

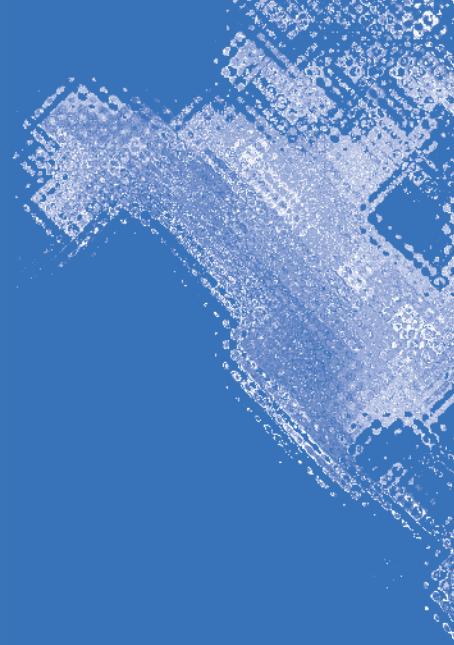
GE

Sensing & Inspection Technologies

# Phasec 3 Series Flaw Detectors

## Eddy Current





GE Sensing & Inspection  
Technologies develops  
innovative solutions for  
challenging environments  
enabling customers to  
accurately measure, inspect  
and analyze asset condition  
and performance.

Our solutions deliver  
improvements in asset life,  
productivity, process  
throughput and knowledge-  
based decision making.



## Industry Focus with Broad Experience

No matter what your inspection or testing challenge is, we can help.

At GE Sensing & Inspection Technologies, we are proud to continue the long legacy of leadership and innovation that we inherit as a member of the GE family of companies. Founded by Thomas Edison in 1878 as the Edison Electric Co., GE is known around the world for its excellence, innovation and imagination. Its rich heritage includes the development of non-destructive testing (NDT) and inspection technologies.

Our focus at GE Sensing & Inspection Technologies covers a broad range of industries and applications. So, whether it's simple or highly complex, we are the world's proven, reliable resource for NDT. We are setting best practices today and are constantly exploring the next generation of NDT solutions, all in an effort to keep our customers at the front edge of quality, safety and inspection productivity.

# Phasec 3

## Phasec 3s

## Phasec 3d

## The Phasec 3 Series of Eddy Current Flaw Detectors



### Main Features

Locator, Absolute, Reflection and Bridge Probes  
Phase Plane, Bargraph, Times Base Views  
Conductivity and Coating Thickness Measurement  
Rotary Mode  
2 Frequencies  
Automix

### Phasec 3   Phasec 3s   Phasec 3d

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### 3 Types of Flaw Detectors

#### Phasec 3

The Phasec 3 offers full phase plane functionality in an ultra-compact package, which can easily fit into a toolbox or a briefcase.

#### Phasec 3s

Phasec 3s adds dynamic rotary inspection capability.

#### Phasec 3d

Phasec 3d additionally offers dual frequency inspection capability.

### Features

- Advanced colour LCD allows easy viewing in all ambient light situations.
- Signal colour coding enhances signal interpretation and trace recall mode allows easy comparison.
- Display can be phase plane, Y/t or bar graph.
- Easy computer connectivity with the integrated USB connection and fast data exchange using supervisor software.
- Increased instrument memory can store up to 200 set-ups and 200 traces.
- Light weight and portable with up to six hours battery life.
- Compatible with all commonly used eddy current probes.

# The Large Colour Display Instrument for Enhanced Detection of Flaws in Ferrous and Non-Ferrous Metals.

## Suitable for a Wide Range of Eddy Current Applications

Developed in response to a market need for eddy current instrumentation which is easier to read and allows better signal interpretation, while still being lightweight, portable and user-friendly.

### Aerospace

- Fastener hole inspection
- Conductivity measurement
- Heat damage assessment
- Surface crack inspection
- Multi-layer inspection
- Corrosion detection
- Coating thickness measurement
- Wheel inspection

### Automotive

- Wheel Inspection
- Conductivity measurement
- Metal sorting

### Other

- Fire brigade ladders and cutting tools
- Rail tracks
- Prison bars

### Petrochemical & Power Generation

- Weld inspection
- Tube and pipe inspection
- Conductivity measurement
- Coating thickness measurement

### Manufacturing

- Conductivity measurement
- Metal sorting
- Tube and pipe inspection
- Surface breaking defects



# Phasec 3

## Phasec 3s

## Phasec 3d

### Common Features



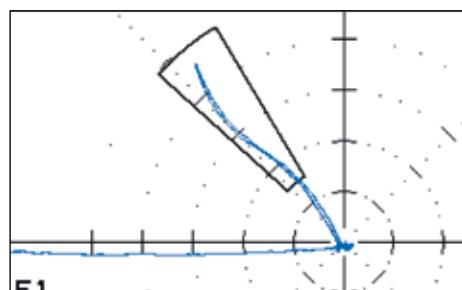
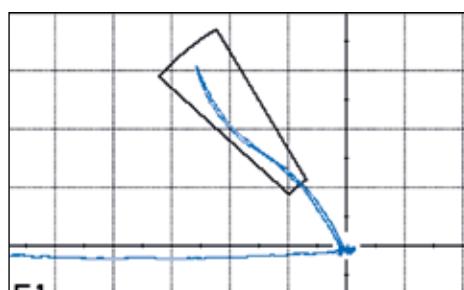
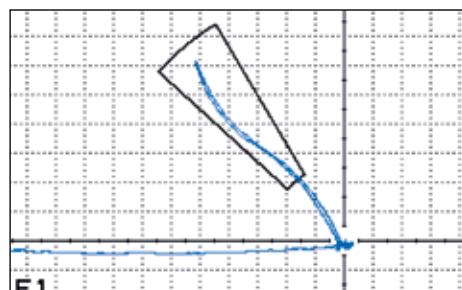
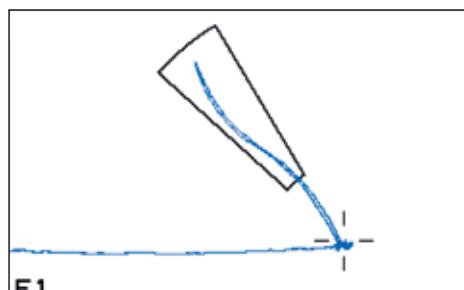
#### Easy to read

The Phasec 3 Series employs a 1/4 VGA TFT large bright colour screen, with a choice of eight colour combinations, so that viewability can be optimized for specific situations according to personal taste. Unlike monochromatic displays, which are temperature-dependent, there is no need to adjust the contrast when the display temperature rises. High resolution display and large clear text fonts also add to the readability of the instruments and ensure that operators no longer have to stare at dim, blurred images.

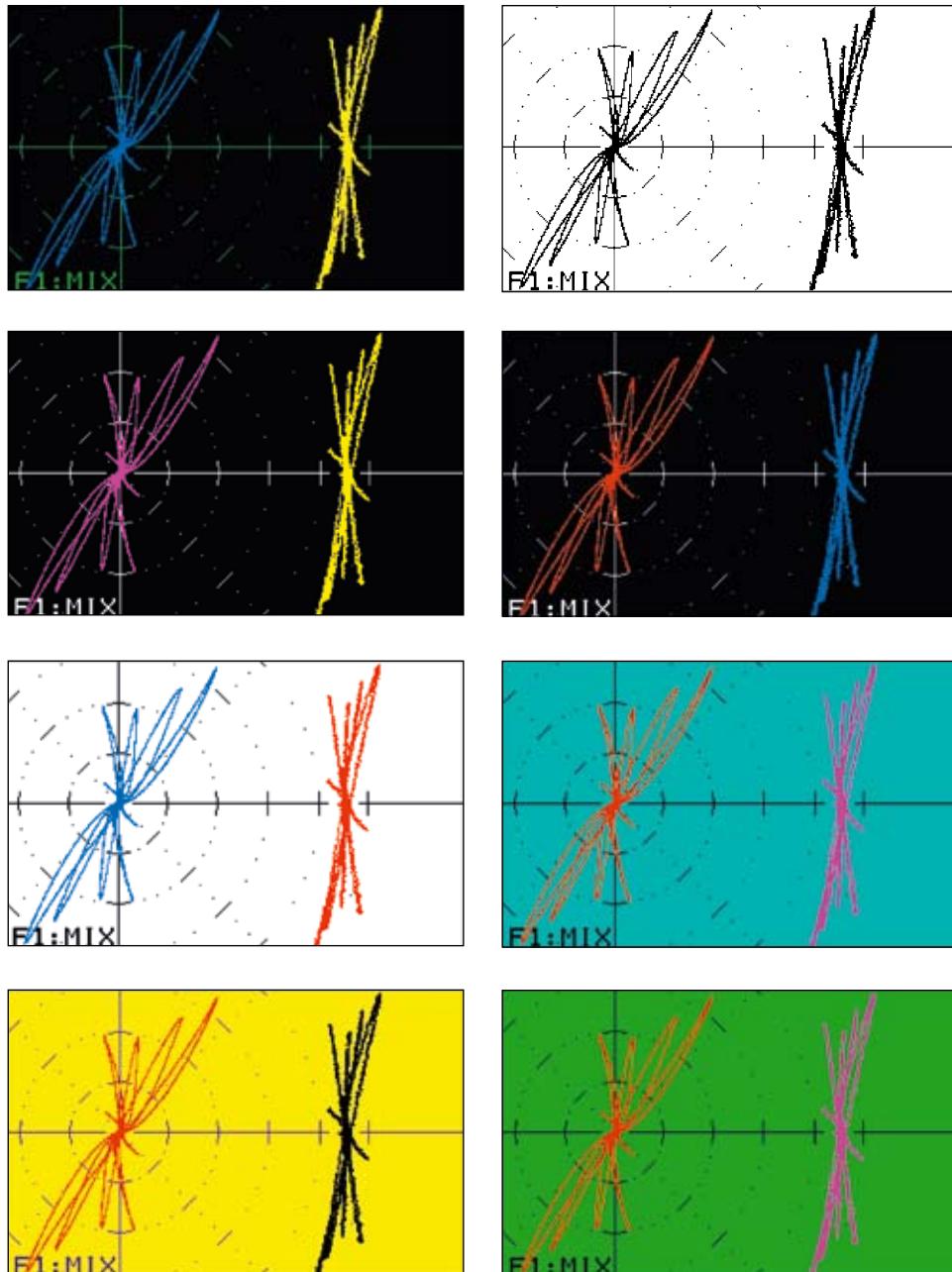
#### Easy interpretation

Colour coding is the key to the ease of signal interpretation of the new range of flaw detectors. As each channel is assigned its own colour, colour coding is used to highlight specific data, to allow easier, more reliable and faster interpretation of displayed signals. With colour it is possible to differentiate the graticule from the signal and different colours can be used for comparison between stored and active traces.

Operators also have choice of display mode of phase plane, Y/t or bar graph to further enhance ease of interpretation.



Set of different graticules fulfills the main application needs and improves readability.



Colour coding is the key to the ease of signal interpretation.

# Phasec 3

## Phasec 3s

## Phasec 3d

### Lightweight, rugged and portable

Portability is a major feature of the Phasec 3 Series. Instruments weigh just 1.1kg including batteries and are roughly the size of a hard backed book. Each instrument is housed in a tough, robust case and instrument internals have been designed to resist most moist, tropical or salt-laden atmospheres. While offering a large display the instrument housing is kept as compact as possible. The batteries of the Phasec instruments allow up to 6 hours operating life with none of the adverse memory effects of more traditional batteries. Furthermore the instruments have been specifically designed to allow the interchangeability of accessories such as probes, cables and test pieces, reducing the amount of kit the operator needs to purchase or carry around for inspections.

### User-friendly and versatile

Operating controls of the Phasec 3 series are based on the Locator and Phasec series user interface. Consequently, operators with knowledge of these instruments can become proficient within a few minutes.

Every instrument has a menu system that is easy to read and navigate. Its operation is intuitive. Set ups are rapid. They can be stored and recalled at any time.

Operating parameters can be rapidly selected and adjusted using the unique keyboard arrangement. Softkeys can be assigned to assist parameter adjustment without referral to the menu. Large tactile buttons in easy reach of either hand give good feedback even when wearing gloves and all instruments are designed for ease-of-use by both right-handed and left-handed inspectors. A huge range of parameter adjustment enables the instrument to be quickly matched to the most exacting inspection requirements, providing extreme versatility in operation.

This versatility is also demonstrated by the fact that the front panel controls can be configured to suit specific operations and then locked into operator mode.

### Built-in reporting software, large memory and USB connectivity

Phasec 3 series instruments are compatible with our unique Windows-based reporting software package, Supervisor PC, which allows operators to download both data sets and screen images for reporting purposes.

The on-screen menu allows all functions to be set and stored in the on-board memory, which has the capacity for 200 set-ups and 200 traces.

An integral USB connection port permits fast data exchange with the Supervisor software. Once the data is transferred to the PC it can easily be used to produce reports, to print and archive.

### Advanced alarms

Phase 3 series flaw detectors are equipped with a digital alarm system to prevent flaws from being overlooked. Alarms, which can be audio, visual or both, cover the full screen and can be configured to meet specific requirements. The virtual LED display also shows when the spot is in the active alarm area.



Ambidextrous: the instrument can be operated by left and right handed people with the same level of comfort. The most used key during inspection can be reached with one finger.

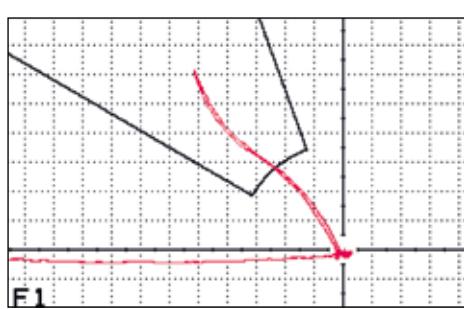
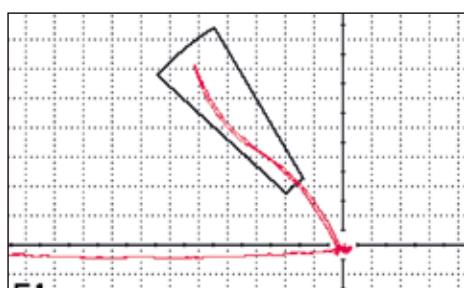
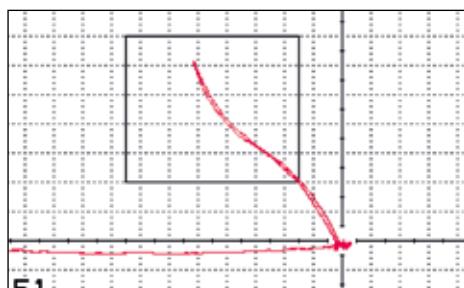


Transportation case

## Digital precision

Phasec 3 series instruments incorporate a number of precision digital features, which lead to better quality inspection. These include:

- Advanced filtering
  - High accuracy frequency and filter setting
  - Auto balance with automatic load selection
- Auto lift off
- Instantaneous balance (1 key press)
- Trace record



Different alarm shapes fulfill the main application needs.

## Range of accessories

Phasec 3 series instruments come with a range of accessories to improve its portability, robustness and versatility.

A custom-built rubber boot can be fitted to Phasec 3 flaw detectors for extreme protection from mechanical damage and shock. The boot includes attachment points for a shoulder strap and has an integrated stand. The stand facilitates screen viewing and keypad operation when the flaw detector is used as a bench-mounted instrument.

A purpose-made transport case provides a convenient carrier for the instrument and all the associated probes, cables and ancillary equipment.

Phase 3 instruments can be supplied with a wide range of probe kits according to the particular model.



Examples of probe applications.



# Phasec 3

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# General Applications

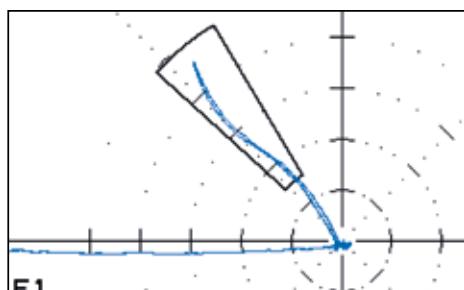
## General crack detection

All Phasec 3 eddy current flaw detectors can be used with a wide range of probes to detect surface breaking and sub-surface cracks.

Adapters are available, allowing use with other manufacturers' probes. One of the main advantages of eddy current technique over other NDT techniques is that it will work through surface coatings, such as paint and oil. Inspections can be carried out with minimal preparation; saving time and money.

## Sub-surface cracking and corrosion

Using a low frequency inspection, eddy currents can also detect cracking and corrosion that is not surface breaking e.g. aircraft fuselage sections are common test areas. This type of test is also applicable for other non-ferrous materials such as stainless steel.

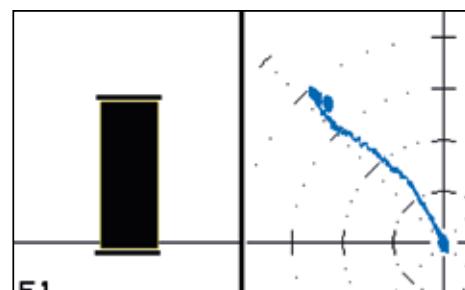


Phase plane display

## Conductivity measurement

The Phasec 3 series flaw detectors can handle non-ferrous material sorting by conductivity measurement for a number of applications, including:

- Measuring conductivity to establish correct inspection frequency
  - Verification of material hardness & state of heat treatment
  - Assessment of heat damage in aluminium alloys
  - Aids in material identification as part of a quality control system
- measurement process. All Phasec flaw detectors provide the operator with step by-step instructions for the test.



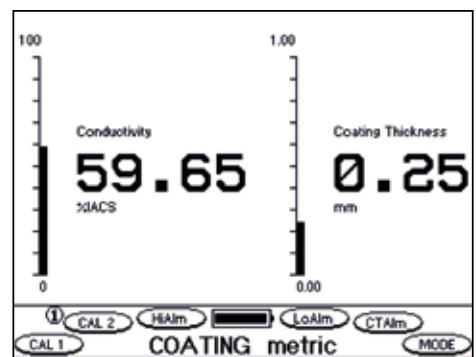
Bargraph and phase plane display

## Coating thickness measurement

The Phasec 3 series flaw detectors have a built-in coating thickness meter, which may be used for:

- Non-conductive coating measurement on non-ferromagnetic materials
- Paint coating measurement
- Quality control in the surface coating industry
- As part of a test procedure to improve the reliability of eddy current testing

As with conductivity measurement, Phasec 3 series instruments take the operator through a simple set of instructions and displays the results clearly on the screen.



Conductivity and coating thickness measurement display

# Phasec 3



## Single Frequency Eddy Current Instrument for Crack and Corrosion Detection, with Conductivity and Coating Measurement

The basic model is suitable for a wide range of applications from high frequency surface inspection to low frequency sub-surface inspection. The conductivity and coating thickness meter function further extends the instrument's capability.

### Standard Eddy Current Probes

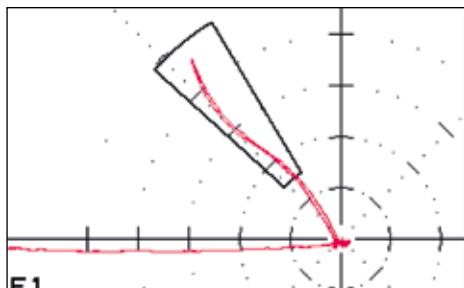
Compatible with all commonly used eddy current probes whether they are simple absolute or complex reflection probes.

Using the GE WeldScan range of probes, the Phasec 3 Series offers an advanced system for checking the integrity of welds on steel structures such as bridges, ships, oil rigs and steel framed buildings. Cracks can be detected through surface coating materials such as paint and aluminium, so minimal time and resources are needed for preparation.

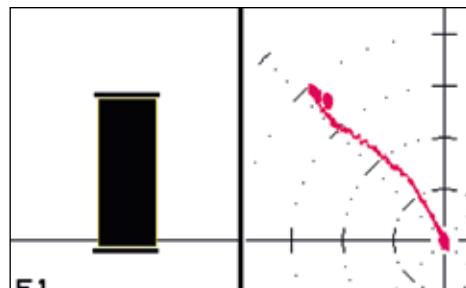
The WeldScan range of probes can be used on ferrous, stainless steel (magnetic and non-magnetic) and aluminium materials. The technique has been written into British and European Standard BS EN 1711:2000.



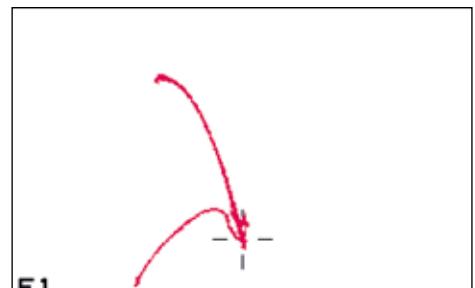
Weldscan probes



Phase plane display



Bargraph and phase plane display



Phase plane display using a weldscan probe

# Phasec 3s

Single Frequency Instrument for Crack and Corrosion Detection, with Conductivity, Coating, Measurement and Dynamic Rotating Capability



Stepping up to the Phasec 3S adds Dynamic Rotary capability to Phasec 3.

## Rotary Inspection

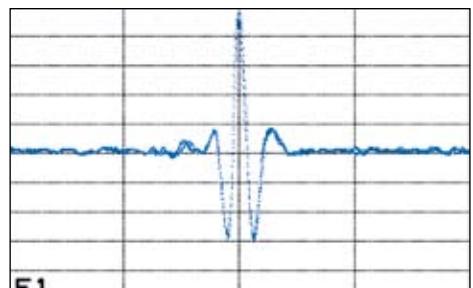
Stepping up to the Phasec 3s adds dynamic rotating inspection capability. The Phasec 3s instrument has an optional powerful dynamic rotating drive that facilitates easy inspections of ferrous and non-ferrous metals. A rotary hole inspection gives the operator an increased Probability of Detection (POD) of flaws compared to a manual inspection and at a far higher speed.

Probe drives from GE and other manufacturers can be used with Phasec 3s.

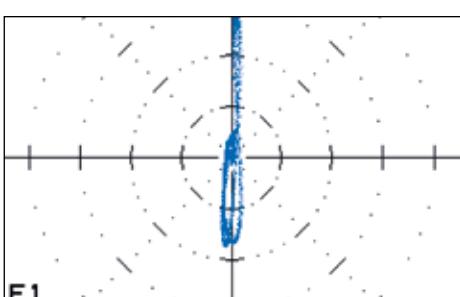
The AutoDetection facility automatically detects the use of the rotary probe and immediately switches to the correct inspection mode. If a GE drive is being used, Phasec 3s will also automatically bring up the previously used rotary settings.



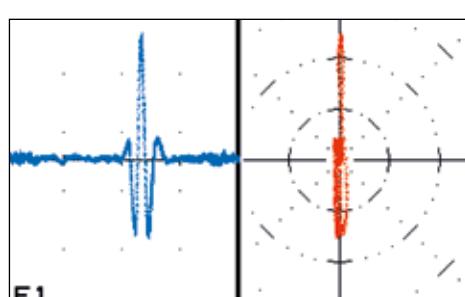
Rotary inspection of aircraft wheel tie bolt holes.



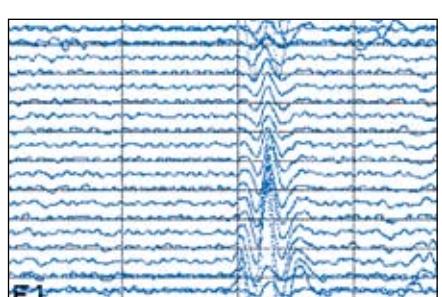
Time base display



Spot display



Simultaneous time base and spot display



Waterfall display

# Phasec 3d

## Dual Frequency Instrument for Crack and Corrosion Detection in Metal Components, Tubes, Structures and Welds



Stepping up to the Phasec 3d adds dual frequency inspection capability plus several features designed to facilitate Eddy Current inspections.

### Crack and Corrosion

Dual frequency inspection offers the ability to test at two frequencies or modes simultaneously. This may be used to remove unwanted signals or give additional information. In order to assist in removing unwanted signals an Automatic Mix Setting (Automix) function is provided.

#### Examples of dual frequency inspection: Inspection optimization

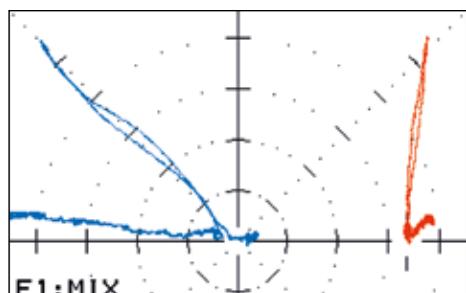
The dual frequency capability allows optimization of the weld inspection Bridge + absolute.

#### Multilayer inspection

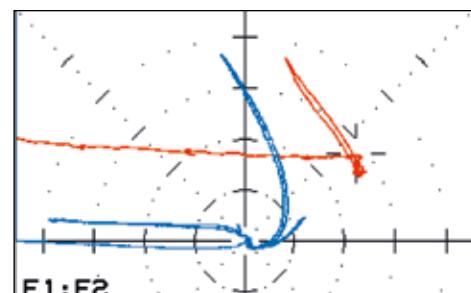
Using two frequencies allows simultaneous inspection at two distinct depths.

#### Reducing the effect of lift off and probe orientation

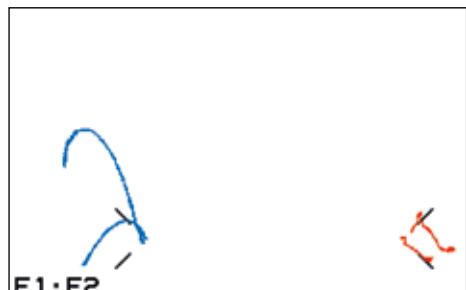
Automix and Automatic Lift off increase inspection speed and improve confidence by reducing the effect of lift off and probe orientation.



Lift off and probe handling reduction mix



Multilayer inspection : Use of 2 frequencies to inspect 2 depths at the same time (blue 2kHz, red 200kHz)



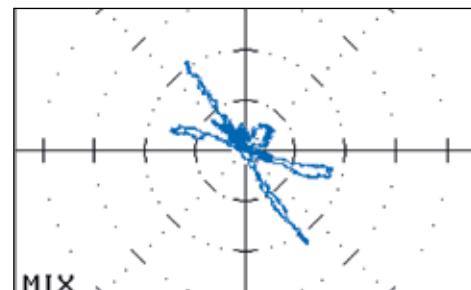
Phase plane mode using weldscan probe



Weld inspection



Fastener inspection



Fast scan

# Technical Specifications

## Common Specifications for Phasec 3 Series

		Phasec 3 - 3s - 3d
Frequency		10Hz – 10 MHz 1188 Steps
Gain	Overall	-8 - + 96 dB, 0.1 Steps
	Input	0/14 dB
	Drive	-8, 0, +8 dB
	Max X/Y Ratio	-74.0 - 74.0 dB
Phase	Range	0-359.9°, 0.1 steps
	Auto Lift Off	•
Filters	Normal High Pass	dc-ultra-1 - 1200 Hz 1675 Steps
	Normal Low Pass	3 - 1500 Hz, 2440 Steps
	Rotary High Pass	
	Rotary Low Pass	
Balance Load	Automatic	•
	Manual	•
Alarms	Box	9 Modes
	Sector	2 Modes
Operating Modes	Single Frequency	•
	Conductivity	•
	Coating Thickness	•
	Rotary Capability	
	Competitor Scanner	
	Split Screen – Time Base / Spot	
	Dual Frequency	
Display	Type	Colour TFT
	Viewable Area (mm)	117.2 x 88.4
	Resolution (pixels)	320 x 240
	Colour Schemes	8
	Display Modes (Spot, Time base, Waterfall and Bargraph)	•
	Trace Recall with Colour Enhancement of Overlapped Live Trace	•
	Display Modes/Trace Views	5/1
	Digital Spot Position Readout	•
	Graticules (None, Polar, Grid 1 and Grid 2)	•
Internal Data Storage	Stored setups up to	200
	Stored traces up to	200
	Record Replay	60 s
Probe Connection		12 way Lemo
	Outputs	USB
	PC Connectivity	
Analogue Output	Digital volt free alarm	•
	VGA	•
	Channels	2
Languages	Configurable as X1, Y1, X2, Y2, X mix or Ymix	•
	English, French, German, Spanish, Portuguese, Chinese & Japanese	•
	Power	
Physical Characteristics	Weight including battery (kg)	1.1
	Size (width x height x depth) mm	192 x 139 x 57
	Operating Temperature oC	0-40
	IP Rating	54

## Rotary Phasec 3s and 3d

Phasec 3s - 3d	
Frequency	10 KHz – 2MHz
Split Screen	Timebase/Spot
Scanner Speed	600, 1200, 1800, 2400, 3000 rpm
Compatibility	GE/Hocking, Staveley, Zetec, Rohmann

## Dual Frequency Phasec 3d

Phasec 3d	
Frequency	2nd channel 10 Hz – 10 MHz
Probe Mode	2nd Channel: Absolute, Locator, Bridge and Reflection
Mix Gain	X/Y -60 to +60 dB
Mix Phase	0 to 359.9° in 0.1 Steps



## Regional Contact Information

### North America

50 Industrial Park Road  
Lewistown, PA 17044  
USA

+1866 243 2638 (toll free)  
+1 717 242 0327

### Europe

Robert Bosch Strasse 3  
50354 Huerth  
Germany

+49 2233 6010

### Asia

5F, Hongcao Building  
421 Hongcao Road  
Shanghai 200233  
China

+86 800 820 1876 (toll free)  
+86 21 3414 4620 (ext. 6029)

### Japan

Medie Corp Bldg.8 2-4-14 Kichijoji-honcho,  
Musashino-shi, Tokyo 180-0004  
Japan

+81 422 67 7067  
+81 422 67 7068

### South America

Av. das Nações Unidas, 8501 - 1º andar  
05425-070, São Paulo, SP  
Brazil

+55 11 3067.8166



[www.geinspectiontechnologies.com](http://www.geinspectiontechnologies.com)

