# An Introduction to Weld Probes

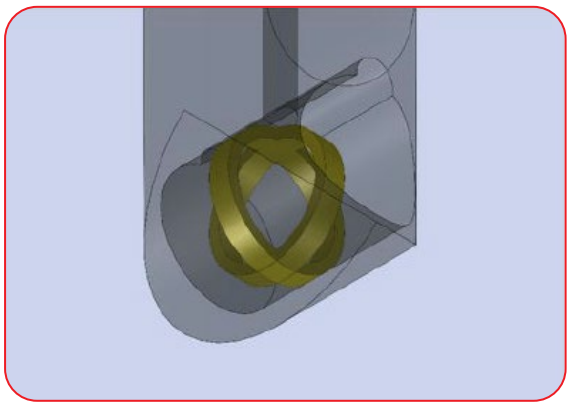
## WHAT ARE WELD PROBES?

Weld Probes are specifically designed for the task of weld inspection of non-ferrous welds and steel structures. They can detect surface cracks on a weld with a non-conductive surface coating on it of up to 2mm.

The application specific design of the probe means that the it is capable of inspecting welds with uneven surfaces and coatings on them.

## PROBE ANATOMY

A probe was built with two orthogonal interleaved coils. The coils positioning is critical to producing signals as required in the inspection procedure.



## WHY USE EDDY CURRENT WELD PROBES FOR WELD INSPECTION?

Welds are often coated or painted making access to the weld for inspection more complicated when using other methods to Eddy Current. For example, MPI and UV inspection require the removing of the coating before inspection, costing both money and time. Eddy current probes allow welds to be efficiently inspected for near-surface cracks because the weld can be inspected through paint or metallic coatings.

## SO WHY USE A SPECIAL WELD PROBE?

Firstly, by using a differential coil configuration, Eddy Current Weld Probes allow inspection without the need to remove any coating / paint.
Also Weld Probes are very sensitive to lift-off and variations in material properties caused by the heat affected zone through a simple absolute probe offering Low lift-off sensitivity variation; 8 db per mm as compared with the pencil probe at 40 db per mm. This gives minimal spurious signals caused by lift-off because of differential connection.

## Benefits of using an Eddy Current Weld Probe.

- **AN APPROVED METHOD TO REPLACE MPI.**
- **HAS APPROVAL FROM MANY CERTIFYING AUTHORITIES AND MANY TRAINING FACILITIES.**
- **A GOOD OPTION FOR ROPE ACCESS INSPECTORS - NO NEED FOR HIGH COST SCAFFOLDING ALSO.**
- **CAN DETECT CRACKS THROUGH SURFACE COATINGS.**
- **APPLICATION SPECIFIC DESIGN TO SUIT THE CLIENTS NEEDS.**
- **COST EFFECTIVE.**
- **TIME EFFICIENT.**

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## APPLICATIONS

### OFFSHORE

**Widely used for Weld Inspection, replacing MPI due to not needing to remove surface coatings.**

**Ideal for Rope Access inspection needs.**

### RAIL

**Used in the manual inspecton of defects in rails and wheels.**

**Axle Inspection evidence shows greater relability that UT.**

**Weld inspection on chassis and bogeys.**

### NUCLEAR

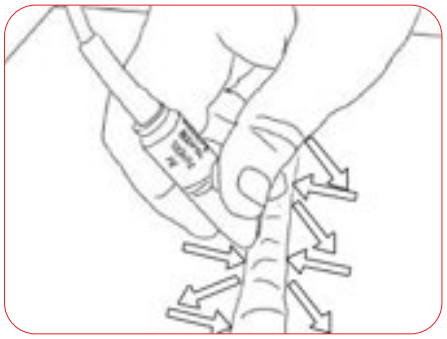
**Widely used in the Nuclear NDT industry.**

### CONVENTIONAL MANUAL INSPECTION AND WITH AUTOMATED SCANNERS.

- **Bridges**
- **Steel Framed Buildings**
- **Prison Bars detecting saw cuts.**
- **Overhead Traffic Lights**
- **Amusement Rides**

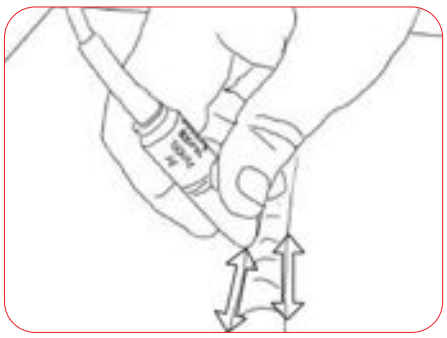
## THE WELD PROBE INSPECTION PROCEDURE

The inspection procedure requires a certain workflow of scanning. It is also important to remember that the active part of the probe is 3mm x 3mm. The diagrams below demonstrate this procedure:



1. Zig-zag scan of the toe in the 'HAZ' (Heat Affected Zone) along the length of the Toe.

2. Scan of the Weld Cap.



3. A sweep along the Toe.

## EQUIPMENT NEEDED TO PERFORM A WELD PROBE INSPECTION

*ETher NDE* can offer the full range of equipment needed to perform a Weld Probe Inspection.
An inspector will need:

- Impedance plane display eddy current instrument (e.g. VANTAGE or VERITOR).
- Weld probe.
- Paint probe to assess coating thickness and compensate calibration by means of shims.
- Test block with 2, 1 and 0.5Mm notches and four 0.5Mm shims.
- A full datasheet complete with all the options for *ETher NDE* Weld Probes is available. *ETher NDE* will also be happy to help with any application specific Weld Probe design.

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# Weld Probes: Bridge

The following range of *ETher NDE* Weld Probes is available in a number of different sizes and frequencies, all with minimal lift-off signal. They can detect surface breaking fatigue cracks through 2mm of surface coating material and are therefore less expensive and quicker to use than other techniques.

## Benefits

- Broad frequency range.
- Cables up to 50 metres available.
- Able to detect cracks through a wide range of coatings.
- Available in a wide range of diameters.

## Applications

Differential Weld probes ideal for in-service inspection of welded structures.

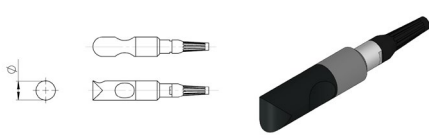
Bridge Weld Probes offer many Key Features within their specification including:

- Straight, 90° Inline, 90° Right Angle
- Diameters, 11.0mm (Small), 16mm (Medium), 32mm (Large)
- Dis-connectable and integral probe cables
- Cable lengths from 1.5 to 50 metres
- Frequency range 100, 20, 100-600kHz
- Minimal lift off signal, can find cracks through paint, oil and conductive and non-conductive coatings
- Made from hard wearing PET
- Stainless steel and ceramic tips available on request

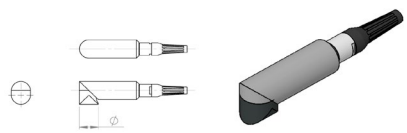
Note:

- 100kHz probes used on standard ferrous welds
- 100-600kHz probe can be used on Aluminium and Stainless Steel welds
- 20kHz probe can be used on multi-surface applications.

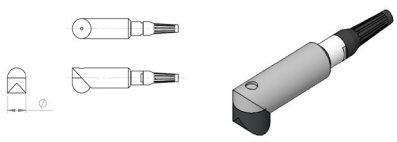
### Straight



### 90° Inline



### 90 ° Transverse



### Waterproof

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# Weld Probe (Bridge) Coding System

PWS100S015L12

| | |
|---|---|
| PW | Probe Weld (Plastic) |
| S | Dia 11.0mm (Small) |
| M | Dia 16.0mm (Medium) |
| L | Dian 32.0mm (Large) |
| 100 | 100kHz (Standard) |
| 020 | 20kHz Enhanced |
| 106 | 100-600kHz Multi-surface |
| S | Straight |
| I | 90 deg Inline |
| R | 90 deg Transverse |
| 000 | Disconnect |
| 015 | 1.5m Cable |
| 050 | 5.0m Cable |
| 100 | 10.0m Cable |
| 500 | 50.0m Cable |
| L7 | 7 Way Lemo |
| L12 | 12 Way Lemo |
| J6 | 6 Way Jaeger |
| A4 | 4-way Amphenol |
| C3 | 3-way Cannon |
| W | Waterproof |

Example: PWS100S015L12

Part Number: Probe, Weld, Dia. 11.0mm (Small), 100kHz, Straight, 1.5m Cable, Lemo 12-Way.

**Other options are available so please feel free to contact us directly.**

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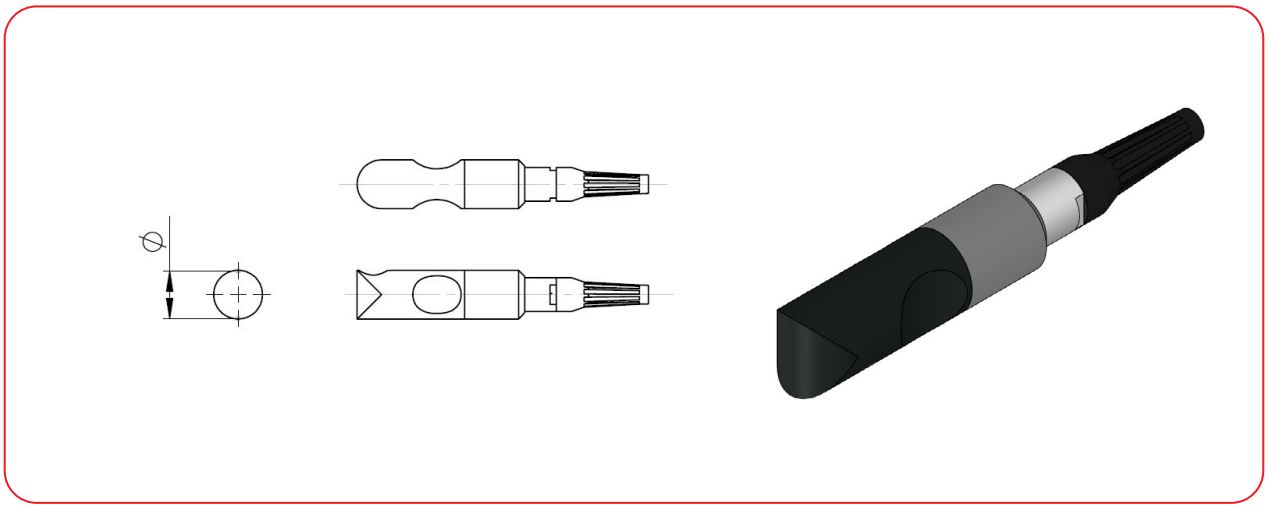
# Straight Weld Probe: Bridge



| Ether Part No | Hocking Part No | Frequency | Description |
|---|---|---|---|
| PWS100S015L12 | 800P01MB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, Straight, 1.5m Cable, Lemo 12-Way |
| PWS100S015L7 | 800P01NB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, Straight, 1.5m Cable, Lemo 7-Way |
| PWS100S015J6 | 800P01JB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, Straight, 1.5m Cable, Jaeger 6-Way |
| PWM100S015L12 | 800P04MB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, Straight, 1.5m Cable, Lemo 12-Way |
| PWM100S015L7 | 800P04NB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, Straight, 1.5m Cable, Lemo 7-Way |
| PWM100S015J6 | 800P04JB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, Straight, 1.5m Cable, Jaeger 6-Way |
| PWL100S015L12 | 800P06MB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, Straight, 1.5m Cable, Lemo 12-Way |
| PWL100S015L7 | 800P06NB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, Straight, 1.5m Cable, Lemo 7-Way |
| PWL100S015J6 | 800P06JB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, Straight, 1.5m Cable, Jaeger 6-Way |
| | | | |
| PWS100S050L12 | 800P01MD1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, Straight, 5.0m Cable, Lemo 12-Way |
| PWS100S050L7 | 800P01ND1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, Straight, 5.0m Cable, Lemo 7-Way |
| PWS100S050J6 | 800P01JD1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, Straight, 5.0m Cable, Jaeger 6-Way |
| PWM100S050L12 | 800P04MD1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, Straight, 5.0m Cable, Lemo 12-Way |
| PWM100S050L7 | 800P04ND1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, Straight, 5.0m Cable, Lemo 7-Way |
| PWM100S050J6 | 800P04JD1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, Straight, 5.0m Cable, Jaeger 6-Way |
| PWL100S050L12 | 800P06MD1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, Straight, 5.0m Cable, Lemo 12-Way |
| PWL100S050L7 | 800P06ND1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, Straight, 5.0m Cable, Lemo 7-Way |
| PWL100S050J6 | 800P06JD1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, Straight, 5.0m Cable, Jaeger 6-Way |

# 90° Inline Weld Probe: Bridge

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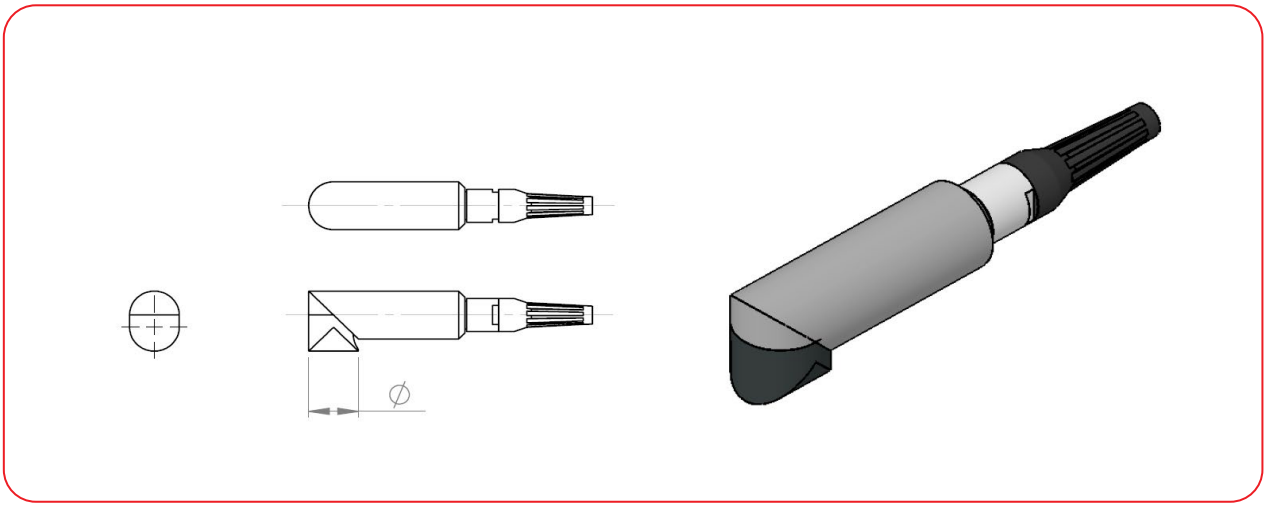


| | Hocking Part No | Frequency | Description |
|---|---|---|---|
| PWS100I015L12 | 801P01MB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Inline, 1.5m Cable, Lemo 12-Way |
| PWS100I015L7 | 801P01NB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Inline, 1.5m Cable, Lemo 7-Way |
| PWS100I015J6 | 801P01JB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Inline, 1.5m Cable, Jaeger 6-Way |
| PWM100I015L12 | 801P04MB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Inline, 1.5m Cable, Lemo 12-Way |
| PWM100I015L7 | 801P04NB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Inline, 1.5m Cable, Lemo 7-Way |
| PWM100I015J6 | 801P04JB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Inline, 1.5m Cable, Jaeger 6-Way |
| PWL100I015L12 | 801P06MB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Inline, 1.5m Cable, Lemo 12-Way |
| PWL100I015L7 | 801P06NB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Inline, 1.5m Cable, Lemo 7-Way |
| PWL100I015J6 | 801P06JB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Inline, 1.5m Cable, Jaeger 6-Way |
| | | | |
| PWS100I050L12 | 801P01MD1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Inline, 5.0m Cable, Lemo 12-Way |
| PWS100I050L7 | 801P01ND1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Inline, 5.0m Cable, Lemo 7-Way |
| PWS100I050J6 | 801P01JD1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Inline, 5.0m Cable, Jaeger 6-Way |
| PWM100I050L12 | 801P04MD1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Inline, 5.0m Cable, Lemo 12-Way |
| PWM100I050L7 | 801P04ND1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Inline, 5.0m Cable, Lemo 7-Way |
| PWM100I050J6 | 801P04JD1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Inline, 5.0m Cable, Jaeger 6-Way |
| PWL100I050L12 | 801P06MD1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Inline, 5.0m Cable, Lemo 12-Way |
| PWL100I050L7 | 801P06ND1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Inline, 5.0m Cable, Lemo 7-Way |
| PWL100I050J6 | 801P06JD1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Inline, 5.0m Cable, Jaeger 6-Way |

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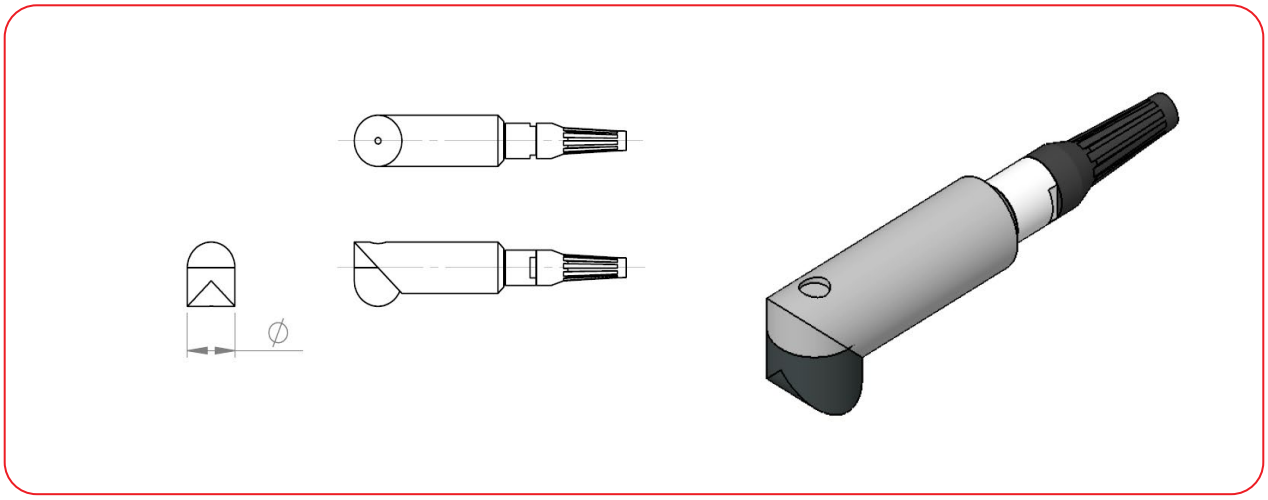
# 90° Transverse Weld Probe: Bridge



| EThер Part No | Hocking Part No | Frequency | Description |
|---|---|---|---|
| PWS100R015L12 | 802P01MB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Lemo 12-Way |
| PWS100R015L7 | 802P01NB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Lemo 7-Way |
| PWS100R015J6 | 802P01JB1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Jaeger 6-Way |
| PWM100R015L12 | 802P04MB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Lemo 12-Way |
| PWM100R015L7 | 802P04NB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Lemo 7-Way |
| PWM100R015J6 | 802P04JB1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Jaeger 6-Way |
| PWL100R015L12 | 802P06MB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Lemo 12-Way |
| PWL100R015L7 | 802P06NB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Lemo 7-Way |
| PWL100R015J6 | 802P06JB1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Right Angle, 1.5m Cable, Jaeger 6-Way |
| | | | |
| PWS100R050L12 | 802P01MD1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Lemo 12-Way |
| PWS100R050L7 | 802P01ND1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Lemo 7-Way |
| PWS100R050J6 | 802P01JD1P | 100kHz | Probe, Weld, Small, Dia 11.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Jaeger 6-Way |
| PWM100R050L12 | 802P04MD1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Lemo 12-Way |
| PWM100R050L7 | 802P04ND1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Lemo 7-Way |
| PWM100R050J6 | 802P04JD1P | 100kHz | Probe, Weld, Medium, Dia 16.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Jaeger 6-Way |
| PWL100R050L12 | 802P06MD1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Lemo 12-Way |
| PWL100R050L7 | 802P06ND1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Lemo 7-Way |
| PWL100R050J6 | 802P06JD1P | 100kHz | Probe, Weld, Large, Dia 32.00, 100kHz, 90 deg Right Angle, 5.0m Cable, Jaeger 6-Way |



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