



Webinar Optimizing Weld Inspection with the Mentor EM

UPDATED Call in Details Below

Additional Phone Numbers Included in Your Webinar Reminder

North America Toll-Free Dial-In Number: (877) 437-7543

International Dial-In Number: (973) 638-3441

Conference ID: 3095457

Imagination at work.

Challenging New Landscape of NDT

- Aging NDT inspector population
 - How to train the next generation of inspectors
- Increasing complexity of inspections
- Demanding EHS regulations
 - Eddy current as alternative to LP and MPI
- Drive for improved Probability-of-Detection (POD) and productivity



Addressing the New NDT Challenges

- Leveraging advancements in digital electronics, packaging, and display technology
- Expanding use of downloadable customized applications ('apps') for NDT inspections
- Integrating wireless communication into NDT instrumentation to allow immediate collaboration with remote experts



Eddy Current Alternative to LP & MPI

Eddy Current Does Not Require...

- Chemicals (penetrant, developer, and cleaning liquids)
 - Eliminates costly disposal
- Pre-inspection coating removal or post inspection repainting



Eddy Current

Return-on -Investment

Shut down at 250,000 barrel per day refinery for inspection of 10,000 welds

Liquid Penetrant

Recurring \$6,500 for chemicals + 2,100 hrs. for pre & post tasks + 2,900 hrs. for LP inspection + cost of chemical disposal

Eddy Current

One-time \$12,000 capital investment + 1,700 hrs. for EC inspection



Eddy Current Weld Inspection ISO and EN Approved

ISO/DIN 17643

(Previously EN 1711: 2000)

“Eddy Current Examination of Welds by
Complex Plane Analysis”

Additional Approval Bodies

Lloyds Register

DNV (Det Norske Veritas)

Bureau Veritas



Mentor EM for Eddy Current Weld Inspection



Full Featured Eddy
Current Flaw Detector
+ WeldScan Probes

With

Capability to Add
Custom Applications



Mentor EM for Eddy Current Weld Inspection



Eddy Current WeldScan Probes






- Eddy current coil design minimizes effect of surface roughness (also called lift-off) on EC signal response
- Cross wound differential coil design (coil windings at 90 degrees)
- Three 'center' frequencies:
 - 60 kHz to 700 kHz
- High temperature and high wear ceramic versions available



Minimal Lift Off



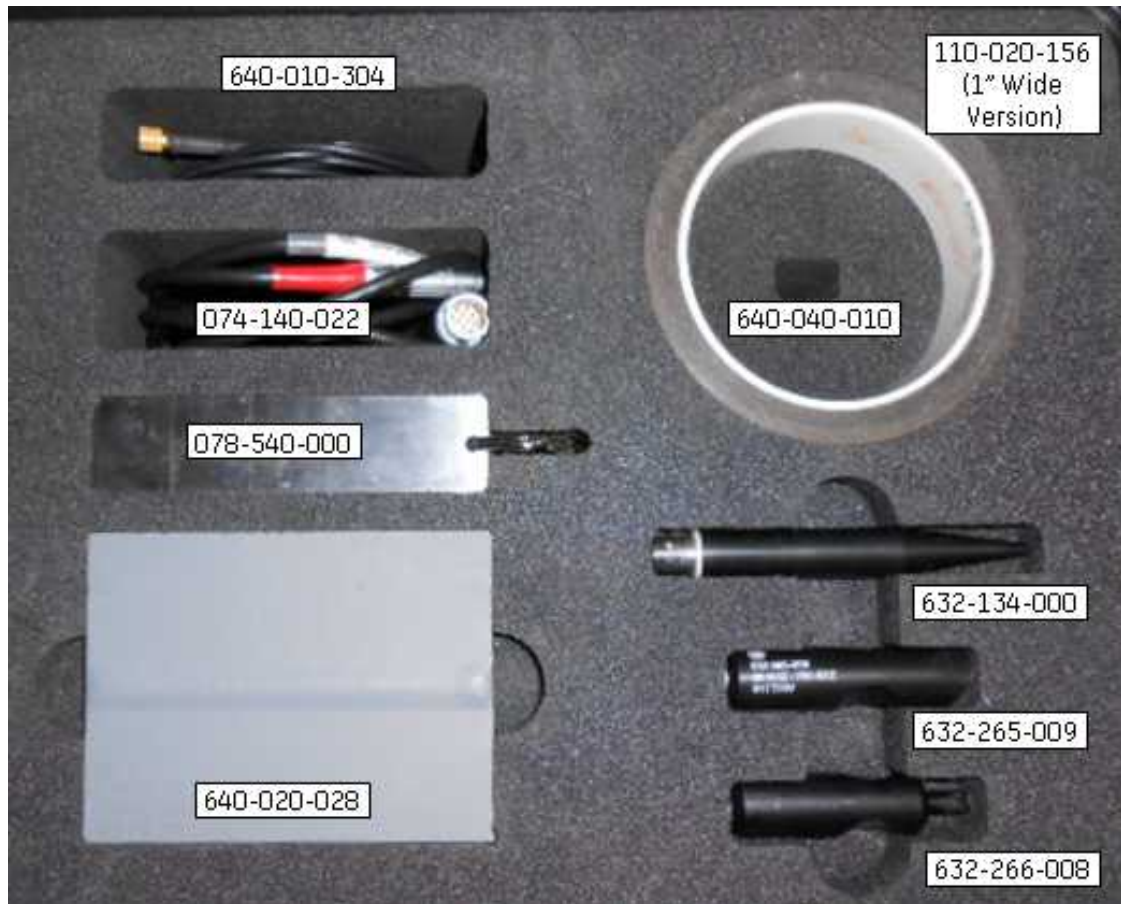
Eddy Current WeldScan Probes

			Phasec 1.1	Locator 2 & 2s	Phasec 2200	Zetec	Staveley/	Disconnect	Disconnect	
			Mini Phasec		D-62		Nortec	Probe	Probe	
			QuickCheck		Phasec 2 & 3		Rohmann	*Cable Required	*Cable Required	
Connector			6P Jaeger	7P Lemo	12P Lemo	4P Amphenol	8P Burndy	4P Lemo	3P Fischer	
Probe Description										
Straight Probes		Frequency	Cable Length							
7/32" Straight		450kHz-2.5MHz	6'	632-267-000					632-267-008	
			12'	632-267-010						
3/8" Straight		60kHz-1.2MHz	6'	632-266-000					632-266-008	
			12'	632-266-010						
5/8" Straight		60kHz-700kHz	6'	632-265-000	632-265-002	632-265-004	632-265-006	632-265-009		
			12'	632-265-010	632-265-025	632-265-012	632-265-014	632-265-016		
90° Tipped Probes										
7/32", inline, 1/4" drop		450kHz-2.5MHz	6'	632-267-100					632-267-108	632-267-208
			12'	632-267-110						
3/8", inline, 1/4" drop		60kHz-1.2MHz	6'	632-266-100					632-266-108	
			12'	632-266-110						
5/8" Inline, 1/4" Drop		60kHz-700kHz	6'		632-265-102	632-265-104				
			12'							
5/8" 90°, 1/4" Drop		60kHz-700kHz	6'							
			12'							
High wear Straight Probes										
3/8" High Wear (Ceramic Tip)		60kHz-1.2MHz						632-266-011		
5/8" High wear (Ceramic Tip)		60kHz-700kHz	6'	632-265-001	632-265-013	632-265-003	632-265-005	632-265-007	632-265-011	
5/8" High wear (SST)		60kHz-700kHz						632-265-018		
High Temperature										
425° F (220° C) Continuous Use										
5/8" Straight Handle Length 6"		60kHz-700kHz						632-265-008		



WeldScan Inspection Kit

Details at EMProbes.com



Mentor EM for Eddy Current Weld Inspection



Optimizing the Weld Inspection Experience

- Easily customize the instrument interface to optimize eddy current inspection
- Design signal presentations
- Accommodate inspector preferences
- Develop step-by-step procedures to assist the inspector and eliminate error traps
 - Embed graphics, videos, and photographs
 - Control access to key parameter settings



Mentor Create Customizes the Inspection Experience



PowerPoint Type Application

Drag, Drop, and Size Signal Displays

Create step-by-step workflow applications

Limit Parameter Ranges

Add Figures, Photos, Videos



Mentor NDT Platform

Develop Inspection
on Your PC



PowerPoint Type Application
Drag, Drop, and Size Signal Displays
Limit Parameter Ranges
Add Figures, Photos, Videos



Upload to
Mentor EM



Full Featured EC Flaw Detector
Rugged Case
Impact Resistant Display
Battery Compliant for Air Transport



Guided Workflow for Weld Inspection

Purpose of the Inspection

PURPOSE OF THE INSPECTION
This workflow is a basic outline for inspection of ferrous or non-ferrous welds using Eddy Current. The workflow is designed to detect surface breaking indications welds that, which may have a non-ferrous coating applied to its surface. The workflow is based on EN1717-2003.

DESCRIPTION
The workflow uses a single WandScan probe to assess the Coating Thickness and perform the "Weld Inspection". This workflow is designed for simultaneous assessment of the weld and the sensitivity loss due to coating presence.

Equipment Used

DESCRIPTION	PART NUMBER
Cable for Broad Band (Hard) Probe	9194212-304 or 9045151
Cable for Detachable WandScan Probe	9194212-002
WandScan Reference Standard	9194212-003 or 9194213
Wand Scan Probe	9194212-001
302 WandScan Probe (Detachable)	932265-002
302 WandScan Probe (Detachable)	932265-003
Broad Band (Hard) Probe	932264-001 or 9326-2
TTU Case (Probe Protection)	10423-132

Coating Assessment

Coating Calibration
The goal of this workflow is to calibrate the instrument. The following steps must be followed prior to the actual inspection to account for the different types of coating and the instrument's sensitivity. The calibration is performed by the following steps:

- Step 1:** Perform a "Full Instrument Calibration".
- Step 2:** Remove the probe and place it over the reference standard. Take the probe and place it over the reference standard. Take the probe and place it over the reference standard. Take the probe and place it over the reference standard. Take the probe and place it over the reference standard.
- Step 3:** Adjust the gain to 1.000.
- Step 4:** The probe should be placed over the reference standard and placed in the instrument's display. The probe should be placed over the reference standard. The probe should be placed over the reference standard. The probe should be placed over the reference standard.
- Step 5:** Remove the probe and place it over the reference standard. Take the probe and place it over the reference standard. Take the probe and place it over the reference standard. Take the probe and place it over the reference standard.

Inspection

Scan Patterns

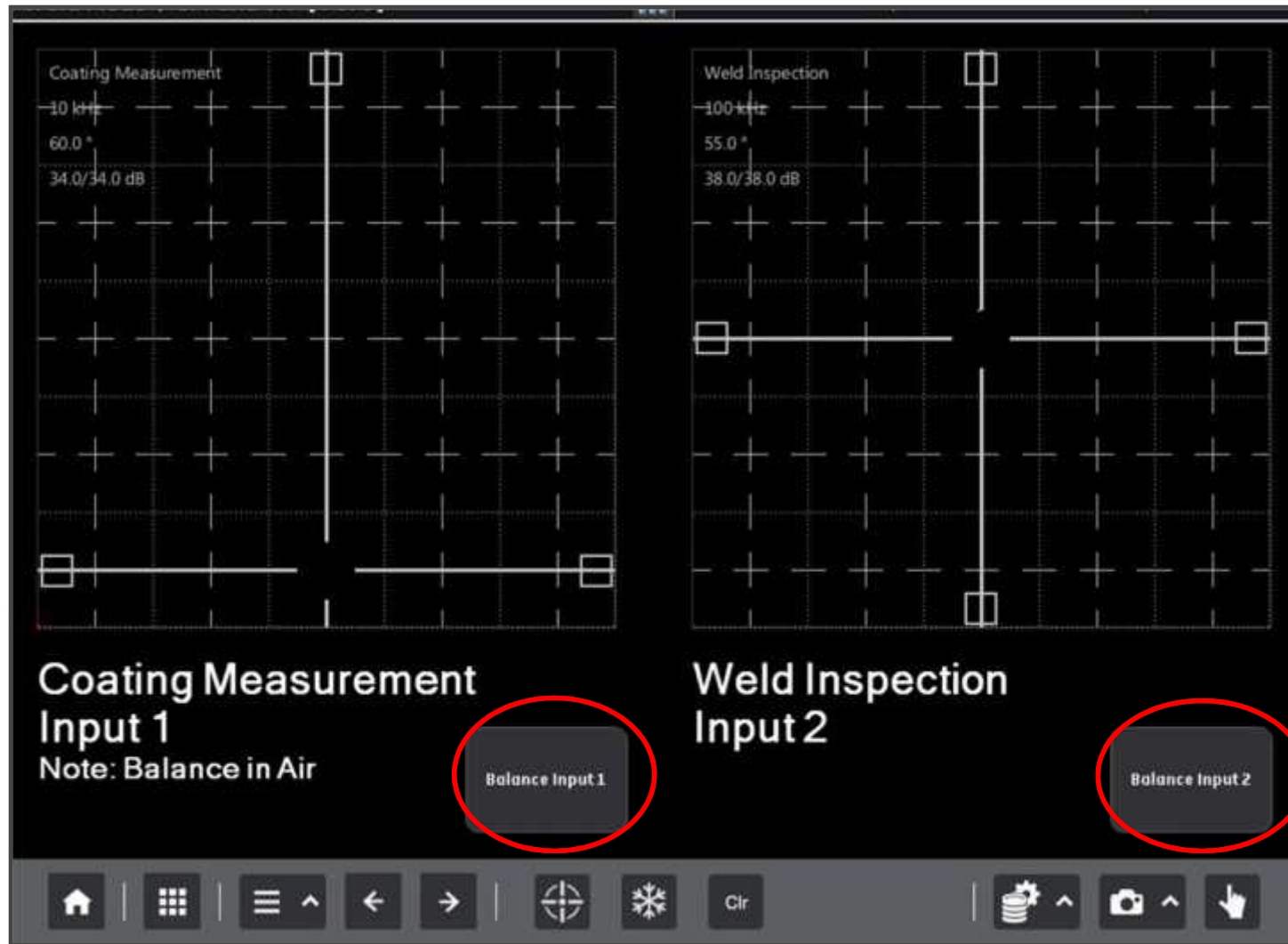
Scan Patterns
Step 1 Scan the Weld Cap and Toe using the scan patterns shown in the figures.
Step 2 Monitor the Weld Inspection Screen for indications and the Coating Measurement screen for variations in Coating Thicknesses.

Calibration - Weld

Weld Calibration
Step 1 Place the number of turns determined from the coating measurement step over the reference standard twice.
Step 2 Perform a "Full Instrument Calibration".
Step 3 Tick the probe over 1.0 mm marks and adjust the gain (gain and phase) to be at 100% screen height on the vertical from the balance point.

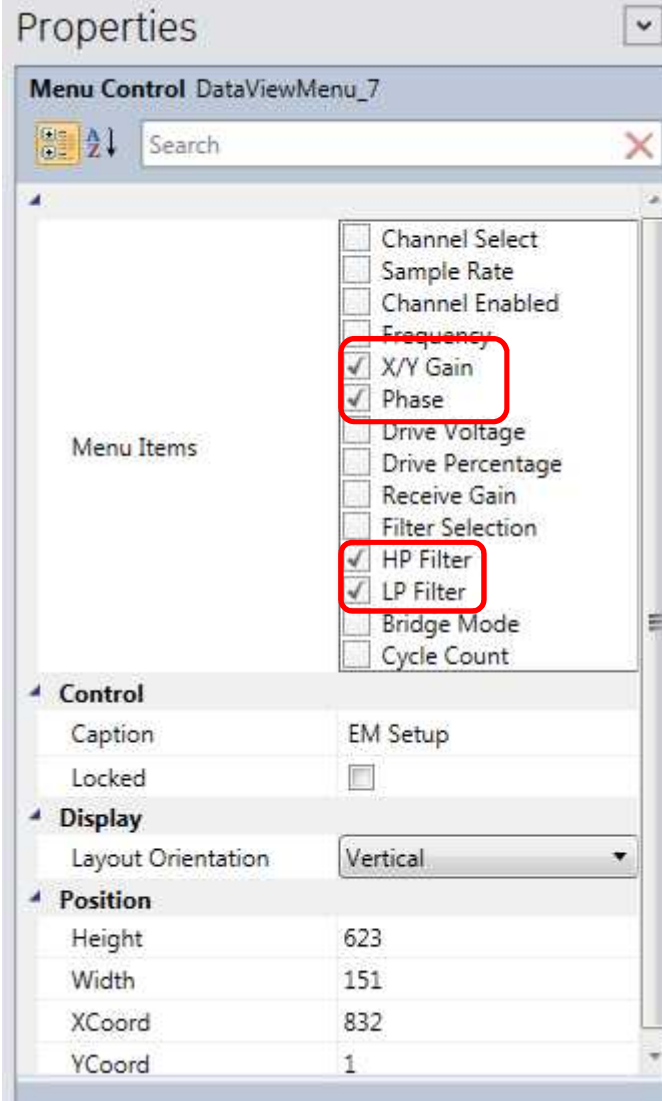


Customized Interface & Signal Displays



Easy Customization of Mentor Controls

Full Access



Limited Access



Developing a Custom Application with Mentor Create



Developing a Custom Weld Inspection Application with Mentor Create



WELD INSPECTION SERVICES

Procedure 001
Revision 1
Date: 05.12.2013

Inspection
The purpose of this inspection is to assess surface breaking defects in the welds, base metal and heat affected zone of fabricated TIG brackets Part No: W500781, see figure 1.



Bracket Part No: W500781 - Figure 1

Preparation:
After the bracket has been welded, wait a minimum of 1 hour, to allow the component to cool sufficiently, to inspect. If required remove any scale.

Equipment Required:

1. Instrument: Phasor3d
2. Probe: Nidiscat 60 (4x - 700kHz) - Part No: 631-251-001
3. Cables: 12 pin (4m) to 4 pin (4m) - Part No: 074-140-022
4. Reference Standard: Calibration 9.2 (10x) - Part No: 074-046-005

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WELD INSPECTION SERVICES

Procedure 001
Revision 1
Date: 05.12.2013

Area of Inspection



Weld Line HAZ Yield Cap

Inspection Area - Figure 2

Calibration Procedure:
Basic Instrument Parameters:
Frequency: 100 kHz
Horizontal Gain: 2T dB
Vertical Gain: 0T dB
Azim: 250°
High Pass Filter: DC
Low Pass Filter: 200 kHz

Calibration Steps:

- a) Position the "Balance" to the centre of the screen.
- b) Place the probe on the reference standard exactly 90mmy edge and maximum amplitude balance.
- c) Scan the reference standard in a figure 8 pattern with a signal amplitude of 25% from the balance point and rotate the probe to vertical.
- d) See Figure 3 below.



Figure 3

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WELD INSPECTION SERVICES

Procedure 001
Revision 1
Date: 05.12.2013

Inspection

Figure 2

- a) Scan the full length of the welds of the bracket in the area of the cap, toe and HAZ, as shown below and Figure 2.



Typical Scanning Pattern for Cap of the Weld Typical Scanning Pattern for the Toe and HAZ

Defect Recording and Action:

- a) Any signal that has an amplitude > 25% and has a length > 2mm shall be considered a repairable defect.
- b) The defect must be marked on the bracket with a white wax.
- c) The weld manufacturer must be contacted to enable a repair of the defective area to be carried out.
- d) The repaired area must then be re-inspected in accordance with the procedure.

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Mentor *Create*



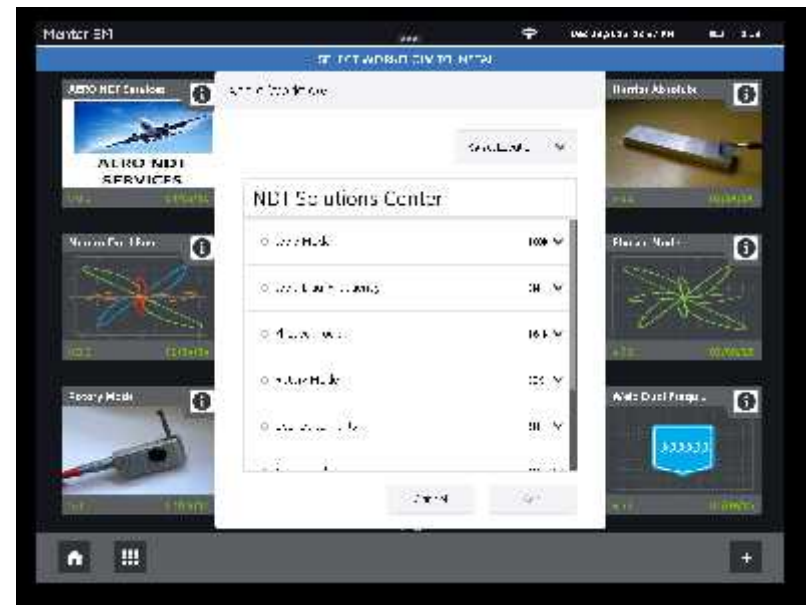
Imagination at work

Version : 0.76.3.0 ©GE Corporation All rights reserved



Once Created, Weld Inspection Workflow App Easily Deployed...

- Local deployment to Mentor EM via USB or Wi-Fi
- Deployment to off-site Mentor's by e-mailing app or Wi-Fi



Mentor EM For Weld Inspection

- ✓ Eddy current is an environmentally friendly and approved NDT technique for weld inspection
- ✓ Mentor EM allows rapid weld inspection by all levels of inspectors - from Expert to the newly qualified
- ✓ Mentor Create enables easy customization of the user interface to suit the applications and skill level of the inspector
- ✓ Workflows are easily transferred from the PC to Mentor and quickly shared between remote sites



Your Next Steps for the Mentor EM

- ✓ Contact your local GE Inspection Technologies sales engineer to discuss your eddy current application and receive a copy of mentor Create at no-charge
- ✓ Arrange an on-site demo of the Mentor EM
- ✓ 10% discount for all Webinar attendees on a Mentor EM for orders placed by Dec 24, 2015



www.geinspectionstechnologies.com

Mentor EM



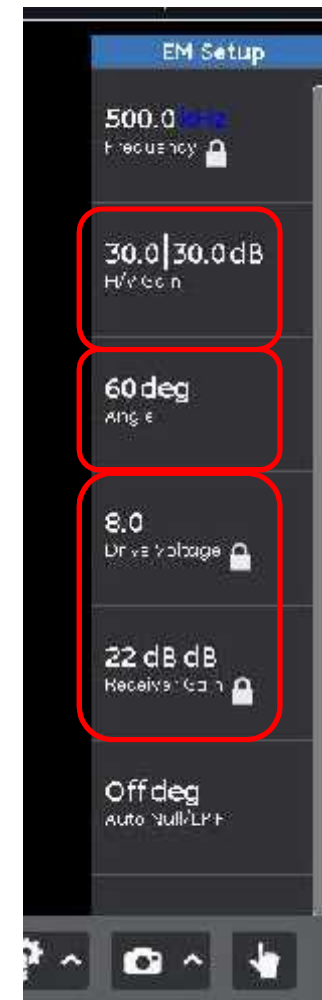
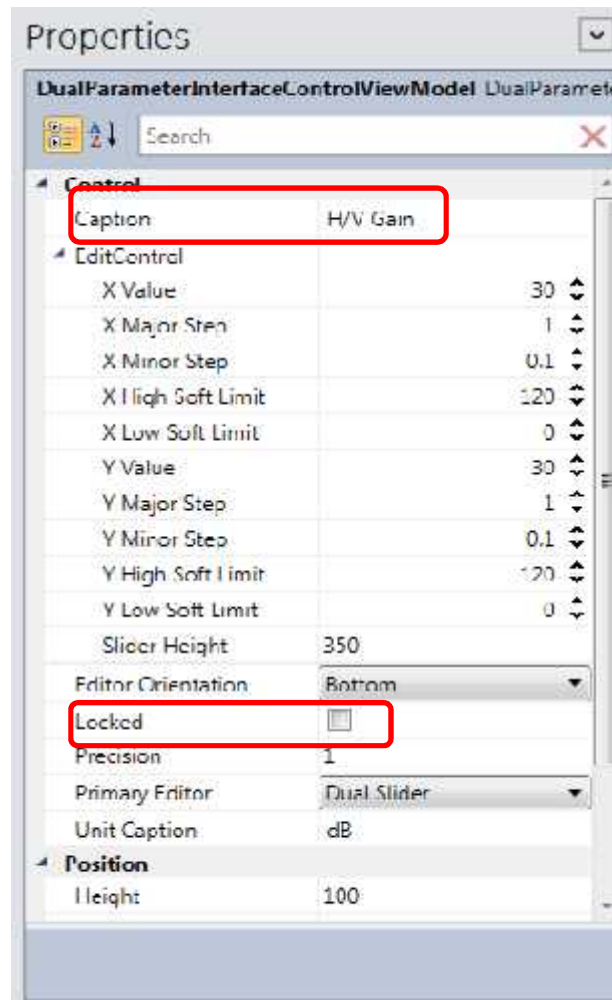
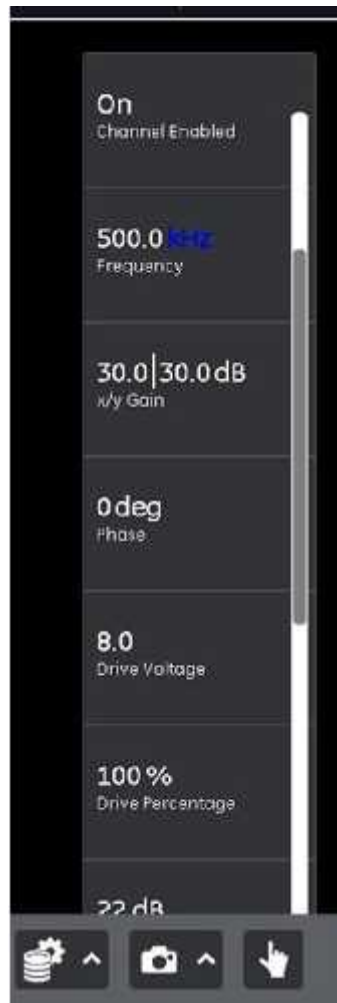
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Mentor EM Specifications

- Two probes inputs with independent generators
- Multiple frequencies for each probe input – 4 each
- Frequency range of 10 Hz to 6 MHz
- Compatible with GEIT/Hocking and other manufacturer's eddy current probes
- High-resolution display with touchscreen controls
- Wi-Fi enabled with “Remote Desktop” capability
- Screen and user interface fully customizable using **Mentor Create** software
- Customizable hardware with probe and connectivity modules



Customize Parameter Names and Values



H/V Gain

Angle

Locked Parameters

