



**Eddyfi  
Technologies**

Beyond current

Getting Started with

# LYNCS



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LYNCS™ User Manual Version 4.0

Original instructions supplied with the LYNCS™ system.

The text, figures and programs have been worked out with the utmost care. However, we cannot accept either legal responsibility or any liability for any incorrect statements which may remain, and their consequences. The following documentation is protected by copyright. All rights reserved.

Eddyfi reserves the right to continue developing the system and software without documenting each individual case.

September 2022

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# Precautions and Conventions

## 1. General Precautions

The following precautions must be observed at all times when using the LYNCS™ 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.
- Eddyfi holds no responsibility for any damage or destruction caused when instructions within this manual are not followed.
- Do not use substitute parts or perform unauthorized modifications to the system.
- If the system does not operate normally, please contact Eddyfi for assistance.

### 1.1 Safety Precautions

During operation of the LYNCS™ system please observe the safety warning and precautions.

#### Magnetic Field



The wheels of the LYNCS™ 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 LYNCS™ 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 LYNCS™ 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.

#### Laser



The LYNCS™ system utilizes a Class 1 laser for scanning guidance. While laser protection eyewear is not normally necessary, do not deliberately look or stare into the laser beam. Avoid accidental exposure to eyes. Do not aim at aircraft or vehicles, it is unsafe and illegal.

## 1.2 Conventions

### Markings and Symbols

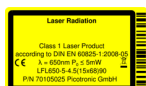
The following symbols appear on the system and pertain to safety regulations that should be carefully observed:



This label is used to indicate the presence of strong magnetics that generate magnetic fields. Always refer to the user’s manual to ensure proper protection and safety.



This label is used to indicate that a crush hazard is present. Always refer to the user’s manual to ensure proper protection and safety.



This label is used to indicate a Class 1 laser is present. Always refer to the user’s manual to ensure proper protection and safety.



This label acts as a reminder that you should dispose of this system in accordance with your local Waste Electrical and Electronic Equipment (WEEE) regulations. Due to its nature, this product may contain small quantities of substances known to be hazardous to the environment and to human health if released in the environment. As such, it falls under WEEE regulations and should not be disposed of in the public waste stream.

## 1.3 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 warning indications, ensure the condition is understood before proceeding.

### TETHER LINE

A suitable safety line must be centrally attached to the designated tether points of the LYNCS scanner during operation. Attach the tether line BEFORE placing the LYNCS 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.



## 1.4 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 Customer's 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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The information contained in this document is subject to change without notice.

LYNCS™

## 2. Introducing LYNCS™

LYNCS™ is an advanced modular ultrasonic inspection scanner that has been designed by experts to provide Phased Array corrosion mapping and weld integrity assessment. It is the first truly versatile system that allows users to interchange between weld inspection and advanced corrosion mapping in less than a minute. While primarily designed to work with an Eddyfi PA UT instrument, it can be utilised with other third-party PA UT instruments.

Compatible Eddyfi PA UT Instruments:	Models
Mantis	All
Gekko	All Type D or later.* *Compatibility with earlier version of Gekko requires additional cable.

The LYNCS™ system is offered as one of three available packages, the LYNCS WI for weld inspection, LYNCS CM for corrosion mapping, or LYNCS FULL for both weld inspection and corrosion mapping.

**LYNCS WI** weld inspection configuration can accommodate up to 6 PA and/or TOFD probes and has a dual-bar structure for enhanced stability and probe placement accuracy. It is a toolless scanner with an interchangeable design, making it ideally suited to all weld inspection configurations.

**LYNCS CM** corrosion mapping arrangement is ideally suited to vessel and pipework inspection. It has an extremely low profile and lightweight design, making it the most suitable option for rope access deployment and heavily congested pipework.

**LYNCS FULL** combines both the weld inspection configuration and corrosion mapping arrangement in one package.

**LYNCS CHAIN** is an accessory that bolts onto the scanner and opens up weld and corrosion inspection capability to non-ferrous piping such as stainless steel and HDPE. The design offers incredible alignment and stability whilst maintaining full use of the LYNCS system's market leading advantages. There are three different options available, based upon the range of pipe outer diameter to inspect:

- LYNCS CHAIN 4-32 to work on a range of outer diameters pipes from 100 mm (4 in) up to 812 mm (32 in).
- LYNCS CHAIN 4-12 to work on a range of outer diameter pipes from 100 mm (4 in) up to 305 mm (12 in).
- LYNCS CHAIN 12-32 is an expansion kit for the LYNCS CHAIN 4-12 by increasing the working range of outer diameter pipes from 305 mm (12 in) up to 812 mm (32 in).

**LYNCS AXIAL** is an accessory that bolts onto the scanner and brings weld inspection capability (PAUT, ToFD & TFM) for seamed pipework and vessel seam welds of both ferrous and non-ferrous components. The design offers rapid and absolute adjustment through a range of diameters starting at 50 mm (2 in) and going all the way up to flat plate for longitudinal inspection. In **addition** to this, the LYNCS AXIAL can be inverted for internal weld inspection from 355 mm (14 in) up to flat plate.

## 2.1 What's in the Box

This depends upon which package of the LYNCS™ system has been purchased.

### LYNCS WI

The LYNCS WI package is supplied in a rugged transport case and comes with the following standard accessories:

#### Transport case

- LYNCS scanner frame – 412 mm (16.2 in)
- 2x Inner tool posts
- 2x Outer tool posts
- 4x Large tool post arms
- Small rails – 180 mm (7 in)
- Medium rails – 500 mm (19.7 in)
- Umbilical – 5 m (16 ft) or 15 m (48ft)
- Cable management sleeve
- 4x Cable guides
- Removable central handle
- Universal straps (Pre-Amp mounting)
- 4x Hose guides
- Irrigation kit
- Positioning laser



Figure 1: LYNCS WI Transport case



## LYNCS CM

The LYNCS CM package is supplied in a rugged transport case and a portable site bag, and comes with the following standard accessories:

### Transport case

- LYNCS scanner frame – 412 mm (16.2 in)
- Small rails – 180 mm (7 in)
- Umbilical – 5m (16 ft) or 15m (48 ft)
- Cable management sleeve
- 4x Cable guides
- 4x Hose guides
- Encoder increment / reset adaptor cable

### Portable site bag

- Large Metric rails – 667 mm (26.2 in) with 50 mm drilled holes for step increments
- Large Imperial rails – 676 mm (26.6 in) with 2 in drilled holes for step increments
- Water box assembly
- 15 mm and 30 mm water box extensions
- 25x Foam seals
- Corrosion mapping mount



Figure 2: LYNCS CM Transport case



Figure 3: LYNCS CM Portable site bag

## LYNCS FULL

The LYNCS FULL package is supplied in a rugged transport case and a portable site bag, and comes with the following standard accessories:

### Transport case

- LYNCS scanner frame – 412 mm (16.2 in)
- 2x Inner tool post
- 2x Outer tool post
- 4x Large tool post arms
- Small rails – 180 mm (7 in)
- Medium rails – 500 mm (19.7 in)
- Umbilical – 5 m (16 ft) or 15m (48 ft)
- Cable management sleeve
- Irrigation kit
- 4x Cable guides
- Removable central handle
- Universal straps (Pre-Amp mounting)
- 4x Hose guides
- Positioning laser
- Encoder increment / reset adaptor cable

### Portable site bag

- Large Metric rails – 667 mm (26.2 in) with 50 mm drilled holes for step increments
- Large Imperial rails – 676mm (26.6 in) with 2 in drilled holes for step increments
- Water box assembly
- 15 mm and 30 mm water box extensions
- 25x Foam seals
- Corrosion mapping mount



Figure 4: LYNCS FULL Transport case



Figure 5: LYNCS FULL Portable site bag

## LYNCS CHAIN 4-32

The LYNCS CHAIN 4-32 is supplied in a rugged transport case and comes with the following standard accessories:

### Transport case

- Slimline stabiliser for reduced width one sided scanning
- 15x Single wheel chain link small
- 5x Single wheel chain link medium
- Chain attachment block assembly
- Quick release block
- Fixed adjuster link
- Chain hook link
- 3x Removable handles



Figure 6: LYNCS CHAIN 4-32 Transport case

## LYNCS CHAIN 4-12

The LYNCS CHAIN 4-12 is supplied in a rugged transport case and comes with the following standard accessories:

### Transport case

- Slimline stabiliser for reduced width one sided scanning
- 15x Single wheel chain link small
- Chain attachment block assembly
- Quick release block
- Fixed adjuster link
- Chain hook link
- 3x Removable handles



Figure 7: LYNCS CHAIN 4-12 Transport case

## LYNCS CHAIN 12-32

The LYNCS CHAIN 12-32 supplies the following standard accessories designed to fit into the LYNCS CHAIN 4-32 transit case:

- 5x Single wheel chain link medium



Figure 8: LYNCS CHAIN 12-32 expansion rails

## LYNCS AXIAL

The LYNCS AXIAL accessory is supplied within the LYNCS WI rugged transport case and comes with the following standard accessories:

Transport case

- LYNCS AXIAL frame - compatible with LYNCS WI
- Laser mount
- Cable management



Figure 9: LYNCS AXIAL Transport case

### 3. LYNCS™ Scanner Frame General Overview

#### Top View

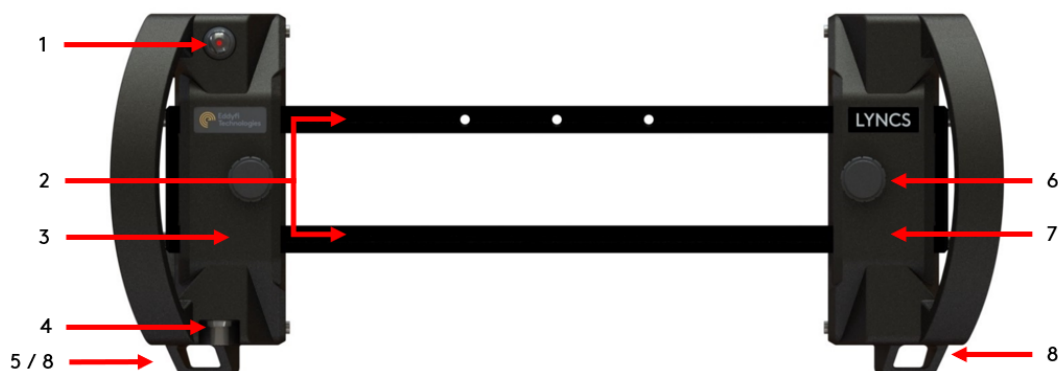


Figure 10: Scanner frame top overview

#### 1. On board controls

Depending upon the system hardware setup the on-board button can be used during the inspection for either *Pause / Resume* or *Increment / Encoder Reset* functionality. Refer to LYNCS WI and LYNCS CM overview for hardware setups.

#### 2. Scanner frame and end caps

**Scanner frame:** Consists of two identical length rails used to mount the tractor units, tool posts and corrosion mapping mount.

**End caps:** Remove the end caps via two captive thumbscrews to insert / remove the tractor units, tool posts, corrosion mapping mount, cable and hose guides, and other accessories.

#### 3. Left electronic tractor unit

The left tractor is the electronic unit assembly which houses the on-board button controls and the encoder.

#### 4. Encoder umbilical socket

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

#### 5. Encoder cable strain relief point

Used to provide strain relief on the encoder cable.

#### CAUTION



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

Do **not** use the encoder cable strain relief point to tether the scanner unit!

#### 6. Tractor unit clamping mechanism

Used to hold the tractor unit in place on the scanner frame.

Loosen the thumbscrew counter clockwise to adjust tractor unit position. Tighten the thumbscrew clockwise to lock tractor unit in place on the rail.

#### 7. Right mechanical tractor unit

The right tractor is a mechanical tractor unit assembly. It contains no electronics.

#### 8. Umbilical assembly strain relief points

#### CAUTION



Used to provide strain relief on the umbilical cable assembly.

Prior to use, ensure the umbilical strain relief is correctly applied. Failure to do so could result in damage to the assembly.

Do not use the umbilical strain relief points to tether the scanner.

## Left Side View



Figure 11: Left side overview

### 9. Encoder

Housed in the left tractor and connects direct to the rear wheel. It records the distance travelled by the scanner.

## Rear View



Figure 12: Scanner rear overview

### 10. Tractor unit handles / tether points

Used to carry, deploy, move and remove the scanner.

#### CAUTION



Ensure the tractor unit handles are used at all times when handling or operating the scanner.

#### TETHER LINE

**CAUTION**  
DO NOT OPERATE  
WITHOUT TETHER

Ensure the unit is tethered centrally to each attachment point at all times to prevent the scanner from falling.

#### IMPORTANT

Prior to use, ensure the end caps and each tractor unit are securely fastened onto the scanner rail.

### 11. Wheel brakes

Used to hold the scanner in position.

**To engage brakes:** Turn levers up, facing

away from the inspection surface.

**To disengage brakes:** Turn levers down, facing towards the inspection surface.

#### CAUTION



Ensure brakes are disengaged (levers down) prior to moving the scanner. Failure to do so will result in accelerated wear of the brake teeth.

### 12. Magnetic wheels

The four wheels provide permanent magnetic attraction to the inspection surface.

#### WARNING



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

## 4. LYNCS Scanner 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 -30°C (-22°F).
- have a maximum ambient temperature of no greater than 50°C (122°F).
- have a minimum ambient temperature of no lower than -20°C (-4°F).
- have a minimum diameter of 100 mm (4 in) up to flat plate for circumferential scanning.
- have a minimum radial clearance of 110 mm (4.3 in).
- be free of excess rust, scale, ferrous debris, oil, ice, frost or any organic growth.

### System Storage and Transportation

When storage or transportation of the LYNCS system is required, it must be stored:

- in the supplied transit cases and portable site bag.
- 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 40°C (104°F).
- in such a way as to avoid damage to the system.

### System Encoder Resolution

The encoder resolution on the PA UT instrument must be set to 25.85 pts/mm (656.59 pts/in).

### System Power Requirements

Power supply (from instrument)	5V dc / 200mA
--------------------------------	---------------

#### WARNING



If the LYNCS is powered from a source other than an Eddyfi PA UT instrument, the power supplied to the product must have reinforced isolation from the mains with no reference to earth ground and be of limited energy 5V dc and  $\leq 1A$ .

### System Ingress Protection

System ingress protection rating	IP66
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## 5. LYNCS WI Overview

### Top View

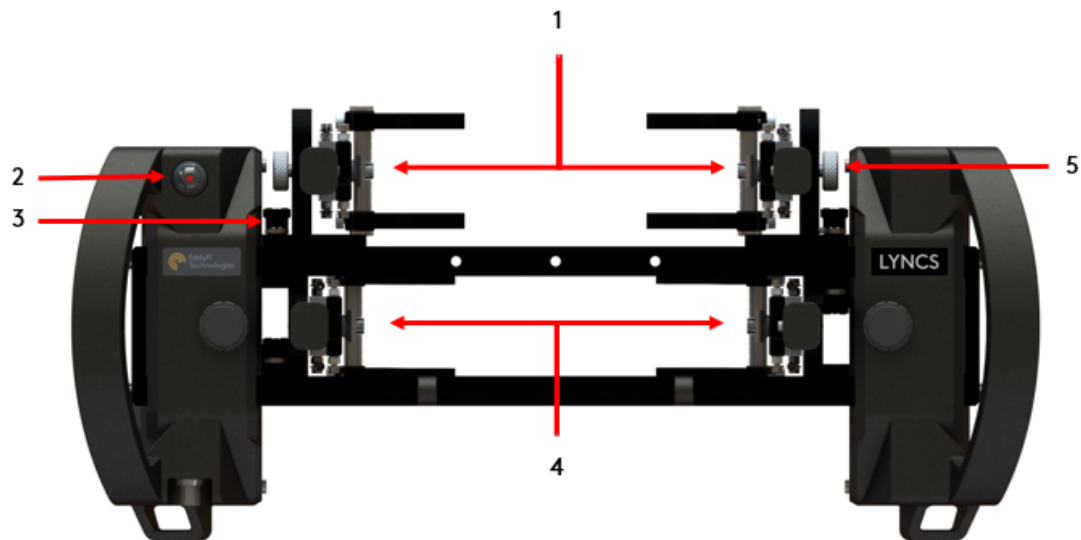


Figure 13: LYNCS WI frame top overview

#### 1. Outer tool posts

Wedge tool posts that mount to the outside of the scanner frame and are secured by a single mounting clamp. They also provide a tilt adjustment when on small diameter pipework.

#### 2. On board controls

Use this button for *Pause / Resume* functionality.

#### IMPORTANT

Do not connect the encoder adapter cable as this will enable *Increment / Encoder Reset* functionality. Ensure the encoder umbilical cable is plugged directly into the instrument and scanner for this functionality.

\*Adapter supplied with LYNCS FULL, LYNCS CM.

#### 3. Tool post clamp

Used to hold the inner and outer tool post in place along the scanning frame.

To engage the tool post clamp, turn lever up to vertical position.

To disengage the tool post clamp, turn lever down to horizontal position.

#### CAUTION



Ensure the tool post clamps are disengaged (levers down) prior to moving the tool post.

#### 4. Inner tool posts

Wedge tool posts that mount between the scanner frame and are secured by clamps on either side of the tool post.

#### 5. Outer tool post tilt adjustment

Used to tilt the outer tool posts forward when on small diameter pipework.

To tilt the tool post forwards, loosen the thumbscrew, tilt to the desired position then tighten to lock tool post in place.

#### NOTE

During setup, ensure outer tool posts are in a vertical (un-tilted) position to ensure ease of wedge setup. Tilt the tool posts forwards when on the inspection surface.



## Top Accessory View

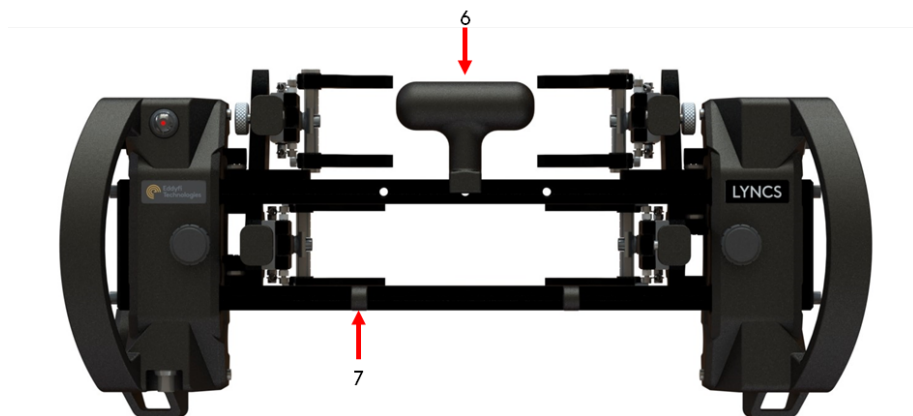


Figure 14: LYNCS WI frame top accessory overview

### 6. Removable central handle

An accessory which can be mounted to scanner rail to aid stability and manoeuvrability during an inspection.

#### CAUTION



Do not use the removable handle for lifting or removing the scanner from the inspection surface as it is not intended for this purpose.

### 7. Cable management guides

An accessory which can be mounted to scanner rail to aid cable and water hose management. There are two different types of guides:

**C-Type** are typically for larger diameter probe leads.

**D-Type** are typically for water hose and smaller diameter probe leads.

## Tool Post Assembly View

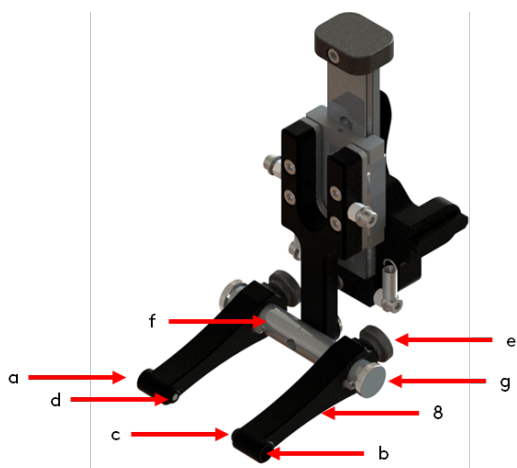


Figure 15: Standard Tool post assembly view



Figure 16: Large Tool post assembly view

### Tool post arms / wedge mounting points

Used to mount varying wedge widths. Depending upon which wedge pin is required the tool post arms can be reversed. One side has an 8 mm integrated male pin (a) and a 5 mm female pin receiver (b), located within

the 8 mm pin boss. The other side of the tool post arm has a 5 mm integrated male pin (c) and a 3 mm grub screw (d). Use a 1.5mm hex key to access the grub screw through the 8 mm pin boss and wind it out of the 5 mm pin.

Larger tool post arms can be fitted for use with longer and wider wedges.

#### NOTE

Additional 3 mm grub screws are supplied with the spares kit.

Each tool post arm is secured by a thumbscrew (e) onto a horizontal bar (f). Loosen this thumbscrew to adjust the width of the tool post arms. Use the etched marking lines on the horizontal bar as a guide when positioning.

To remove the tool post arms from the horizontal bar, remove the thumbscrew (g) located either end of the bar then slide the arms off. Replace the arms by

aligning the keyway. Tighten the arm thumbscrew (e) to lock in place and replace thumbscrews (g) if removed.

#### IMPORTANT

When fitting the tool post arms ensure the etched marking on the horizontal bar are facing upwards.

Reversal of the horizontal bar may help during inspection of flange tapered necks by avoiding contact between the tool post arms and surface.

## 5.1 LYNCS WI Specifications

The table below lists specification of the LYNCS WI system.

Dimensions (w x d x h)	Short bar	255 x 198 x 109 mm (10 x 7.8 x 4.3 in)
	Standard bar	487 x 198 x 109 mm (19.2 x 7.8 x 4.3 in)
	Medium bar	575 x 198 x 109 mm (22.6 x 7.8 x 4.3 in)
Bar width options	Short	180 mm (7 in)
	Standard	412 mm (16.2 in)
	Medium	500 mm (19.7 in)
Maximum width of tool posts		65 mm (2.5 in)
Maximum number of tool posts		6
Tool posts compatibility		3 mm, 5 mm and 8mm female wedge
		5 mm male pin wedge
Scanner weight with:	2 x tool posts	3 kg (6.6 lb)
	4 x tool posts	3.5 kg (7.7 lb)
	6 x tool posts	4 kg (8.8 lb)
Circumferential scanning	External	100 mm (4 in) to flat plate
	Internal	864 mm (34 in) to flat plate
Longitudinal scanning*	External	50 mm (2 in) to flat plate
	Internal	355 mm (14 in) to flat plate

\*Requires LYNCS AXIAL accessory

## 5.2 LYNCS WI Inspection Setup and Operation

To prepare and connect the system together:

1. Remove a tractor unit from the scanner frame by:
  - a. Remove the endcap from the scanning rail by unscrewing both thumbscrews.
  - b. Loosen the clamping mechanism of the tractor unit by unscrewing the thumbscrew.
  - c. Slide the tractor unit off the end of the scanning frame.
2. Select the amount of tool posts required to match the number of wedges / probes being deployed. Affix the required tool posts and accessories to the scanning frame depending upon the application.



### CAUTION

Ensure the tool post clamps are disengaged (levers down) prior to moving the tool post along the scanning rails.

3. Re-attach the tractor unit to the scanning frame and tighten the clamping mechanism.
4. Replace and secure the end cap using the thumbscrews.
5. Load the probe wedges to the tool post arms of the scanner.

### IMPORTANT

Select the appropriate side of the tool post arm so the pin matches the wedge hole diameter.

6. Connect the encoder umbilical cable, in the cable management sleeve, to the left tractor unit encoder socket by aligning the white dots. Secure the encoder umbilical cable to the left tractor unit strain relief point.



### CAUTION

Ensure the encoder umbilical is attached to the strain relief point on the left tractor unit. Failure to do so could result in damage to the assembly.

7. Attach the cable management sleeve strain relief chains to the strain relief points at the rear of each tractor unit, as illustrated below.

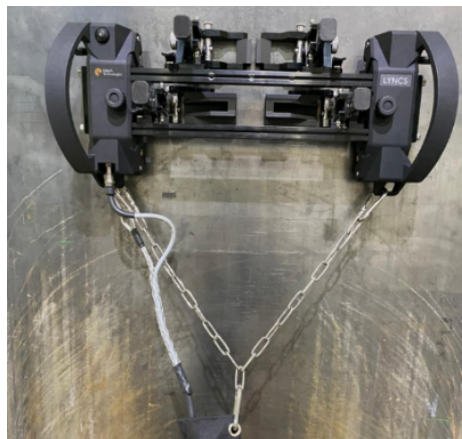


Figure 17: Strain relief chain for the cable management



### CAUTION

Ensure the strain relief chains are applied centrally to the scanner and allows for sufficient relief on the cables. Depending upon the tractor unit distance adjust the strain relief chain length by altering the clip position.

8. Unzip the cable management sleeve and insert the required probe cables for the application. Use Velcro ties to secure the probe cables to the encoder cable then zip up the cable management sleeve. Feed the probe cable through the cable guides on the scanner frame to the probe wedges.



### CAUTION

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

9. Set the tool posts into the desired position along the scanners frame and lock into place. When utilizing the outer tool posts to ease wedge setup, ensure they remain in their vertical (un-tilted) position. Once on the test item tilt the tool posts forwards and tighten the thumbscrew to lock in place.

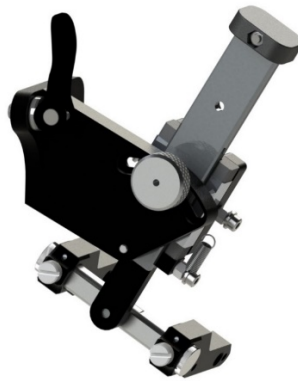


Figure 18: Outer tool post tilt adjustment and thumbscrew

10. Tether the scanner from both tractor unit handles.
11. Connect the encoder umbilical lead to the instrument by aligning the red dot.
12. Setup the data acquisition unit. For Eddyfi PA UT instrument select LYNCS WI in scanner list.

### NOTE

Typical encoder resolution: 25.85 pts/mm.

13. Perform an encoder calibration and complete the remaining setup configuration.
14. Place onto test item to perform scan.

When using Eddyfi PA UT instrument, once setup is complete, press the Play button immediately followed by the Pause button. The scanner is now ready to make use of the on-board control Pause / Resume function. If a third-party instrument is used, please refer to section 9 of the manual.

## 6. LYNCS CM Overview

### Top View

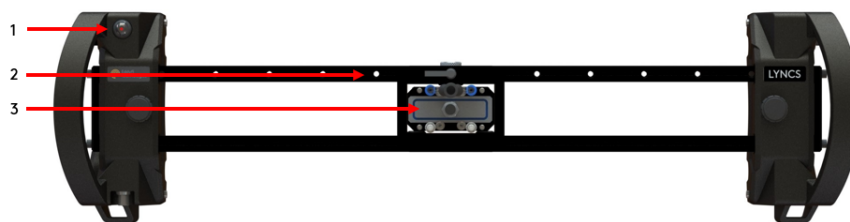


Figure 19: LYNCS CM frame top overview

#### 1. On board controls

This button is used for either the *Increment / Encoder Reset* functionality or *Pause / Resume* functionality.

To use the *Pause / Resume* functionality, plug the encoder umbilical cable directly into the instrument.

To use the *Increment / Encoder Reset* functionality, connect the supplied encoder adapter cable between the encoder umbilical and instrument.

\*Adapter supplied with LYNCS FULL, LYNCS CM.

#### 2. Scanner rail holes

Allows the corrosion mapping mount to be locked along the scanning frame by clicking into each hole position. The spacing between the holes in the metric bars (667 mm) is set at 50 mm and for the imperial bars (26.26 in) the spacing is set at 2 in.

#### 3. 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 0.9 x 1 in).

### Isometric View

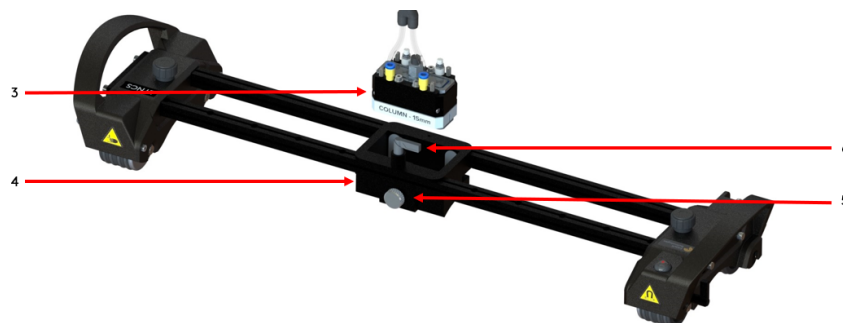


Figure 20: LYNCS CM scanner isometric overview

#### 4. Corrosion mapping mount

Used to house the supplied water box. The corrosion mapping mount fits between the scanning frame and slides along it. Its position can be locked manually using the cam lever lock or via the spring-loaded lever lock which clicks into each hole in along the length of the scanning rail. The lever lock must sit on the same side as the rail with the drilled holes.

#### 5. Water box clamping mechanism

Used to secure the water box at the desired position in the corrosion mapping mount. Tighten the thumbscrew clockwise to clamp the water box. Loosen counter clockwise to release.

## Corrosion mapping mount

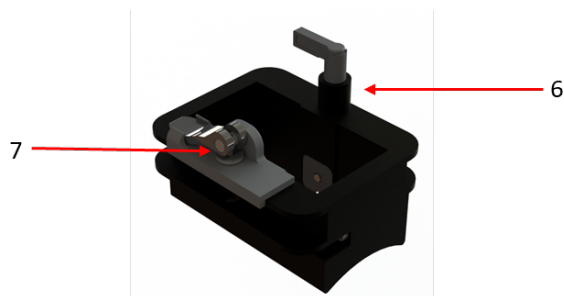


Figure 21: LYNCS CM corrosion mapping mount overview

### 6. Spring loaded lever lock

Turn the lever to unlock the spring-loaded pin in the mechanism. As the corrosion mapping mount slides along the scanning frame, the pin automatically drops into the next hole. To continue sliding, rotate the lever slightly to lift the pin.

#### IMPORTANT

When using the spring-loaded lever lock the increment position of the corrosion mapping mount is determined by the hole spacing in the scanning frame.

### 7. Cam lever lock

Disengage the cam to allow the corrosion mapping mount to move along scanning frame. Re-engage when located at desired position.

#### IMPORTANT

When using the cam lever lock the position of the corrosion mapping mount can be manually set to any position along the scanning frame. Ensure the spring-loaded lever locks the pin in the raised position.

## Water box

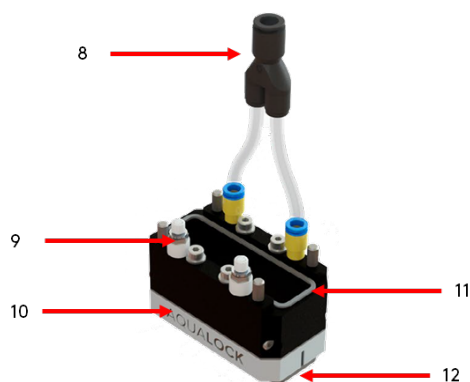


Figure 22: LYNCS CM water box

### 8. Water inlet

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

### 9. 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.

#### CAUTION



Air bubbles and turbulence in the water box could compromise the UT signals.

### 10. Water box wedge column

An interchangeable wedge provides a column of either 15 mm or 30 mm. The

selection of the wedge is dependent upon the thickness of test part and application.

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

#### 11. Probe seal

Provides a watertight seal between the

probe and water box.

#### 12. Foam Seal

Provides a watertight seal between the water box and the inspection surface.

#### NOTE

Periodic replacement of the foam seal is recommended.

## 6.1 LYNCS CM Specifications

The table below lists specification of the LYNCS CM system.

Dimensions (w x d x h)	742 x 198 x 109 mm (29.2 x 7.8 x 4.3 in)
Standard bar widths	180 mm (7 in) 412 mm (16.2 in) Metric - 667 mm (26.2 in) Imperial 675 mm (26.6 in)
Maximum scan width	510 mm (20 in)
Scanner weight:	without water box with water box
	2.7 kg (6 lb) 3.5 kg (7.7 lb)
Circumferential scanning	100 mm (4 in) to flat plate
Water box mount external dimensions (w x d x h)	100 x 80 x 47 mm (3.9 x 3.1 x 1.8 in)
Water box mount internal dimensions (w x d x h)	82 x 42 x 47 mm (3.2 x 1.6 x 1.8 in)
Water box external dimensions (w x d x h)	81 x 41 x 57 mm (3.2 x 1.6 x 2.2 in)
Water box internal dimensions (w x d x h)	78 x 24 x 25 mm (3 x 0.9 x 1 in)

## 6.2 LYNCS CM Inspection Setup and Operation

To prepare and connect the system together:

1. Remove a tractor unit from the scanner frame by:
  - a. Remove the endcap from the scanning rail by unscrewing both thumbscrews.
  - b. Loosen the clamping mechanism of the tractor unit by unscrewing the thumbscrew.
  - c. Slide the tractor unit off the end of the scanning frame.
2. Select the required scanning rails to use as the scanner frame then slide any cable management and hose guides if required to the scanning frame.

3. Affix the corrosion mapping mount at the initial required position depending upon incremental spacing for the required application.

#### IMPORTANT

The incremental position of the corrosion mapping mount along the scanning frame can be achieved by using either the spring-loaded lever lock at the hole spacing, or the cam lever lock at manually determined spacing.

4. Re-attach the tractor unit to the scanning frame and tighten the clamping mechanism.
5. Replace and secure the end cap using the thumbscrews.
6. Insert the probe into the water box by:
  - a. Unscrewing and remove the 4 cap head bolts and washers using a 3 mm hex key.
  - b. Removing the supplied probe seal (page 27, item 11 of figure 22) from the water box and fix 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 3 mm 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.

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

#### NOTE

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



#### 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.

8. Open the pressure release valves on the water box, if not already open.
9. On the corrosion mapping mount loosen the water box clamping mechanism.
10. Insert the water box with fitted probe into the corrosion mapping mount 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.

11. Secure the water box in the corrosion mapping mount by tightening the water box clamping mechanism.

#### NOTE

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

12. Connect the encoder umbilical cable, in the cable management sleeve, to the left tractor unit encoder socket by aligning the white dots. Secure the encoder umbilical cable to the left tractor unit strain relief point.



#### CAUTION

Ensure the encoder umbilical is attached to the strain relief point on the left tractor unit. Failure to do so could result in damage to the assembly.



13. Attach the cable management sleeve strain relief chain clips to the strain relief points at the rear of each tractor unit, as illustrated below.

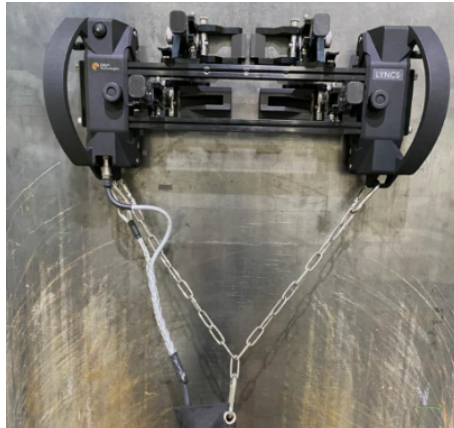


Figure 23: Strain relief chain for the cable management



### CAUTION

Ensure the strain relief chains are applied centrally to the scanner and allows for sufficient relief on the cables. Depending upon the tractor unit distance adjust the strain relief chain length by altering the clip position.

14. Unzip the cable management sleeve and insert the required probe cables for the application. Use Velcro ties to secure the probe cables to the encoder cable then zip up the cable management sleeve. Feed the probe cable through the cable guides on the scanner frame to the probe wedges.



### CAUTION

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

15. Connect the water hose in the cable management sleeve to the water box on the scanner. If required feed the hose through the hose guides on the scanner.



### CAUTION

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

16. Connect the water hose to the pump.
17. Tether the scanner from both tractor unit handles.
18. Connect the encoder umbilical lead to the instrument by aligning the red dot. Depending upon the function of the scanners on board control, the supplied encoder adapter cable may need to be connected between the encoder umbilical and instrument.

### IMPORTANT

If the Pause / Resume functionality is required, do not use encoder adapter cable.

If the Increment / Encoder Reset functionality is required connect the encoder adapter cable.

19. Setup the data acquisition unit. For Eddyfi PA UT instrument select LYNCS CM in scanner list

### NOTE

Typical encoder resolution: 25.85 pts/mm.

20. Perform an encoder calibration and complete the remaining setup configuration.
21. Place onto test item to perform scan.
22. Start data acquisition on instrument and move scanner forward.

To build up a 2-axis stitched C-Scan once the scanner stops moving:

23. Apply the wheel brakes on both tractor unit.
24. When using Eddyfi PA UT instrument, press the on-board button on the tractor unit to increment the step on the instrument. If a third-party instrument is used, please refer to section 9 of the manual.
25. Loosen the corrosion mapping mount, either by the spring-loaded lever lock, or the cam lever lock, then slide to the next desired incremental position along the rail and lock in place.

#### CAUTION



The incremental position of the corrosion mapping mount along the rail can be achieved by using either the spring-loaded lever lock at the hole spacing of the rail, or the cam lever lock at manually determined spacing. When using the cam lever lock ensure the spring-loaded lever locks the spring-loaded pin in the raised position.

26. Release the wheel brakes on both tractor unit.
27. Move the scanner backward to continue data acquisition.

#### NOTE

A long press on the tractor assembly button will reset the scan direction encoder to zero.

28. Repeat the above steps from step 22 until all scans have been captured for the C-Scan.

## 7. LYNCS CHAIN Overview

### Isometric View

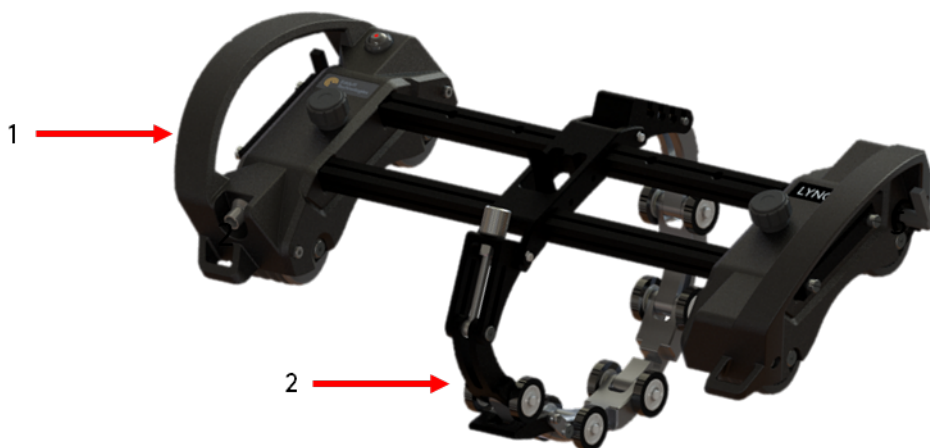


Figure 24: LYNCS CHAIN Isometric overview

#### 1. LYNCS scanner

Use the LYNCS WI and/or LYNCS CM system frame to attach the LYNCS chain assembly too.

#### 2. LYNCS chain

LYNCS chain assembly is compatible with LYNCS WI & LYNCS CM system.

### Side View

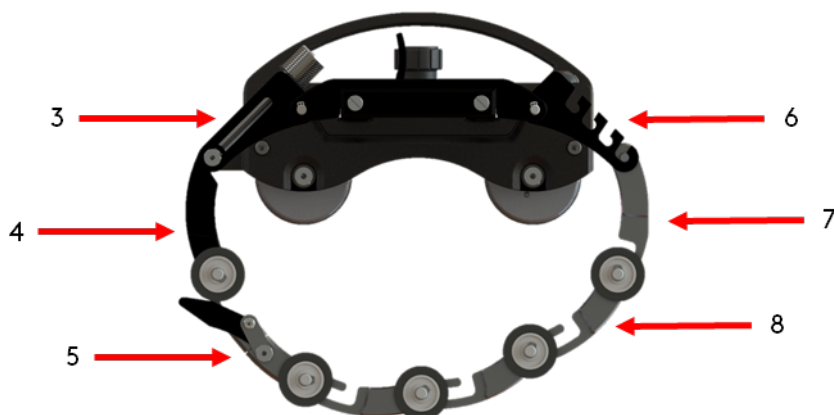


Figure 25: LYNCS CHAIN side overview

#### 3. Adjustment assembly thumbscrew

Use the thumbscrew on the adjustment assembly to alter the tension on the chain. The adjustment assembly is part of chain attachment block assembly (10). Turn the thumbscrew clockwise to increase chain tension and counter clockwise to loosen tension.

and hooks over the barrel of the thumbscrew adjuster assembly (3) part of the chain attachment block (10).

\* Supplied in black

#### 4. Chain hook link

This link is positioned at the end of the chain, after the quick release link (5),

#### 5. Quick release (QR) link

Use the lever on the quick release link to release tension on the chain assembly and introduce some slack. This helps during the fitment, removal, and repositioning of the chain.

### 6. Fixed adjuster

Select from one of the available slots to locate the pins of the fix adjuster link (7) into. Choose a slot depending upon the required chain tension. The fixed adjuster is part of chain attachment block assembly (10).

### 7. Fixed adjuster link

Used to connect the first link of the chain assembly to the fixed adjuster (6), that

is part of the chain attachment block assembly (10).

### 8. Small chain single wheel link

Used to create the chain assembly by hooking over the next links wheel axle. Select the required quantity of these links depending upon the pipe O/D diameter being inspected.

## Flat View

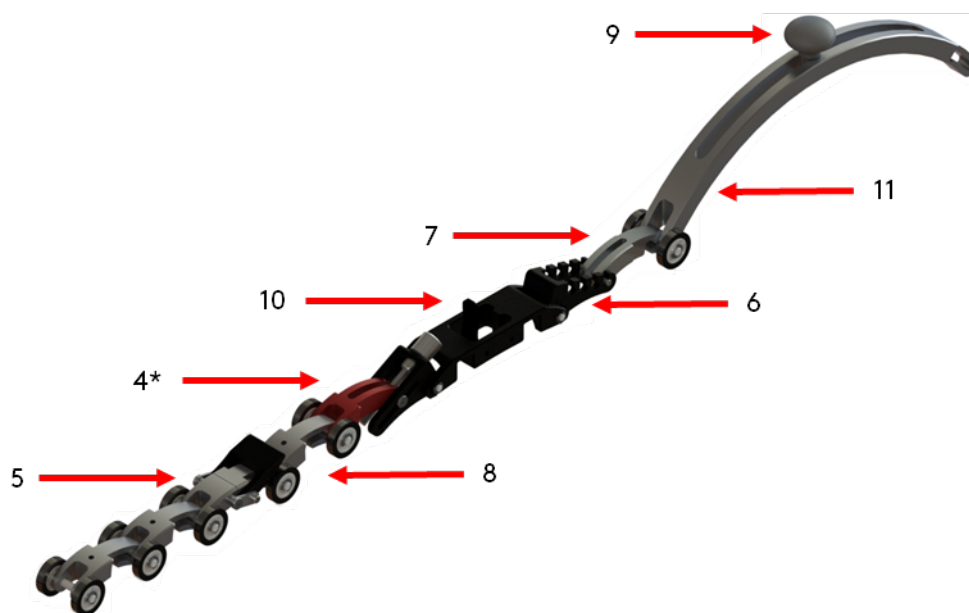


Figure 26: LYNCS CHAIN flat overview

### 9. Removable handle

Used as an additional point of contact for rotating of chain around pipe once the tension has been set. They can be attached onto any of the chain single wheel link (8)(11) by screwing into the threaded hole.

### 10. Chain attachment block assembly

Used to mount the chain assembly to the scanner frame. The chain attachment block slides onto the scanning frame and locked into place by engaging the cam lever.

### 11. Medium chain single wheel link

Used to create the chain assembly by hooking over the next links wheel axle. Select the required quantity of these links depending upon the pipe O/D diameter being inspected.

## Slimline Stabiliser

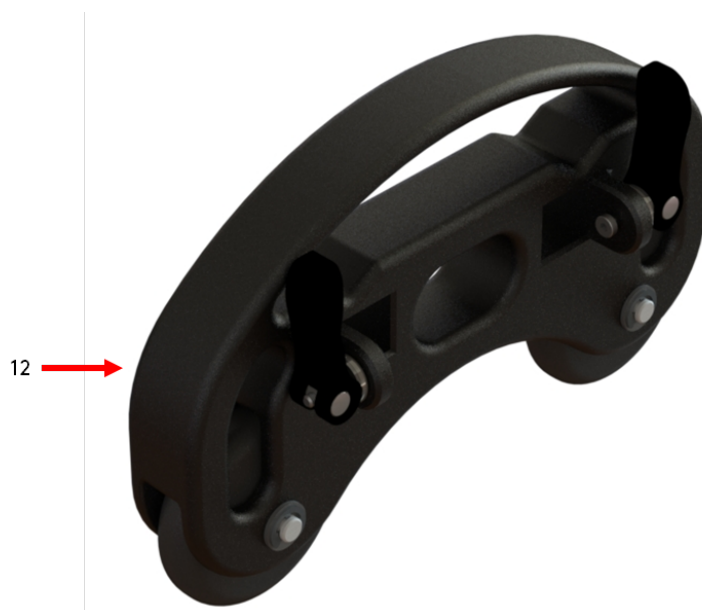


Figure 27: LYNCS CHAIN slimline stabiliser overview

### 12. Slimline stabiliser

Use the slimline stabiliser for reduced width single sided scanning. The stabiliser slides onto the scanning frame and replaces the right mechanical

tractor unit. It consists of two cam locks for adjustment along the scanning frame. There are no umbilical strain relief points on the slimline stabiliser.

## Slimline Chain Setup

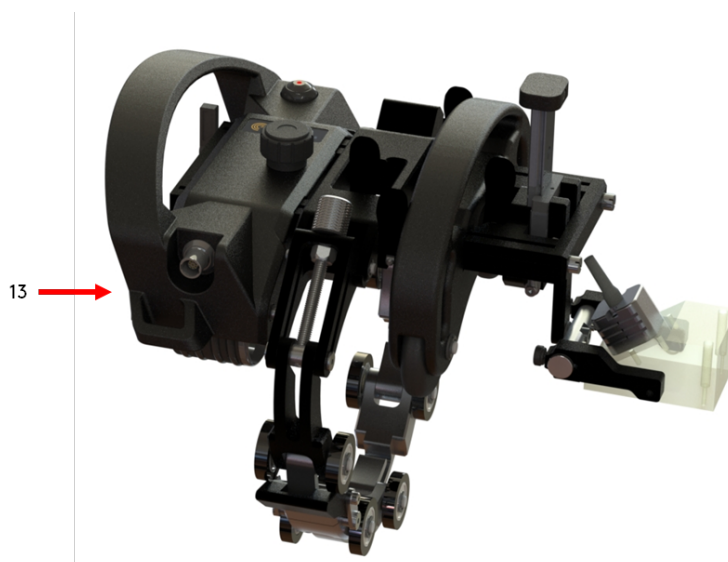


Figure 28: LYNCS CHAIN slimline chain setup overview

### 13. Slimline chain setup

Incorporation of the LYNCS WI with the left electronic tractor unit, the short bars, the slimline stabilizer, the LYNCS

chain and a single tool post for a reduced single sided inspection application.

## 7.1 LYNCS CHAIN Specifications

The table below lists specification of the LYNCS CHAIN system.

Diameter range	100 – 812 mm (4 – 32 in)	
Compatible configurations	LYNCS WI, LYNCS CM	
Minimum width 1 x Electronic tractor, 1 x Chain assembly block, 1 x slimline stabiliser mounted	140 mm (5.5 in)	
Chain weight:	305 mm (12 in)	1.4 kg (3 lb)
	812 mm (32 in)	2.75 kg (6 lb)

## 7.2 Chain Link Inspection Configuration

The table below identifies the number of small and medium links required to create a chain to fit and inspect around the pipe outer diameter.

PIPE O/D	No. SMALL LINKS	No. MEDIUM LINKS
100 mm (4 in)	2	0
152 mm (6 in)	5	0
203 mm (8 in)	8	0
254 mm (10 in)	11	0
305 mm (12 in)	13	0
355 mm (14 in)	3	2
407 mm (16 in)	1	3
458 mm (18 in)	4	3
508 mm (20 in)	1	4
559 mm (22 in)	4	4
610 mm (24 in)	2	5
660 mm (26 in)	5	5
712 mm (28 in)	8	5
762 mm (30 in)	10	5
812 mm (32 in)	13	5
<p>Note: all values are based on including Fixed Adjuster Link, QR Link, and Final Link in chain. Figures above may vary depending on pipe wall thickness and coatings.</p>		

## 7.3 LYNCS CHAIN Inspection Setup

The steps below are for the setup and fitment of the LYNCS CHAIN to the LYNCS scanner. Once fitted, please refer to the specific inspection setup and operation sections for the LYNCS WI or LYNCS CM, depending upon the inspection being performed.

29. Select the scanner configuration to be deployed with the LYNCS CHAIN. Either the LYNCS scanner with two tractor units or the LYNCS scanner with a left electronic tractor only and the slimline stabiliser for single side scanning.



Figure 29: LYNCS CHAIN and scanner configuration with two tractors



Figure 30: LYNCS CHAIN and scanner configuration with one tractor and slimline stabiliser

30. Remove a tractor unit from the scanner frame by:
- Remove the endcap from the scanning rail by unscrewing both thumbscrews.
  - Loosen the clamping mechanism of the tractor unit by unscrewing the thumbscrew.
  - Slide the tractor unit off the end of the scanning frame.
31. Select the amount of tool posts required to match the number of wedges / probes being deployed for weld inspection. If corrosion mapping inspection is required select the desired water box wedge column and attach to the water box.
32. If setting up for two-sided weld inspection scanning, place the tool posts required on one side of the scanning frame prior to the placement of the chain attachment block assembly. Affix the required tool posts and accessories to the scanning frame depending upon the application. If setting up for single sided weld inspection scanning, the chain attachment block assembly must sit next to the left tractor unit.
- If setting up for corrosion mapping inspection scanning, fit the chain attachment block assembly and corrosion mapping mount.

### NOTE

Due to the chain attachment block assembly the width of a corrosion mapping inspection will be reduced.

### CAUTION

Ensure the tool post clamps are disengaged (levers down) prior to moving the tool post along the scanning rails.



33. If setting up for two-sided weld inspection scanning, attach any further tool posts before the second tractor unit.
- If setting up for single side weld inspection scanning, first add the slimline stabilizer prior to any tool posts. If setting up for corrosion mapping inspection add the second tractor unit.
34. Replace and secure the end cap using the thumbscrews.

35. Gather the fixed adjuster link (7), the required number of small and/or medium single wheel links (8) (11), the quick release link (5) and the chain hook link (4).

**NOTE**

Refer to the chain configuration table to determine the correct number and size of links.

36. Assemble the chain for the required pipe outer diameter. Starting with the fixed adjuster link, hook the required small and/or medium single wheel links to the chain, then the quick release link and finally the chain hook link.
37. Place scanner and chain arrangement on pipe.
38. Hook the chain hook link over the barrel of the thumbscrew adjuster assembly, and fixed adjuster link to a tooth of fixed adjuster.
39. With the quick release link lever in the engaged position, set the chain tension by tightening the thumbscrew until finger tight.
40. Run chain around pipe, ensuring it is straight and any slack has been taken up. Once satisfied, disengage the quick release link lever, increase tension on thumbscrew by a turn then re-engage the quick release link lever.

**NOTE**

The quick release lever can be used to slacken the chain for removal without having to adjust the thumb nut.

If conducting weld inspection continue with the inspection setup and operation on from step 5 on page 23.

If conducting corrosion mapping inspection continue with the inspection setup and operation from step 6 on page 28.



## 8. LYNCS AXIAL Frame Overview

### Isometric View

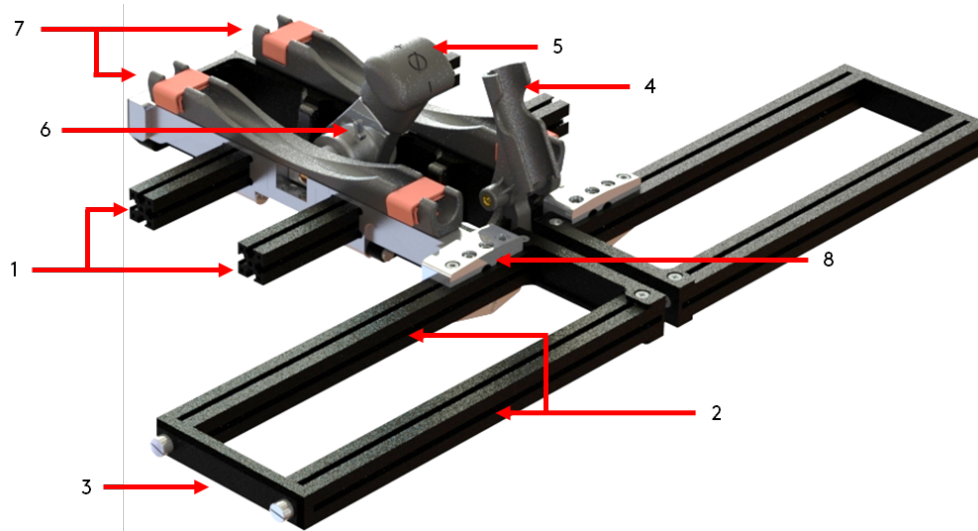


Figure 31: LYNCS AXIAL frame overview

#### 14. Tractor unit rails

Used to mount the left electronic tractor unit and right mechanical tractor unit onto the LYNCS AXIAL frame.

#### 15. Scanning frame

The hinged scanning frame consists of two identical length rails used to mount up to four tool posts.

#### 16. Scanning frame end caps

Remove the end caps via the two captive thumbscrews to insert / remove the tool posts onto the scanning frame.

#### 17. Laser mount

An adjustable laser mount can be set and used as a positional guide during inspection. If the laser is removed, the mount can be used as an open sight.

#### 18. Ratchet handle

Swings back and forth to adjust the scanning frame to the required pipework diameter. The ratchet switch (6) determines the direction of adjustment.

#### CAUTION



Raise the laser mount to a vertical position before using the ratchet handle.

#### 19. Ratchet switch

Located on the right-hand side of the ratchet handle and used to determine the direction of adjustment.

**For smaller diameter:** Set ratchet switch lever to point towards negative ( - ) and push the ratchet handle forward.

**For larger diameter:** Set ratchet switch level to point towards positive ( + ) and pull the ratchet handle backwards.

#### 20. Cable management runners

Used to secure the probe cabling along either side of the LYNCS AXIAL frame.

#### 21. Scanning rail support blocks

Used to secure the scanning rails to the LYNCS AXIAL scanning frame.

## LYNCS AXIAL Scanner Setup

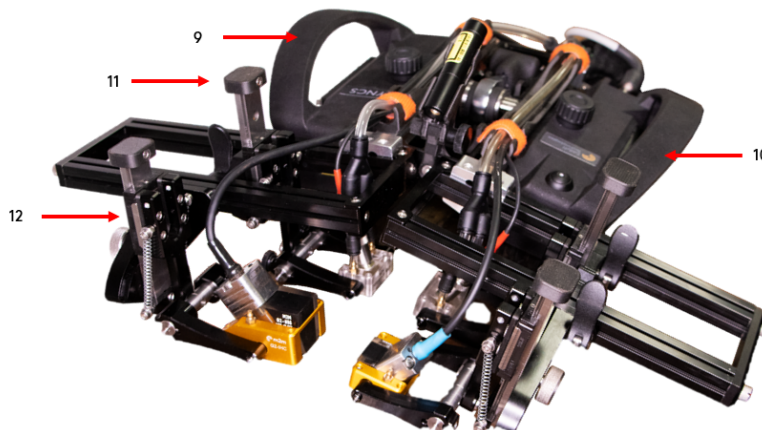


Figure 32: LYNCS AXIAL scanner setup with probes

### 22. Right mechanical tractor unit

The right tractor is a mechanical tractor unit assembly. It contains no electronics.

the scanner frame and are secured by clamps on either side of the tool post.

### 23. Left electronic tractor unit

The left tractor is the electronic unit assembly which houses the on-board button controls and the encoder.

### 25. Outer tool posts

Wedge tool posts that mount to the outside of the scanner frame and are secured by a single mounting clamp. They also provide a tilt adjustment when on small diameter pipework.

### 24. Inner tool posts

Wedge tool posts that mount between

## 8.1 LYNCS AXIAL Specifications

The table below lists specification of the LYNCS AXIAL system.

Dimensions (w x d x h)		436* x 288 x 132 mm (17.1 x 11.3 x 5.2 in) * width can be reduced to 270 mm (10.7 in) by changing modular front rails
Diameter range:	External longitudinal	50 mm (2 in) to flat plate
	Internal longitudinal	355 mm (14 in) to flat plate
Compatible configurations		LYNCS WI
Scanner weight with:	No tool posts	3.4 kg (7.5 lb)
	2 x tool posts	3.9 kg (8.6 lb)
	4 x tool posts	4.6 kg (10.1 lb)
Radial clearance		145 mm (5.7 in)

## 8.2 LYNCS AXIAL Setup and Operation

The steps below are for the fitment, setup and operation of the LYNCS AXIAL scanning frame to the LYNCS scanner for external inspection.

### External Inspection Setup

1. Remove the LYNCS WI scanner from the transit case then remove both tractor units from its frame by:
  - a. Remove the endcaps from the scanning rail by unscrewing both thumbscrews.
  - b. Loosen the clamping mechanism of the tractor unit by unscrewing the thumbscrew.
  - c. Slide the tractor unit off the end of the scanning frame.
2. Remove the LYNCS AXIAL scanning frame from the transit case.
3. Fit both tractor units onto the LYNCS AXIAL scanning frame by sliding onto the tractor unit rails and tightening the clamping mechanism.
4. Take the endcaps from the LYNCS WI and secure to the ends of the tractor unit rails using the thumbscrews.
5. Remove the end caps from the scanning frame of the LYNCS AXIAL.
6. Select the amount of tool posts required to match the number of wedges / probes being deployed. Affix the required tool posts to the LYNCS AXIAL scanning frame depending upon the application.



#### CAUTION

Ensure the tool post clamps are disengaged (levers down) prior to moving the tool post along the scanning rails.

7. Replace and secure the end caps using the thumbscrews.
8. Load the probe wedges to the tool post arms of the scanner.

#### IMPORTANT

Select the appropriate side of the tool post arm so the pin matches the wedge hole diameter.



#### CAUTION

Ensure the laser mount is tilted backward to the vertical position to prevent any damage to it if the scanner is positioned on its back during the fitment of the probe wedges.

9. Connect the encoder umbilical cable, in the cable management sleeve, to the left tractor unit encoder socket by aligning the white dots. Secure the encoder umbilical cable to the left tractor unit strain relief point.



#### CAUTION

Ensure the encoder umbilical is attached to the strain relief point on the left tractor unit. Failure to do so could result in damage to the assembly.

10. Attach the cable management sleeve strain relief chains to the strain relief points at the rear of each tractor unit, as illustrated below.

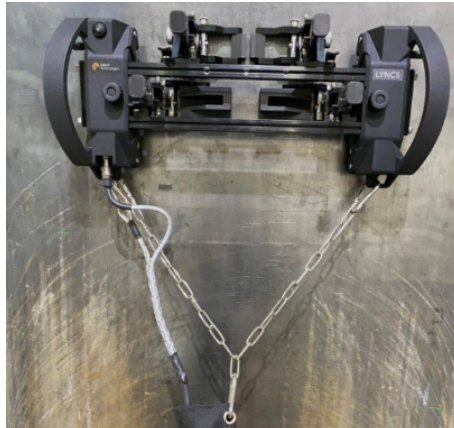


Figure 33: Strain relief chain for the cable management



### CAUTION

Ensure the strain relief chains are applied centrally to the scanner and allows for sufficient relief on the cables. Depending upon the tractor unit distance adjust the strain relief chain length by altering the clip position.

11. Unzip the cable management sleeve and insert the required probe cables for the application. Use Velcro ties to secure the probe cables to the encoder cable then zip up the cable management sleeve.



### CAUTION

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

12. Route the probe cables into the cable management runners and secure using the orange ties.
13. Raise the laser mount to a vertical position.
14. Adjust the scanning frame to suit the diameter of the pipework being inspected. Set the ratchet switch level to the required direction then swinging the ratchet handle back and forth until the required diameter is reached. Stow the ratchet handle in its horizontal position.

To reduce the diameter, set the ratchet switch lever to point towards negative ( - ) and push the ratchet handle forwards.

To increase the diameter, set the ratchet switch lever to point towards positive ( + ) and pull the ratchet handle backwards.

### NOTE

Once the scanner is positioned on the pipework some tweaking may be required.

### CAUTION

The ratchet mechanism can be overtightened and may lock out when adjusting to its extreme positions. Once locked it can be very difficult to access and move the ratchet switch level in order to loosen the mechanism.



15. Set the tool posts into the desired position along the scanners frame and lock into place. When utilizing the outer tool posts to ease wedge setup, ensure they remain in their vertical (un-tilted) position.

### NOTE

In cases where a G3 wedge is used and the required index offset cannot be achieved, it is recommended to reverse the tool post orientation and mount wedges backwards within the tool post arms.

**IMPORTANT**

If the Index offset position or the Probe center separation (PCS) cannot be achieved, it is possible to carefully slacken the scanning rail support block bolts by half a rotation then slide the scanning rail towards the center. Ensure all bolts are locked back in place then re-adjust the tool post position along the rail. Alternatively adjust the ratchet for a tighter / looser fit against the pipe surface.

16. Tether the scanner from both tractor unit handles.

**CAUTION**

Never leave the scanner unattended.

17. Connect the encoder umbilical lead to the instrument by aligning the red dot.
18. Setup the data acquisition unit. For Eddyfi PA UT instrument select LYNCS in scanner list.

**NOTE**

Typical encoder resolution: 25.85 pts/mm.

19. Perform an encoder calibration and complete the remaining setup configuration.
20. Tilt the laser mount back then switch the laser on and setup as required for scanning guidance.
21. Place onto test item to perform scan.

When using Eddyfi PA UT instrument, once setup is complete, press the Play button immediately followed by the Pause button. The scanner is now ready to make use of the on-board control Pause / Resume function. If a third-party instrument is used, please refer to section 9 of the manual.

**Internal Inspection setup**

The LYNCS AXIAL can be setup to perform internal inspection. During setup of the system turn the scanning frame upside down before fitting the tractor units.

**NOTE**

It is not possible to fit the end caps to the end of the tractor unit rails.

**IMPORTANT**

When the scanner is positioned on the test surface it is not possible to adjust the scanning frame to suit the diameter of pipework.



Figure 34: LYNCS AXIAL setup for internal pipework

## 9. Third party Instrument compatibility

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

### 9.1 Olympus

Below is setup information when using an Olympus instrument together with the LYNCS system:

One Line (LYNCS-WI) – Without LYNCS adapter lead

- Encoder 1: quadrature
- Encoder 2: OFF
- DIN2: Any selectable function - Pause/Resume recommended (BUTTON) subject to 3<sup>rd</sup> party software offering.
- Usage: Position scanner, press button to start data acquisition, move LYNCS forward, press button to pause scan.

Raster mode (LYNCS-CM) – Without LYNCS adapter lead

- Encoder 1: quadrature
- Encoder 2: clicker, (BUTTON) preset off - (Bidirectional scan)
- DIN1-4: OFF
- Usage: Scan forward, press button to index, move LYNCS CM block to next position, move scanner backwards, press button to index, move LYNCS CM block to next position and repeat.
-

LYNCS™

Maintenance

## 10. Technical Support

For technical support, please contact [support@eddyfi.com](mailto:support@eddyfi.com)

### 10.1 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	Remove the handle and check encoder housing is securely in place via the 3 socket head cap bolts (see steps 1 - 3 in encoder replacement).	
Button not performing Pause / Resume function	Adapter lead connected to encoder cable	Disconnect adapter lead for Pause / Resume functionality.
	Connection issue	Remove handle and check the white connector is securely connected (see steps 1 - 4 in encoder replacement to gain access).
Insufficient probe contact	Weld Inspection - Tool post setup	Tilt the tool post forwards until probe makes sufficient surface contact. Refer to LYNCS WI Overview for details.
	Corrosion mapping – water box height adjustment	Release thumbscrew, adjust height of water box so that foam seal is in contact with external surface. The foam seal should be slightly compressed.
Button not performing Increment / Encoder Reset	Adapter lead not connected to encoder cable	Connect adapter lead for Increment / Encoder Reset functions.
Pre-Amp mounting	Universal straps not located	Contained within accessories tool case in transit case lid. *Only supplied with LYNCS FULL & LYNCS WI
Cannot achieve probe center separation (PCS) or Index offset with LYNCS AXIAL.	Diameter of scanning frame set too small	Use the ratchet handle to increase the diameter
	Restricted tool post movement	Reverse the tool post orientation and mount wedges backward within the arms.
Cannot achieve probe center separation (PCS) or Index offset with LYNCS WI.	Restricted tool post movement	Reverse the tool post orientation and mount wedges backward within the arms.



Laser not functioning	Flat Batteries	Unscrew and replace batteries. Requires 2 x LR44 A76 button cell
	Broken or damaged laser	Remove the laser and position using the open sight integrated into the laser mount.
LYNCS AXIAL ratchet lock-out	Overtightening of the ratchet mechanism at it extreme positions	Using a flat blade screwdriver to apply pressure to the ratchet switch level to reverse its direction.

## 10.2 Connector Pinout

The single connection is for the umbilical in the left electronic tractor unit.

<b>Eddyfi Part Number#</b>	SW010159
<b>Manufacturer</b>	Fischer Connectors
<b>Manufacturer Part Number</b>	UR01W08 M007S BK1 E1AB

Recommended Cable side connector

<b>Eddyfi Part Number#</b>	SW010160
<b>Manufacturer</b>	Fischer Connectors
<b>Manufacturer Part Number</b>	UP01L08 F007S BK1 Z1ZB

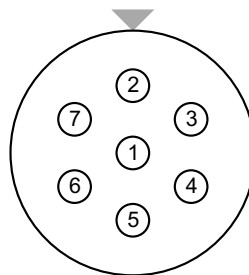


Figure 35: Connector shown from umbilical cable solder side

Pin	Signal	Description
1	GND	Ground
2	+5V	5V supply (from instrument)
3	A	Quadrature Encoder Signal A
4	B	Quadrature Encoder Signal B
5	DIN1	Button (high = pressed, float = not pressed)
6	<i>Reserved (DIN2)</i>	<i>Not connected in LYNCS</i>
7	<i>Reserved (DIN3)</i>	<i>Not connected in LYNCS</i>

## 10.3 Maintenance

After each inspection, it is recommended that:

- the LYNCS scanning head is dried after use.
- any dirt or debris are removed from the wheel teeth and scanning rails.
- the system is packed into the transit case with the umbilical assembly.

### Encoder replacement

The left electrical tractor unit contains the encoder. To replace:

1. Remove four socket cap bolts.
3. Remove three socket cap bolts and encoder housing.



Figure 36: Encoder replacement step 1

2. Carefully lift off handle cover, making sure not to place excess strain on wiring.



Figure 37: Encoder replacement step 2

3. Remove three socket cap bolts and encoder housing.



Figure 38: Encoder replacement step 3

4. Remove Fischer socket nut and disconnect JST connector (white part in image) to remove encoder assembly. Fit spare parts and reverse steps to re-assemble.



Figure 39: Encoder replacement step 4

The information in this document is accurate as of its publication. Actual products may differ from those presented herein.

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