

# Mentor EM Portable Equipment User's Manual



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In service situations, please contact:    Email: ITTechsupport@ge.com  
                                                         Website: <http://www.geittechsupport.com>  
                                                         Phone: See listing of Global Tech Support at the end of this manual.

Table of Contents

Chapter 1: Introduction ..... 1-1

    Important Notice ..... 1-2

    Limited Service Warranty ..... 1-5

    Safety Information ..... 1-6

    Compliance Information ..... 1-14

Chapter 2: Features..... 2-1

    Mentor EM Instrument Overview ..... 2-2

    Using this Manual ..... 2-2

    Powering On and Connecting to the Instrument ..... 2-3

    Desktop Features ..... 2-4

Chapter 3: Operation ..... 3-1

    Launching Workflows ..... 3-2

    Installing New Workflows ..... 3-2

    Navigating within a Workflow ..... 3-3

    Workflow Features ..... 3-4

    EM Setup Menu and Changing Parameter Values ..... 3-5

    Data Display Screens ..... 3-6

    Working with Gates..... 3-7

    Interpreting the LED Indicator Light ..... 3-8

    Using the Data Review Tool ..... 3-9

    Changing the System Settings ..... 3-10

    Working with Stored Files ..... 3-11

    Wifi Connections..... 3-13

    Bluetooth Connections ..... 3-14

    Using the Mentor EM Software..... 3-15

Appendix A – EM Parameter Listing with Definitions..... AP A-1

Appendix B – Specifications..... AP B-1



# Chapter 1:

## Introduction

# Important Notice

The following information must be read and understood by any user of GE Inspection Technologies equipment. Failure to follow these instructions can lead to errors in measurements or other test results. Decisions based on erroneous results can, in turn, lead to property damage, personal injury or death. Any use for medical applications or other purposes is not allowed.

## General Warnings

Proper use of test equipment requires three essential elements:

- Selection of the correct test equipment.
- Knowledge of the specific “test application requirements.”
- Operator training.

The operating manual provides instruction in the basic set up and operation of the testing equipment.

## Operator Training

Operators must receive adequate training before using test equipment.

Operators must be trained in general testing procedures and in the set up and performance required by a particular test.

More specific information about operator training, qualification, certification, and test specifications is available from various technical societies, industry groups, and government agencies.

## Safety Information

**ATTENTION!** This is an instrument for materials testing. Any use for medical applications or other purposes is not allowed.

The instrument may only be used in industrial environments.

## Software

According to the current state of the art, software is never completely free from errors.

Before using any software-controlled test equipment, please make sure that the required functions operate perfectly in the intended combination.

## Defects/Errors and Exceptional Stresses

If you have reason to believe that a safe operation of your instrument is no longer possible, you have to disconnect the instrument from its AC Power Adapter/Battery Charger, shut it down, and secure it against unintentional reconnection.

A safe operation is no longer possible if:

- The instrument shows visible damages.
- The instrument no longer operates perfectly.
- Being subjected to heavy stresses during transportation
- After prolonged storage under adverse conditions like exceptional temperatures and/or especially high air humidity, or corrosive environmental conditions.

## Service

Every effort has been made to provide you with a reliable product. However, should service become necessary, GE Inspection Technologies has established a number of Factory Trained Service Centers. For the location of the nearest facility, refer to the end of this user manual.

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## Batteries

Only batteries (Lithium-ion) recommended and supplied by GE Inspection Technologies may be used for instrument operation.

### ! NOTE:

Internal batteries may only be replaced by a factory trained service center. Opening the instrument case in an attempt to access the batteries will void the instrument's warranty. An externally connected battery pack is available from suppliers as described in this manual.

### ! NOTE:

When the instrument reaches the end of its life, the Lithium-ion battery must be removed. Then properly dispose of the instrument and of the Lithium-ion battery.

## Power plug

**Class 1:** For AC line powered equipment the power plug may only be inserted into a grounding-type receptacle. Any disconnection or interruption of the protective conductor may make the instrument unsafe. When connecting equipment with other devices, the protective conductors shall be made equipotential.

**Class 2:** Use only the power cord and AC Power Adapter/Battery Charger supplied by GE Inspection Technologies for this instrument. Serious harm to the instrument is highly likely if the incorrect power supply is used.

## Charger Specifications

AC input to charger specification: 100–240 VAC, 47–63 Hz

DC charge input specification: 12 VDC  $\pm$  5%, 72 W

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## Limited Service Warranty

If, through our negligence, GE Inspection Technologies directly caused damage to your equipment while the equipment is in the sole custody and control of GE Inspection Technologies, we shall choose at our opinion either to repair the damage or replace the damaged portion of the equipment at our own expense, or to indemnify and hold you harmless for such physical damage to the Equipment. The equipment shall be free of any claim of ownership by third parties and when new, be free from defects in material and workmanship and perform in accordance with the Product's specifications under normal use and service.

EXCEPT FOR THE WARRANTY SET IN THIS PARAGRAPH, GE INSPECTION TECHNOLOGIES EXPRESSLY DISCLAIMS ALL WARRANTIES AND REPRESENTATION OF ANY KIND WITH RESPECT TO OUR SERVICES OR THE INFORMATION CONTAINED IN ANY REPORTS THAT WE ISSUE TO YOU, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, TITLE AND WARRANTIES ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

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 GE Inspection Technologies or one of our authorized service representatives; or (iii) external causes, such as accident, abuse, misuse, or problems with electrical power.

The use of unauthorized spare parts shall render the manufacturer's warranty null and void.

# Safety Information

Follow the safety instructions and exercise caution at all times to reduce the risk of accidents, personal injury, and material damage.



## NOTE:

This message indicates additional information.



## DANGER!

Immediate danger: situation will cause death or serious injury if not averted.



## WARNING!

This term indicates danger and the possibility of personal injury.



## CAUTION

This term indicates that damage could occur to equipment.



## WARNING!

Danger resulting from misuse!

**WARNING!**

Equipment to be operated by authorized personnel only.



Wear Personal Protective Equipment when there are risks of injury!

**ELECTRICITY!**

Potential death or serious injury may result from contact with electrically charged components. An electric charge can build up in electronic components and remain even after switching off and disconnecting the equipment from the power supply.

**WARNING!**

Instruments containing wireless devices are designed for use in specific countries. Instrument user is responsible for ensuring that the instrument's wireless devices are only used in countries for which they are intended.

**WARNING!**

Operation of some wireless devices on airlines is prohibited because their signals could interfere with critical aircraft instruments.

**WARNING!**

The instrument contains a Lithium Ion battery and magnesium in its case. Should the instrument be involved in a fire, use an extinguisher approved for use on electrical and flammable metal fires. Water must not be used.

**CAUTION**

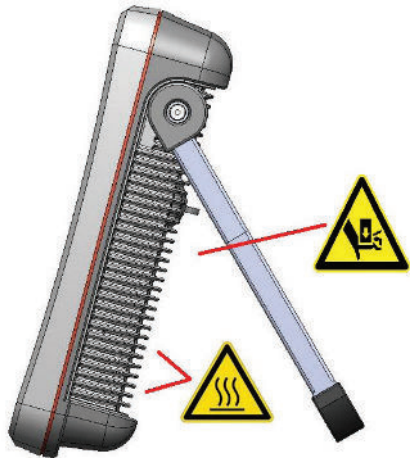
There are no serviceable parts inside the instrument. Do not open the instrument housing.

**WARNING!**

Surfaces on the rear of the instrument can become hot under normal operating conditions.

**WARNING!**

Support stand can cause injury if allowed to close on fingers.



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# Compliance Information

Instrument conforms to the following regulations:

EMC Directive 2004/108/EC

FCC Part 15, Subpart B, Class A

R&TTE Directive 1999/5/EC

Instrument carries the following agency markings:



Federal Communications Commission



European Commission

## Wireless Module Approvals:

### **IEEE 802.11b/g/n**

FCC Part 15, FCC ID: XF6-RS9110N1102

IC ID: 8407A-91101102

### **Bluetooth (BT) 2.1 + EDR**

FCC Part 15, FCC ID: QQQWT32AE

IC ID: 5123A-BGTWT32AE

**Notifications for Wireless Modules:**

- The modules are Class 1 and are exempt under sub “class 22, Wideband Data Transmission Systems 2400 -2483.5 MHz”.
- The wireless modules utilize the 2.4 GHz band.
- The modules are designed to be embedded into general electric devices, and are not designed for aircraft instruments, atom control, artificial life support and any other devices requiring extremely high reliability and quality.
- As the modules communicate via radio waves, it is strongly recommended that configuration be performed regarding security, to prevent information leakage to a third person.
- The modules are wireless modules for embedded use. Please understand the functions and features of the modules, and test the final product into which the modules have been embedded. Also, as an EMC measurement of the modules has not been performed, an EMC test and application must be performed with the final product into which the modules have been embedded.
- The modules may effect or be affected by any surrounding devices utilizing the same bandwidth. Please investigate the environment in which the modules will be operated before installing it.
- Disassembling or modifying the modules may lead to penalties based on radio wave law.
- The modules are an embedded module that has its connectors and parts exposed. Be careful to avoid electrostatic discharge, water contamination, and powder or dust contamination.

**FCC Notice for Wireless:**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IMPORTANT: Under FCC rules, modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

**Canadian Notice for Wireless:**

This equipment does not exceed the Class A limits for radio noise emissions as described in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radio-electrique edicte par le ministere des Communications du Canada.

**Mexico Wireless Information:**

La operación de este equipo está sujeta a las siguientes dos condiciones:

- 1) es posible que este equipo o dispositivo no cause interferencia perjudicial y
- 2) este equipo debe aceptar cualquier interferencia, incluyendo la que pueda causar su propia operación no deseada.

**Brazil Wireless Information:**

"Este produto está homologado pela ANATEL, de acordo com os procedimentos regulamentados pela Resolução 242/2000, e atende aos requisitos técnicos aplicados"

Para maiores informações, consulte o site da ANATEL [www.anatel.gov.br](http://www.anatel.gov.br)



" Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário."

**Taiwan Wireless NCC Information**

低功率電波輻射性電機管理辦法

第十二條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

**Thailand Wireless NTC Information:**

This telecommunication equipment conforms to NTC technical requirement

**South Korea Wireless Information:**

|                                                                                   |                                                                                                                                                                                     |                                                                                                                                                               |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 1.기기의명칭(모델명): MENTOR EM<br>2.인 증 번 호: MSIP-CMM-GEI-MENTOR<br>3.인증받은자의상호: GE INSPECTION TECHNOLOGIES<br>4.제 조 년 월 일: 2014 년 xx 월 xx 일<br>5.제조자/제조국: GE INSPECTION TECHNOLOGIES / USA | <b>Translation</b><br>1. Product name (model name):<br>2. Certificate no.:<br>3. License holder:<br>4. Manufactured date:<br>5. Manufacturer/name of country: |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                   |                                      |
|-----------------------------------------------------------------------------------|--------------------------------------|
|  | Certificate no.: MSIP-CMM-GEI-MENTOR |
|-----------------------------------------------------------------------------------|--------------------------------------|

**EMC requirement:**

| Class                  | Notification                                                                           |
|------------------------|----------------------------------------------------------------------------------------|
| A급 기기<br>(업무용 방송통신기자재) | 이 기기는 업무용(A급)으로 전자파적합으로서 판매자 또는<br>사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서<br>사용하는 것을 목적으로 합니다. |
| B급 기기<br>(가정용 방송통신기기)  | 이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는<br>것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.                |

**Translation:**

| Class   | Notification                                                                                                                                                                               |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CLASS A | EMC registration is done on this equipment for a business use<br>only (Class A). Product seller and user should notice that this<br>equipment is purposed to be used expect for house use. |
| CLASS B | EMC registration is done on this equipment mainly for a house<br>use (Class B) and also can be used in all areas.                                                                          |

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**Disposal of packaging materials**

Dispose of packaging material in accordance with legal requirements and local regulations.

**Environmental Compliance**

GE 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](http://www.ge.com/inspectiontechnologies) for take-back instructions and more information about this initiative.

**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 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 marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling return the battery to our supplier or to a designated collection point.

# Maintenance

## Inspecting and Cleaning the System

Inspect and clean the Mentor EM system before and after each use with the a soft cloth and a 70% alcohol-to-water solution. If using the system in a dirty environment, clean the components more frequently, as needed.

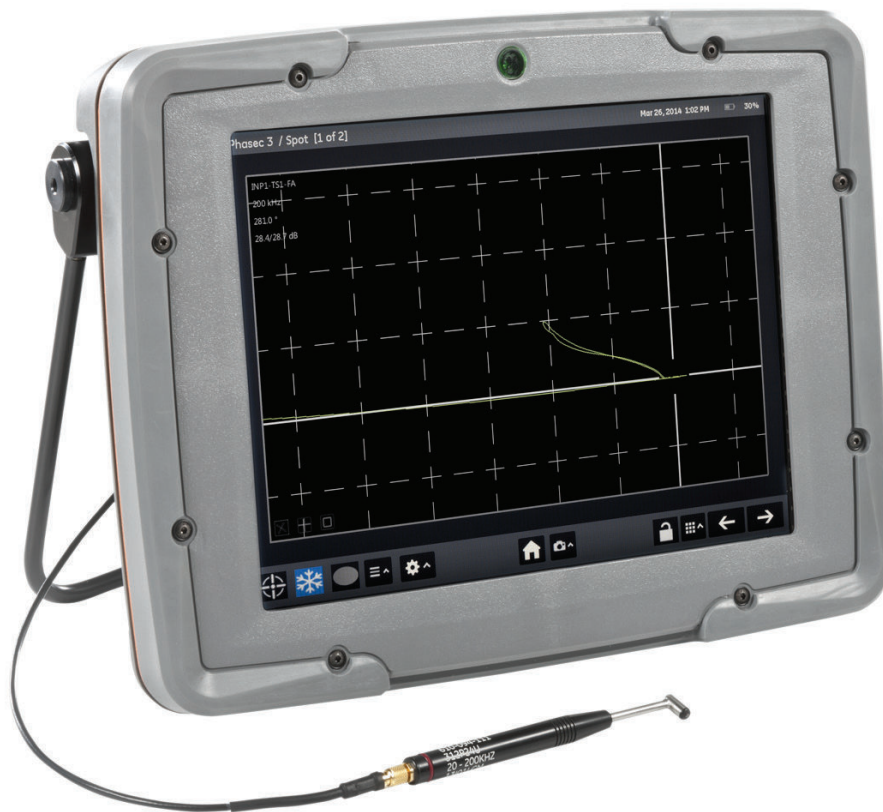
If damage is found, contact GE Inspection Technologies for return instructions and an RMA (return material authorization) number.

***Early detection of minor conditions can prevent costly repair.***



## Chapter 2:

# Features



## Mentor EM Instrument Overview

The Mentor EM instrument and Mentor Create workflow builder allows you to interpret test procedures while generating workflows adapted to your needs and reflecting your best practices. This highly portable electromagnetic

inspection device incorporates a high-resolution screen that's visible in any light, a touchscreen that works when wearing many common glove types, and a customizable interface through which all members of your team can communicate.

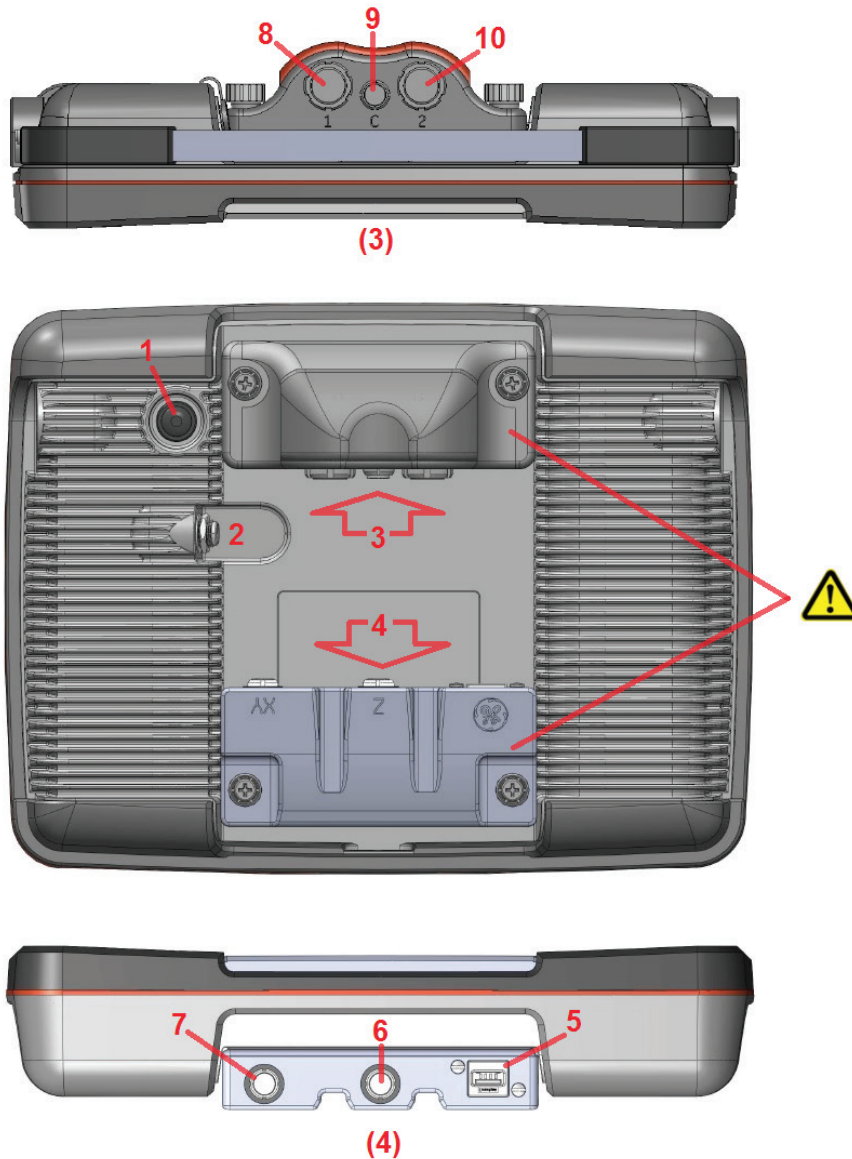
Additional features include:

- Gate alarms
- Easily switch perspective between radial position and size
- Improved signal-to-noise ratio over the entire frequency range when compared with handheld eddy current test devices
- Increases available torque on Mini-drive for more consistent running speeds
- Available band-pass video filters

## Using this Manual

This manual explains how to navigate between the Mentor EM's various on-screen features and utilize its various parameter-adjusting tools. The user needs to apply these instructions to various different on-screen configurations since a workflow's architect determines its specific contents, the parameters and data types displayed, and various other features.

When working with an electronic version of this manual, you select any topic listed in the [Table of Contents](#) or other links to jump to a description of the indicated feature. This manual includes an [Appendix](#) that describes each of the parameters available to workflow architects.



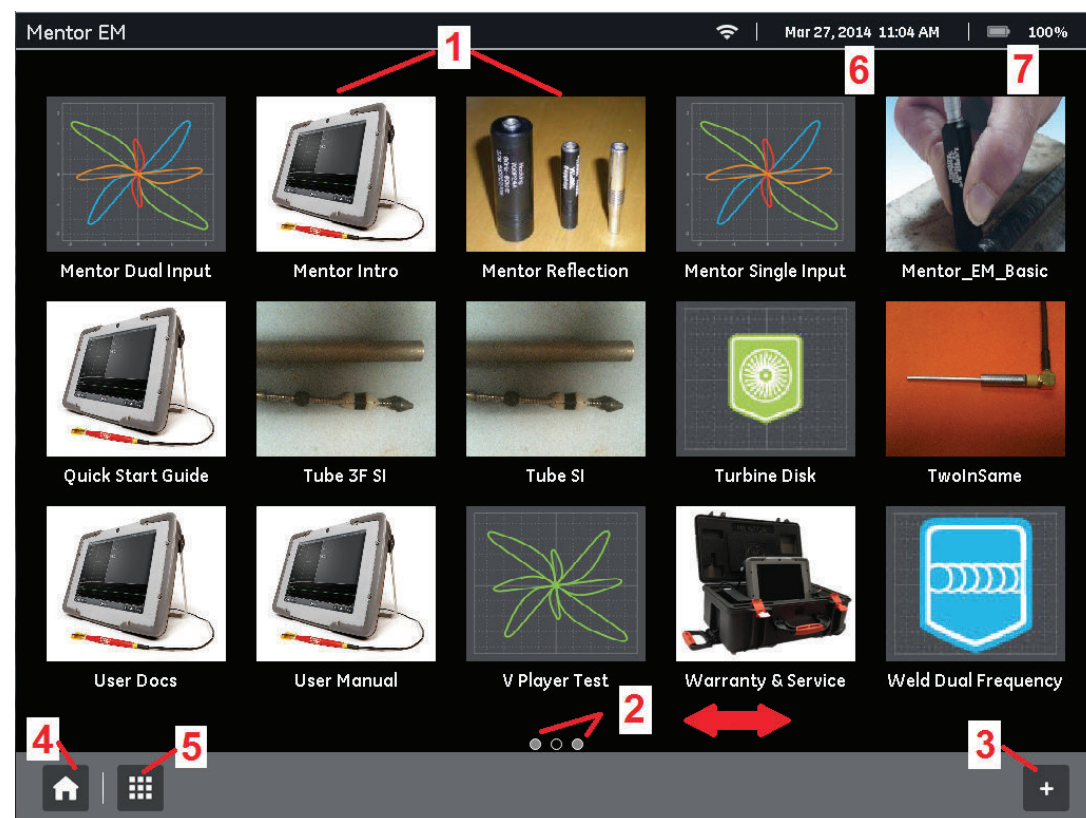
## Powering On and Connecting to the Instrument

- 1** - Press and momentarily hold to power on the instrument.
- 2** - Connect the AC power adapter here.
- 3** - EM probe connectors are inserted here (optional, varies by probe type).
- 4** - Connectivity module includes various data ports (optional)
- 5** - USB
- 6** - Encoder Z, Alarm and Inhibit signals
- 7** - Encoder XY and Encoder Index
- 8** - Input 1
- 9** - Conductivity Probe
- 10** - Input 2



### CAUTION

The instrument must be powered OFF before attaching or removing these or other modules. To avoid equipment damage, only attach modules in the correct orientation and to the proper port.



This is the Desktop. It is displayed when the instrument powers on (if so configured by the Startup setting) and whenever the HOME KEY is pressed.

## Desktop Features

**1** - Use touch screen to select any workflow loaded into the instrument's active desktop.

**2** - Slide left or right to access additional pages. Number of circles at bottom center of a display indicate how many additional pages are viewable. Open circle indicates the position of the current view in relation to all available pages (in the case shown here, the user is currently viewing the second of three available pages).

**3** - Press to access and load additional workflow files (including those on certain external devices such as a USB thumbdrive).

**4** - Press at any time to return to the Desktop.

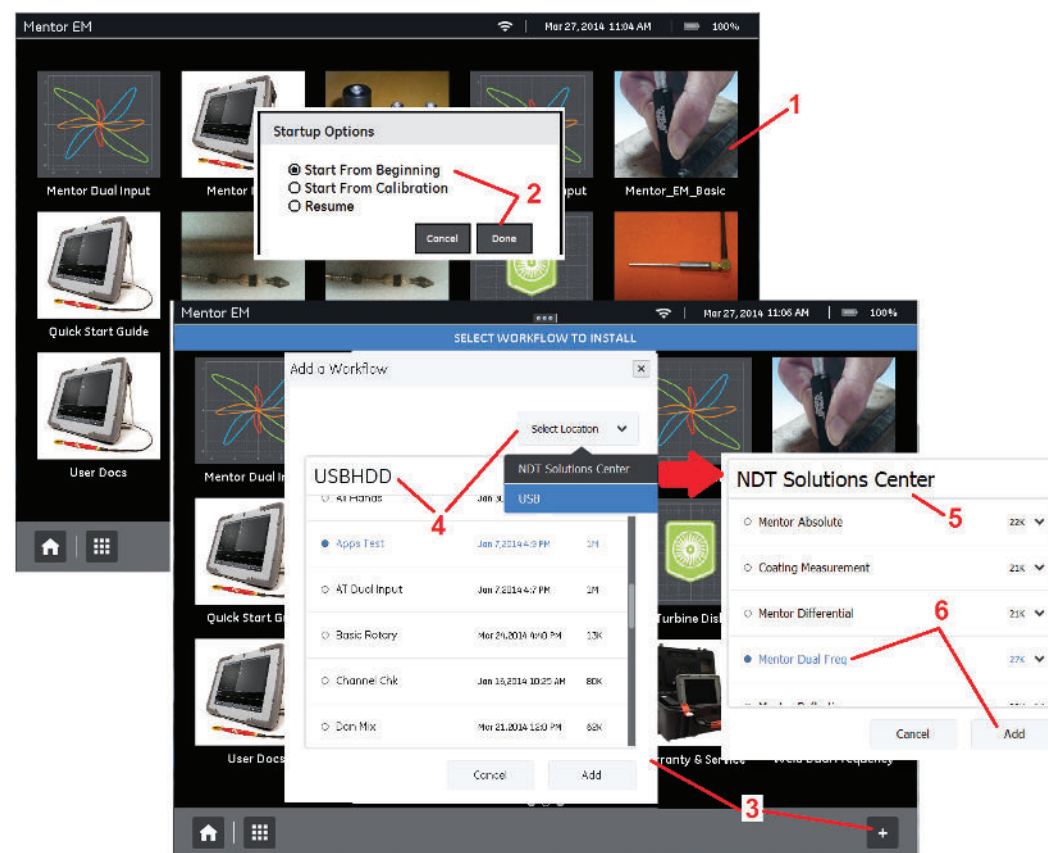
**5** - Press to access **System Settings** (WiFi, Bluetooth, User Preferences, etc.), **File Manager**, **Remote Access** setup, and to **Shut Down** the instrument.

**6** - Date and time format are selected via the Regional setting.

**7** - Battery life indicator

# Chapter 3:

## Operation



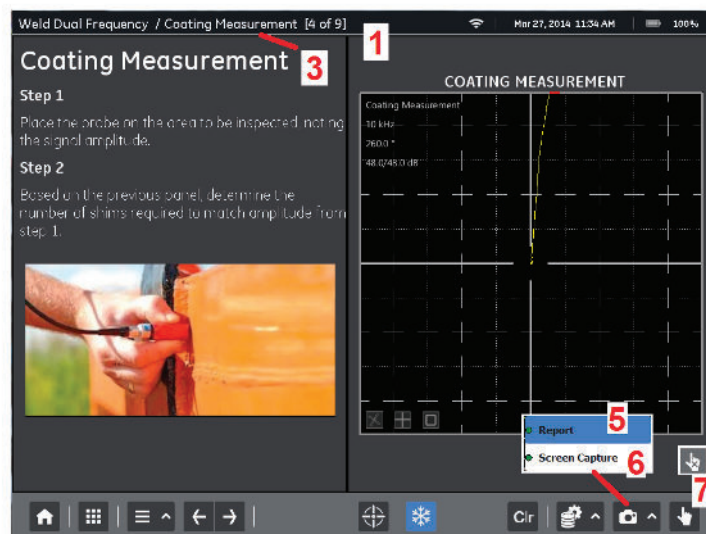
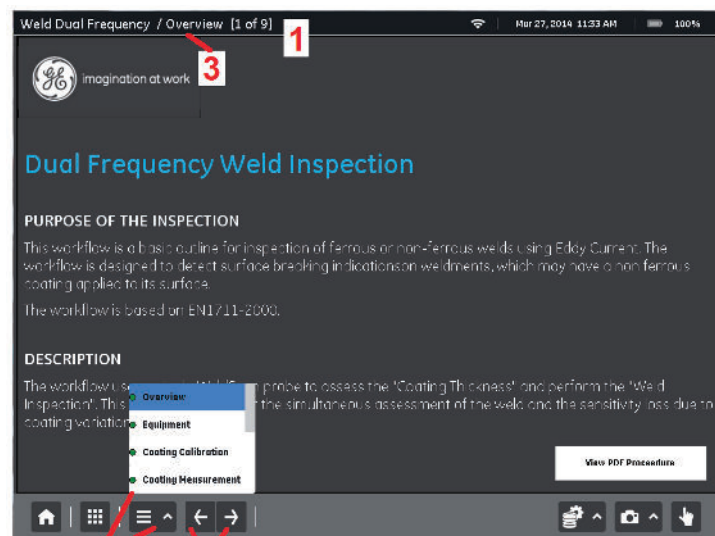
## Launching Workflows

- 1** – Use touch screen to select any workflow installed on the instrument.
- 2** – Select the workflow's starting point from a list of options determined by the workflow architect. Selecting **Resume** begins the workflow at the panel last active.

## Installing New Workflows

- 3** – Press to access workflow files stored on connected external devices or from GE's **NDT Solutions Center**. Files must first be *added* into the active workflow list (those that appear on the desktop) before they can be *launched*.
- 4** – Choose a workflow from the USB list (if one is installed) or choose **Select Location** to access the **NDT Solutions Center** (via an Internet connection).
- 5** – The **NDT Solutions Center** contains workflows for various applications.
- 6** – After selecting a file (it will turn blue), select **Add** to install the workflow in the instrument. The newly installed workflow joins others on the instrument's desktop.

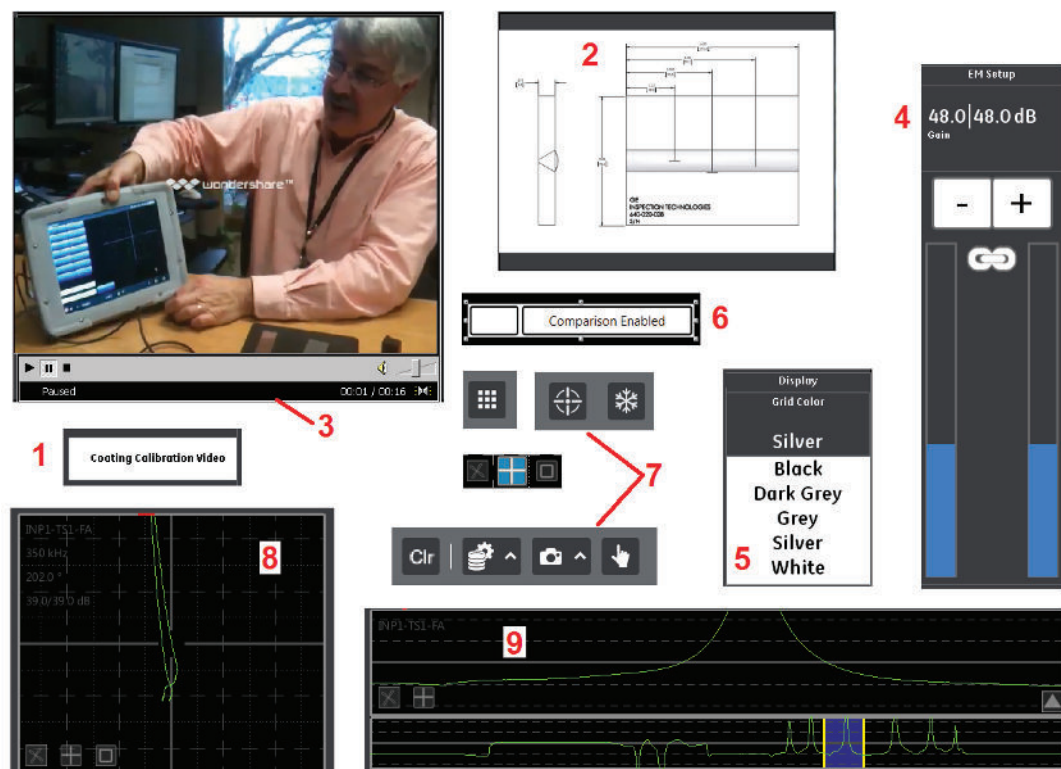
**Note:** workflow files have an **iwp** file extension.



## Navigating within a Workflow

Workflows contain a variety of EM data display capabilities, video and still-image visual guides, and illustration/text references. A workflow's architect determines its specific contents, the inspection parameters displayed, which parameters are adjustable by the user, and to within what range of values a particular parameter can be set. Workflows include one or more panels. Follow this guide to identify and move between these panels.

- 1** – Identifies which panel of the active workflow is currently displayed.
- 2** – Press this key to access the list of all panels in the active workflow, identify the position of the currently active panel, and jump to any other available panel.
- 3** – Name of the currently displayed panel.
- 4** – Press to sequentially navigate through all available panels in the active workflow.
- 5** – Generates a report of settings.
- 6** – Captures the current display and saves as an image file.
- 7** – Turns touchscreen **ON** or **OFF**.



## Workflow Features

Workflows contain a variety of EM data display capabilities, video and still-image visual guides, and illustration/text references. A workflow's architect determines its specific contents, the inspection parameters displayed, and which parameters are adjustable by the user. This guide identifies features that may be found in workflows.

### Static Controls – Instructional purposes

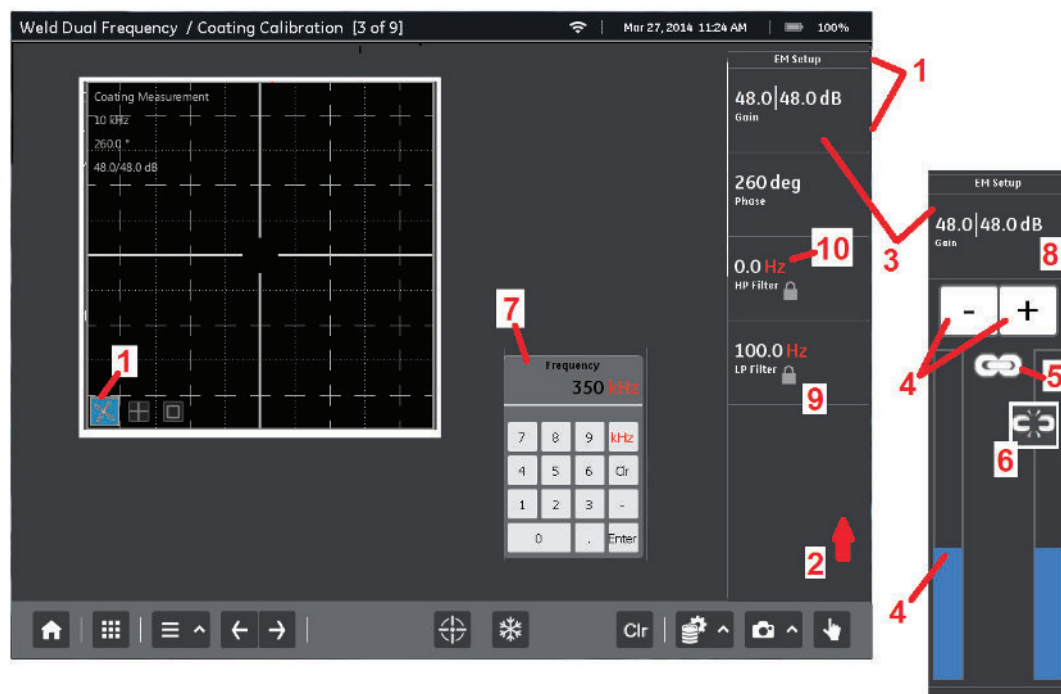
- 1** – Goto – Jumps to another panel in the workflow
- 2** – Image – photo or other image
- 3** – Video Player – opens a video player frame  
PDF viewer – tool for viewing pdf documents  
Rich Text – tool for viewing text

### Parameter Controls – system wide settings effect instrument operation. Note that channel based parameter controls are accessed via View Controls (see below)

- 4** – Numeric – set by sliders or number pad
- 5** – List – select from a drop down list
- 6** – Check Box – Boolean type parameters
- 7** – Command Buttons – perform a task (such as freezing the display) or open a menu

### View Controls – display and control of an individual channel and its data. A defined menu opens with the press of each button.

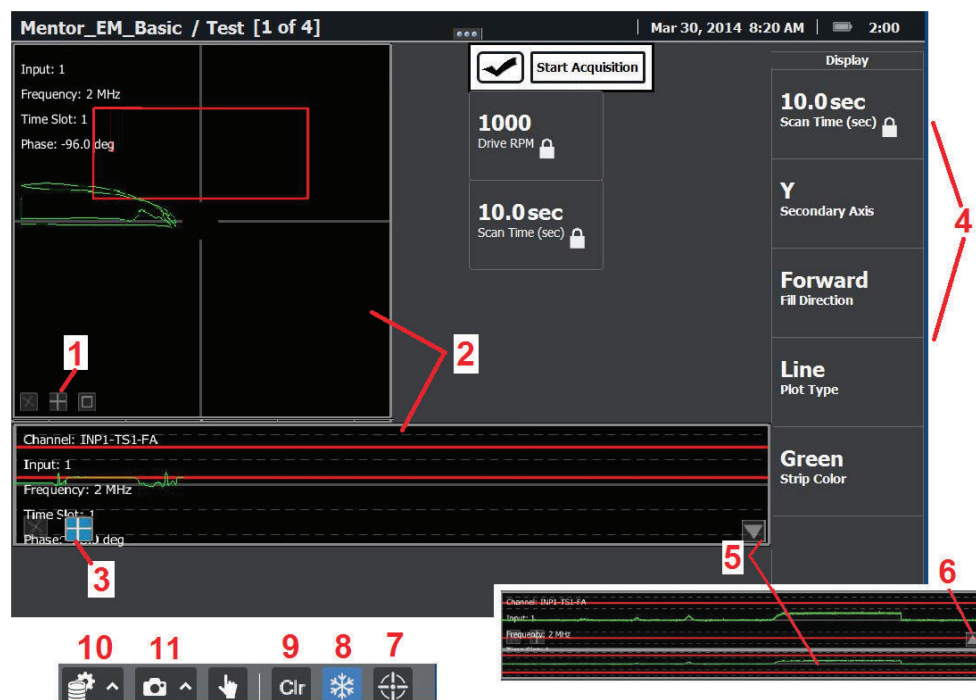
- 8** – Lissajous – an eddy current impedance plane view (also known as a Spot view)
- 9** – Strip Chart – time/amplitude strip chart display



## EM Setup Menu and Changing Parameter Values

The EM Setup menu provides access to those parameters that impact test conditions. A description of each parameter is found in the [Appendix](#). Each workflow's architect determines which parameters are viewable and adjustable. Refer to the next several pages of this manual to access the Display and Gates menus.

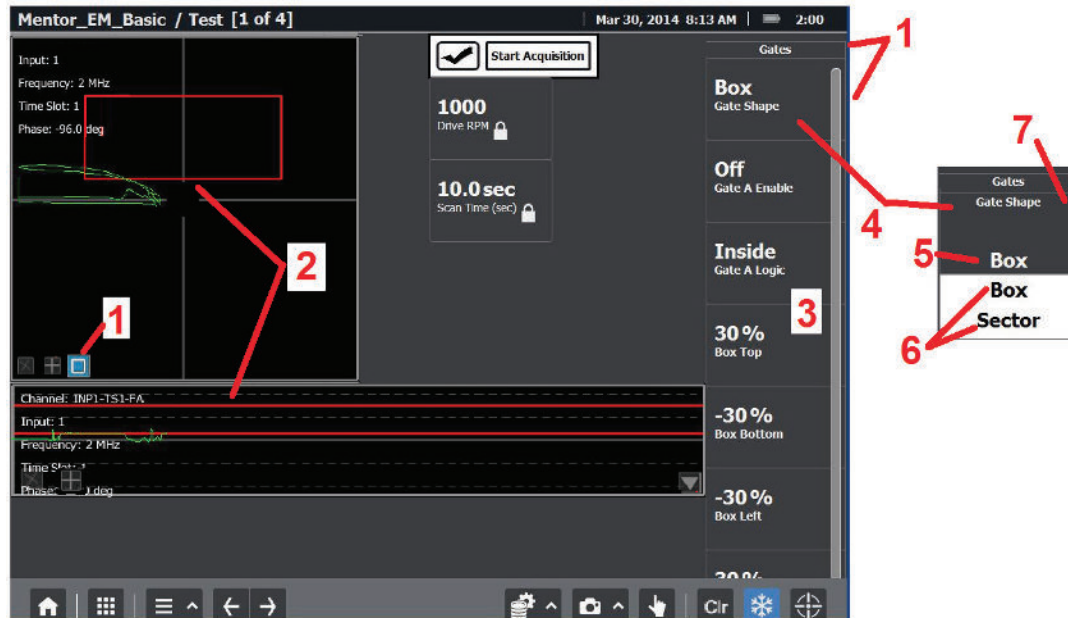
- 1 – The EM Setup Icon opens and closes menu
- 2 – Drag this list to access all parameters available for viewing or (*if enabled*) modification.
- 3 – Touch the desired parameter control to activate it and (*if enabled*) set its value.
- 4 – Press to increase or decrease parameter value (*if adjustable*) or touch and drag for coarse adjustment.
- 5 – Link icon indicates two parameters will be adjusted in equal increments. Touch icon to unlink or re-establish this connection.
- 6 – When link icon is unlinked, each parameter can be adjusted independently. Hold icon for 2 seconds to equalize values.
- 7 – Individual parameter controls may also appear anywhere on a workflow panel.
- 8 – Press anywhere in this header area to deactivate the parameter.
- 9 – Indicates that the parameter value is **Locked**. Parameter's are locked for one of the reasons: either the workflow's architect intended the value to be observed but not altered, or the display is frozen. When frozen, all parameters whose value affects only live data are locked until the display is unfrozen and live data returns.
- 10 – Units related to frequency (Hz, kHz, and MHz) are shown in red for purposes of clarity only.



Data can be displayed on one or more Data View Screens and/or Strip Charts. Display menus control the appearance of each screen (provided the workflow's architect made these parameters viewable and adjustable). A description of each parameter is found in the [Appendix](#). The user can also open the Strip Chart Overview, which serves as a Data Review Tool (described later).

## Data Display Screens

- 1 – Select the Display Icon to access parameters related to the Lissajous (or Spot) display.
- 2 – The Data View Screen and Strip Chart display all data collected for a duration equal to the indicated Scan Time.
- 3 – Select this Display Icon to access parameters related to the Strip Chart display.
- 4 – Display parameters available for viewing or (if enabled) modification. Touch to activate.
- 5 – Select to display the strip chart overview. When data is frozen, the strip chart and overview function as a data review tool.
- 6 – Select to close the strip chart overview.
- 7 – Select to balance (null) both inputs or press and hold to select which input(s) to balance.
- 8 – Freezes and unfreezes the active data display.
- 9 – Clears the active display of data.
- 10 – Select to **Save** currently acquired data (display must first be frozen) or to **Load** previously saved data. Also allows saving or loading of settings.
- 11 – Capture the display screen or generate a report.



## Working with Gates

The Gates menu provides access to those parameters that impact gate position, shape, and functioning characteristics. A description of each parameter is found in the [Appendix](#). Each workflow's architect determines which gate-controlling parameters are viewable and adjustable. Refer to the previous pages of this manual to access the EM Setup and Display menus.

- 1 – Select the Gate Icon to open the Gates menu.
- 2 – Gates (change color and illuminate LED when triggered by an alarm condition)
- 3 – Drag up or down to access all gate-configuring parameters available for viewing or (*if enabled*) modification. These include: Gate Shape (Box or Sector), the number of gates enabled for each channel, the triggering logic of each gate, and each gate's size and position.
- 4 – Touch the desired parameter control to activate it and (*if enabled*) set its value.
- 5 – Displays the active parameter's current value.
- 6 – Select the desired value for the active parameter.
- 7 – Press to deactivate the parameter.



## Interpreting the LED Indicator Light

**1** – This LED light changes color and/or flashes to indicate instrument status, gate-triggered alarms, or other conditions.

### During Normal Operation:

Red LED – Gate Alarm

Green LED – normal run, no external power

Cyan LED – normal run, with external power

Blinking Magenta LED – Microcontroller is currently being updated or microcontroller firmware is damaged and needs to be updated

### When the Instrument is Powered Off:

No LED – Instrument is off and the external charger is not connected

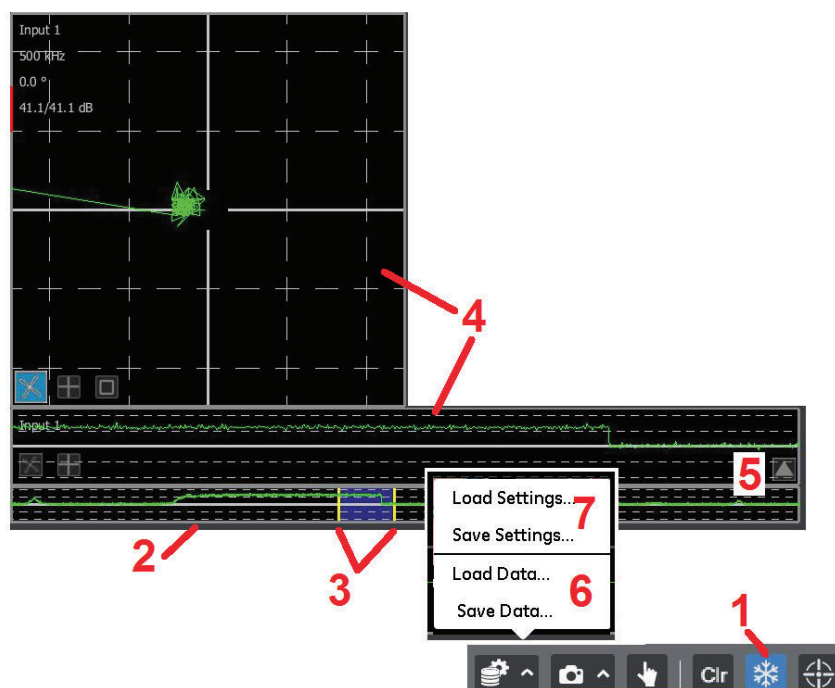
Blinking Blue LED – battery is being charged

Steady Blue LED – battery is fully charged and the charger is connected

### While the Instrument is Powering On:

Blinking Yellow LED – Instrument is powering up, FPGA is being configured (Operator can release power button)

Blinking Magenta LED - Instrument is powering up, but there's an internal power supply failure



**1** - Freeze the data display to use the Data Review Tool. Touch again to return to live data display.

**2** - The Strip Chart Overview shows all data collected during the indicated Scan Time.

**3** - Touch and drag any portion of the Strip Chart Overview to review the data that falls within these *moveable* yellow bars.

**4** - The data acquired in the time period defined by the moveable yellow bars appears in both the Data View Screen and Strip Chart. Note that only the data acquired in the defined time period now appears in the Data View Screen and Strip Chart.

Note that once the overview tool is open, swiping or pinching/expanding the main strip chart changes the position and/or zoom level of the overview tool.

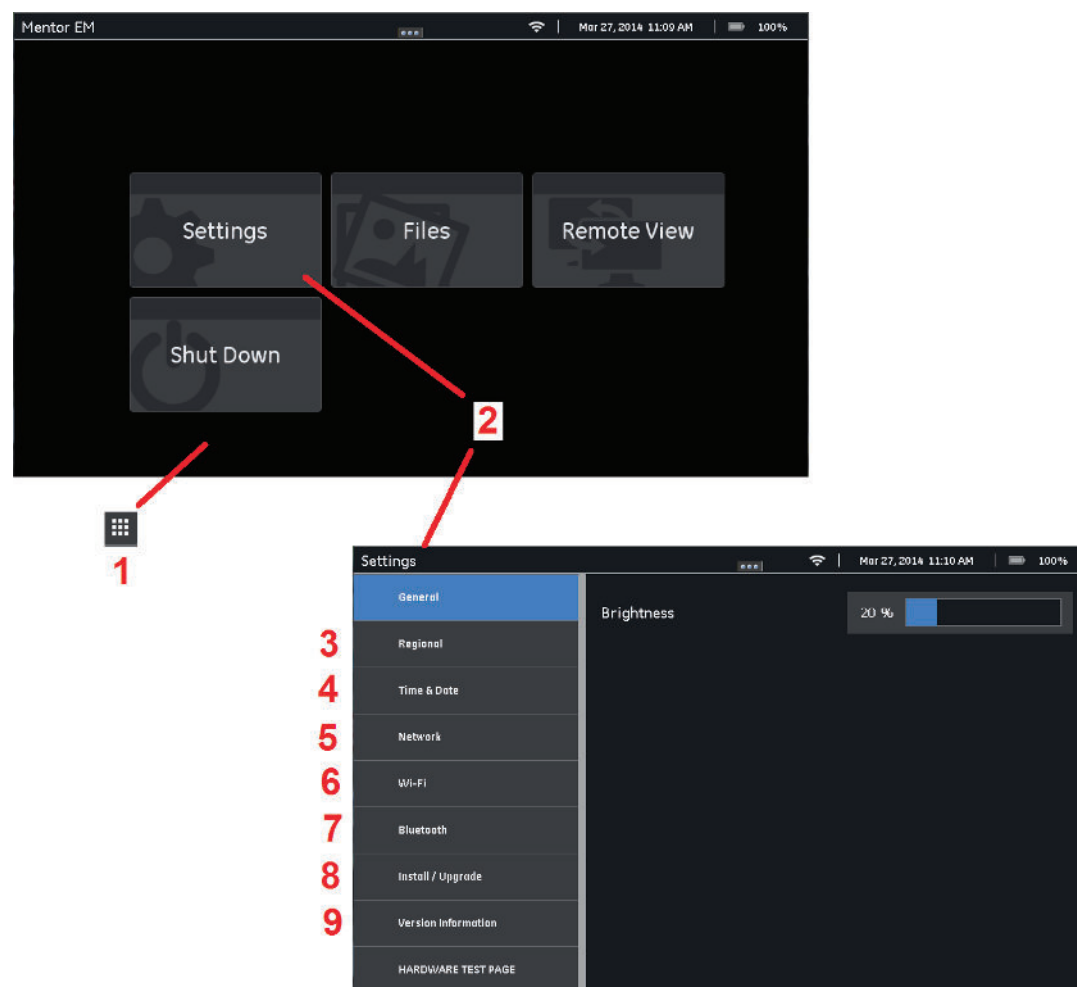
**5** - Touch to open or close the Strip Chart Overview tool.

**6** - Select to **Save** currently acquired data (display must first be frozen) or to **Load** previously saved data.

**7** - **Saves** parameter settings for the currently active workflow. Settings can later be reloaded, but only in the same workflow.

## Using the Data Review Tool

With the Strip Chart Overview enabled, the active data display can be frozen at any time throughout the scan. This allows the user to use the Data Review Tool to more closely review data acquired at any point during the indicated Scan Time. Note that the user defines exactly what data to review



## Changing the System Settings

**1** – Press to open this menu view then select any item in the list to access the function or group of settings.

**2** – Press to display the System Settings.

**Settings** – Instrument settings and connectivity

**Files** – Access reports and other files

**Remote View** – Turns on VNC Remote Desktop Server

**Shut Down** – Turns off Mentor EM only

**3** – Regional Settings allows the user to select Units of Measure, Date and Time Format, and the type of decimal point displayed.

**4** – Set the time and date.

**5** – Automatically obtain or to manually input a network's IP address.

**6** – WiFi: Turn access on or off.

**7** – Bluetooth: scan and connect to available Bluetooth devices.

**8** – Install a workflow or upgrade the instrument's software using a GE-supplied file.

**9** – Version Information: Determine the software version installed in your instrument.

## Working with Stored Files



**1** – Press to access **File Manager** and then select **Files** to open **Workflow List Display**.

**2** – From this Workflow List Display, you can perform one of three actions (items **3** through **5**). Note that you can slide the view to the left or right to access additional pages. Number of circles at bottom center of a display indicates how many additional pages are viewable. Open circle indicates the position of the current view in relation to all available pages.

**3** – Choose to display all **Workflow, Report, Data, Setting, or Image** files stored in the instrument or from another **Location** (such as a connected USB storage device). Choose **Sort** to control the arrangement of the displayed files.

**4** – Select  to open this **Workflow Information** box that, along with providing a description of the workflow, allows the workflow to be deleted.

**5** – First choose a workflow whose files you wish to access by selecting it with a finger tap. The workflow's name appears across the top of the **File Manager** display. Now, choose **Filter by** to display *only* the **Report, Data, Setting, Image** or **All** files *associated with the selected workflow*. Choose **Sort** to control the arrangement of the displayed files.

**6** – Selecting either of these buttons at any time returns to the **Workflow List Display**.

**7** – Choosing any item in a displayed list changes its displayed text to blue and allows it to be **Uploaded** (from the instrument to a connected external device) or **Downloaded** (from the connected device to the instrument). Choose **Select Location** to access the connected USB storage device and, after selecting the file(s) to be

moved, click either  to **Upload** the file to the USB device or  to **Download** the file to the instrument.

**8** – Deletes or Renames the selected file(s).

**9** – Allows you to create and name a folder (directory) on the connected external device.

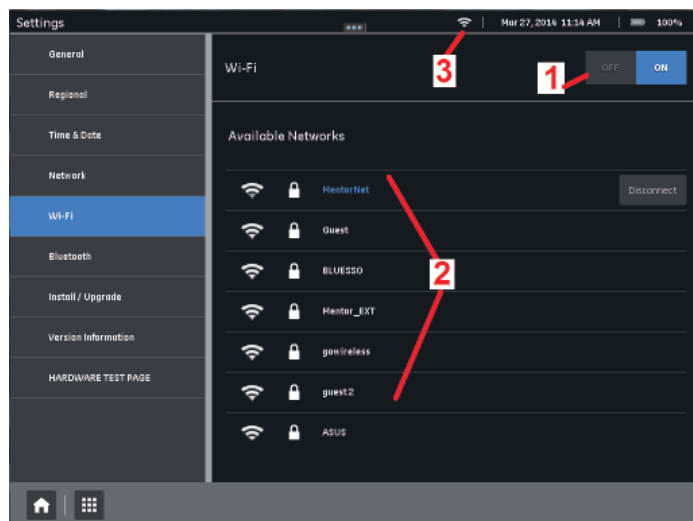
## Wifi Connections

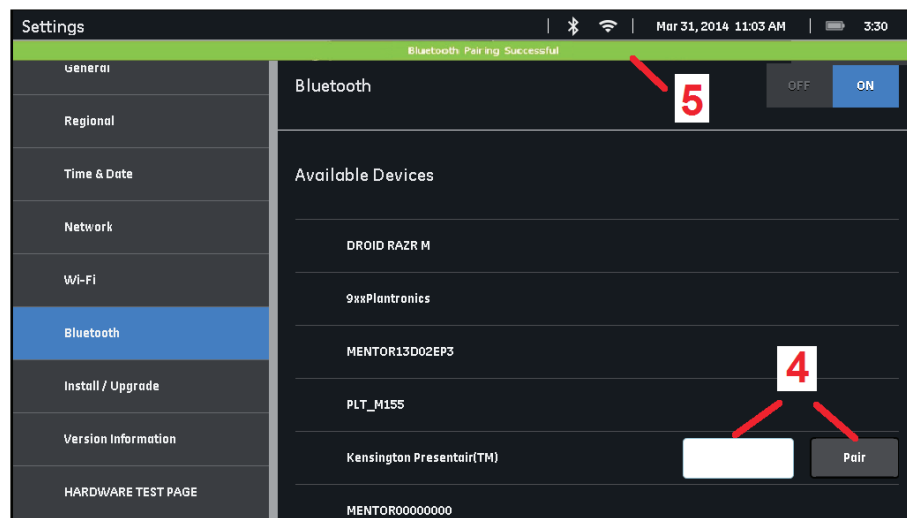
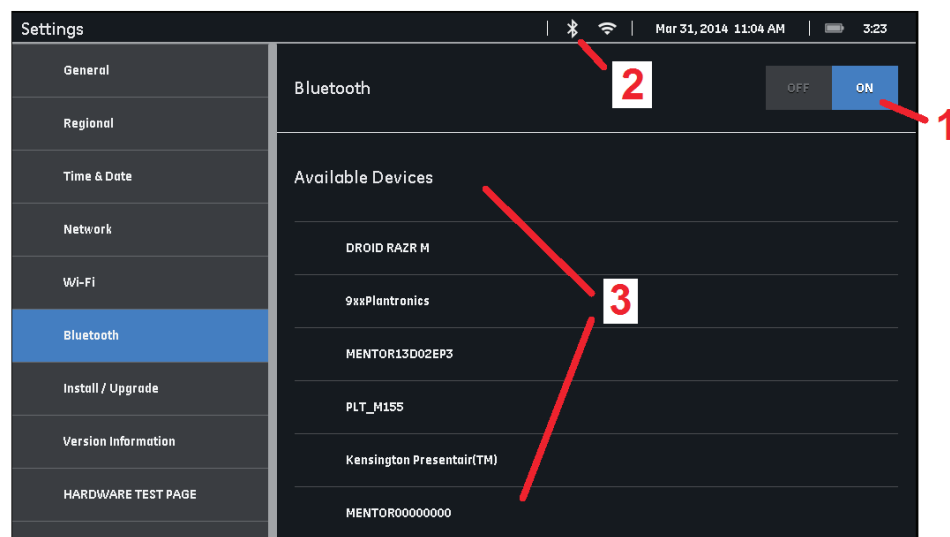
**1** – Select to enable instrument's Wifi connection and to detect and display available Wifi connections.

**2** – List of all detected Wifi connections.

**3** – Displays whenever the instrument's Wifi connection is enabled.

**4** – Select to identify an available Wifi connection that is not displayed.





## Bluetooth Connections

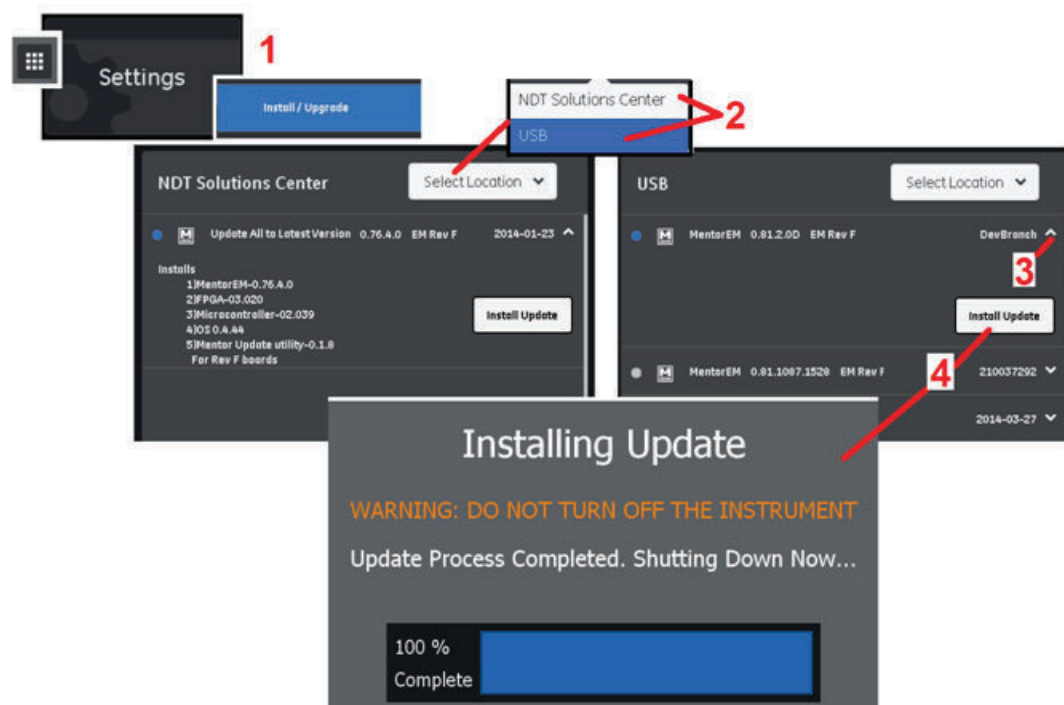
**1** – Select to enable instrument's Bluetooth connection and detect available Bluetooth devices.

**2** – Displays whenever the instrument's Bluetooth connection is enabled.

**3** – List of all detected Bluetooth devices. Select device you wish to connect.

**4** – Password-entry box and Pair key appear when device is selected. Input password (only needed if required by the external device) and then select Pair to connect the Mentor EM to the selected device.

**5** – Displays whenever the instrument and the selected Bluetooth-capable device are paired. The device will remain paired to the Mentor EM.



## Updating the Mentor EM Software

**1** – Press to access the **Settings** button and then choose **Install / Upgrade**.

**2** – Select the location from which you will download the software **Upgrade**.

**USB** – Connected USB storage device

**NDT Solutions Center** – GE source of workflows and upgrades (requires Web access).

**3** – Select to open (or close) details for any Upgrade listed.

**4** – Select to install the desired **Upgrade**. Follow on-screen instructions to complete the process.



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# Appendix A – EM Parameter Listing with Definitions

**Alarm A Source**—Which input to connect to Alarm A

**Alarm A Action**—What to do when the alarm even occurs (display only - play tone - etc.).

**Alarm A Latch**—Whether to latch the alarm (and freeze) or alarm for a given time

**Alarm A Delay**—Delay time before starting the alarm output after an alarm even occurs

**Alarm A Hold**—How long to hold the alarm on when alarm even occurs

**Alarm B Source**—Which input to connect to Alarm B

**Alarm B Action**—What to do when the alarm even occurs (display only - play tone - etc.).

**Alarm B Latch**—Whether to latch the alarm (and freeze) or alarm for a given time

**Alarm B Delay**—Delay time before starting the alarm output after an alarm even occurs

**Alarm A Hold**—How long to hold the alarm on when alarm even occurs

**Frame Rate**—Rate at which data is taken

**Drive RPM**—Desired speed (rotation) of the rotary drive

**Mix Color**—Color of the Mix signal

**Persistence**—Time (in seconds) to hold data on the Lissajous

**Probe Mode**—Current inspection mode of the attached probe

**Scan Time**—Time (in seconds) of the scan window

**Source**—Current connected input and the attached probe type

**Channel Select**—Allows user to change the channel.

**Grid Selection**—Selection for Cartesian or Polar grid

**Plot Width**—Lissajous plot line/dot width

**Plot Type**—Selection for dot or line or spline plotting

**Grid Color**—Grid color selection

**Lissajous Color**—Lissajous color selection

**Channel Label**—User-defined label

**Channel Enabled**—Is this frequency channel used

**Frequency**—Frequency of the currently selected channel

**Drive Percentage**—Percentage of drive voltage used by the currently selected channel

**Gain X**—Display gain of view in the x direction

**Gain Y**—Display gain of view in the y direction

**Phase**—Phase rotation of the currently selected channel

**Filter Selection**—Determines if filters are on (band pass) or off

**Filter Frequency**—High/Low pass filter bandwidth selection

**Gate A Enable**—Gate A enable flag (on/off)

**Gate A Logic**—Gate A logic when to alarm (inside or outside)

**Gate B Enable**—Gate B enable flag (on/off)

**Gate B Logic**—Gate B logic when to alarm (inside or outside)

**Gate Shape**—Selection for Box or Sector gate shape

**Box Top**—Gate top placement (start 1)

**Box Bottom**—Gate bottom placement (stop 1)

**Box Left**—Gate left edge placement (start 2)

**Box Right**—Gate right edge placement (stop 2)

**Sector Start**—Gate start angle (start 1)

**Sector Stop**—Gate stop angle (stop 1)

**Sector Inner**—Gate inner border placement (start 2)

**Sector Outer**—Gate outer border placement (stop 2)

**Box Top**—Gate top placement (start 1)

**Box Bottom**—Gate bottom placement (stop 1)

**Box Left**—Gate left edge placement (start 2)

**Box Right**—Gate right edge placement (stop 2)

**Sector Start**—Gate start angle (start 1)

**Sector Stop**—Gate stop angle (stop 1)

**Sector Inner**—Gate inner border placement (start 2)

**Sector Outer**—Gate outer border placement (stop 2)

# Appendix B – Specifications

|                                                     |                                                                        |                                              |
|-----------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|
| Battery Size - 62 watt-hours/airtransport compliant | Charge Input - 12 VDC $\pm$ 5%, 72 W AC                                | AC Input to charger - 100- 240 VAC, 47-63 Hz |
| Battery Life - 4 hours for most conditions          |                                                                        |                                              |
| 90-minute charge time                               |                                                                        |                                              |
| Extended battery pack adds 6 hours                  |                                                                        |                                              |
| Generators - 2 generators and 2 connectors          |                                                                        |                                              |
| 2 time slices max per generator                     |                                                                        |                                              |
| 4 frequency simultaneous injection                  |                                                                        |                                              |
| Display - 10.4" XCV A 1024 x 768                    |                                                                        |                                              |
| Projected capacitive touch                          |                                                                        |                                              |
| Frequency Range -                                   | 10 Hz - 6 MHz                                                          |                                              |
| Sample Rate (max) -                                 | 50 kHz                                                                 |                                              |
| Receiver Gain -                                     | 0-34 db                                                                |                                              |
| Gain -                                              | 0-120 db in 0.1 db steps                                               |                                              |
| Drive Voltage -                                     | 0.5 1, 2, 4, 8, and 16 VPP                                             |                                              |
| Gates Output -                                      | 2 per channel                                                          |                                              |
| Alarm Outputs -                                     | 2 total, TTL levels, one per input                                     |                                              |
|                                                     | One LED on instrument face, audio through Bluetooth (headset protocol) |                                              |
| Operating Temperature -                             | -20 to 55 deg C                                                        |                                              |
| Storage -                                           | 8 GB SSD                                                               |                                              |
| Connectivity -                                      | Wi-Fi; 6 Bluetooth channels                                            |                                              |
| Dimensions -                                        | 2.5 kg without modules; 295 mm x 60 mm                                 |                                              |
|                                                     | 2.9 kg with 2-probe connector module and connectivity module           |                                              |
| Image Formats -                                     | BMP, JPG                                                               |                                              |
| Video Formats -                                     | MPEG 4, Type 10                                                        |                                              |

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