

GE
Measurement & Control Solutions

Ultrasonic

DMS Go

Operator's Manual



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P/N 1347494 Rev. 1
October 2010

DMS Go

Ultrasonic Thickness Gauge

Operator's Manual

P/N 1347494 Rev. 1
October 2010



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Safety Information

Before powering up or operating this instrument, the safety information in this section should be read carefully. This *Operator's Manual* should be stored in a safe place for reference.

IMPORTANT: *This instrument is to be used only for testing materials in an industrial environment. Any use for medical applications or any other purpose is not permitted.*

IMPORTANT: *This instrument is waterproof according to IP 67. It can be operated either with batteries or with the power supply unit. The power supply unit meets the requirements of Electrical Safety Class II.*

Batteries

For battery operation of this instrument, GE only recommends the use of a lithium-ion battery. You should only use the battery recommended by GE for operation of this instrument. You can charge the lithium-ion battery either within the instrument itself or with the external battery charger.

IMPORTANT: *See “Battery Disposal” on page 151 for instructions on proper battery disposal procedures.*

Important Ultrasonic Testing Guidelines

Please read the information in this section before using your instrument. It is important that you understand and observe this information to avoid any operator errors that might lead to false test results. Such false results could result in personal injuries or property damage.

Using Ultrasonic Test Equipment

This *Operator's Manual* contains essential information on how to operate your test equipment. In addition, there are a number of factors that affect the test results, but a description of all these factors is beyond the scope of this manual. The three most important factors for safe and reliable ultrasonic inspection are:

- Operator training
- Knowledge of special technical test requirements and limits
- Choice of appropriate test equipment

Operator Training

The operation of an ultrasonic test device requires proper training in ultrasonic testing methods. Proper training comprises adequate knowledge of:

- The theory of sound propagation
- The effects of sound velocity in the test material
- The behavior of the sound waves at interfaces between different materials
- The shape of the sound beam
- The influence of sound attenuation in the test object and the influence of the surface quality of the test object

Lack of such knowledge could lead to false test results with unforeseeable consequences. You can contact GEIT or NDT societies or organizations in your country (DGZfP in Germany; ASNT in the USA) for information on opportunities for training on ultrasonic instruments that use time-of-flight measurements.

Accurate measurement results require a constant sound velocity in the test object. Steel test objects have only slight variations in sound velocity, thus affecting only high precision measurements. Test objects made of other materials (e.g., nonferrous metals or plastics) may have larger sound velocity variations, which could adversely affect the accuracy of the measurements.

Test Object Material Effects

If the material of the test object is not homogeneous, the sound waves may propagate at different velocities in different parts of the test object. An average sound velocity should then be used for the range calibration. This is achieved by using a reference block with a sound velocity equal to the average sound velocity of the test object.

If substantial sound velocity variations are expected, then the instrument calibration should be adjusted to the actual sound velocity values at shorter time intervals. Failure to do so may lead to false readings.

Test Object Temperature Effects

The sound velocity also varies as a function of the temperature of the test object. This can cause appreciable errors in measurements if the instrument has been calibrated with a reference block at one temperature, and the instrument is then used on a test object at a different temperature. Such measurement errors can be avoided either by ensuring that the reference block and the test object are at the same temperature, or by using a correction factor obtained from published tables.

Limited Warranty

For a period of two (2) years from the date of purchase, we warrant that the instrument will be free of any claim of ownership by third parties, (ii) when new, be free from defects in material and workmanship and perform in accordance with the Product's specifications under normal use and service for the applicable warranty period following the date of sale. The second year of this warranty is valid only if the instrument is calibrated to within the provided specifications, by us or one of our certified service providers after month twelve of ownership but before month fourteen begins. The duration of the warranty may be extended or modified by explicit service contracts.

This limited warranty shall not apply to any problems arising from (i) failure to follow the product instructions or failure to perform preventive maintenance, (ii) service, repair or modification by someone other than us or one of our authorized service representatives; or (iii) external causes, such as accident, abuse, misuse, or problems with electrical power.

This warranty does not cover parts identified as wear-and-tear parts or lamps, transducers, tubes, accessories, or optional equipment not manufactured by us, which items may be covered by separate manufacturers' warranties.

Our obligation under this warranty is limited to the repair or replacement of components determined by us to be defective within the warranty period at no cost to the original purchaser. Customer shall arrange for delivery to us in approved packing material. This warranty extends to the original purchaser and cannot be assigned or transferred to any other party.

EXCEPT FOR THE WARRANTY SET ABOVE, WE EXPRESSLY DISCLAIM ALL WARRANTIES AND REPRESENTATIONS OF ANY KIND WITH RESPECT TO OUR PRODUCTS, WHETHER EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, TITLE AND ANY WARRANTIES ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

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Chapter 1. General Information

The *DMS Go* is a portable ultrasonic thickness gauge. In addition to its light-weight design, the *DMS Go* includes a clean and simple user interface and a large, easy-to-read color WVGA (800x480) display. The instrument provides ultrasonic flaw detection and thickness measurements., and can store scans, operating parameters, and reports. Before beginning to take measurements, however, the instrument display, operating parameters, and data files must be configured by using the Configure, Probe & Cal, and DR menus. The following specific topics are discussed in this chapter:

- Supplying power to the instrument
- Powering the instrument ON and OFF
- Using the keypad
- Using the display

1.1 Supplying Power to the Instrument

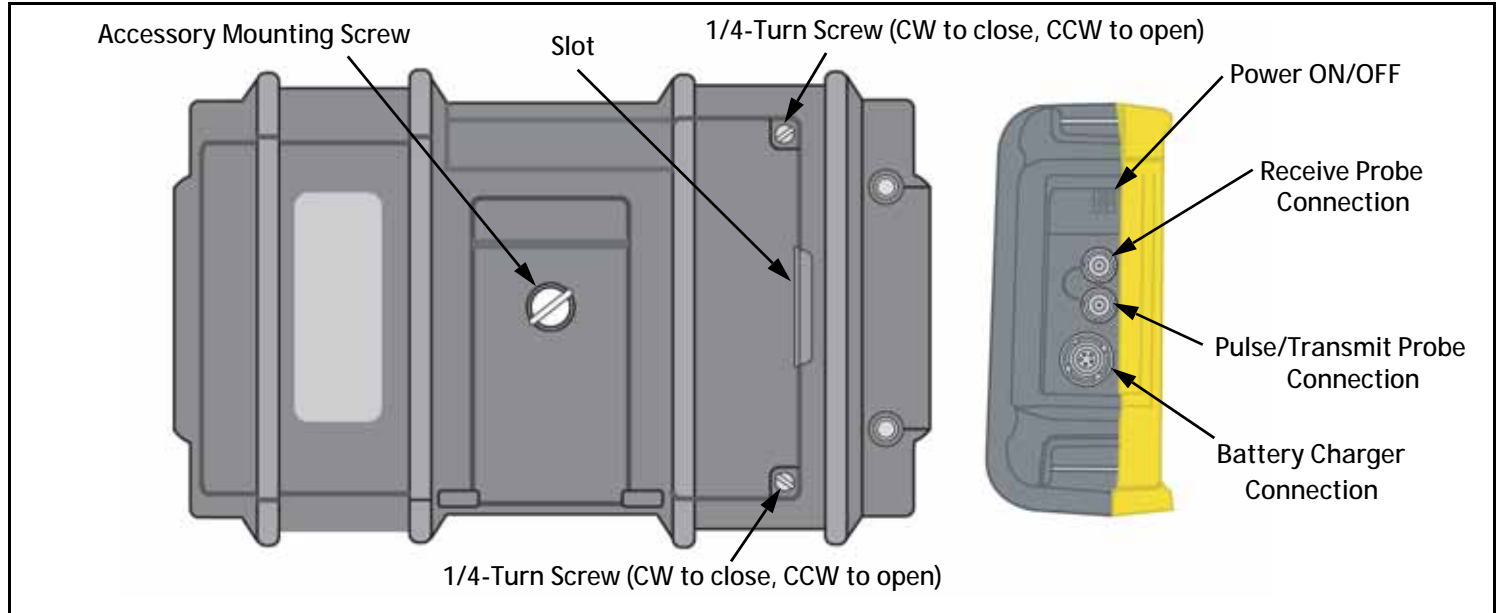


Figure 1: Rear and Side Views of the DMS Go Case


1.1 Supplying Power to the Instrument (cont.)

The *DMS Go* can be powered in either of two ways (see *Figure 1 on page 2*):

- A lithium-ion battery pack that is installed in a compartment on the rear of the case, or
- An external power adapter plugged into the connector on the side of the case

CAUTION! Use only the GEIT supplied lithium-ion battery pack in this instrument, and charge only this battery pack in the instrument or in the provided GEIT charger/adapter.

To remove the battery compartment cover, loosen the two 1/4-turn screws and then lift up on the slot between the screws. The standard GEIT lithium-ion battery pack is designed to provide maximum operating life between chargings.


The approximate level of remaining battery life is shown on the display (see *Figure 2 on page 5*) by the battery icon, , and the approximate “hours of charge” indication below the icon. When a fully-charged battery pack is installed, the icon will appear as “full,” and the icon will begin to “empty” as the battery life is depleted. If you remove the battery pack, the rear side of the pack offers a button. There you will find a button that illuminates up to 5 blue LEDs, each of them representing @20% of battery charge (on) or discharge (off). If you see all 5 LEDs lit, it means you have a fully charged pack. When the battery indicator is down to one-quarter full, charge the battery pack as soon as possible.

Note: *The instrument automatically shuts OFF when the batteries are too weak for reliable operation. However, your settings are saved and then restored when the instrument is turned back ON. When testing in remote locations, always carry a spare battery pack.*

1.1 Supplying Power to the Instrument (cont.)

When the AC adapter is connected to the instrument, the icon in the upper right corner of the display indicates the percentage of full-charge of the battery pack. When removing the battery pack to install a charged spare, the instrument will automatically turn OFF if the AC adapter is not connected to the instrument. However, if the adapter is connected, the instrument will remain ON while you change battery packs.

1.2 Powering the Instrument ON and OFF

To power the *DMS Go* ON or OFF, simply press the power button, , on the side of the case (see *Figure 1 on page 2*). As soon as the button press is recognized, you will hear the click of an internal relay. Then, after about 4 seconds, the display controller will be fully loaded and the display will become visible.

1.3 Using the Keypad

The *DMS Go* is designed to provide the user quick access to all of the instrument's functions. Its easy-to-use menu system allows any function to be accessed with a minimum of effort.

See *Figure 2 on page 5* for the locations of the front-panel components described in this chapter.

1.3 Using the Keypad (cont.)

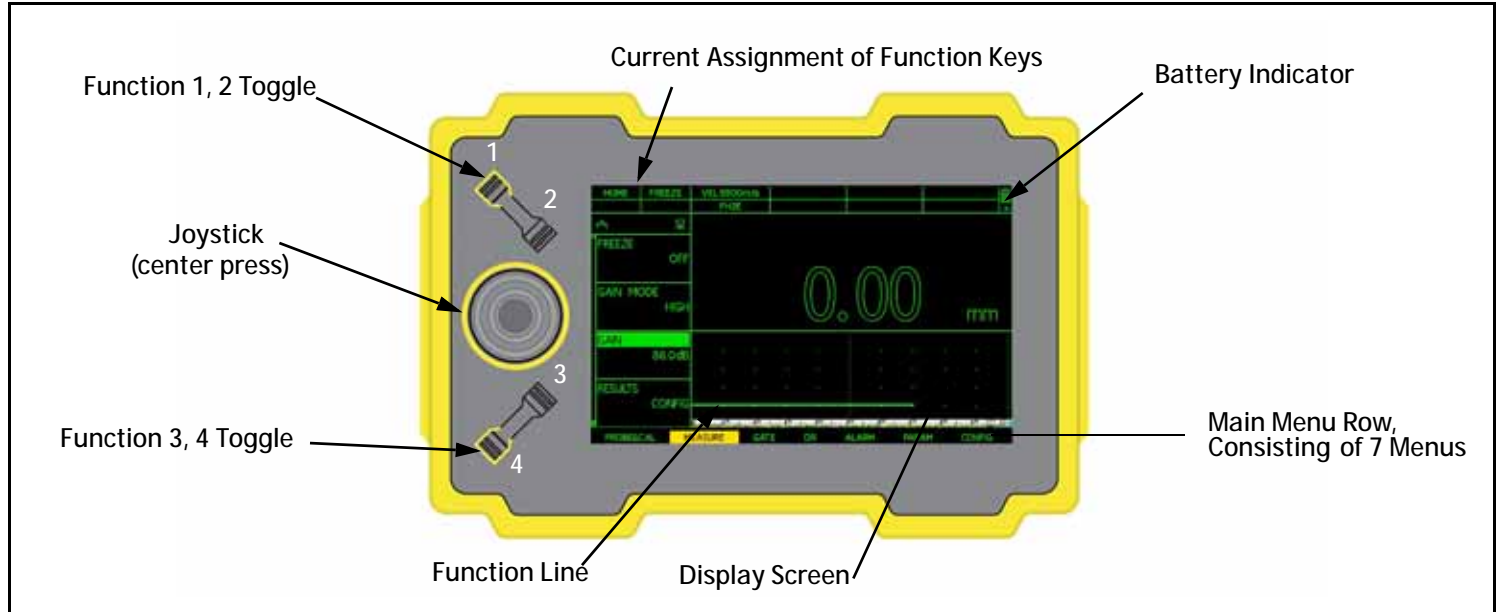


Figure 2: Front Panel of the DMS Go

1.3.1 Instrument Orientation


One of the innovative features of the *DMS Go* is the user option to quickly and easily rotate the instrument 180° to accommodate either right-hand or left-hand operation. During this process, the display image is also rotated to allow proper viewing. *Figure 3* below shows the instrument in both orientations.



Figure 3: DMS Go in Left-Hand and Right-Hand Orientations

1.3.2 Keypad Components

The *DMS Go* keypad includes the following items (see *Figure 2 on page 5*):

- **Center-press joystick** (

In specific menus, the function keys can offer specific uses (for instance, scrolling through preassigned steps). The upper left section of the display screen shows the current function key assignments for the current menu or option.

1.3 Keypad Components (cont.)

The four function keys have specified functions, depending on the selected menu or function. For example:



- **F1:** HOME (menus), EXIT (pop-up menus / windows and DR properties) or OBSTR / CLEAR (in DR grid)
- **F2:** SEND (in DR mode), ENTER (select a letter or file), TAG (comment), DONE (pop-up menus / windows), NEW (explorer), CONFIRM, EXPORT
- **F4:** FREEZE, DELETE (explorer), BKSP, BACK, NOTE (in DR grid), CRSE- (numeric fields) or custom selection from CONFIG menu (OBSTR, NOTE, uGRID)
- **F3:** CLEAR (B-Scan and Min/Max), NEXT, CRSE+ (numeric fields), uGRID (in DR grid)

Note: *You can also assign one of five custom functions to F4.*



1.3.1 Joystick Functions

The effects of the joystick actions described on the previous page are as follows:

Joystick Center Press:

- A single press and release () allows users to toggle between the menu navigation and the DR navigation (when a DR menu is open). It also activates or deactivates a parameter for adjustment, or allows a user to enter (in certain functions) a highlighted alphanumeric character. A 2-second press-and-hold () confirms an entry.

Joystick Movement:

- Moving up/down () scrolls between the available function options for the highlighted menu.
- Moving left/right () allows you to navigate to a menu. Once you have selected an option, it opens a menu option or adjusts the value of a selected parameter. (In the DR Properties option, you can also navigate in the submenu.) When you push the joystick slightly, numerical values change in small increments. Pushing the joystick to the extreme right or left will cause values to change rapidly or in larger increments.

1.3.2 Multi-Key Functions

Three functions require a combination of keys:

- Software Update = Power ON + F4 + F2
- Factory Setup = Power ON + F4 + F1
- JPG Capture = F1 + F2

Note: *All multi-key functions are defined with the instrument in the left-hand orientation (see the left side of Figure 3 on page 6).*

- Power button + F4 + F2

Pressing and holding these three buttons simultaneously causes the instrument to initiate a software update.

Note: *A formatted SD card with a valid DMS Go update file in the root directory must be inserted prior to pressing these buttons. Be aware that the root directory can have only one file with an .sdu extension.*

- Power button + F4 + F1

Pressing and holding these three buttons simultaneously causes the instrument to ignore the last known setup and revert to the factory default settings.

Important: *The last known setup will be overwritten and lost during this process.*

1.3 Multi-Key Functions (cont.)

- F1+ F2

Pressing and holding these two buttons simultaneously causes the instrument to capture the current screen as a jpg file for future study. The DMS Go stores the jpg file in either the root directory or in the currently active DMS Go folder of the SD card.

Note: A formatted SD card must be inserted prior to pressing these buttons.

1.4 Using the Display

A typical display for the *DMS Go* is illustrated in *Figure 4* below. See the following pages for step-by-step instructions on accessing these menus.

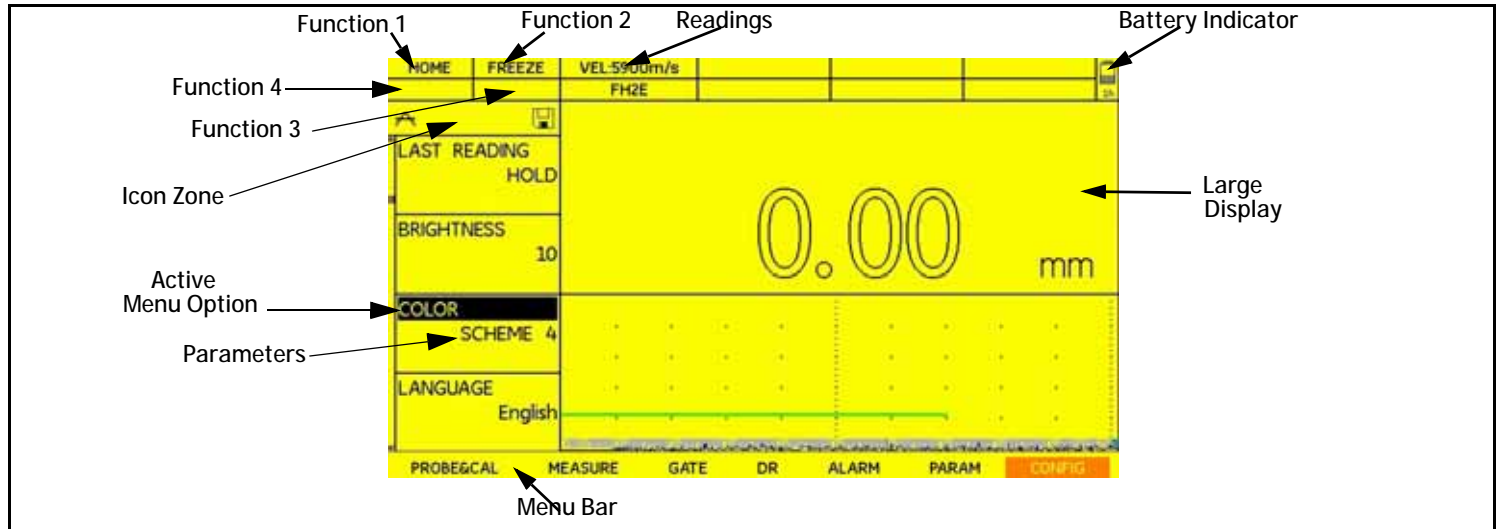









Figure 4: DMS Go Display

1.5 Display Icons

Table 1 below lists the icons that appear below the four function key windows in the upper left display, along with their meanings.

Table 1: DMS Go Icons

	Single-echo — Indicates that the DMS Go is in single-echo measurement mode (see page 58)
	Dual-echo — Indicates that the DMS Go is in dual-echo measurement mode (see page 58).
	Dual-Multi — Indicates that the DMS Go is measuring in Dual-Multi mode (see page 68).
	Freeze — Indicates that the Freeze mode (see page 74) has frozen the screen.
	SD Card — Indicates that an SD memory card is in the compartment at the top. When a screen capture (see page 10) is taken, this icon briefly enlarges.
	Calibration Reminder — Indicates that the calibration reminder has been triggered.
	Alarm — Indicates that an alarm has been triggered.

1.6 Using the SD Slot, USB Connector & I/O Connector

The *DMS Go* uses a standard 2 to 8 GB *SD memory card* for storing data set files and reports and for loading an instrument software upgrade (see “*Multi-Key Functions*” on page 10). The SD card slot is located in a compartment on the top of the instrument, along with a USB connector and an I/O connector (see *Figure 5* below).

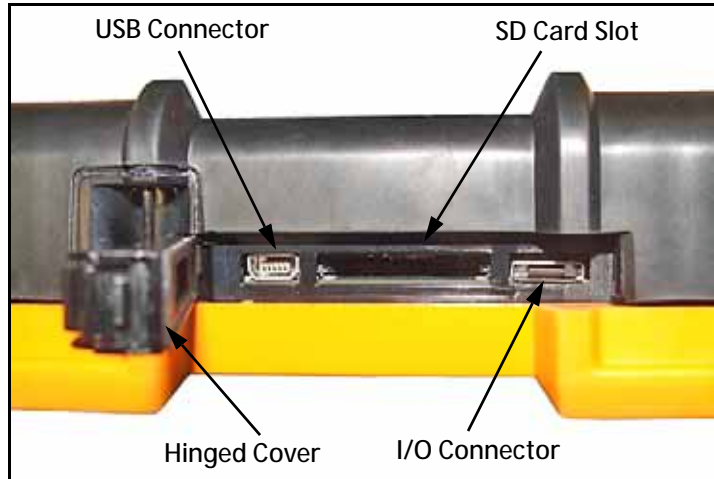


Figure 5: Top View of DMS Go Case

1.6.1 Removing the SD Card

To remove the SD card from its slot, proceed as follows:

1. Access the SD card slot by pushing on the cover in the direction of the arrow and lifting the hinged cover.
2. Press down on the SD card with your finger and then remove your finger quickly. The SD card will be partially ejected, and you can then grasp it by the edge and slide it completely out of the slot.

1.6.2 Inserting the SD Card

To insert the SD card into its slot, proceed as follows:

CAUTION! Do not force the SD card into the slot if you feel significant resistance. If the card does not enter the slot freely, it is probably oriented incorrectly.

1. Access the SD card slot by pushing on the cover in the direction of the arrow and lifting the hinged cover.
2. Orient the SD card so that the label side faces the rear of the instrument and the blank side with the row of gold-colored electrical contacts faces the display side of the instrument. The edge of the card with the row of gold-colored electrical contacts must enter the slot first.
3. Slide the card fully into the slot and push gently until the card seats into its socket. Then, close the SD card slot cover.

1.6.3 Connecting the USB Port

The connector closest to the hinge of the top compartment cover (see *Figure 5 on page 14*) is a *Mini USB* port. If you use a standard USB cable to connect the *DMS Go* to a PC (no special drivers are required), the installed SD card will be added to the list of active drives on the PC. You can then perform all normal drive activities, such as copying and deleting files, on the *DMS Go* SD card.

Important: *While the DMS Go is connected to a PC via the USB port, the instrument will not accept any user input from the keypad. Normal operation resumes as soon as the USB cable is disconnected.*

1.6.4 Connecting the I/O Port

The connector furthest from the hinge of the top compartment cover (see *Figure 5 on page 14*) is an I/O port. This port serves a dual role:

- *Serial port pins* - these are used strictly for factory service diagnostics.
- *Sync & Alarm pins* - these signals are accessible to the user via a special optional cable.

To use this connector you must order the optional *DMS Go* cable, which is available as P/N 022-510-032. The pin designations for connecting the open end of this cable are listed in *Table 2* below:

Table 2: I/O Connector Pin Assignments

Pin #	Color	Signal
1	Brown	+5V
2	Red	SAP
3	Orange	Alarm
4	Yellow	RS232 CTS
5	Green	RS232 TX
6	Blue	RS232 RX
7	Purple	GND

1.7 Typical DMS Go Operation

Typical operation of the DMS Go involves several steps:

1. Be sure the DMS Go batteries are charged, or that the DMS Go is connected to a power source.
2. Plug the UT Transducer into the DMS Go.
3. Turn on the DMS Go. (If the unit has dual functionality, select DMS Go at the initial screen.)
4. If you need to record data in a file, scroll to the DR menu. You have two options: You can open an existing file in the Explorer option (page 107) or press F4 (New) in the Explorer option to set up a new file (see page 66).
5. Once you have set up or selected the file, use the joystick to select the PROBE&CAL menu (page 54).
6. With the joystick, scroll down and select the probe. Move the joystick left or right until the probe ID name is displayed.
NOTE: If using a dialog probe, the Probe name will appear automatically.
7. Scroll to the TG Mode option and select the desired operating/measurement mode.
8. Scroll down to THK CAL. Select the desired calibration point mode (1 point or 2 point).
9. Scroll down to ZERO (page 63). Select the desired probe zero method. (**NOTE:** This menu is not available when THK CAL is in 2-pt. mode.)
10. Scroll down to **CALIBRATION**. Move the joystick right to begin the calibration process. Follow the on screen prompts to complete the calibration process. (The calibration process might ask you to put the probe on the zero block, the round block on the DMS Go stand.)
11. You are now ready to begin taking thickness measurements.

1.8 DMS Go Software Options

If you purchase a specific software option, GE will provide a specific activation code. These specific options include TOPCOAT and AUTO-V, Extended Data Recorder, and USM Go Mode. Activation codes matched to your DMS Go serial number can be input via the CODE submenu (see “Entering a New Activation Code for Options (CONFIG - CODE)” on page 52).

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Chapter 2. Instrument Setup

2.1 Display Screen and Keypad Features

The *DMS Go* user interface has been designed for clarity and ease of use. *Figure 6 on page 20* shows the major components of the display and the keypad. To access the menus and parameters, click the joystick button to move from submenu to submenu, and then to access the parameters within a submenu. Once you have highlighted a parameter, toggle the joystick left or right to change its value.

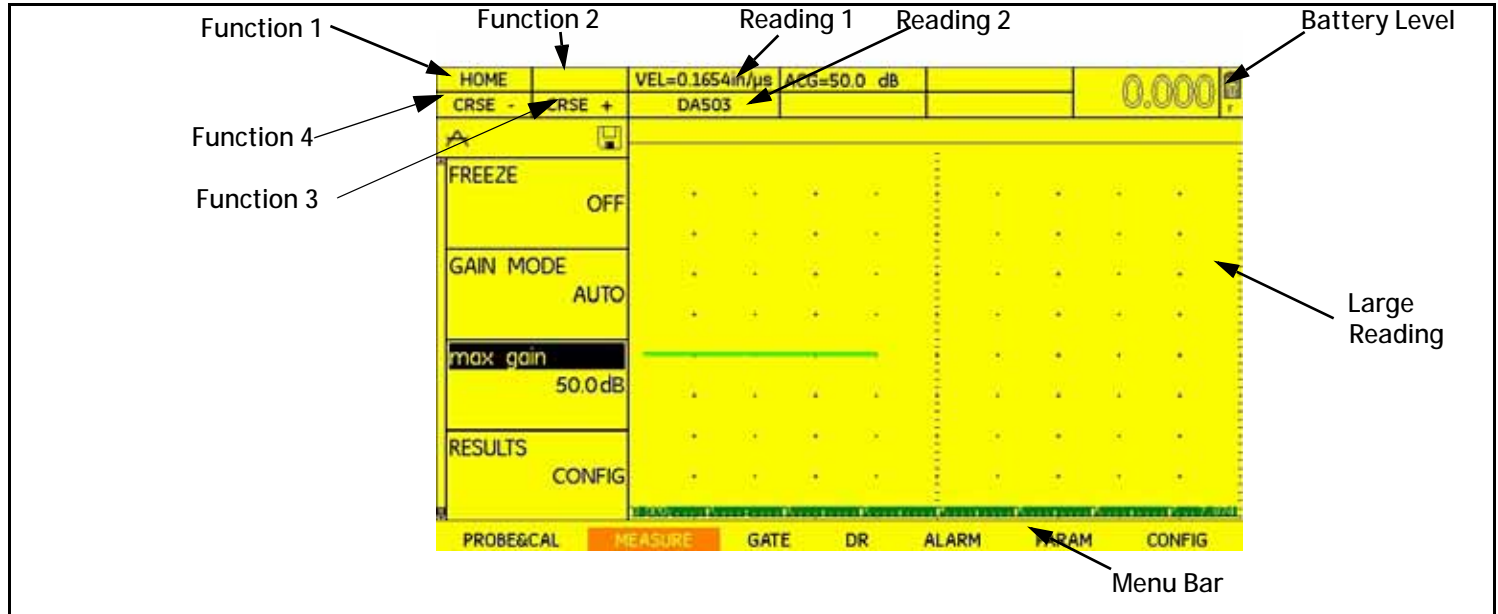


Figure 6: Display Screen Features

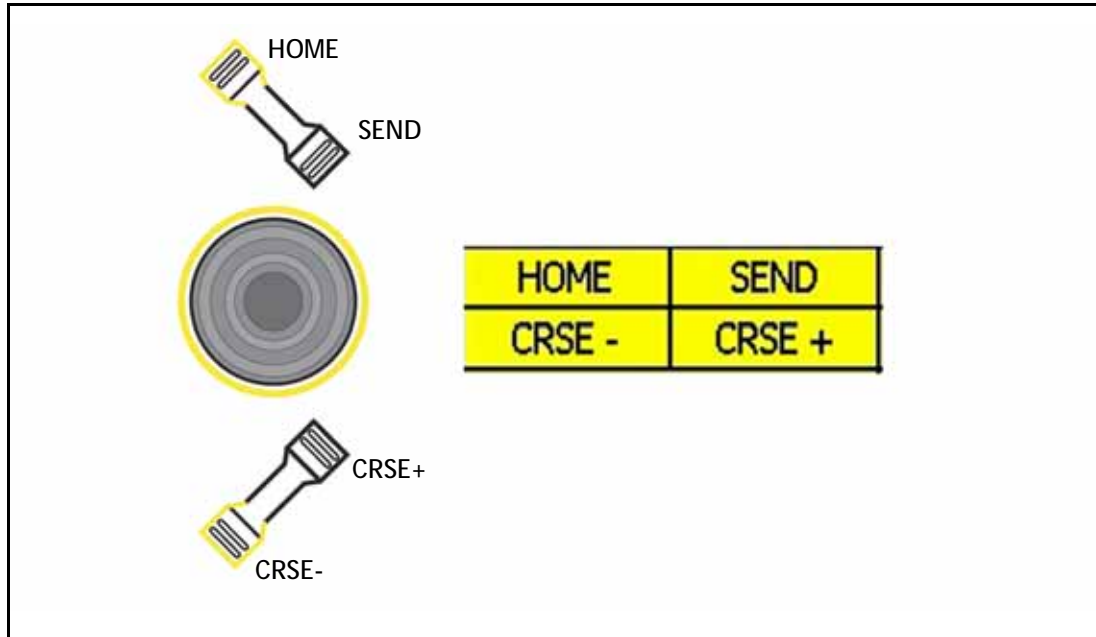


Figure 7: Function Keys and Associated Windows

2.2 The Menu System

The *DMS Go* menu system allows the operator to select and adjust various instrument features and settings. It includes:

- **Probe & Cal Menu:** Consists of several functions used to configure the probe type, zeroing and thickness calibration. They are Probe (page 54), TG Mode (page 58), Thickness Calibration (page 60), Zero (page 63), Calibration (page 61), Probe Zero (page 65), Velocity (page 68), Calibration Reminder (page 70), and Temperature Compensation (page 68).
- **Measure Menu:** Consists of several functions used to configure the instrument during a test. They are Mode (page 87), Dual-Multi (page 89), Display Delay (page 93), Display Range (page 90), Freeze (page 94), Maximum Gain Mode (page 95), Maximum Gain Adjustment (page 95), and Results (page 100).
- **Gate Menu:** Consists of several functions used to set starting point, width and threshold for Gates A and B. They are: Gate A (or B) Start (page 84), Gate A or B Width (page 85), and Gate A or B Threshold (page 86).
- **DR Menu:** Consists of several functions used to specify data recording: Explorer (page 66), Properties (page 109), View (page 109), Master Comment (page 78), Export (page 123) and Overwrite (page 80). A submenu (page 110) allows you to specify DR properties.
- **Alarm Menu:** Consists of several functions used to configure minimum and maximum alarm. They are: Max (page 98), Min (page 98), Max Alarm (page 99) and Min Alarm (page 99).
- **Param Menu:** Consists of several functions used to load or save parameters. They are: Load P-Set (page 104) and Save P-Set (page 105).

2.2 The Menu System (cont.)

- **Config Menu:** Consists of several functions used to configure the instrument prior to a test, including specifying the units, time and date, and the screen appearance, and controlling other significant measurement parameters. They include: Update Rate (page 40), Rectify (page 41), Radix (page 44), Last Reading (page 45), Brightness (page 34), Color (page 32), Language (page 26), Orientation (page 30), Date and Time Format (page 28), Date and Time (page 29), Power Down (page 31), Unit (page 27), Resolution (page 36), Zero Block (page 37), Velocity Reference Block (page 38), Lockout (page 46), Menu Mode (page 48), Function Key (page 49), Password (page 50), Code (page 52), and About (page 45).

The information provided in this chapter describes how to set up a DMS Go for operation and for individual measurements.

2.2 The Menu System (cont.)

2.3 Initial Setup

In this section, you'll learn how to configure the *DMS Go* display and operating features. Follow these procedures to turn the instrument **ON** and make initial adjustments to the control settings. Because the instrument can be set to save the control settings when it is turned **OFF** and restore them when it is turned back **ON**, you won't have to repeat these adjustments unless a change is required.

When you power the instrument **ON**, the **Main Menu** is automatically activated.

Note: *For most menus, you can press the F1 key to return HOME to the Main Menu or exit a particular function.*

2.3.1 Language, Units of Measurement, Date, and Time




Use the procedures in this section to adjust the units of measurement, the date, the time, and the language that appears on the display screen, as well as the operator level and the password. These parameters are in the CONFIG submenu, highlighted in Figure 8 below.







Figure 8: The CONFIG Submenu

2.3.1 Language, Units of Measurement, Date, and Time (cont.)




2.3.1a *Setting the Language (CONFIG-LANGUAGE)*

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick (). Several functions are displayed on the screen.
2. Use the joystick () to select the **LANGUAGE** function. To change the selected language, either move the joystick or press the function toggle. You'll note that the options available are English, German, French, Spanish, Japanese and Chinese. The default language is English.
3. Use the joystick () to move to another function, or press **HOME** to return to the Main Menu. The display screen and report language are now set to the choice last selected.






2.3.1b *Setting the Units of Measurement (CONFIG-UNIT)*

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick (). Several functions are displayed on the screen.
2. Use the joystick () to select the **UNIT** function. The following options are available:
 - **mm** - default setting which displays values in millimeters
 - **in** - displays values in inches
3. To change the units of measurement, move the joystick left or right ().
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.





2.3.1c *Setting the Date and Time Formats (CONFIG-DT FMT)*

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick () . Several functions are displayed on the screen.
2. To change the selected date and time format, move the joystick () to the **DT FMT** function. Choose from the following date and time formats:
 - Y-M-D date format and 12 or 24 hour time format
 - M/D/Y date format and 12 or 24 hour time format
 - D.M.Y date format and 12 or 24 hour time format
3. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu. The date and time format shown on the display screen and in the out reports are now set to the choice last selected.

2.3.1d *Setting the Date and Time (CONFIG-DATE TIME)*




1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick () . Several functions are displayed on the screen.
2. Use the joystick () to select the **DATE TIME** function and shift the joystick left or right () to open the Date/Time window.
3. To change the selected date and time, use the joystick to scroll to the date or time. Then move the joystick up or down () to enter the correct date and time. press **F2 (CONFIRM)** to confirm the new date or time, or press **F1 (EXIT)** to close the window without changing the date or time.
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu. The date and time shown on the display screen and in the reports are now set to the choice last selected.

2.3.1e *Setting Left-Hand or Right-Hand Orientation (CONFIG-ORIENTATION)*


1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick ().
2. Use the joystick () to select the function titled **ORIENTATION**, and then () to select either **RIGHT** hand or **LEFT** hand control.
3. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.3.1f *Setting the Time Before an Unattended Meter Powers Down (CONFIG - POWER DOWN)*

The Power Down function powers down the instrument after a preset amount of time in which no one enters any inputs into the DMS Go; the unit is receiving no button or joystick inputs from the user, and it is not receiving a valid thickness indication (as indicated by a display solid lettering, rather than hollow). Countdown is reset by a valid measurement or keyboard activity.

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick () .
2. Use the joystick () to select the function titled **POWER DOWN**, and then () to enter the number of minutes before the DMS Go powers down. Your selections are 1, 2, 3, 4, 5, 10, 15, 30 minutes and **Manual**.




Note: *GE recommends setting the selection to 5 minutes to avoid draining the battery.*

3. After entering the number of minutes, use the joystick () to move to another function, or press **HOME** to return to the Main Menu

2.3.2 Screen Appearance

Follow the procedures in this section to adjust the display appearance. The adjustments require access to the CONFIG submenu.

2.3.2a *Setting the Display Color (CONFIG-COLOR)*

1. In the MAIN menu, scroll to the CONFIG submenu using the joystick ().
2. Use the joystick () to select the function titled COLOR. There are four preset color schemes.
3. To change the display color scheme, move the joystick to scroll to the desired scheme. (Figure 9 on the next page shows the possible color schemes.)
4. After making your choice, use the joystick () to move to another function, or press HOME to return to the Main Menu

2.3.2a Setting the Display Color (CONFIG-COLOR) (cont.)

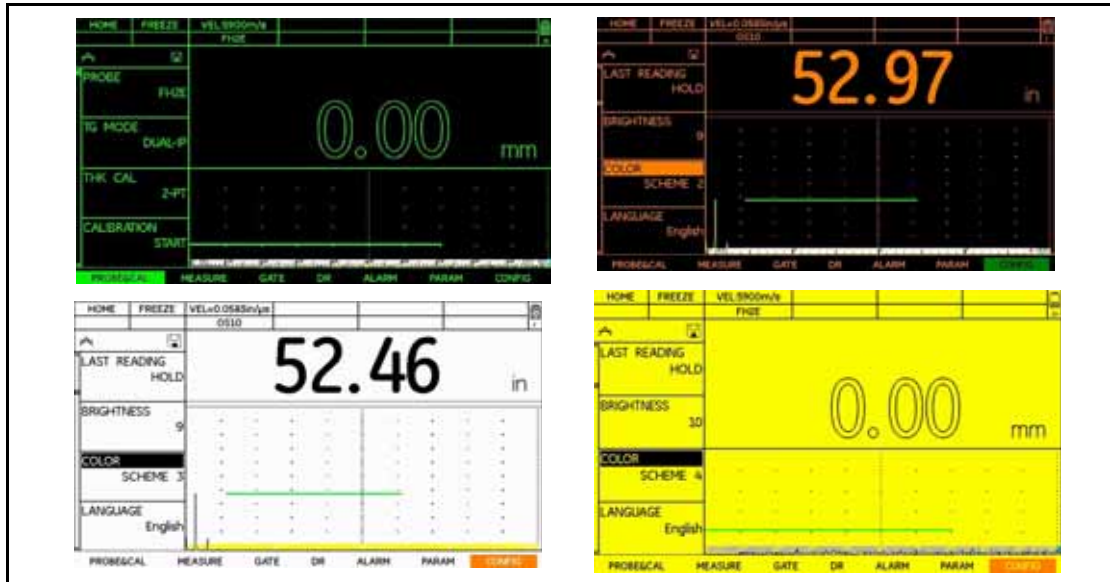






Figure 9: Available DMS Go Color Schemes

2.3.2b *Setting the Display Brightness (CONFIG-BRIGHTNESS)*

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick () .
2. Use the joystick () to select the function **BRIGHTNESS**. The available settings range from 1 to 10.
3. To change the brightness level, move the joystick () .

Note: *GE recommends a setting of 6 to maximize battery time.*

4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu

2.3.2c Handling the Last Reading for Coupling Control (CONFIG-LAST READING)

The reading display can help users to determine how well the probe is coupled to the measured surface. Solid figures indicate good coupling, while hollow or blank figures may indicate bad coupling.





1. In the MAIN menu, scroll to the CONFIG submenu using the joystick (). Several functions are displayed on the screen.
2. Use the joystick () to select the LAST READING function. The available settings are HOLD and BLANK. If you set the setting to HOLD, the last measured value will remain on the screen with outline (“hollow” rather than solid) lettering when the probe is uncoupled. A current measurement, with the probe coupled, is shown in solid lettering (see Figure x below). If you set the setting to blank, it will display dashes.





Figure 10: Live Reading — Last Reading HELD — and Last Reading BLANK



Note: *If you are in the DR mode and the value is set to HOLD, you can still send the value to the file. If the value is set to BLANK, the DMS Go will leave the location empty.*

3. To change the reading setting, move the joystick ().
4. After making your choice, use the joystick () to move to another function, or press HOME to return to the Main Menu.

2.3.2d Setting the Display Resolution (CONFIG-RESOLUTION)




1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick () .
2. Use the joystick () to select the function titled **RESOLUTION**. Display resolution can be set automatically (**AUTO**) to the thickness you are measuring, to 1/10 (X.X) or 1/100 (X.XX) in mm and 1/100 (X.XX) or 1/1000 (X.XXX) in inches.

Note: *In the AUTO selection, the threshold is 10 inch (for inches). The value which is smaller than 10 inch will be shown in X.XXX mode. Otherwise the value will be shown in X.XX mode.
For mm, the threshold is 100 mm. The value which is smaller than 100 mm will be shown in X.XX mode. Otherwise the value will be shown in X.X mode.*

3. To change the resolution level, move the joystick () .
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.3.2e Setting the Zero Block Configuration (CONFIG-ZERO BLOCK)

If you are using a zero block for your probe, you can enter its thickness and velocity configuration into the DMS Go. (See “Setting the Probe Zero (PROBE & CAL - ZERO)” on page 63.)

1. In the MAIN menu, scroll to the CONFIG submenu using the joystick (.
2. Use the joystick () to select the ZERO BLOCK function, then move the joystick () to open the configuration window (Figure 11 below).

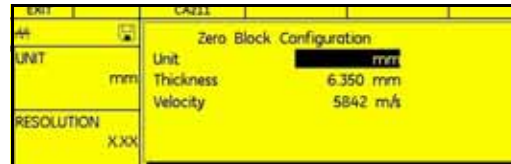




Figure 11: Zero Block Configuration Window

3. Move the joystick () to change the unit (inches or mm), thickness (in inches or mm) or the velocity (in inches/microseconds or m/s) to the value engraved on the GE-supplied reference block. These values will always be displayed in metric (mm). Press F2 (DONE) to confirm the entry, or F1 (EXIT) to close the window without changing the configuration.
4. After making your choice, use the joystick () to move to another function, or press HOME to return to the Main Menu.



2.3.2f *Setting the Velocity Reference Block Configuration (CONFIG-VEL. REF. BLOCK)*

The copper velocity reference block comes with an engraved serial number, as well as the velocity in inch/us and m/s. (See Figure 12 below.) While the steel zero block represents the upper end of sound velocity (@ 6000 m/s), the velocity reference block represents the lower end (@ 4700 m/s). If you are using a velocity reference block for your probe, you can enter both the velocity and coating velocity into the DMS Go. However, this function is only necessary when the TopCOAT/Auto-V option is enabled.



Figure 12: Engraved Velocity Reference Block

2.3.2f Setting the Velocity Reference Block Configuration (CONFIG-VEL. REF. BLOCK) (cont.)

1. In the MAIN menu, scroll to the CONFIG submenu using the joystick () .
2. Use the joystick () to select the VEL. REF. BLOCK function, and to open the configuration window (Figure 13 below).

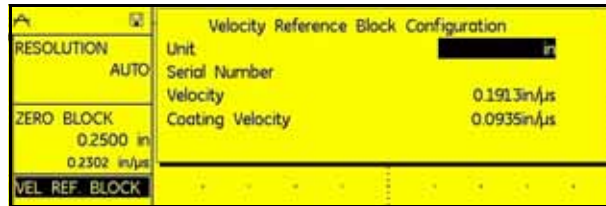







Figure 13: Velocity Reference Block Configuration Window

3. Move the joystick to change the unit measurement (inches or mm), the serial number, the velocity of the base material (in inches or mm/μsec) and the coating velocity (the velocity of the coated material, in inches or mm/μsec) to the value engraved on the block. Press F2 (DONE) to confirm the entry, or F1 (EXIT) to close the window without changing the configuration.
4. After making your choice, use the joystick () to move to another function, or press HOME to return to the Main Menu.

2.3.2g *Setting the Update Rate (CONFIG-UPDATE RATE)*

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick ().
2. Use the joystick () to select the **UPDATE RATE** (the rate at which the screen refreshes, in Hz). The available settings are 4, 8 and 16 Hz.
3. To change the update rate, move the joystick ().
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

Note: *In the B-Scan and Min/Max modes, the update rate is always 32 Hz.*

2.3.2h Selecting a Rectification Mode (CONFIG-RECTIFY)

Rectification effects the orientation of the A-scan on the display screen. The A-scan represents the sound pulse (i.e., echo) that is returned to the instrument from the material being tested. The series of echoes looks like the *Radio Frequency (RF)* signal shown in *Figure 14* below. Note that the RF signal has both a negative component below the axis and a positive component above the axis. In RF mode, Gate A and Gate B can be positioned either above or below the axis, to be triggered by either a positive-heading echo or a negative-heading echo. The rectification mode is normally automatically set up by the probe selection. Most GEIT thickness gauge probes are designed to be used in negative rectification.

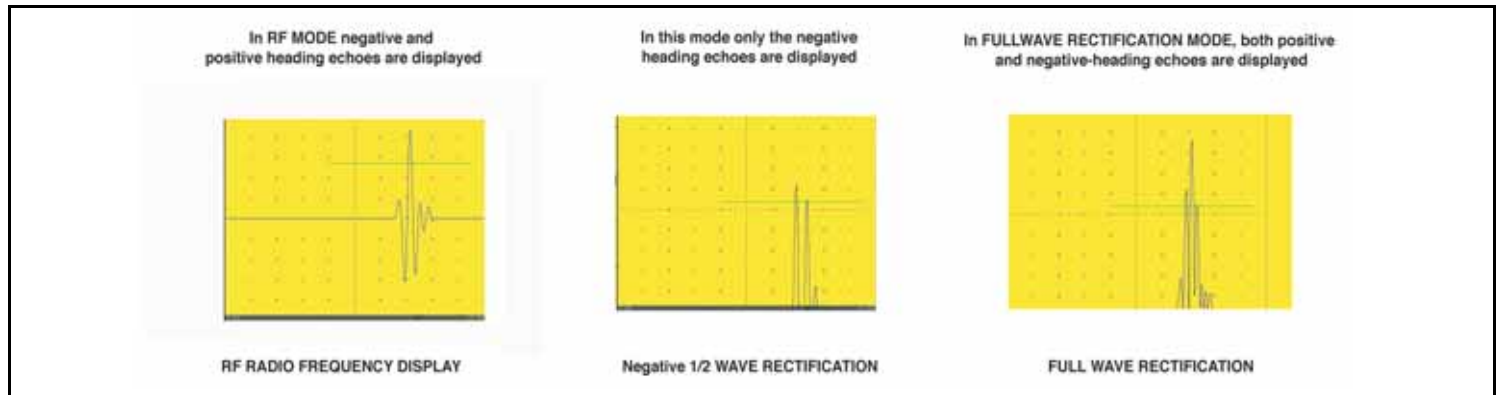






Figure 14: Typical RF and Rectified Signals

2.3.2h *Selecting a Rectification Mode (CONFIG-RECTIFY) (cont.)*

- *Positive Halfwave Rectification* means that only the upper (i.e. positive) half of the RF signal is displayed.
- *Negative Half wave Rectification* means that only the lower (i.e. negative) half of the RF signal is displayed (see *Figure 14 on page 41*). Note that although only the negative half of the RF signal is displayed, it is shown in the same orientation as a positive component to simplify viewing.
- *Full-Wave Rectification* combines the positive- and negative-rectified signals together, and displays both of them in a positive orientation (see *Figure 14 on page 41*).
- *RF* means no rectification.

The rectification determines the cycle in which the zero crossing measurement is made. Under ordinary circumstances, GE recommends not changing this parameter. It is only necessary to change the rectification mode for special probes or special applications. If necessary, use the procedure on the next page to select a rectification mode.




2.3.2h Selecting a Rectification Mode (CONFIG-RECTIFY) (cont.)

1. In the **MAIN** menu, activate the **CONFIG** submenu using the joystick () .
2. Use the joystick () to select the function titled **RECTIFY**. The following options are available:
 - **NEG** - Shows the negative component of the RF signal but displays it in a positive orientation.
 - **POS** - Shows the positive component of the RF signal.
 - **FULL** - Shows the positive and negative halves of the RF wave, but both are oriented in the positive direction.
 - **RF** - Shows the echo with no rectification.
3. Move the joystick () to select the desired rectification method.
4. After completing your selection, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.3.2i .Setting the Decimal Point (CONFIG-RADIX)

The radix, or decimal point, is typically a period in the US, or a comma in some European countries.

Note: *When utilizing the DR mode, the decimal point should not be changed, as the DR is not dynamically changed*

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick (). Several functions are displayed on the screen.
2. Use the joystick () to select the **RADIX** (the symbol for the decimal point in measurements). The available symbols are a comma and a period.
3. To change the radix, move the joystick.
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.3.2j Obtaining Information on the Program (CONFIG-ABOUT)

Data on the DMS Go serial number and codes may be needed for your service provider to assist with any updates or corrections. It is available through the **ABOUT** function.




1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick () .
2. Use the joystick () to select **ABOUT** (for general *DMS Go* information), and then toggle it () to enter the function. The program displays the required data (see Figure 15 below).
3. After reviewing the information, press the joystick or any function key to return to the main screen.





Figure 15: DMS Go Information Screen

2.3.3 Setting Security Functions

Follow the procedures in this section to adjust the display appearance. (The adjustments require access to the CONFIG submenu.)

2.3.3a Permitting a User to Access Specified Functions (CONFIG - LOCKOUT)

A supervisor might need other users to have access only to particular DMS Go functions. The DMS Go has two user levels: Expert and Inspector. The Expert can access all functions, while the Inspector can use only those functions that have not been locked out in the LOCKOUT menu. Set up the PASSWORD function (page 50) before selecting functions for inspectors.

1. In the MAIN menu, scroll to the CONFIG submenu using the joystick () .
2. Use the joystick () to select LOCKOUT, and then to enter the function. The function menu (a duplicate of the Main Menu, as shown in *Figure 16* below) opens.

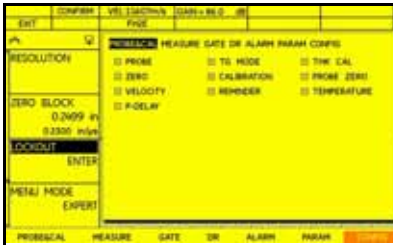








Figure 16: Lockout Option Window

2.3.3a *Permitting a User to Access Specified Functions (CONFIG - LOCKOUT) (cont.)*

3. Use the joystick to toggle to any functions that need to be accessed, and press the center of the joystick () to enable the function.
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.3.3b *Setting the User Level (CONFIG - MENU MODE)*

The DMS Go has two user levels: Expert and Inspector. The Expert can access all functions, while the Inspector can use only those functions that have not been locked out in the LOCKOUT menu. To set the menu to the appropriate level, complete the following steps:




1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick () .
2. Use the joystick () to select the **MENU MODE**.
3. To change the level, move the joystick () .
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.3.3c Setting a Specified Function 4 Key (CONFIG - FUNC KEYS)

Note: For general information on function keys, see page 7

If needed, you can set a custom function for the F4 function key. Four selections are available:

- **OBSTR/CLEAR** — A notation that indicates a physical location was not accessible.
- **NOTE** — Permits a user to add a note.
- **uGRID**—Enables a user to create a microgrid at a specific data point.
- **TOGGLE LEFT HAND / RIGHT HAND** — Enables users to alternate between left and right-hand operation.

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick (). Several functions are displayed on the screen.
2. Use the joystick () to select the function titled **FUNC KEYS**. Select the function to be associated with F4.
3. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.3.3d Entering a New Password (CONFIG - PASSWORD)

To enter a new password for the DMS Go, complete the following steps:

1. In the MAIN menu, scroll to the CONFIG submenu using the joystick (🕹️).
2. Use the joystick (🕹️) to select the PASSWORD function, and toggle it (🔑) to open the password window (Figure 17 below).

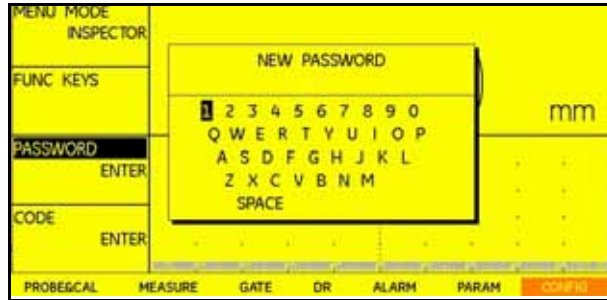




Figure 17: Password Function Window

2.3.3d Entering a New Password (CONFIG - PASSWORD) (cont.)




3. Move the joystick to the letter or number you want to enter; then press the center of the joystick () to enter the character. Repeat these steps until you have entered the complete password, then press F2 (ENTER).

Note: *In case you had a previous PASSWORD (OLD) system first asks you for the OLD PASSWORD before it allows you to enter the NEW PASSWORD. The DMS Go also allows you to have NO PASSWORD. In this case there is no access.*

4. After entering the password, use the joystick () to move to another function, or press HOME to return to the Main Menu.

2.3.3e Entering a New Activation Code for Options (CONFIG - CODE)

If you purchase a specific software option, GE will provide a specific activation code. These specific options include TOPCOAT and AUTO-V, Extended Data Recorder, and USM Go Mode. Activation codes matched to your *DMS Go* serial number can be input via the CODE submenu, which is located in the CONFIG menu. This submenu also lists the serial number assigned to your instrument. To input an activation code:

1. In the MAIN menu, scroll to the CONFIG submenu using the joystick () .
2. Use the joystick () to select the function titled CODE, and then use the joystick () to activate the function. Note that the first character of the current code value is highlighted (*Figure 18* below).

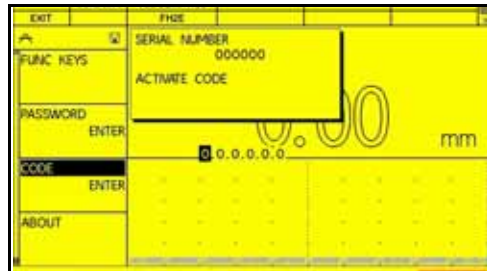




Figure 18: The Code Entry Function

2.3.3e Entering a New Activation Code for Options (CONFIG - CODE) (cont.)

3. Use the joystick () to change the highlighted character. Then move the joystick () to select the next character, and continue modifying the values until they all match the code provided by GEIT.
4. After completing the code entry, confirm the entry by pressing F2 (CONFIRM). If the code is not valid, the DMS Go displays the message “Error - Invalid Code!”
5. Be sure to follow on-screen instructions to successfully complete the activation.

2.4 Installing a Probe

Follow the instructions in this section to install a probe on your *DMS Go*.

2.4.1 Connecting the Probe

When connecting a probe to the instrument, the following steps must be taken:

- Properly complete the physical connection of the probe to the instrument.
- Properly configure the instrument to work with the connected probe.

The *DMS Go* accepts either a *single-element* probe or a *dual-element* probe.

A single element probe has only one ultrasound crystal. It acts first like a loudspeaker, converting the electronic pulse into a mechanical ultrasound pulse, then the same crystal acts at the same time like a microphone, receiving all the echoes, converting these back into electronic pulses.

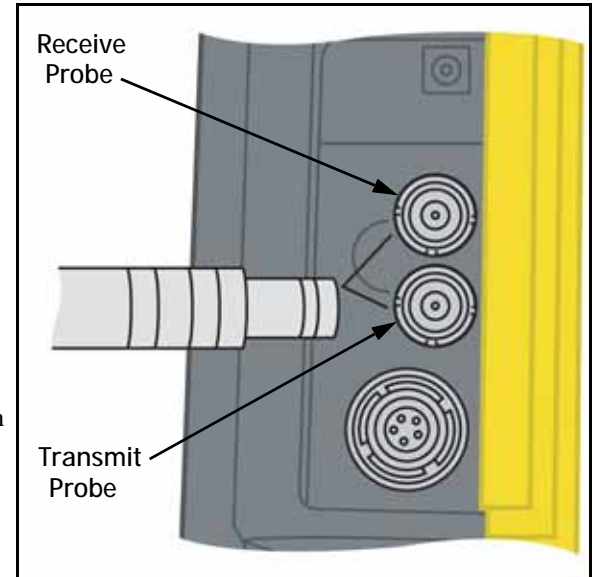


Figure 19: Probe Connector Locations

2.4.1 Connecting the Probe (cont.)


A dual element probe has the loudspeaker separated from the microphone. Identify these probes simply by the number of LEMO (or other type of) connectors: one for a single, two for a dual.

To install a *single-element* probe, connect the probe cable to either of the two ports on the side of the instrument (see *Figure 19* on the previous page). When a *dual-element* probe is connected to the instrument, the key ensures proper orientation of the transmit and receive connectors.

2.4.2 Configuring the Instrument

Three instrument settings are directly dependent on the type of probe installed. These settings must be adjusted any time a probe of a different type is installed, by following the instructions in the following sections.

2.4.2a Determining the Probe Type (PROBE & CAL - PROBE)

1. Activate the PROBE & CAL submenu using the joystick ()
2. If the DMS Go is connected to a dialog probe, it automatically detects the probe if the probe selection is on a dual element probe. Once detected, the screen shows the word “Dialog” below the probe name. If it is not a dialog probe, use the joystick to scroll through the list of probes and select the appropriate unit. (If you disconnect a dialog probe, then the DMS Go displays the last probe selection, but the dialog below the probe will no longer appear.) If you change a non-dialog probe, you must again scroll through the list and select the new unit.


Note: *A dialog probe contains a small chip with probe information. When the probe is connected to the DMS Go, it transmits this information to the unit.*

Note: *The DMS Go offers an option for a GE-supplied custom probe definition file, with a .prb suffix, to be entered via the SD card. The DMS Go will show this file as part of the Probes list, designated by the (Custom) addition.*

2.4.2a Determining the Probe Type (PROBE & CAL - PROBE)





Figure 20: Display for Connected Dialog Probe
(Dialog Indicated by Signal at Bottom)

3. Move the joystick up or down () to navigate away from this function, or press HOME to return to the Main Menu.

2.4.2b *Setting the Ultrasonic Detection Mode (PROBE & CAL - TG MODE)*

The DMS Go performs all measurements in zero-crossing mode, at the point where the signal crosses the zero amplitude line. The available modes will vary with the probe used.


IMPORTANT: *Not all modes are available for all probes!*

1. In the **MAIN** menu, scroll to the **PROBE & CAL** submenu using the joystick ().
2. Use the joystick () to select the function titled **TG MODE**, and then to select the mode. Six options are available:
 - **S-IP** — This mode indicates that a single-element type transducer is connected to the *DMS Go*. It starts ultrasonic detection from an artificial point relative to the pulser firing (IP, initial pulse, or “T0”) and ends with the last zero crossing before the first detected flank crossing in gate-A. The corresponding TOF is compensated by the probe zero offset (P-delay), calculated automatically during the calibration process. The *DMS Go* calculates and displays a thickness result value from the acquired data. It is used with a single-element probe to test thickness in non-coated materials, especially those with smooth, parallel surfaces.
 - **S-PEAK** — This mode indicates that a single-element type transducer is connected to the *DMS Go*. It starts ultrasonic detection from the last zero crossing before the peak in gate A and ends with the last zero crossing before the peak echo in gate-B. The *DMS Go* calculates and displays a thickness result value from the acquired data. It is used with a single-element probe to test thickness in coated materials, especially those with smooth, parallel surfaces.

2.4.2b *Setting the Ultrasonic Detection Mode (CONFIG - TG MODE) (cont.)*




- **S-FLANK** — This mode indicates that a single-element type transducer is connected to the *DMS Go*. It starts ultrasonic detection from the last zero crossing before the first detected flank in gate-A and ends with the last zero crossing before the first detected flank crossing in gate-B. The *DMS Go* calculates and displays a thickness result value from the acquired data. The mode is used with a single-element probe to test thickness in COATED materials, especially those with smooth, parallel surfaces.
- **DUAL** — This mode indicates that a dual-element type transducer is connected to the *DMS Go*. It starts ultrasonic detection from an artificial point relative to the pulser firing (IP, initial pulse, or “T0”) and ends with the last zero crossing before the first detected flank in gate-A. The corresponding TOF is compensated by the probe zero offset (P-delay), calculated automatically during the calibration process. The *DMS Go* calculates and displays a thickness result value from the acquired data. This mode is used with a dual-element probe to test corrosion thickness in non-coated materials, especially on curved and irregular backwall surfaces.
- **DUAL-MULTI** — This mode is available when a dual-element type transducer is connected to the *DMS Go*. It starts ultrasonic detection from the last zero crossing before a peak echo detected in gate-A and ends with the last zero crossing before a peak echo in gate-B. The *DMS Go* calculates and displays a thickness result value from the acquired data. This mode is used with a dual-element probe to test thickness in coated materials.
- **TOP-COAT**—When used with a special TopCOAT probe, this mode tests thickness in coated materials. It is especially well suited to curved and irregular (pitted) backwall surfaces. (Optional)
- **AUTO-V**— When used with a special TopCOAT probe, this mode measures non-coated materials. It requires no knowledge of the measured material’s type and calculates velocity without a like-material calibration standard. (Optional)

2.4.2b *Setting the Ultrasonic Detection Mode (CONFIG - TG MODE) (cont.)*

3. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.4.2c *Setting the Thickness Calibration Method (PROBE & CAL - THK CAL)*

In this option, you can set thickness calibration to one or two points.

1. In the **MAIN** menu, scroll to the **PROBE & CAL** submenu using the joystick () .
2. Use the joystick () to select the function titled **THK CAL**, and then to select the method. The available choices are 1-point and 2-point.
3. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.5 Calibration

Calibration of the *DMS Go* requires the use of a calibrated standard. This standard must be made of the same material as the test piece. The calibration procedure varies, depending on whether you have selected 1 or 2 points in the THK CAL option. The choice of 1 or 2-point calibration depends on your test blocks:

- 1 Point involves use of a single test block, for which you enter or verify the thickness; both gates appear, and measure the distance between the first and second backwall echoes (BWEs). The DMS Go also calculates and sets sound velocity and probe delay.




Note: *The number of gates (1 or 2) is independent of the CAL mode, but is determined by the measurement mode (1 gate for dual, 2 gates for dual-multi). You can perform 1-point calibration with one gate from the start to first backwall.*

- 2 Point involves use of two blocks, or a single block with two steps (low-cal and high-cal). A user enters or verifies first the lower step block, then the higher step block.

One-point calibration requires using the Probe Zero function; however, zeroing is unnecessary in 2-point calibration.

2.5.1 1-Point Calibration (PROBE & CAL - CALIBRATION)



To calibrate the *DMS Go*, follow the instructions in this section.

1. In the **MAIN** menu, scroll to the **PROBE & CAL** submenu using the joystick ().
2. Use the joystick () to select the function titled **CALIBRATION**. Then, press the function toggle or move the joystick () to **Start**.
3. For 1-point calibration, verify the thickness of the calibration block/piece with the value displayed on the *DMS Go* when in calibration mode (if applicable - after probe zeroing has been completed). Press F2 (**ENTER**) to manually change the calibration value. If the calibration block/piece value is correct, couple the probe to the thickness calibration block. The *DMS Go* will automatically perform the calibration and adjust the material velocity to match that of the calibration block/piece.


2.5.1a Setting the Probe Zero (PROBE & CAL - ZERO)

TOF values that are started from an artificial point relative to the pulser firing (the initial pulse, IP, or “T0”), must be compensated by a probe zero offset value to remove the transit time due to the artificial starting position and probe delay lines. This value also allows adjustment for uneven probe wear and variations in delay lines.

Note: *ZERO is not available when the DETECT MODE parameter specifies a gate-to-gate and multi-echo type measurement, or when the THICKNESS CAL parameter is set to 2-point mode.*





1. In the MAIN menu, scroll to the PROBE & CAL submenu using the joystick ().
2. Use the joystick () to select the function titled ZERO, and then to select the zero method. Six options are available:
 - **Manual** — This zero method uses the instrument reference block of known thickness and sound velocity to determine the probe zero offset value for the connected transducer. It is applicable to both single and dual-element contact type transducers, and works with critical coupling conditions or rough surfaces.
 - **Auto** — This zero method automatically determines the probe zero offset value while the transducer is actively coupled to the material being tested. Zero is taken from the interface echo after the probe was coupled, and then takes the backwall echo. It requires good coupling conditions, and multiple data acquisitions to determine the TOF to the material interface (the point at which sound enters the material) and the TOF to material backwall (the point at which sound reflects from the backside of the material). Since it performs zeroing every time a measurement is taken, it continuously adjusts for temperature changes and delay wear.

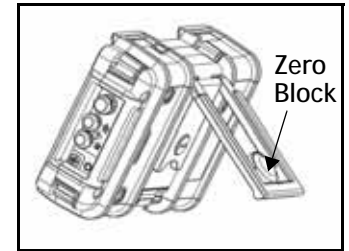
2.5.1a *Setting the Probe Zero (PROBE & CAL - ZERO) (cont.)*

- **User** — Working with a clean, uncoupled probe, this method automatically determines the probe zero offset from the probe face before coupling, and only performs zeroing on user request. It then takes the backwall echo afterwards. It also works in critical coupling conditions or with rough surfaces
3. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

2.5.1b Zeroing Out the Probe (PROBE & CAL - PROBE ZERO)


IMPORTANT: This option is only available if the Zero option (see page 60) in the 1-point calibration mode has been set to Manual or User.

1. In the MAIN menu, scroll to the PROBE & CAL submenu using the joystick (.
2. Use the joystick () to select the PROBE ZERO function, then use the joystick () to select Start.
3. The menu now varies.
If you have selected Manual in the Zero function, a message appears, “Put probe on zero block -- use couplant.” Put the probe on the zero block on the DMS Go stand (see the figure at right), apply couplant to the probe, and take the measurement.
4. If you have selected User in the Zero option, the message reads, “Wipe off Couplant from Probe, Press Zero.”
5. The DMS Go zeroes out the probe. After completing the measurement, use the joystick () to move to another function, or press HOME to return to the Main Menu.






2.5.2 2-Point Calibration (PROBE & CAL - CALIBRATION)

For two-point calibration

- a. The DMS Go displays “Press ENTER to edit low calibration standard thickness or couple to low calibration thickness”. The thickness of the cal block is displayed (instead of measured thickness). If you do not need to edit the value, couple the probe to the low-calibration thickness calibration block. The DMS Go indicates that it is acquiring the value, and then directs you to remove the probe.
 - b. The DMS Go displays “Press ENTER to edit high calibration standard thickness or couple to high calibration thickness”. The thickness of the cal block is displayed (instead of measured thickness). If you do not need to edit the value, couple the probe to the high-calibration thickness calibration block. The DMS Go indicates that it is acquiring the value, and then directs you to remove the probe. Then press DONE.
6. After completing the procedure, use the joystick () to move to another function, or press HOME to return to the Main Menu.

2.5.3 Calibrating by Material Velocity (PROBE&CAL - VELOCITY)


When calibration blocks/pieces are not available, or a procedure requires a specific material velocity to be used during an ultrasonic wall thickness test, the DMS Go can be calibrated by adjusting the material velocity.

1. In the **MAIN** menu, scroll to the **PROBE & CAL** submenu using the joystick () .
2. Move the joystick () to view **VELOCITY**, the calculated velocity after the calibration is shown. Move the joystick () to change the velocity. If you see **VELOCITY** in capital letters, it indicates that you are using a preset velocity from the internal material table, while velocity in lower case letters appears when you have fine-tuned the velocity or performed a calibration that adjusted the velocity.
3. Press **F3** or **F4** key to open a preprogrammed list of material velocities, and continue pressing those keys to scroll through the list. Adjustments in increments of 1 are made with the joystick.

2.5.4 Adjusting Temperature Compensation (PROBE & CAL - TEMP COMP)

Temperature variations change the sound velocity of materials and transducer delay lines and, therefore calibrations. All calibrations should be performed onsite, and with calibration blocks at the same temperature as the test piece, to minimize errors due to temperature variations. When it is not possible to heat the calibration block, the use of a temperature compensation formula can be used to calculate the test piece thickness back to ambient temperature.

Temperature Compensation: As the temperature of a test object increases, the ultrasonic velocity of the material will slightly decrease. When this occurs, the wall thickness will read thicker than the actual temperature when measured at ambient. To compensate for this factor, the DMS Go has the ability to calculate a compensated thickness value based upon the inputted test piece temperature and a compensation factor.

1. In the **MAIN** menu, scroll to the **PROBE & CAL** submenu using the joystick ()
2. Use the joystick to **ENABLE** or **DISABLE** temperature compensation. If you **ENABLE** temperature compensation, three other functions appear:
 - **CAL TEMP** - The temperature of the calibration block (typically ambient temperature).
 - **CUR TEMP** - The current temperature of the material.
 - **TEMP COEF** (Temperature Coefficient) - The change in material velocity per degree, adjusted from a user table. (A typical value for carbon steel is $-0.0002 \text{ in/us/}^\circ\text{F}$ or $-0.###\text{mm/m/C}$). The value input should be obtained from the company level III UT manager or corporate NDT guidelines.




2.5.4 Adjusting the Calibration Results (PROBE & CAL - TEMP COMP) (cont.)

Note: *These functions have both coarse and fine adjustment. Press F3 or F4 to enter coarse adjustment (the lower case function tag turns to capital letters) to adjust the values in increments of 100 (for velocity) or 10 (for temperature). Adjustments in increments of 1 are made with the joystick.*

The DMS Go can display both the uncompensated and compensated thickness values simultaneously. Display THK (the uncompensated thickness value) on the Results area of the display. (see Displaying Measured Results (MEASURE- RESULTS)).

2.6 Using the Calibration Reminder Alarm (PROBE & CAL - CAL REMINDER)

The *DMS Go* incorporates a timed alarm feature that causes an icon to appear on user-defined input intervals. To use this alarm:

1. In the **MAIN** menu, scroll to the **PROBE & CAL** submenu using the joystick () .
2. Use the joystick () to select the function titled **CAL REMINDER**. The **CALIBRATION REMINDER CONFIG** window opens. Input the mode, or the parameter that will trigger the reminder (**TIME IN MINUTES**, **NUMBER OF READINGS**, **POWER ON**, and **OFF**) and then the value the reminder alarm will trigger. Setting this value automatically resets the alarm to trigger on the specified intervals. This function also allows the alarm to be disabled (**OFF**).
3. Press the function toggle or move the joystick () to change the alarm interval.
4. Press **F2 (CONFIRM)** to acknowledge the triggered alarm and reset it to resume normal operation or **F 4 (EXIT)** to close the window without changing the alarm setting.

Note: *The selection of the **VELOCITY** function also resets the alarm.*

Chapter 3. Creating Data Recorder Files

The on-board data recorder option of the DMS Go is a flexible, powerful tool for managing ultrasonic thickness data. It can store, evaluate, display, and report on various types of measurement data. The *Data Recorder* (DR) menu functions are shown in *Figure 21* below.

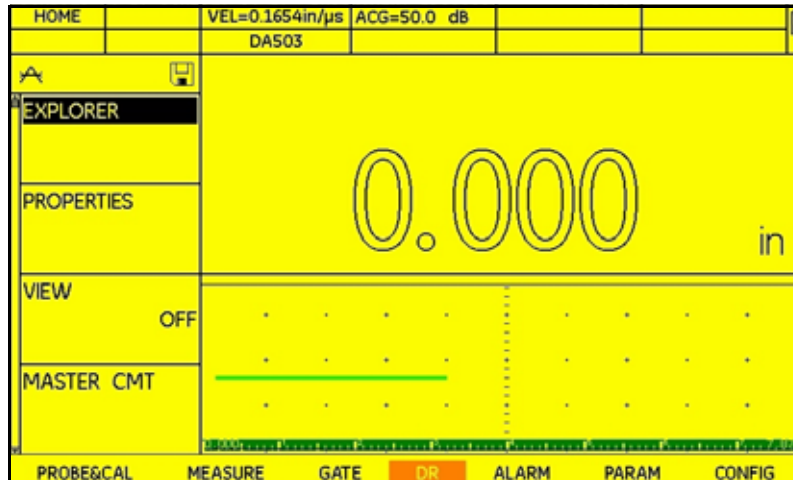




Figure 21: The DR Menu

3.1 Creating a Data File (DR - EXPLORER - NEW)

Before you can store any measurements, you must set up a data file. Once the file is created, you can take measurements and enter them into the file for later interpretation (see Chapter 6).

1. Use the joystick () to select the function titled EXPLORER in the DR menu. Press F4 (NEW) to create a file in the DR submenu. Move the joystick right () to open the function. The file will be stored in the directory currently selected in the Explorer window.
2. The first selection is the *File Type* (Figure 22 below).

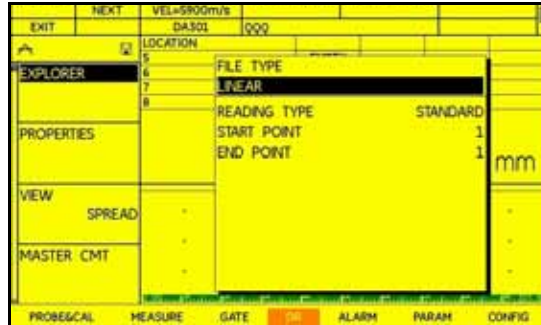


Figure 22: Data File Type Selection

3.1 Creating a Data File (DR - EXPLORER - NEW) (cont.)

Seven options are available. (For further information on file types, refer to Appendix B.)

- **Linear** - A one-dimension file with sequential numeric values as location labels. Often used for tank truck and similar applications. Accepts up to 99,999 data points in sequential locations. Each point is placed in a location. User parameters are Reading Type (Standard —Thickness Measurement only or Extended —Thickness Measurement, Velocity and other values), Start Point, and End Point.
- **Grid** - A three-dimension file with grid coordinates for locations and sequential numeric points. Often used for storage tank, large diameter fluid conductors, and similar applications. The user can build a file with up to 702 rows and 702 columns. Each row and column meet to establish a coordinate location. Accepts up to 9 points per location. The starting value for the grid coordinates can be specified within the range allowed. The starting value for the POINT sequential numeric values must be one. Parameters are Reading Type ((Standard —Thickness Measurement only or Extended —Thickness Measurement, Velocity and other values), Grid Labeling, Starting Row and Column, Ending Row and Column, Start Point, and End Point.
- **Custom Linear** - A two-dimension file with user-defined location names and sequential numeric point labels. Often used for process piping (where measurements are taken at 90-degree intervals around the pipe) and similar applications. Accepts up to 999 data points in each location. Up to 9,999 sequential locations are allowed. User parameters are Reading Type (Standard or Extended), Number of Locations, Location Label Length, Start Point, and End Point.

3.1 Creating a Data File (DR - EXPLORER - NEW) (cont.)

- **Custom Grid** - A three-dimension file with user-defined locations and grid coordinates for points. Often used for tank floors, ship hulls, and similar applications. Users can build numerous “grids” (up to 999) within a file. Each grid is made up of up to 702 rows and 702 columns. Each row and column meet to establish a data-point input location. User parameters are Reading Type (Standard or Extended), Number of Locations, Location Label Length, Grid Labeling, Starting Row and Column, Ending Row and Column Start Point, and End Point.
- **Custom Point** - A two-dimension file with user-defined location and point labels. Often used for process piping circuits, pressure vessels, and similar applications. Accepts up to 999 data points in each location. Up to 999 locations are allowed. User parameters are Reading Type (Standard or Extended), Number of Locations, Location Label Length, Points Per Location, and Point Label Length.
- **Boiler** - A three-dimension file with user-defined location names, sequential numeric tube labels, and a fixed (custom) set of point names. Often used for boiler wall tubing and similar applications. Stores up to four data points per tube, for up to 999 tubes. Data can be recorded at up to 9,999 elevations. User parameters are Reading Type (Standard or Extended), Number of Elevations, Elevation Label Length, Starting Tube #, Ending Tube #, and Points on Tube.
- **Copy** - Enables you to copy a selected file to another file.

Note: *Custom 3D and 4D files are only supported as built outside of the DMS Go DR creation system.*

After selecting the option, enter the associated parameters, listed for each type in Table 3 on the next page. When you have finished, press F2 (NEXT) to proceed.

3.1 Creating a Data File (DR - EXPLORER - NEW) (cont.)

Table 3: Items to be Defined for Each File Type

	Reading Type	Set file style to Standard (normally recommended) or Extended.
Linear File	Start Point	Defines the number assigned to the first point in the data file.
	End Point	Defines the number assigned to the last point in the data file.
	File Name	16 character file name, set using the virtual keyboard. No two files in the DMS Go memory may have the same file name.
	Units	Selects either inches or millimeters as the unit of measurement
	T-MIN	Defines the minimum thickness limit. Measurements below this limit cause an alarm to signal.
	T-MAX	Defines the maximum thickness limit. Measurements above this limit cause an alarm to signal.

Table 3: Items to be Defined for Each File Type (cont.)

Boiler File	Reading Type	Set file style to Standard (normally recommended) or Extended.
	Number of Elevations	Quantity of elevations.
	Elevation Label Length	Sets the maximum length of the label identifying each elevation.
	Points Per Tube	Defines the number of points to be recorded for each tube.
	Point Label Length	Sets the maximum length of the label identifying each elevation.
	Starting Tube #	Defines the number assigned to the first tube in the data file.
	Ending Tube #	Defines the number assigned to the last tube in the data file.
	File Name	16 character file name, set using the virtual keyboard. No two files in the DMS Go memory may have the same file name.
	Units	Selects either inches or millimeters as the unit of measurement
	T-MIN	Defines the minimum thickness limit. Measurements below this limit cause an alarm to signal.
	T-MAX	Defines the maximum thickness limit. Measurements above this limit cause an alarm to signal.

Table 3: Items to be Defined for Each File Type (cont.)

Grid File	Reading Type	Set file style to Standard (normally recommended) or Extended.
	Grid Labeling	Specify if rows and columns will have alphabetical or numerical tags.
	Starting Row	Defines the number or letter assigned to the first row in the data file.
	Ending Row	Defines the number or letter assigned to the last row in the data file.
	Starting Column	Defines the number or letter assigned to the first column in the data file.
	Ending Column	Defines the number or letter assigned to the last column in the data file.
	Start Point	Defines the number assigned to the point in each data file location; a location is one cell grid
	End Point	Defines the number assigned to the last point in each data file location.
	File Name	16 character file name, set using the virtual keyboard. No two files in the DMS Go memory may have the same file name.
	Units	Selects either inches or millimeters as the unit of measurement
	T-MIN	Defines the minimum thickness limit. Measurements below this limit cause an alarm to signal.
	T-MAX	Defines the maximum thickness limit. Measurements above this limit cause an alarm to signal.

Table 3: Items to be Defined for Each File Type (cont.)

Custom Grid File	Reading Type	Set file style to Standard (normally recommended) or Extended.
	Location Label Length	Sets the maximum length of the label identifying each location.
	Grid Labeling	Specify if rows and columns will have alphabetical or numerical tags.
	Starting Row	Defines the number or letter assigned to the first row in the data file.
	Ending Row	Defines the number or letter assigned to the last row in the data file.
	Starting Column	Defines the number or letter assigned to the first column in the data file.
	Ending Column	Defines the number or letter assigned to the last column in the data file.
	File Name	16 character file name, set using the virtual keyboard. No two files in the DMS Go memory may have the same file name.
	Units	Selects either inches or millimeters as the unit of measurement
	T-MIN	Defines the minimum thickness limit. Measurements below this limit cause an alarm to signal.
	T-MAX	Defines the maximum thickness limit. Measurements above this limit cause an alarm to signal.

Table 3: Items to be Defined for Each File Type (cont.)




Custom Linear File	Reading Type	Set file style to Standard (normally recommended) or Extended.
	Number of Locations	Quantity of locations
	Location Label Length	Sets the maximum length of the label identifying each location.
	Start Point	Defines the number assigned to the first point in the data file.
	End Point	Defines the number assigned to the last point in the data file.
	File Name	16 character file name, set using the virtual keyboard. No two files in the DMS Go memory may have the same file name.
	Units	Selects either inches or millimeters as the unit of measurement
	T-MIN	Defines the minimum thickness limit. Measurements below this limit cause an alarm to signal.
	T-MAX	Defines the maximum thickness limit. Measurements above this limit cause an alarm to signal.

Table 3: Items to be Defined for Each File Type (cont.)

Custom Point File	Reading Type	Set file style to Standard (normally recommended) or Extended.
	Number of Locations	Quantity of locations
	Location Label Length	Sets the maximum length of the label identifying each location.
	Points Per Location	Defines the number of points assigned to each file location.
	Point Label Length	Sets the maximum length of the label identifying each point.
	File Name	16 character file name, set using the virtual keyboard. No two files in the DMS Go memory may have the same file name.
	Units	Selects either inches or millimeters as the unit of measurement
	T-MIN	Defines the minimum thickness limit. Measurements below this limit cause an alarm to signal.
	T-MAX	Defines the maximum thickness limit. Measurements above this limit cause an alarm to signal.


Note: *Setting the reading type to “extended” stores additional information with the thickness measurement, including: the time/date of reading, time/date of last calibration, measurement mode, rectification, probe type, velocity and gain. Once stored, this additional information is only accessible using UltraMATE®.*




3.1 Creating a Data File (DR - EXPLORER - NEW) (cont.)

3. The DMS Go then asks for the *File Name* by opening a keyboard window. Move the joystick () to choose the first character in the desired file name. Press the center of the joystick () to enter the character. Then, move the joystick left or right () to move the cursor to another character position in the text string. (Press BKSP to eliminate a character.) Repeat the process until you have entered the entire file name.
4. When you have finished, press F2 (NEXT) to proceed. The option lists descriptive parameters you can enter into the file header:
 - Probe
 - Calibration
 - Units
 - Company
 - Inspector
 - Description (four lines)
 - Temp

3.1 Creating a Data File (DR - EXPLORER - NEW) (cont.)

- T-Min
- T-Max
- Memo

For any function that requires alphanumeric data, highlight the function and move the joystick right (). A keyboard window opens.

Move the joystick up or down () to choose the first character. Press F2 (ENTER) or the center of the joystick () to enter the character. Then, move the joystick left or right () to move the cursor to another character position in the text string. Repeat the process until you have entered the needed data.

5. For boiler and custom files, the remaining step enables you to add custom labels for each elevation. The label options are:

- Prefix Text
 - Starting Numeric
 - Increment By
 - Suffix Text
6. Press F2 to indicate that the file is DONE, or F4 to EXIT the option.

3.2 Creating Master Comments for Addition to a File (DR - MASTER CMT)

Before you create any new DR files, you should build a Master Comment List. This is a list of observations that can be attached to all produced files.




1. In the DR submenu, use the joystick () to select and enter the MASTER CMT function. The keyboard window shown in Figure 24 below opens.



Figure 24: Master Comments Window





3.2 Creating Master Comments for Addition to a File (DR - MASTER CMT) (cont.)

2. Move the joystick up or down () to choose the first character. Press F2 (ENTER) to enter the character. Then, move the joystick left or right () to move the cursor to another character position in the text string. Repeat the process until you have entered the needed data. When you have completed the comment, press F4 (CONFIRM) to confirm the entry.
3. Press F1 (EXIT) to leave the function.


You can change this Master Comment List at any time. Later, when working in a specific Data File, you can use this Master Comment List as a basis for an Active File Comment List attached to one specific file.

3.3 Setting Up the Meter to Overwrite Data (CONFIG-OVERWRITE)





If you have created a DR file, and want to overwrite data in a specific file location, the DMS Go asks for confirmation. However, if you have switched on the **OVERWRITE** function, the meter automatically overwrites data without asking for further confirmation.

1. In the **MAIN** menu, scroll to the **CONFIG** submenu using the joystick (). Several functions are displayed on the screen.
2. Use the joystick () to select the **OVERWRITE** function.
3. To switch the **OVERWRITE** function **ON** or **OFF**, move the joystick ().
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

3.4 Accessing the Data Recorder File

In the MAIN menu, use the joystick () to activate the DR submenu (see *Figure 21 on page 65*). Then, proceed to the appropriate section below to either create a new file name or select an existing file name.

3.4.1 Selecting a Data File (DR - EXPLORER)

1. Use the joystick () to select the function titled EXPLORER in the DR submenu, and move it left or right to open the function.
2. A window opens with the list of files available on the installed SD card. Move the joystick up or down () to select the desired file name from the list of SD card files, and press the center of the joystick () to confirm the selection.
3. A window asks “Show file’s properties?” Move the joystick to select YES or NO, and press the center of the joystick () to confirm the selection. (If you select YES, go to page 110 for an explanation of the Properties option.)
4. Press F1 (EXIT) to exit this function. Press F1 (HOME) to return to the Main Menu.

3.5 Making and Recording Measurements

Once you have opened the data file and configured the DMS Go, you are ready to take and record measurements.

1. Apply couplant to the material being tested, and then carefully (but firmly) place the probe's contact surface onto the couplant-covered surface. Use the least amount of couplant necessary to obtain quick, stable thickness readings.
2. When you have obtained a reading, press F2 (SEND) to send the reading to the data location.
3. Repeat steps 1 and 2 as often as necessary to take all the readings necessary.

Chapter 4. Measuring and Recording Data

This chapter will explain how to measure thicknesses and store those measurements in the data file you have created in Chapter 3. If you wish to store the measurement data and have not yet created a data file, refer to Chapter 3.

4.1 Setting up Data Measurements




4.1.1 Positioning Gate A and Gate B

Setting the position and the characteristics of Gate A and Gate B is the first step in configuring the instrument for material thickness measurements. Use the procedures in this section to set the vertical and horizontal position of Gate A and Gate B. Remember that gate position has the following effects on instrument performance:

- A-Scan echoes on the right side of the display screen represent features that occur at a greater depth from the test-material surface than those on the left side of the display screen. Therefore, moving a gate to the right means that the gate is evaluating a deeper portion of the test material.
- A wider gate setting means that the gate is evaluating a thicker portion of the test material.
- Increasing the vertical height, called the threshold, of a gate means that only reflected signals of sufficiently large amplitude will cross the gate.

Each probe selected has default gate settings which should work for most applications. If the echoes are not being properly measured, the user can adjust the gating to ensure the DMS Go is measuring the proper echoes. To configure the gate parameters, proceed to the appropriate section:

4.1.1a Setting the Gate Starting Point (GATE - GATE A or GATE B START)

1. In the **MAIN** menu, scroll to the **GATE** submenu using the joystick () .
2. Use the joystick () to select the **GATE A START** (or **GATE B START**) function.
3. To change the gate starting point, either move the joystick () or press F3 and F4.




Increasing and decreasing the value of the starting point moves the gate to the right and left, respectively. The gate starting point remains as set here, even when width adjustments are made.

Note: *The **GATE A START** and **GATE B START** functions have both coarse and fine adjustment modes. Coarse adjustments (of .050, .060 or .100 increments) are made with the function toggle, while fine adjustments (of 0.001 in) are made with the joystick. When the function name appears in all capital letters, coarse adjustments are being made, while fine adjustments occur when the function name appears in all lower-case letters.*

4. After completing your selection, move the joystick up or down () to navigate away from this function, or press **HOME** to return to the Main Menu.

4.1.1b Adjusting the Gate Width (GATE - GATE A WIDTH or GATE B WIDTH)





Adjusting the A-gate width may be necessary in multi-echo modes because the returning sound pulse (backwall echo) may be too low in amplitude to trigger a measurement reading. Adjusting the B-gate width reduces or increases the width of the B-gate to control which signal crosses the B-gate and triggers a thickness measurement.

1. In the MAIN menu, scroll to the GATE submenu using the joystick ().
2. Use the joystick () to select the GATE A WIDTH (or GATE B WIDTH) function.
3. To change the gate width, move the joystick () or press the function toggle.

Note: *The GATE A WIDTH and GATE B WIDTH functions have both coarse and fine adjustment modes. Coarse adjustments (of 1,5 or 10 in) are made with the function toggle, while fine adjustments (of 0.001 in) are made with the joystick. When the function name appears in all capital letters, coarse adjustments are being made, while fine adjustments occur when the function name appears in all lower-case letters.*

4. After completing your selection, move the joystick up or down () to navigate away from this function, or press HOME to return to the Main Menu.

4.1.1c *Setting the Gate Threshold (Vertical Position) (GATE - GATE A THR or B THR)*

1. In the **MAIN** menu, scroll to the **GATE** submenu using the joystick () .
2. Use the joystick () to select the **GATE A THR** (or **B THR**) function.
3. To change the gate height, either move the joystick () or press the function toggle. Increasing or decreasing the value of the threshold moves the gate up or down, respectively.
4. After completing your selection, move the joystick up or down () to navigate away from this function.

Note: *When RECTIFY is RF, negative threshold values are available. When changed to POS, NEG or FULL, the gate threshold changes to the corresponding positive values for a short period of time. However, when RECTIFY is switched back to RF, negative positions for GATE THRESHOLD(s) may be reinstated again.*

Gate B is not permanently available; it is available in TG MODE S-PEAK, S-FLANK for single element probes, and in DUAL MULTI for some dual element probes.

4.1.2 Selecting the Measurement Method (MEASURE - MODE)

The DMS Go can perform thickness measurement and corrosion monitoring in five modes:





- **A-Scan**- Display in which the echo amplitude is shown in the y-axis and the transmit time (also shown without echoes) and the pulse travel time is shown in the x-axis. It provides a graphical display of the echoes used to measure thickness.
- **B-Scan** - Two-dimensional graph in which travel time is shown in the vertical axis and transducer movement in the horizontal axis. If you select B-Scan, the Measure menu has two additional options:
 - **TIMEOUT** - The time that elapses, once a probe is uncoupled from the DMS Go, before the B-scan stops. (During the timeout period, the battery icon in the upper right corner fills with yellow.) The B-scan mode will allow you to map the thickness profile of the material being tested over a period of time. The thickness mapping procedure may be briefly interrupted during this time period. The maximum length of this interruption of data collection is controlled by the TIMEOUT feature, which can be set from 0 to 15 seconds.
 - **TIME** — The duration of a B-scan (from 7 to 30 sec).
Use the joystick to adjust these parameters.
- **Min/Max** - Display of minimum and maximum values. This mode relies on a sequence of readings. On the left of the screen, it always shows the minimum value of the sequence; on the right, it shows the maximum value. The large reading in the center is the current value. If the probe is uncoupled for several seconds, the sequence is terminated. When you resume in Min/Max, the DMS Go starts a new sequence. This mode aids in determining the stability of your actual reading(s) or the overall deviation of the thickness in your test piece while scanning.

4.1 Selecting the Measurement Method (MEASURE - MODE) (cont.)

- **Diff** - Display of differential values. DIFF shows the difference from a NOMINAL value (located just below that function) as an absolute value or as a percentage related to NOMINAL. Positive means “More than” Negative means “Less than” NOMINAL absolute or relative in percentage. For example, for a NOMINAL thickness of 5.00mm for a tube wall, then a 4.50mm is indicated as -0.50mm, and 10% delta value. The delta symbol means Difference.

Note: Use the F3 and F4 keys to enter the NOMINAL option, and to enter values in increments of 10. Use the joystick to enter values in increments of 1.





- **Thickness** - The thickness currently being measured (if the probe is coupled) or the last valid thickness value measured. The displayed numerals will appear “solid” whenever the probe is coupled and “hollow”, or as a series of dashes (- - -), when uncoupled. The Last Reading function sets the appearance when uncoupled.

1. In the MAIN menu, scroll to the MEASURE submenu using the joystick () .
2. Use the joystick () to select the MODE function.
3. To change the mode, either move the joystick () or press the function toggle.
4. After completing your selection, move the joystick up or down () to navigate away from this function, or press HOME to return to the Main Menu.

4.1.1 Setting up a Dual Element Transducer (MEASURE - DUAL MULTI)

Note: *This function does not appear if a single-element probe is connected.*

The Dual Multi mode is available when a dual-element type transducer is connected to the *DMS Go*. It starts ultrasonic detection from the zero crossing before a peak echo detected in gate-A and ends with the zero crossing before a peak echo in gate-B. The *DMS Go* calculates and displays a thickness result value from the acquired data. This mode, sometimes called “Thru-Coating,” is always used with a dual-element probe to test thickness through painted or coated materials. From the base material, the probe measures between two backwall echoes. If you have attached a dual element transducer to the *DMS Go*, you should set this option to ON.

1. In the MAIN menu, scroll to the MEASURE submenu using the joystick () .
2. Use the joystick () to select the DUAL MULTI function.
3. To change the Dual Multi mode, move the joystick () to ON or OFF.
4. After completing your selection, move the joystick up or down () to navigate away from this function, or press HOME to return to the Main Menu.

4.2 Adjusting the Display

To configure the *DMS Go* display, follow the instructions in this section.

4.2.1 Setting the Display Range (MEASURE - DISPLAY RANGE)

Display Range starts after Display Delay elapses. It represents the visible part of the sound track in inches or millimeters, and should contain all echoes of interest, or a subsection for more detailed views. . If the instrument's range needs to be modified, complete the steps on the next page.

Note: *Display Range is present when a probe is selected. It represents the standard thickness range for the selected probe, and can be modified if needed.*

4.2.1 Setting the Display Range (MEASURE - DISPLAY RANGE) (cont.)

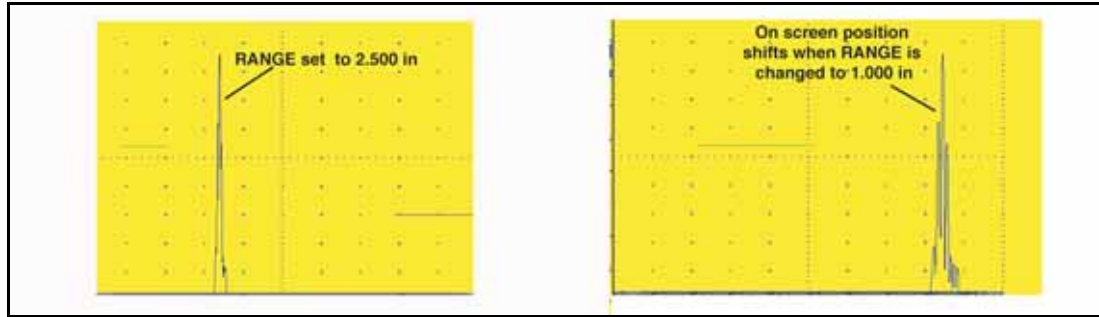






Figure 25: Effects of the Display Range Adjustment

To set the display range:





1. In the MAIN menu, scroll to the MEASURE submenu using the joystick () .
2. Use the joystick () to select the function titled DISPLAY RANGE.

4.2.1 Setting the Display Range (MEASURE - DISPLAY RANGE) (cont.)

3. Press F3 or F4 to change the display delay in increments of 5 or 10 in (50 or 75 mm), or move the joystick () to change the range setting in increments of 0.001 in. (0.01 mm). Values from 0.040 to 1100 in. are allowed.
4. After completing your selection, move the joystick up or down () to navigate away from this function, or press HOME to return to the Main Menu.





4.2.2 Setting the Display Delay (MEASURE-DISPLAY DELAY)

Display delay represents the transit time between the initial zero (T0) of the transmit pulse to the left hand edge of the A-scan area. A display delay value of zero always makes the transmit pulse visible at the left hand edge of the A-scan area. This parameter is used with the display range to align the A-scan echoes on the display. To set the display delay:

1. In the **MAIN** menu, scroll to the **MEASURE** submenu using the joystick ().
2. Use the joystick () to select the function titled **DISPLAY DELAY**.
3. Press the Function 3 or 4 keys to change the display delay in increments of $2.5\mu\text{s}$ or move the joystick () to change the display delay in increments of $0.001\mu\text{s}$. As you change the value, you should see the displayed echoes shift to the left or the right.
4. After completing your selection, move the joystick up or down () to navigate away from this function, or press **HOME** to return to the Main Menu.

4.2.3 Setting the Freeze (MEASURE - FREEZE)

Freezing the A-scan display allows the user to more closely evaluate the measurement and/or adjust the A-scan range and gates. You can program the F4 key (see page 49) to **FREEZE** the display. Then, whenever a display is active, pressing that end of the *Function Toggle* freezes the display. The active display will remain as it appeared when the toggle was pressed and the display will remain frozen until it is pressed again. While the display is frozen, the displayed readings are based on the frozen echoes.




1. In the **MEASURE** submenu, activate the **FREEZE** option using the joystick () .
2. Move the joystick up or down () . to turn the freeze **On**. The screen freezes with the current measurement, and a freeze symbol appears below the function key assignments on the screen. Move the joystick up or down () . to turn the freeze **Off**.
3. After making your choice, move the joystick up or down () to navigate away from this function, or press **HOME** to return to the Main Menu.

4.2.4 Setting the MAX GAIN MODE (MEASURE - MAX GAIN MODE)

The DMS Go always operates in Automatic Gain Control (AGC) mode: the gain is adjusted automatically by the instrument to get the echo in the gate 4dB above the gate threshold. MAX GAIN MODE is used to select the maximum gain used by the AGC process:

- **HIGH:** the max gain is limited to a preset (different for each probe) high gain value (suitable for attenuative material like Stainless Steel)
- **LOW:** the max gain is limited to a preset (different for each probe) low gain value (suitable for less-attenuative material like Aluminum)
- **AUTO:** the instrument select the HIGH or LOW preset value automatically based on material velocity (the switch between HIGH and LOW is at 6248400 mm/s = 246000 in/s to differentiate between steel and aluminum)
- **MANUAL:** the max gain is limited to the value set in “max gain” field (discussed on the next page).




To determine whether the gain should go high or low, complete the following steps:

1. In the MEASURE menu, activate the MAX GAIN MODE submenu using the joystick (.
2. Move the joystick left or right () to select AUTO, HIGH, LOW or MANUAL.
3. After making your choice, move the joystick up or down () to navigate away from this function, or press F1 (HOME) to return to the Main Menu.

4.2.4a *Setting the max gain (MEASURE - max gain)*

Note: *This function is only available if the MAX GAIN MODE function has been set to MANUAL.*

When adjusting the max gain, each press of the joystick increases or decreases the gain level. To enter a user-specified gain step, complete the following steps:

1. In the MEASURE menu, activate the max gain submenu using the joystick () .
2. Press the F3 or F4 keys to change the max gain in increments or move the joystick () to change the max gain in increments or decrements of 0.1 dB.
3. After making your choice, move the joystick up or down () to navigate away from this function, or press HOME to return to the Main Menu.

4.2.5 Setting Gate Alarms

The alarm settings allow you to indicate the material thickness readings above which and below which (MAX and MIN) the instrument will signal alarms. The thickness value at which an alarm will appear changes from one test application to another, any time that the acceptable material dimensions change.

Note: *Once a data file is saved, the MIN and MAX alarm values used when that data was recorded will become effective whenever that data file is reactivated.*

An alarm can be set for either the minimum or maximum thickness. If the value goes below the minimum value or above the maximum value, the displayed value on the screen flashes red, and the Alarm icon flashes in the icon bar at the upper left (Figure 26 below).

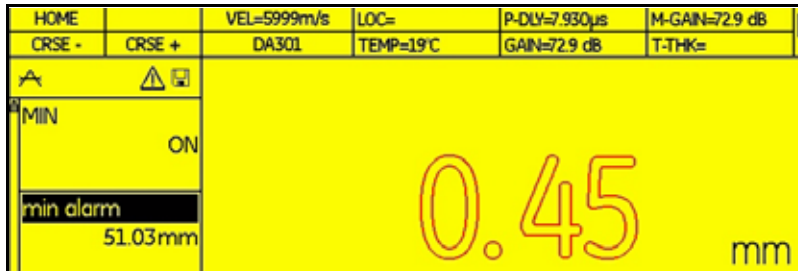






Figure 26: Screen with Triggered Alarm





4.2.5a *Setting Up Alarms (ALARMS - MIN, MAX)*


Each gate alarm can be triggered by a minimum or maximum value.

1. In the **MAIN** menu, activate the **ALARM** submenu using the joystick ().
2. Use the joystick () to select the function titled **MIN** or **MAX**.
3. Move the joystick up or down () to turn the alarm **On** or **Off**.
4. After making your choice, move the joystick up or down () to navigate away from this function, or press **HOME** to return to the Main Menu.

4.2.5b Setting Up Alarm Parameters (ALARMS - MIN ALARM, MAX ALARM)

Note: *These functions only appear if the MIN or MAX functions have been switched ON.*

1. In the **MAIN** menu, activate the **ALARM** submenu using the joystick () .
2. Use the joystick () to select the function titled **MIN ALARM** or **MAX ALARM**.
3. Move the joystick up or down () to enter the alarm value in increments of 0.001.
4. After making your choice, move the joystick up or down () to navigate away from this function, or press **HOME** to return to the Main Menu.

Once you have set the alarm, if the value goes below the minimum value or above the maximum value, the displayed value on the screen flashes red, and the Alarm icon  flashes in the icon bar at the upper left.


4.3 Displaying Measured Results (MEASURE- RESULTS)

The instrument is capable of displaying up to six measured readings at one time. The displayed readings are selected using the RESULTS submenu. The parameters available for display, which depend on the instrument configuration and the evaluation mode, include the following:

- LOC - The location of the reading (for example, A1 or B2)
- GAIN - The gain value automatically set up by the DMS Go
- M GAIN - The maximum gain value, entered by the user in the Measure menu.
- TEMP - The current temperature of the material, entered by the user in the Probe & Cal menu.
- THK - The thickness of the material measured by the DMS Go (not compensated by temperature)
- T-THK - Temperature Compensated Thickness, or the thickness of the material as measured by the DMS Go, compensated by the temperature
- P-DLY - The probe delay, or the time between when the DMS Go generates a pulse and the time it leaves the probe and enters the material (or its travel time through the probe, typically measured in microseconds)
- C-THK - Coating thickness when in TopCOAT mode.
- OFF

4.3 Displaying Measured Results (MEASURE- RESULTS) (cont.)


The measured readings can be displayed at the top of the display screen in six small reading boxes and one large reading box. To set the reading box configuration:

1. In the MEASURE menu, activate the RESULTS submenu using the joystick (.
2. In the RESULTS submenus, access and set the READING 1 through READING 6 functions to select the desired result to be displayed.

Note: *In some configurations, the DMS Go can display only four items, as shown in Figure 27 below.*

VEL=5999m/s	LOC=	P-DLY=7.930 μ s
DA301	TEMP=19°C	GAIN=81.8 dB

Figure 27: Sample Readings

Move the joystick up or down () to navigate away from this function, or press HOME to return to the Main Menu.

[no content intended for this page - proceed to next page]

Chapter 5. Using Parameter Files

The current *DMS Go* settings, which include most of the functional settings, can be stored as a *parameter file*. When a stored parameter file is later recalled, all active function settings are modified to match those contained in the file. After a data set is loaded, the newly active functional settings may then be modified if desired, and saved for later use. The PARAM menu allows users to select, save and re-load up to twenty thickness gage parameter sets with corresponding A-scan images. When a parameter set is saved by selecting SAVE P-SET, the settings of all of the parameters (except the user preferences listed below) are retained. You can then apply this set of parameter settings (usually associated with specific applications such as tanks or cooling tubes) to a data file by selecting LOAD P-SET.






When an existing P-SET is loaded or applied to a new data file, the current instrument settings are automatically replaced by the stored settings and the stored A-scan image is displayed. These settings can then be adjusted as required. The saved P-SET can't be changed. If you wish to modify an existing P-SET, first make the changes, delete the existing P-SET, as described below, and save the new parameter settings using the same P-SET name. This feature provides the following two major benefits:

1. Storing and recalling calibration setups saves time, ensures consistent data, and minimizes calibration errors. Transferring setups to and from a computer also saves time and allows identical setups to be stored in multiple instruments.
2. A-scan images and parameter sets associated with specific applications, such as pitted or thin wall conditions, can be saved in a consistent format and later recalled, printed, or transferred to a computer for documentation and analysis.

All settings (including current A-Scan) are saved except the user preferences: language, radix, brightness, screen color, orientation, zero block and reference block.

5.1 Loading a Stored PARAM File (PARAM-LOAD P-SET)

To load a selected parameter file:

1. In the **MAIN** menu, activate the **PARAM** submenu using the joystick ().
2. Use the joystick () to select the function titled **LOAD P-SET**, and move the joystick () to activate the function.
3. The Parameter Set List window opens. Move the joystick up or down () to select the desired file, and press F2 (**ENTER**) to load it.
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.







After a data set file is recalled, the instrument settings may then be modified, but these changes only affect the stored data set file if the new settings are stored with the same file name as the original data set file.

To delete a stored P-SET, press F3 (**DELETE**). Press F2 (**YES**) to confirm deletion.

Note: *The DMS Go parameter set files can be recognized by the ".DGO" extension on the filenames.*

5.2 Saving a New Parameter File (PARAM-SAVE P-SET)

To save the currently loaded parameter file:



1. In the **MAIN** menu, activate the **PARAM** submenu using the joystick () .
2. Use the joystick () to select the function titled **SAVE P-SET**, and move it left or right to activate the function.
3. The Param Set File Name window opens. Move the joystick up or down () to choose the first character in the desired file name.
Press F2 (ENTER) or the center of the joystick () to enter the character. Then, move the joystick left or right () to move the cursor to another character position in the text string. Repeat the process until you have entered the entire file name. Press F4 (CONFIRM) to save the file.
4. After making your choice, use the joystick () to move to another function, or press **HOME** to return to the Main Menu.

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Chapter 6. Working with Recorded Data

The DMS Go combines a thickness gauge with sophisticated data recording capabilities. It permits an operator to save and organize all thickness measurement data (along with comments, A-scan graphics, B-scan cross-sectional profiles, Micro-Grids, and other information) into data files for editing, evaluation and export to PCs via the SD card or the USB port.

6.1 Selecting a Data File (DR - EXPLORER)

1. Use the joystick () to select the function titled EXPLORER in the DR menu. Move the joystick right () to open the function. If you have created files, the display appears similar to Figure 28 on the next page.

6.1 Selecting a Data File (DR - EXPLORER) (cont.)

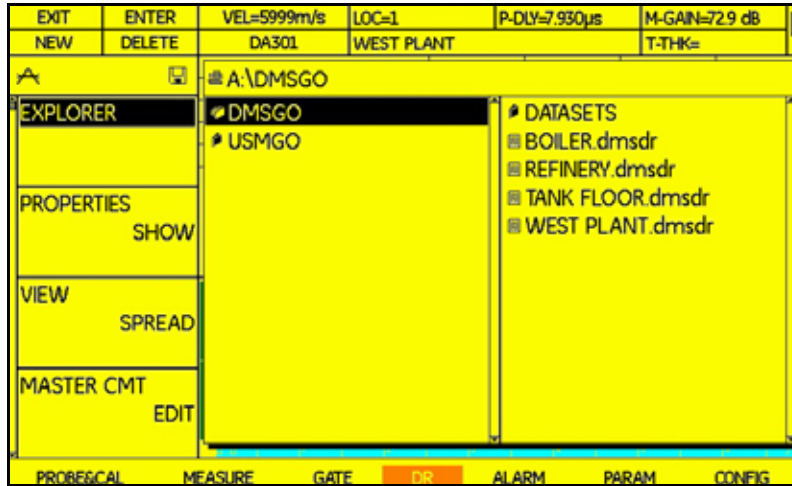


Figure 28: The Explorer Option (with Created Files)

Use the joystick to select the file, and then press F2 or center-press () to confirm your selection. The DMS Go asks, “NOTICE Show File’s Properties?” Move the joystick to Yes, and the PROPERTIES function opens (Figure 29 on page 110).

6.1 Selecting a Data File (DR - EXPLORER) (cont.)

To select a second file, scroll to the second file and press ENTER to confirm your selection. The DMS Go closes the first file and opens the second file.


Note: *Only one file can be open at any given time.*


To delete a file, scroll to the file and press F3 (DELETE). The DMS Go asks for confirmation. Press F2 or center-press YES.

To exit the Explorer function, press F4 (EXIT). Note, however, that the currently open file remains on the display.

6.2 Viewing the Data Recorder File in a List or Spread Format (DR - VIEW)

To view the DR file that you have selected, complete the following steps:

To set up a viewing format, use the joystick () to select the function titled **VIEW** in the DR submenu. Three choices are available:


Off, **List** and **Spread**. Move the joystick left or right () to scroll to the desired selection:

- **List** displays the file by location, value, comments and flags in a one-dimensional format.
- **Spread** displays the file by location and data points (see Figure 29 on the next page). The display format is maintained.
- **Off** closes the file display completely.

6.3 Using Existing Data Recorder Files (DR - PROPERTIES)

Note: Before you can use this function, you must create and/or select a file in the Explorer option.

The Properties option allows you to enter (and, in some parameters, edit) data in a given file.

1. In the DR submenu, use the joystick () to select and enter the PROPERTIES function. When the DR file is displayed, the name of the DR file is displayed at the top of the grid, and the display appears similar to Figure 29 below. The parameters listed will vary with the type of file created.

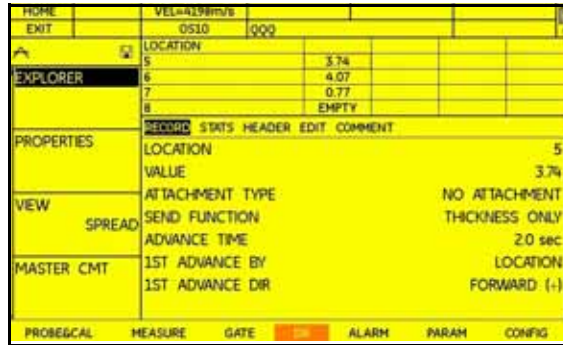


Figure 29: The Properties Option

6.3 Using Existing Data Recorder Files (DR - PROPERTIES) (cont.)

2. Four parameters are available: Record, Stats, Header, Edit and Comment.

- **Record** lists the data by location, value, attachment type, send function, advance time, 1st Advance by and Dir, and Auto Reverse. (With the joystick, you can change the location, send function, advance time and direction.)
- **Stats** lists data as readings, empty points, obstructed points; min readings, # min points, T-Min points; max readings, # max points, T-Max points; A-Scan, B-Scan and M-Grid points; range, mean and standard deviation. (This data is not editable.)
- **Header** covers other information: file type, modification date, starting and ending row, starting and ending column, starting and ending point, description (four lines), serial number, probe, calibration, temperature, inspector, company, unit, velocity, T-min and T-max, absolute and # loss, absolute and % growth, and memo. (You can edit the description, temperature, inspector, company, and memo data. Use the joystick to enter the option. Then, in the alphanumeric window, select each character, and press F2 (ENTER) to confirm your selection. Press F3 (BKSP) to delete characters, or F4 (CONFIRM) to confirm the complete entry.)
- **Edit** allows you to insert, append or delete file locations. Use the F1, 2, or 3 keys to insert, append or delete locations, and the F4 key to confirm your selection.
- **Comment** allows you to enter or edit comments A through P for each individual file in the File Comment list. (See page 121.)

6.3 Using Existing Data Recorder Files (DR - PROPERTIES) (cont.)




Once thickness measurements are stored in data files, users can quickly locate specific points within a file and locate specific values for all file parameters. For instance, users can pinpoint a value in a specific grid location, check maximum and minimum values, and t. This section describes ways you can use the Properties submenu to examine and edit your files.

6.3.1 Moving to a Specific Data Point (DR-PROPERTIES-RECORD)

Note: *To use this function, you must have created a 2-dimension file having ROWs and COLUmns. A LINEAR file has LOCATIONS only!*

Note: *The described features are available in VIEW mode LIST only.*

In the RECORD submenu, you can directly access the specific row and column location of the currently active file.

1. Be sure the RECORD submenu is highlighted in the PROPERTIES function (see Figure 29 on page 110).
2. With the joystick () , move to the ROW entry. Use the joystick () to scroll to the desired selection.
3. Move down to the COLUMN entry. Use the joystick () to scroll to the desired selection.

A red outline highlights the selected value at that point in the file. The following entry (Value) also displays the selected value, and the entry Attachment Type describes any attachment inserted at that point. If you have selected a file containing A-scans, pushing the joystick horizontally displays the stored A-scan.

6.3.2 Modifying Data Entry (DR-PROPERTIES-RECORD)

In the **RECORD** submenu, you can also modify the way in which the DMS Go enters data into the file. When operating in the **MEASURE** menu, a user stores thickness measurement in the active data file location by pressing **F 2 (SEND)**. Then, the instrument typically advances automatically, making the next point in the data file active. However, you can modify the **AUTO-ADVANCE** feature to suit specific measurement applications. For instance, when recording measurements into a large grid type file, the physical measurement site may dictate that it's best to advance by column. Thus, the active data point would automatically move horizontally across the file window, and all the way through the last column before moving down to the next point or row in the file.

Once the **AUTO-ADVANCE** feature has moved through a column of data, it will then move on the next column or point, and move through all of the rows in that column of data. If **AUTO REVERSE** is turned **ON**, when data is recorded in the last row, the next position will be at the last position of the next column. If **AUTO REVERSE** is **OFF** (the default position), the next position will be at the first position of the next column.

To change how the DMS Go enters data:

1. From the **RECORD** submenu, use the joystick to scroll to **SEND FUNCTION**. You can choose from three selections: **Thickness**, **Thickness + ASCAN**, and **Thickness/Thickness + ASCAN**.
2. Scroll to **ADVANCE TIME**. You can select a time at which the file will automatically advance from 0.0 to 3.0 sec (in 0.5 sec increments).
3. Scroll to **1st ADVANCE BY**. Depending on your file type, the selections can include **Row**, **Column**, **Location**, **Point**, and **Elevation**. Set the first advance value to the file component you wish to auto-advance through first.
4. Scroll to **1st ADVANCE DIR**. The options are the **FORWARD** and **BACKWARD** directions, which determine whether the auto-advance moves in the direction of increasing (+) or decreasing (-). Set the desired direction.

6.3.2 Modifying Data Entry (DR-PROPERTIES-RECORD) (cont.)

5. Scroll to AUTO REVERSE (shown in Figure 30 below). Select ON or OFF.

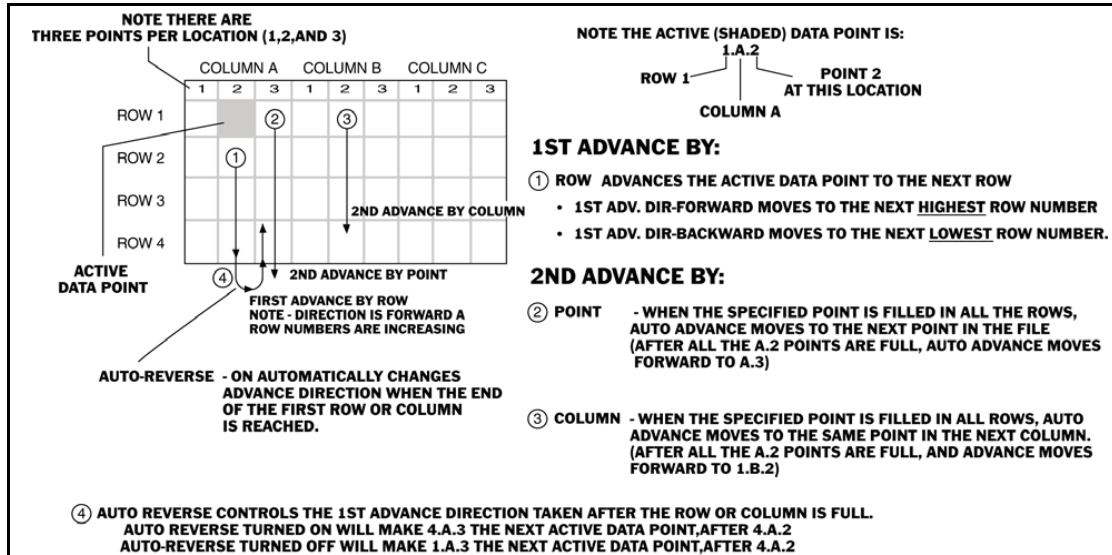


Figure 30: Data Entry in the Grid

6.3.2 Modifying Data Entry (DR-PROPERTIES-RECORD) (cont.)

6. If you have the functions 2ND ADVANCE BY, 2ND ADVANCE DIR and AUTO REVERSE, repeat steps 3, 4 and 5.
7. Scroll up to exit the RECORD submenu.

6.3.3 Viewing File Statistics (DR-PROPERTIES-STATS)

In the STAT submenu, you can evaluate a data file's contents to identify overall trends. The DMS Go automatically compiles and calculates the following statistical data related to each data file:

- Number of readings
- Number of empty points
- Number of obstructed points
- Minimum thickness reading stored
- Number of data points at the minimum thickness level
- Number of thickness points below the min-thickness limit
- Maximum thickness reading stored

6.3.3 Viewing File Statistics (DR-PROPERTIES-STATS) (cont.)

- Number of data points at the maximum thickness level
- Number of thickness points above the max-thickness limit
- Number of points with A-scans attached
- Number of points with B-scans attached
- Number of points with Micro-Grids attached
- The range, mean range, and standard deviation of the data contained in the data file (empty and obstructed points are excluded from these calculations.)

To view the statistical properties listed above, from the **PROPERTIES** menu, use the joystick to highlight the **STATS** submenu. You can then scroll to the required statistic. In addition, you can press **F2** to **TAG** a specific field to perform a search. For example you can tag “**EMPTY PNTS**”. Then you can press **F3** (**SEARCH**) and the DMS Go will return in the DR section all the empty points. This function aids users to min, max, empty, and other values.


Note: *The data in this submenu is not directly editable.*

6.3.4 Editing the File Header (DR-PROPERTIES-HEADER)

Within a typical data file, several file features are identified with labels. For instance, in a boiler type file, elevation and point names are assigned as part of the file creation process. The **HEADER** submenu permits you to enter or modify several notations related to instrument settings, probe serial number, and operator and company identification.

1. From the **PROPERTIES** menu, use the joystick to highlight the **HEADER** submenu.
2. Several notation lines appear, including some of the following: Description, Probe, Calibration, Probe, Operator, Company, and others. (This listing varies, depending on the selected file type). These lines allow the operator to insert notations specific to the active data file. These notations will then be listed in the header of an outputted report.

Note: *Not all the notation lines listed on the display screen can be modified.*

3. Select the line you wish to modify. For instance, if you wish to add a notation to the **PROBE** line (typically, the probe's serial number at this position), you must first highlight **PROBE**.
4. Use the joystick () to open the keyboard window. Then scroll to each character, and center-press the joystick to add the character to the text line. When you have finished, press F2 (**CONFIRM**) or F3 (**SEND**) to add the text to the line.

Note: *Whenever a parameter is changed, it will be stored automatically to the DR file when you leave or replace the file.*

5. Repeat step 4 for each line you wish to edit.
6. When you have finished, scroll up to exit the **HEADER** submenu.

6.3.5 Changing the Size of the Data Recorder File (DR - PROPERTIES - EDIT)

The size of an existing data file can be enlarged or reduced using the **EDIT** submenu. It allows you to specify the items you wish to add to or delete from a file (such as points, columns, or rows) and lets you determine the location of the expanded file capacity. The **INSERT** selection places the added items within a specific point, while **APPEND** automatically attaches the added items to the end of the open data file.

6.3.5a Inserting Additional Capacity into a Data File (DR-PROPERTIES-EDIT-INSERT)

1. From the **PROPERTIES** menu, use the joystick to highlight the **EDIT** submenu.
2. Depending on the file type, several file characteristics are listed: Point, Row, Column, or Location.
3. Select the characteristic (row, column, point, etc.) where you wish to insert data.
4. Press Function 1 (**INSERT**). A window asks how many rows, columns or points (depending on your selection), you want to insert. Use the joystick to enter the desired number, and press Function 2 to **CONFIRM**.

The number of items you specify will be automatically inserted into the active data file at the indicated position.

6.3.5b *Inserting Additional Capacity at the End of a Data File (DR-PROPERTIES-EDIT-APPEND)*

1. From the **PROPERTIES** menu, use the joystick to highlight the **EDIT** submenu.
2. Depending on the file type, several file characteristics are listed: Point, Row, Column, or Location.
3. Select the characteristic (row, column, point, etc.) where you wish to add data capacity.
4. Press Function 2 (**APPEND**). A window asks how many rows, columns or points (depending on your selection), you want to insert. Use the joystick to enter the desired number, and press Function 2 to **CONFIRM**.

The number of items you specify will be automatically added to the end of the active data file.

6.3.5c *Deleting Empty Capacity from a Data File (DR-PROPERTIES-EDIT-DELETE)*


Note: *This function will not work for any characteristic that contains actual values.*

1. From the **PROPERTIES** menu, use the joystick to highlight the **EDIT** submenu.
2. Depending on the file type, several file characteristics are listed: Point, Row, Column, or Location.
3. Select the characteristic (row, column, point, etc.) where you wish to delete data capacity.
4. Press Function3 (**DELETE**). A window asks how many rows, columns or points (depending on your selection), you want to insert. Use the joystick to enter the desired number, and press Function 2 to **CONFIRM**.

The number of items you specify will be automatically deleted from the active data file.


6.3.6 Adding or Modifying Comments (DR-PROPERTIES-COMMENT)

As you review the active file, you might need to add to or modify your comments on a given file. The Comments submenu enables you to create or modify comments.

1. From the **PROPERTIES** menu, use the joystick to highlight the **COMMENT** submenu.
2. Several notation lines appear
3. Enter the line you wish to modify.
4. Use the joystick () to open the keyboard window. Then scroll to each character, and center-press the joystick to add the character to the text line. When you have finished, press F2 (**CONFIRM**) or F3 (**SEND**) to add the text to the line.
5. Repeat step 4 for each line you wish to edit.
6. When you have finished, scroll up to exit the **COMMENTS** submenu.

6.4 Adding a Comment to a Stored Value

Users can add comments to individual values from the prepared File Comment list.

1. In the Measure mode, with a data file active and the desired data point (which must already contain a thickness measurement) selected, center-press and briefly hold the joystick. The function key window will now change, so that F4 is NOTE.
2. Press F4 (NOTE) The File Comment List window opens on the display screen.
3. Move the joystick up or down () to choose the file comment. Press F2 (TAG) to enter the character. Then, move the joystick . When you have completed adding the comment, press F1 (EXIT) to confirm the entry.

The DMS Go will return to Measure mode, and the letter associated with the comment will appear in the “Comments” column next to the value column.

6.5 Adding a Micro-Grid to a Stored Value


If users wish to record additional thickness measurement data in a single file location, they can create a Micro-Grid. Micro-Grids are small data subsets within a file. The entire subset is stored at one specific data location. Micro-Grids are created in the Measure mode. They can only be stored in a file location that already contains a thickness measurement and are placed in the data file location selected at the time of Micro-Grid creation.

6.5.1 Creating and Navigating Within a Micro-Grid

1. In the Measure mode, with a data file active and the desired data point (which must already contain a thickness measurement) selected, center-press and briefly hold the joystick. The function key window will now change, so that Function 1 is μ GRID.
2. Press Function 1 (μ GRID) The Micro-Grid window opens on the display screen, next to a value representing the grid's size. Note that all Micro-Grids must be symmetrical; that is, they must have the same number of rows and columns. Micro-Grids can be created in sizes ranging from 2×2 to 9×9 .
3. Set the size of the Micro-Grid by using the joystick to scroll to the desired value.
4. When you have entered the size information, press F 2 (DONE). The DMS Go will return to Measure mode, and the Micro Grid will be open for data entry. Enter data as you would in a DR file.
5. When you have completed entering data, press F3 (μ GRID) to close the Micro-Grid.

6.6 Exporting the Active File (DR - EXPORT)

When you have finished adding data to the active file, you can export it in several formats (CSV, PDF, XML or DAT) format to the internal SD card for transfer to a PC.

1. In the DR submenu, use the joystick () to select the EXPORT function and then to activate the function.
2. Then use the joystick to scroll to the desired file format (CSV, PDF, XML or DAT).
3. Press F2 (EXPORT) to export the file.

The DMS Go saves the active file to the SD card for transfer to a PC.

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Appendix A. Specifications

A.1 Display

WVGA Color LCD with adjustable LED backlight

A.1.1 Active Area

W: 108 mm (4.25")

H: 64.8 mm (2.55")

A.1.2 Size

5.0"

A.1.3 Pixel Resolution

W x H: 800 x 480 pixels

A.2 Environment

A.2.1 Languages

English, German, French, Spanish, Chinese and Japanese

A.2.2 Size

175 mm x 111 mm x 50 mm (6.8" x 4.3" x 1.9")

A.2.3 Weight

870 g (1.92 lb.) with the battery

A.2.4 Temperature Shock (Storage)

3 cycles: 4 hrs at -20°C (-4°F) up to 60°C (140°F), 4 hrs at 60°C (140°F),

Transitions within 5 minutes,

MIL-STD-810E Method 503.4, Procedure II

A.2.5 Vibration

MIL-STD-810E method 514.5, Procedure I, Annex C, Figure 6, General Exposure: 1 hr each Axis

A.2.6 Shock

6 cycles each Axis, 15 g, 11 ms Half Sine, MIL-STD-810E Method 516.5, Procedure I

A.2.7 Loose Cargo (In Shipping Container)

MIL-STD-810E Method 514.5, Procedure II

A.2.8 Transit Drop (Packaged for Shipment)

MIL-STD-810E Method 516.5, Procedure IV, 26 drops

A.2.9 Operating Temperature Range

0°C to 55°C (32 to 131°F)

A.2.10 Storage Temperature Range

-20°C to 60°C (-4 to 140 °F) with battery, 24 hrs

A.2.11 Dust Proof / Water Proof

As per IEC 529 Specification for IP67 Classification

A.2.12 Hazardous Atmosphere Operation

As defined by MIL-STD-810E, Method 511.3, Procedure 1

A.3 Compliance

A.3.1 EMC/EMI

EN 55011 & EN61000-6-2:2001

A.3.2 Ultrasound

EN 15317, EN12668 , ASTM-E1324, ASTM-E317

A.4 I/O Connectors

Transducer: Dual lemo-00 (Coax)

Mini USB

Power IN and TTL Alarm OUT

A.5 Power Supply

A.5.1 Battery Type

Li-ion battery

A.5.2 Operating Time

Min 8 hours in typical DMS Go continuous operation

On Board Charging

Off Board Charging with Optional Adaptor

Proportional Battery Gauge Indicating Remaining Operation Time

A.5.3 Charger

“Universal” AC (100-240 V, 50-60 Hz) meets CCC, CE, UL, CSA and PSE requirements

A.6 Measuring Range

0.40 mm to 650 mm (0.010” to 25.00”) in Steel, in standard operation, depending on the probe, material and surface.

A.7 Digital Display Resolution

0.01 mm or 0.1 mm (0.001” or 0.01”) selectable over the entire measuring range.

A.8 Material Velocity Range

250 to 16,000 m/s (0.0098” to 0.6299”/is)

A.9 Units

Selectable: Millimeter or Inch

A.10 Measurement Techniques

All measurements using Zero Crossing technique single element IP to 1st echo / single element multi echo / dual-element IP to 1st echo / dual element multi echo

A.10.1 DMS Go TC Only

TopCoat (Patent# 6,035,717) and Auto-V

A.11 Measurement Display Modes

Temperature corrected thickness
Thickness and large A-Scan
B-Scan
MIN / MAX capture
Differential
Data Recorder

A.12 Calibration

One-point, two-point / Auto or manual on-block and off-block zero /Automatic V-path correction

A.13 Update Rate

32 Hz in MIN/MAX-capture mode and B-scan display mode /4 Hz or 8 Hz or 16 Hz (selectable) in standard mode

A.14 Receiver

110 dB dynamic range, automatic gain control with manual (set by user), High, low and Auto Gain limit

A.15 Pulser

Square Wave, Pulse-width and -voltage (120 V or 250 V) automatically matched to probe

A.16 Memory

2 GB SD Card included. Up to 16 GB memory cards can be used. Data export as PDF, XML, CSV, DAT. JPEG screen copy.

A.17 Data Recorder

100,000 readings per file. Multiple files can be stored on SD card up to card capacity

A.18 File Formats

6 file formats with DL option (3 with base instrument)

A.19 Attachments

Insertion of 2x2 to 9x9 MicroGrid per measuring point

1 to 16 user-definable comments for each file format with up to 16 alphanumeric characters per measuring point

A-scan

B-scan

A.20 Application Software

A.20.1 UltraMATE LITE

Simple data management program for transferring measurement data files to a PC, including integration of the data into Windows programs

A.20.2 UltraMATE

Extensive data management program for displaying and printing measurement data as graphics, for managing test data, for entering comments on files

A.20.3 Software Development Kit

Available for integration into other software applications

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Appendix B. DR File Type Explanations

When creating a data file in the DR menu (see Chapter 3), users can choose from six file structures:

- Linear
- Custom Linear
- Custom Point
- Grid
- Custom Grid
- Boiler

This appendix explains the structure and application of each file type.

B.1 Linear File

Linear is the simplest data file format, with sequentially numbered measurement points.

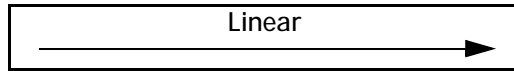


Figure 31: Linear File Structure

Point: 1—2—3—4—5—6 through **n**. You can start with ANY number (1 - 99999) and end with ANY number (1 - 99999).

Table 4: Linear File Convention:

Element	Max Number	Descriptor
File Name	1 (per file)	16 alphanumeric characters
Point	1 - 99999	Sequentially numbered

B.2 Custom Linear

The custom linear data file format has two structure elements (Location and Point).

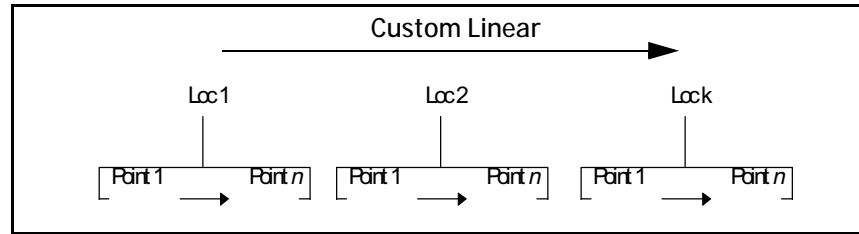


Figure 32: Custom Linear File Structure

Each location must be given a name by the user. Each location will have the same number of points as set by the user when the file is created.

B.2 Custom Linear (cont.)

Table 5: Custom Linear File Structure

Element	Max Number	Descriptor
File Name	1 (per file)	16 alphanumeric characters
Location	1 - 999	16 alphanumeric characters
Point	1 - 999	Sequentially numbered

B.2.1 Custom Linear File Example

A “200 P 451301” pipe shows corrosion. A measurement of remaining wall thickness should be made for four locations: “MS 1” to “MS 4”, each having three measurement points.

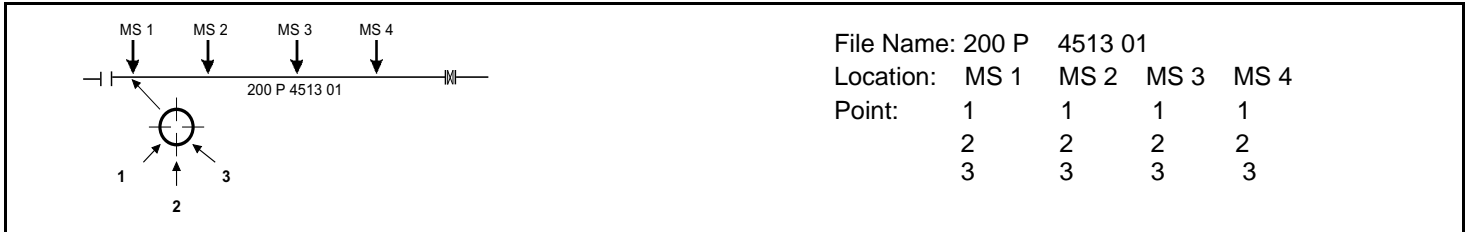


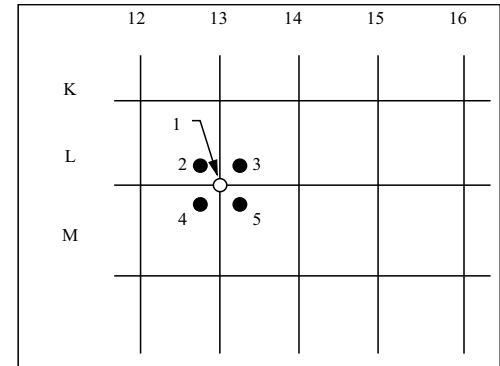
Figure 33: Pipe with Four Test Locations

B.3 Grid File

The grid file is a useful data file format for testing of areas (e.g. tanks, pipes). Locations are 2D coordinates (as with a chess board). Letters may be used for columns (Numbers will be used for rows). OR Numbers may be used for columns (Letters will be used for rows.)

Table 6: Grid File Convention

Element	Number	Descriptor
File Name	1 (per file)	16 alphanumeric characters
Location	determined by available memory	2D-Coordinates, (A0 - AZ9999) or (0A - 9999AZ)
Point	1 - 9	Sequentially numbered



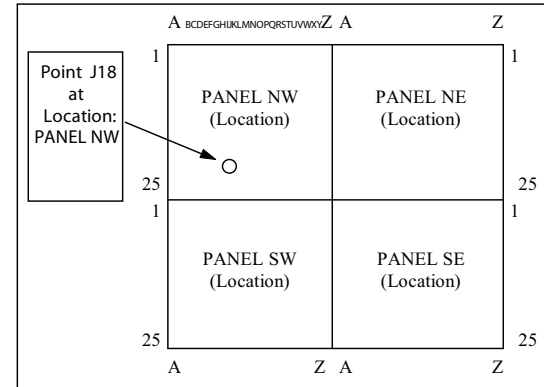
5 Point Location Grid

B.4 Custom Grid File

The custom grid data file format supports testing of areas where each location consists of a grid of the same size. A Custom Grid file will consist of up to 999 locations where *each* location will be identified by its user given alphanumeric name. Each location will be a grid of the same size (user determined) where one thickness reading is stored at each coordinate.

Table 7: Custom Grid File Convention

Element	Number	Descriptor
File Name	1 (per file)	16 alphanumeric characters
Location	1 - 999	16 alphanumeric characters
Point	determined by available memory	2D-Coordinates, (A0 - AZ9999) or (0A - 9999AZ)



Tank Bottom

B.4.1 Grid File Flexibility

- Choice of more than 1 point per 2D-coordinate (default is 1)
- Choice between 8 possible directions of movement through file as **SEND** key is pressed. Progressing horizontally, starting from the left or right, or vertically, starting from the top or the bottom.
- Free choice of grid orientation (S: start coordinate, E: end coordinate)

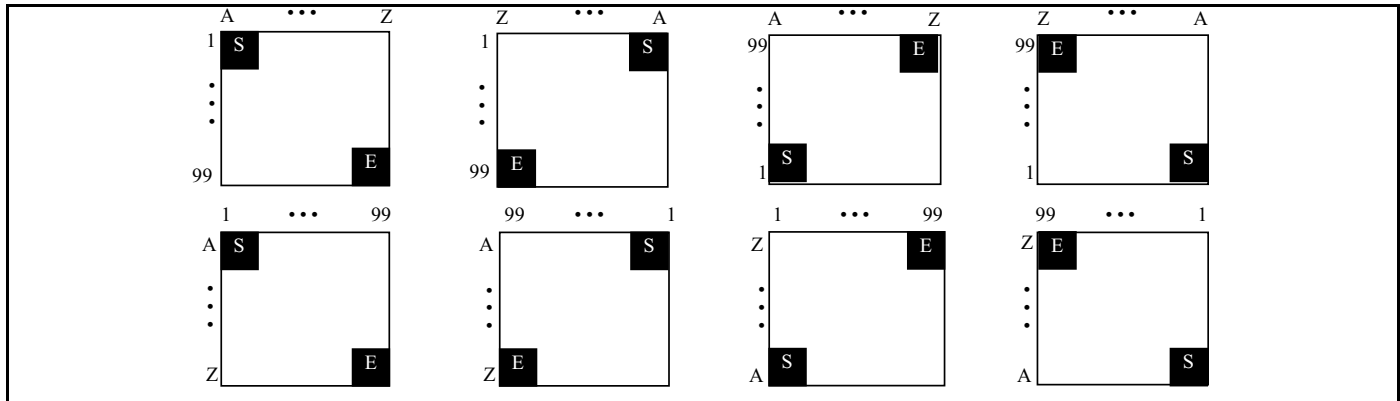


Figure 34: Grid Files

B.5 Boiler File

The boiler file is a Data file format with three structure elements (ELEVATION, TUBE, and POINT); especially for inspecting boilers and other structures with two identifying levels.

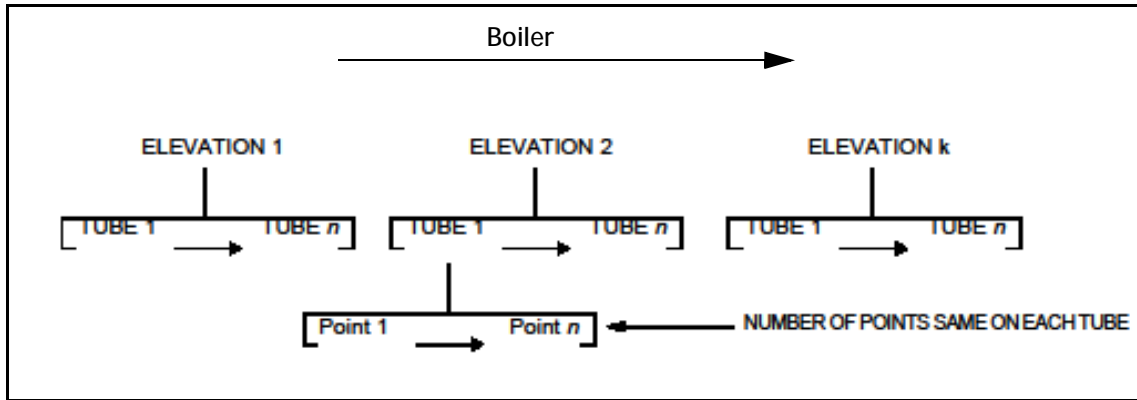


Figure 35: Boiler File Structure

Each elevation must be given a name by the user. Each elevation will have the same number of points as set by the user when the file is created.

B.5 Boiler File (cont.):**Table 8: Boiler File Convention**

Element	Number	Descriptor
File Name	1 (per file)	16 alphanumeric characters
Elevation	1 - 999	16 alphanumeric characters
Tube	1 - 999	Sequentially numbered
Point	1 - 4	Numbers 1,2,3,4 OR letters L,C,R,B (Left, Center, Right, Back)

B.5.1 Boiler File Flexibility

- Free choice of first tube to be tested
- Free choice of distance with “skipping” of tubes

Note: If you are measuring ribbed tubes and recording in a Boiler file, you can automatically insert “OBST” into a designated series of C (center) positions. Set up the file with the “Points on Tube” option set to “L, C, R” (left, center, right). At a specific center (c) data location, press F3 (OBST). A screen appears similar to Figure x below. Enter the end tube number for the last center location to contain OBST. The DMS Go then inserts OBST into the designated center locations The user may then attach a “RIBBED” comment to all obstructed positions

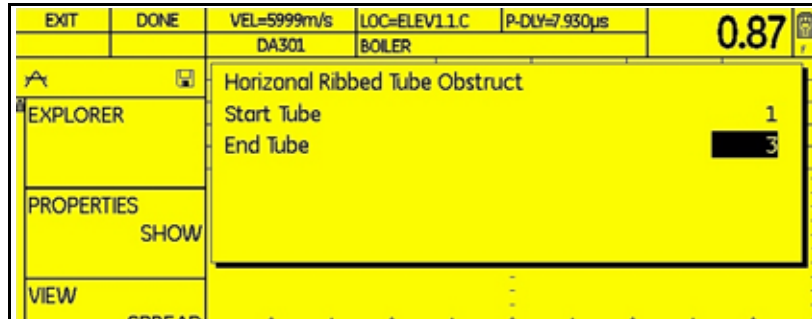


Figure 36: OBST Setup Option

B.5.2 Example of Boiler File

Boiler “Unit 3”, Section “B” with 141 vertical tubes should be examined every meter in the range between 202 m and 208 m. The thickness of each tube has to be checked at 3 points (Left, Center, Right).

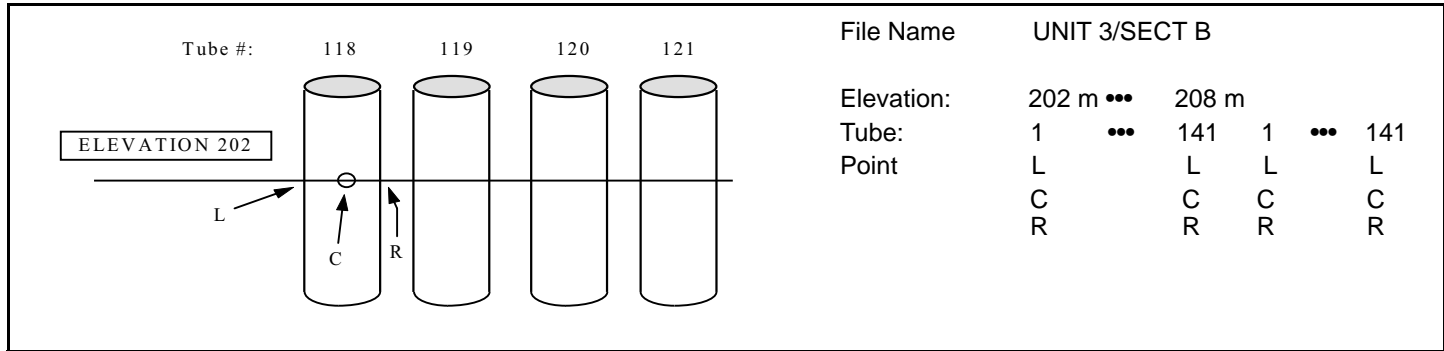


Figure 37: Boiler File Example

B.6 Custom Point File

The custom point file is a data file format with two structure elements (location and point); similar to the Custom Linear file but with alphanumeric descriptors for points.

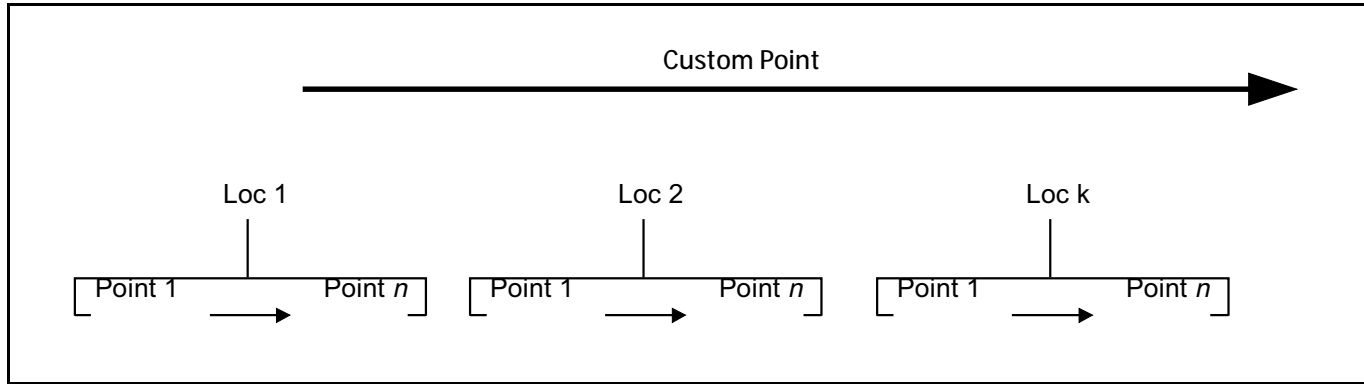


Figure 38: Custom File Structure

Each location must be given a name by the user. Each location will have the same number of points as set by the user when file is created. Each point must be given an alphanumeric name.

B.6 Custom Point File (cont.)

Table 9: Custom Point File Convention

Element	Number	Descriptor
File Name	1 (per file)	16 alphanumeric characters
Location	1 - 999	16 alphanumeric characters
Point	1 - 999	16 alphanumeric characters

B.6.1 Example of Custom Point File

File Name	H2SO4 PIPE 15	
Location:	SECTION 2	SECTION 3
Point	P1 - 0°	P1 - 0
	P1 - 90°	P1 - 90°
	P1 - 180°	P1 - 180°
	P1 - 270°	P1 - 270°
	P2 - 0°	P2 - 0°
	P2 - 90°	P2 - 90°
	P2 - 180°	P2 - 180°
	P2 - 270°	P2 - 270°

Appendix C. Environmental Compliance

This appendix contains information on the following topics:

- WEEE Directive (see *Section C.1 on page 150*)
- Battery disposal (see *Section C.2 on page 151*)

C.1 Waste Electrical and Electronic Equipment (WEEE) Directive

GE Sensing & Inspection Technologies is an active participant in Europe's Waste Electrical and Electronic Equipment (WEEE) take-back initiative, directive 2002/96/EC.



The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

Visit www.ge.com/inspectiontechnologies for take-back instructions and more information about this initiative.

C.2 Battery Disposal



This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling return the battery to your supplier or to a designated collection point.

C.2.1 What do the Markings Mean?

Batteries and accumulators must be marked (either on the battery or accumulator or on its packaging, depending on size) with the [separate collection symbol](#). In addition, the marking must include the chemical symbols of specific levels of toxic metals as follows:

- Cadmium (Cd) over 0.002%
- Lead (Pb) over 0.004%
- Mercury (Hg) over 0.0005%

C.2.2 The Risks and Your Role in Reducing Them

Your participation is an important part of the effort to minimize the impact of batteries and accumulators on the environment and on human health. For proper recycling you can return this product or the batteries or accumulators it contains to your supplier or to a designated collection point.

Some batteries or accumulators contain toxic metals that pose serious risks to human health and to the environment. When required, the product marking includes chemical symbols that indicate the presence toxic metals: Pb for lead, Hg for mercury, and Cd for cadmium.

- **Cadmium** poisoning can result in cancer of the lungs and prostate gland. Chronic effects include kidney damage, pulmonary emphysema, and bone diseases such as osteomalacia and osteoporosis. Cadmium may also cause anemia, discoloration of the teeth, and loss of smell (anosmia).
- **Lead** is poisonous in all forms. It accumulates in the body, so each exposure is significant. Ingestion and inhalation of lead can cause severe damage to human health. Risks include brain damage, convulsions, malnutrition, and sterility.
- **Mercury** creates hazardous vapors at room temperature. Exposure to high concentrations of mercury vapor can cause a variety of severe symptoms. Risks include chronic inflammation of mouth and gums, personality change, nervousness, fever, and rashes.

Appendix D. EN15317 Specifications

The EN 15317 specifications for the DMS Go are listed in *Table 10* below.

Table 10: EN15317 Specifications

Title of Test	Dimension	Min	Typical	Max	Comment		
General Characteristics							
Size	mm			175 x 111 x 50			
Weight	kg		0.870		With battery		
Display Type	Pixel		800 x 480				
Display Size	mm		108 x 64.8				
Display Update Rate	Hz		60				
Probe Connection					2 “00” LEMO		
Low Battery Warning			yes				
Battery Operational Time	Hours		8				

Table 10: EN15317 Specifications (cont.)

Title of Test	Dimension	Min	Typical	Max	Comment		
General Characteristics (cont.)							
Operational Voltage Range	Volts	6		8.4			
Operational Current Range	milliAmps			1.2			
Operational Temperature Range	°C	0		50			
Stability against Temperature							
Amplitude	%/10°C	-5	0	5			
Echo position	%/10°C	-1	0	1			

Table 10: EN15317 Specifications (cont.)

Title of Test	Dimension	Min	Typical	Max	Comment		
Transmitter							
PRF	Hz			4/8/16/32			
Rise time [ns]					Damping	Power	PRF [Hz]
	ns	min		max	[Ohm]	[Volt]	
		0		10	50	low	16
		0		10	1000	low	16
		0		10	50	high	16
		0		10	1000	high	16
Voltage [V]					Damping	Power	PRF [Hz]
	V	min		max	[Ohm]	[Volt]	
		-130		-106	50	low	16
		-131		-107	1000	low	16
		-321		-263	50	high	16
		-329		-269	1000	high	16

Table 10: EN15317 Specifications (cont.)

Title of Test	Dimension	Min	Typical	Max	Comment		
Transmitter (cont.)							
Width [ns]		Width [ns]			Damping	Power	PRF [Hz]
	ns	min		max	[Ohm]	[Volt]	
		45		55	50	low	16
		61		75	1000	low	16
		29		35	50	high	16
		39		47	1000	high	16
Vr [%]		Vr [%]			Damping	Power	PRF [Hz]
	%	min		max	[Ohm]	[Volt]	
		0		4	50	low	16
		0		4	1000	low	16
		0		4	50	high	16
		0		4	1000	high	16

Table 10: EN15317 Specifications (cont.)

Title of Test	Dimension	Min	Typical	Max	Comment		
Receiver							
Gain Control				Automatic			
Frequency ranges	MHz		Broad Band				
Lower frequency ranges	MHz	0.963	1.07	1.177			
Upper frequency ranges	MHz	18.495	20.55	22.605			
Center frequency	MHz	4.432	4.665	4.898			
Dynamic range	dB	-	> 105	-			
Performance							
Minimum and Maximum Measurable Thickness	mm	1.2		650	with DA501		
Minimum and Maximum Measurable Thickness	mm	5		650	with DA503		
Minimum and Maximum Measurable Thickness	mm	0.6		75	with DA512		
Minimum and Maximum Measurable Thickness	mm	0.8		300	DA590		

Table 10: EN15317 Specifications (cont.)

Title of Test	Dimension	Min	Typical	Max	Comment		
Performance (cont.)							
Accuracy	mm	-0.05		0.05	0 to 25.40 mm / 0 to 1.000 in		
		-0.5% of expected thickness		0.5% of expected thickness	>25.40mm / > 1.000inch		
Resolution					0.01mm or 0.1mm / 0.001inch or 0.01inch		
Range of Velocity Setting		1000		9999			
Calibration Methods					2 Point, Off Block Zeroing, Automatic On Block Zeroing		
Calibration setting storage							

Table 10: EN15317 Specifications (cont.)

Title of Test	Dimension	Min	Typical	Max	Comment		
Type of Sockets							
Probe connection					Lemo 00 type		
I/O interface					Molex	10-pin	
USB					Mini-USB		
Storage memory					Standard SD-Card		
Data Storage					DR file save in Standard SD-Card		
Data Output					Standard SD-Card		

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Appendix E. Probes

Table 11: Probes for DMS Go

Probe	Application	Part Number	Cable	Range mm (steel)		Range inch (steel)		Temp Range	Freq	Contact Diameter
				Min	Max	Min	Max			
DA301	General use	151822	KBA533 or DA231	1.25	200.00	0.050	8.000	-20 to +60°C 0 to 140°F	5 MHz	12.1 mm 0.475"
DA303	High penetration	151823	KBA533 or DA231	5.00	300.00	0.200	12.000	-20 to +60°C 0 to 140°F	2 MHz	16.1 mm 0.635"
DA312	Thin materials -Fingertip	151824	KBA533 or DA231	0.60	50.00	0.025	2.000	-20 to +60°C 0 to 140°F	10 MHz	7.6 mm 0.3"
DA501	General use - high sensitivity	1258820	KBA533 or DA231	1.00	200.00	0.040	8.000	-10 to 70°C 14 to 160°F	5 MHz	12.1 mm 0.475"
DA503	High penetration - high sensitivity	1258827	KBA533 or DA231	5.00	300.00	0.200	12.000	-10 to 70°C 14 to 160°F	2 MHz	16.1 mm 0.635"
DA507	General use - optimized for through coating measurement	1347128	potted	2.50	300.00	0.100	12.000	-20 to +60°C 0 to 140°F	5 MHz	18 mm 0.685"

Table 11: Probes for DMS Go (cont.)

Probe	Application	Part Number	Cable	Range mm (steel)		Range inch (steel)		Temp Range	Freq	Contact Diameter
				Min	Max	Min	Max			
DA512	Thin materials - high sensitivity - Fingertip	1025336	potted	0.80	75.00	0.030	3.000	-10 to 70°C 14 to 160°F	7.5 MHz	7.5 mm 0.296"
DA590	High temp - continuous measurement	1346081	C120 or C123	2.50	300.00	0.100	12.000	0 to +200°C 32 to 400°F	5 MHz	12.1 mm 0.475"
DA590	High temp - intermittent measurement	1346081	C120 or C123	2.50	300.00	0.100	12.000	200 to 540°C 400 to 1000°F	5 MHz	12.1 mm 0.475"
FH2E	High sensitivity fingertip	162571	potted	0.75	50.00	0.030	2.000	-20 to +60°C 0 to 140°F	7.5 MHz	9.6 mm 0.38"
FH2E-D	High sensitivity fingertip - Dialog	162573	potted	0.75	50.00	0.030	2.000	-20 to +60°C 0 to 140°F	7.5 MHz	9.6 mm 0.38"

Notes:

- DA590 actual temperature range depends upon surface condition, and couplant.
- DA590 temperature cycling required with surface temperatures above 200°C (400°F) per GE Inspection Technologies instruction card.

Table 11: Probes for DMS Go (cont.)

Probe	Application	Part Number	Cable	Range mm (steel)		Range inch (steel)		Temp Range	Freq	Contact Diameter
				Min	Max	Min	Max			
TC560	TopCOAT / Auto-V - coating range	162550	KBA532 or KBA531TC	0.00	2.00	0.000	0.080	-20 to +60°C 0 to 140°F	5 MHz	15.9 mm 0.675"
TC560	TopCOAT / Auto-V - material range	162550	KBA532 or KBA531TC	1.50	200.00	0.060	8.000	-20 to +60°C 0 to 140°F	5 MHz	15.9 mm 0.675"
A2DFR	High Resolution Delay Line	162530	C-022 or CL331	0.25	10.00	0.010	0.400	-10 to +50°C 14 to 120°F	15 MHz	7.6 mm 0.3"
CA211A	Standard contact	162541	C-022 or CL331	2.00	400.00	0.080	16.000	-10 to +50°C 14 to 120°F	5 MHz	19.1 mm .75"
OSS-10	Oxide Scale - range is application dependent	169618	C-022 or CL331					-10 to +50°C 14 to 120°F	10 MHz	7.6 mm 0.3"

Notes:

- Most Dialog probes are also supported. Consult probe documentation for application specifications.
- Probe specifications are subject to change without notice.

Table 12: DMS Go Cables

Name	Description	Part Number
KBA533	Probe cable, dual-Lemo00 to dual-Lemo00, 1.2m (4')	163587
DA231	Probe cable, dual-Lemo00 to dual-Lemo00, 1.5m (5')	151693
KBA531TC	Probe cable Dual Lemo00 to Microdot 10/32 & 12/32, 1.2m (4'), with boot	163618
KBA532	Probe cable Dual Lemo00 to Microdot 10/32 & 12/32, 1.8m (6'), no boot	163620
C-120	DA590 Probe cable, without armor jacket, 1.2m (4')	1260306
C-123	DA590 Armor jacket probe cable, 1.2m (4')	163647
C-022	Probe cable Straight Lemo00 to Microdot, 1.8m (6')	136374
CL331	Probe cable Straight Lemo00 to Microdot	311786

Table 13: DMS Go Accessories

Description	Part Number
Ergonomic Kit (chest harness, wrist strap, belt holster)	1312444
Chest Harness	1254633
Belt Attachment	1254634
Wrist Strap	1312406
Lithium Ion Battery	1255323
Lithium Ion battery charger /AC power supply	1255477
External Battery Charger Adapter for Li-Ion Battery	1255324
USB Cable	1260193
SD Memory Card (2 GB)	1255478
SD Card Reader to USB	1002866
Transport Case	1256799
Heavy Duty, Lockable, Transport Carry Case	115737
Protective Screen Overlays, clear	1305847

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