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.
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.
The Phasec 3 Series of Eddy Current Flaw Detectors

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.

### Main Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Phasec 3</th>
<th>Phasec 3s</th>
<th>Phasec 3d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locator, Absolute, Reflection and Bridge Probes</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Phase Plane, Bargraph, Times Base Views</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Conductivity and Coating Thickness Measurement</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Rotary Mode</td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>2 Frequencies</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Automix</td>
<td>●</td>
<td></td>
<td>●</td>
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</tbody>
</table>
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
Easy to read
The Phasec 3 Series employs a ¼ 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, V/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.
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.
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

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.
General crack detection
All Phasec 3 eddy current flaw detectors can be used with a wide range of probes to detect surface breaking and subsurface 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.

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.

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.
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.

**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
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
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.

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.
# Technical Specifications

## Common Specifications for Phasec 3 Series

<table>
<thead>
<tr>
<th>Specification</th>
<th>Phasec 3 - 3s - 3d</th>
<th>Phasec 3s - 3d</th>
<th>Dual Frequency Phasec 3d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td>10Hz – 10 MHz (1188 Steps)</td>
<td>10 KHz – 2MHz</td>
<td>2nd channel 10 Hz – 10 MHz</td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td>Overall -8 - + 96 dB, 0.1 Steps</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Input 0/14 dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drive -8, 0, +8 dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phase</strong></td>
<td>Max X/Y Ratio -74.0 - 74.0 dB</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Auto Lift Off</td>
<td></td>
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<tr>
<td><strong>Filters</strong></td>
<td>Normal High Pass dc-ultra-1 - 1200 Hz (1675 Steps)</td>
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<tr>
<td></td>
<td>Normal Low Pass 3 - 1500 Hz, 2440 Steps</td>
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<tr>
<td><strong>Balance Load</strong></td>
<td>Automatic</td>
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<td></td>
<td>Manual</td>
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<tr>
<td><strong>Alarms</strong></td>
<td>Box 9 Modes</td>
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<tr>
<td></td>
<td>Sector 2 Modes</td>
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<tr>
<td><strong>Operating Modes</strong></td>
<td>Single Frequency</td>
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<tr>
<td></td>
<td>Conductivity</td>
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<tr>
<td></td>
<td>Coating Thickness</td>
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<tr>
<td></td>
<td>Rotary Capability</td>
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<tr>
<td></td>
<td>Competitor Scanner</td>
<td></td>
<td></td>
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<tr>
<td><strong>Display</strong></td>
<td>Split Screen – Time Base / Spot</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>Dual Frequency</td>
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<tr>
<td></td>
<td><strong>Type</strong> Colour TFT</td>
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<td></td>
<td><strong>Viewable Area (mm)</strong> 117.2 x 88.4</td>
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<td></td>
<td><strong>Resolution (pixels)</strong> 320 x 240</td>
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<td><strong>Colour Schemes</strong> 8</td>
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<tr>
<td></td>
<td><strong>Display Modes (Spot, Time base, Waterfall and Bargraph)</strong></td>
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<tr>
<td></td>
<td><strong>Trace Recall with Colour Enhancement of Overlapped Live Trace</strong></td>
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<tr>
<td><strong>Internal Data Storage</strong></td>
<td>Stored setups up to 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stored traces up to 200</td>
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<td></td>
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<tr>
<td><strong>Probe Connection</strong></td>
<td>12 way Lemo</td>
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<tr>
<td><strong>Outputs</strong></td>
<td>PC Connectivity</td>
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<tr>
<td></td>
<td>Digital volt free alarm</td>
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<td></td>
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<tr>
<td><strong>Analogue Output</strong></td>
<td>Channels 2</td>
<td></td>
<td></td>
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<tr>
<td><strong>Languages</strong></td>
<td>Configurable as X1, Y1, X2, Y2, X mix or Ymix</td>
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<td></td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>English, French, German, Spanish, Portuguese, Chinese &amp; Japanese</td>
<td></td>
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<tr>
<td><strong>Physical Characteristics</strong></td>
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<td>Weight including battery (kg) 1.1</td>
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<tr>
<td></td>
<td><strong>Size (width x height x depth) mm</strong> 192 x 139 x 57</td>
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<tr>
<td></td>
<td><strong>Operating Temperature °C</strong> 0-40</td>
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<td><strong>IP Rating</strong> 54</td>
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<tr>
<td><strong>Rotary Phasec 3s and 3d</strong></td>
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</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>10 KHz – 2MHz</td>
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<td></td>
</tr>
<tr>
<td><strong>Split Screen</strong></td>
<td>Timebase/Spot</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compatibility</strong></td>
<td>GE/Hocking, Staveley, Zetec, Rohmann</td>
<td></td>
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</tr>
<tr>
<td><strong>Scanner Speed</strong></td>
<td>600, 1200, 1800, 2400, 3000 rpm</td>
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<tr>
<td><strong>Mix Gain</strong></td>
<td>X/Y –60 to +60 dB</td>
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<tr>
<td><strong>Mix Phase</strong></td>
<td>0 to 359.9° in 0.1 Steps</td>
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<tr>
<td><strong>Phasec 3 Series</strong></td>
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### Regional Contact Information

<table>
<thead>
<tr>
<th>Region</th>
<th>Address</th>
<th>Phone Numbers</th>
</tr>
</thead>
</table>
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