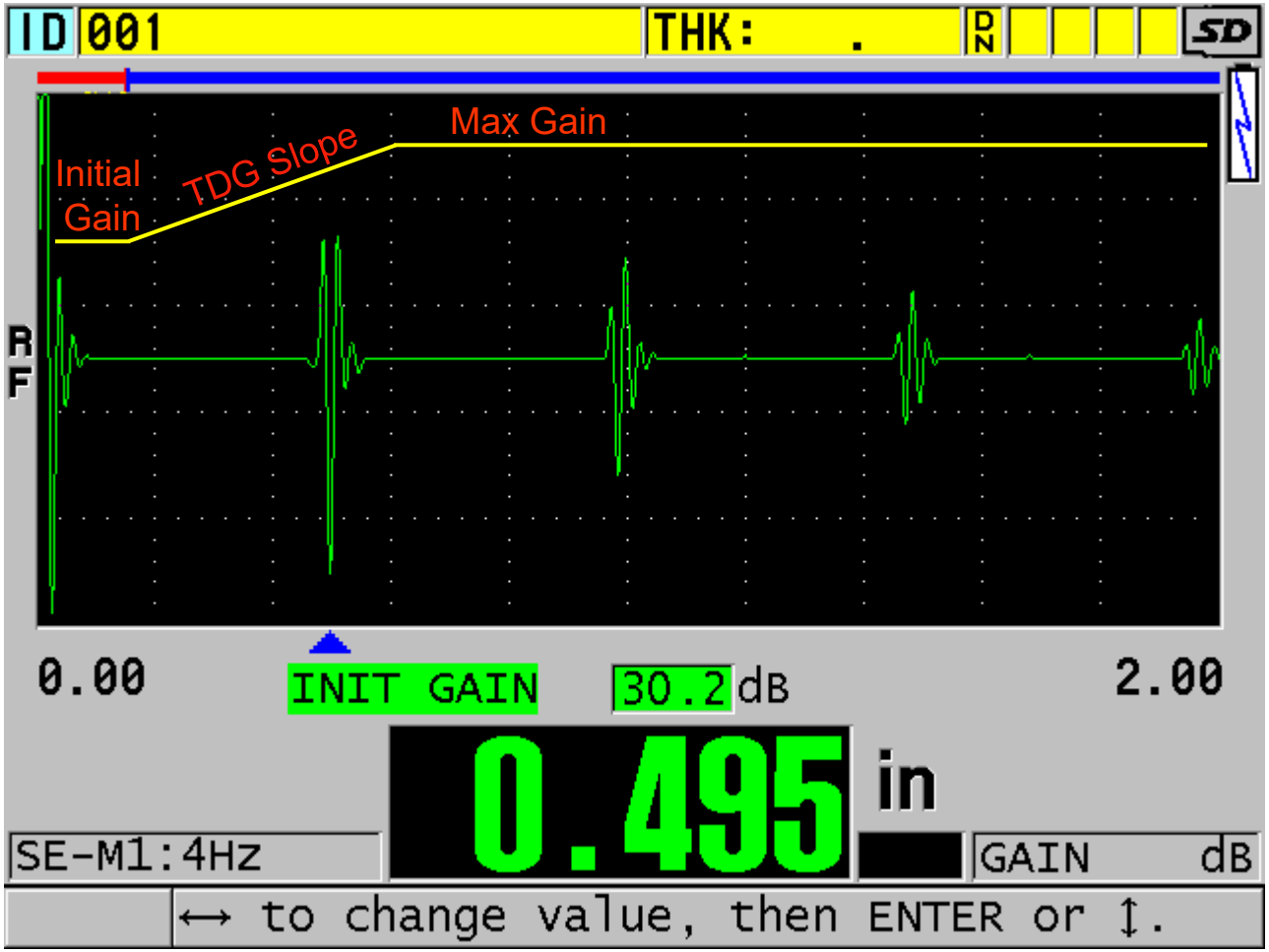
TDG Gain Mode 1



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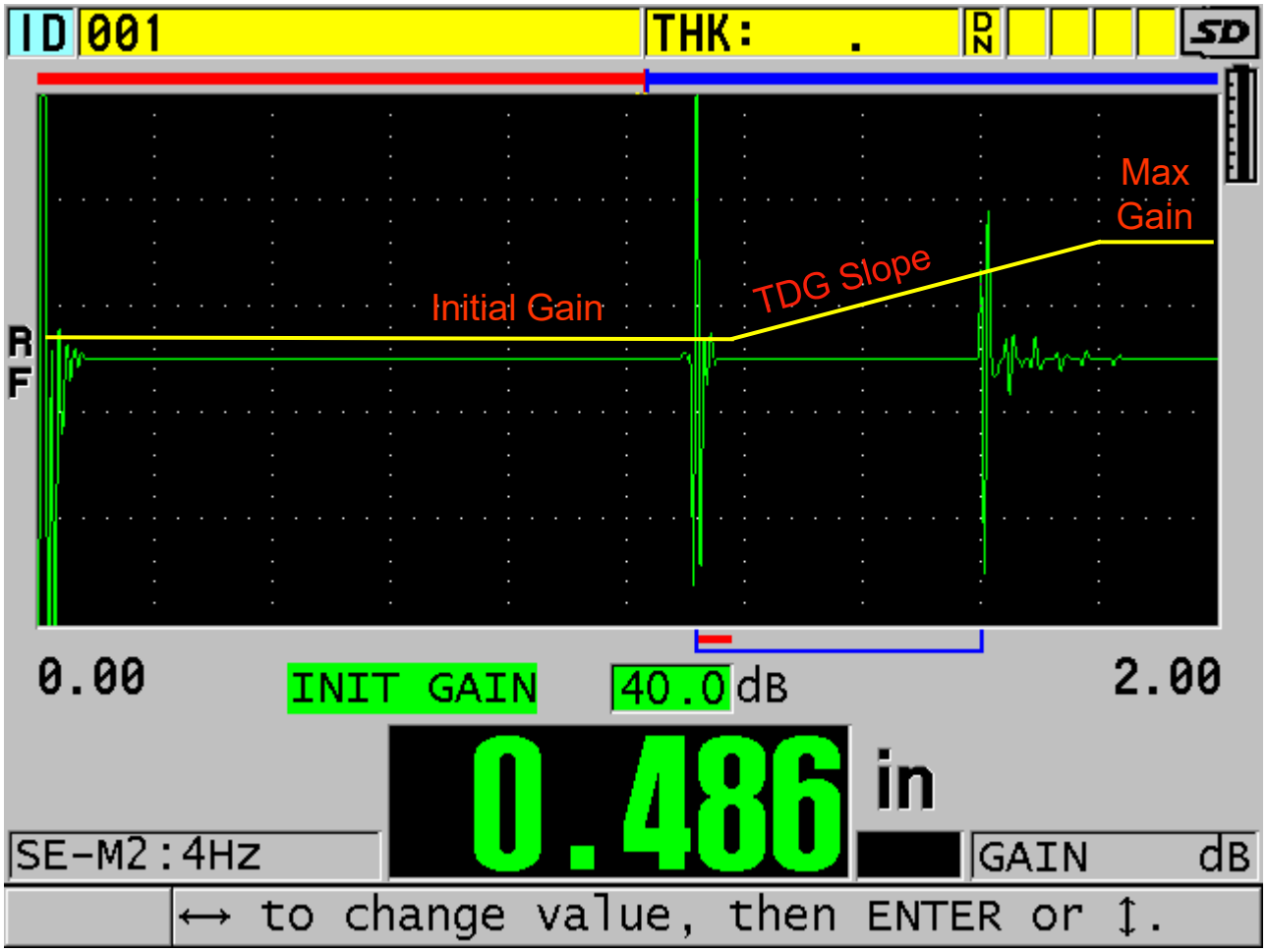
TDG Gain Mode 2 and Mode 3



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Main Bang Blank (MBBlank)

- A blank zone that protects the receiver from false readings generated by the Main Bang
- Indicates the point in time where the gage begins to search for echoes
- Adjustment directly affects the minimum thickness the gage can measure in Mode 1
- Set just past the Initial Pulse in Mode 1
- Set just before the Interface Echo in Modes 2 and 3
- Make sure that the Main Bang Blank is always set before the Interface Echo from the shortest water path when using immersion transducers

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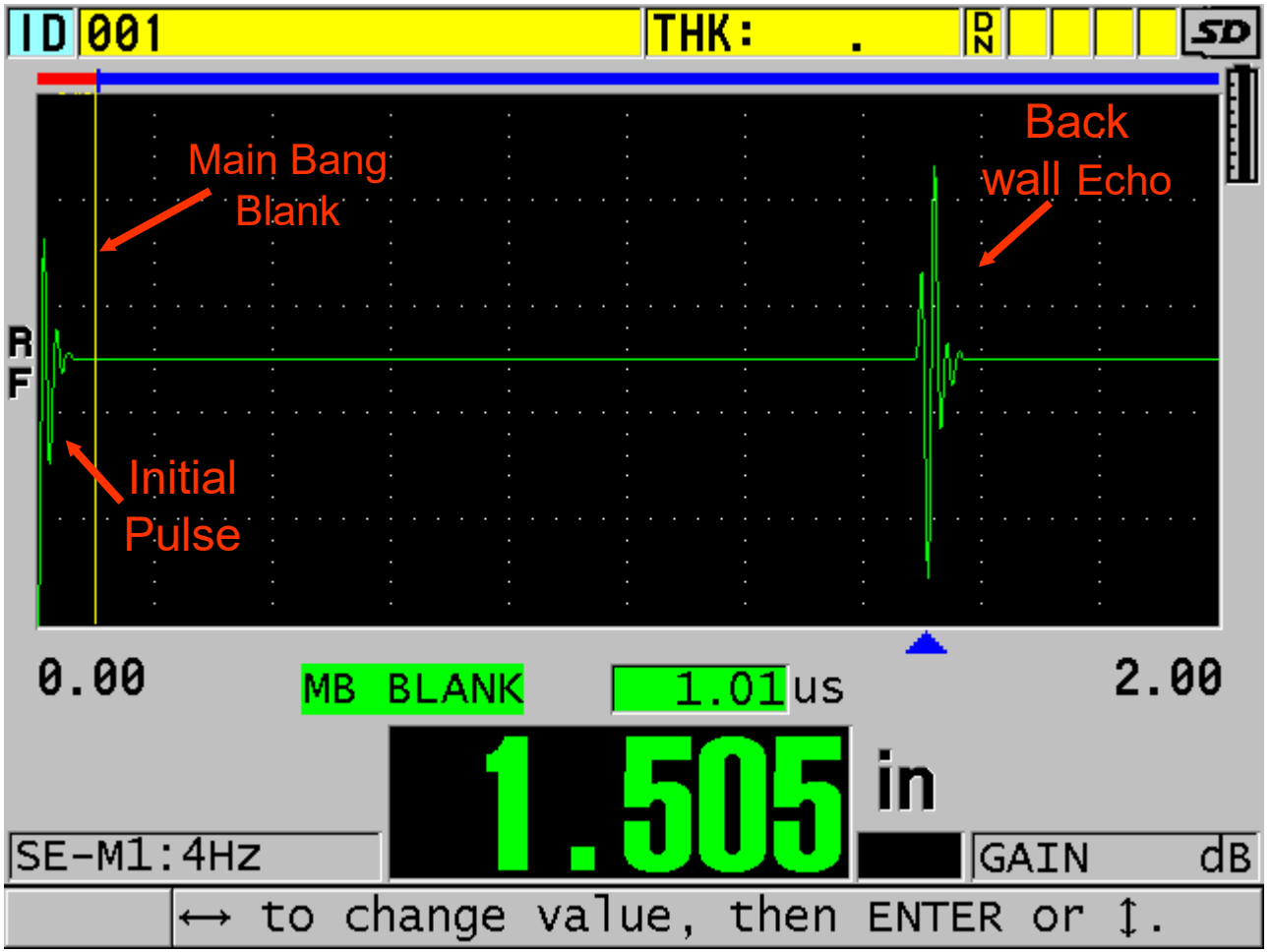
MBBlank in Mode 1



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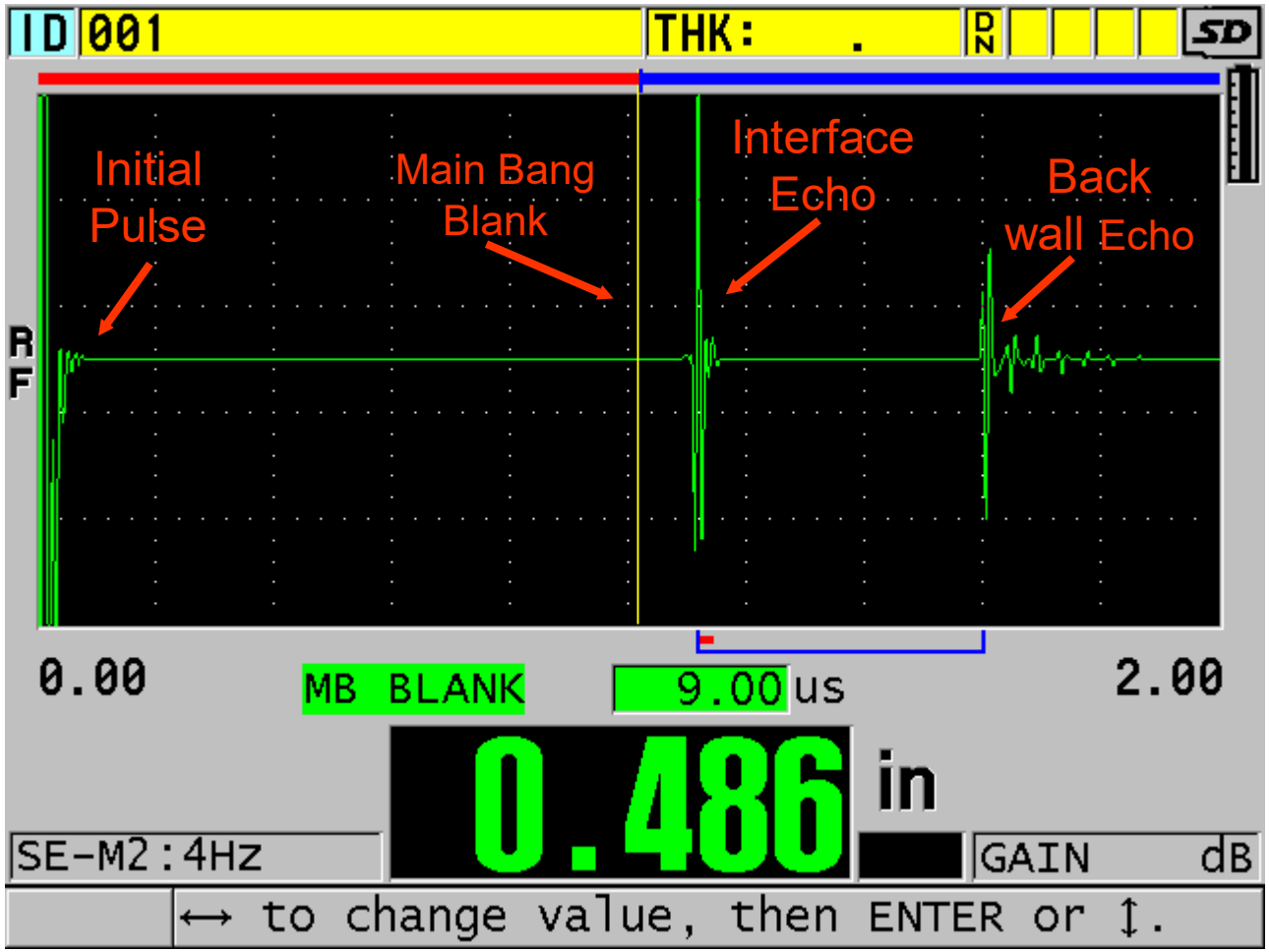
MBBlank in Mode 2 and Mode 3



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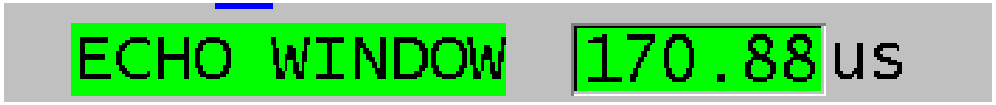
Echo Window



- Defined as the time between:
  - The Main Bang Blank and the Echo Window in Mode 1
  - The end of the Interface Blank and the Echo Window in Mode 2 or Mode 3
- Indicates the selected period of time in which the receiver will search for echoes
- Signal appearing after (i.e. outside of) the Echo Window will not be detected by the gage

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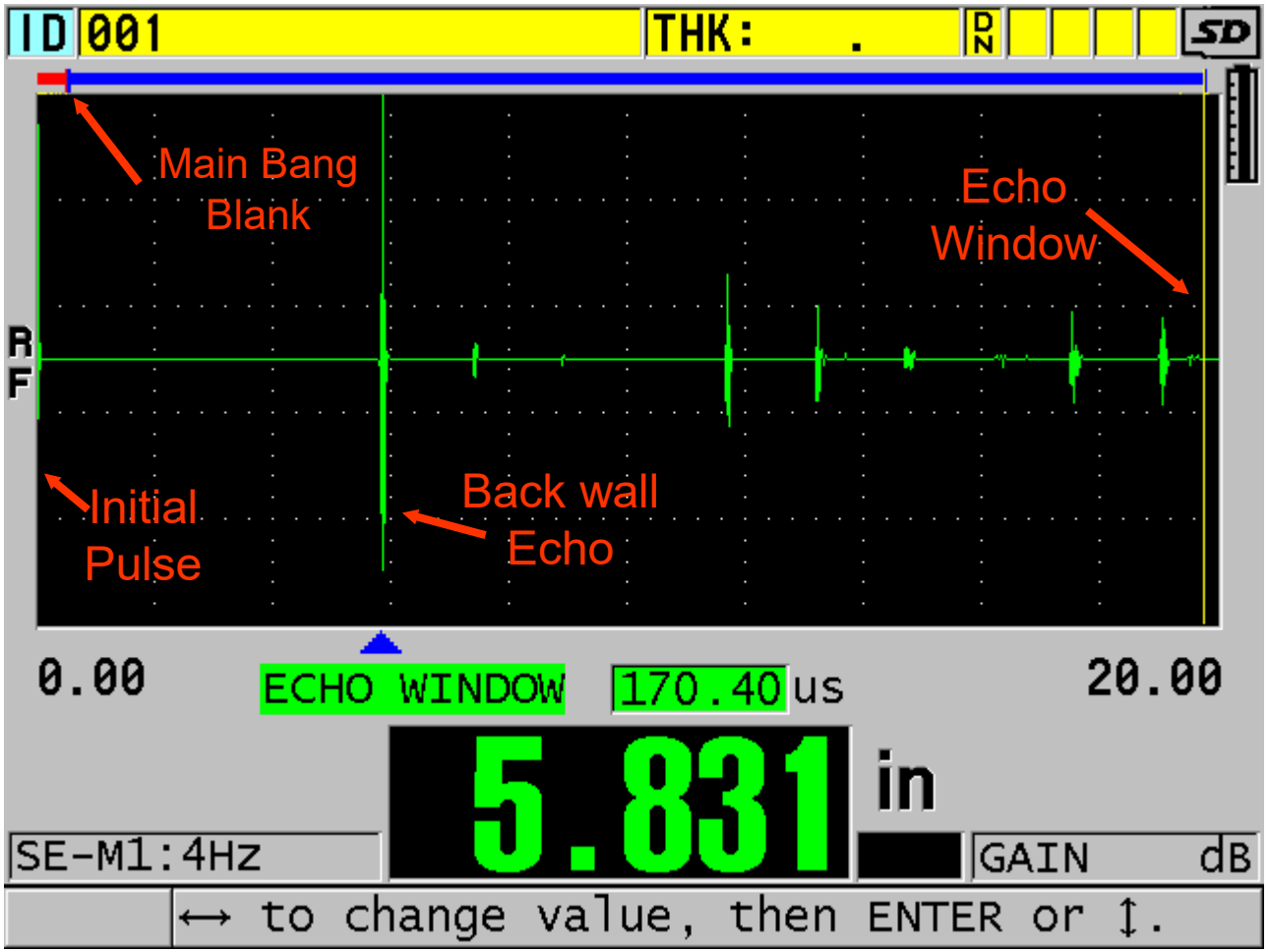
Echo Window in Mode 1



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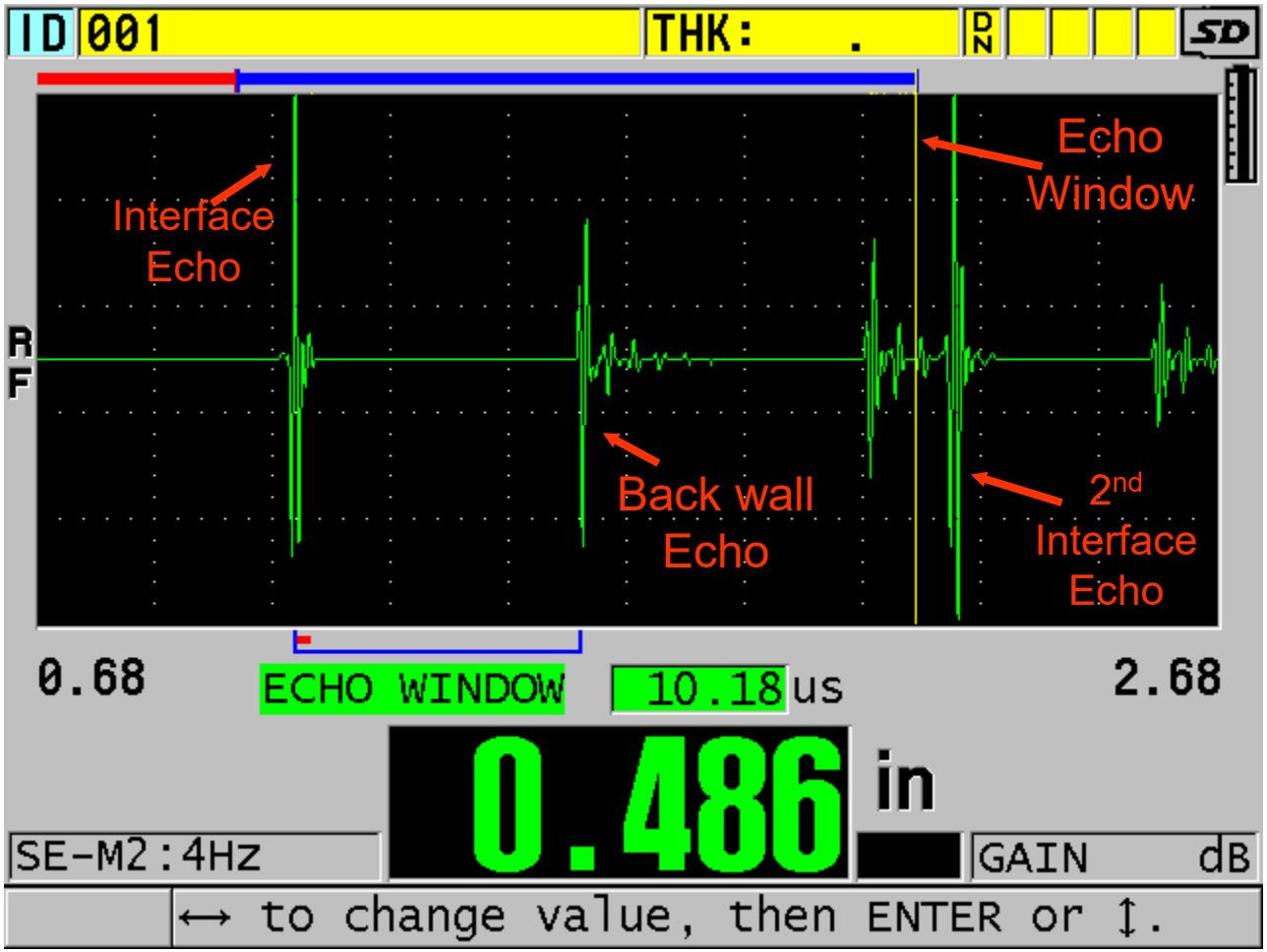
Echo Window in Mode 2 and Mode 3



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Echo 1 Detect

- This indicates the detection polarity of the "first detected back wall signal" in the Echo Window in Mode 1
- In Modes 2 &3 it refers to detection polarity of Interface (or delay line) Echo
- Always choose the detection polarity on the singular lobe of the echo
- Echo polarity is affected by:
  - Acoustic impedance
  - Echo distortion can be caused by grain structure, internal fibers, and surface conditions

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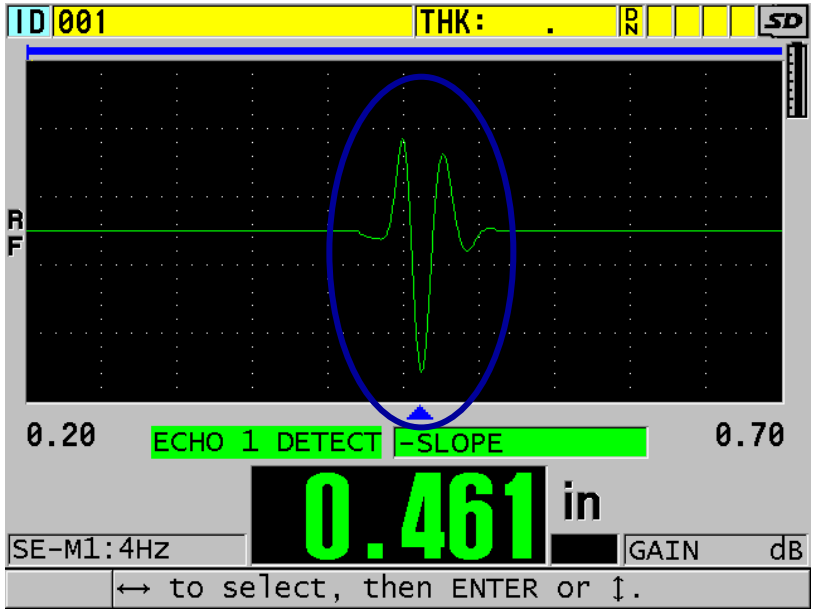
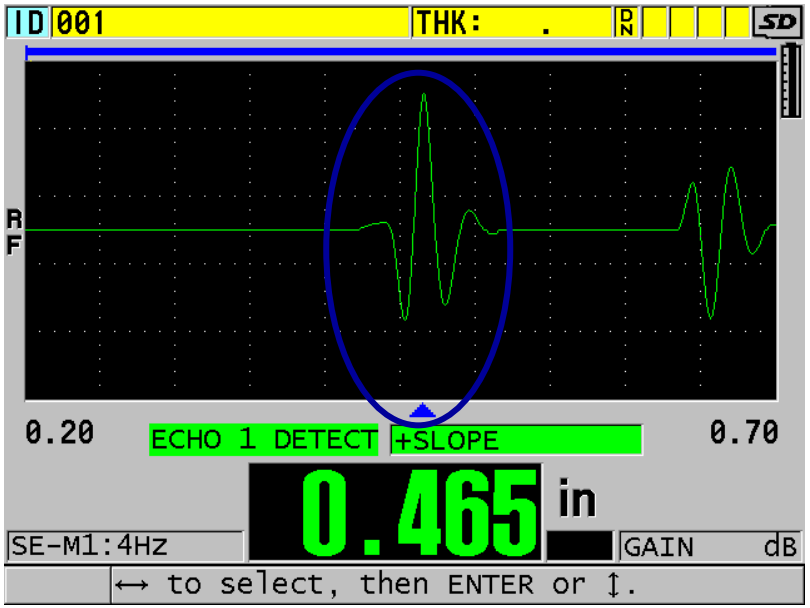
Echo 1 Detect



Negative Detection
Steel Back by Air



Positive Detection Plastic
Bonded to Steel

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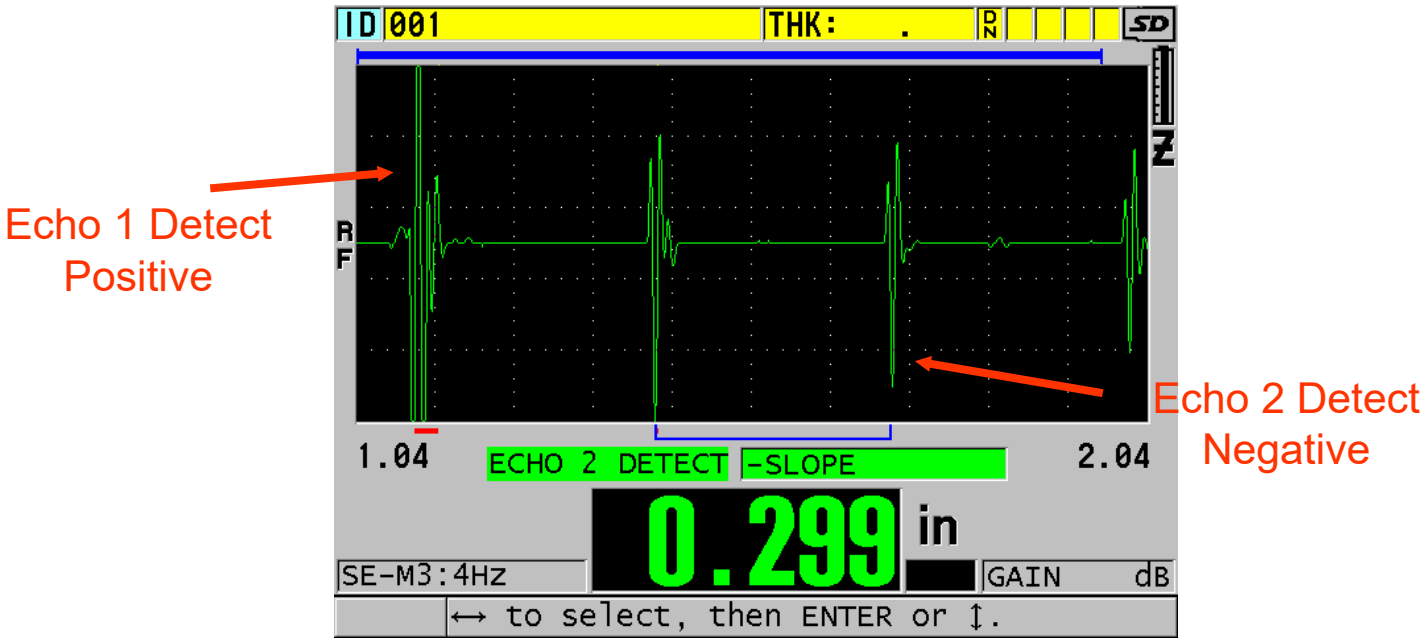
Echo 2 Detect (Modes 2 and 3 only)

- Indicates the detected polarity of the back wall echo in Mode 2 or the pair of back wall echoes in Mode 3
- Always choose the detection polarity on the singular lobe of the echo



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Interface Blank (Modes 2 and 3 only)

- Sets the length of a blank that follows the detected interface echo
- Used to prevent the gage from detecting the trailing edge of the Interface Echo in Mode 2
- Used to select which pair of back wall echoes will be detected in Mode 3

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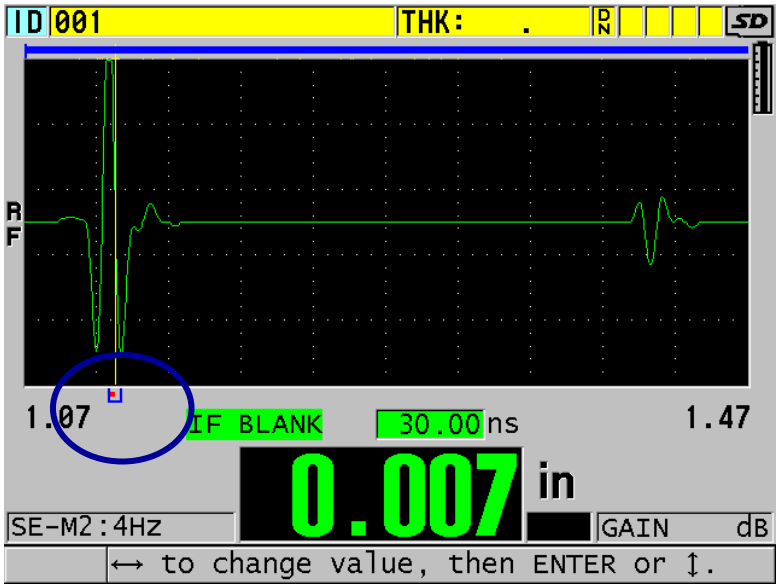
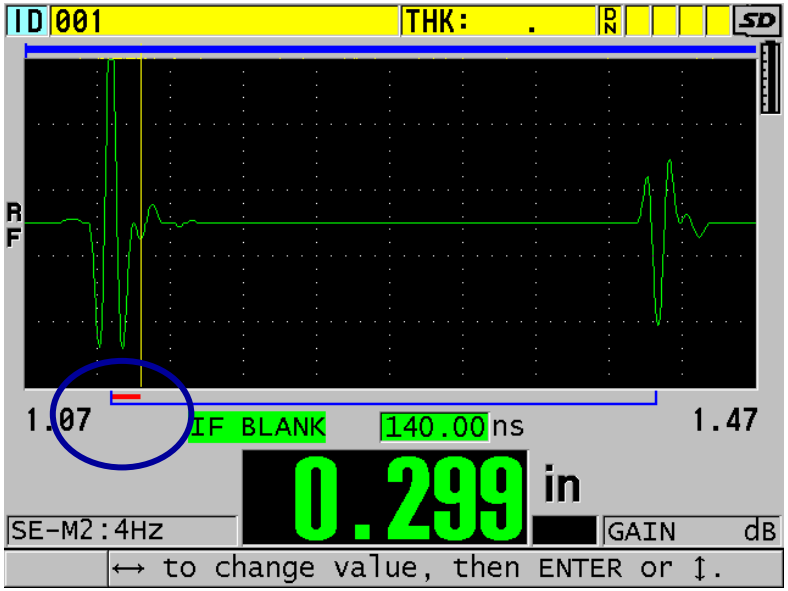
Interface Blank Mode 2



Gage Reading Trailing Edge of the Interface Echo



Interface Blank Set Correctly

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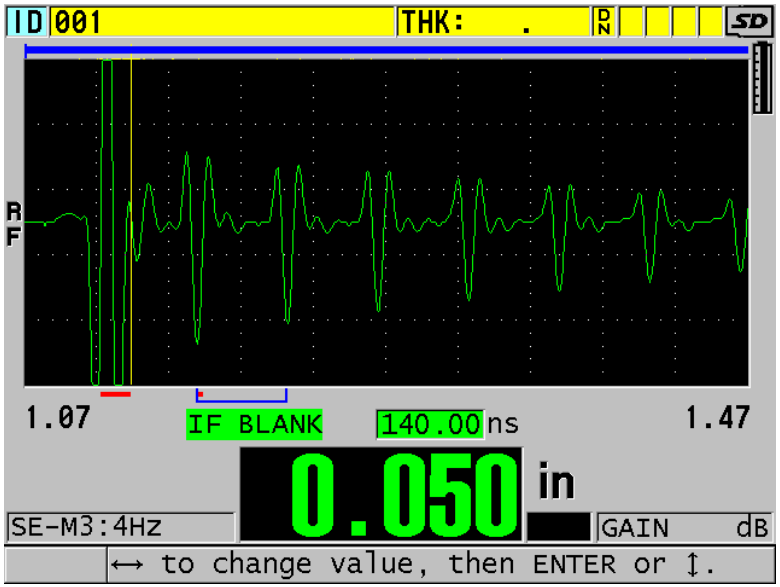
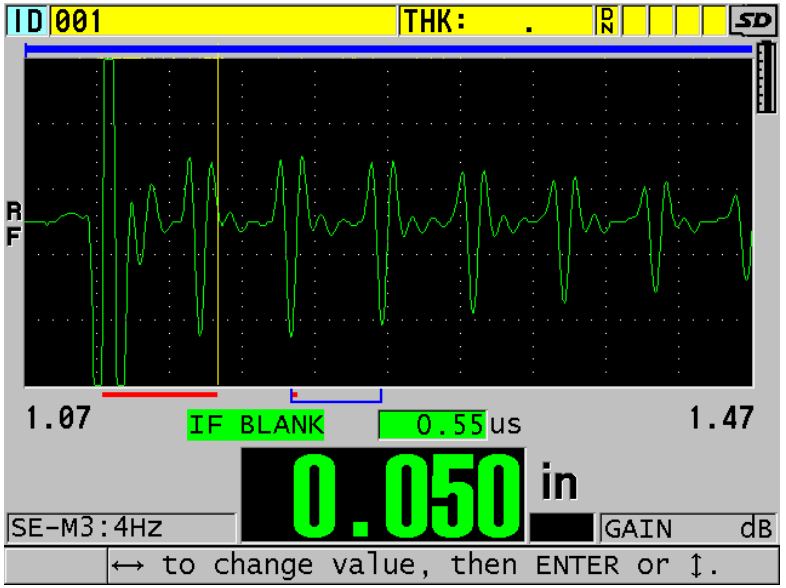
Interface Blank Mode 3



Gage Reading between
Back Wall 1 and 2



Gage Reading between
Back Wall 2 and 3

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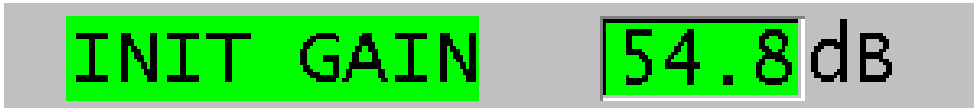
Mode 3 Blank (Mode 3 only)



- Sets the length of a blank that follows the first detected back wall echo in Mode 3
- Used to prevent the gage from detecting the trailing edge of the first back wall echo

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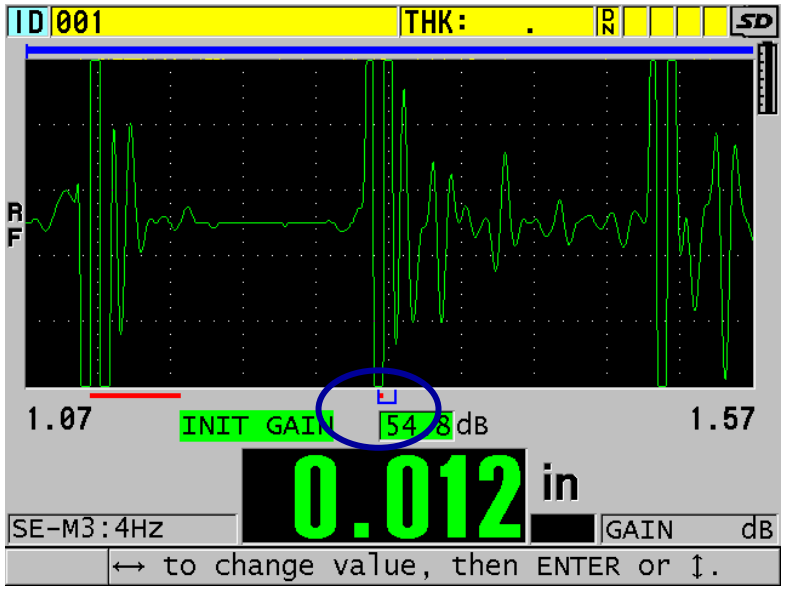
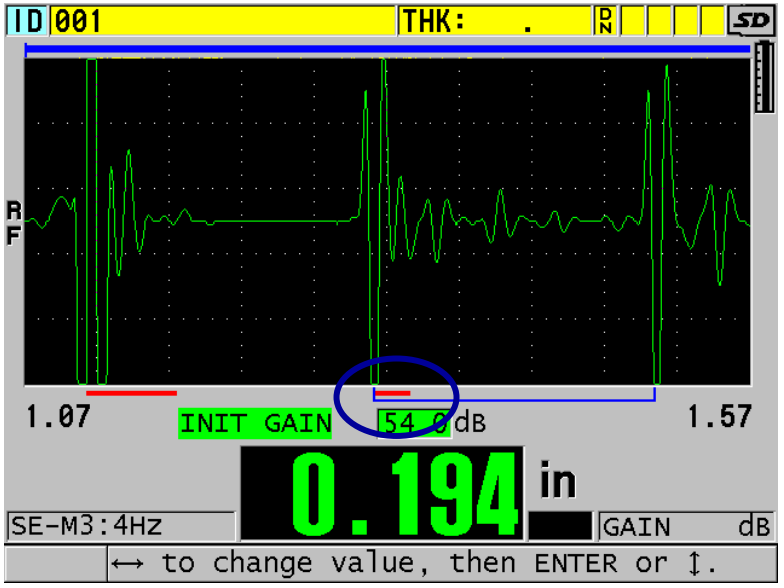
Mode 3 Blank (Mode 3 only)



Gage Hanging Up on Trailing Edge of Back Wall 1



Mode 3 Blank Set Properly

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38DL PLUS
Custom Dual Element Transducer Setups

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Custom Transducer Setup for Non Standard Dual Transducers

The 38DL PLUS offers probe recognition for the Olympus' standard D79X series dual element transducers. When one of these dual element transducers is plugged into the 38DL PLUS the gage automatically recalls a default setup and V-Path correction.

These D79X series transducers will provide superior performance when used with the 38DL PLUS. The gage . The gage also has the ability to create and store custom setups for non standard dual element transducers, including a custom V-Path correction.

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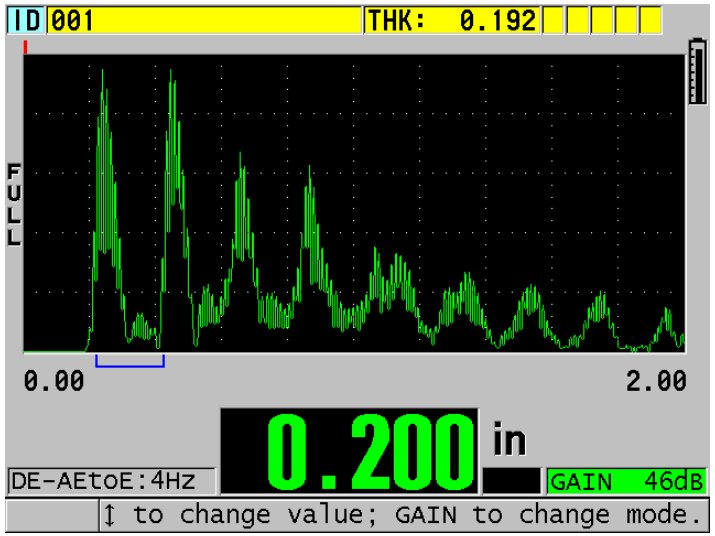
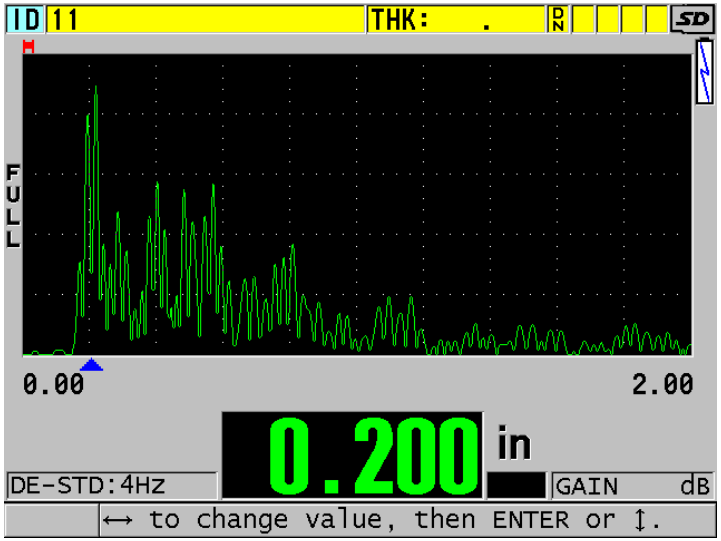
Caution for Non Center Pin Duals

- Olympus cannot guarantee measurement accuracy or performance for transducers other than our standard D79X duals
- Performance, accuracy and minimum/maximum thickness capability with other duals needs to be verified by the user
- Transducers that work in standard mode (first back wall) may not work very well in Echo-to-Echo mode
- The 38DL PLUS is designed to work with most dual element transducers that are used for thickness gauging applications, but there is no guarantee that it will work with all dual element transducers



D790 on 0.200 in. Block



Other 5 MHz Dual on 0.200 in. Block

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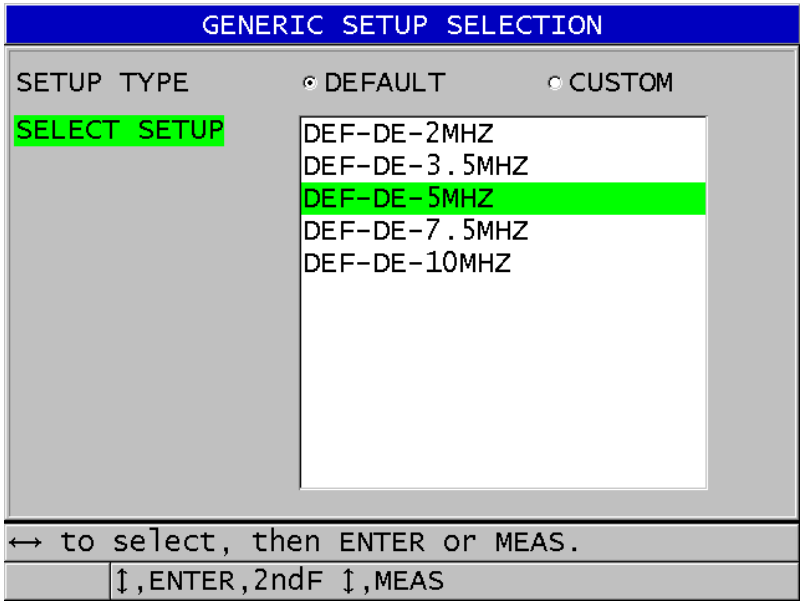
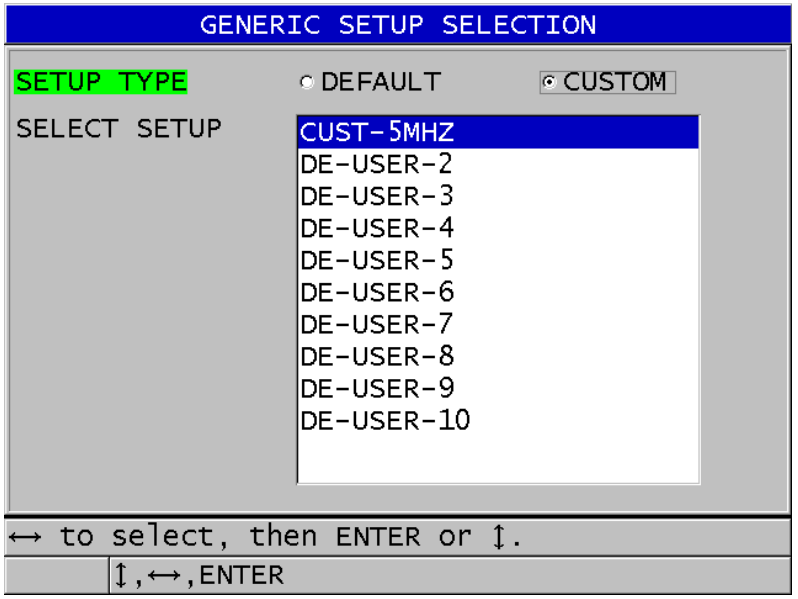
Non Standard Dual Element Transducers

When a user plugs in a dual element transducer that is not an Olympus D79X transducer. The 38DL PLUS will display the generic dual element transducer setup selection screen





Use [←],[→] to highlight “Default” to select from the list generic dual element transducer or “Custom” to select for the list of previously stored custom dual element setups.

Note: When selecting a generic setup, choose the one that best matches the frequency of the transducer being used.

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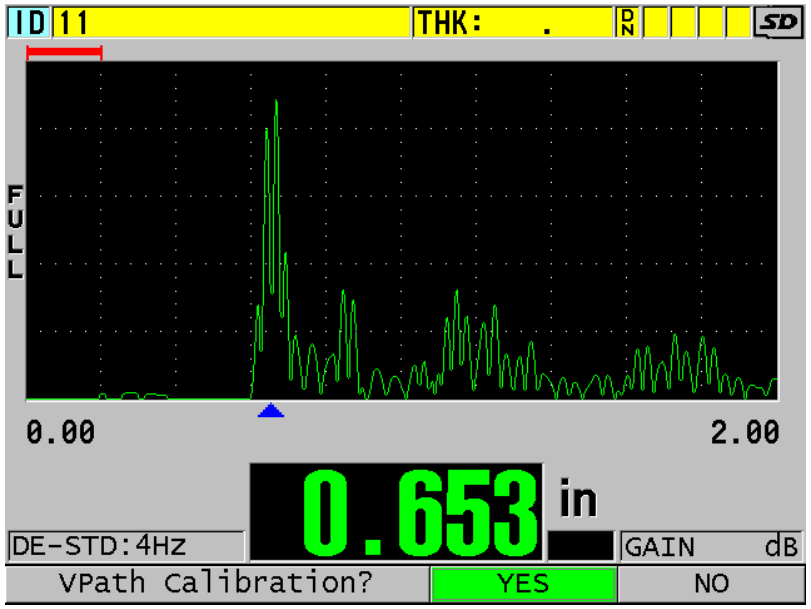
V-Path Builder (Create a custom V-Path)

- Turn V-Path calibration on
- Gage asks user if they want to do V-Path Cal when [CAL VEL] is pressed
- Enter up to 10 points and save setup and V-Path as a custom dual element setup
- The user can store up to 10 Custom Dual element setup



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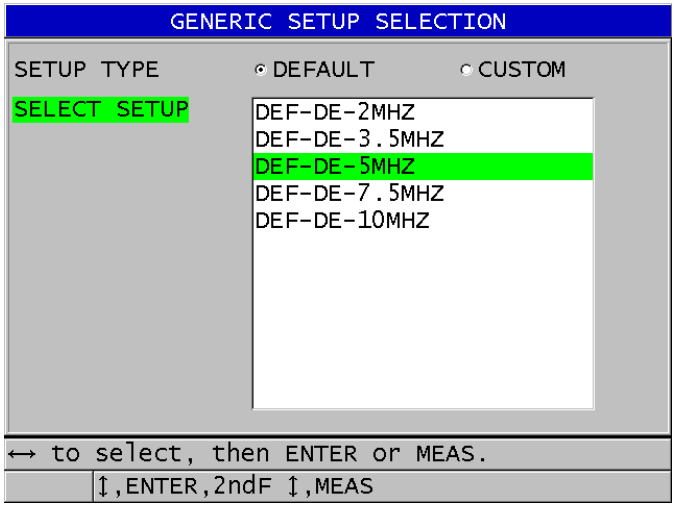
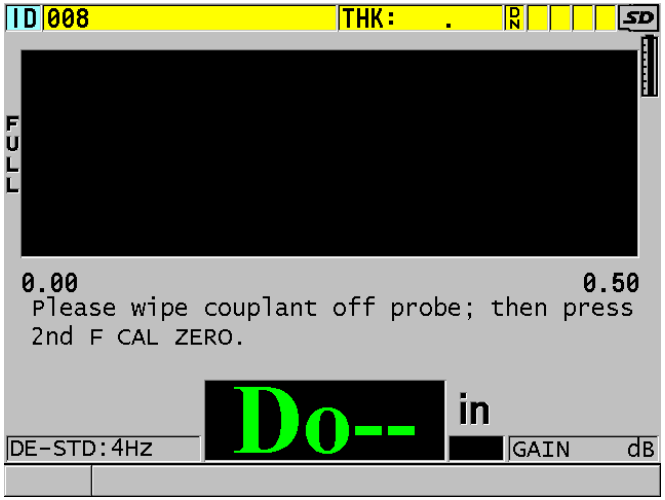
Creating a Custom Dual Transducer Setup

Use the [🡻],[🡹] keys to select a generic setup from the list of default dual element transducers and press [MEAS]:



Press **2nd F** then **CAL ZERO** (Do-ZERO)

To zero the transducer



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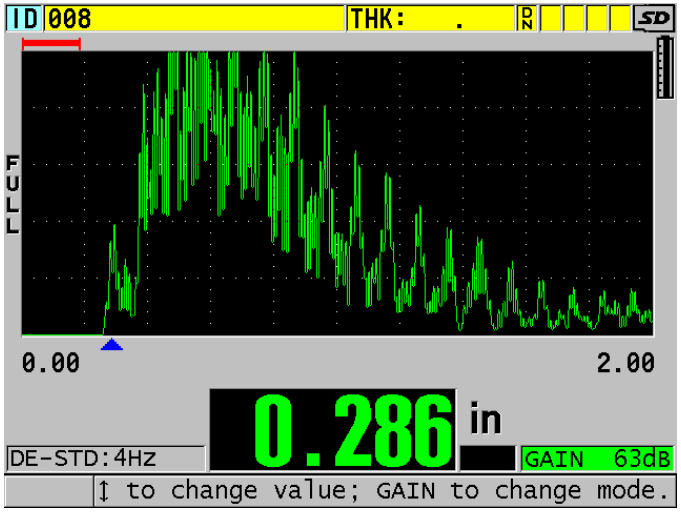
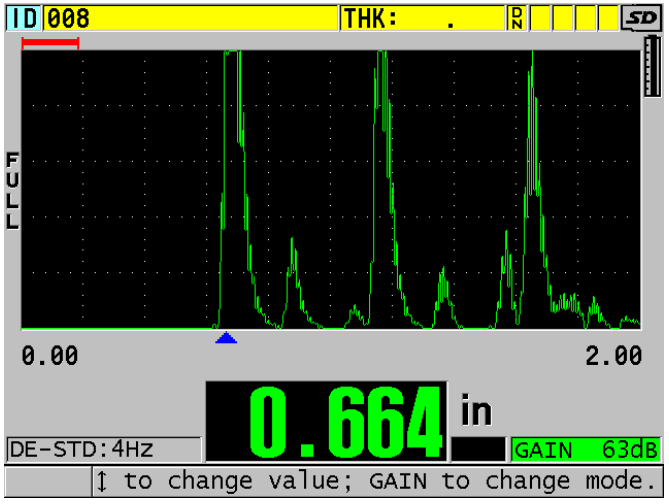
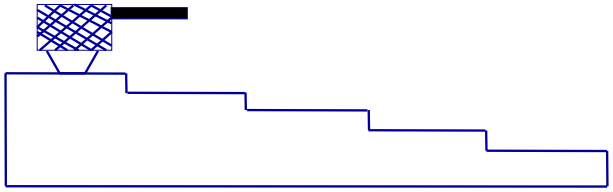
Creating a Custom Dual Transducer Setup

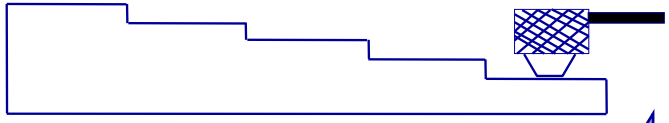
- Adjust the range of waveform so the echoes from the upper thickness limit can be seen on screen
- Couple to your thick and thin test standards and adjust the gain so that the proper echo detection is being made on the min and max thickness

Note: the thickness measurement value at this point will most likely not be correct









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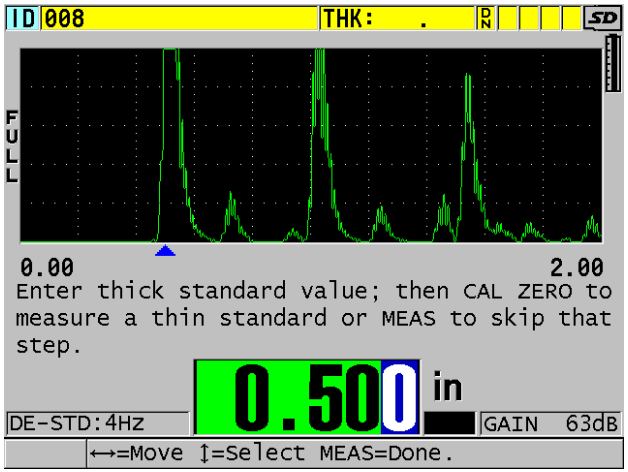
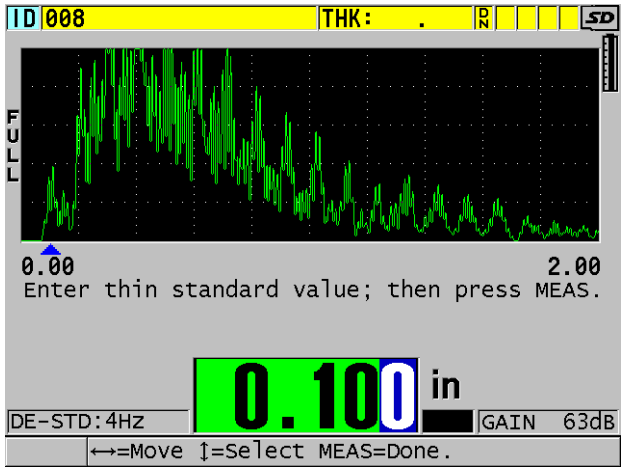
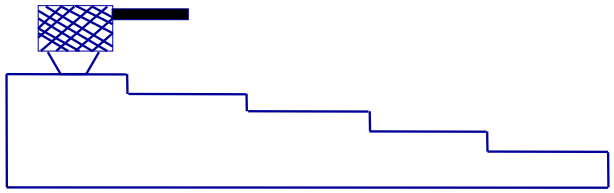
Two Point Calibration (Cal VEL & Cal Zero)

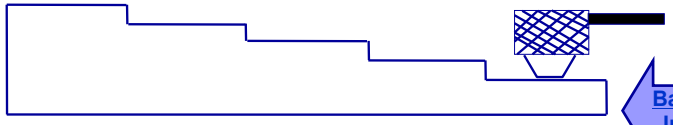
- Couple to the thick step, get a steady reading and press [Cal VEL], then [ENTER], then enter in the known thickness
- Couple to the thin step, get a steady reading press [Cal VEL], then [ENTER], then enter in the known thickness and press [MEAS]
- Check the thickness on all steps if measurement accuracy is sufficient then save the setup as a custom dual element transducer setup.

Note: If the accuracy is not acceptable then a custom V-Path should be performed.









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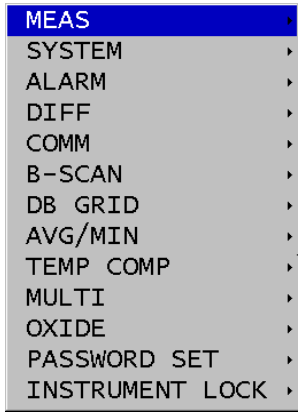
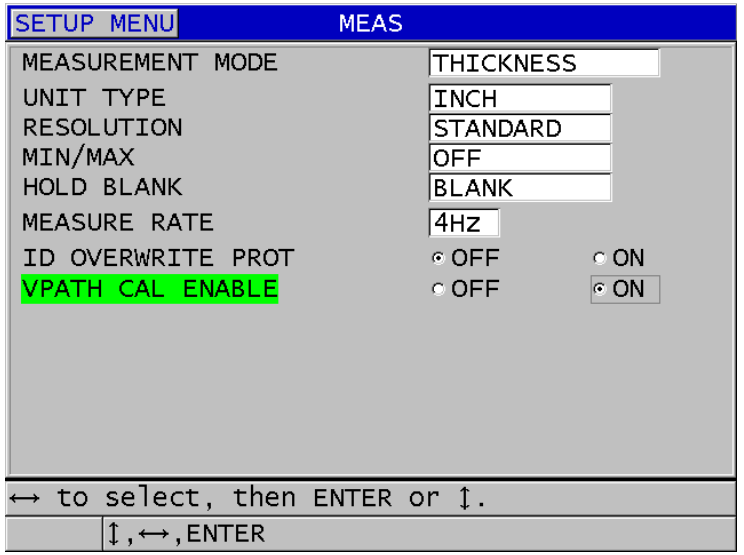
Turn V-Path Builder on

Press **SP MENU** **SETUP MENU**

Use the [🡻],[🡹] keys to select MEAS, then press [ENTER]





Use the [🡻],[🡹] keys to highlight V-Path CAL Enable and use the [🡸],[🡺] to turn it on, then press the [MEAS]

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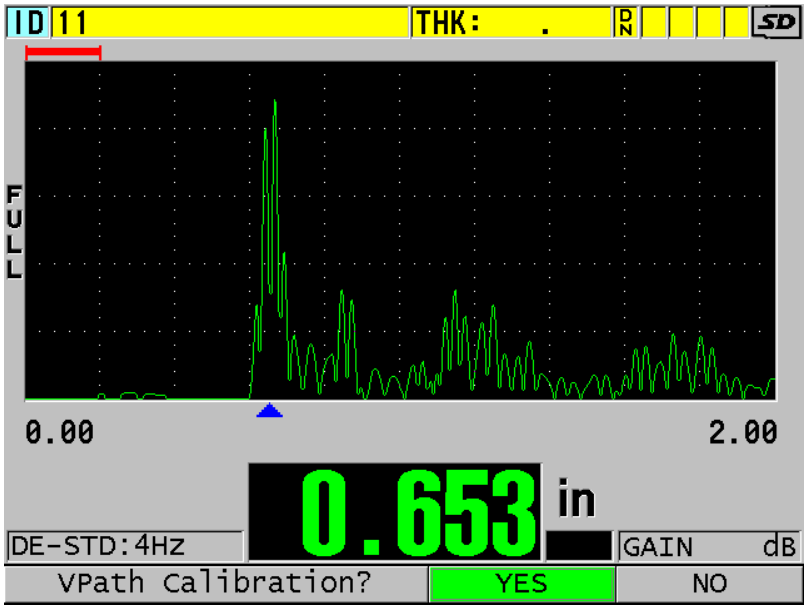
V-Path Builder (Create a custom V-Path)

- When V-Path builder is turned on the 38DL PLUS will ask the user if they want to perform a V-Path calibration when the [Cal VEL] is pressed.
- V-Path builder requires at least three calibration points and allows the user to enter up to 10 calibration points to create a custom V-Path
- Points should all be within the measurement range and should represent the min and max thickness to be measured.



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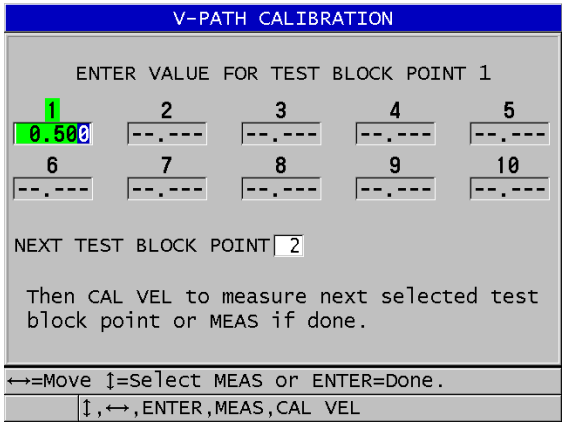
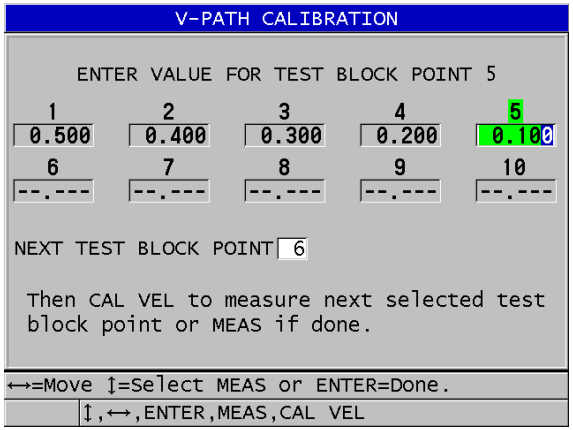
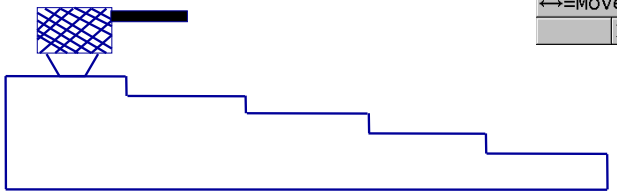
Creating a custom V-Path table

Couple to the thickest standard and get a steady thickness reading and press[CAL VEL], select “yes” for V-Path calibration, then press [ENTER] and [ENTER] again Use the [🡻],[🡹] keys to enter the know thickness of the step.



Then couple to the next thickest step and press [CAL VEL] then [ENTER]. Use the [🡻],[🡹] keys to enter the know thickness of the step, repeat by using the [CAL VEL] until all points are entered, then press [MEAS] to complete the table.





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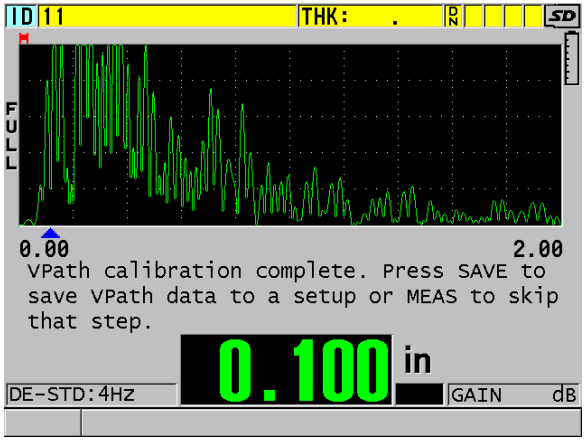
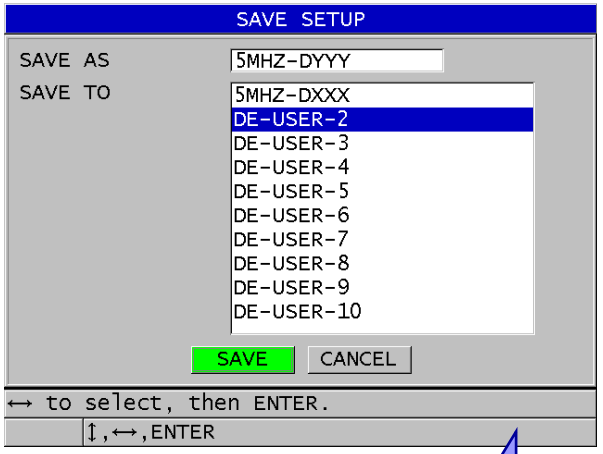
Saving a custom V-Path

Press [Save/Send] and use the editing functions to enter a name for the custom setup, then use the [🡻],[🡹] keys to highlight a location to save the setup and press [ENTER] then highlight Save and press [ENTER]



Note: The saved setup including the calibration and V-Path table can be recalled at any time when using this dual element



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38DL PLUS
Velocity and Time of Flight Measurements

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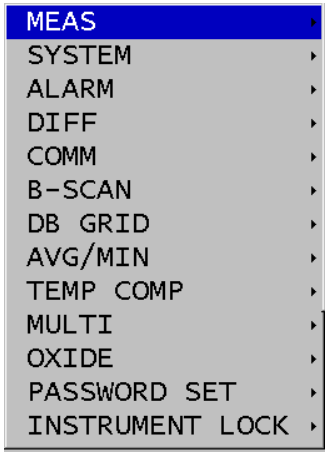
Velocity Measurements

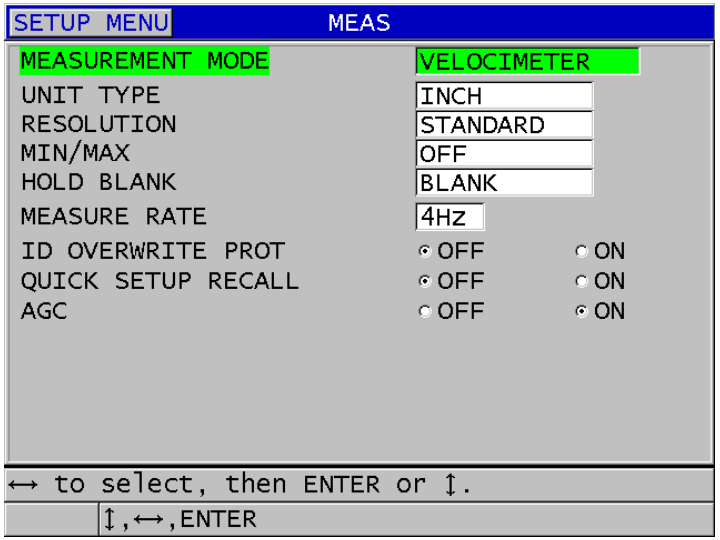
The 38DL PLUS has the ability to be make thickness, Velocity or time of flight. The user can select the measurement mode in the Setup menu

SP MENU

Press **SETUP MENU**

Use the [🡻],[🡹] to highlight "MEAS" then press [ENTER]





Use the [🡻],[🡹] to highlight Measurement Mode then Use [🡸],[🡺] to select Velocimeter then press [MEAS]

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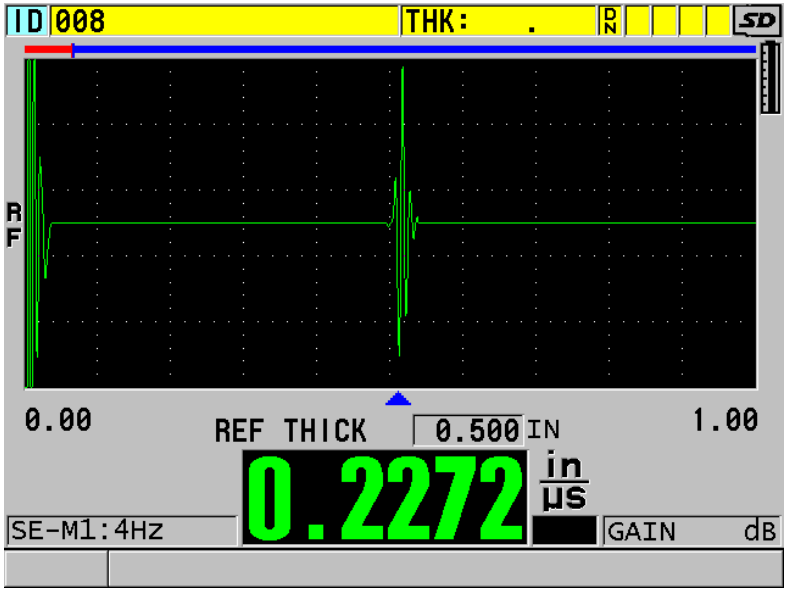
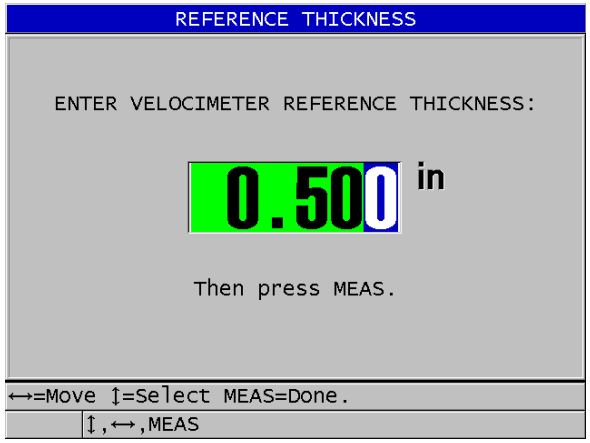
Making Velocity Measurements

When in velocity mode it is necessary to perform a two point thickness calibration to properly set the zero offset for the transducer being used.

- Once calibrated couple to a sample of known thickness
- The gage will display a velocity based on the current REF Thickness value
- Press [2nd F],[XDCR RECAL] (REF VALUE) and enter the know thickness of the sample and press [ENTER]





Note: To save velocity measurement to the datalogger you need to make sure you create a file with the file data type set as “Velocity”.

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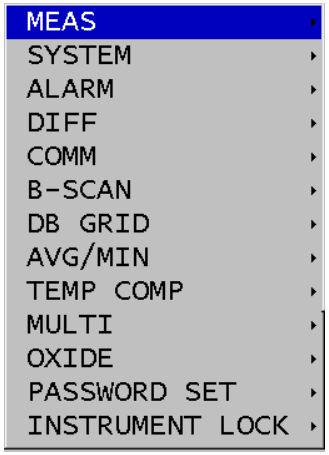
Time of Flight Measurements

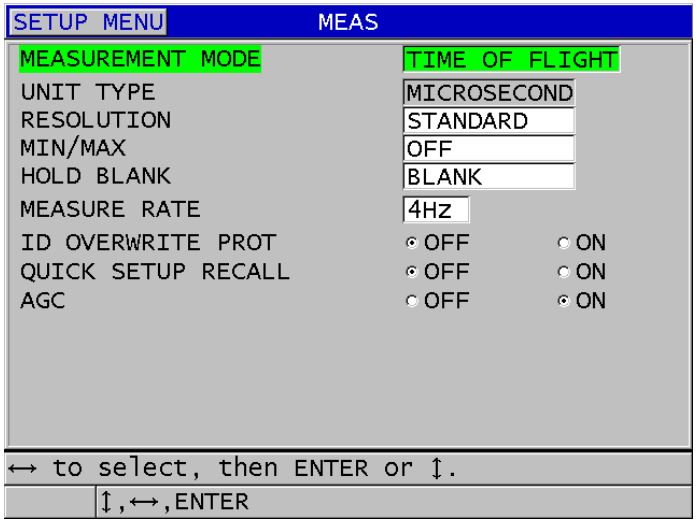
The 38DL PLUS has the ability to be make thickness, velocity or time of flight. The user can select the measurement mode in the Setup menu

SP MENU

Press **SETUP MENU**

Use the [🡻],[🡹] to highlight "MEAS" then press [ENTER]





Use the [🡻],[🡹] to highlight Measurement Mode then Use [🡸],[🡺] to select Time of Flight then press [MEAS]

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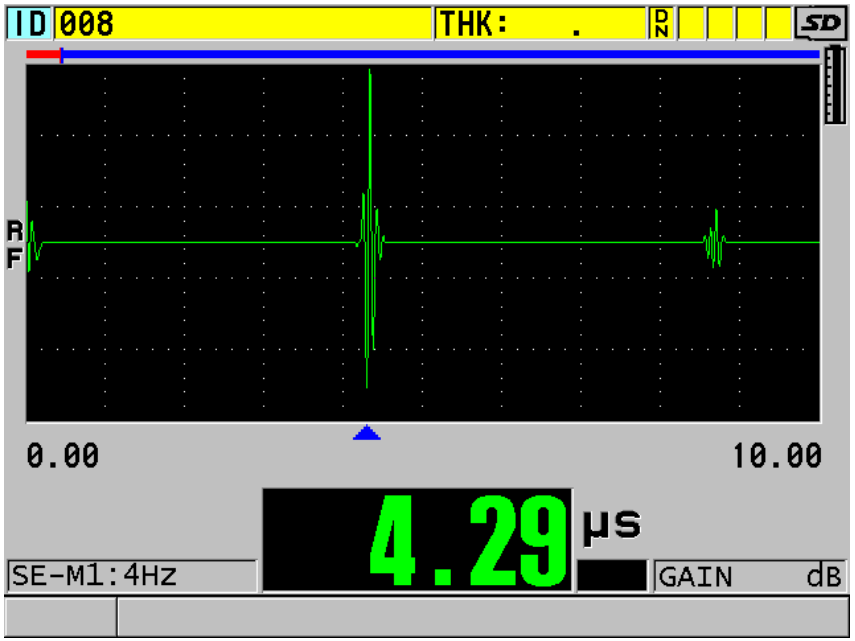
Making Time of Flight Measurements

When in time of flight mode it is necessary to perform a two point thickness calibration to properly set the zero offset for the transducer being used.

- Once calibrated couple to a sample of known thickness
- The gage will display a two way time of flight for the material



Note: To save velocity measurement to the datalogger you need to make sure you create a file with the file data type as “Time of Flight”

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38DL PLUS Software options

- High Resolution (HR) Software Option
- Internal Oxide Software Option
- High Penetration (HP) Software Option
- Multi-Layer (MM) Software Option
  - Multi-Layer Calibration

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Activating Software Options

- The software options for the 38DL PLUS are activated using a licensed option key. An option can be purchased at the time the unit is purchased or the 38DL PLUS can be upgraded with the software options in the field. If the unit was purchased along with software options then they will be installed and activated when you receive it.
- If software options are needed after the unit is purchased then they will have to be activated using a unique licensed option key.
- Please contact your Olympus representative for information concerning activating software options for your 38DL PLUS

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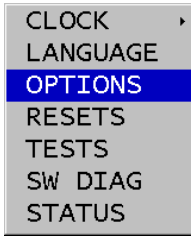
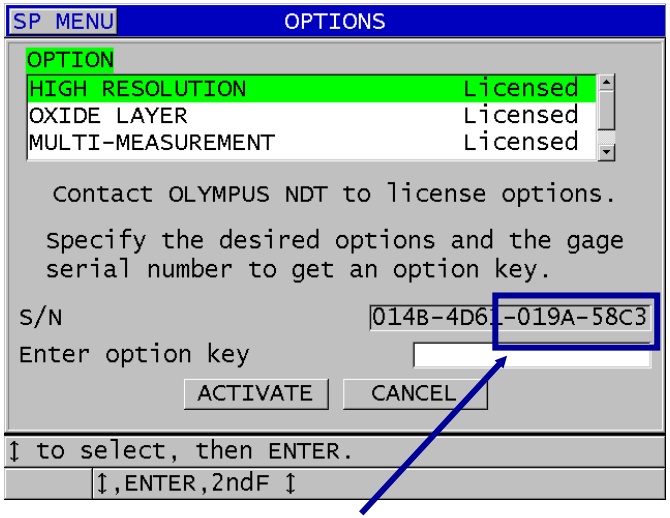
Activating Software options

Press **2nd F** Then **SP MENU** **SETUP MENU**

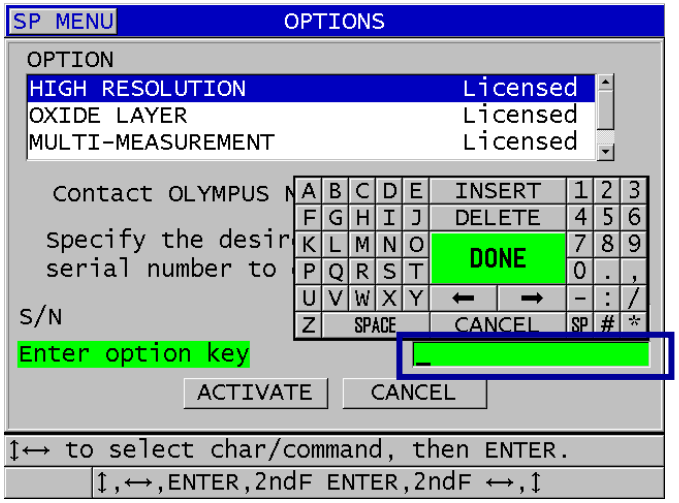


Use [↓],[↑] to highlight Options and then press [ENTER]



Provide the last 8 character of the s/n number to Olympus and we can provide a option key to activate the software option.

Allows the user to activate one or several of the software options for the 38DL PLUS. One single option key can activate more then one software option.



Enter the provided option key using the editing functions and press [ENTER]. Highlight activate and press [ENTER] to activate the software options.

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38DL PLUS
High Resolution Software Option

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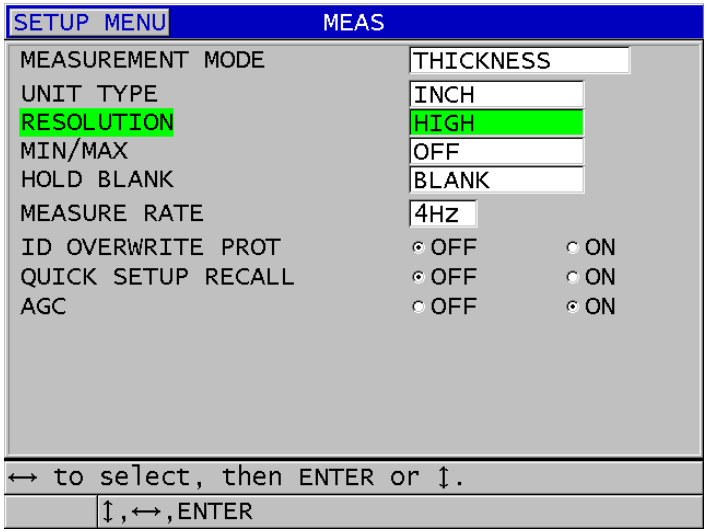
HR (High Resolution Software Option

The standard resolution for the 38DL PLUS is 0.001 in. (0.01 mm). The High Resolution software option allows the gage to display thickness measurements in High Resolution 0.0001 in (0.001 mm)

Note: High resolution is **not available** for Dual element transducer or HP (High Penetration single element transducers.

When High Resolution had been activated it will then be one of the resolution options available in the Measurement Setup Menu.



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38DL PLUS
Internal Oxide Software Option

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Oxide Software Option

- Oxide/Scale can build up on the inside of boiler tubes
- The oxide that builds up acts as an insulator.
- This effects the heat transfer from outside of the tube to the water inside the tube
- The tubes runs at a higher temperature then they were designed for and they start to thin faster.
- Knowing both the thickness of the steel and Internal Oxide the remaining tube life can be more accurately predicted

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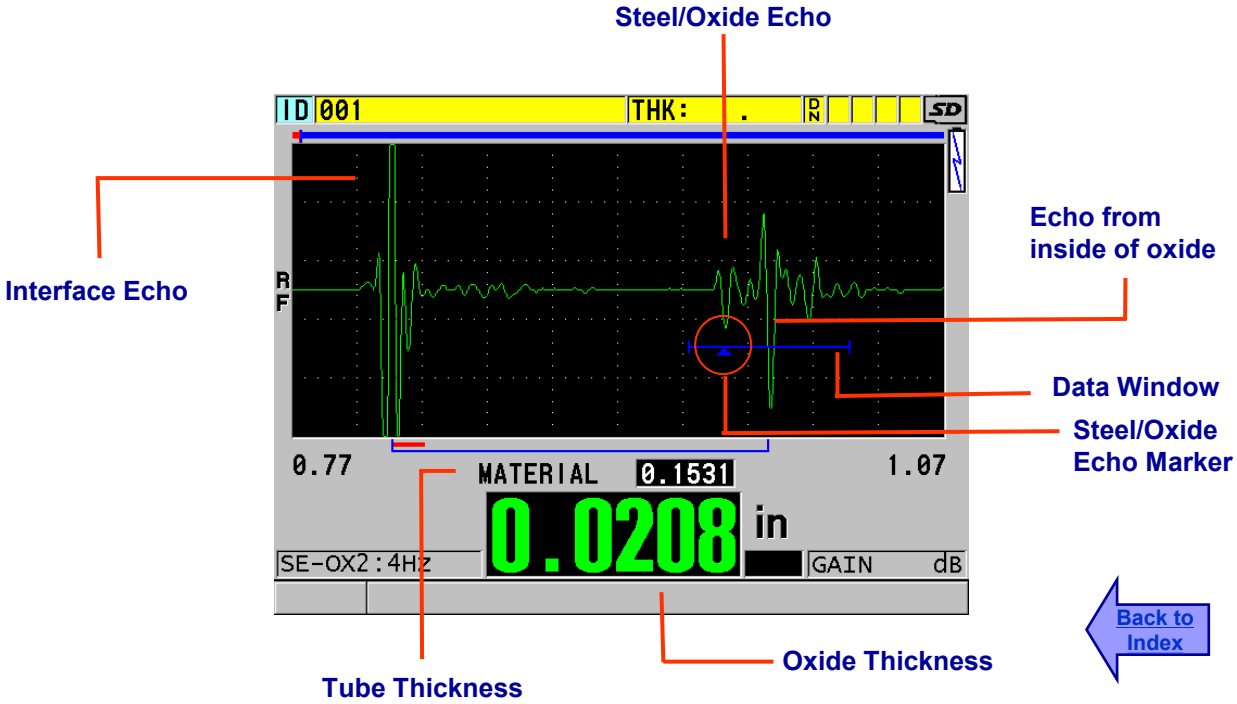
Oxide/Scale Measurement

- New measurement algorithm allows the user to measure scale or oxide build up on the inside of boiler tubes
- Thickness of Oxide helps predict tube life
- Measures and displays Oxide and tube thickness at the same time
- Min scale thickness
  - 0.010 in. (0.25mm) with M2017
  - 0.006 in. (0.150 mm) with M2091 Normal Incident Shear



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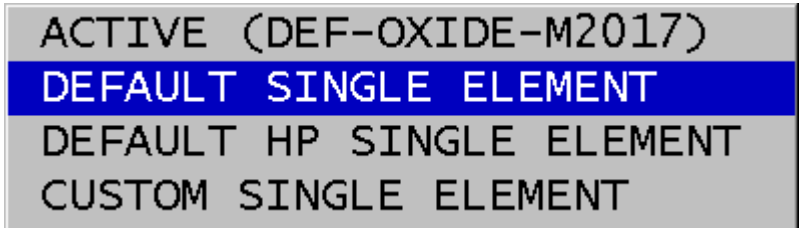
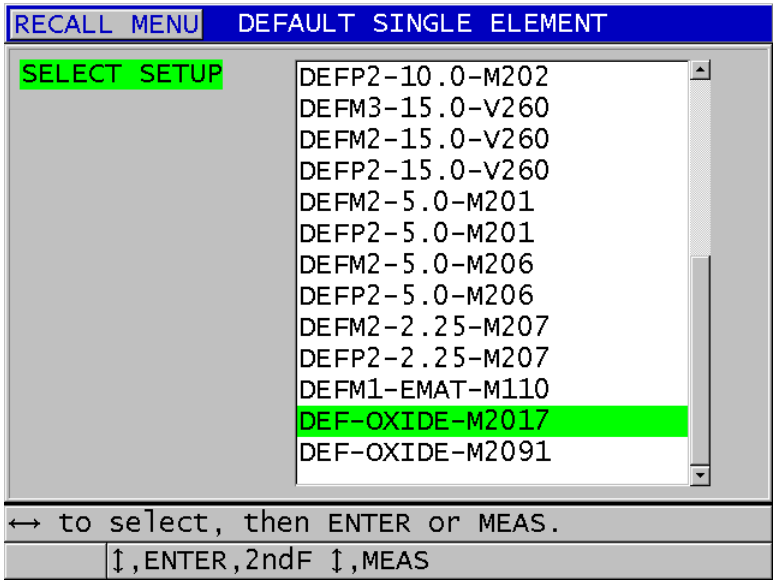
Oxide setup for M2017 Transducer

Select the setup for the M2017 transducer setup

Press **REF VALUE** **XDCR RECALL**



Use [🡻],[🡹] to highlight Default Single Element and press [ENTER] then user the [🡻],[🡹] To highlight the DEF-OXIDE-M217 or DEF-OXIDE-M2091 transducer and press [MEAS]



Note: The M2091 is a normal incident shear wave transducer and must be used with SWC couplant between the delay and on the surface of the material

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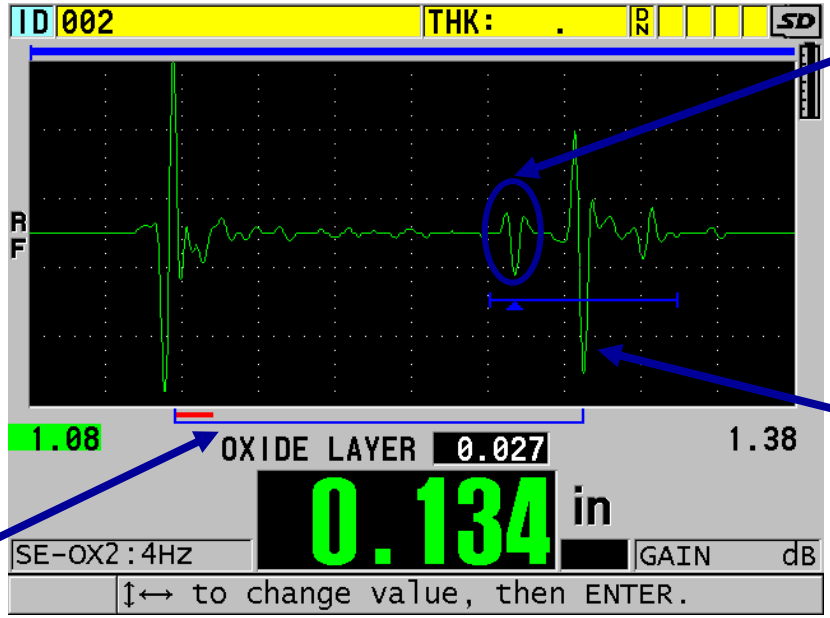
Adjust the Initial Gain, Slope and Max Gain

Adjust the TVG Gain (Initial, Max Gain and Slope) to make a mode 2 detection of the larger total back wall.



Oxide/Steel Interface Echo

Total back wall echo

Mode 2 detection from delay line echo to total back wall echo

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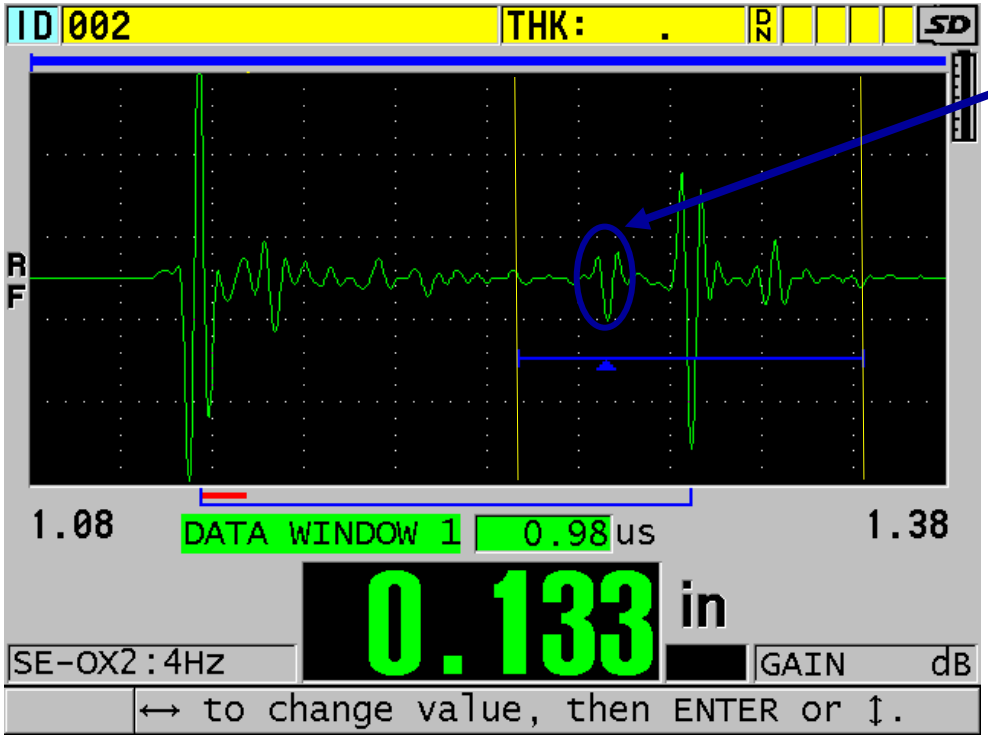
Adjust Data Window1

Adjust the DataWin1 so it extends far enough to cover the oxide steel interface echo



Oxide/Steel Interface Echo

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Oxide: Steel Cal Velocity

Couple transducer to thick steel sample without oxide

Press VEL

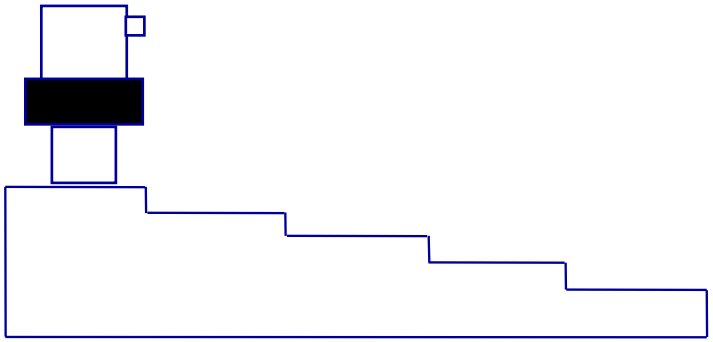
CAL VEL

Allows the user to calibrate for the speed of sound of the material to be tested. Usually done on a sample representing the maximum of the measurement range.

Once reading is steady

Press ENTER

Uncouple the transducer and enter the known thickness using the



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Oxide: Steel Cal Zero

Couple transducer to the thin steel sample without oxide

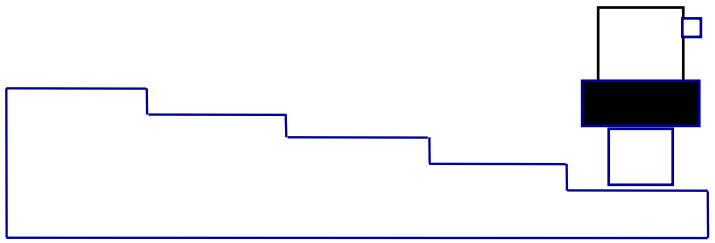
Press **CAL ZERO** (Do-ZERO)

Once reading is steady

Press **ENTER**

Uncouple transducer and enter the known thickness. Then press [CAL] to calibrate for the velocity of the oxide.

A subtracted time measurement used to compensate for the transit time through the delay line in the transducer and the couplant layer. Cal Zero is usually done on a sample representing the minimum of your measurement range.



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Oxide Coating Calibration

Couple transducer to a sample with known oxide thickness

Press VEL

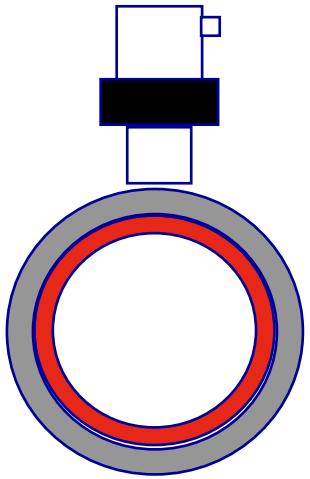
CAL VEL

Once reading is steady

Press ENTER

Uncouple the transducer and enter the known oxide thickness
Press [MEAS]

Allows the user to calibrate for the sound speed of the of the oxide material.



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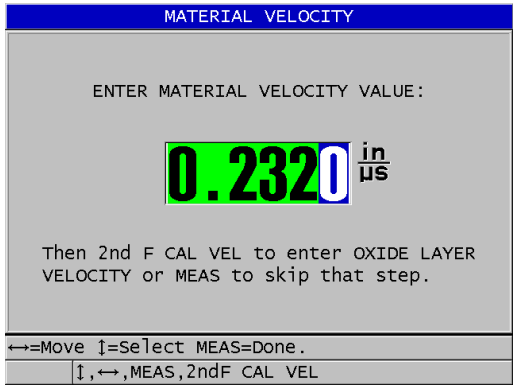
Directly Enter Velocity, Oxide Mode

Press **2nd F** Then **VEL** **CAL VEL**

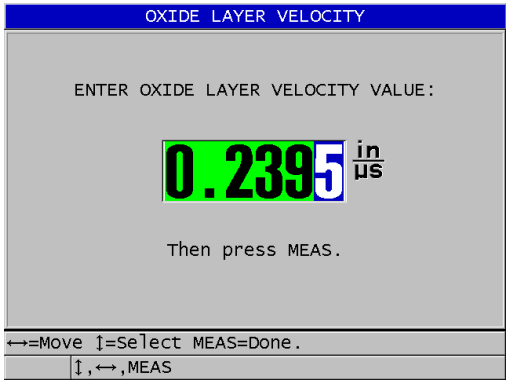
Allows the user to directly enter the velocity of the material to be tested. When using oxide mode the velocity of the oxide can also be entered

The current material velocity will be displayed. Use the numeric keys to enter the know velocity. Then press [MEAS]



Press **2nd F** Then **VEL** **CAL VEL** Again

The current oxide velocity will be displayed. Use the numeric keys to enter the know velocity. Then press [MEAS]



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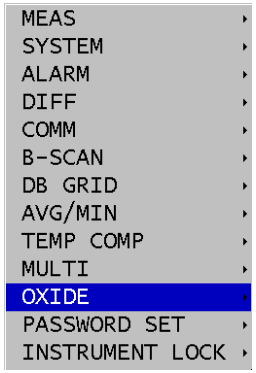
Oxide Software Setup

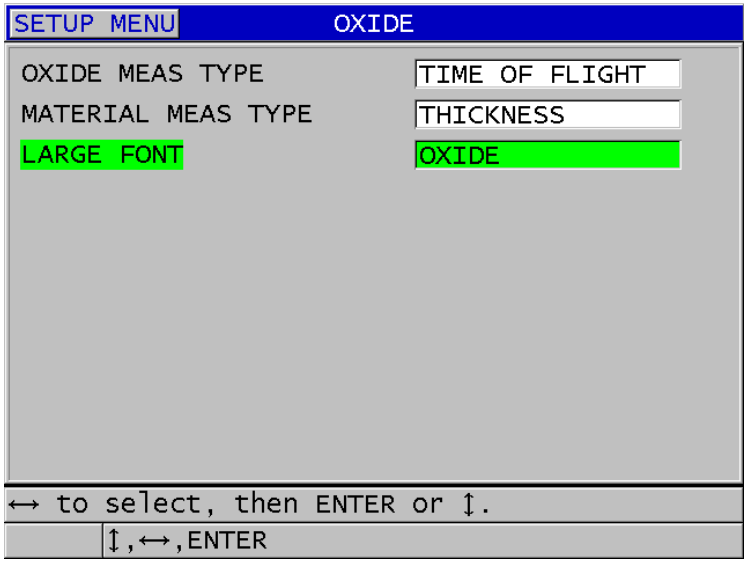
SP MENU

Press **SETUP MENU**



Use the [🡻],[🡹] to highlight “Oxide Options” then press [ENTER] to display the Oxide Measure Type setup screen. Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to adjust it then press [ENTER]

Allows the user to select if they want to display the thickness of the Oxide or Boiler tube in thickness or time of flight and they can also select which measurement is displayed in large font.



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38DL PLUS
HP Software Option

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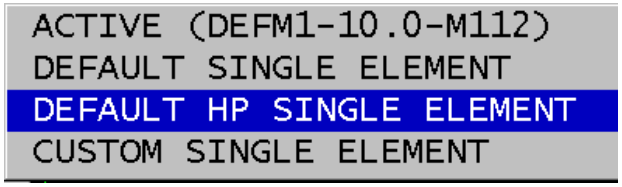
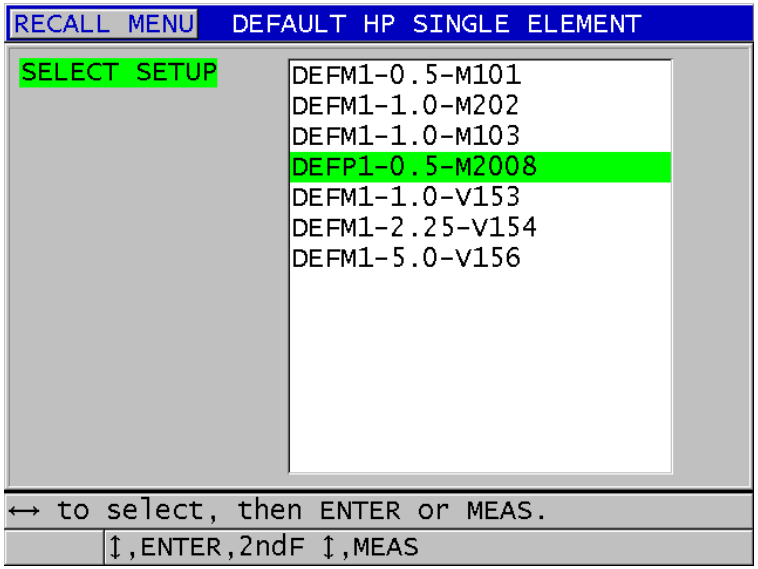
HP transducer setups

Press REF VALUE **XDCR RECALL**



Use [↓],[↑] to highlight Default HP Single Element and press [ENTER] then user the [↓],[↑] to highlight any of the default low frequency transducer setup and press [MEAS].

Once the HP (High Penetration) software has been activated the 38DL PLUS will add a list of HP low frequency single element transducers to the list of default single element transducers.



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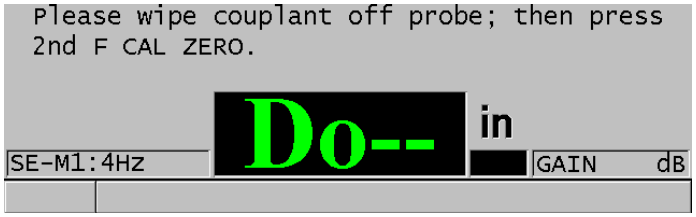
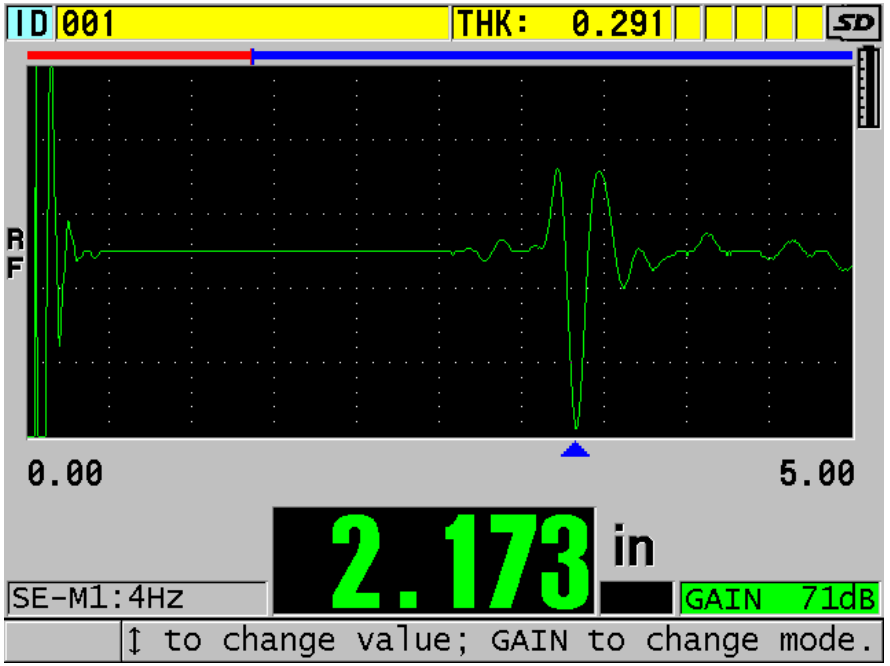
Measurements with The M2008

Press **2nd F** Then **VEL** **CAL VEL**



The M2008 is a special low frequency transducer that is used to measure thick fiberglass and composite materials. Especially good for material 0.200 in. (6 mm) and greater. When using this transducer it is necessary to Zero the delay line.



M2008 on thick fiberglass

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38DL PLUS
Multi Layer Software Option

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Multi-Layer Software Option

The Multi-Layer software option is used to simultaneously display the thickness of up to four layers of a multi-layer material.

Some common applications are:

- Multi-Layer plastic fuel tanks
- Multi-Layer plastic bottle preforms
- Multi-Layer aircraft windows
- Calculate the radius of curvature and the thickness of contact lenses
- Co-extruded plastic
- Two layer hot tubs and spas

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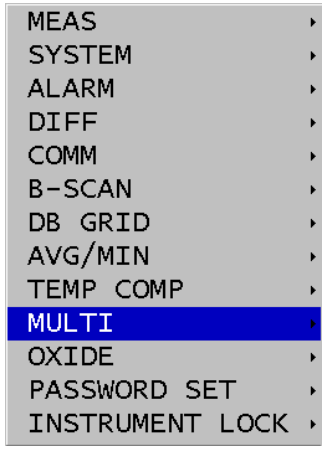
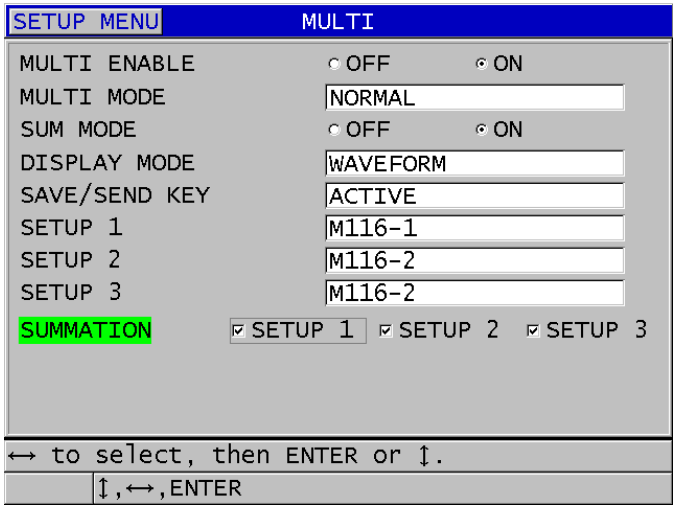
Multi-Measure Setup

Press **SP MENU** → **SETUP MENU**



Uses the [↑],[↓] to highlight the setup type and press [ENTER]

Once activated this software option allows the user to select up to four custom stored transducer setups and display all the thickness readings on the display at one time. A custom transducer setup has to be made for each layer of the material to be measured.



Uses the [↑],[↓] to highlight the parameter and type and press [ENTER]

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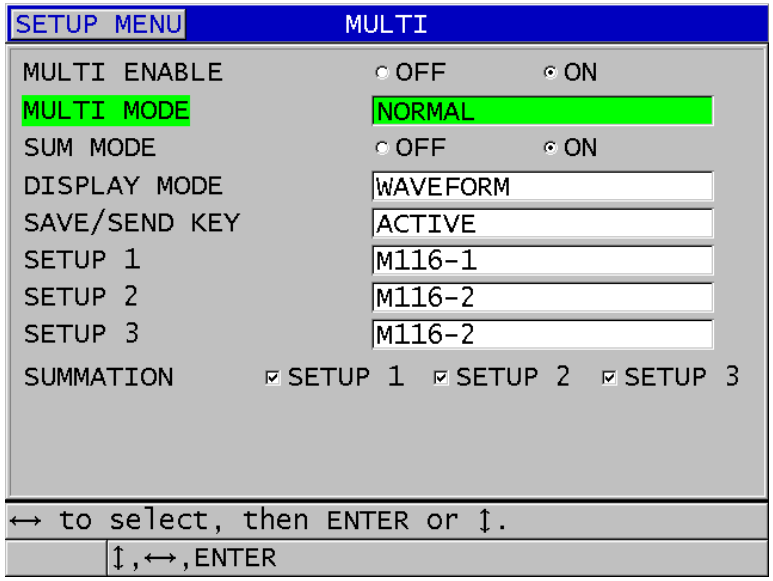
Multi-Measure Mode (Normal Mode)



Used to measure an application consisting of multiple layers

Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter

Enable:	Turns Multi-Measure function – On/Off
Mode:	Select (Normal, Soft Contact, or Pct Total Thk)
Sum Mode:	Mathematical sum of selected layers – On/Off
Display:	Select (Waveform or Large Font) [see next slide]
Save/Send Key:	Select (Active or Auto-Incr Active)
Setup 1 - 4:	User selected custom setups for each layer
Summation:	If Sum Mode is On, select layers to sum (Setup 1 - 3)

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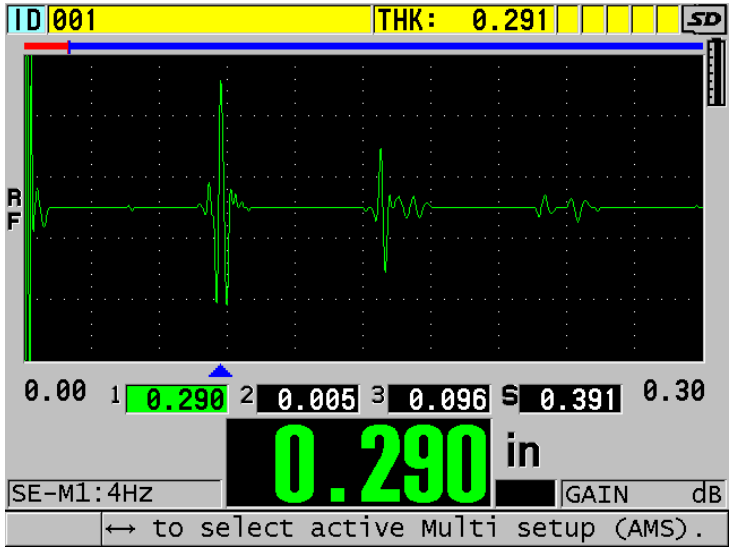
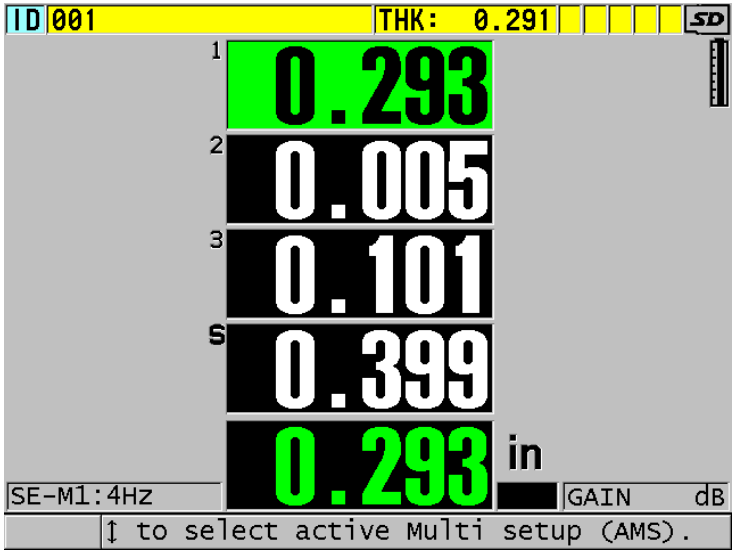
Multi-Measure Mode

Display Parameter (Waveform vs. Large Font)



Display set to Waveform



Display set to Large Font

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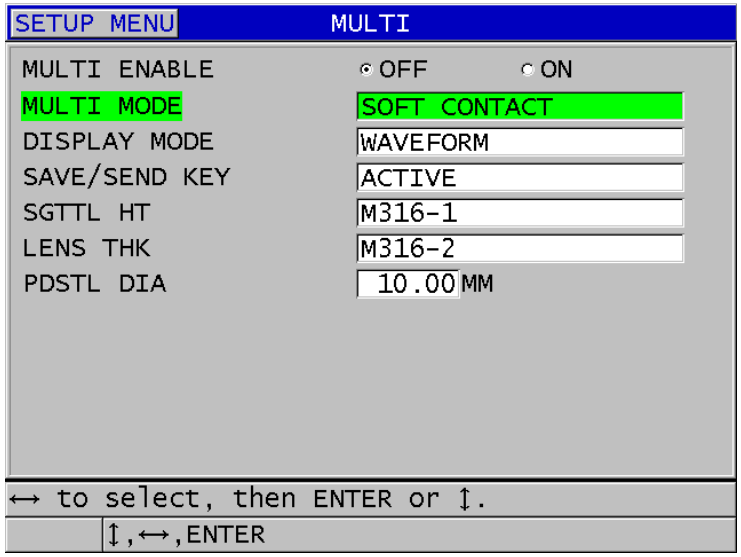
Multi-Measure Mode (Soft Contact)



Used to measure the layers of a soft contact lens application

Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter

Enable:	Turns Multi-Measure function – On/Off
Mode:	Select (Normal, Soft Contact, or Pct Total Thk)
Display:	Select (Waveform or Large Font)
Save/Send Key:	Select (Active or Auto-Incr Active)
SGTTL HT:	Select custom setup saved for sagittal height
LENS THK:	Select custom setup saved for lens thickness
PDSTL DIA:	Enter diameter of pedestal

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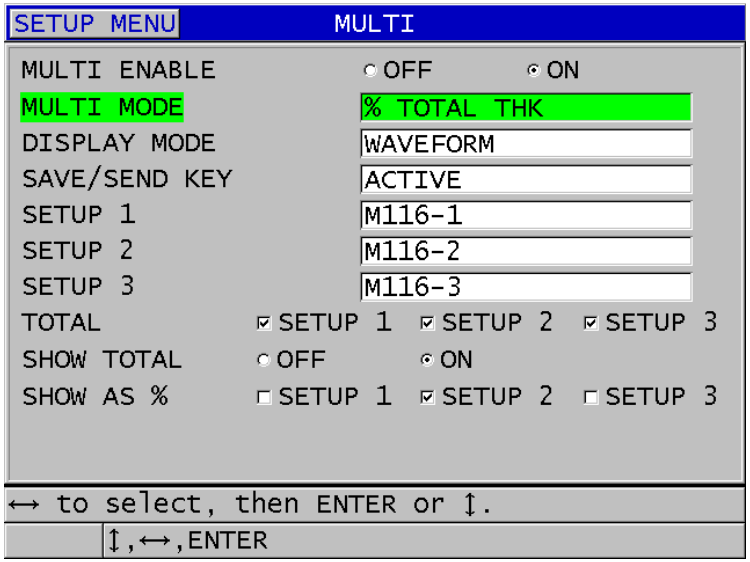
Multi-Measure Mode (Percent Total Thickness)



Used to express the thickness of a layer as a percentage of the total thickness of a part

Use [🡻],[🡹] to highlight the parameter and [🡸],[🡺] to change the parameter

Enable:	Turns Multi-Measure function – On/Off
Mode:	Select (Normal, Soft Contact, or Pct Total Thk)
Display:	Select (Waveform or Large Font)
Save/Send Key:	Select (Active or Auto-Incr Active)
Setup 1 - 3:	User selected custom setups for each layer
Total:	Choose layers to be part of the total thickness
Show Total:	Select to show total thickness when measuring
Show as %:	Choose which layers to display as a percentage

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Data Window 1 (Barrier Layer only)

- Only available in Barrier Layer measurement type
- Used in Mode 1 to setup a gate on the Barrier Layer echo. The gage automatically centers DataWin1 on the detected Barrier Layer echo. The width of DataWin1 should be set so the entire echo is within the gate.
- Used in Mode 2 to setup a gate on the Interface/Surface echo. The gage automatically centers DataWin1 on the Interface/Surface echo. The width of DataWin1 should be set so the entire echo is within the gate.

Note: In Mode 2 the echo in DataWin1 is used as a reference echo for the advanced algorithm.

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Data Window 2 (Barrier Layer only)

- Only available in Barrier Layer measurement type and Mode 2
- In Mode 2 it is used to setup a gate on the Barrier Layer echo. The gage automatically centers DataWin2 on the detected Barrier Layer echo. The width of DataWin2 should be set so the entire echo is within the gate.

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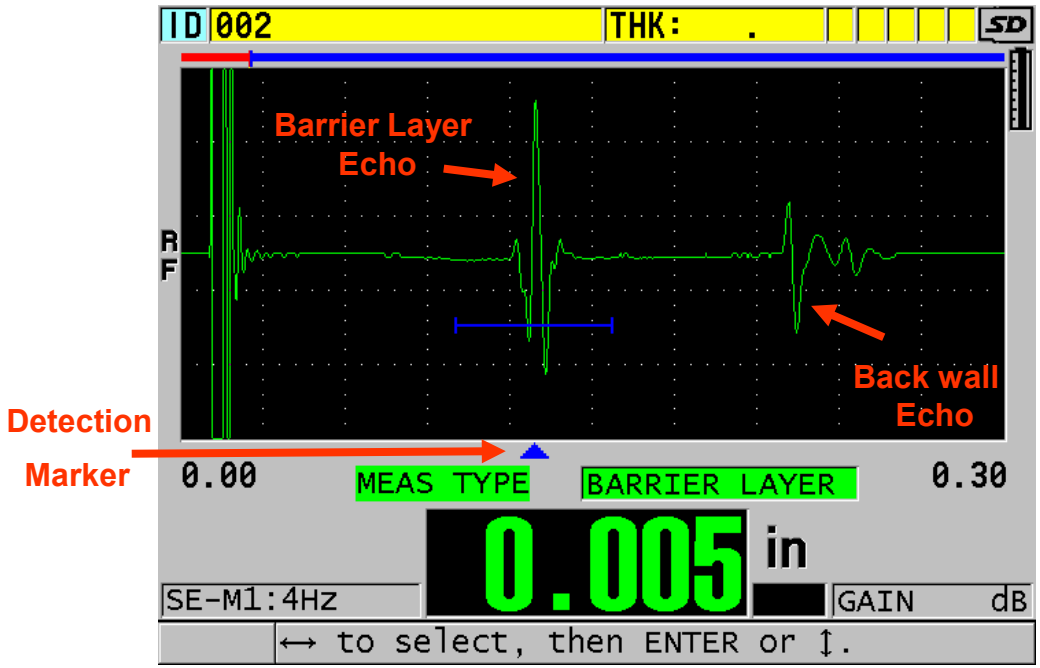
Barrier Layer Measurement (Mode 1)

- Select the default setup for M116
- Enter the parameter adjust by pressing [WAVE ADJ]
- Use [↑] or [↓] to select MEAS Type and use [←] or [→] to select Barrier Layer
- Adjust Max Gain, Initial Gain and TDG Slope so that the Barrier Layer is being detected as shown below



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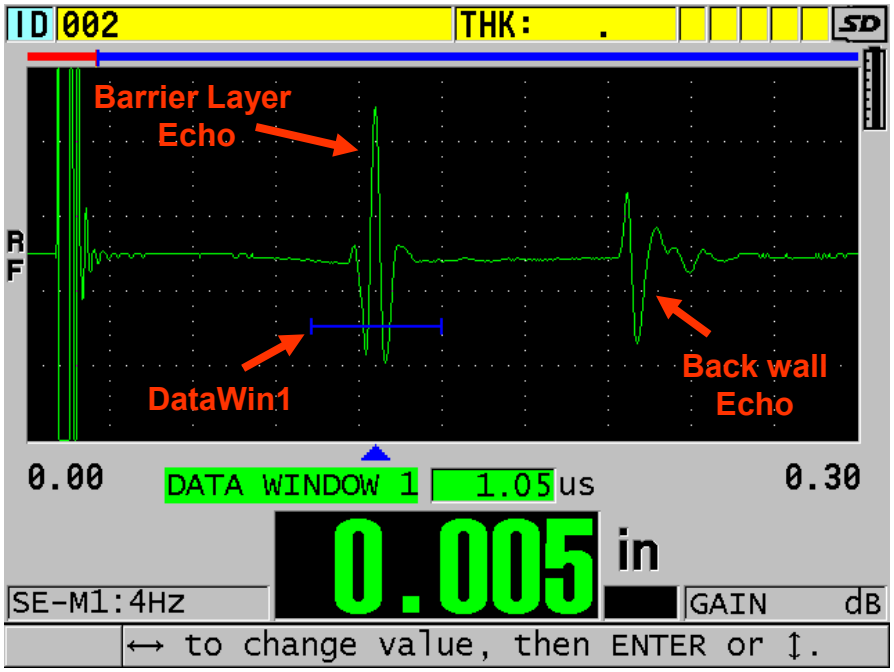
Barrier Layer Measurement (Mode 1)

Use [↑] or [↓] to select DataWin1 and use [←] or [→] adjust the width so it is large enough to include the entire Barrier Layer reflection, but not include the Main Bang echo or Back wall echo.



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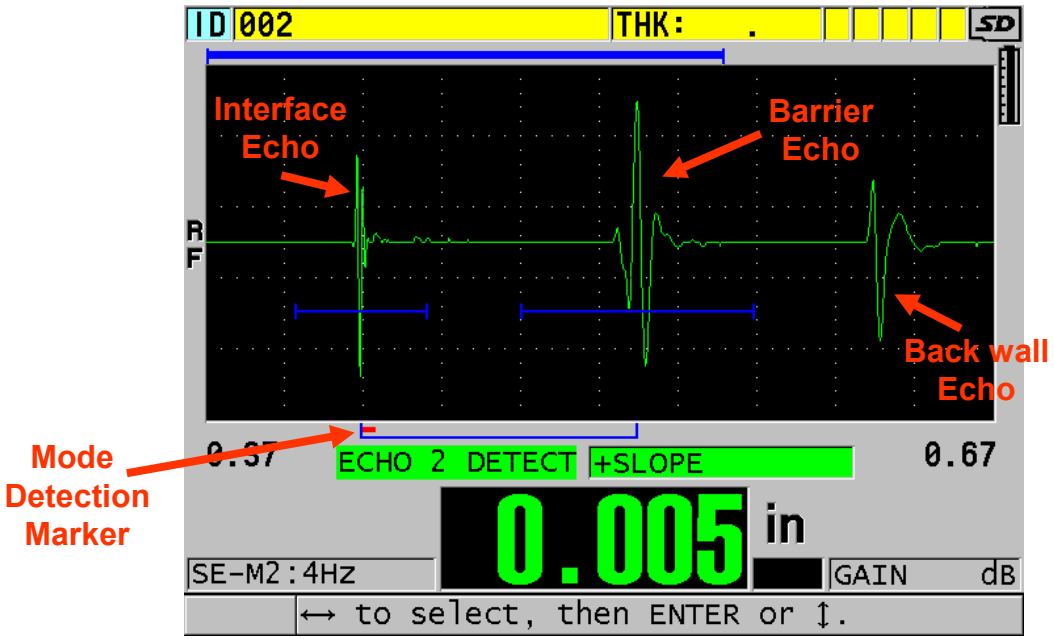
Barrier Layer Measurement (Mode 2)

- Select the default setup for M208
- Enter the parameter adjust by pressing [WAVE ADJ]
- Use [↑] or [↓] and [←] or [→] to make sure Mode 2 is selected and the Meas Type is set to Barrier Layer. Adjust Max Gain, Initial Gain, TDG Slope, Echo 1 and Echo 2 polarity so a proper detection is being made between the Interface echo and the Barrier Layer echo as shown below.



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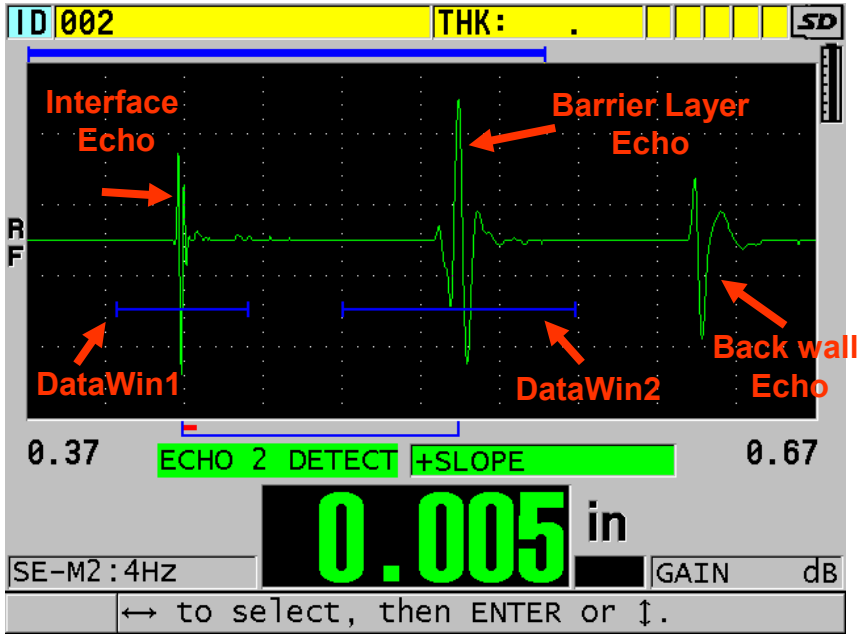
Barrier Layer Measurement (Mode 2)

- Use [↑] or [↓] to select DataWin1 and use [←] or [→] to adjust the width so it is large enough to include the entire Interface echo but does not include the Main Bang or the Barrier echo.

- Use [↑] or [↓] to select DataWin2 and use [←] or [→] to adjust the width so that the width of the window is large enough to include the entire Barrier Layer reflection, but does not include the Interface echo or Back wall echo.



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38DL PLUS
Multi-Layer Calibration

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Cal Velocity (Standard Measurement Type)

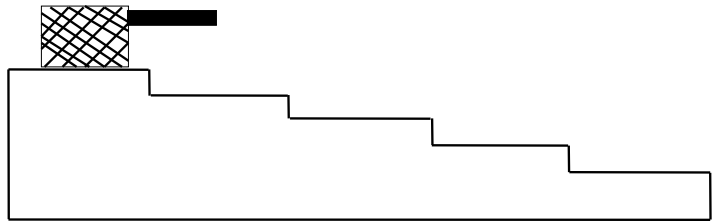
Couple transducer to the thick sample

Press VEL → CAL VEL

Allows the user to calibrate for the speed of sound of the material to be tested. Usually done on a sample representing the maximum of the measurement range.

Once reading is steady

Press ENTER



Uncouple the transducer and enter the known thickness

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Cal Zero (Standard Measurement Type)

Couple transducer to the thin sample

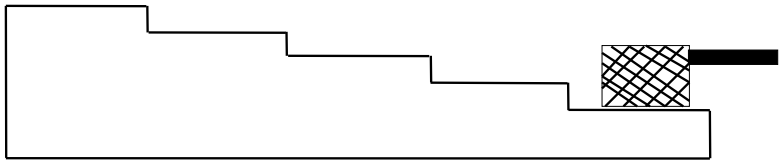
Press **CAL ZERO** (Do ZERO)

Once reading is steady

Press **ENTER**

Uncouple transducer and enter the known thickness. Then press the [MEAS] key to complete the calibration.

A subtracted time measurement used to compensate for the transit time through the delay line in the transducer and the couplant layer. Cal Zero is usually done on a sample representing the minimum of your measurement range.



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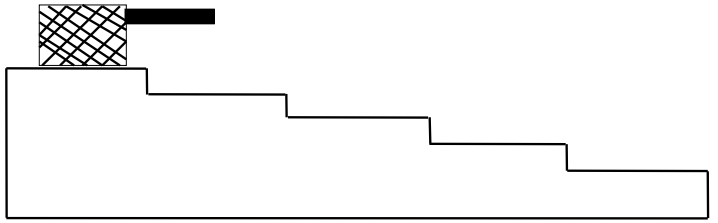
Cal Mode 1 (Barrier Measurement Type)

Press VEL CAL VEL

Allows the gage to store a reference echo off a test block and calibrate for the sound speed of the barrier material to be tested.

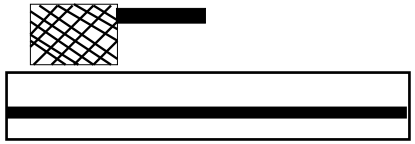
Couple transducer to 0.50 in. or 15 mm test block

Press ENTER



Couple to a sample with known barrier thickness

Press VEL CAL VEL Then ENTER



Enter the known thickness for the barrier layer thickness and press [MEAS]

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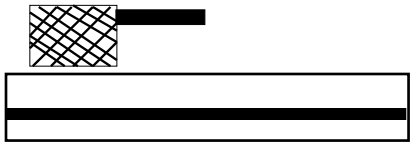
Cal Mode 2 (Barrier Measurement Type)

Press VEL CAL VEL

Allows the gage to calibrate for the sound speed of the barrier material to be tested.

Couple to a sample with known barrier thickness

Press ENTER



Enter the known thickness for the barrier layer thickness press [MEAS]

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