Eddyfi Technologies

Beyond current

Getting Started with

R-SCAN ARRAY

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R-Scan Array User Manual Version 2.1

This manual is part of the original documentation supplied with the R-Scan Array system.

January 2022.

Table of Contents

Precautions and Conventions

General Precautions

The following precautions are to be observed at all times when using the R-Scan Array scanner. Please ensure that you review them before utilizing the system:

- Keep this document in a safe place for future reference.
- Carefully follow the installation and operation procedures detailed herein.
- Observe all warnings, notes and instructions as marked on the packaging, the scanner, and detailed in the user manual.
- When transporting, it is your responsibility to follow all safety precautions as dictated by the relevant local governing bodies.
- The equipment must not be used for purposes other than those intended. Eddyfi assumes no responsibility for any damage resulting from such improper usage.
- Do not use substitute parts or perform unauthorized modifications to the system.
- If the system does not operate normally, please contact Eddyfi for assistance.

Safety Precautions

During operation of the R-Scan Array system please observe the safety warning and precautions.

Magnetic Field

The wheels of the R-Scan Array scanner contain magnets that produce an extremely strong magnetic field which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, and medical or other electronics devices.

Any form of credit card, security pass, computer or programmed equipment may be permanently affected if exposed to the magnetic field of the system.

Pacemakers or other Medical Devices and Mechanical Implants

Powerful magnets may interfere with medical electronics such as pacemakers, defibrillators, or other internal and external medical devices. The interference can be severe and cause malfunctions. Individuals wearing such devices should not handle strong magnets. If any user has any type of electronic, mechanical, implanted, or external medical device, they should consult a physician and the manufacturer of the medical device to determine its susceptibility to static magnetic fields prior to allowing them to handle the R-Scan Array system. All magnetic products should be kept at a safe distance from individuals with such devices.

Finger Trap

Due to the powerful magnets involved care must always be taken when handling and using the R-Scan Array system, especially when deploying and removing the scanner from the inspection surface as the system will exhibit a strong attractive force and present a finger trap.

Loose ferrous material such as tools, metal objects or magnets will be attracted to the systems magnetic wheels and may cause injury as they move towards them. Always ensure to work in a clean area, carefully follow handling instructions and be vigilant.

Conventions

Safety Indications in This Document

The safety indications in this document are intended to ensure operator safety and the integrity of the system.

DANGER!

Danger statements are a description of an imminent hazardous procedure or a practice (or the like) that, if performed incorrectly, can result in severe injury or death if not avoided and should be limited to the most extreme situations. Do not ignore danger indications, ensure the condition is understood before proceeding.

WARNING!

Warning statements are a description of a potentially hazardous procedure or a practice (or the like) that, if not avoided or if performed incorrectly, could result in injury. Do not ignore warning indications, ensure the condition is understood before proceeding.

CAUTION!

Caution statements are a description of a potentially hazardous procedure or a practice (or the like) that, if not avoided or if performed incorrectly, could result in material damage, loss of data, or both. Do not ignore caution indications, ensure the condition is understood before proceeding.

TETHER LINE

A suitable safety line must be attached to the handle of the R-Scan Array scanner during manual operation. Attach the tether line BEFORE placing the R-Scan Array scanner onto the inspection surface.

IMPORTANT

Calls the attention to information important to completing tasks.

NOTE

Calls the attention to an operating procedure, a practice, or the like that requires special attention.

Limited Warranty

LIMITED PRODUCT WARRANTY: Except as otherwise agreed to by EDDYFI in writing, products such as instruments, mechanical products, spare parts, probes and cables are warranted, to the original Customer only, for use solely by Customer or direct affiliate, against defects in material and workmanship for a period of twelve (12) months from the date of delivery. Additional coverage may be provided under any Hardware Maintenance Plan (HMP) purchased by the Customer. Probes and cables are considered consumables and require periodic replacement due to wear. EDDYFI does not warrant the service life of probes, cables and other consumables. EDDYFI does not warrant any products against damages or defects caused by wear and tear, negligence, misuse, abnormal operating conditions, alterations or damage caused by events beyond the control of EDDYFI. EDDYFI shall not be liable for product defects caused by or resulting from any inaccuracies in any drawing, description or specification supplied by the Customer. Upon Customers written request during the warranty period, EDDYFI, at its choice, will repair or replace defective products within a reasonable time. The original term of warranty applies, without extension, for repaired or replacement products. All defective product shall be sent to EDDYFI freight prepaid by Customer in packaging appropriate to prevent damage in transit. The Limited Product Warranty does not apply to periodic

calibration or minor maintenance as described in products operating manuals. All Customer paid repairs performed by EDDYFI are warranted against defects in materials and workmanship for ninety (90) days from the completion of repair. Upon Customer's written notice of defect within the ninety (90) day period, EDDYFI will replace the defective part(s) and/or re-perform the service. This warranty is limited to failures in areas directly related to the repair performed. EDDYFI does not warrant any non-EDDYFI products.

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TECHNICAL SUPPORT: Eddyfi shall have no obligations to provide technical support and expertise for i) Hardware Product that are not under a valid calibration certificate or under a valid Hardware Maintenance Plan (HMP), and ii) Software that has not been updated to the latest version available under a Software Subscription or a Software Maintenance Plan.

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The information contained in this document is subject to change without notice.

R-Scan Array

Introducing R-Scan Array

R-Scan Array PAUT system is the perfect solution for the inspection of complex geometry components including curved surfaces, flat plate, pipelines, and restricted access areas. The versatile, battery-operated, portable semi-automated Phased-Array (PA) corrosion mapping solution with onboard data collection capabilities delivers improved inspection dexterity and accuracy. While primarily designed to work with an Eddyfi PA UT instrument, it can be utilised with other third-party PA UT instruments.

In conjunction with the RMS Phased Array solution from Eddyfi Technologies, the R-Scan Array scanner allows for manually encoded Phased Array (PA) corrosion mapping with onboard data stitching capabilities and fully remote automated PA corrosion mapping.

Having this unique ability with a manual phased array scanner, allows operators to quickly determine defect type and morphology, and also navigate restricted and complex scanning surfaces. Detection capabilities include corrosion, erosion, hydrogen-induced cracking (HIC), and high-temperature hydrogen attack (HTHA) with quantifiable, detailed defect characterization, allowing for complete coverage during complex inspection campaigns.

Phased-Array Corrosion Mapping

The phased-array configuration utilizes the water-column concept that eliminates the need for a wedge, thus providing the benefits of improved signal consistency, accuracy, and limited dead zone. This concept offers enhanced surface conformance and improved coupling.

R-Scan Array Operation Modes

The scanner can be used in both manual and automated capacities. When deployed as a portable handheld manual Phased Array corrosion mapping system, the high friction wheels in conjunction with the on-board control buttons provide the adhesion, friction, and stability to perform a stitched C-Scan data set without needing to return to the instrument.

When requiring a remote and fully automated scanning solution, the high friction interchangeable wheels are replaced by the low friction wheels for a smooth axial/lateral step for precision C-Scan data stitching.

What's in the Box

This depends upon which package of the R-Scan Array system has been purchased.

R-Scan Array

The R-Scan Array package is supplied in a rugged transport case and comes with the following standard accessories:

Nanuk transport PELI-CASE

- R-Scan Array scanner
- 4x low friction wheels
- 25x Foam seals
- 1x Spares kit
- Water box assembly
- 15mm and 30mm water box extensions
- Spiral wrapped umbilical (5m or 15m / 16.4ft or 49.2ft)
- PA Probe (Optional)
- Spiral wrap tool

Figure 1: R-Scan Array Nanuk transport case

Included for Automated Scanning

- RMS Scanner Attachment Arm
- RMS Encoder Breakout cable
- RMS Control Box to Instrument encoder cable

Figure 2: R-Scan Array automated scanning items

R-Scan Array Overview

Scanner Components

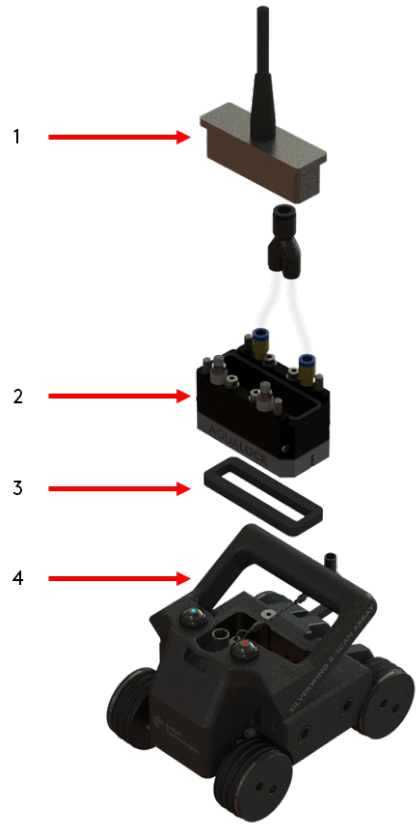

Figure 3: R-Scan Array Scanner components

1. **Phased-array Probe**

   Typically paired with a 7.5 MHz 64 Element Linear Array 1mm pitch probe. The probe is not supplied as standard with the scanner.

2. **Water box**

   Designed to house the immersion phased array probes with external dimensions (L x W x H) of 73 x 24 x 25 mm (2.87 x 0.94 x 0.98 in).

3. **Foam Seal**

   Provides a watertight seal between the water box and the inspection surface. Periodic replacement of the foam seal is recommended.

4. **R-Scan Array**

   Portable hand-held scanner, comprising of an integrated encoder, on-board instrument controls, interchangeable wheels, wheel brake for use in manual mode and mounting points for use in automatic mode.

Front Isometric View

Figure 4: R-Scan Array Front isometic view

5. Handle

Used to carry, deploy, move, and remove the scanner. It is also used as a tether point for the scanner. An electronic assembly housing the on-board button controls and encoder is integrated and sealed into the handle. The encoder connects direct to the front wheel axle and is used to record the distance travelled by the scanner.

CAUTION

Ensure the handle is used at all times when handling or operating the scanner.

TETHER LINE

CAUTION
DO NOT OPERATE WITHOUT TETHER

Ensure the unit is tethered at all times when used in manual mode to prevent the scanner from falling.

6. Pause / Resume button

Identified by an illuminated red LED. Used during an inspection to pause / resume the scan.

CAUTION

When paused during a scan any forward or backwards movement by the scanner is not recorded by the encoder.

7. Indexing button

Identified by an illuminated blue LED. Button has two functions:

Press once: Proceed to the next scan path by increasing the Index axis.

Press and hold: Reset the encoder count value of the scan axis back to zero.

8. Encoder umbilical socket

Connect the encoder cable to this socket to provide communication back to the instrument.

CAUTION

Prior to connecting, ensure the encoder strain relief clip is connected.

9. Encoder cable strain relief point

Used to provide strain relief on the encoder cable.

CAUTION

Prior to use, ensure the **encoder strain** relief is applied. Failure to do so could result in encoder cable or tractor unit damage.

Do not use the encoder strain relief point to tether the scanner unit.

10. Automatic Mode Mounting

Mounting points either side of the chassis are used to attach the system to the Eddyfi RMS scanner for automated PA scanning.

Rear Isometric View

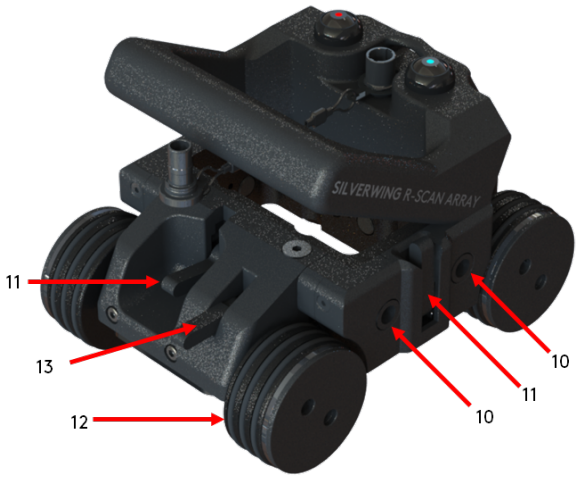

Figure 5: R-Scan Array rear isometic view

11. Probe Lock

Two probe lock levers are used to clamp the water box securely to the scanner chassis. One is located at the rear of the scanner and the other is on right-hand side.

To engage probe lock: lift the lever up.

To disengage probe lock: push the lever down.

IMPORTANT

Engage both probe lock levers to prevent water box movement.

12. Magnetic wheels

Four wheels provide a permanent magnetic attraction to the inspection surface. The system is supplied with two different types of wheels. Select and fit the correct wheels based on the desired inspection mode.

Manual PA scanning: Requires the high friction wheel. These are supplied fitted to the scanner.

Automated PA scanning: Requires the low friction wheels. These are supplied in the transit case attached to a magnetic keeper plate.

CAUTION

Ensure the correct wheels are fitted for the desired inspection mode.

13. Wheel brake

Used to hold the scanner in position on the inspection surface. The wheel brake lever clamps a brake shoe onto the rear axle of the scanner.

To engage brake: push the lever down.

To disengage brake: lift the lever up.

IMPORTANT

Intended to be used during manual mode inspections only when fitted with the high friction wheels.

CAUTION

When used with low friction wheels the scanner may slide along the surface.

Ensure the brake is disengaged (levers up) prior to moving the scanner.

Do not engage the brake during automated scanning.

Excessive brake shoe wear will occur if the brake remains engaged during scanning.

Magnetic Wheels

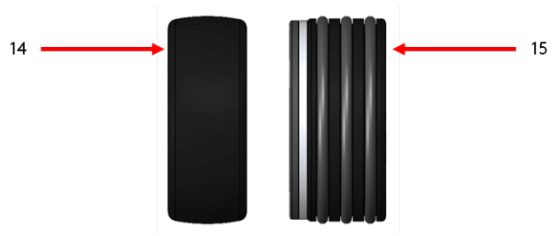

Figure 6: R-Scan Array wheel identification

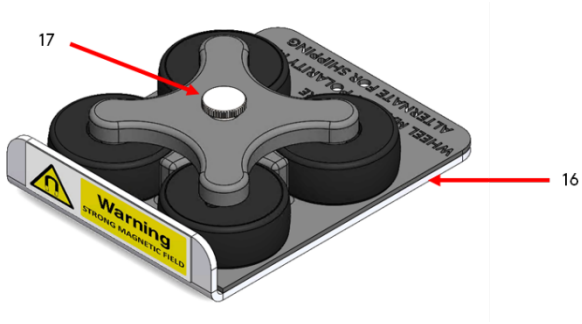

Figure 7: Transit case keeper plate

14. Low friction wheels

Are identified by a smooth wheel surface. Designed to be used for automated PA scanning.

WARNING

Magnetic wheels, risk of finger trap. Handle with care.

15. High friction wheels

Are identified by having three O-rings on the wheels surface.

Designed to be used for manual PA scanning.

WARNING

Magnetic wheels, risk of finger trap. Handle with care.

16. Keeper Plate

Used to safely store the low friction set of wheels in the transit case and control the magnetism for shipping.

WARNING

Wheel magnet polarity must be alternated for shipping.

17. Keeper Plate clamp and thumb nut

Used to secure the four wheels to the keeper plate and prevent movement.

Water box

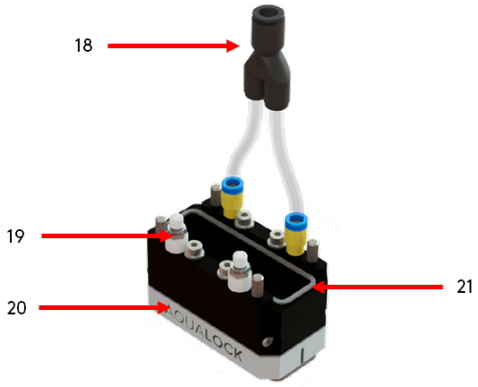

Figure 8: R-Scan Array water box

18. Water inlet

Irrigated couplant feed that connects to the 8mm OD hose in the umbilical.

19. Pressure release valve

Used to remove air bubbles trapped within the water box.

To open: raise the nut and thumbnut.

To close: lower the nut and thumbnut.

IMPORTANT

Turbulence and bubbles in the water box could compromise the UT signals.

20. Water box wedge column

An interchangeable wedge provides a column of either 15mm or 30mm. The selection of the wedge is dependent upon the thickness of test part and application.

Changing the wedge moves the repeat (2nd) interface echo position along the time base.

21. Probe seal

Provides a watertight seal between the probe and water box.

R-Scan Array General Specifications

Inspection Surface Specifications

The condition of the inspection surface is critical to the quality of the results obtained from the scanner.

The ferrous inspection surface to be inspected must:

- have a maximum surface temperature of no greater than +80°C (176°F).
- have a minimum surface temperature of no lower than -10°C (14°F).
- have a minimum diameter of 100mm (4in) up to flat plate for circumferential scanning.
- have a minimum radial clearance of 110mm (4.3in).
- be free of excess rust, scale, ferrous debris, oil, ice, frost or any organic growth.

System Storage

When storage of the R-Scan Array system is required, it must be stored:

- in the supplied transit cases.
- with all components in a clean and dry state prior to packing.
- away from water and harsh environment conditions.
- in a minimum storage temperature of no less than -10°C (14°F).
- in a maximum storage temperature of no greater than 45°C (113°F).
- in such a way as to avoid damage to the system.

System Encoder Resolution

When connecting the system to the PA UT instruments the resolution of the encoder is 3.14 pts/mm (79.76 pts/in). A scanner encoder calibration is recommended prior to Inspection.

System Technical Specifications

A full technical specification sheet is available to download from the link below:

R-Scan Array Specification Sheet

R-Scan Array Specifications

The table below lists specification of the R-Scan Array system.

Dimensions (w × d × h)	117 × 159 × 116 mm (4.6 × 6.2 × 4.5 in)
Weight without probe	1.2 Kg (2.6 lbs)
Circumferential scanning	100 mm (4 in) to flat plate
Maximum scan speed	1 x 1 mm resolution = 220 mm/sec (Based on 40mm range using M2M instrument) (0.04 x 0.04 in resolution = 8.6 in/sec (at 1.5 in range))
Scan grid	Configurable from 1 × 1 mm (0.04 × 0.04 in)
Typical near surface resolution	1.5 mm (0.06 in)
Typical single line scan width	61 mm (Based on 4 element aperture) (2.4 in)
Scanner control	Manual (On board indexing and pause/resume controls)
Encoder resolution	3.14 pts/mm (79.76 pts/In)
Delay line wedge height	15mm & 30mm (0.591 In & 1.181 In)
Umbilical cable	5 m (16 ft) standard. 7.5 m (24 ft), 15 m (49 ft) and 30 m (98 ft) optional

A full technical specification sheet is available to download from the link below:
R-Scan Array Specification Sheet

R-Scan Array Setup and Operation

Manual mode

To prepare and connect the system together for a manual inspection:

1. Power on the PA UT instrument
2. Connect the probe cable and encoder cable to the instrument.
3. For a manual mode inspection ensure the high friction wheels are in place on the scanner.
4. Insert the probe into the water box by:
    a. Unscrewing and remove the 4 cap head bolts and washers using a 3mm hex key.
    b. Removing the supplied probe seal (page 17, item 21 of figure 8) from the water box and fixing to the probe.
    c. Sliding the probe into the top of the water box.
    d. Replacing the 4 cap head bolts and washers, using a 3mm hex key, to secure the probe.

CAUTION

To ensure a watertight seal between probe and water box, check the probe sits flush with the top of the water box and the sealed gasket is fitted.

5. Select the required water box wedge required for the application. Use the four captive thumb screws the remove and fit the wedge to the water box.

NOTE

It is recommended to use the 15mm wedge if the thickness of test item is 25mm or less and use the 30mm wedge if the thickness is greater than 25mm.

CAUTION

To ensure a watertight seal between water box and water box wedge, check the probe sits flush with the top of the water box and the sealed gasket is fitted.

6. Open the pressure release valves on the water box, if not already open.
7. On the scanner disengage both probe lock levers by pushing each lever down.
8. Insert the water box with fitted probe into the scanner chassis from the top and push down.

IMPORTANT

Ensure element 1 of the probe is positioned on the left-hand side of the scanner when looking forward. Element 64 is located next to the probe lock on the right-hand side of the scanner.

9. Secure the water box in the chassis by lifting both probe lock levers up to clamp in position.

NOTE

The water box height will need to be adjusted once on the test item.

10. If the probe cable is not already housed in the spiral wrap umbilical, insert it into the spiral wrap by using the spiral wrap tool suppled.

CAUTION

Ensure that no undue strain can be put on the probe cables.

11. Secure the encoder umbilical cable clip to the strain relief point on the scanner then connect the encoder cable in the spiral wrap umbilical to the encoder umbilical socket by aligning the white dots.

CAUTION

Ensure the encoder umbilical is attached to the strain relief point on the scanner handle. Failure to do so could result in damage to the cable assembly.

12. Connect the water hose in the spiral wrap umbilical to the water box on the scanner.

CAUTION

Ensure that no undue strain can be put on the water hoses.

13. Connect the water hose to the pump.
14. Attach a tether to the handle of the scanner.

When using the Eddyfi PA UT instrument follow the onscreen setup instructions paying particular attention to the following options:

a. In Specimen ensure the thickness value of the test item is entered correctly.
b. In Probe select the Silverwing PA G14 with the 15mm or 30mm water box wedge.
c. In Scanner select the Silverwing R-Scan Array.
    i. Ensure Input coder is set to 3.
    ii. Ensure Opposite Direction is ticked.
    iii. Check the physical distance moved by the scanner is correctly displayed in the Scan(mm) box in the software. If required perform an encoder calibration by following the onscreen instructions.
d. In Settings seek guidance from technical authority for setup parameters.
e. In Configuration, motion, trajectory tab ensure the increment step value matches the indexing distance of the scanner when moved perpendicular for the next scan.
f. In inspection press play to begin the data capture in the desired scanning pattern.

If a third-party instrument is used, please refer to the third-party instrument compatibility section of the manual.

Manual mode scanning pattern

A 2-axis stitched C-Scan can be generated by scanning in either a uni-directional or bi-directional scanning pattern.

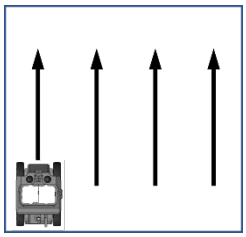

Figure 9: Uni-directional scanning pattern

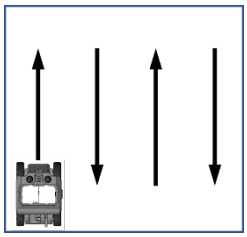

Figure 10: Bi-directional scanning pattern

Uni-directional scanning steps using the R-Scan Array scanner:

1. Press play and move scanner forward to capture data for the first scan.
2. When the target distance has been reached, press the red pause/resume button to pause the scan.

3. Slide scanner across perpendicular to next scan path then pull it backward to position it at the start of the next scan.
4. Press the blue indexing button to increment the index axis position on the software ready for the next scan.
5. Press and hold the blue button to reset the encoder count value of the scan axis position to zero.
6. Press the red pause/resume button to resume the next scan then move the scanner forward to capture data.
7. Repeat steps 2-5 until grid scan is complete then save the data file.

Bi-direction scanning steps using the R-Scan Array scanner:

1. Press play and move scanner forward to capture data for the first scan.
2. When the target distance has been reached. press the blue indexing button to increment the software to the next scan.
3. Slide the scanner across perpendicular to next scan path. Do not slide diagonally.
4. Move the scanner backwards to capture data for the next scan.
5. Repeat steps 2-4 until grid scan is complete then save the data file.

Automatic mode

To prepare and connect the system together for an automated inspection:

1. For an automatic mode inspection fit the low friction wheels to the scanner.
2. Disengage the wheel brake lever.
3. Attach R-Scan Array scanner to the RMS scanning head using the supplied quick release bracket.
4. Follow the setup instructions found in RMS-PA User guide.

Third party Instrument compatibility

Instructions for on-board scanner control use with third party instrumentation.

Olympus

Below is setup information when using an Olympus instrument together with the R-Scan Array system. Please ensure the adapter lead is positioned between the Instrument and the encoder lead:

Raster mode (1)

Encoder 1: quadrature

Encoder 2: clicker, (RED BUTTON) preset on - resets scan axis and increases index axis position based on input value upon button press (unidirectional scan)

DIN1: Any function Pause/Resume recommended (BLUE BUTTON)

Usage: Scan forward, press red, press blue, move R-Scan Array (to 0mm scan axis, +50index), press blue button and repeat.

Raster mode (2)

Encoder 1: quadrature

Encoder 2: clicker, (RED BUTTON) preset off - increases index axis position based on input value upon button press (Bidirectional scan)

DIN1-4: off

Usage: Scan forward, press red button to step index axis, move R-Scan Array (+50 index), and move backwards.

R-Scan Array Maintenance

Technical Support

For technical support, please contact: support@eddyfi.com

Troubleshooting

Problem	Possible Cause	Action
Encoder not functioning	Instrument setup	Refer to the instrument's documentation regarding encoder setup / calibration.
	Encoder cable	Check the encoder cable plug is making full contact with the corresponding socket.
		Check encoder cable plugs are free from dirt / debris.
	Encoder	Encoder is integrated into the handle. Fit replacement the handle.
	Handle	Check the handle is securely fastened to the chassis.
Buttons not performing function	Connection issue	Button is integrated into the handle. Fit replacement the handle.
Insufficient probe contact	Both probe lock levers are not engaged	Ensure both probe lock levers are engaged to clamp the water box
	Water box height adjustment	Release both probe lock levers on the scanner and adjust height of water box so that foam seal is in contact with external surface. The foam seal should be slightly compressed.
		Plunger wear on the probe lock lever. Replace the plunger
Wheel Brake not working	Worn brake shoes	Replace the brake shoes
	Incorrect wheels fitted	Using brake when low friction wheels fitted to scanner. Fit high friction wheels.

Maintenance

After each inspection, it is recommended that:

- the R-Scan Array scanning head is dried after every use.
- any dirt or debris are removed from the wheels.
- the system is packed into the transit case with the umbilical assembly.

Handle replacement

The handle contains the sealed electronics and encoder. To replace:

1. Remove the waterbox from the scanner.
2. From beneath remove the two pozi screws securing the dust cover to the front handle.

Figure 11: Front handle dust cover screw location

3. Remove the four socket cap screws from the front of the handle, two either side of the wheels.

Figure 12: Front handle front bolt location

4. Remove the two countersunk screws from the rear of the handle.

Figure 13: Front handle rear bolt location

5. Lift the handle to separate it from the chassis.
6. Install the new handle and secure with all screws.

Probe lock cam lever and plunger replacement

Gaining access to the rear and side probe lock cam are different, but once accessible the replacement procedure for the probe lock cam and plunger is identical.

Rear probe lock cam lever

1. From beneath remove the two pozi screws securing the dust cover to the rear fairing.

Figure 14: Rear fairing dust cover screw location

2. Remove the two countersunk bolt and the two socket cap bolts securing the rear fairing to the chassis.

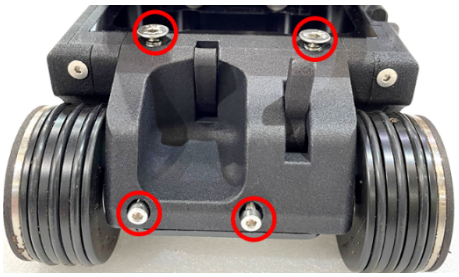

Figure 15: Rear fairing bolt location

3. Carefully lift and remove the rear fairing away from the chassis.
4. Remove the four socket cap bolts securing the rear probe lever to the chassis.

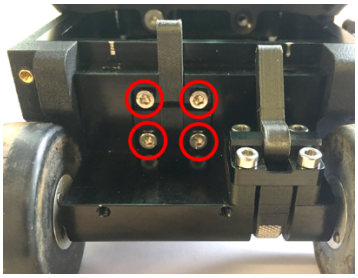

Figure 16: Rear probe lever bolt location

5. Remove the rear probe lever, the black plunger and metal spring washer from the scanner.

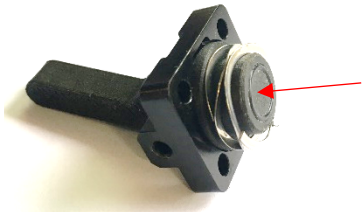

Figure 17: Cam lever with plunger and metal spring washer

6. Install a new plunger together with the spring washer into recess in the chassis and re-install the cam lever assembly in the same orientation. Secure using the four socket cap bolts.
7. Check the operation of the probe lock cam lever. Lift the lever up and the plunger pushes

outward. Push the lever down and the plunger retracts inwards.

8. Replace the rear fairing and dust cover.

Side Probe lock cam lever

1. Remove the two countersunk bolts securing the right-side cover.

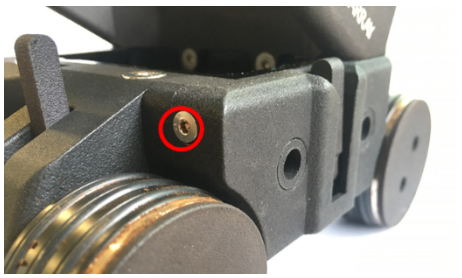

Figure 18: Right-side cover rear bolt location

Figure 19: Right-side cover front bolt location

2. Push the cam lever down and carefully prise away the side cover from the chassis.

Figure 20: Prising off the right side cover

3. Remove the four socket cap bolts securing the rear probe lever to the chassis.

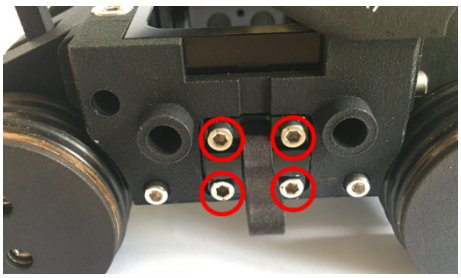

Figure 21: Uni-directional scanning pattern

4. Remove the side probe lever, the black plunger and metal spring washer from the scanner.

Figure 22: Cam lever with plunger and metal spring washer

5. Install a new plunger together with the spring washer into recess in the chassis and re-install the cam lever in the same orientation. Secure using the four socket cap bolts.
6. Check the operation of the probe lock cam lever. Lift the lever up and the plunger pushes outward. Push the lever down and the plunger retracts inwards.
7. Replace the right-side cover.

Wheel Brake Shoe replacement

The wheel brake sits on top of the replaceable brake shoe. To replace:

1. From beneath remove the two pozi screws securing the dust cover to the rear fairing.

Figure 23: Rear fairing dust cover screw location

2. Remove the two countersunk bolt and the two socket cap bolts securing the rear fairing to the chassis.

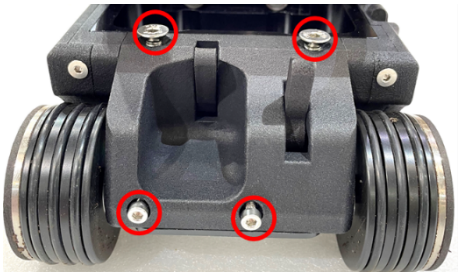

Figure 24: Rear fairing bolt location

3. Carefully lift and remove the rear fairing away from the chassis.
4. Remove the four socket cap bolts securing the brake cam lever and brake shoe to the chassis.

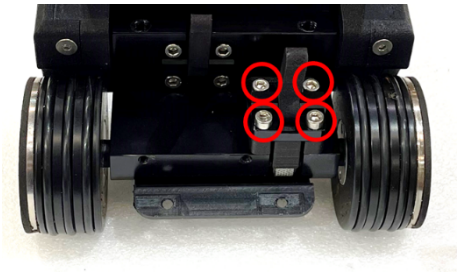

Figure 25: Brake lever bolt location

5. Lift off the cam lever assembly to access the brake shoe.

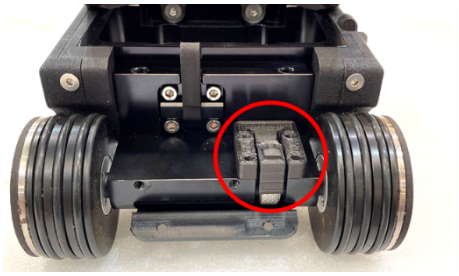

Figure 26: Brake shoe location

6. Install a new brake shoe and replace the cam lever assembly in the same orientation. Secure the cam lever assembly using the four socket cap bolts.
7. Check the operation of the brake cam lever. Lift the lever up and the wheels spin freely. Push the lever down and the brake is applied preventing the wheels from spinning.
8. Replace the rear fairing and dust cover.

Wheel Replacement

The wheels of the scanner can be changed between low friction and high friction wheels. To replace:

1. Remove the two socket cap screws from the wheels

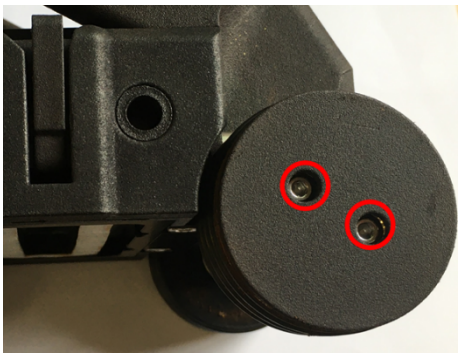

Figure 27: Wheel bolt location

2. Carefully pull the magnetic wheels away from the wheel hub.

WARNING

Magnetic wheels, risk of finger trap. Handle with care

3. Remove the wheels from the keep plate by unscrewing the thumb nut and removing the keeper plate clamp.
4. Carefully remove one wheel from the keeper plate in preparation for installation.
5. When installing the new wheels onto the wheel hub, ensure the keyway is aligned correctly and the wheel sits flat on the wheel hub.

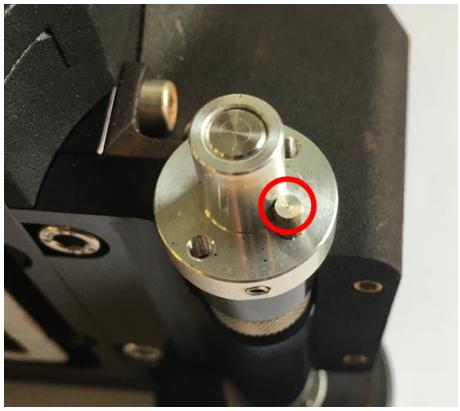

Figure 28: Wheel hub keyway location

Figure 29: Inside face of wheel keyway location

6. Replace the two socket cap screws.
7. Carefully place the removed wheel onto keeper plate in the required orientation.

WARNING

Magnetic wheels, risk of finger trap. Handle with care

IMPORTANT

It is recommended to replace each wheel one at a time and placing the removed wheel back onto the keeper plate prior to replacing the next.

8. Once all four wheels of the scanner have been replaced and the removed wheels are safely on the keeper plate, place back into the transit case.

O-ring replacement for high friction wheels

The high friction wheels have 3 O-rings that sit within groves around the wheel. To replace:

1. Remove the two socket cap screws from the wheels that requires replacement O-rings.

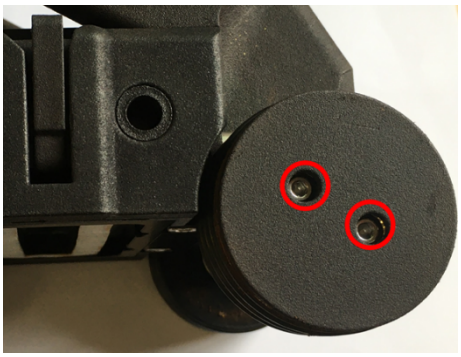

Figure 30: Wheel bolt location

2. Carefully pull the magnetic wheels away from the wheel hub.

WARNING

Magnetic wheels, risk of finger trap. Handle with care

3. Remove the O-ring from the wheel by rolling out of its required slot. Replace by rolling a new O-ring into the slot on the wheel.
4. Replace the removed wheels onto the wheel hub ensure the keyway is aligned correctly and the wheel sits flat on the wheel hub.

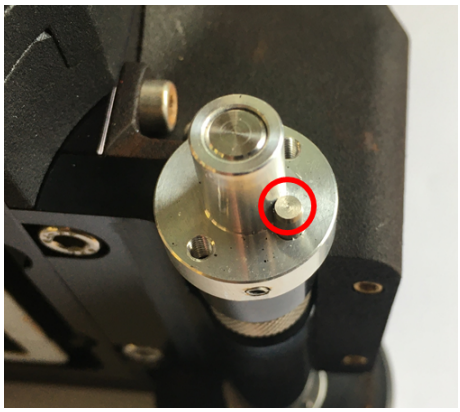

Figure 31: Wheel hub keyway location

Figure 32: Inside face of wheel keyway location

5. Replace the two socket cap screws.

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