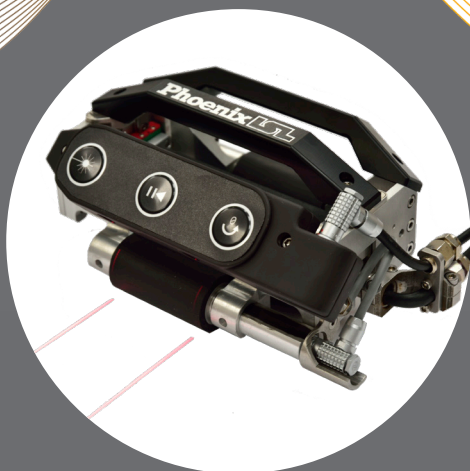
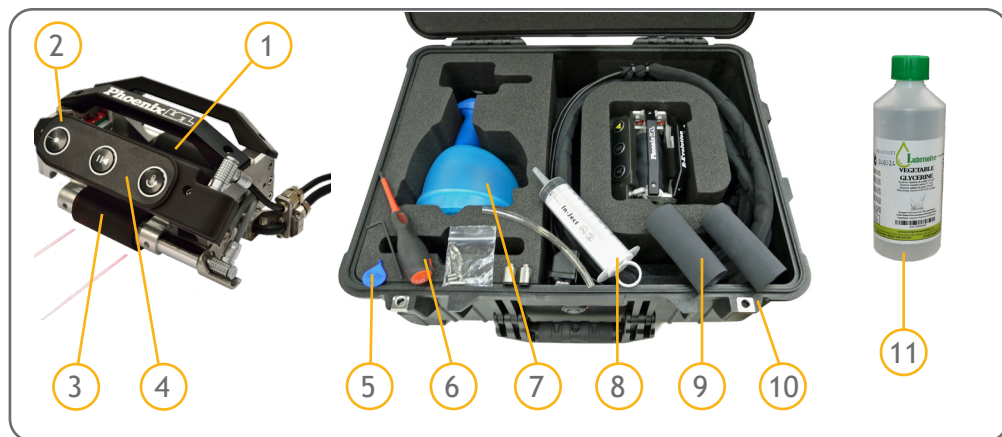


**R-Evolution**  
Ultrasonic Array Roller Probe  
**User Manual**



## R-Evolution Kit



- |                                      |                                               |
|--------------------------------------|-----------------------------------------------|
| 1. Array roller probe                | 7. Water spray bottle                         |
| 2. Self-normalising buggy            | 8. Tyre filling syringe and irrigation tubing |
| 3. Integrated encoder                | 9. 2 x Spare tyres                            |
| 4. Laser guidance handle             | 10. Protective carry case                     |
| 5. Laser orientation adjustment tool | 11. Glycerine                                 |
| 6. Tool kit                          |                                               |

## Spare Parts

### Order Information

To order spare and consumable parts for R-Evolution email quoting the relevant order code and description to: [sales@phoenixisl.com](mailto:sales@phoenixisl.com)

- |                         |                                     |
|-------------------------|-------------------------------------|
| ■ REVLTN-TYRE           | Spare tyre for wheel probe          |
| ■ AEP-REVLTN-PROBE-5-64 | Wheel probe only, 5MHz, 64 elements |
| ■ AEP-REVLTN-HNDL       | Handle with lasers                  |

Or visit [www.phoenixisl.com/products/r-evolution](http://www.phoenixisl.com/products/r-evolution)  
Select from the Accessories section and submit a quote request.

# R-Evolution

## Specification



|                              |                                   |
|------------------------------|-----------------------------------|
| Frequency                    | 2MHz, 3.5MHz, 5MHz, 7.5MHz, 10MHz |
| Number of elements           | 64                                |
| Element pitch                | 0.8mm                             |
| Element elevation            | 6.4mm                             |
| Immersion standoff           | 21.5mm                            |
| Probe weight                 | <1kg                              |
| Probe coupling force         | 25N                               |
| Roller diameter              | ø42mm                             |
| Overall dimensions L x W x H | 100 x 175 x 75 (excludes cable)   |
| Temperature range            | 5° C - 45° C                      |
| Encoder resolution           | 51.25 steps/mm                    |
| Glycerine (velocity)         | 1920 m/s                          |



**Scan**

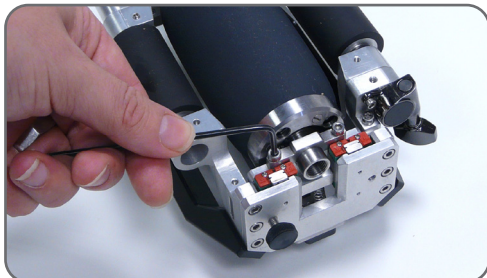
for more information and video

Or visit [www.phoenixisl.com/products/r-evolution](http://www.phoenixisl.com/products/r-evolution)

## 1. Operation

R-Evolution is a single axis scanner that utilises a linear array to produce approximately a 50mm wide C-scan. The inspection tool is simple to operate and adjust and designed to be of low maintenance. The following sections show how to set up and adjust the wheel probe for correct operation.

### 1.1 Aligning the wheel probe

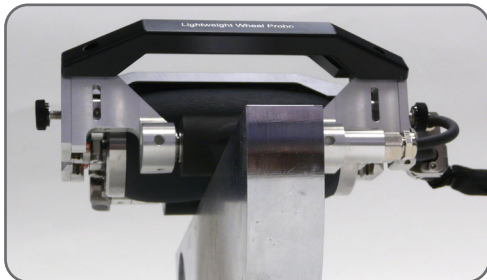


There are two ways to vary the orientation of the array to ensure the beam is perpendicular to the surface of the part. The first method gives a coarse adjustment and should be set by eye as a best effort. To set this, release the four screws from the underside clamps that attach the roller transducer axle to the buggy. Rotate the transducer so that the cable support bracket is parallel to the buggy frame. Tighten the screws.

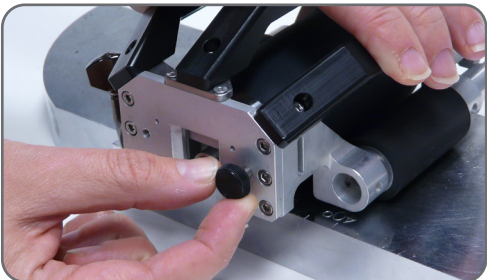


For fine alignment of the array, the rear roller can be raised or lowered using the cam thumbscrew. Connect the roller transducer to the inspection instrument and view an A-scan from the centre of the array. Place the R-Evolution on a flat uniform block (low attenuation material). Spray a fine mist of water onto the wheel / block to ensure good coupling. Push down the scanner so that the front and rear rollers are in contact with the part and the rubber wheel is coupled. Adjust the rear support roller height via the cam screw to maximise the back wall echo height.

### 1.2 Aligning the wheel probe



When inspecting thin components, or off the edge of components, it is possible to lock the height of the roller transducer. This overrides the pressure of the spring and prevents the thin tyre from being distorted as it is pushed against the part.



For inspecting a flat part, push the probe down on a large flat surface and hold it in position. Screw in the thumb screws on the side of the wheel probe to lock the height. The probe is now at a set height for the inspection.

# R-Evolution

The R-Evolution has an optional handle that includes two laser pointers and three buttons. The first button activates the lasers and the other two buttons can be used as instrument input switches, depending on the instrument that the R-Evolution is being used with. The function of these buttons can be set by the user.

## 1.3 Laser guidance handle



The handle connects to the encoder cable for power and does not need batteries to operate.



The two linear lasers are spaced approximately 50mm apart and indicate the scan limits of the roller array. The lasers are switched on and off using the button on the right.



A typical use for the central button, marked 'B' is to start/stop the data collection.

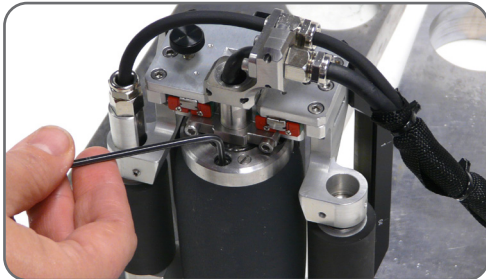


A typical use for the left button, marked 'A' is as a 'clicker' that resets the scan axis to zero and increments the index axis by a set distance. This allows the user to quickly build up a combined C-scan of an area.

## 2. Maintenance

The array roller probe includes a non-return ball valve so that it can be inflated with Glycerine. In order to fill it, connect a tube fitting to the 1/8" BSP screw thread on the array roller probe. The fitting should be connected to a large syringe (supplied) or a manual pump. Where possible avoid pumping air bubbles into the wheel probe.

### 2.1 Filling the wheel probe

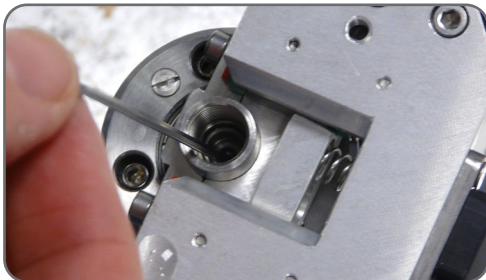


Stand the R-Evolution on one end with the fitting at the bottom. Undo one of the air-bleed set screws from the upturned side face of the array roller probe.



Pump Glycerine in to the bleed hole. Tighten the bleed set screw to seal the array roller probe and continue to pump Glycerine in to inflate the tyre. The tyre should be inflated but not exceed Ø50mm. Once filled disconnect the supply and remove the fitting.

### 2.2 Removing air bubbles



Check the wheel probe for air bubbles by holding it upside down and observing the tyre reflection on a B-scan/S-scan display. Bubbles will 'roll' across the display and interfere with the tyre reflection. To remove bubbles orientate the R-Evolution so the filling valve is upright and shake to move the bubbles to the valve. Using a small driver or allen key, push in the non-return ball valve until Glycerine comes out and then release.



If the tyre deflates too much it may be necessary to top up by repeating the filling procedure.

# R-Evolution

## 3. Removing or replacing the tyre

It may be necessary to remove the tyre either for cleaning or to replace it if damaged. Firstly, unplug the encoder cable from the handle or front roller. Separate the array roller probe from the buggy by removing the underside clamps holding the axle (see 1.1). The array roller probe should be drained of Glycerine by inverting and pushing in the non-return ball valve (see 2.2).

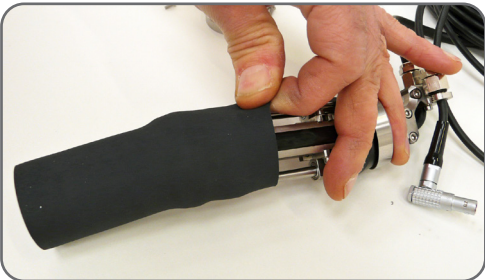


The tyre is gripped on either side of the array roller probe by an end cap. Each end cap is held in place by four slotted, countersunk screws, which should all be removed.



Pulling the end pieces away allows the tyre to be pulled off the body, away from the cables. The tyre is undersized so it must be stretched to remove it.

## 4. Maintenance Schedule



To fit a new tyre, the above procedure should be reversed, clamping the new tyre with the end caps. When the array roller probe is installed back into the buggy it should then be aligned as per section 1.1.



It is recommended that:

- The tyre is removed and cleaned every 12 months. Check the tyre for damage and if necessary replace it with a new tyre.
- R-Evolution is drained of Glycerine before transporting by air in an unpressurised cargo hold.

## Contact Us

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