

MultiMag User Manual

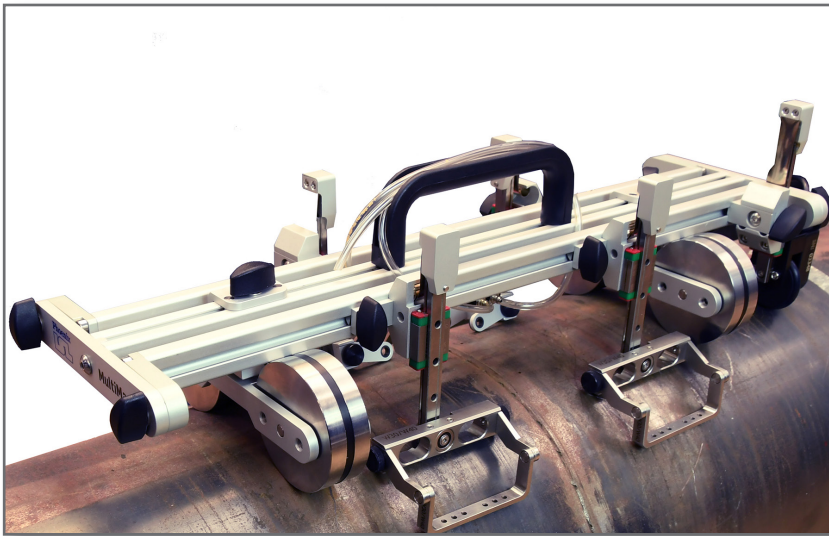
Ver.2



Contents

Section		Page
1.0	Introduction	3
2.0	MultiMag Main Components	4
3.0	MultiMag Basic Set-Up	5
4.0	Probe Holding Toolposts	6
5.0	Phased Array Toolposts	7
6.0	Circumferential weld inspection	8
7.0	MutiMag Accessories	10
7.1	Waterproof wheel encoder	10
7.2	Laser Guide	10
8.0	Maintenance and Repair	11
8.1	MultiMag Maintenance	11
8.2	MultiMag Support and Repair	11

1. Introduction



The MultiMag is a versatile scanner capable of holding multiple probes configured for weld inspection. It is ideal for inspections requiring a combination of phased array and TOFD pairs, as well as inspections utilising multiple pulse-echo transducers. The MultiMag is suitable for inspecting circumferential welds on ferritic pipeline and vessels.

Features include:

- Large magnetic wheels that provide a stable platform and a smooth rolling motion
- Frame and wheel positions can be easily adjusted and reconfigured such that the scanner can be used on a wide range of pipe sizes
- Operates on pipes from Ø4 for circumferential welds up to flat plate
- Wheels have sprung suspension that help the scanner to roll over minor surface irregularities such as weld spatter, without disruption to the inspection and provides compliance for mismatched welds

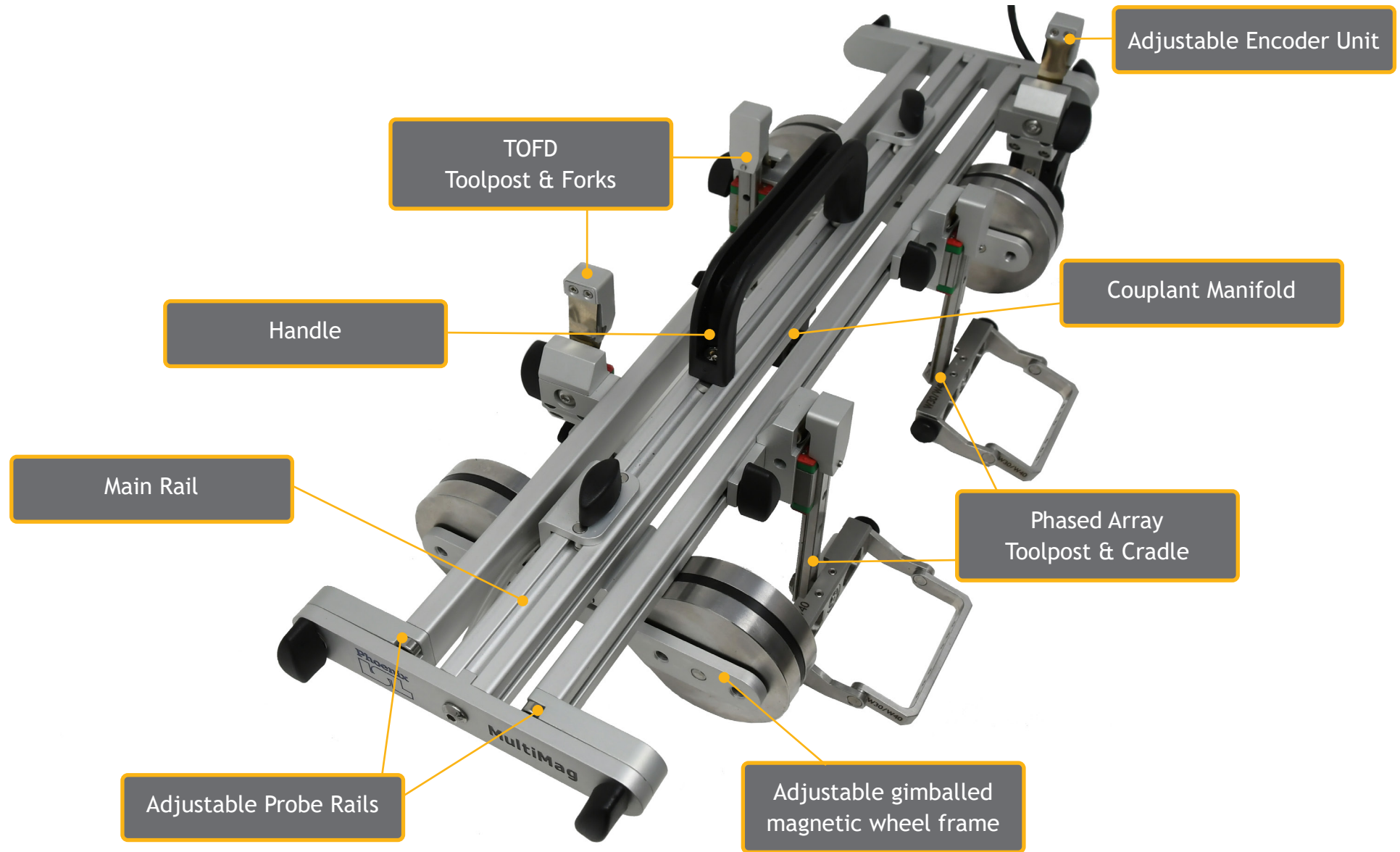
The MultiMag can hold up to six transducers simultaneously, arranged as two pairs on either side of the weld and two singles looking into the weld. The transducers are mounted to sprung-loaded probe holders that push them onto the surface to provide stable positioning. The probe-holding toolposts incorporate a constant force spring that provides equal pressure and therefore consistent coupling over a wide range of operating heights making the setup quick, easy and hassle-free.

Transducers can be simply re-positioned relative to the weld without the use of tools. Each probe-holding toolpost is fixed in place with a thumb screw. The toolposts have passive gimbals in two directions to ensure the transducers accommodate surface variations without loss of contact.

The MultiMag has a single axis wheel encoder that can be wired to any suitable instrument making the scanner compatible with any multi-channel flaw detection system. Each scanner also includes a couplant manifold and tubing to distribute a single water feed to each of the transducers.

Optional accessories include a guide chain to maintain scanner alignment and direction, a laser guide for the operator to track a weld line by eye, and manual or automated couplant pump supply systems.

MultiMag Main Components

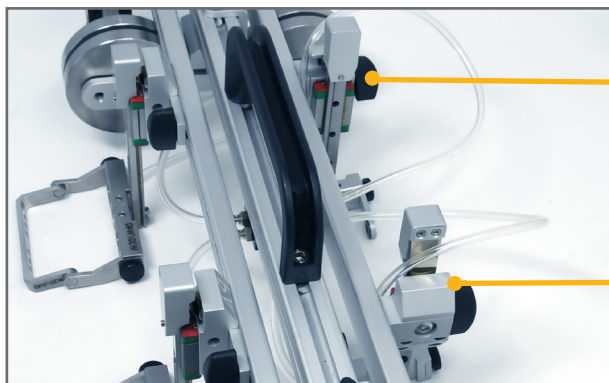


MultiMag Basic Set-Up

1. Loosen the thumbscrews at either end of the probe rail
2. Rotate probe rail until probes point at pipe centre
3. Tighten thumbscrews to lock rail in position
4. Loosen thumbscrews and slide toolposts left or right to adjust probe separation
5. Adjust encoder unit and lock in position with thumbscrew
6. Repeat with probe rail and toolposts on the other side of the MultiMag



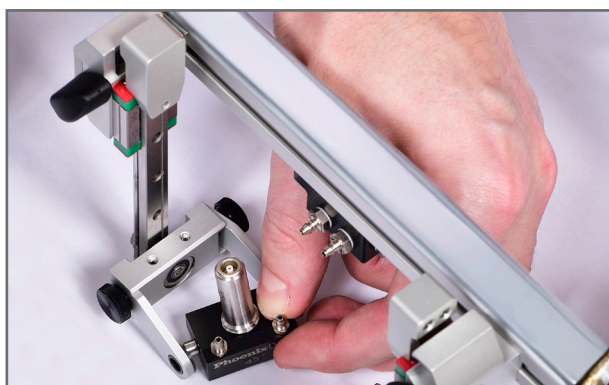
4. Probe Holding Toolposts



To remove a Probe Toolpost from the MultiMag, undo the thumb screw that attaches it to the Probe Rail. It is easier to undertake this when the scanner is not on the pipe surface so that the Probe Toolpost spring is in its relaxed position. The screw is captive to prevent loss, however care should be taken to not misplace the T-slot nut in the Probe Rail when the Probe Toolpost is removed.



To swap a TOFD or conventional transducer, undo one of the thumb screws from the side of the Probe Forks until the probe / wedge is removable.



Replace with the new probe / wedge, and tighten the thumb screw to fix it in place. Check that the new probe rotates freely in the screw gimbal.

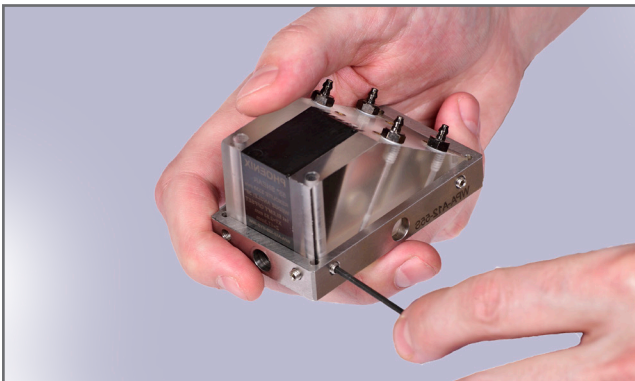
5. Phased Array Toolposts and Cradles



Phased array transducers and wedges are typically fitted into full or half metal cradles.



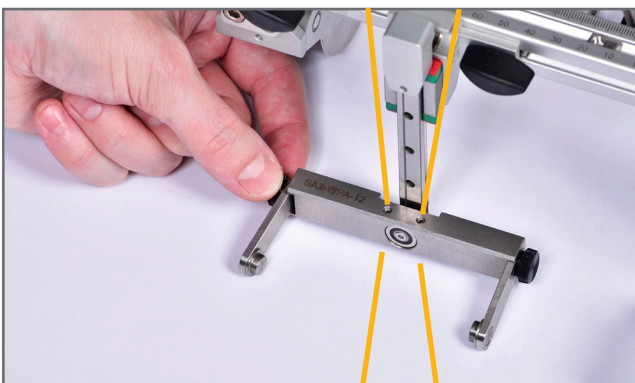
The cradles are mounted to the gimbaling probe forks. Phased array probe toolposts are typically forward facing.



To swap a phased array probe and wedge from its cradle release the series of set screws in the cradle wall.

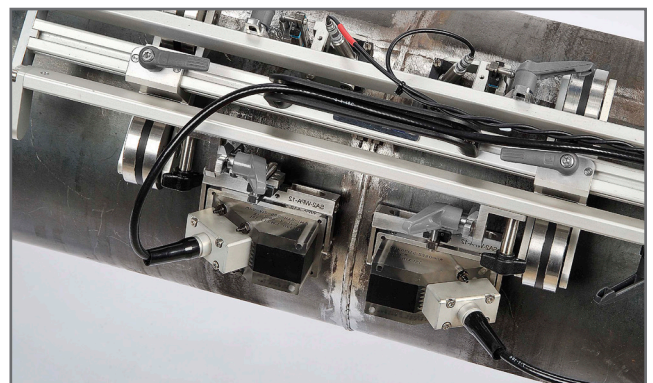


Remove the probe and wedge and replace with the new one, and retighten the set screws.



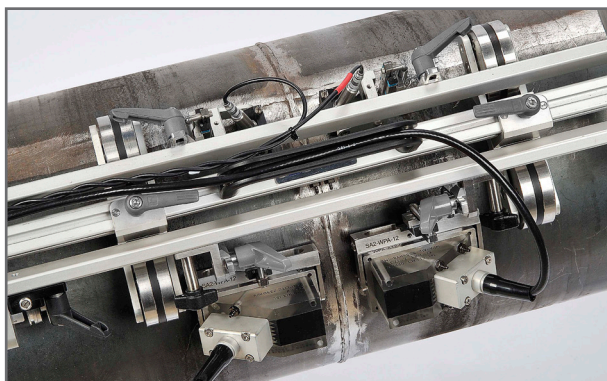
Changing the phased array probe and wedge:

1. Loosen the four set screws securing the probe forks to the journal bearing at the base of the sprung rail.
2. Remove the probe forks and cradle by pulling them forward and away from the journal bearing.
3. Install the new probe forks and cradle.
4. Retighten the four set screws to secure them.

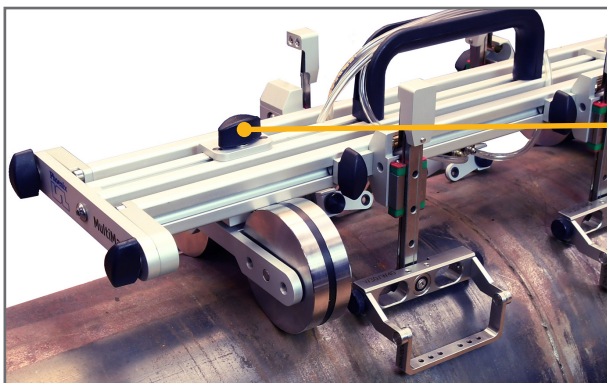


Do not allow any twist of the probe. Toolposts provide improved stability and prevent twist due to friction forces during scanning. Due to the variety in sizes, probe forks and cradles are often supplied specific to the phased array probe type.

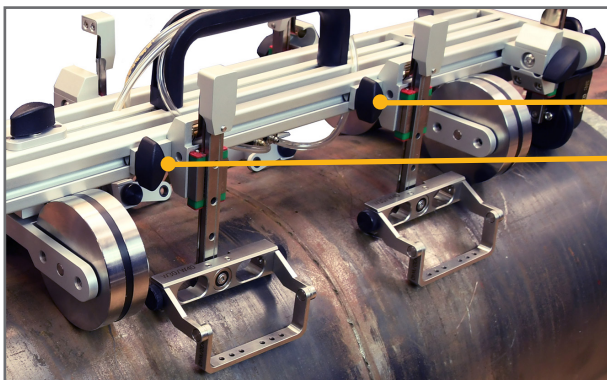
6. Scanner Set-Up - Circumferential Weld Inspection



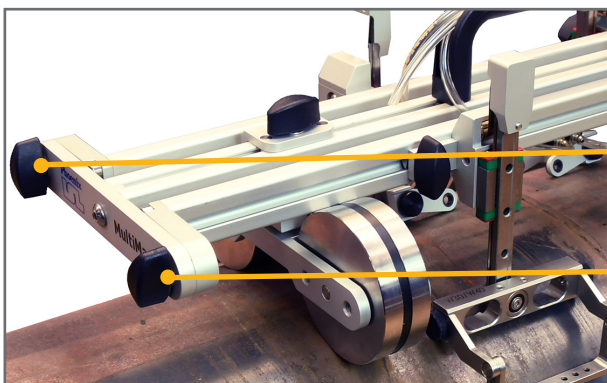
For the pipe size being inspected, set the wheel separation so that the MultiMag fits on the pipe with adequate clearance along the Central Probe Rail for the required toolpost separation.



To adjust the wheel position, release the screw attaching the Wheel Unit to the Central Probe Rail, slide the wheel to the desired position and retighten the screw. Ideally ensure the wheels are equally spaced on either side of the weld.



Once the wheels are set, attach the Probe Toolposts in the configuration desired for the inspection. To change the position of a transducer, undo the thumb screw attaching the Probe Toolpost to the Probe Rail by one turn, slide it to the desired position and re-tighten the thumb screw. The thumb screw attaches to T-slot nuts in the rail for easy repositioning.

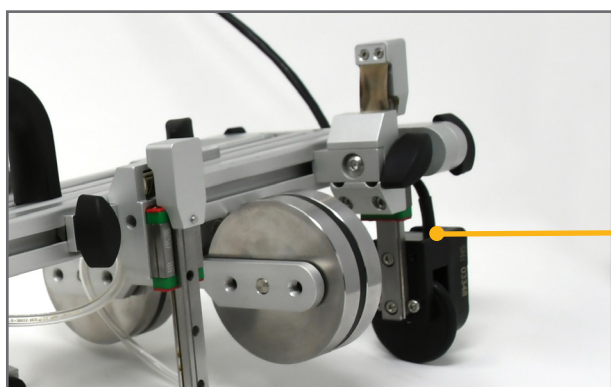


The angle of the Adjustable Probe Rails should be set to match the pipe size such that they are the same height from the pipe surface as the Central Probe Rail and that the Probe Toolposts are approximately normal to the pipe. To achieve this release the Probe Rail Locking Levers by half a turn on each side, adjust the angle of the Adjustable Probe Rails to the desired position and re-tighten them.

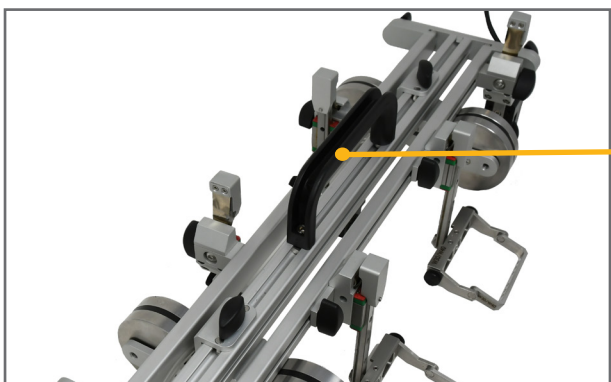
6. Circumferential Weld Inspection / Continued...



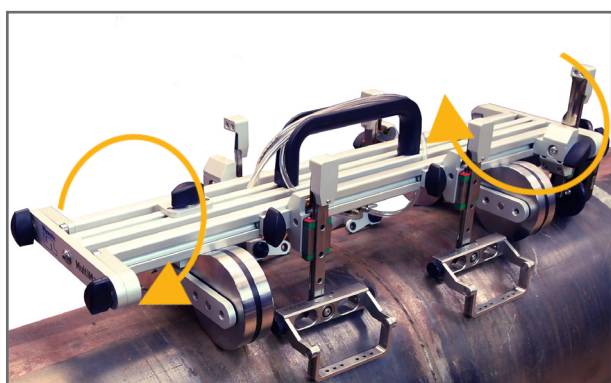
Ensure accessories and peripheral items such as encoders, laser pointers, guide chains and couplant manifolds are correctly positioned and connected. Tidy all cables and secure as necessary to the MultiMag frame.



The MultiMag is ready to be used for circumferential weld inspections. Set the encoder resolution to 65.6 steps/mm (quadrature). Move the scanner to the start position and set the position on the acquisition unit to zero.



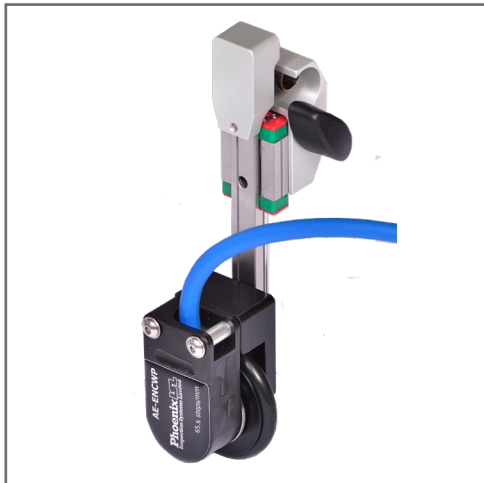
Start the acquisition unit collecting data, push the scanner around the pipe using the MultiMag handle.



To remove the MultiMag, twist the frame across the axial direction of the pipe using the end rails to break the magnetic attachment and pull the MultiMag away from the pipe.

7. MutiMag Accessories

7.1 Waterproof Wheel Encoder



The encoder is attached to a sprung loaded toolpost that is similar to a TOFD or conventional probe toolpost and mounted in the same way to a probe rail. The encoder has an O-ring tyre and is ~Ø40mm. The encoder provides 5V TTL quadrature encoder signals with a count of 65.6 steps/mm. The encoder can be terminated for a wide range of instruments, to be identified upon ordering. The encoders are typically single-ended (A, B signals), however they can be manufactured to be differential type (A+, A-, B+, B- signals) upon special request for demanding applications.

The encoder is submersible - IP68, to ensure it functions continuously and reliably in the inspection environment.

7.2 Laser Guide



The A laser pointer may be used to assist the operator follow the centre line of a weld or a line on the pipe surface. The laser pointer is provided with an adjustable bracket that attaches to the top of one of the Probe Rails. The adjustable bracket allows its lateral position and the pitch of the laser to be set to meet the user requirements. Adjustment is made by releasing the appropriate thumb screws. The laser pointers require LR44 batteries for operation and have an on/off button switch on the rear.

8. Maintenance and Repair

8.1 MultiMag Maintenance



1. Check that the magnetic wheels are free of debris and clean as necessary.
2. Check that the wheel suspension springs operate smoothly and are free of debris.
3. Check that each Probe and Encoder Toolpost slides up and down smoothly.
 - a. Use a very small amount of oil to lubricate the springs periodically as necessary.
 - b. Take note that excess oil tends to gather dirt and debris quickly and so should be avoided.
4. Check that each Probe Fork is attached firmly to the journal bearing at the base of the sprung rail.
 - a. Tighten the four set screws in the Probe Fork as required to prevent and twisting motion of the transducer.

8.2 MultiMag Support and Repair

The MultiMag scanner is built from durable, modular components designed to withstand demanding site conditions.

In the unlikely event that your MultiMag experiences a fault or requires a repair, please contact the Phoenix ISL Sales Team with details of the issue:

T: +44 (0)1925 826000

E: sales@phoenixisl.com

Upon receipt of your request, a Returned Merchandise Authorisation (RMA) Form will be completed and issued. Please enclose the RMA form with the scanner when returning it to Phoenix ISL for inspection and repair.

Contact Us

Phoenix Inspection Systems Limited

Dalton House, 40 Hardwick Grange,
Warrington, WA1 4RF, United Kingdom

t: +44 (0) 1925 826 000

f: +44 (0) 1925 838 788

e: sales@phoenixisl.com

www.phoenixisl.com

