
Eddy Current Probes & Accessories

Catalogue 2001-2002

HOCKING

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Introduction to Hocking NDT

Leaders in Eddy Current NDT

Wherever metals are used, the specialist knowledge of Hocking can be used to assure integrity and cost-effectiveness. For over 30 years Hocking has been recognised internationally as an innovative designer and manufacturer of high quality eddy current instruments and accessories. Hocking products are among the world's most advanced for the detection of cracks and flaws both during and after production processes.

Why Eddy Current ?

Eddy current inspection is a cost-effective, versatile non-destructive testing technique. It has many advantages over other forms of non-destructive inspection, not least of all its exceptional sensitivity to microscopic flaws at or near the metal surface. Eddy current should be your non-destructive inspection choice because it means:

- ◆ Highly accurate and repeatable detection of flaws.
- ◆ High inspection speeds.
- ◆ Minimal surface preparation.
- ◆ Detection of flaws through coatings such as paint.
- ◆ Good discrimination between flaw types.
- ◆ No couplant, consumables or radiation hazards.

Why Hocking ?

Your product might be a critical jet engine component, part of an offshore platform, a tube in a power station or simply raw metal on the production line. Whatever it is, if it needs to be inspected, Hocking can help. Our efficient and reliable inspection equipment meets the stringent requirements of users in applications ranging from aerospace research to steel production.

Aerospace

Our instruments are used by the aerospace industry to carry out a vast range of procedures for aircraft inspection. Checks are made to detect flaws in wings, wheels, engines, bodies, gears, rotors and many other parts, giving manufacturers and users help in areas where in-service safety is absolutely critical.

Engineering structures

Assessing the integrity of structures such as oil rigs, bridges, ships, cranes and heat exchangers, helping to bring higher levels of quality and reliability to all aspects of heavy engineering.

Metals Industry

Hocking instruments are used daily by the metals industry for the inspection of rods and bars, ERW pipe, seamless pipe and extruded sections to

identify cracks, splits, lack of fusion etc. They are also used for alloy identification, metal sorting and for measuring the density of powder metal parts.

Hocking provide a full range of eddy current instruments, with probes for standard and special applications. They are designed to meet industry's most stringent standards and Hocking is registered to the highest international quality standard ISO9001.

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Choosing Eddy Current Probes

Eddy current testing is different from other non-destructive testing techniques in one important respect: the equipment used, in particular the probes, is specific to the inspection task. Eddy current testing is therefore inherently flexible. In order to get the best results, it is vitally important to choose the optimum equipment for each task.

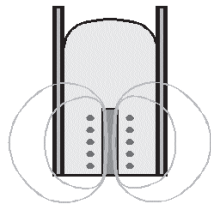
These notes are a guide to selecting probes from this catalogue. They explain:

- the different types of probe available;
- how to define your inspection task;
- the choices available in this catalogue;
- how to make your choice.

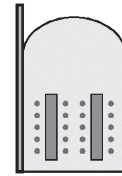
Types of probe

Absolute and differential

Absolute probes consist of a sensing coil which detects the response in the test piece. Absolute probes can detect both sharp and gradual changes in the test piece.

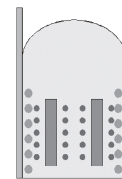


Differential probes contain two or more coils which are electrically arranged to be in opposition to each other. This arrangement minimises effects which act on both coils simultaneously (e.g. material variations, temperature). Signals which affect the coils differently are enhanced. Differential probes can therefore respond to sharp changes in the test piece but are insensitive to slow changes in material structure or long, continuous flaws.



Reflection probes

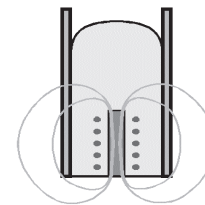
Reflection probes contain one set of coils which generates the primary field and a second set which senses the response in the test piece. The sensing coils can be absolute or differential.



Reflection probes offer a wide frequency band and a good signal to noise ratio.

Shielded and unshielded probes

The key difference between shielded and unshielded probes is the spread of the magnetic field generated. Unshielded probes generate a broad field so the test area can be scanned in fewer



passes. They are used to detect larger cracks and where the geometry of the test piece is constant.

In shielded probes the spread of the magnetic field is constricted by placing ferrite around the coils. The field is focused into a narrow beam below the probe. Shielded probes can therefore be used close to edges or where there are changes in geometry. They are also used where ferrous material is close to non-ferrous material.

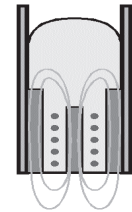


Table 1: Defining the inspection task

Options	Your Task
Identify the type of task: Defect detection/metal sorting/measuring extent of corrosion	
Describe the test piece: Plate/ tube/ section/ fasteners/ bolt holes/ weld	
Which area of the test piece will be inspected? Body/ near edges/ adjacent to different material	
Define the thickness of the test piece	
Is the cross-section of the area under test constant or varying? If varying, define the variation	
Define the type of material: Ferrous/ non-ferrous Magnetic/ non-magnetic Specify alloy type	
Describe surface condition of test piece: rough/smooth Coated/uncoated If coated, define coating type and thickness	
Describe the likely position of flaws of interest: Surface/sub-surface If sub-surface, define depth. Orientation	
Define the range of sizes of the flaws you are looking for: Length/width/depth	
Define the available access to the test piece: For tubes: internal/external - define diameter does probe require straight or angled handle? Lead length	
Define any special environmental conditions: High or low temperature/underwater/oily	
Specify instrument type and frequency settings	

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This catalogue contains details of probes for a variety of inspection tasks. The variations available are summarised in Table 2.

Table 2: Probe Choices				
Probe type	Choice			
	Frequency	Shielded/ unshielded	Diameter	Probe Style
Surface probes	✓	✓	✓	✓
Electrical conductivity	✓	⊗	✓	✓
Aircraft fasteners				
Low frequency	⊗	✓	✓	✓
Spot face	✓	⊗	✓	✓
Sliding probe	✓	⊗	✓	✓
FastScan	✓	⊗	✓	⊗
Bolt Holes				
Manual	✓	⊗	✓	✓
Rotating	✓	⊗	✓	✓
Thread inspection	✓	⊗	⊗	✓
WeldScan	✓	⊗	✓	✓
Tube inspection				
I.D.	✓	⊗	✓	✓
External	✓	⊗	✓	✓
Micro Probes	✓	✓	⊗	⊗
Metal Sorting	✓	⊗	⊗	✓
Static differential scanning	✓	✓	✓	✓

✓ - indicates choice available ⊗ - indicates no choice available

How to choose your probe

Your choice of probe depends on:

- the inspection task
- the component to be inspected
- the nature of the flaw
- access to the test piece
- the test environment

Table 2 shows that once you have defined the inspection task there are three possible choices involved in selecting a probe:

- frequency
- shielded or unshielded
- probe size and configuration

The aims when selecting a probe are:

- to ensure that an eddy current of sufficient strength passes through the volume of the component under inspection;
- to maximise the signal caused by flaws of interest;
- to minimise effects caused by other features (e.g. edges);
- to optimise the display for phase plane instruments.

Frequency

The key decision when selecting a probe is to identify the optimum frequency. The choice is based on:

- the material under inspection
- the location of the flaws of interest
- the equipment used
- the display required

The frequencies quoted in the catalogue are centre band frequencies. Probes will operate efficiently between 1/3 and three times the quoted centre band frequency for bridge configured probes.

Frequency determines the depth of eddy current penetration into the material being tested. As frequency increases, penetration decreases. Higher frequency probes are used to detect surface breaking cracks. Lower frequency probes are used to detect sub-surface cracks.

There are three steps to determining the optimum frequency:

1. Use the graph on page 42 to select the frequency based on the material being tested and the likely location of flaws.
2. Check that the frequency chosen is compatible with the equipment you are using.
3. Occasionally with low conductivity, non-ferrous materials, the angle between the

lift-off signal and flaw signal is too small to give a clear display. Increasing the frequency should optimise the display.

Shielded or unshielded

The difference between shielded and unshielded probes is the spread of the magnetic field that they produce. The choice of probe is based on the geometry of the test piece and the configuration of the area under test.

Use shielded probes when inspecting any of the following areas:

- near edges
- changing cross-section
- non-ferrous material adjacent to ferrous material

or

- when looking for short flaws.

Use unshielded probes when:

- the cross-section is constant
- looking for longer cracks

All other things being equal unshielded probes will scan an area in less passes than a shielded probe.

Probe diameter and configuration

The choice of probe design is dictated by the available access to the test piece. Choose the argest probe that access permits to give the best signal.

Threaded probes are machined to order. Please supply details of the exact configuration and tolerances of the thread you wish to inspect.

Probes are available in a range of diameters, tip angles and shaft angles.

Environment

Probes can be adapted to withstand a variety of different service conditions such as high or low temperatures, oily surfaces or for underwater use. Probe tips can be protected to prevent wear when inspecting rough surfaces.

Leads

Once you have selected your probe, use the tables on pages 45 and 47 to choose the correct lead. In some cases leads are available in lengths of 100m or more. Contact Hocking to discuss any special requirements.

Special probes

If the probes in this catalogue do not meet your particular needs, Hocking will be pleased to discuss the production of special probes tailored to your inspection task. For more advice, contact your distributor.

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Ordering Eddy Current Probes

Choosing a probe

1. Identify which instrument you wish to use the probe with.
2. Identify which frequency you wish to inspect at.
3. Decide whether you require an absolute or differential probe.
4. Define the probe geometry – access to the appropriate area to be inspected will often determine the shape and size necessary.
5. Decide if the probe needs to be shielded.

Frequency

Eddy current probes operate over a band of frequencies. This depends on the probe and the instrument with which they are being used. Frequencies marked on the probe indicate the setting for best performance.

Best performance on impedance plane instruments used in bridge mode is generally achieved at a frequency (f) at which the probe's impedance (Z_p) has a similar value to the instrument bridge impedance (Z_I). The Phasec 2200 is 50 Ohms.

Probe inductances (L) are given in the tables to enable Z_p to be calculated for any frequency (f). $Z_p = 2\pi fL$ ohms. In most cases the winding resistance has little effect and can be ignored.

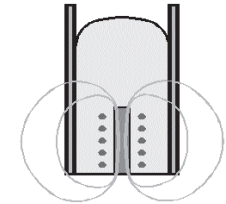
High frequency probes are appropriate for surface crack detection.

Low frequencies are appropriate for penetration of non-ferrous materials, e.g. for the detection of the sub-surface cracks or corrosion. Lower frequency allows greater penetration. Low frequency probes tend to be larger than high frequency probes. Low frequency probes are not as sensitive to short shallow cracks as they create a larger eddy current field.

Sensor Formats

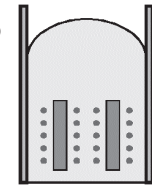
Absolute

Probes consisting of a single coil (or winding) interrogating the test piece which respond to all changes in material, heat treatment, shape, etc. Changes of a gradual nature are detected, as well as sharp discontinuities.



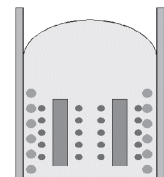
Differential

Probes with two or more balanced windings generally in the same area of the test piece. Designed to respond selectively to sharp changes in the test piece, e.g. cracks, they are insensitive to slow changes of material or geometry and long continuous defects. In the case of the encircling coils used for material sorting or comparison purposes the coils are separated with one loaded with an 'unknown' part while the other has the 'unknown' part placed in it.



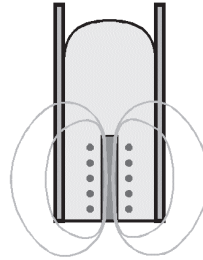
Reflection

Probes in which a sense coil/s (pick-up/s) near the test piece detects the eddy current field reflected from it. The eddy currents are created by a driver coil situated around or near the pick-up coil(s). These probes are usually differential, but can be absolute, with a balance coil situated remote from the test piece also surrounded by, or adjacent to, a similar driver coil to ensure an accurate balance. Their principle advantage is a wide frequency band and a good signal to noise ratio.



Unshielded

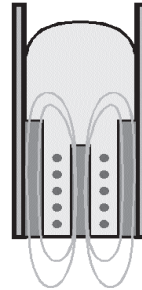
These probes are lower in cost and produce a broader eddy current field than shielded probes. They are more tolerant of lift-off and probe angle changes and require less passes to scan an area due to their broad field. This is a benefit when only larger cracks are of interest and where the inspection area is uniform.



Shielded

The sideways spread of the eddy current field is restricted by placing shielding around the sensor. This focuses the field into a narrow beam at the end of the sensor. It is thus more sensitive to short cracks, unaffected by edges, geometry changes, adjacent ferrous materials and can operate close to edges. This narrow field means that closer scans are required to cover a given area.

Shielded probes should always be considered for work on or near edges, angles, etc. or for inspecting non-ferrous materials adjacent to ferrous materials, e.g. wing skins around and near ferrous fasteners.



Dimensions

The dimensions may be rounded for convenience or brevity. In those cases where a particular dimension is important an accurate figure or drawing can be supplied on request. The drawings in these documents are not necessarily to scale.

Hocking NDT Ltd pursues a policy of continuous product development and improvement, specifications are therefore, liable to change without notice.

If you have any questions about the range of Hocking eddy current probes and accessories, or you would like to place an order, please contact your local Hocking representative. If you would like to discuss your special probe requirements in more detail, please contact us directly.

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or visit our web site: <http://www.hocking.com>

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Special Probe Design Checklist

SECTION 1. (Contact details)

Name: Company: Address:
 Telephone: Fax:
 E-mail:

Is there a similar probe to the one you require, in the probe catalogue? Yes No (Tick appropriate check boxes)

If yes please specify Hocking No.: and alteration details required:
 (Complete this section only)

SECTION 2. (Flaw to detect)

Material to be tested:
 Surface Subsurface Both
 Depth of penetration required: mm
 Typical size of Flaw: mm (length)
 mm (depth)
 Minimum Flaw size to be detected: .. mm (length)
 mm (width)
 mm (depth)
 Orientation of Flaw:

SECTION 3. (Instrument/Connection type)

Phasec 1.1 D60
 Phasec 2200 D62
 Locator Quickcheck
 Mini Phasec Other
 If other please specify:

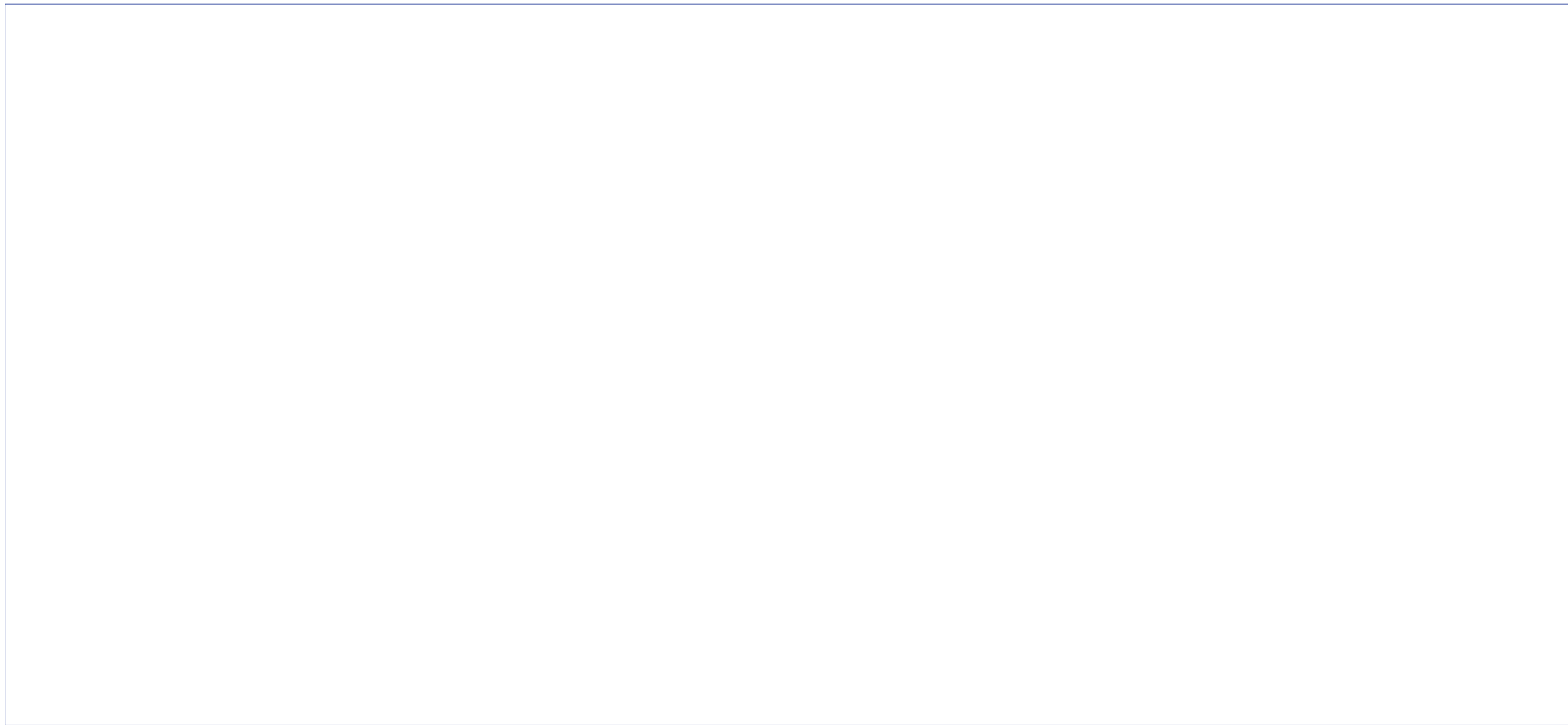
Preferred method of connection:
 (i.e. Connector Type, Cable length, special Cable etc.)

SECTION 4. (Probe type)

- | | | | | | | | |
|------------|--------------------------|---------------|--------------------------|---------------|--------------------------|----------------|--------------------------|
| Absolute: | <input type="checkbox"/> | Differential: | <input type="checkbox"/> | Reflection: | <input type="checkbox"/> | Weld Probe: | <input type="checkbox"/> |
| I/D Probe: | <input type="checkbox"/> | O/D Probe: | <input type="checkbox"/> | Remote Field: | <input type="checkbox"/> | To be Advised: | <input type="checkbox"/> |

SECTION 5. (Diagram)

Use the space below to sketch your requirements. Include details of probe mounting, working length required and any possible obstructions to scan path.



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Shielded Surface Probes 1

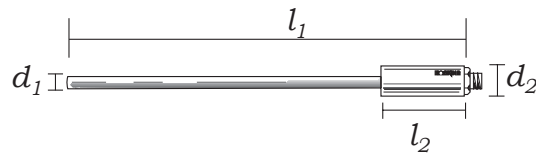
Application

Absolute probes for general purpose inspection.

Features

Double shielded probes with a stainless steel shaft and a choice of normal or 90° tip. Micro connector.

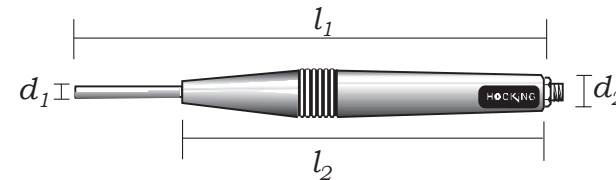
① Straight with metal handle



d_2	l_1	l_2	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	6MHz <i>NFe</i>
6.35	38	30	100P1	101P1	102P1	103P1
6.35	76	30	100P3	101P3	102P3	103P3
L (μH)			120	47	8.2	1.3
d_1			4.45	4.45	3.30	2.34
d_1^* min			3.3	3.3	2.34	–
Price			CC	CC	CC	CC

*add F to the end of the probe number (eg 100P3F).

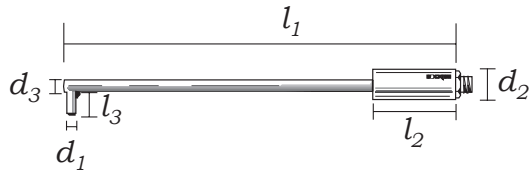
② Straight with Delrin handle



d_2	l_1	l_2	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	6MHz <i>NFe</i>
9.5	114	86	104P4	105P4	106P4	107P4
9.5	152	86	104P6	105P6	106P6	107P6
9.5	203	86	104P8	105P8	106P8	107P8
9.5	254	86	104P10	105P10	106P10	107P10
9.5	305	86	104P12	105P12	106P12	107P12
L (μH)			120	47	8.2	1.3
d_1			4.45	4.45	3.30	2.34
d_1^* min			3.3	3.3	2.34	–
Price			CC	CC	CC	CC

*add F to the end of the probe number (eg 104P12F).

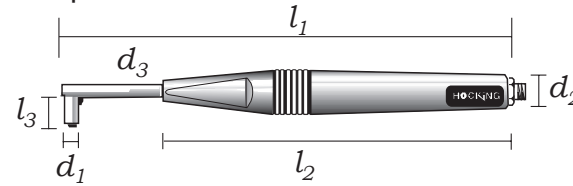
3 90° Tip with Metal Handle



d_2	l_1	l_2	l_3	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	6MHz <i>NFe</i>
6.35	51	30	min	300P12	301P12	302P12	303P12
6.35	51	30	6	300P22	301P22	302P22	303P22
6.35	51	30	13	300P32	301P32	302P32	303P32
6.35	51	30	19	300P42	301P42	302P42	303P42
6.35	51	30	25	300P52	301P52	302P52	303P52
6.35	76	30	min	300P13	301P13	302P13	303P13
6.35	76	30	6	300P23	301P23	302P23	303P23
6.35	76	30	13	300P33	301P33	302P33	303P33
6.35	76	30	19	300P43	301P43	302P43	303P43
6.35	76	30	25	300P53	301P53	302P53	303P53
L (μH)				120	47	8.2	1.3
d_1				4.45	4.45	3.30	2.34
d_3				3.3	3.3	3.3	3.3
l_3 min				5	5	2.7	1.7
d_1^* min				3.3	3.3	2.34	—
Price				CE	CE	CE	DA

*add F to the end of the probe number (eg 300P53F). Price DA.

4 90° tip with Delrin Handle



d_2	l_1	l_2	l_3	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	6MHz <i>NFe</i>
9.5	114	86	min	308P14	309P14	310P14	311P14
9.5	114	86	6	308P24	309P24	310P24	311P24
9.5	114	86	13	308P34	309P34	310P34	311P34
9.5	114	86	19	308P44	309P44	310P44	311P44
9.5	114	86	25	308P54	309P54	310P54	311P54
9.5	152	86	min	308P16	309P16	310P16	311P16
9.5	152	86	6	308P26	309P26	310P26	311P26
9.5	152	86	13	308P36	309P36	310P36	311P36
9.5	152	86	19	308P46	309P46	310P46	311P46
9.5	152	86	25	308P56	309P56	310P56	311P56
9.5	203	86	min	308P18	309P18	310P18	311P18
9.5	203	86	6	308P28	309P28	310P28	311P28
9.5	203	86	13	308P38	309P38	310P38	311P38
9.5	203	86	19	308P48	309P48	310P48	311P48
9.5	203	86	25	308P58	309P58	310P58	311P58
9.5	254	86	min	308P110	309P110	310P110	311P110
9.5	254	86	19	308P410	309P410	310P410	311P410
9.5	305	86	min	308P112	309P112	310P112	311P112
9.5	305	86	19	308P412	309P412	310P412	311P412
L (μH)				120	47	8.2	1.3
d_1				4.45	4.45	3.30	2.34
d_3				3.3	3.3	3.3	3.3
l_3 min				5	5	2.7	1.7
d_1^* min				3.3	3.3	2.34	—
Price				CE	CE	CE	DA

*add F to the end of the probe number (eg 308P412F). Price DA.

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Shielded Surface Probes 2

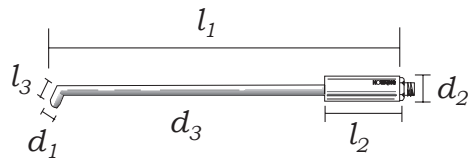
Application

Absolute probes for general purpose inspection.

Features

Double shielded probes with a stainless steel shaft.
Available with a 45° crank or a 15° crank with a 90° tip. Micro connector.

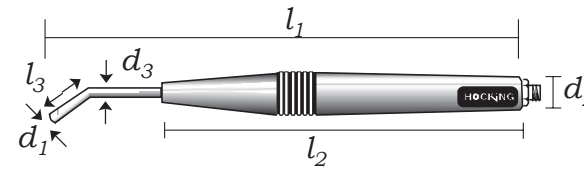
① 45° Crank with Metal handle



d_2	l_1	l_2	l_3	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	6MHz <i>NFe</i>
6.35	51	30	13.4	200P2	201P2	202P2	203P2
6.35	76	30	13.4	200P3	201P3	202P3	203P3
L (μH)				120	47	8.2	1.3
d_1				4.45	4.45	3.30	2.34
d_3				3.3	3.3	3.3	3.3
d_1^* min				3.3	3.3	2.34	–
Price				CE	CE	CE	DA

*add F to the end of the probe number (eg 200P3F). Price DA.

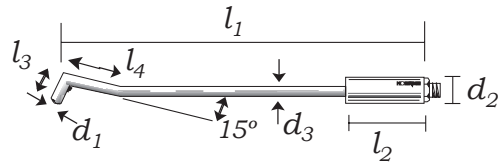
② 45° Crank with Delrin handle



d_2	l_1	l_2	l_3	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	6MHz <i>NFe</i>
9.5	114	86	13.4	204P4	205P4	206P4	207P4
9.5	152	86	13.4	204P6	205P6	206P6	207P6
9.5	203	86	13.4	204P8	205P8	206P8	207P8
9.5	254	86	13.4	204P10	205P10	206P10	207P10
9.5	305	86	13.4	204P12	205P12	206P12	207P12
L (μH)				120	47	8.2	1.3
d_1				4.45	4.45	3.30	2.34
d_3				3.3	3.3	3.3	3.3
d_1^* min				3.3	3.3	2.34	–
Price				CE	CE	CE	DA

*add F to the end of the probe number (eg 204P12F). Price DA.

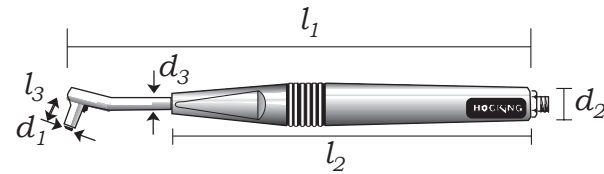
3 15° Crank, 90° Tip with Metal Handle



d_2	l_1	l_2	l_3	l_4	200kHz Fe & NFe	500kHz Fe & NFe	2MHz NFe	6MHz NFe
6.35	51	30	min	15	304P12	305P12	306P12	307P12
6.35	51	30	6.5	15	304P22	305P22	306P22	307P22
6.35	51	30	13	15	304P32	305P32	306P32	307P32
6.35	51	30	19	15	304P42	305P42	306P42	307P42
6.35	51	30	25	15	304P52	305P52	306P52	307P52
6.35	76	30	min	25	304P13	305P13	306P13	307P13
6.35	76	30	6.5	25	304P23	305P23	306P23	307P23
6.35	76	30	13	25	304P33	305P33	306P33	307P33
6.35	76	30	19	25	304P43	305P43	306P43	307P43
6.35	76	30	25	25	304P53	305P53	306P53	307P53
L (μH)					120	47	8.2	1.3
d_1					4.45	4.45	3.30	2.34
d_3					3.3	3.3	3.3	3.3
l_3 min					5	5	2.7	1.7
d_1^* min					3.3	3.3	2.34	–
Price					CE	CE	CE	DA

*add F to the end of the probe number (eg 204P12F). Price DA.

4 15° Crank, 90° tip with Delrin Handle



d_2	l_1	l_2	l_3	l_4	200kHz Fe & NFe	500kHz Fe & NFe	2MHz NFe	6MHz NFe
9.5	114	86	min	15	312P14	313P14	314P14	315P14
9.5	114	86	6.5	15	312P24	313P24	314P24	315P24
9.5	114	86	13	15	312P34	313P34	314P34	315P34
9.5	114	86	19	15	312P44	313P44	314P44	315P44
9.5	114	86	25	15	312P54	313P54	314P54	315P54
9.5	152	86	min	25	312P16	313P16	314P16	315P16
9.5	152	86	6.5	25	312P26	313P26	314P26	315P26
9.5	152	86	13	25	312P36	313P36	314P36	315P36
9.5	152	86	19	25	312P46	313P46	314P46	315P46
9.5	152	86	25	25	312P56	313P56	314P56	315P56
9.5	203	86	min	25	312P18	313P18	314P18	315P18
9.5	203	86	6.5	25	312P28	313P28	314P28	315P28
9.5	203	86	13	25	312P38	313P38	314P38	315P38
9.5	203	86	19	25	312P48	313P48	314P48	315P48
9.5	203	86	25	25	312P58	313P58	314P58	315P58
L (μH)					120	47	8.2	1.3
d_1					4.45	4.45	3.30	2.34
d_3					3.3	3.3	3.3	3.3
l_3 min					5	5	2.7	1.7
d_1^* min					3.3	3.3	2.34	–
Price					CE	CE	CE	DA

*add F to the end of the probe number (eg 204P12F). Price DA.

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Unshielded Surface Probes

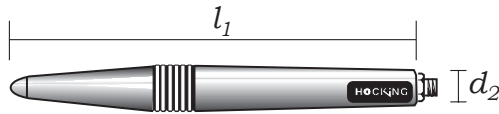
Application

Absolute unshielded surface probes are broad field probes which are most effective when used away from edges and sharp changes of geometry. Used extensively in the Aerospace industry.

Features

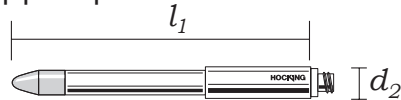
All probes are fitted with a micro connector.

1 Delrin general purpose pencil probe



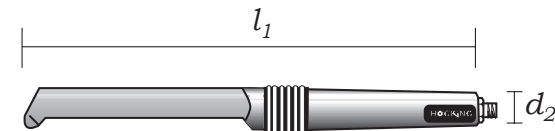
d_2	l_1	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	2MHz <i>Fe</i>	6MHz <i>NFe</i>	6MHz <i>Fe</i>
9.5	100	120P1A	121P1A	122P1A	123P1A	124P1A	125P1A
L (μH)		120	47	8.2	8.2	1.3	1.3
Price		BD	BD	BD	BD	BD	BD

2 Delrin tip pencil probe with stainless steel shank and handle



d_2	l_1	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	2MHz <i>Fe</i>	6MHz <i>NFe</i>	6MHz <i>Fe</i>
4	38	120P1D	121P1D	122P1D	123P1D	124P1D	125P1D
4	50	120P2D	121P2D	122P2D	123P2D	124P2D	125P2D
4	76	120P3D	121P3D	122P3D	123P3D	124P3D	125P3D
L (μH)		120	47	8.2	8.2	1.3	1.3
Price		BE	BE	BE	BE	BE	BE

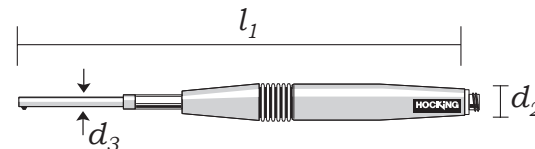
3 Delrin 65° angle tip knife probe



d_2	l_1	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	2MHz <i>Fe</i>	6MHz <i>NFe</i>	6MHz <i>Fe</i>
9.5	133	350P1A	351P1A	352P1A	353P1A	354P1A	355P1A
L (μH)		120	47	8.2	8.2	1.3	1.3
Price		BE	BE	BE	BE	BE	BE

4 Delrin 90° angle tip knife probe

d_2	d_3	l_1	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	2MHz <i>Fe</i>	6MHz <i>NFe</i>	6MHz <i>Fe</i>
9.5	3	133	-	-	352P1B	-	354P1B	355P1B
L (μH)			-	-	8.2	-	1.3	1.3
Price					EA		EA	EA



Industrial Broad Band Unshielded Probes

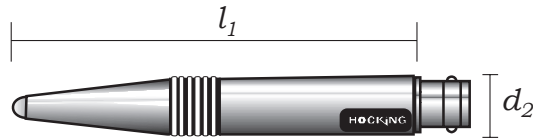
Application

This is a range of absolute heavy duty probes for general industrial use with impedance plane instruments only

Features

All probes are made from Delrin and fitted with BNC connector. The range extends from high to relatively low frequencies, optimised for each frequency range.

1 Standard Series



l_1	d_2	500kHz to 4MHz	150kHz to 1MHz	35kHz to 250kHz	7kHz to 60kHz	2kHz to 15kHz
100	12.7	130P1	130P2	130P3	130P4	130P5
L (μ H)		5.6	22	82	390	1500
Price		CA	CA	CA	CA	CA
Balance Load		5A001	5A002	5A003	5A104	5A115

Special Unshielded Probes

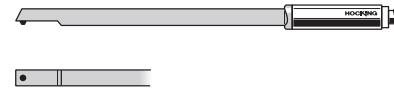
Application

Absolute unshielded probes built to special order for user defined geometry. Please quote this page number and figure number plus your instrument type, test frequency, test material and probe length.

Features

The following are examples of special probes.

2 Metal handle probe with 4mm square section Delrin shank



3 Delrin probe with core tip at 50° for chamfer inspection



4 Delrin knife probe with 90° Tip



5 Delrin probe with parallel handle for probe holder



6 Delrin tip with metal shank available in long lengths



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Surface Inspection and Sorting

Spot Face Probes

Application

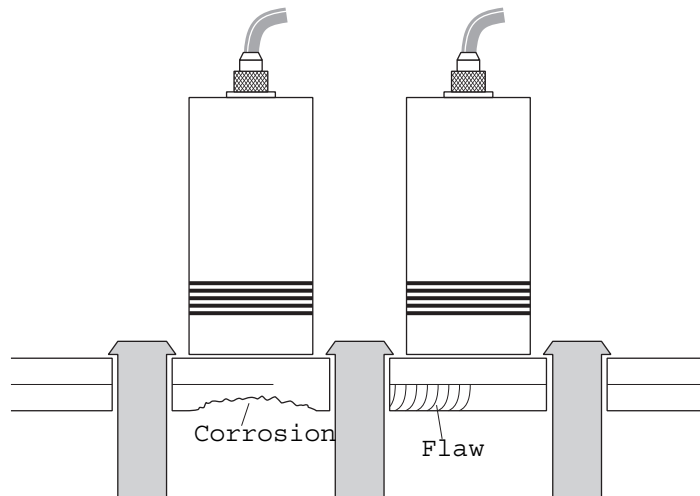
Detection of sub-surface corrosion and other flaws. Excellent depth penetration.

Features

Absolute - Reflection. Has a magnetic core for focused penetration through several layers of test material. Compatible with most phase plane instruments. 4 way Lemo connector. Lower frequencies achieve greater penetration.

Cables

For Phasec 2200, D60, D62 use probe cable 33A130 (1.5m) or 33A171 (2m). For other cables see page 36.



1 Metal body with tapered tip

d_1	l_1	Freq	Probe
7	48	1kHz-100kHz	700P07A
8	48	1kHz-100kHz	700P08A
Price			EC



2 Delrin Body

d_1	l_1	Freq	Probe
11	45	300Hz-100kHz	700P11A
12.7	45	200Hz - 200kHz	700P13A
16	45	300Hz-100kHz	700P16A
24	58	80Hz-60kHz	700P24A
32	60	80Hz-60kHz	700P32A
Price			EA



Metal Sorting

Application

General metal sorting.

Features

A sprung core assembly fitted to a double vee block provides constant perpendicular pressure on both flat and curved surfaces.

Note

Sprung guides are also available for use with a standard pencil probe for metal sorting - see **Leads and Accessories 1** - *Probe Accessories*.



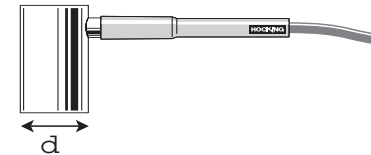
Flat Surface Probes

Application

Metal sorting and general surface inspection.

Features

Absolute probes. Stainless steel body provides semi-shielding. An integral load reduces thermal effects. Fitted with integral leads terminated with a 6 pin Jaeger connector.



	80kHz	150kHz	200kHz	300kHz	500kHz	2MHz
Material						
Fe & NFe	806P3	806P2	807P1	806P1	-	-
Fe	-		-	-	808P2	809P2
NFe			-	-	808P1	809P1
Price	DA	DA	DA	DA	DA	DA
L (μH)	100	47	120	27	47	8.2

Diameter <i>d</i>	Frequency	Probe with integral lead	L (μH)
12.7	500kHz-4MHz	720P1F1	5.6
12.7	250kHz-2MHz	720P1F2	12
12.7	50kHz-400kHz	720P1F3	56
12.7	5kHz-40kHz	720P1F4	560
12.7	1.5kHz-10kHz	720P1F5	3900
19	250kHz-2MHz	720P2F2	12
19	50kHz-400kHz	720P2F3	56
19	5kHz-40kHz	720P2F4	560
19	1.5kHz-10kHz	720P2F5	3900
Price		DA	

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Electrical Conductivity

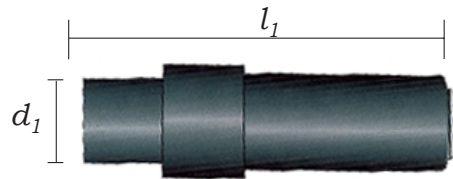
Electrical Conductivity Probes

Application

Electrical conductivity measurement of non-ferrous metals. Alloy identification and verification, the verification of heat treatment during manufacture and to detect in-service heat damage, detection of changes in material grade, for metal sorting and to determine the density of powder metal parts.

Features

For operation with Hocking AutoSigma 3000, Phasec 2200, Phasec D62, and Phasec D60 instruments. Lemo 4 way.



Ref. No.	Frequency	d_1	Style	l_1	Price
*47P001	60kHz/500kHz	12.7	Straight	57	KA
47P002	500kHz	8.0	Straight	57	KA
*47P003	60kHz/500kHz	12.7	90° Tip	26.2	LA
47P004	500kHz	8.0	90° Tip	27	LA

Connecting leads:

47A001 1.5m lead for AutoSigma 3000
 *33A135 or 1.5m lead for Phasec 2200/D62/D60
 33A170

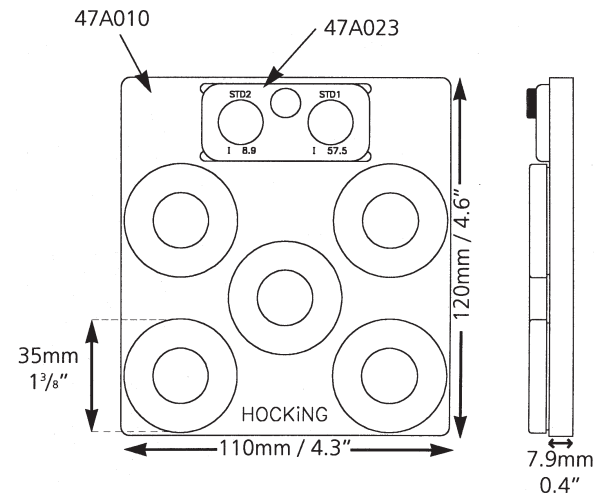
*for use with 47P001 or 47P003 at 60kHz only

Operating Reference Blocks

Conductivities

Nominal values. Precise values will be shown on the blocks.

%IACS	M Sm^{-1}	Material	PRN	Price
1	0.58	Ti 2TA7	47A011	CD
2	1.2	Stainless Steel 303S	47A012	CD
9	5	Nickel Silver LC1291	47A013	CD
17	10	P/Bronze	47A014	CD
24	14	Brass LM5681	47A015	CD
28	16	Al 5083	47A016	CD
34	20	Al 7075-TF	47A017	CD
38	22	Al 2014A-T6	47A024	CD
43	25	Al 6061-TF	47A018	CD
47	27	Al 6082-TF	47A019	CD
60	35	Al 1200-H4	47A020	CD
89	52	CuCr/CuZr LC639	47A021	CD
100	58	Cu	47A022	CD
9 & 58	5 & 34	Dual Ref. Sample	47A023	CD
N/A	N/A	5 Sample Holder	47A010	CD
N/A	N/A	3 Sample Holder	47A025	CA



Conductivity Correction for Curved Surfaces

Conductivity correction factors for round Aluminium alloy bars and tubes.
For use with the Hocking AutoSigma 3000.

Test Piece Diameter	Factor for 47P001		Factor for 47P002
	At 60kHz	At 500kHz	At 500kHz
6.4	–	–	0.792
9.5	0.756	0.773	0.882
12.7	0.837	0.841	0.927
19	0.902	0.904	0.957
25.4	0.933	0.933	0.972
38	0.960	0.960	0.981
51	0.972	0.970	0.987
63.5	0.978	0.975	0.991
76	0.980	0.979	0.992
89	0.984	0.984	0.993
102	0.985	0.986	0.995
127	0.989	0.992	0.996

AutoSigma 3000 Reading ÷ Factor = Corrected Value

Full tables are available from Hocking on request.

Minimum Test Piece Thickness for Aluminium alloys

Freq	Min. test piece thickness
60kHz	1.5mm
500kHz	0.5mm

Conductivity of Common Materials

	IACS	MSm ⁻¹
Silver (pure)	107	62
Copper Annealed	100	58
Gold	78	45
Aluminium (pure)	65	38
Brass (Cu-Zn) 5% Zn	55	32
Aluminium Alloys	25-60	15-35
Magnesium	39	23
Brass (Cu-Zn) 15% Zn	37	21
Molybdenum	33	19
Al 7075-76	32	18.5
Tungsten	32	18.5
Al 2024-74	30	17.5
Zinc	29	17
Brass (Cu-Zn) 30% Zn	28	16
Brass + Lead	12-25	7-14.5
Magnesium Bronze	24	14
Beryllium Copper	24	14
Cu/Ni (90/10)	12	7
Lead	8	4.5
Cu/Ni (70/30)	5	3
Zirconium	4	2.5
Stainless Steel	2.5	1.5
Titanium	1-4	0.5-2.5
Inconel 600	1	0.58

$$\%IACS = MSiemens\ m^{-1} \times 0.58$$

$$MSiemens\ m^{-1} = \% IACS \times 1.724$$

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Fastener Inspection - Standard

Low Frequency Ring (Donut)

Application

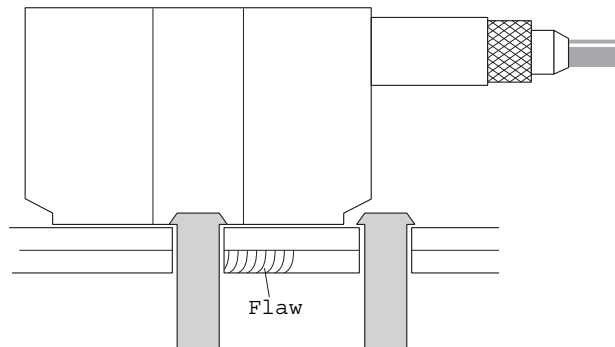
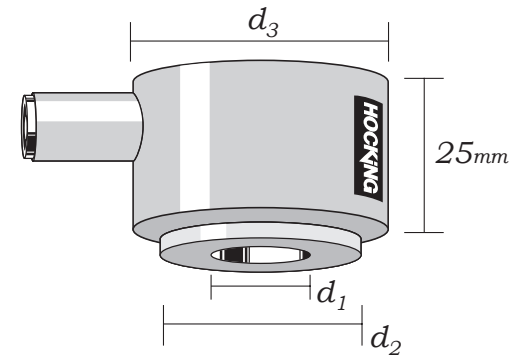
To detect surface and sub-surface flaws around aircraft fastener holes without removal of the fastener. These absolute reflection probes will penetrate several layers of non-ferrous material with good sensitivity.

Features

Absolute - Reflection. Compatible with most phase plane instruments. 4 way Lemo connector. Lower frequencies achieve greater penetration.

Connectors

For Phasec 2200, D60, D62 use probe lead 33A130, 33A171 or 33A141. For other leads see page 36.



d_1	d_2	d_3	Freq	Probe	Price
5	16	24	250Hz-40kHz	702P05A	FA
8	22	30	250Hz-40kHz	702P08A	FA
10	22	30	250Hz-40kHz	702P10A	FA
13	29	37	80Hz-50kHz	702P13A	FA
13	32	40	80Hz-50kHz	702P13B	FA
14	29	37	80Hz-50kHz	702P14A	FA
15	31	39	80Hz-50kHz	702P15A	FA
16	29	37	80Hz-50kHz	702P16A	FA
16	40	40	80Hz-50kHz	702P16B	FA
20	38	46	80Hz-50kHz	702P20A	FA
28	44	52	80Hz-50kHz	702P28A	FA

Sliding probes, Dual element

Application

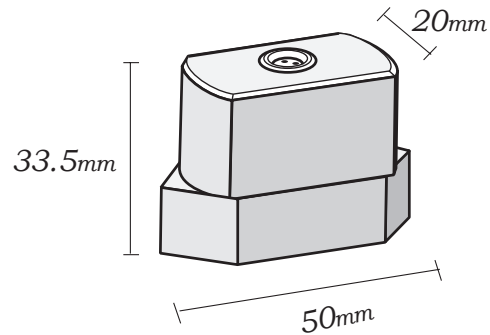
To slide along rows of fasteners on aircraft wing skins and other similar structures. Detect cracks and corrosion on or near the surface around fasteners and, at low frequencies, in deeper layers under the skin.

Features

Reflection probe. Contains a transmitter element and a receiver element housed inside the block. The underside of the block is, in some cases, relieved to slide over raised fasteners. 4 way Lemo connector. May be used with standard reflection probe leads.

1 – General purpose dual element sliding probe

Probe Number : 851P001
Price Band : HB
Frequency Range : 400Hz-50kHz
Fastener Head Size : 11 mm and below



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Fastener Inspection - FastScan

FastScan, Multi-element

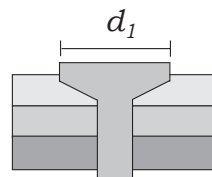
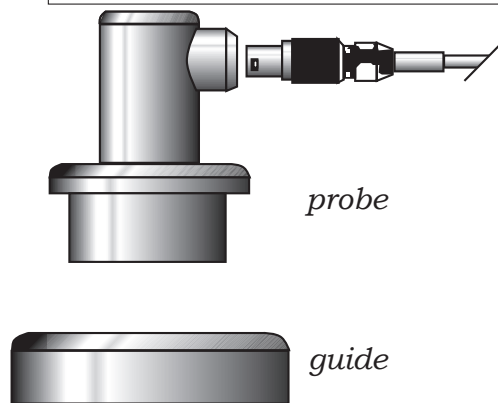
Application

Finding cracks around fasteners in multi-layer structures. Unwanted signals are mixed out and the display is simplified for easy interpretation of crack severity and location. FastScan probes detect cracks under the heads of all common fasteners in sub-layers. FastScan probes can detect 1mm cracks in the second layer beneath a 2.5mm thick skin.

Features

For use with cable 33A130 on the Phasec 2200 or D62 multi frequency units. Consists of a probe unit and a guide unit. Lemo 4 way connector.

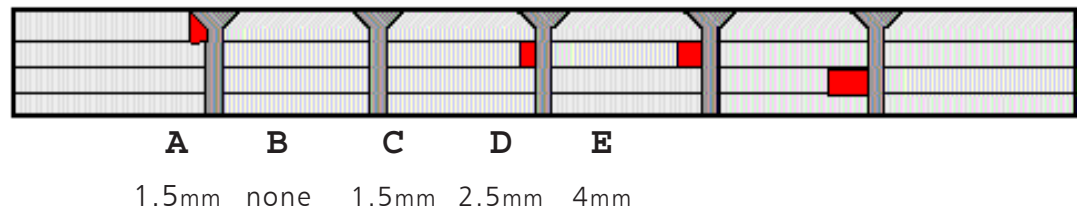
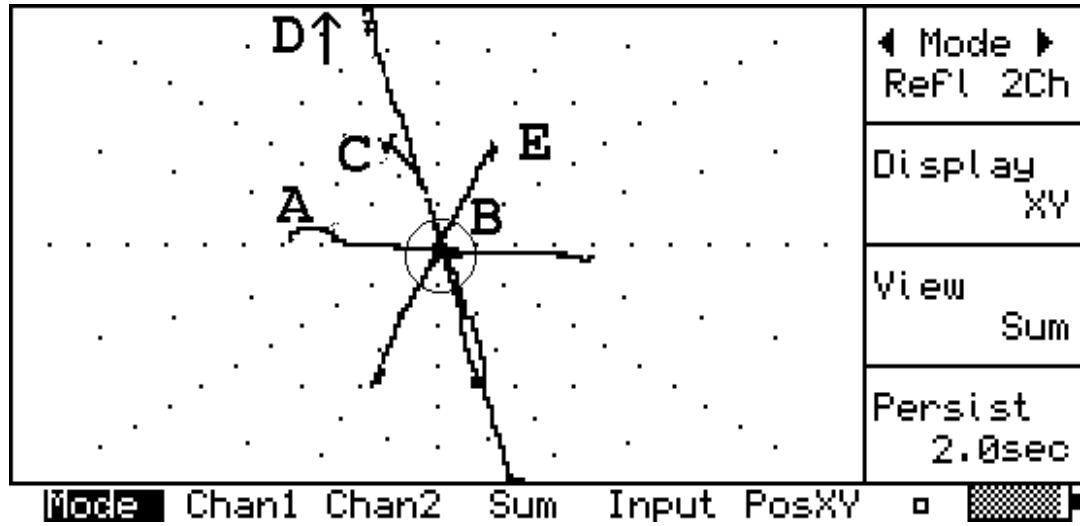
Probe	Price	Freq	d_1	Guide	Price
851P103	SB	200 - 30k	4 - 5.5	851A001	CB
851P100	SB	200 - 30k	6 - 8	851A004	CB
851P101	SB	200 - 30k	9 - 13	851A009	CB
851P102	SB	200 - 30k	14 - 18	851A024	CB



FastScan Inspection Method for Phasec 2200

1. Choose a probe and guide slightly larger than the in-situ fasteners.
2. Calculate Frequency (F_0) to give standard depth of penetration for the conductivity of the material to be inspected (see page 42).
3. Set Frequency (F_1) of Channel 1 (CH1) at $3 \times F_0$.
4. Set Frequency (F_2) of Channel 2 (CH2) at $6 \times F_0$.
5. Position guide centrally around fastener and hold firmly in position.
6. Insert probe into guide and rotate CW and CCW repeatedly.
7. Adjust gain on CH1 to give 3 to 4 divisions of spot movement.
8. Set to CH2 and adjust gain to give same spot movement.
9. Record signals on Phasec 2200 (see operating instructions).
10. Automix signals. Flawless material now gives small spot deflections.
11. Display mixed signal (Sum).
12. Move guide and probe to inspect around fastener on test sample. As probe is rotated flaws will be shown by deflections of spot on screen. Phase angle of deflection indicates depth of cracked layer. Amplitude indicates crack severity at that depth.
13. Adjust gains and remix if required to improve sensitivity and optimise noise performance.
14. Set-up may may be stored for future inspections (see operating instructions).

Flaw signals from multi-layer test block 33A094.



Test Settings
 Probe 851P100 F₁: 500Hz F₂: 3kHz

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Hole Inspection - Manual

Bolt Hole probes

Application

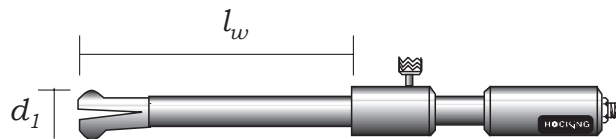
Inspection of the bore of bolt holes for cracks and corrosion. Hand operated.

Features

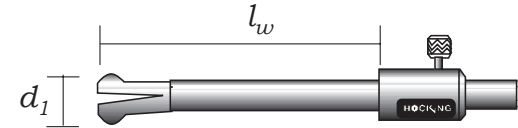
All probes have a Delrin tip. Flexible probes allow inspection when access is not directly in line with the hole. Micro connector.

① Rigid Bolt Hole probes 3.2 to 7mm

d_1	l_w	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	Price
3.2	76	501P08	503P08	504P08	CC
3.6	76	501P09	503P09	504P09	CC
3.9	76	501P10	503P10	504P10	CC
4.3	76	501P11	503P11	504P11	CC
4.5-5.5	76	501P12	503P12	504P12	CC
5.5-6.5	76	501P14	503P14	504P14	CC
6.0-7.0	76	501P16	503P16	504P16	CC
7.0-8.0	76	501P18	503P18	504P18	CC
L (μH)		120	47	8.2	

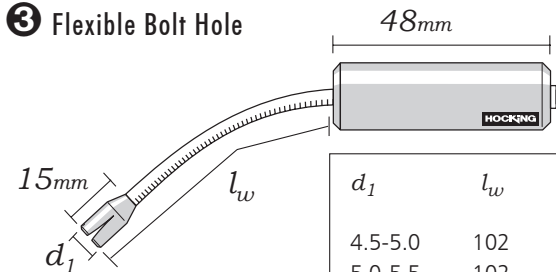


② Rigid Bolt Hole probes 7.5 to 11mm



d_1	l_w	200kHz <i>Fe & NFe</i>	500kHz <i>Fe & NFe</i>	2MHz <i>NFe</i>	Price
7.5-9.0	76	501P20	503P20	504P20	CC
8.5-10	76	501P22	503P22	504P22	CC
9.5-11	76	501P24	503P24	504P24	CC
10-11.5	76	501P26	503P26	504P26	CC
11-12.5	76	501P28	503P28	504P28	CC
L (μH)		120	47	8.2	

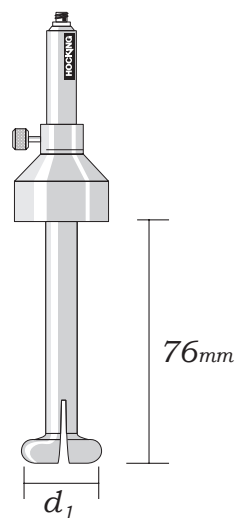
③ Flexible Bolt Hole



d_1	l_w	2MHz <i>NFe</i>	Price
4.5-5.0	102	524P12	DB
5.0-5.5	102	524P13	DB
5.5-6.0	102	524P14	DB
6.0-6.5	102	524P16	DB
6.5-7.0	102	524P17	DB
7.0-7.5	102	524P18	DB
7.5-8.0	102	524P20	DB
8.0-8.5	102	524P21	DB
8.5-9.0	102	524P22	DB
9.0-9.5	102	524P23	DB
9.5-10	102	524P24	DB
10-10.5	102	524P26	DB
L (μH)		8.2	

4 Rigid Bolt Hole probe 11.5 to 38mm

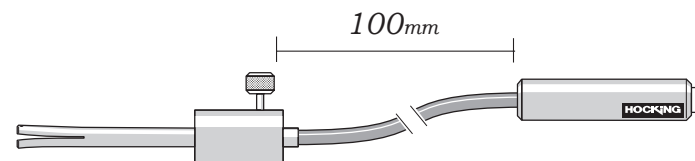
d_1	200kHz <i>Fe/NFe</i>	500kHz <i>Fe/NFe</i>	2MHz <i>NFe</i>	Price
11.5	501P30	503P30	504P30	CE
12.5	501P32	503P32	504P32	CE
13	501P34	503P34	504P34	CE
14	501P36	503P36	504P36	CE
15	501P38	503P38	504P38	CE
15.5	501P40	503P40	504P40	CE
16.5	501P42	503P42	504P42	CE
17	501P44	503P44	504P44	CE
18	501P46	503P46	504P46	CE
19	501P48	503P48	504P48	CE
19.5	501P50	503P50	504P50	CE
20.5	501P52	503P52	504P52	CE
21	501P54	503P54	504P54	CE
22	501P56	503P56	504P56	CE
23	501P58	503P58	504P58	CE
23.5	501P60	503P60	504P60	CE
24.5	501P62	503P62	504P62	CE
25	501P64	503P64	504P64	CE
26	501P66	503P66	504P66	CE
26.5	501P68	503P68	504P68	CE
27.5	501P70	503P70	504P70	CE
28.5	501P72	503P72	504P72	CE
29	501P74	503P74	504P74	CE
30	501P76	503P76	504P76	CE
30.5	501P78	503P78	504P78	CE
31.5	501P80	503P80	504P80	CE
32.5	501P82	503P82	504P82	CE
33	501P84	503P84	504P84	CE
34	501P86	503P86	504P86	CE
34.5	501P88	503P88	504P88	CE
35.5	501P90	503P90	504P90	CE
36.5	501P92	503P92	504P92	CE
37	501P94	503P94	504P94	CE
38	501P96	503P96	504P96	CE
L (μ H)	120	47	8.2	



5 Flexi-lead bolt hole probes

Application

Flexi-lead probes are for inspections involving difficult access. A flexible cable is incorporated between the tip and the handle.



d_1	2MHz <i>NFe</i>	Price
2.8	514P07	DC
3.2	514P08	DC
3.6	514P09	DC
3.9	514P10	DC
4.7	514P12	DC
5.5	514P14	DC
6.3	514P16	DC
7.0	514P18	DC
L (μ H)	8.2	

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Hole Inspection - Dynamic Rotary

Rotating probes for use with drive units

Application

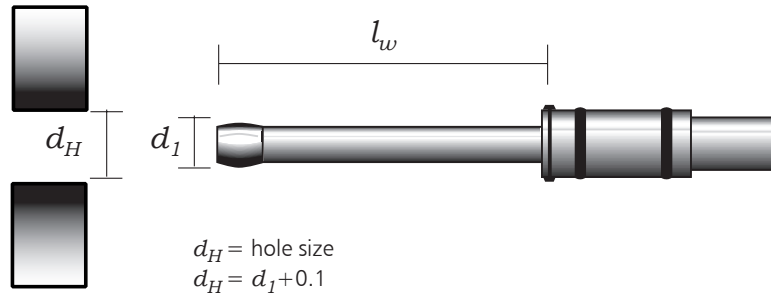
Inspection of the inner surface of bore holes, countersinks and counterbores. Requires probe drive unit and suitable eddy current unit. Frequency range 200kHz to 2MHz.

Features

Differential, single shielded. Stainless steel. Flexible probes allow inspection when access is not directly in line with the hole. Fischer connector to drive unit.

1 - Mini Drive fitting (Hocking, Rohmann and Förster)

Fits Hocking Drives 33A100 and 33A106

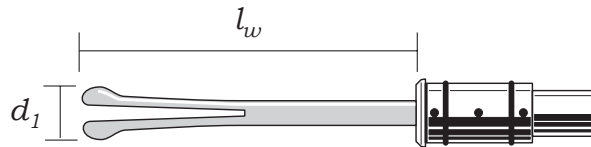


d_H	l_w	Probe	Price
1.59	35	615P004	DB
1.98	35	615P005	DB
2.38	35	615P006	DB
2.78	35	615P007	DB
3.18	35	615P008	DB
3.57	35	615P009	DB
3.97	35	615P010	DB
4.37	35	615P011	DB
4.76	35	615P012	DB
5.16	35	615P013	DB
5.56	35	615P014	DB
5.95	35	615P015	DB
6.35	35	615P016	DB
6.75	35	615P017	DB
7.14	35	615P018	DB
7.54	35	615P019	DB
7.94	35	615P020	DB
8.33	35	615P021	DB
8.73	35	615P022	DB
9.13	35	615P023	DB
9.53	35	615P024	DB
9.92	35	615P025	DB
10.3	35	615P026	DB
10.7	35	615P027	DB
11.1	35	615P028	DB
11.5	35	615P029	DB
11.9	35	615P030	DB
12.3	35	615P031	DB
12.7	35	615P032	DB
13.1	65	615P033	DB
13.5	65	615P034	DB

d_H	l_w	Probe	Price
13.9	65	615P035	DB
14.3	65	615P036	DB
14.7	65	615P037	DB
15.1	65	615P038	DB
15.5	65	615P039	DB
15.9	65	615P040	DB
16.3	65	615P041	DB
16.7	65	615P042	DB
17.1	65	615P043	DB
17.5	65	615P044	DB
17.9	65	615P045	DB
18.3	65	615P046	DB
18.7	65	615P047	DB
19.1	65	615P048	DB
19.5	65	615P049	DB
19.8	65	615P050	DB
20.2	65	615P051	DB
20.6	65	615P052	DB
21.0	65	615P053	DB
21.4	65	615P054	DB
21.8	65	615P055	DB
22.2	65	615P056	DB
22.6	65	615P057	DB
23.0	65	615P058	DB
23.4	65	615P059	DB
23.8	65	615P060	DB
24.2	65	615P061	DB
24.6	65	615P062	DB
25.0	65	615P063	DB
25.4	65	615P064	DB

② Mini Drive fitting (Hocking, Rohmann and Förster) Delrin shank

Fits Hocking Drives 33A100 and 33A106



d_H	l_w	Probe	Price
4.0-5.0	51	619P010	DC
4.7-5.7	51	619P012	DC
6.0-7.0	51	619P016	DC
7.5-8.0	51	619P020	DC
9.5-10.5	51	619P024	DC
11.1-12.1	51	619P028	DC
12.5-13.5	51	619P032	DC
14.0-15.0	51	619P036	DC
15.9-16.9	51	619P040	DC
17.5-18.5	51	619P044	DC
19.1-20.1	51	619P048	DC
20.6-21.6	51	619P052	DC
22.0-23.0	51	619P056	DC
23.5-24.5	51	619P060	DC
28.5-29.5	51	619P072	DC

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Aerospace Applications

Jet Engine Inspection

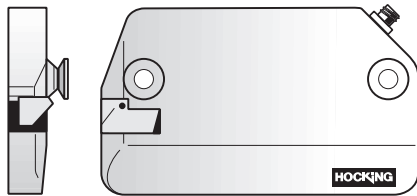
Application

Compressor and turbine, leading and trailing edges.

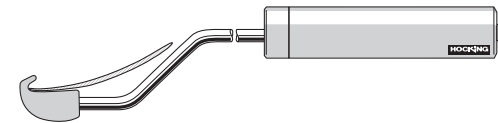
Features

Variety of configurations for all applications. Hocking's advanced technology and expertise in the production of micro miniature, highly shielded and focused eddy current sensors permit reliable detection of very small cracks in areas of difficult geometry and material.

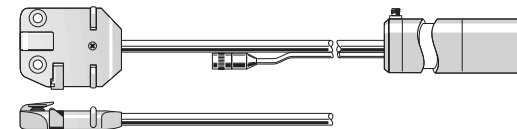
1 Compressor blade probe, general purpose 29PA81 w/Sprung stylus



2 Adour compressor stator trailing edge probe 29PA63



3 Special probe for Pegasus 29PC26 - with sprung stylus and inspection lamp



4 A selection of other custom made applications

Adour stator stage 1 and 2 trailing edge	29P369
Viper fan stage zero	29PA74
Pegasus fir tree	29PA82
Fan leading & trailing edge general inspection	29P358
Avon turbine leading edge (roller guide)	29PC07
Pegasus stage 3 leading edge	29PC03
Avon turbine	29PC27

Thread Inspection

Pencil Type Probes

Application

Detection of cracks in male and female thread roots.

Features

All probes are fitted with a micro connector.

1 External thread probe



Material	200kHz	500kHz	2MHz	Tip
NFe	818P3A	820P3A	822P3A	Chisel
Fe	819P3A	821P3A	823P3A	Chisel
Price	CA	CA	CA	

2 Internal thread probe



Material	200kHz	500kHz	2MHz	Tip
NFe	818P1B	820P1B	822P1B	Pointed
Fe	819P1B	821P1B	823P1B	Pointed
NFe	818P2B	820P2B	822P2B	Chisel
Fe	819P2B	821P2B	823P2B	Chisel
L (μH)	120	47	8.2	
Price	CA	CA	CA	

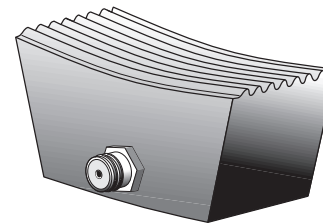
Saddle and Plug Probes

Threaded sections are best inspected using a dedicated probe which can be supplied to fit either external or internal threads precisely.

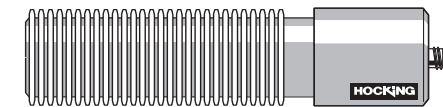
External threads are inspected with a Saddle probe with a thread cut into the concave surface. The sensor is fitted into the thread section to allow inspection to be carried out with very little probe wobble. A Saddle probe can be in the shape of a segment or a hinged encircling coil to screw along the thread like a nut.

Internal threaded sections are inspected with a threaded Plug probe (segments in the case of larger dimensions) with a sensor moulded into the threaded area. The Plug probe is then simply moved along the thread, in the area of interest, to ensure 100% inspection.

Saddle and Plug probes are manufactured to order. A sample of the threaded section is usually required as a pattern for making probes.



3 Saddle Probe



4 Plug probe

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Weld Inspection - WeldScan

WeldScan

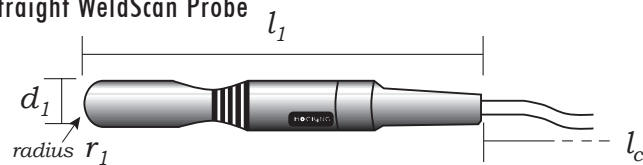
Application

WeldScan probes offer a cost-effective alternative to Magnetic Particle Inspection (MPI) for in-service inspection of welded steel structures. Find cracks through paint and oil etc.

Features

All probes are 100kHz. Integral probe cable terminated with a 6 pin Jaeger connector. All types are also available with a 12 way Lemo connector to suit the Phasec 2200 (add suffix 'L', e.g. 800P01 with a Lemo connector becomes 800P01L). Customised probes are available e.g. ceramic tips and high temp. material. Please ask for a quote.

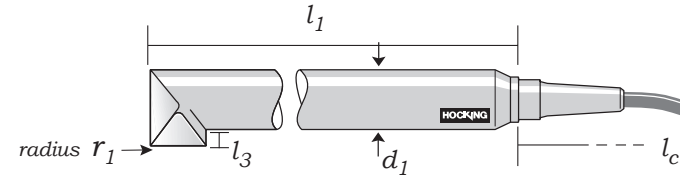
1 Straight WeldScan Probe



d_1	l_1	r_1	Probe	l_c	Price
9.5	50	4.8	800P01	5m	FA
9.5	50	4.8	800P49*	5m	FC
9.5	135	4.8	800P02	5m	FA
10	30	4.8	800P03	5m	FA
16	55	8	800P04	5m	FA
16	55	8	800P04A	40m	GA
16	55	Flat	800P07	15m	FA
16	55	8	800P48*	15m	FC
16	135	8	800P05	5m	FA
32	76	16	800P06	5m	FA

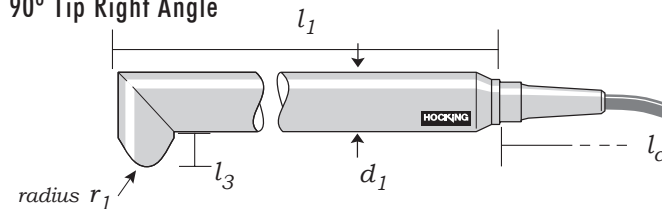
*these probes can be used for Aluminium and Stainless Steel welds, as well as Ferrous welds.

2 90° Tip Inline



d_1	l_1	l_3	r_1	Probe	l_c	Price
9.5	50	23	4.8	801P01	5m	FA
16	138	20	8	801P04	5m	FA
16	238	20	8	801P05	5m	FA

3 90° Tip Right Angle



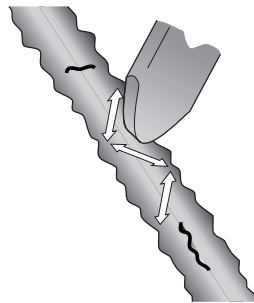
d_1	l_1	l_3	r_1	Probe	l_c	Price
9.5	50	23	4.8	801P02	5m	FA
16	76	20	8	801P03	5m	FA

4 Water Resistant WeldScan Probe

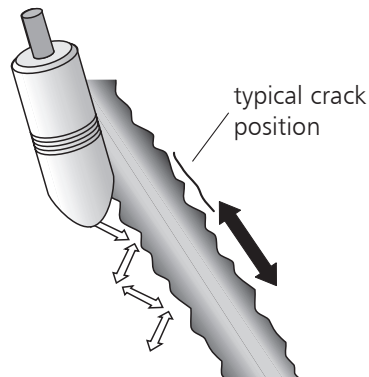


d_1	l_1	r_1	Probe	l_c	Price
16	85	8	800P10	-	FA
32	145	16	800P12	-	FA

Scanning across weld cap, weld toe and HAZ



Scan pattern technique to detect surface or near surface cracks in the weld cap.



Scanning technique to detect surface or near surface cracks in the weld toe and Heat Affected Zone of the parent metal.

Rotating WeldScan probes for use with Mini Drive

Application

Inspection of weld seams through cladding in high cost, high stressed steel structures in buildings, cranes, bridges, oil platforms, rolling stock etc.

Features

The Rotating WeldScan probe tip is protected by a stainless steel cap to increase the wear resistance.

Product Description

Phasec D60/D62 or 2200

Rotating Drive Unit

Rotating Drive Unit Lead

Rotating WeldScan Probe

WeldScan Test Block

PRN

33I0011, 33I012 &

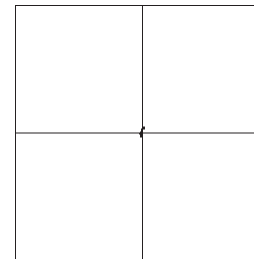
33I013, 33I016

33A100

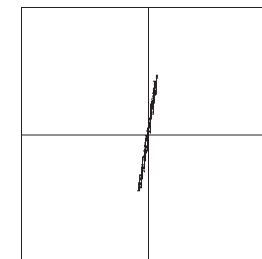
33A103

805P002, 805P004

31A008



Scan of flawless part of Fe test block



Signal from 0.5mm deep flaw

Typical inspection signals from probe type 805P004 used with the above equipment:

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Tube Inspection – I.D.

Application

Internal diameter tube inspection. Typically for tubular heat exchangers e.g. in condensers and air conditioning.

Features

A wide range of configurations including disconnectable and integral cable probes. Connectors are also available to fit Zetec and most other eddy current instruments.

- Probe diameters in 0.5mm steps from 7.5mm to 30mm
- Disconnect I.D. probes in diameters >11.5mm.
- Centre frequencies: 10, 24, 76, 190 and 400kHz.
- Cable lengths (disconnect or integral: 3, 10, 15, 20, 25 and 30m).
- 'Push/Pull' (rigid) and Probe Transport System (flexible) cables in both integral and disconnect format.



Cables and probes are available with switchable absolute to differential facility, balance load BNC socket for absolute operation (see following pages). For special I.D. probe requirements please contact your local representative or Hocking direct with details of your application. Flexible head versions of I.D. probes are available for inspection of tubes containing bends.

I.D. Probe Frequency Table

Quick estimation of test frequency in kHz for given tube material and wall thickness

BWG	24	22	20	–	18	–	16	–	14	12	10
thou. inch	0.22	0.28	0.35	0.40	0.49	0.60	0.65	0.80	0.83	1.09	1.34
mm	0.56	0.71	0.89	1.02	1.24	1.50	1.65	2.00	2.11	2.77	3.40
Titanium 6Al-4V 1.1% IACS	1500	930	592	470	305	208	170	117	105	61	41
Inconel 600 1.67% IACS	985	613	390	309	200	137	115	77	69	40	27
304 Stainless 2.5% IACS	660	410	260	206	134	92	76	52	46	27	18
C.P. Titanium 3.6% IACS	460	285	181	143	93	63	53	36	32	19	12
70/30 Copper Nickel 5.0% IACS	330	205	130	103	67	46	38	26	23	14	9
90/10 Copper Nickel 11.9% IACS	140	86	55	43	28	19	16	10.8	9.7	5.6	3.8
Aluminium Bronze 13% IACS	126	79	50	40	26	18	15	9.9	8.9	5.2	3.4
Admiralty Brass 25% IACS	66	41	26	21	13	9.2	7.6	5.2	4.6	2.7	1.8
Brass (70/30 Cu-ZN) 28% IACS	59	36	23	18	12	8.2	6.8	4.6	4.1	2.4	1.6
Brass (85/15) 37% IACS	44	28	17	14	9	6.2	5.1	3.5	3.1	1.8	1.2
Brass (95/5) 55% IACS	30	19	12	9.4	6.1	4.2	3.4	2.4	2.1	1.2	0.8
Copper 100% IACS	16	10	6.5	5.2	3.4	2.3	1.9	1.3	1.2	0.7	0.5

Example probe specification:

Part No	IDP145L--24k
Diameter	14.5mm
Probe Type	Disconnect
Centre Frequency	24kHz

Example cable specification:

Part No	Length	Cable	Connections
LHC-1B	10m	PTS cable	Disconnect to 6 way Jaeger
LHC-1P	10m	Push/Pull	Disconnect to 6 way Jaeger

Frequency in kHz for a differential test, according to formula:

$$f(\text{kHz}) = \frac{516}{t^2 \cdot C}$$

Where C is in % IACS, and t is wall thickness in mm.

For a standard absolute test use approximately one half of the above frequency.

Standard Heat Exchanger Tube Sizes

Recommended I.D. probe diameters for different tube sizes

These sizes are chosen to give a probe diameter between 0.8 and 1.5mm less than the tube internal diameter, more clearance being allowed for larger diameters. This should be acceptable for typical conditions of tube condition and manufacturing tolerances. If these are particularly poor then a greater clearance (i.e. smaller probe size) should be chosen, with tape being used as necessary to reduce probe 'wobble'. With tubes in 'as manufactured' condition or of corrosion resistant material such as stainless steel/titanium a larger probe size may be possible.

The table shows the calculated internal diameter of the tube, and the suggested probe size, where 'xx' is replaced by the probe type e.g. I.D. for rigid differential, and --- is the frequency/connection code.

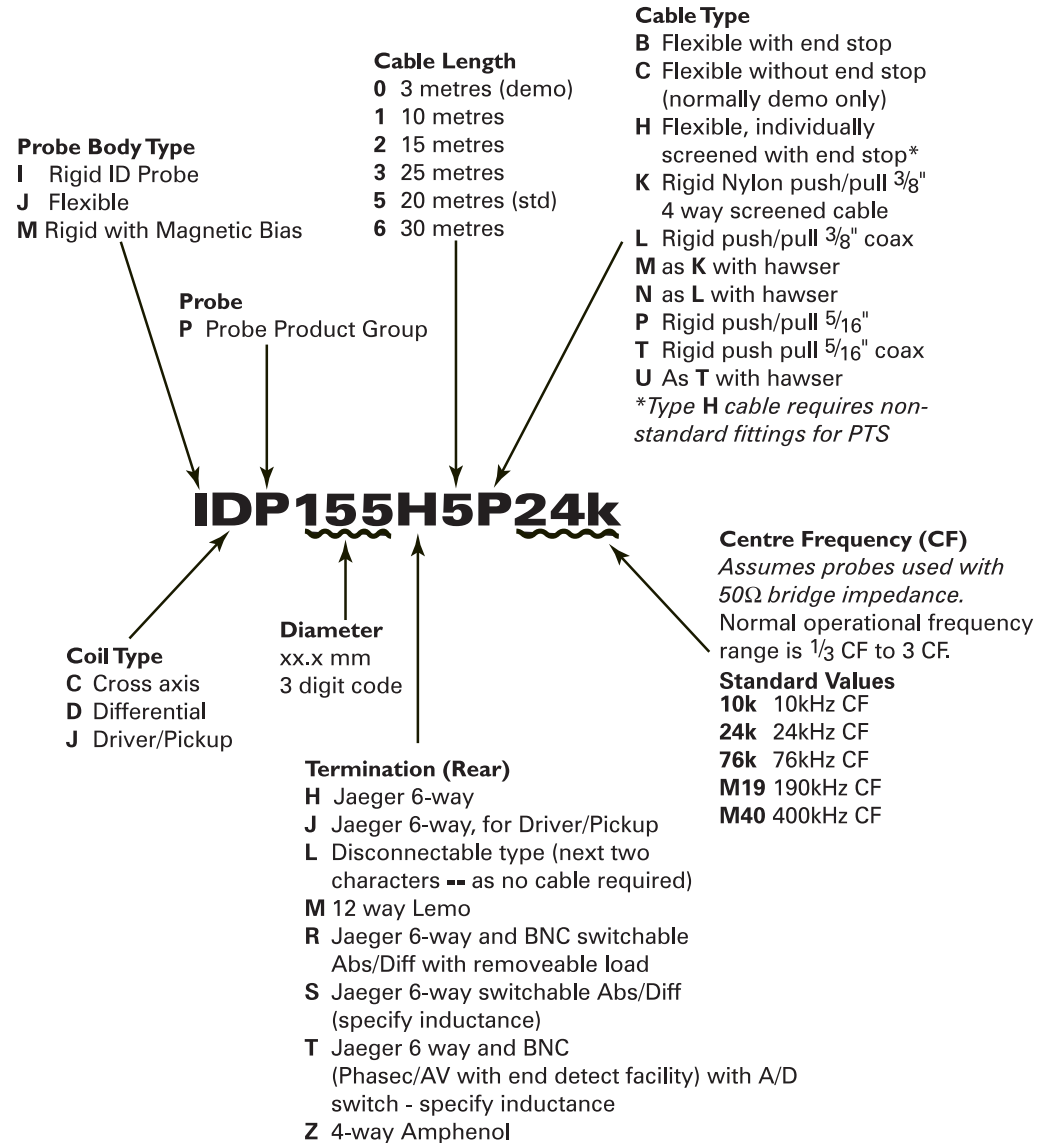
The following limitations apply:

- The minimum size for detachable I.D. probes is 11.5mm, probes below this require integral cables.
- The size range for magnetically biased probes is 12.5-20mm.
- The size range for cross-axis probes is 11.5-20mm.
- The size range for driver pick-up probes is 9.0-35mm.

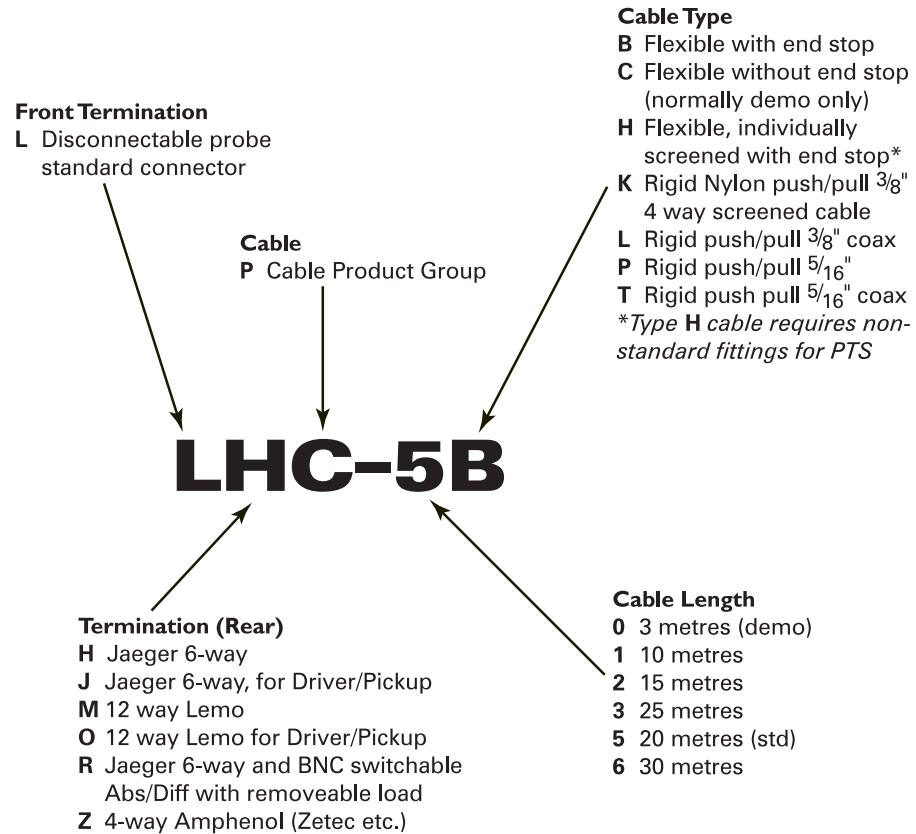
t \ O/D	1/2" 12.7mm	5/8" 15.88mm	3/4" 19.05mm	7/8" 22.23mm	1" 25.4mm	1 1/8" 28.58mm
12 BWG 2.77mm	7.16 xxP060---	10.34 xxP090---	13.51 xxP125---	16.69 xxP155---	19.86 xxP185---	23.04 xxP220---
13 BWG 2.41mm	7.88 xxP070---	11.06 xxP100---	14.13 xxP130---	17.41 xxP165---	20.58 xxP195---	23.76 xxP225-
14 BWG 2.11mm	8.48 xxP075--	11.65 xxP105--	14.83 xxP140---	18.01 xxP170---	21.18 xxP200---	24.36 xxP230---
15 BWG 1.83mm	9.04 xxP080---	12.22 xxP111---	15.39 xxP145---	18.57 xxP175---	21.74 xxP205---	24.92 xxP235---
16 BWG 1.65mm	9.4 xxP085---	12.58 xxP115---	15.75 xxP145---	18.93 xxP180---	22.1 xxP210---	25.28 xxP240---
17 BWG 1.47mm	9.76 xxP085---	12.94 xxP120---	16.11 xxP150---	19.29 xxP180--	22.46 xxP210--	25.64 xxP245---
18 BWG 1.24mm	10.22 xxP090---	13.40 xxP125---	16.57 xxP155---	19.75 xxP185---	22.92 xxP220---	26.1 xxP250---
19 BWG 1.07mm	10.56 xxP095---	13.74 xxP125---	16.91 xxP160---	20.09 xxP190---	23.26 xxP220---	26.44 xxP250---
20 BWG 0.89mm	10.92 xxP100---	14.1 xxP130---	17.27 xxP160---	20.45 xxP195---	23.62 xxP225---	26.8 xxP255---
21 BWG 0.81mm	11.09 xxP100---	14.26 xxP130---	17.43 xxP165---	20.61 xxP195---	23.78 xxP225---	26.96 xxP255---
22 BWG 0.71mm	11.28 xxP100---	14.46 xxP135---	17.63 xxP165---	20.81 xxP200---	22.98 xxP220---	27.16 xxP260---

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Numbering system for Hocking I.D. probes



Numbering system for Hocking I.D. probe cables



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Industrial Applications 1

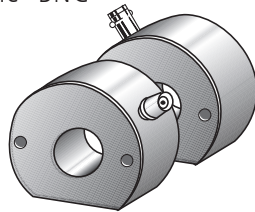
Encircling coils - Absolute

Application

Absolute encircling coils for the inspection of tube, bar and wire. Detection of surface breaking cracks and comparative material sorting.

Features

Requires a suitable balance load. A second separate coil can be used to balance, or a pair can easily be joined together to provide a single differential coil. One BNC connector per coil.



Hole Size (mm)	Frequency	PRN	Price
5	5kHz-50kHz	840P050A	EA
7	5kHz-50kHz	840P070A	EA
10	5kHz-50kHz	840P100A	EA
13	5kHz-50kHz	840P130A	EA
16	5kHz-50kHz	840P160A	EA
20	5kHz-50kHz	840P200A	EA

Other diameters and frequencies available to order.

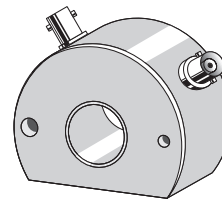
Encircling coils - Differential

Application

Differential encircling coils for the inspection of tube, bar and wire. Crack detection.

Features

A cost effective single enclosure with two BNC connectors



Hole Size (mm)	Frequency	PRN	Price
5	5kHz-50kHz	841P050A	ED
7	5kHz-50kHz	841P070A	ED
10	5kHz-50kHz	841P100A	ED
13	5kHz-50kHz	841P130A	ED
16	5kHz-50kHz	841P160A	ED

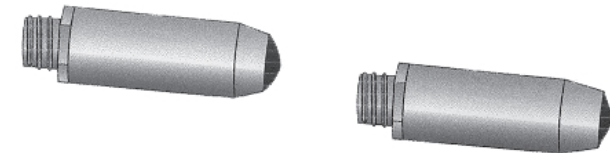
Micro Probes

Application

Inspections where very small physical size is required or as a multiple array suite for special applications. Please contact Hocking for advice.

Features

Can be treated as probe elements for use in special probes or fixtures. Each Micro Probe is fitted with a micro connector and is a probe in its own right, performing in the same way as full-sized probes.



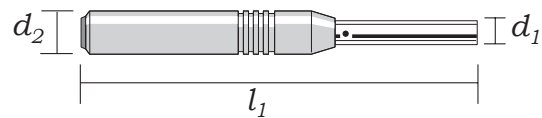
Freq.	Material	Type	PRN	Diameter-Length	Price
200kHz	Fe/NFe	Unshielded	120PA	6mm – 23.8mm	CA
200kHz	Fe/NFe	Shielded	100PA	6mm – 21.7mm	CA
500kHz	Fe/NFe	Unshielded	121PA	6mm – 23.8mm	CA
500kHz	Fe/NFe	Shielded	101PA	6mm – 21.7mm	CA
2MHz	NFe	Unshielded	122PA	6mm – 23.8mm	CA
2MHz	NFe	Shielded	102PA	6mm – 21.7mm	CA
2MHz	NFe	Shielded	102PAF	6mm – 21.7mm	CC

Differential Scanning Probes

Application

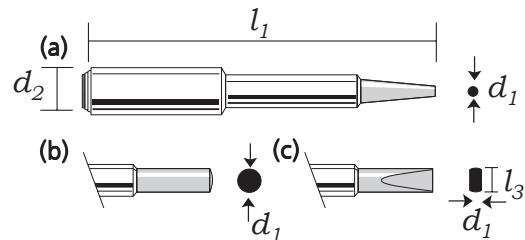
Inspection of rotating test pieces such as bearings, housings, steering components, pins, bushes, automotive valves, bars and tubes.

1 – Pencil, shielded, 2mm core



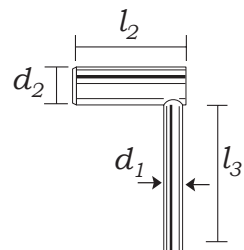
Frequency	PRN	d_1	d_2	l_1	L (μ H)	Connector	Comments	Price
120kHz-1MHz	5P409	5	11.1	100	22	Lemo 4W	General Purpose	FC
400kHz-3MHz	5P495	4	11.1	100	8.2	Lemo 4W	General Purpose	FA
400kHz-3MHz	5P469	5	11.1	100	8.2	Lemo 4W	Ungrounded	EA
400kHz-3MHz	5P411	5	11.1	100	8.2	Lemo 4W	Grounded body	FC

2 – Pencil, unshielded, 1mm core



	Frequency	PRN	d_1	d_2	l_1	l_3	L (μ H)	Connector	Comments	Price
(a)	200kHz-3MHz	5P501	2.5	12	91	-	Reflection	Lemo 4W	Pointed Tip	KA
(b)	200kHz-3MHz	5P503	4.7	12	91	-	Reflection	Lemo 4W	Spherical Tip	KA
(c)	200kHz-3MHz	5P502	2.5	12	91	4.7	Reflection	Lemo 4W	Chisel Tip	KA

3 – Pencil 90°, shielded, 2mm core

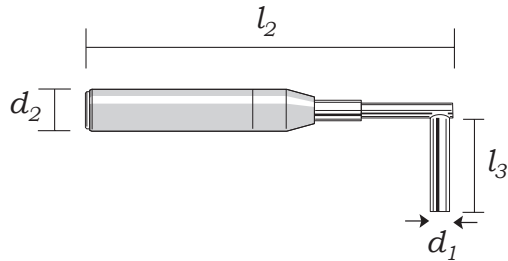


Frequency	PRN	d_1	d_2	l_2	l_3	L (μ H)	Connector	Comments	Price
400kHz-3MHz	5P456	5	10	30	50	8.2	Lemo 4W	Flat Tip	HA

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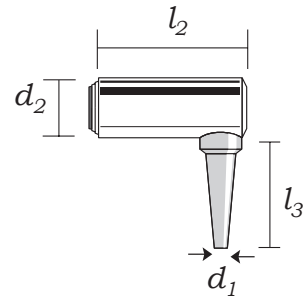
Industrial Applications 2

④ – Pencil 90°, shielded, 2mm core



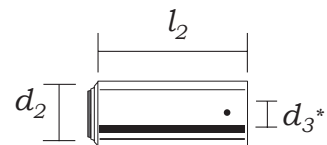
Frequency	PRN	d_1	d_2	l_2	l_3	L (μ H)	Connector	Comments	Price
120kHz-1MHz	5P436	5	11.1	100	25	22 μ H	Lemo 4W	Flat Tip	FC

⑤ – Pencil 90°, unshielded, 1mm core



Frequency	PRN	d_1	d_2	l_2	l_3	L (μ H)	Connector	Comments	Price
200kHz-3MHz	5P504	2	12	32	31.1	Reflection	Lemo 4W	Pointed Tip	KA
200kHz-3MHz	5P506	2	12	31	31.1	Reflection	Lemo 5W	Pointed Tip	JA

⑥ – Block, shielded.



* d_3 = Scan Width

Frequency	PRN	d_2	d_3	l_2	L (μ H)	Connector	Comments	Price
100kHz	5P458	16	3.5	40	Reflection	Lemo 4W	Angle tolerant	JA
100kHz	5P496	16	3.5	40	Reflection	Integral cable to Jaeger 6W	Rougher surface	KB

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Leads and Accessories 1

Instrument accessories – carry bags and cases

PRN	Description	Price
29A009	Locator UH, Locator UH-200	CD
29A045	Locator UH Carrying strap	AC
33A140	Phasec 2200	CB
33A026	Phasec 1.1, Phasec D60, Phasec D62/R62	CC
44A003	MiniPhasec, AutoSigma 2000, QuicCheck	CC
31A005	Phasec 3.4	DB
47A009	AutoSigma 3000	BA
47A008	AutoSigma 3000 hard case for instrument and accessories	AJ

Instrument power accessories

PRN	Description	Price
33A110	Phasec 2200, USN 52 charger unit	HA
33A113	Phasec 2200 battery pack charging lead	BD
33A080	MiniPhasec charger unit 115/230V	CA
33A104	MiniPhasec charger unit 240V	CA
29A094	Power cord USA/Canada	AE
29A095	Power cord UK	AC
29A096	Power cord universal Europe	AE
29A013	Coiled power cord	AE
29A082	Locator UH battery set	CE

Probe input accessories – conductivity meters

PRN	Description	Price
33A135	Probe (AutoSigma 3000) lead Phasec 2200/D60/D62/R62	DA
33A170	Probe (AutoSigma 3000) lead Phasec D62/R62 only (Auto detect)	DA
44A001	Probe lead AutoSigma 2000, 1.5m length	BD
47A001	Probe lead AutoSigma 3000, 1.5m length	CB

Instrument communications accessories – PC connection leads and software

PRN	Description	Price
33A083	Serial printer lead for Phasec D62, D60, MiniPhasec, Phasec 1.1/3.4	AH
33A084	Serial PC interface lead for the Phasec D62, D60, MiniPhasec, Phasec 1.1/3.4	DA
33A160	Serial to parallel printer converter, use with 47A004 or 33A084	CC
47A002	Serial printer lead for Phasec 2200/ AutoSigma 3000	BD
47A004	Serial PC interface lead for Phasec 2200/ AutoSigma 3000	DA
33A191	DocuMate Phasec D62/200 reporting utility	EA

Probe accessories

PRN	Description	Price
29A012	Spring 'v' block guide holder for 9.5mm diameter probes	CE
5A147	Spring 'v' block guide holder for 12.7mm diameter probes	CB
29A031	PTFE tape butterfly, pack of 30	AB
50A020	PTFE tape 7mm wide, 0.125mm thick, roll 1m long, for WheelScan probes	AD
33A050	PTFE tape 70mm wide, 0.1mm thick, 1m long	AF
29A015	Lift-off shims (pair) for non-ferrous coating simulation 0.15mm	AA
29A019	Lift-off shims (pair) for non-ferrous coating simulation 0.1mm	AA
29A044	Tool roll for absolute probes	AC

Rotary drive units and instrument connection leads

PRN	Description	Price
33A100	Mini Drive unit	-
33A106	Large Drive unit	-
33A103	Lead, Hocking drive units to Phasec 2200/D60/D62/R62	EC
33A137	Interface unit, Rohmann drive unit to Phasec 2200/D60/D62/R62	JA
33A101	Lead, Hocking new drive units to Phasec 1.1SD (requires ver. 10 or higher software)	EC

Leads – interconnection BNC to Probe

PRN	Instrument	Termination		Cable Type	Length m	Price
		End A	End B			
5A011	Phasec/QuickCheck	BNC plug	BNC plug	RG174 (Ø 2.5)	1.5	AH
5A235	Phasec/QuickCheck	BNC plug	BNC plug	RG174 (Ø 2.5)	2	AE
5A154	Phasec/QuickCheck	BNC plug	BNC plug	RG174 (Ø 2.5)	4	AH
5A237	Phasec/QuickCheck	BNC plug	BNC plug	RG58 (Ø 5)	10	AH
5A192	Phasec/QuickCheck	BNC plug	BNC plug	RG58 (Ø 5)	20	CB
29A001	Loc/Phasec/QuickCheck	BNC plug	Micro plug	RG178 (Ø 1.8)	1.5	AH
29A002	Loc/Phasec/QuickCheck	BNC plug	Micro plug	RG174 (Ø 2.5)	4	AH
29A110	Loc/Phasec/QuickCheck	BNC plug	90° micro plug	RG174 (Ø 2.5)	1.5	BA

Adapters – instruments to two BNC sockets

PRN	Instrument		Connector	Price
	Manufacturer	Type		
33A120	Hocking	Phasec 2200/D60/D62/R62	Lemo 12 way plug	CB
5A018	Hocking	QuickCheck/Phasec 3.4	Jaeger 6 way socket	CA
99A003	Förster	Defectoscop SD/D/S/AF	Veam 15 way plug	DA
5A155	Magnaflux	ED 800	Mic 4 way plug	-
5A156	Magnaflux	ED 810	Amphenol 6 way plug	-
5A157	Staveley (Nortec)	NDT 19	Burndy 8 way plug	CB
5A158	Staveley (Nortec)	NDT 25	Burndy 12 way plug	DA
5A131	Zetec	Em3300, MIZ-10, MIZ-17, MIZ-20	Amphenol 4 way plug	BC

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Leads and Accessories 2

Probe adapter leads for Hocking Phasec/QuickCheck (Jaeger 6 way)

PRN	Length m	Probe Type	Connector	Price
5A173	1.5	Hocking Reflection	Lemo 4W	CB
5A189	2	Hocking Reflection	Lemo 4W	CB
5A174	4	Hocking Reflection	Lemo 4W	CB
5A134	2	Hocking Differential	Lemo 4W	CB
5A201*	2	Hocking Differential	Lemo 4W	CA
5A184	4	Hocking Differential	Lemo 4W	BD
5A135	1.	Rohmann Reflection	Fischer 4W	CB
5A207	2	Rohmann Reflection	Fischer 4 W	CB
5A136	1.5	Förster Defectoscop Reflection	Lemo 5W	BD
5A219	2	Förster Defectoscop O/D Coil	Veam 15W	DC
5A224	1.5	GK Reflection	Lemo 2 + 2W	BE

Probe adapter leads for Hocking Phasec 2200/D60 (Lemo 12 way)

PRN	Length m	Probe Type	Connector	Price
33A130	1.5	Hocking Reflection	Lemo 4W	CC
33A171*	2	Hocking Reflection	Lemo 4W	CE
33A131	4	Hocking Reflection	Lemo 4W	CE
33A132	1.5	Hocking Differential	Lemo 4W	CC
33A172*	2	Hocking Differential	Lemo 4W	CE
33A133	4	Hocking Differential	Lemo 4W	CE
33A135	1.5	Hkg FastScan/Cond.	Lemo 5W	DA
33A170	1.5	33A135 with autodetect		DA
33A128	3	Hocking System	Jaeger 12W	EA
33A129	1.5	Förster Reflection	Lemo 5W	-

* oil resistant

* oil resistant

Probe adapter leads – various

PRN	Manuf.	Instrument Type	Connector	Length m	Probe Type	Connector	Price
99A009	Förster	Defectoscop	Veam 15W	1.5	Hocking Reflection	Lemo 4W	DB
99A010	Förster	Defectoscop	Veam 15W	4	Hocking Reflection	Lemo 4W	DC
5A204	Magnaflux	ED800	MIC 4W	1.5	Hocking Reflection	Lemo 4W	CA
5A183	Rohmann	B1	DIN 3W	1.5	Hocking Reflection	Lemo 4W	BE
5A210	Rohmann	B1	Fischer 8W	1.5	Hocking Reflection	Lemo 4W	CC
5A171	Nortec	NDT-19	Burndy 8W	1.5	Hocking Reflection	Lemo 4W	CB
5A193	Nortec	NDT-19	Burndy 8W	2	Hocking Reflection	Lemo 4W	DA
5A209	Nortec	NDT-19	Burndy 8W	2.3	Hocking Reflection	Lemo 4W	DA
5A203	Zetec	MIZ-20	Amphenol 4W	1.5	Hocking Reflection	Lemo 4W	CB

Adapters – connect non-Hocking probes to Phasac/QuickCheck (with Jaeger 6 Way connectors)

PRN	Manuf.	Instrument Type	Connector	Probe	Price
33A134	Hocking	Phasac 2200/D62/R62	Lemo 12W	Bridge-Diff	DA
5A031	Staveley	Alcoprobe	DIN 7W	Reflection	-
5A180	Nortec	NDT-19	Burndy 8W	Ref + Abs/Diff	CC
5A048	Zetec	MIZ-10/17/20 EM 3300	Amphenol 4W	Diff/Abs	CC
5A188	Zetec	MIZ-20	Amphenol 4W	Reflection	CC

Adapters – connect non-Hocking probes to Phasac 2200, D60, D62, R62

PRN	Manuf.	Instrument Type	Connector	Probe	Price
33A122	Staveley (Nortec)	NDT-19	Burndy 8W	Ref + Bridge	CC
33A124	Zetec	MIZ-10/17/20 EM 3300	Amphenol 4W	Bridge	CC
33A125	Zetec	MIZ-20/22	Amphenol 4W	Reflection	CC
33A126	Rohmann	B1	Fischer 8W	Reflection	CC
33A127	Förster	Defectoscop	Veam 15W	Reflection	EA

These adaptors are fitted with Lemo 12 Way plugs to allow other manufacturer's probes or connection systems to fit the Hocking Phasac 2200.

Adapters – convert other instruments to Jaeger 6 Way

PRN	Manuf.	Instrument Type	Connector	Probe	Price
33A121	Hocking	Phasac 2200	Lemo 12W	Ref/Diff	CC
99A012	Förster	Defectoscop - S/SD/D	Veam 15W	Ref/Diff	DC
5A019	Rohmann	B1	BNC x 2	Differential	CA
5A221	Staveley (Nortec)	NDT-19	Burndy 8W	Diff (50Ω)	CC
5A050	Zetec	MIZ-10/17/20 EM 3300	Amphenol 4W	Differential	CB

These adapters are fitted with 6 Way Jaeger plugs to allow Hocking probes and leads to be used on other manufacturers' instruments.

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Leads and Accessories 3

Adapters – special function

PRN	Type	Instrument Manuf.	Connector	Probe	Price
5A072	Phasec/QuickCheck	Hocking	Jaeger terminated	Converts differential probe to absolute by switching in a removeable lead	DA
29A008	Loc-UH/QuickCheck	Magnaflux	ED520 (2W)	Allows probe to operate at 500kHz	CC
29A042	Loc-UH/QuickCheck	Magnaflux	ED520 (BNC)	Allows probe to operate at 500kHz	FA
29A024	Loc-UHB/QuickCheck	Magnaflux	ED520 (2W)	Allows probe to operate at 200kHz	CA
29A010	Locator	Förster/Defectometer	BNC - DIN 5W	Allows some Defectometer probes to be used directly on Locator	BD
99A011	Phasec/QuickCheck	Förster/Defectometer	BNC - DIN 5W	Allows some Defectometer probes to be used on 2200/D60/D62/R62/QuickCheck H (2MHz)	BE

Probe Tip Protectors

Shaped Teflon adhesive tape to protect probe tips from wear (packs of 30).

Product Reference Number: 29A031.

7mm wide by 1m long tape to protect WheelScan probe heads.

Product Reference Number: 50A020

Test Blocks

General purpose with 0.2, 0.5 and 1mm slots

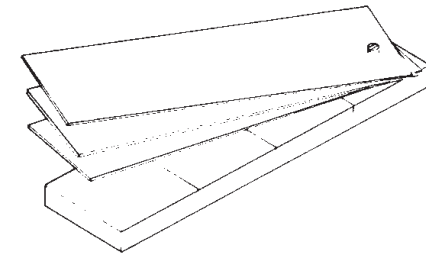
PRN	Material	Dimensions	Price
29A028	Steel EN1A	(102 x 25 x 6mm)	CE
29A029	Aluminium Alloy 7075-T6	(102 x 25 x 9mm)	BE
29A032	Titanium 6A14V	(80 x 35 x 7mm)	GC
29A049	Stainless Steel 304	(80 x 35 x 8mm)	DA
29A120	Magnesium	(80 x 35 x 8mm)	BE
29A047	US Ref. 7075 Al	(80 x 35 x 8mm)	BD

WeldScan Test Block – 31A008 Steel

0.5, 1mm and 2mm slots

Coating thickness calibration standards:
4 x 0.5mm thick

Dimensions: 102 x 25 x 6mm



Balance Loads

Inductance	Reference Number	Frequency Range (50 ohm bridge impedance)	Price
1.3μH	5A084	2MHz-10MHz	AJ
5.6μH	5A001	500kHz-4.5MHz	AJ
8.2μH	5A083	350kHz-3MHz	AJ
10μH	5A016	250kHz-2.5MHz	AJ
15μH	5A097	180kHz-1.5MHz	AJ
22μH	5A002	120kHz-1MHz	AJ
27μH	5A113	700kHz-900kHz	AJ
47μH	5A058	50kHz-500kHz	AJ
56μH	5A190	50kHz-450kHz	AJ
82μH	5A003	35kHz-300kHz	AJ
100μH	5A112	25kHz-250kHz	AJ
120μH	5A089	20kHz-200kHz	AJ
150μH	5A194	18kHz-150kHz	AJ
180μH	5A132	15kHz-130kHz	AJ
220μH	5A185	12kHz-100kHz	AJ
270μH	5A199	10kHz-90kHz	AJ
330μH	5A141	8kHz-75kHz	AJ
390μH	5A104	7kHz-60kHz	AJ
470μH	5A137	5kHz-50kHz	AJ
560μH	5A111	5kHz-45kHz	AJ
680μH	5A065	4kHz-35kHz	AJ
820μH	5A055	3.5kHz-30kHz	AJ
1.0mH	5A063	2.5kHz-25kHz	AJ
1.5mH	5A115	1.8kHz-15kHz	AJ
2.2mH	5A026	1.2kHz-10kHz	AJ
3.9mH	5A146	700Hz-6kHz	AJ
8.2mH	5A022	350Hz-3kHz	AJ

Recommended balance loads for using Hocking absolute probes on impedance plane instruments



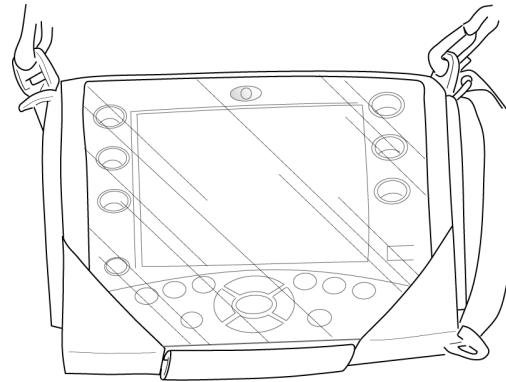
Inductance	Reference Number	Locator Frequency	Price
1.3μH	5A084	6MHz	AJ
8.2μH	5A083	2MHz	AJ
47μH	5A058	500kHz	AJ
120μH	5A089	200kHz	AJ

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Locator 2 Accessories

General accessories

PRN	Description
39A024	RS232 Lead
39A025	Earpiece and connector for Audio output
39A038	SupervisorPC Lite communication software
39A039	Tripod Stand
39A040	Lightweight operating handle
39A041	Splashproof case
39A042	Soft Carrying Case (Large - accepts unit, selection of cables and Charger 39A035)
39A043	Rugged Polycarbonate Transit Case
39A044	Soft Carrying Case (Small - accepts unit and selection of cables etc.)



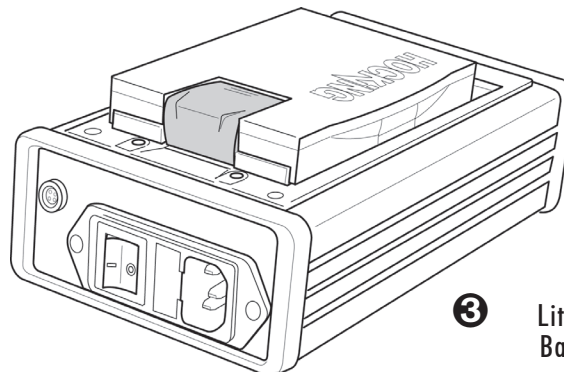
❶ Locator 2 in splashproof case (39A041)



❷ Soft Carrying Case - Large (39A042)

Locator 2 power accessories

PRN	Description
39A023	Output power lead for Charger/Eliminator
39A030	Lithium-ion battery pack
39A031	AA/Battery eliminator pack
39A035	Battery Charger/ Eliminator Unit
29A094	Power cord USA/Canada
29A095	Power cord UK
29A096	Power cord universal Europe
29A013	Coiled power cord



❸ Lithium-ion battery pack (39A030) on Battery Charger Eliminator unit (39A035)

**Probe leads for Locator 2
(Lemo 7 Way 1.5m Long)**

PRN	Type	Connector	Price
39A001	Absolute	Microtech	CB
39A002	Absolute	BNC	CB
39A004	Bridge	Lemo 4W	CB
39A005	Reflection	Lemo 4W	CA
39A009	Rohmann Bridge	Fischer 4 W	CB
39A010	Rohmann Reflection	Fischer 4W	BD
39A011	Super Halec Reflection	Lemo 2W	DC
39A012	Alcoprobe Reflection	Din 7W	BE
39A020	Forster Reflection	Lemo 5W	BE
39A018	Differential Beadseat	2 x Microtech	BE

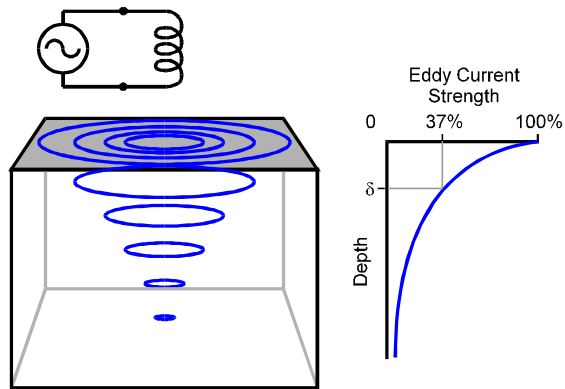
**Adapters for Locator 2
(Lemo 7 Way 75mm Long)**

PRN	Type	Connector	Price
39A003	Absolute	BNC	CB
39A007	Defectometer	Din 5W	BD
39A008	2 x BNC	2 x BNC	CB
39A013	Alcoprobe Reflection	Din 7W	BE
39A014	Hocking Jaeger 6 w	Jaeger 6W	BE
39A015	Burndy Nortec	Burndy	BE
39A016	Zetec Bridge	Amphenol 4W	BE
39A017	Zetec Reflection	Amphenol 4W	BE
39A018	Rohmann Reflection	Fischer 8W	BE
39A019	Forster	Veam 15W	BE

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Eddy Current Reference

Standard Depth of penetration



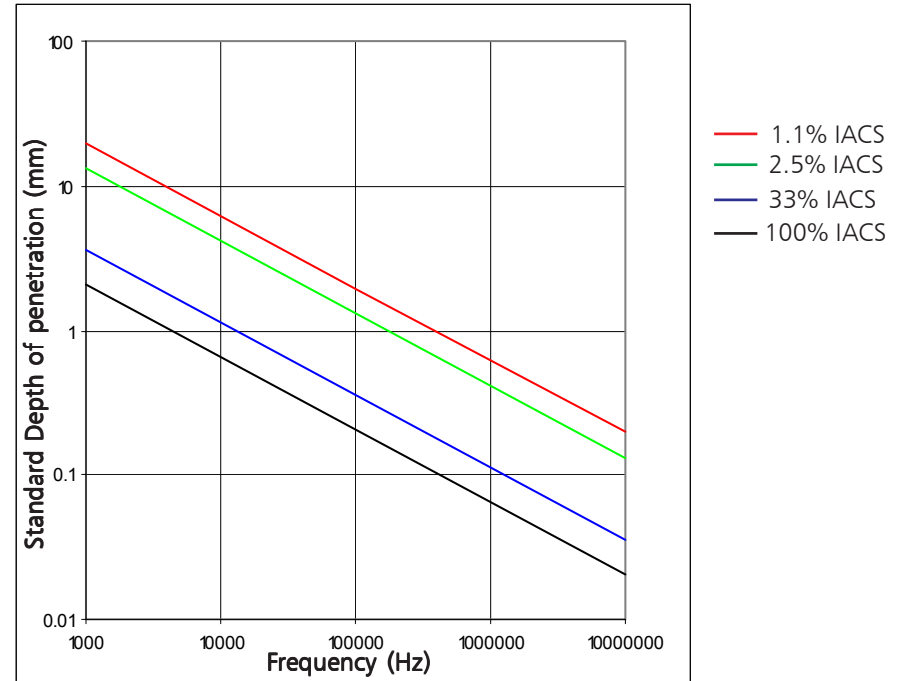
Using IACS

$$\delta = \sqrt{\frac{431,000}{\sigma \mu_r f}} \quad f = \frac{431,000}{\delta^2 \mu_r \sigma}$$

Using MSm⁻¹

$$\delta = \sqrt{\frac{250,000}{\sigma \mu_r f}} \quad f = \frac{250,000}{\delta^2 \mu_r \sigma}$$

- f = Frequency (Hz)
- σ = Conductivity
- μ_r = Relative Permeability
- δ = Standard Depth of penetration (mm)



The standard depth of Penetration is defined as that depth at which the eddy current strength has dropped to 37% of that at the surface. For this table the Relative Permeability has been assumed as 1.

SI Units

Quantity	Symbol	Unit	Symbol
Electric current	I	ampere	A
Current density	J		Am ⁻²
Electric charge	Q	coulomb	C
Electric Flux Density	D		Cm ⁻²
Capacitance	C	farad	F
Inductance	L,M	henry	H
Permeability	μ		Hm ⁻¹
Frequency	f	hertz	Hz
Length	l	metre	m
Conductance	G	Siemens	S
Conductivity	σ		Sm ⁻¹
Magnetic Flux Density	B	tesla	T
Electric potential	V	volt	V
Magnetic Flux	φ	weber	Wb
Impedance	Z	ohm	Ω
Reactance	X	ohm	Ω
Resistance	R	ohm	Ω

Conversion Factors

To Convert	Multiply by;
Inches to cm	2.54
Cm to inches	0.3937
%IACS to MSiemens m ⁻¹	0.58
MSiemens m ⁻¹ to %IACS	1.724

Hocking Product Frequencies

Frequency	200kHz	500kHz	2MHz	6MHz
Locator UH		•	•	•
Locator UH-B	•		•	•
QuickCheck H	•	•	•	•*
QuickCheck L	•	•		
ED520/530	•			
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* Requires external Balance Load.

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