



■ ROTIX

CE0160 Rev 03
3-Axis Nozzle Scanner

SAFETY WARNINGS / PRECAUTIONS

KEEP THIS MANUAL – DO NOT LOSE

THIS MANUAL IS PART OF THE **ROTIX** AND MUST BE RETAINED FOR THE LIFE OF THE PRODUCT. PASS ON TO SUBSEQUENT OWNERS.
Ensure any amendments are incorporated with this document.



DANGER! The **ROTIX** is designed for a specific use. Using the **ROTIX** outside of its intended use could cause damage to the product. Read and understand this manual before using.



WARNING! HOT SURFACE. The **ROTIX** may reach temperatures that may cause burns if contacted with bare skin. Wear heat resistant safety gloves when handling.



WARNING! DO NOT DISASSEMBLE. No user-serviceable parts. Disassembling any of the components in this product, beyond the instructions in this user manual, could void the regulatory certifications and/ or effect the safety of the product.



The **WEEE** symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately.

(see *Disposal* on page 52)

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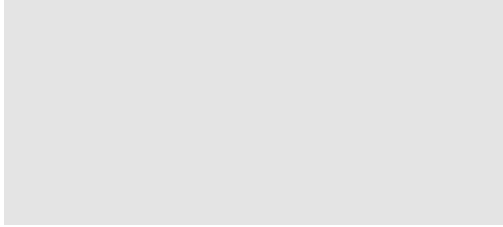
IDENTIFICATION

1.1. Product Brand

This user manual describes the proper safety precautions, setup and use of the **ROTIX** - Nozzle Scanner.

1.2. Manufacturer

Distributor:



Manufacturer:

Jireh Industries Ltd.
53158 Range Road 224
Ardrossan, Alberta, Canada
T8E 2K4
Phone: 780.922.4534
jireh.com

PRODUCT SPECIFICATIONS

2.1. Base ROTIX Specifications

This section outlines the product specifications of the Base **ROTIX** System.

2.1.1. Intended Use

The **ROTIX** nozzle scanner is a manually operated chain scanning system. Its primary purpose is to move an ultrasonic probe circumferentially around pipe nozzles and to provide encoded positional information, encoded probe positional information and encoded skew information.

2.1.1.1 Operating Limits

Category	Parameter	Specification
Inspection Surface	Minimum nozzle range	7.6 cm (3 in)
	Maximum nozzle range	60 cm (24 in)

2.1.1.2 Operating Environment

The **ROTIX** chain scanner is designed for use in an industrial environment that is between -20° C (-4° F) and 50° C (122° F).

The **ROTIX** - High Temperature Kit is required for surface temperatures between 50°C - 350°C (122°F - 662°F).

2.1.2. Dimensions and Weight

Low profile link width (Fig. 1-1)	8 cm (3.2 in)
Low profile link length (Fig. 1-2)	18.8 cm (7.4 in)
Low profile link height (Fig. 1-3)	6.1 cm (2.4 in)
Low profile link weight	0.53 kg (1.2 lb)
Encoded skew vertical probe holder width (Fig. 2-1)	11.6 cm (4.6 in)
Encoded skew vertical probe holder length (Fig. 2-2)	10.4 cm (4.1 in)
Encoded skew vertical probe holder height (Fig. 2-3)	32.2 cm (12.7 in)
Encoded skew vertical probe holder weight	0.75 kg (1.7 lb)

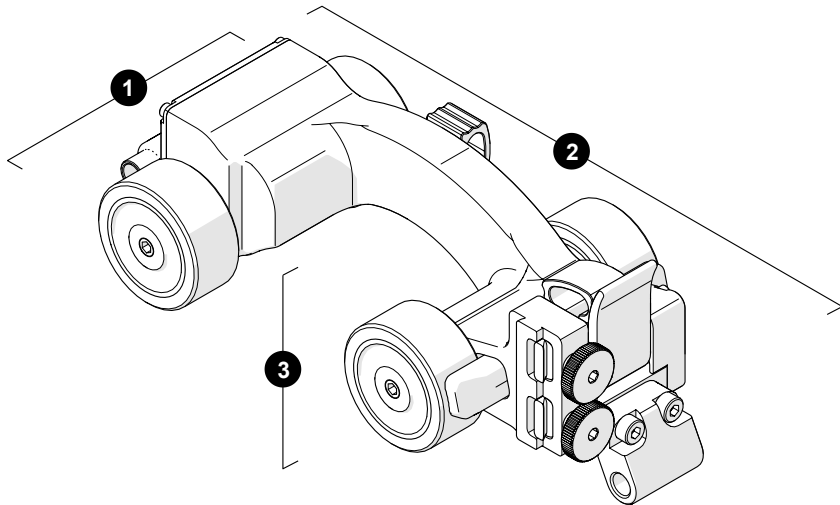


Fig. 1 - Low profile link dimensions

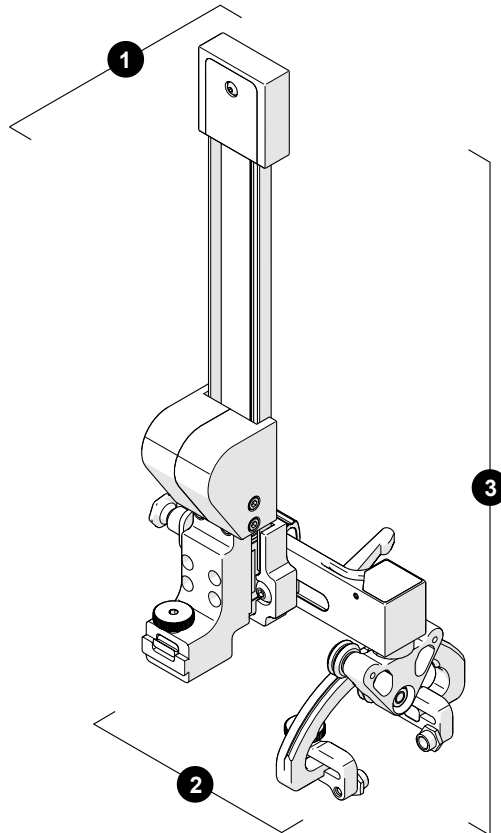


Fig. 2 - Encoded skew vertical probe holder dimensions

2.2.1. Environmental Sealing

Dust-tight, watertight (*not submersible*).

2.2.2. Performance Specifications

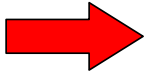
X-Axis encoder resolution	16.3 counts/mm (<i>414.5 counts/inch</i>)
Y-Axis encoder resolution (<i>slider PPS</i>)	161.3 counts/mm (<i>4096.0 counts/inch</i>)
Skew encoder resolution	2.84 counts/deg

DEFINITIONS

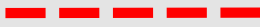
3.1. Definitions of Symbols



Instructions to 'look here' or to 'see this part.'



Denotes movement. Instructing users to carry out action in a specified direction.



Indicates alignment axis



Alerts user that the view has changed to a reverse angle.

3.2. Definitions of Terms

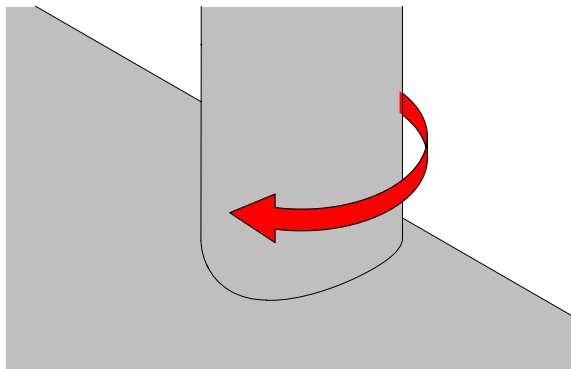


Fig. 3 - Nozzle scanning

Nozzle

Direction of scan travel is around the circumference of the pipe/tube (Fig. 3).

SYSTEM COMPONENTS

4.1. Base System Components

4.1.1. Low Profile Link CEA024

The low profile link contains the main positional encoder and a mounting point for a frame bar. Two encoder inputs are located at the rear of the link, along with the output to the user's instrument (*Fig. 4*).

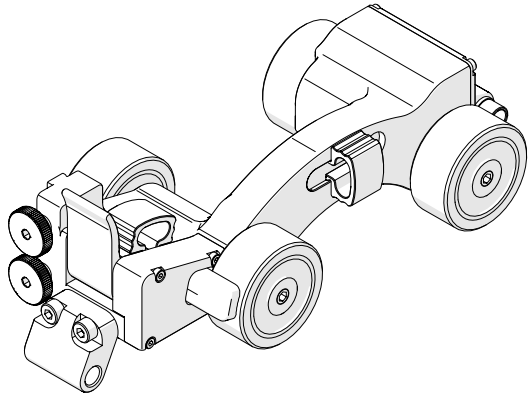


Fig. 4 - Low profile link

4.1.2. Encoded Skew Vertical Probe Holder PHA024-

A probe holder offers 12.2 cm (4.8 in) of vertical travel and an encoded skew measurement (*Fig. 5*).

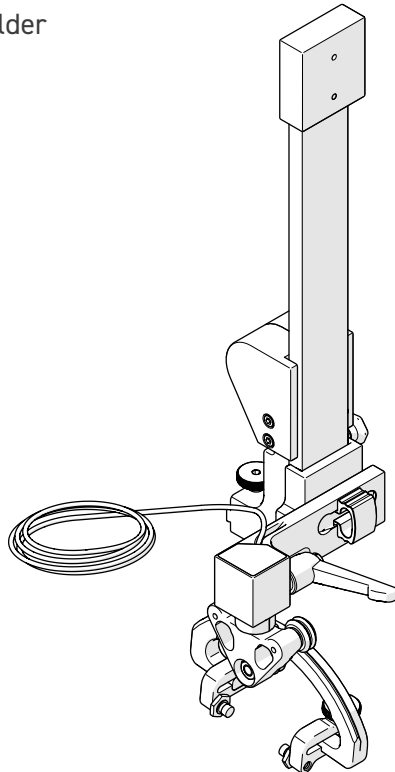


Fig. 5 - Encoded skew vertical probe holder

4.1.3. Frame Bar with Ruler BG0090-

The frame bar with ruler (*Fig. 6*) is used to mount probe holders, probe positioning systems and other accessories. Metric measurements are included on the frame bar.

Frame bars are available in a variety of lengths.

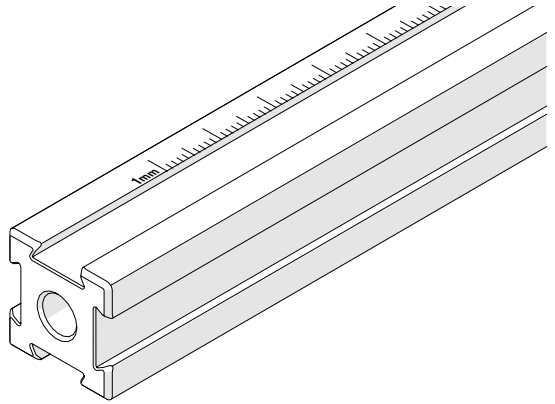


Fig. 6 - Frame bar with ruler

4.1.4. Slider PPS Encoder CJS017-

Measure probe distance from the weld. The slider PPS (probe positioning system) encoder mounts to the frame bar of a slider probe positioning system. The Slider PPS Encoder engages with the encoded lead screw to provide lateral positional feedback of the probe(s) (*Fig. 7*).

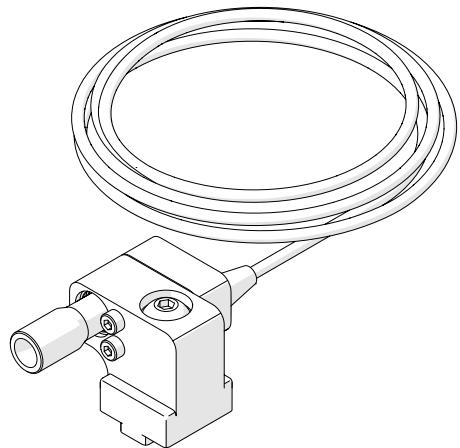


Fig. 7 - Slider PPS encoder

4.1.5. Slider Probe Positioning System CJA002-

The Slider Probe Positioning System uses a slide and leadscrew system to position 1 or 2 probes for weld inspection. Set the probe center spacing and center the two probes over the weld without removing the scanner (*Fig. 8*).

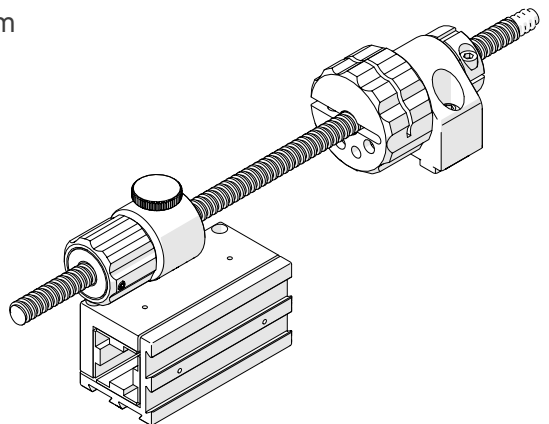


Fig. 8 - Slider probe positing system

4.1.6. ROTIX - Short Link CES002

Combine short links to assemble various lengths of single wheel chain configurations (*Fig. 9*).

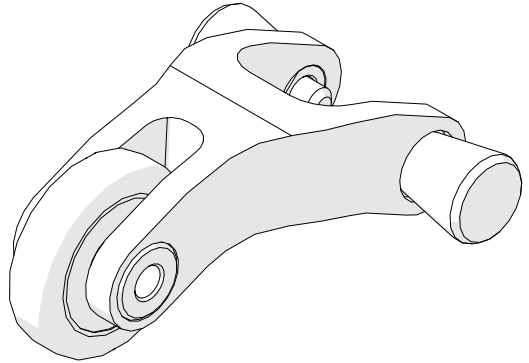


Fig. 9 - Short link

4.1.7. ROTIX - Short Link with Dovetail CES024

Similar to a standard ROTIX - Short Link but with the addition of a dovetail for mounting optional accessories (*Fig. 10*).

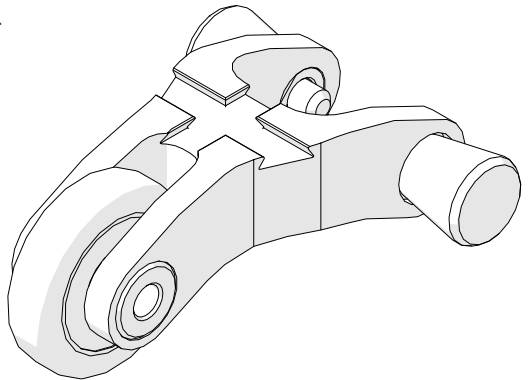


Fig. 10 - Short Link with dovetail

4.1.8. ROTIX - Long Link CES009

The long link is roughly equivalent to the length of three ROTIX - Short Links and is used to assemble various lengths of single wheel chain configurations (*Fig. 11*).

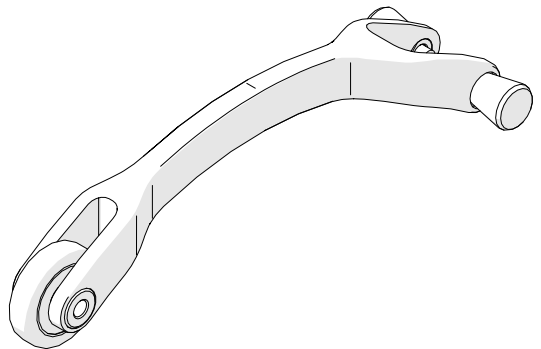


Fig. 11 - Long link

4.1.9. ROTIX - Buckle CES005

The buckle offers adjustment of the chain system tension and provides the connection point of the chain assembly (Fig. 12).

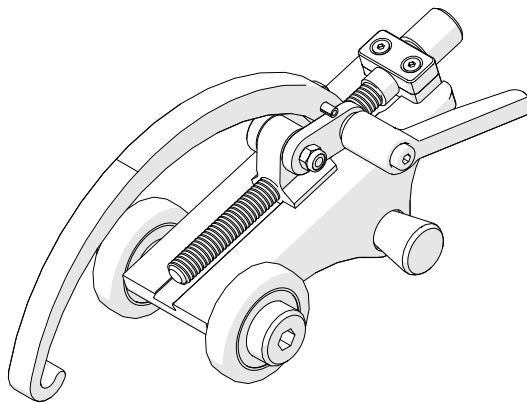


Fig. 12 - Buckle

4.1.10. ROTIX - Catch Link CES003

The ROTIX - catch link is used with the ROTIX - buckle to clamp a single wheel chain scanner to an inspection surface.

The dovetail mount of the catch link is used to affix various accessories, such as cable management (Fig. 13).

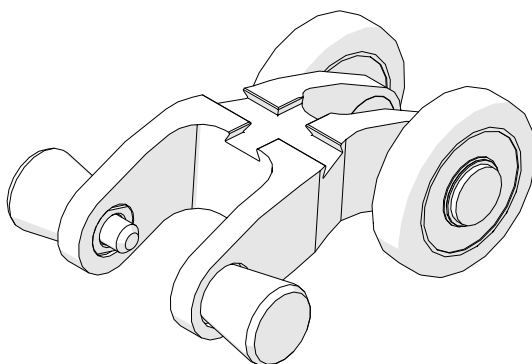


Fig. 13 - Catch link

4.1.11. J400 Encoder Cable UMA036-

The encoder cable connects the **ROTIX** system to the user's instrument. (Fig. 14).

Various encoder cable styles are available for various instruments.

NOTE: *Inspect the cable and connectors for damage before use. When damage is evident, the cable must **NOT** be used.*

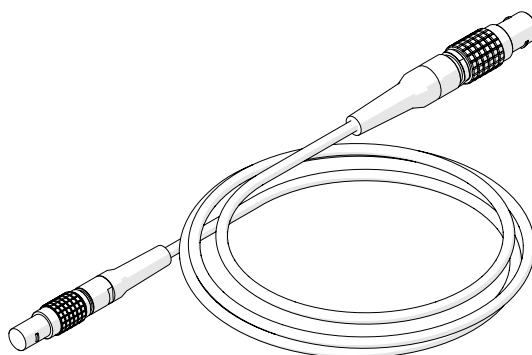


Fig. 14 - J400 Encoder cable

4.1.12. Cable Management, Dovetail Mount CES044-

Cable management provides a means of protecting and organizing cables, tubes and hoses (Fig. 15).

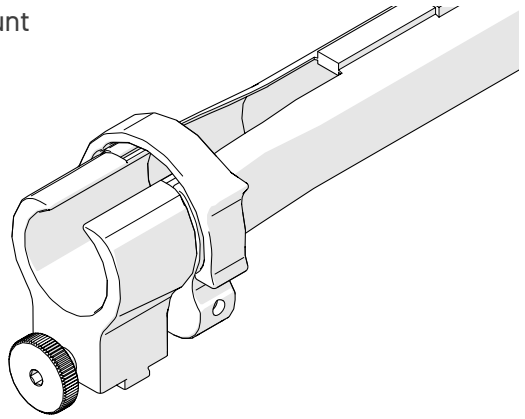


Fig. 15 - Cable Management, Dovetail Mount

4.1.13. Irrigation Kit CMG007

The irrigation kit provides a variety of hoses, fittings, connectors, and splitters commonly used during non-destructive inspection (Fig. 16).

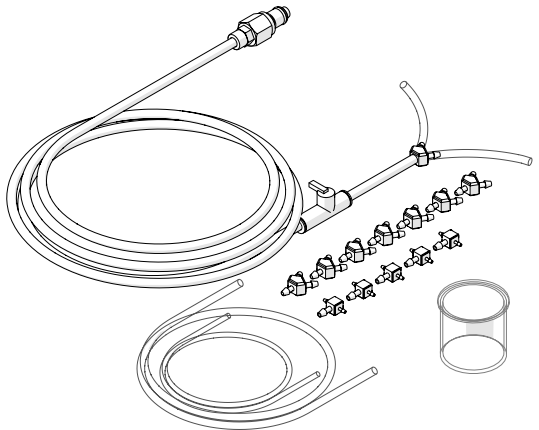


Fig. 16 - Irrigation Kit

4.1.14. Tools

Several tools are included for various scanner and accessory adjustments.

4.1.15. Case

The system is provided with a rugged carrying case.

4.2. Base High Temperature Components

4.2.1. High Temperature Low Profile Link CEA031

The low profile link contains the main positional encoder and a mounting point for a frame bar. Two encoder inputs are located at the rear of the link, along with the output to the user's instrument (*Fig. 17*).

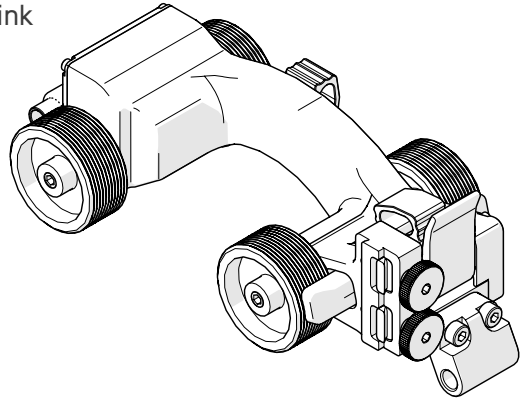


Fig. 17 - High temperature low profile link

4.2.2. Encoded Skew Vertical Probe Holder PHA024-

A probe holder offers 12.2 cm (4.8 in) of vertical travel and an encoded skew measurement (*Fig. 18*).

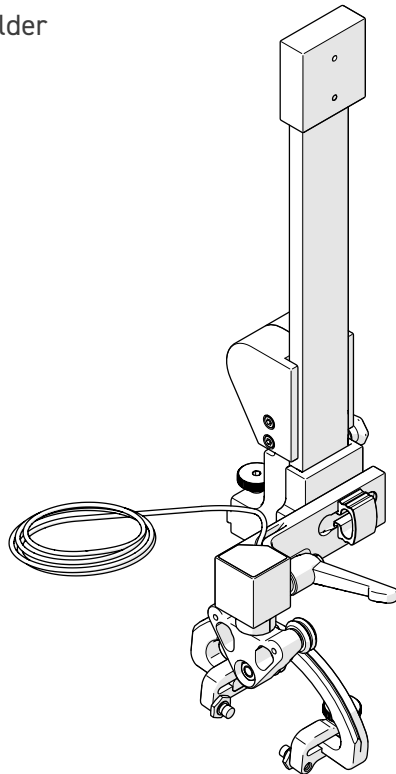


Fig. 18 - Encoded skew vertical probe holder

4.2.3. Frame Bar with Ruler BG0090-

The frame bar with ruler (Fig. 19) is used to mount probe holders, probe positioning systems and other accessories. Metric measurements are included on the frame bar.

Frame bars are available in a variety of lengths.

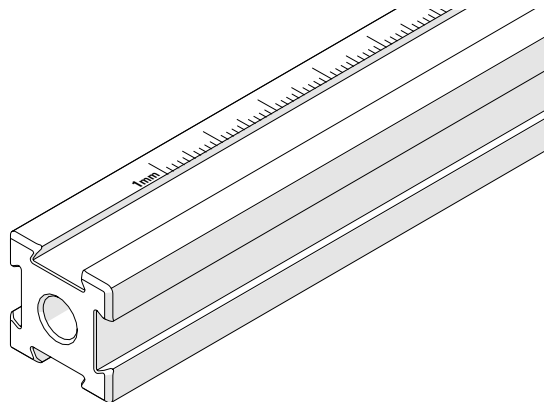


Fig. 19 - Frame bar with ruler

4.2.4. Slider PPS Encoder CJS017-

Measure probe distance from the weld. The slider PPS (probe positioning system) encoder mounts to the frame bar of a slider probe positioning system. The Slider PPS Encoder engages with the encoded lead screw to provide lateral positional feedback of the probe(s) (Fig. 20).

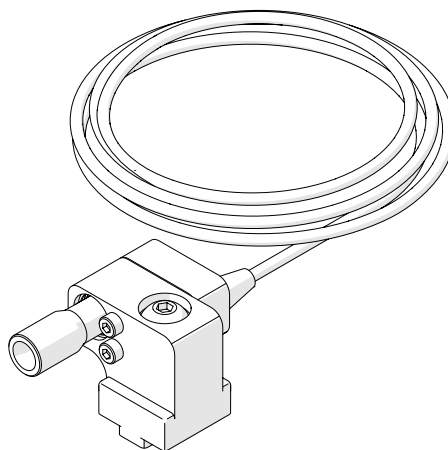


Fig. 20 - Slider PPS encoder

4.2.5. Slider Probe Positioning System CJA002-

The Slider Probe Positioning System uses a slide and leadscrew system to position 1 or 2 probes for weld inspection. Set the probe center spacing and center the two probes over the weld without removing the scanner (Fig. 21).

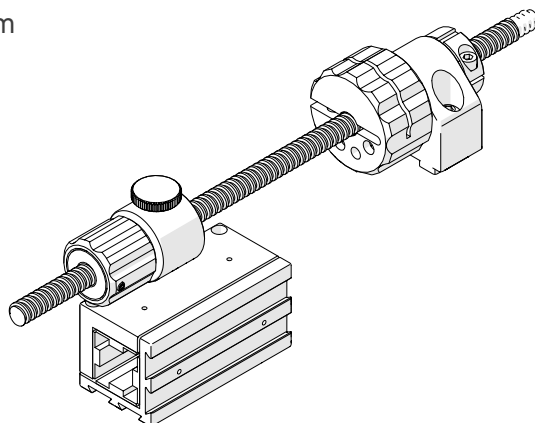


Fig. 21 - Slider probe positing system

4.2.6. High Temperature Short Link CES073

Combine short links to assemble various lengths of single wheel chain configurations (*Fig. 22*).

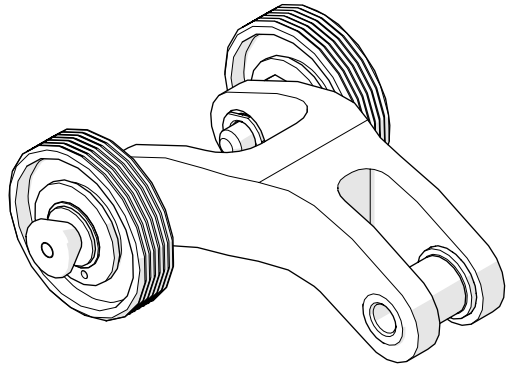


Fig. 22 - High temperature short link

4.2.7. High Temperature Dovetail Link CES076

Similar to a standard ROTIX - Short Link but with the addition of a dovetail for mounting optional accessories (*Fig. 23*).

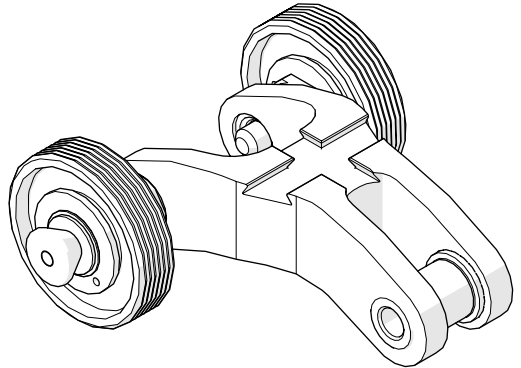


Fig. 23 - High temperature dovetail link

4.2.8. High Temperature Long Link CES075

The long link is roughly equivalent to the length of three ROTIX - Short Links and is used to assemble various lengths of single wheel chain configurations (*Fig. 24*).

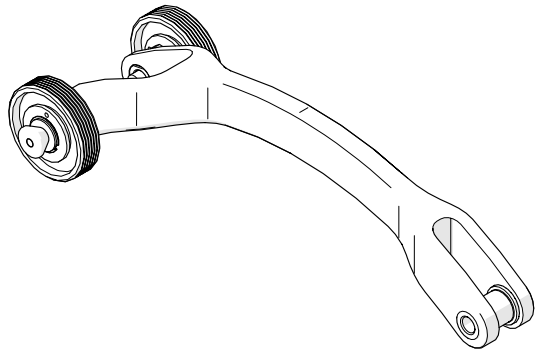


Fig. 24 - High temperature long link

4.2.9. High Temperature Buckle CES078

The buckle offers adjustment of the chain system tension and provides the connection point of the chain assembly (*Fig. 25*).

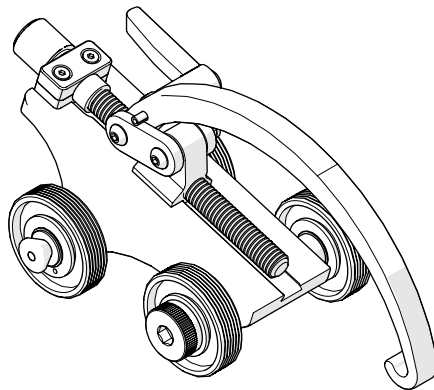


Fig. 25 - High temperature buckle

4.2.10. High Temperature Catch Link CES077

The ROTIX - catch link is used with the ROTIX - buckle to clamp a single wheel chain scanner to an inspection surface.

The dovetail mount of the catch link is used to affix various accessories, such as cable management (*Fig. 26*).

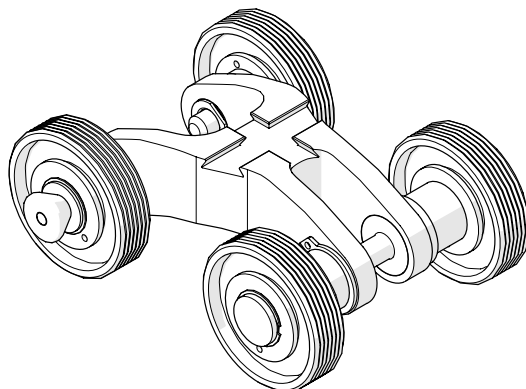


Fig. 26 - High Temperature catch link

4.2.11. Short Transition Link CES038

The buckle offers adjustment of the chain system tension and provides the connection point of the chain assembly (*Fig. 27*).

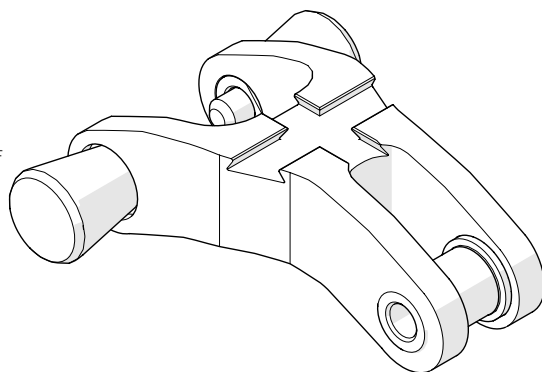


Fig. 27 - Short transition link

4.2.12. J400 Encoder Cable UMA036-

The encoder cable connects the **ROTIX** system to the user's instrument. (Fig. 28).

Various encoder cable styles are available for various instruments.

NOTE: *Inspect the cable and connectors for damage before use. When damage is evident, the cable must **NOT** be used.*

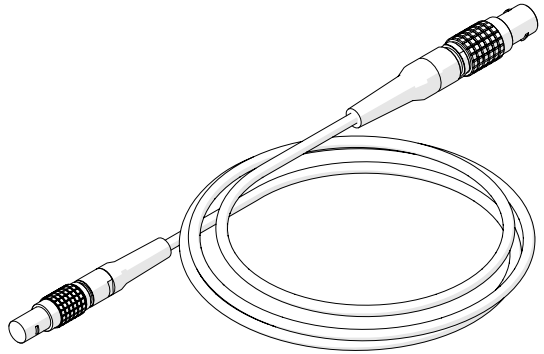


Fig. 28 - J400 Encoder cable

4.2.13. High Temperature Cable Management CES089-

High temperature cable management protects and organizes cables, tubes and hoses (Fig. 29).

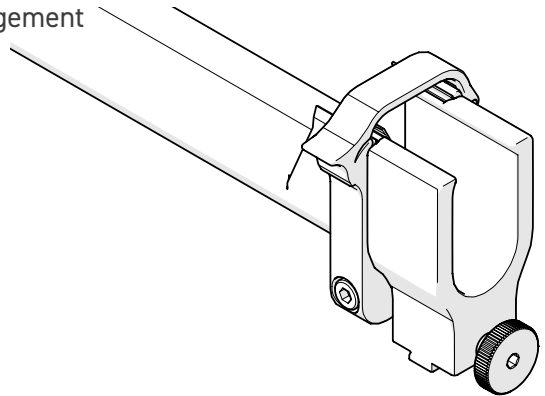


Fig. 29 - High temperature cable management

4.2.14. Irrigation Kit CMG007

The irrigation kit provides a variety of hoses, fittings, connectors, and splitters commonly used during non-destructive inspection (Fig. 30).

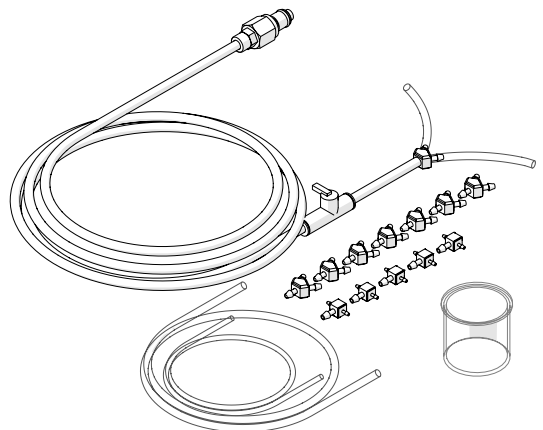


Fig. 30 - Irrigation Kit

4.2.15. Tools

Several tools are included for various scanner and accessory adjustments.

4.2.16. Case

The system is provided with a rugged carrying case.

4.3. Tools

4.3.1. Included tools

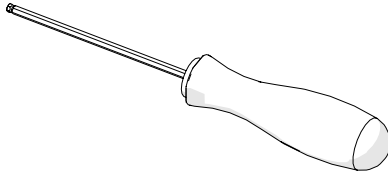


Fig. 31 - 3 mm hex driver

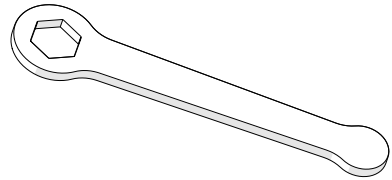


Fig. 32 - 3/8 in wrench

The 3 mm hex driver (*Fig. 31*) is sufficient for all typical operations and adjustments of the **ROTIX**.

The 3/8 in wrench (*Fig. 32*) is used to remove and install pivot buttons on the probe holders.

PREPARATION FOR USE

5.1. Configurations

5.1.1. Nozzle Scanner

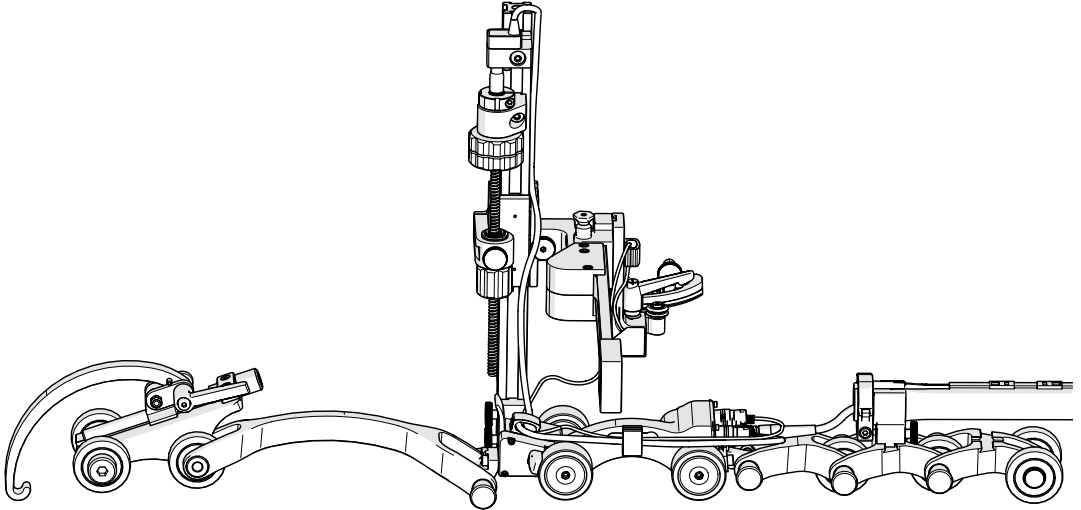


Fig. 33 - Nozzle scanner configuration laid out flat

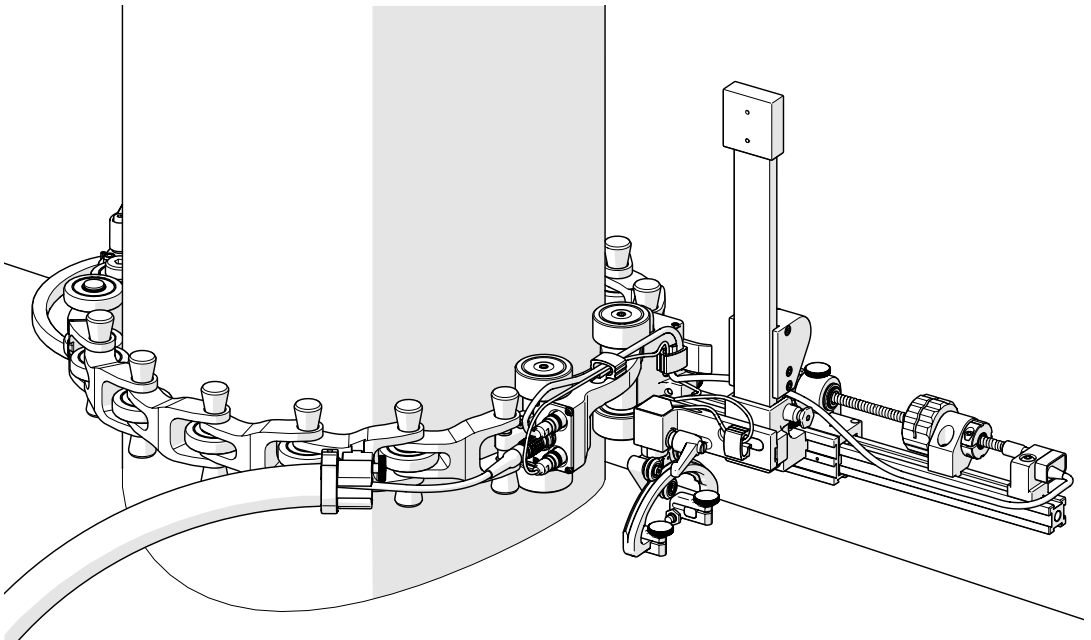


Fig. 34 - Nozzle scanner configuration

5.1.2. High Temperature Nozzle Scanner

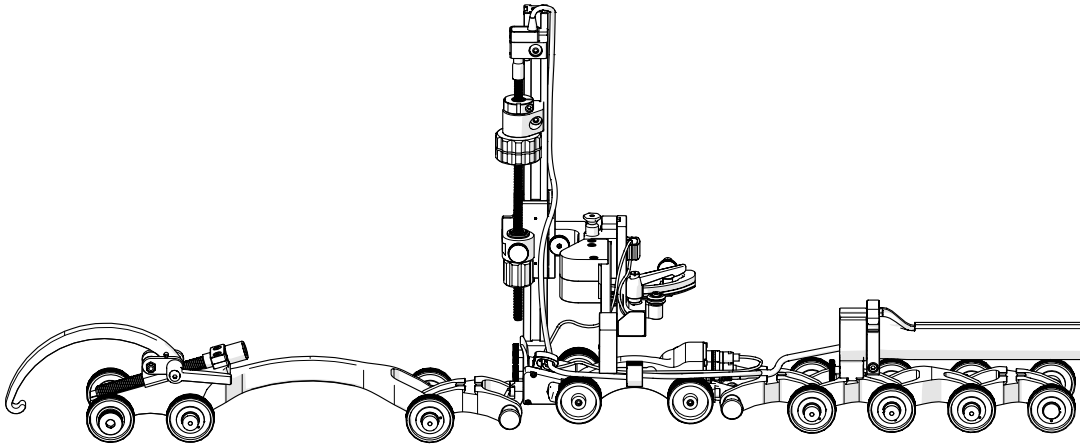


Fig. 35 - High temperature nozzle scanner configuration laid out flat

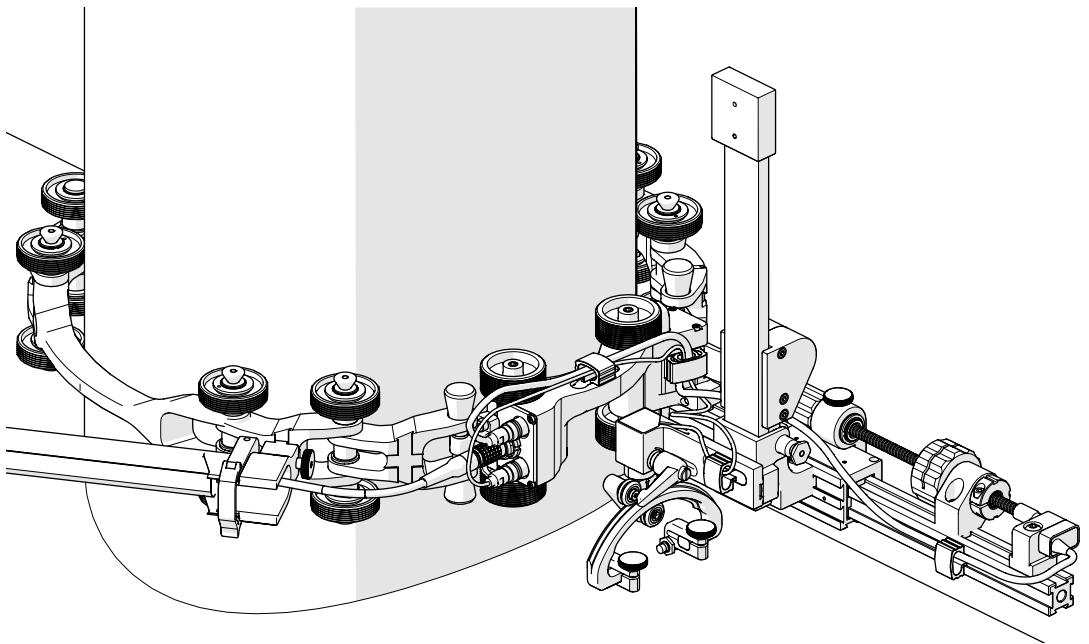


Fig. 36 - High temperature nozzle scanner configuration

5.2. Low Profile Link Adjustment and Setup

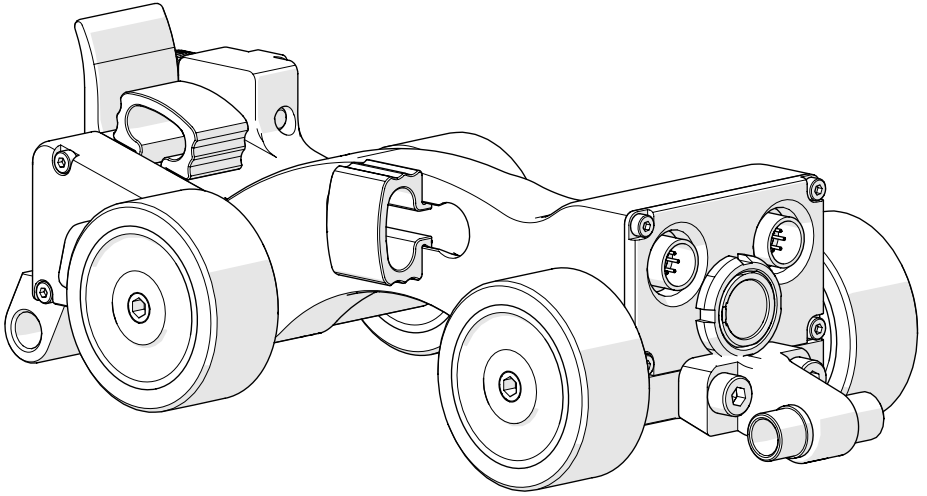


Fig. 37 - ROTIX - Low profile link

5.2.1. Brake

The red lever operates the brake. Lower the lever to activate the brake and prevent scanner movement. Raise the lever to disengage the brake (Fig. 38).

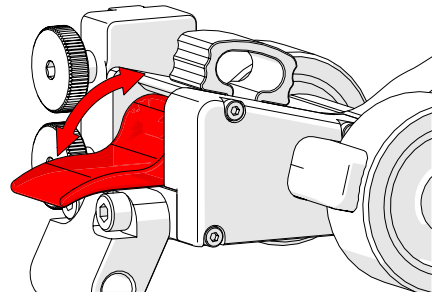


Fig. 38 - Brake lever

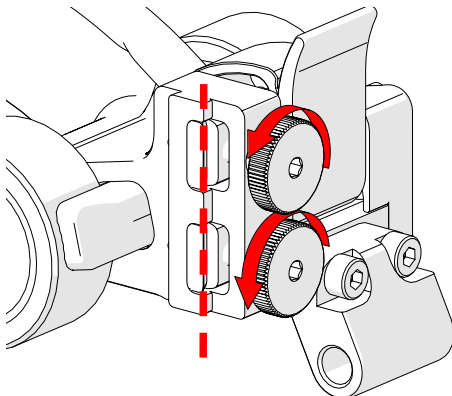


Fig. 39 - Loosen dovetail jaws

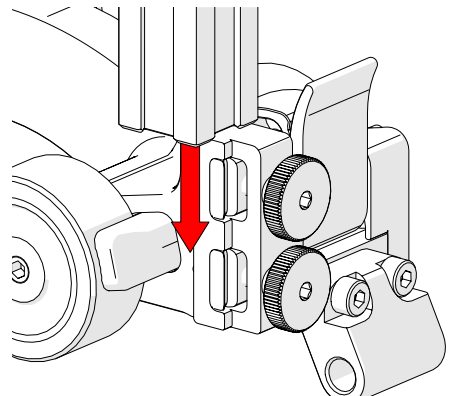


Fig. 40 - Attach frame bar to dovetail

5.2.2. Frame Bar Attachment

1. Rotate the two knobs at the front of the low profile link to align the dovetail jaws (*Fig. 39*).
2. Slide the frame bar over the two dovetails of the low profile link (*Fig. 40*).
3. Tighten the two knobs to secure the frame bar in place (*Fig. 41*).

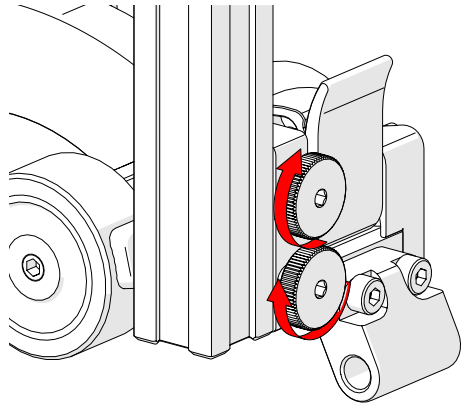


Fig. 41 - Tighten knobs

4. The 3 mm hex driver may tighten and loosen the knobs should additional strength be required (*Fig. 42*).

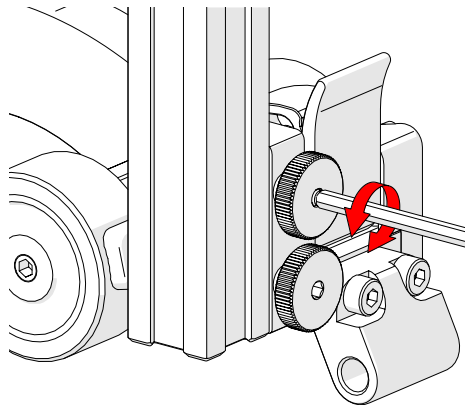


Fig. 42 - Use 3 mm hex driver

5.2.3. Encoder Connections

- A. ENC 1: the Y-axis encoder (*slider probe positioning system*), plugs into this port.
- B. ENC 2: plug the cable from the skew encoder here.
- C. The main encoder output. All encoder signals, including the low profile link's positional encoder, are transmitted to the user's instrument.

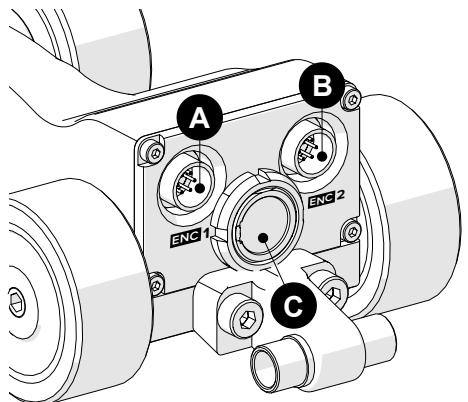


Fig. 43 - Connection identification

5.2.4. Cable Clip

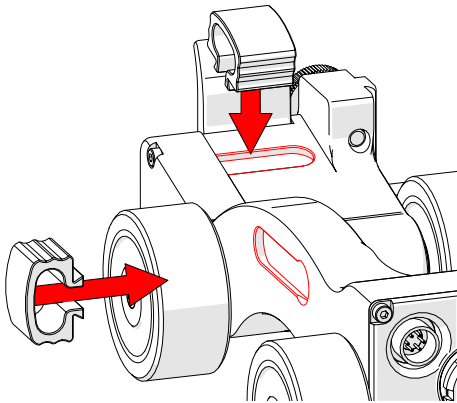


Fig. 44 - Cable clip mounting points

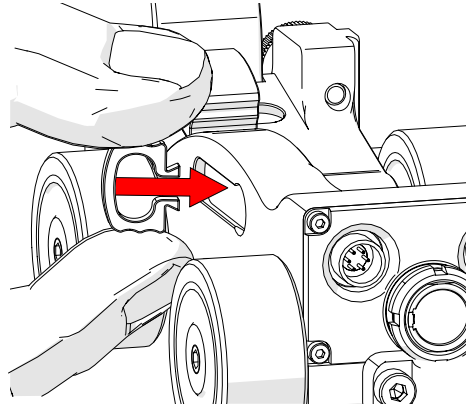


Fig. 45 - Pinch clip and press into place

Locations for cable clips have been provided to assist with cable management (*Fig. 44*). To route the cable or hose through the cable clips, place the cable clip around the hose and then pinch the clip and press it into the dovetail groove (*Fig. 45*) located on the low profile link.

5.3. Encoded Skew Vertical Probe Holder

- A** Probe Holder Adjustment Knob
- B** Probe Holder Arms
- C** Pivot Buttons
- D** Encoder Cable
- E** Skew Adjustment Indicator
- F** Ratchet Lever
- G** Latch Pin
- H** Cable Clip
- I** Probe Holder Arm Adjustment Knob

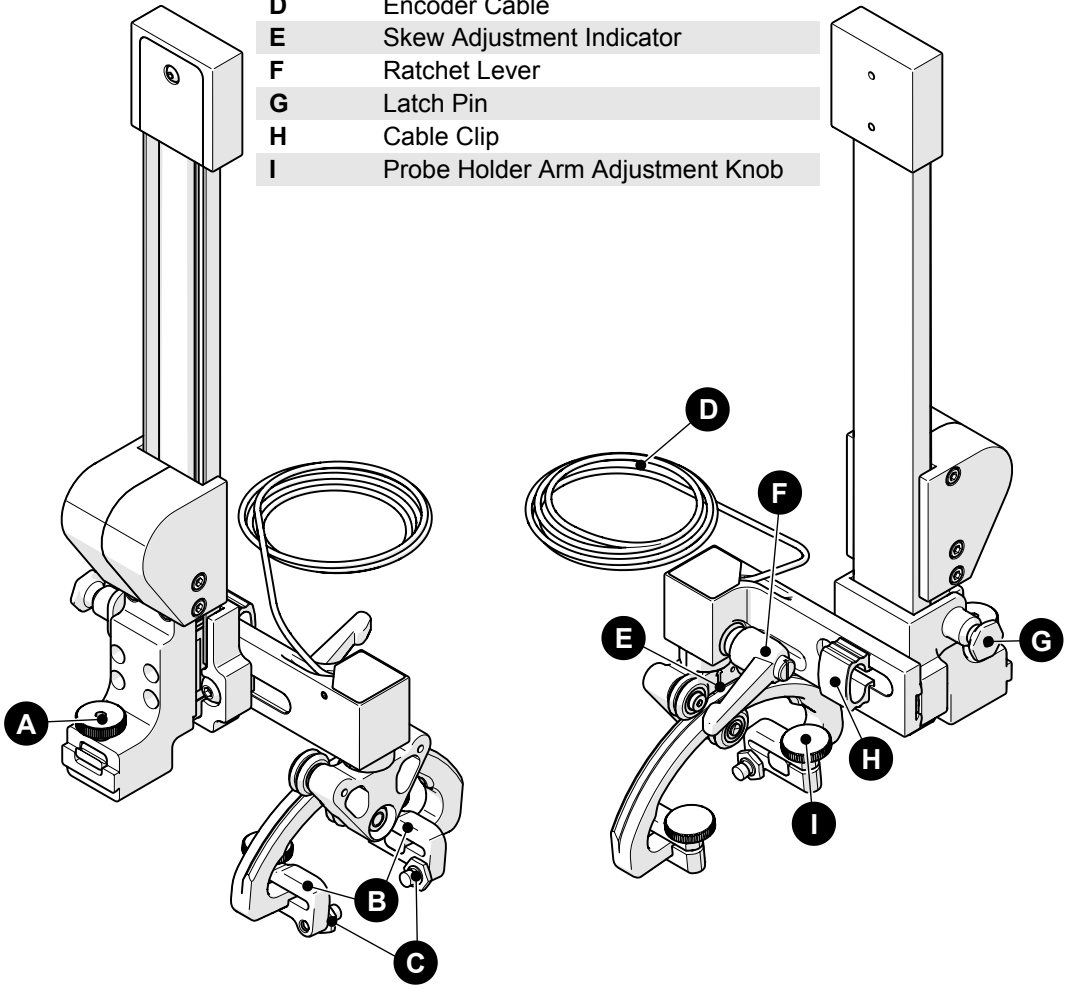


Fig. 46 - Encoded skew vertical probe holder identification

5.3.1. Probe Holder Setup

1. Using the supplied 3/8 in wrench (Fig. 32), install the appropriate pivot buttons to the probe holder arms (Fig. 47).

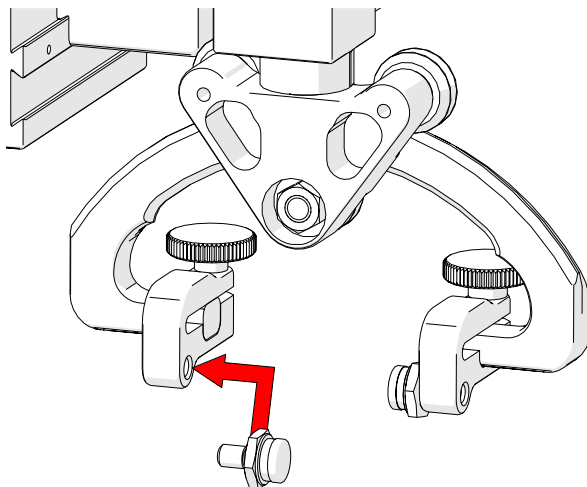


Fig. 47 - Attach pivot buttons

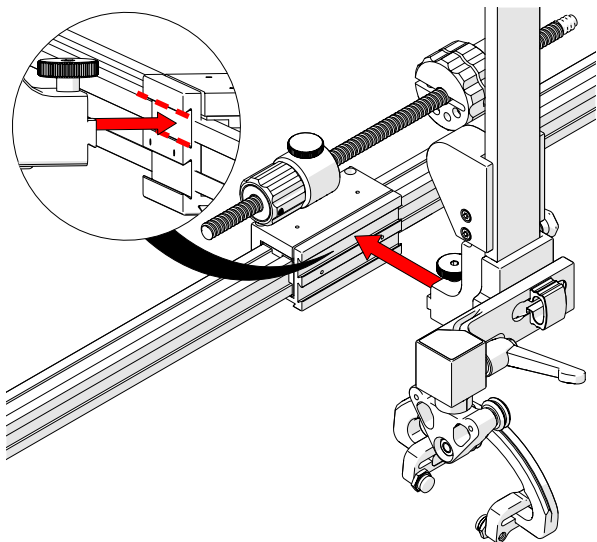


Fig. 48 - Mount to slider pps

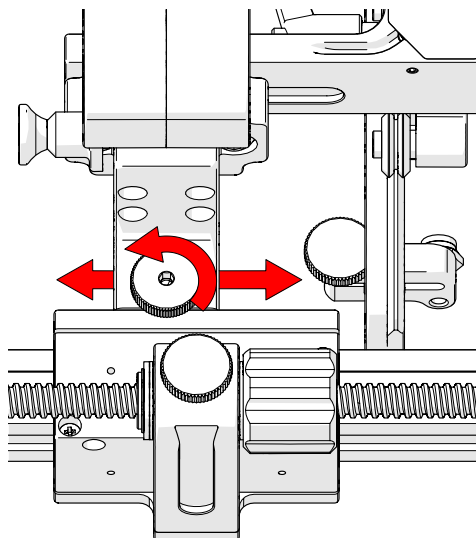


Fig. 49 - Mount to slider pps

2. Loosen the probe holder adjustment knob to attach the encoded skew vertical probe holder to the slider pps slider (Fig. 48).
3. Loosen the knob to position the probe holder horizontally along the slider pps slider (Fig. 49). Tighten the probe holder adjustment knob when positioning is complete.

To mount a UT wedge in the probe holder, follow these steps:

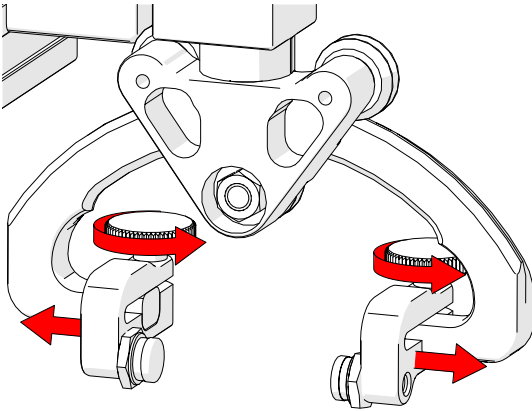


Fig. 50 - Loosen knobs and move arms

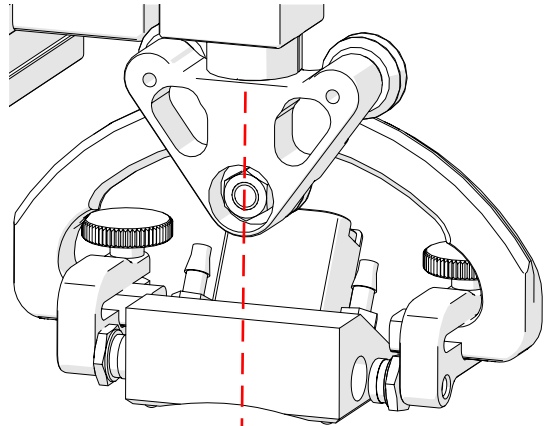


Fig. 51 - Align probe

4. Loosen the two probe holder arm adjustment knobs and move the arms apart to create space for the probe (Fig. 50).
5. Align the probe with the centre of the yoke pivot (Fig. 51).
6. Move the probe holder arms and insert the pivot buttons into the probe's pivot button holes while maintaining the probe's alignment relative to the yoke's pivot (Fig. 52).
7. Tighten the two probe holder arm adjustment knobs.

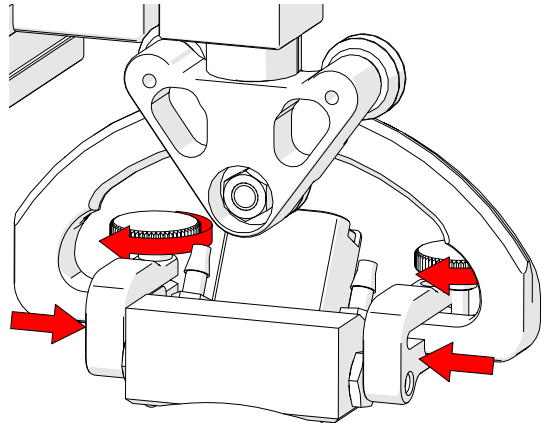


Fig. 52 - Clamp probe with arms and tighten knobs

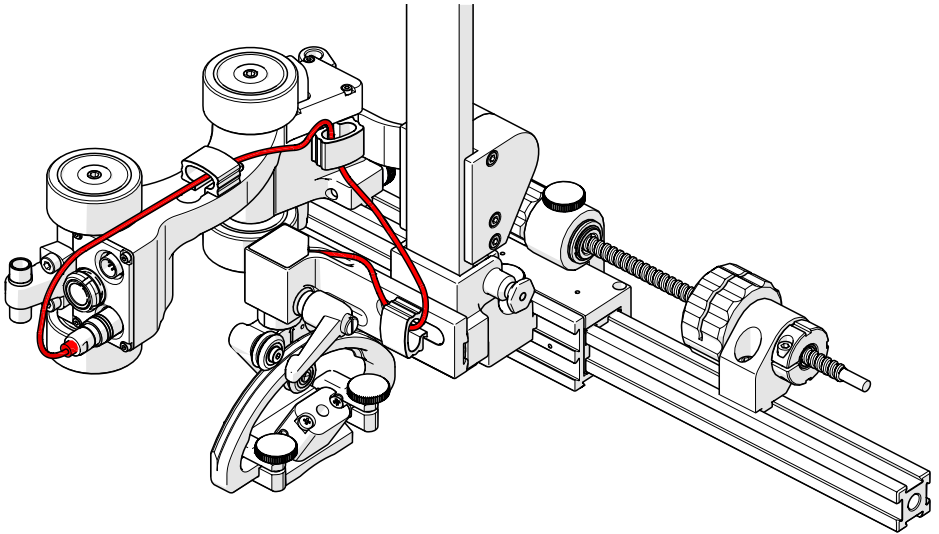


Fig. 53 - Clamp probe with arms and tighten knobs

8. Route the skew encoder cable through the required cable clips (Fig. 53).
9. Plug the skew encoder cable into ENC 2 at the rear of the low profile link (Fig. 53).

5.3.2. Encoded Skew Vertical Probe Holder Adjustment

To lower the probe (and probe holder) to the scan surface, follow these steps:

TIP: The skew encoder cable was removed for illustration purposes.

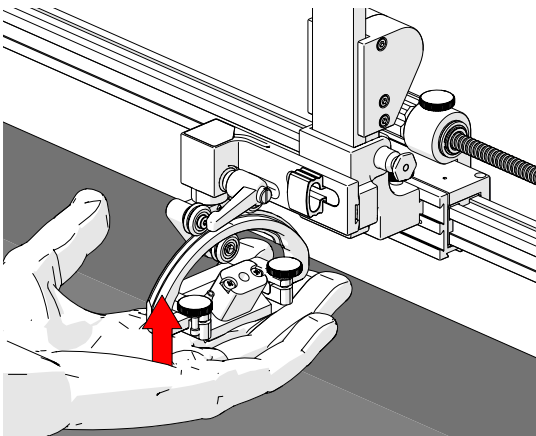


Fig. 54 - Lift probe holder

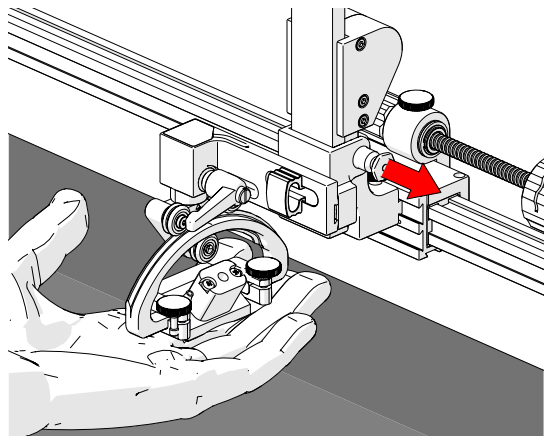


Fig. 55 - Pull latch pin

1. Lift the probe holder slightly to allow the release of the latch pin (Fig. 54).

2. Pull the latch pin (Fig. 55) and slowly lower the probe holder to the scan surface (Fig. 56).

TIP: The probe holder must be lifted slightly to pull and release the latch pin.

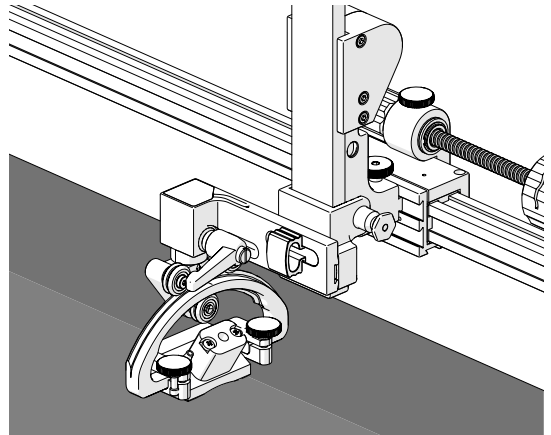


Fig. 56 - Lower probe to inspection surface

5.3.2.3 Latch Pin

The latch pin may be used in one of two methods:

1. Slightly lift the probe holder (Fig. 54).
2. Pull the latch pin to allow movement of the probe holder (Fig. 57).
3. The release latch pin and probe holder lock when raised to the uppermost position.

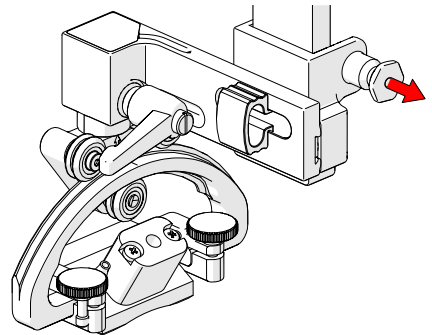


Fig. 57 - Pull latch pin

Method two allows free movement of the probe holder along the entire length of the stroke without locking in place at the uppermost position:

4. Slightly lift the probe holder (Fig. 54).
5. Pull the latch pin and slightly rotate the latch pin left or right (Fig. 58).
6. Release the latch pin, and probe holder movement is now available through the entire stroke length without latching.
7. Rotate the latch pin to return the probe holder to the locking-capable position.

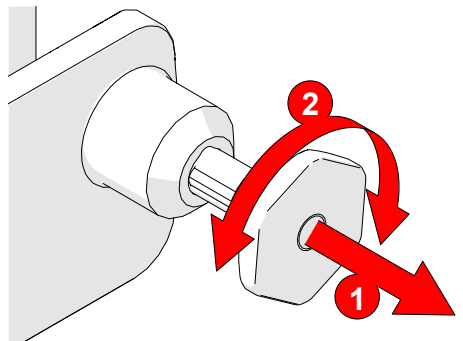


Fig. 58 - Pull latch pin and rotate

5.3.3. Skew Angle Adjustment

Rotation of the probe holder is possible through adjustment of the skew angle.

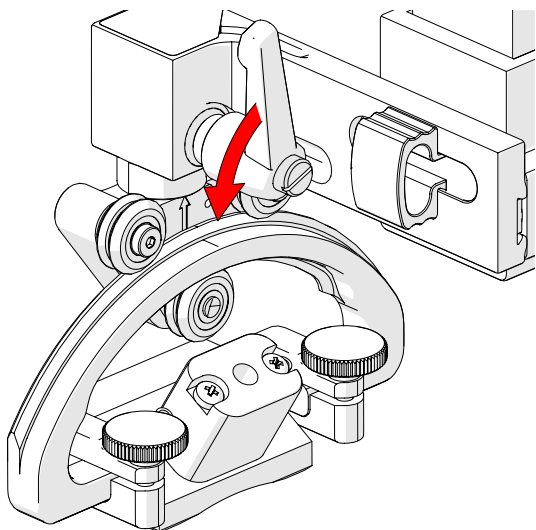


Fig. 59 - Loosen ratchet lever

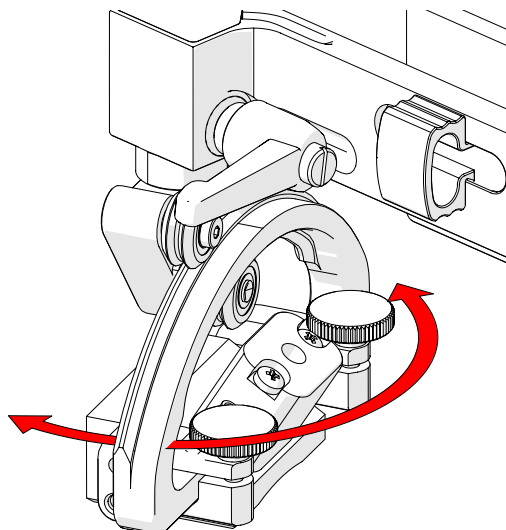


Fig. 60 - Adjust skew angle

1. Loosen the ratchet lever above the yoke (Fig. 59).
2. Rotate the yoke (Up to 90° in either direction) to the angle required (Fig. 60).
3. Tighten the ratchet lever to lock the yoke in place. Should the ratchet lever be unable to tighten or release the yoke fully (see *Ratchet Lever* on page 28 for more information).
4. The engraved arrow above the yoke will align the yoke to the required degree.

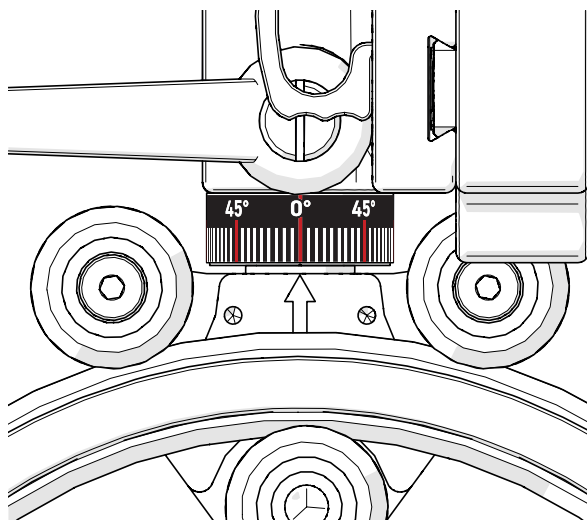


Fig. 61 - Engraved arrow aligns with various degree measurements

5.3.3.5 Ratchet Lever

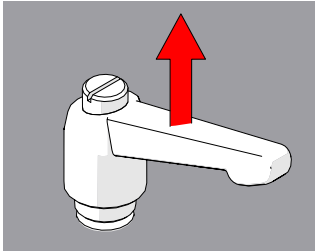


Fig. 62 - Pull ratchet handle

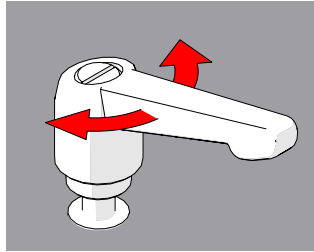


Fig. 63 - Rotate handle

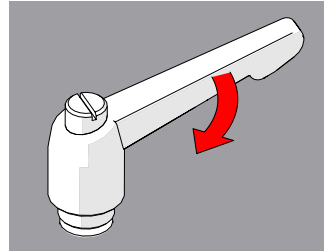


Fig. 64 - Tighten handle

The ratchet levers are used for various locking functions on the **ROTIX** system. Occasionally, movement of the lever locking position is required. The lever placement can be adjusted by following these steps:

1. Pull the ratchet lever away from the base to which it is connected (Fig. 62).
2. Continue to pull while rotating the lever in the appropriate direction (Fig. 63).
3. Release the lever and utilize the new tightening position (Fig. 64).

5.3.4. Pivot Buttons

Available in a variety of shapes and sizes, fitting various wedge dimensions.

Use the supplied 3/8 in wrench (Fig. 32) to remove and install pivot buttons in the desired hole location (Fig. 65).

When a narrow scanning footprint is required, use the pivot button holes closest to the yoke.

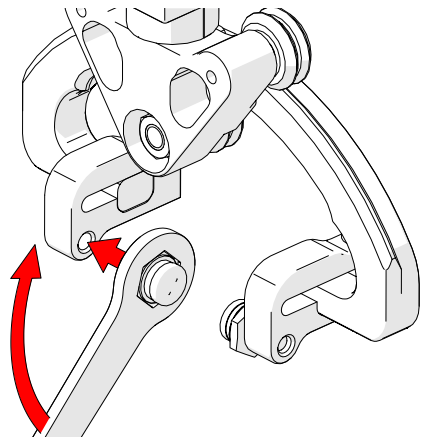


Fig. 65 - - Tighten pivot buttons to probe holder arms

5.4. Slider PPS (*Slider Probe Positioning System*)

The slider PPS uses a slide and leadscrew system to manipulate the position of a probe along a frame bar. To set up and install a slider PPS, follow these steps:

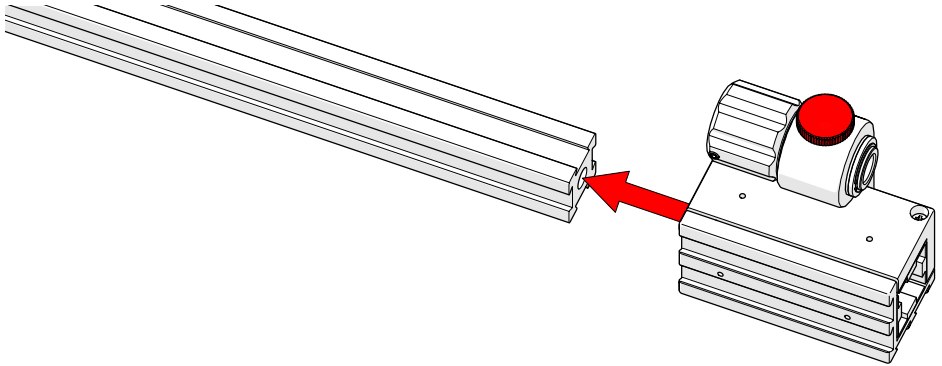


Fig. 66 - Place slider on frame bar and loosen slider lock knob

1. Ease the slider onto the frame bar and push it into position (*Fig. 66*). The slider's friction fit requires an appropriate amount of force to position the slider.
2. Loosen the slider's lock knob (*Fig. 66 - note red highlight*).

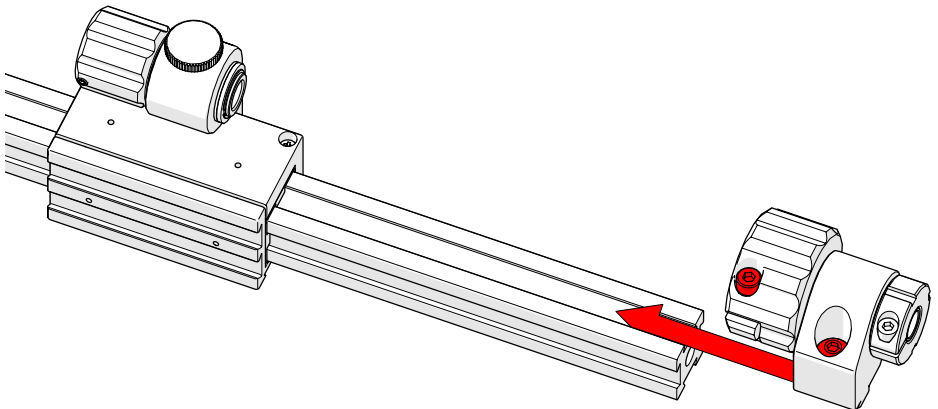


Fig. 67 - Place main knob on frame bar

3. Loosen the main knob's hexagonal screw and lock screw (*Fig. 67 - note red highlight*).
4. Align the dovetail nut of the main knob with the frame bar and slide into position (*Fig. 67*).

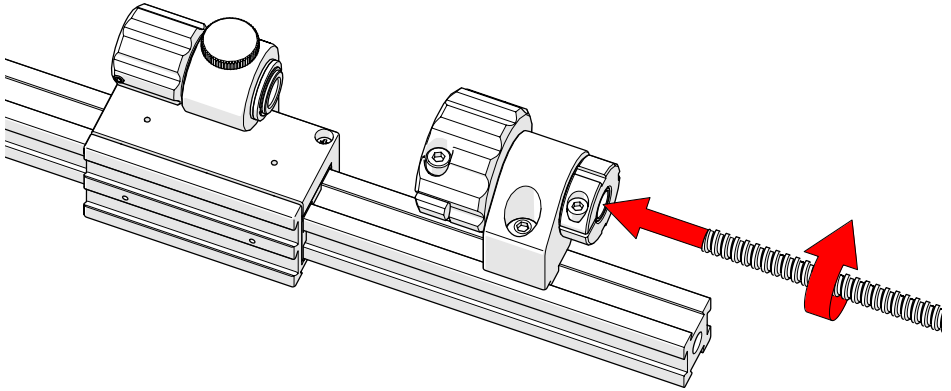


Fig. 68 - Insert leadscrew into main knob and slider

5. Rotate the leadscrew to insert it into the main knob and slider (Fig. 68).

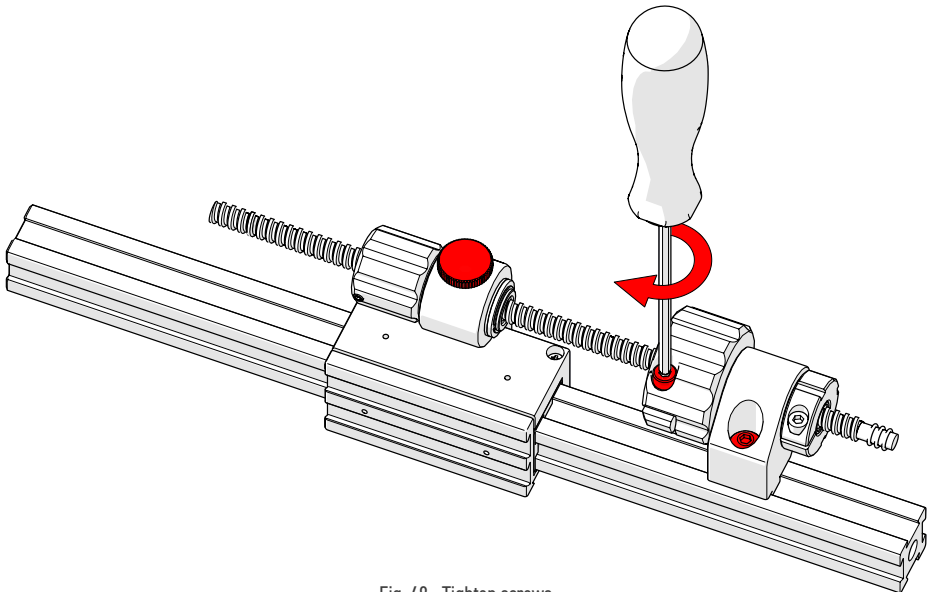


Fig. 69 - Tighten screws

6. Position the slider and main knob where required along the frame bar.
7. Tighten the main knob's hexagonal screw and lock screw, and tighten the slider lock knob (Fig. 69 - note red highlight).

5.4.1. Slider PPS Encoder

The slider PPS (*probe positioning system*) encoder provides positional feedback perpendicular to the scan direction of travel. Follow these steps for installation:

1. Ensure the encoder's lock screw is loose.

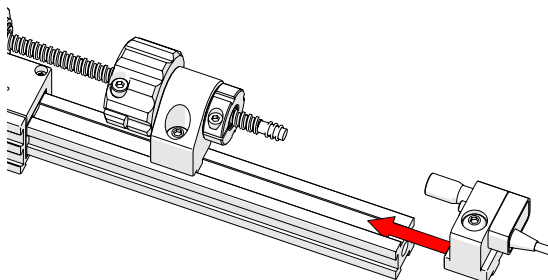


Fig. 70 - Loosen and slide post in place

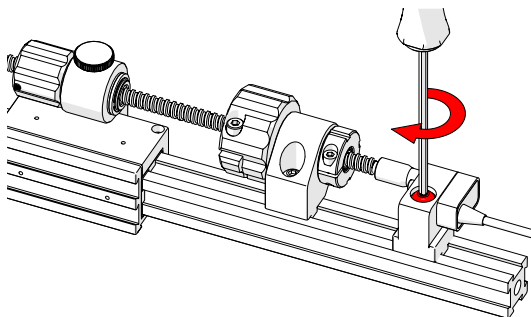


Fig. 71 - Align and mount post

2. Slide the encoder's dovetail nut onto the frame bar (*Fig. 70*) and continue sliding the encoder towards the leadscrew until the leadscrew is pressed snugly into the encoder's coupling (*Fig. 71*).
3. Tighten the encoder's lock screw (*Fig. 71* - note red highlight).
4. Route the encoder cable to the low profile link (*Fig. 72*).

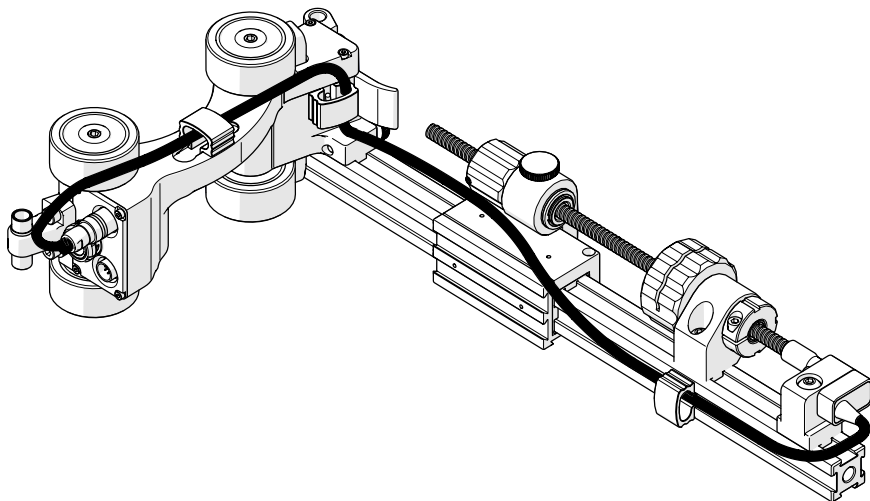


Fig. 72 - Route encoder cable and plug into the low profile link's ENC 1 port

5. Plug the encoder cable into ENC 1 of the low profile link (*Fig. 72*).

5.5. Chain Components

The chain components fasten a nozzle scanning system circumferentially around a pipe or tube.

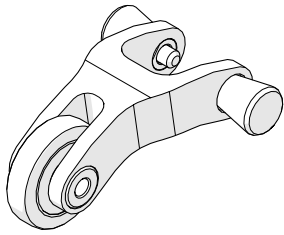


Fig. 73 - Short link

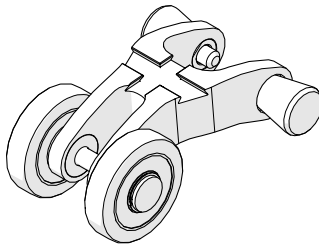


Fig. 74 - Catch link

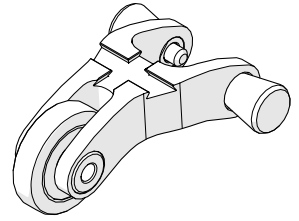


Fig. 75 - Short link with dovetail

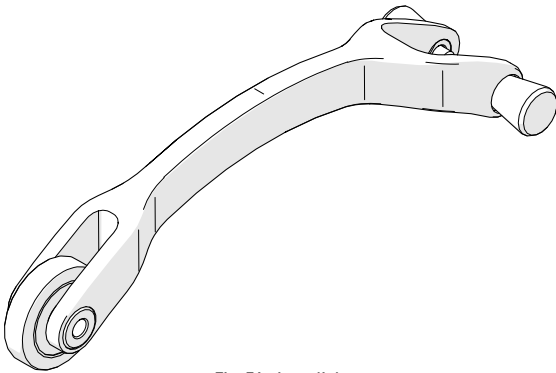


Fig. 76 - Long link

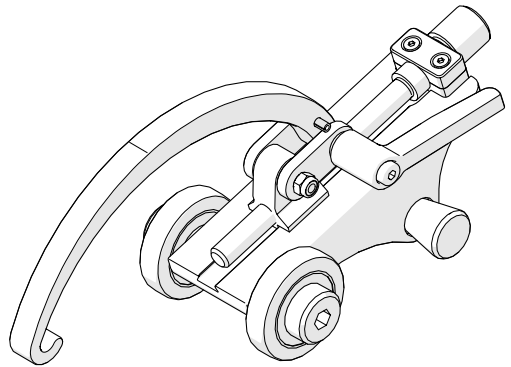


Fig. 77 - Buckle

5.5.1. Chain Connection

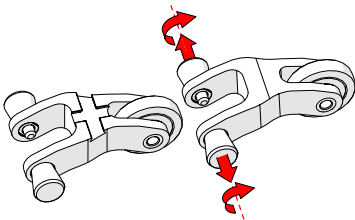


Fig. 78 - Pull out and twist pins

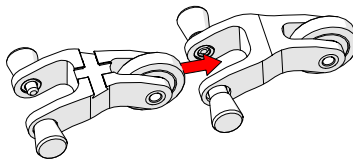


Fig. 79 - Align mounting holes

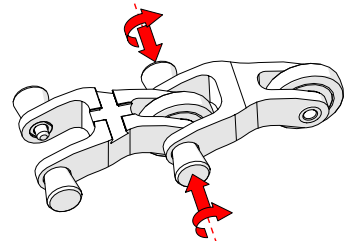


Fig. 80 - Align mounting holes

To connect chain components, see the following steps:

1. Pull the pins out from the wheels, twist a quarter turn and latch the pins in a retracted state (Fig. 78).
2. Align the pins with the mounting holes of the component to be connected (Fig. 79).
3. Twist the pins until they unlatch and extend into the hole of the connected component (Fig. 80).

5.6. Cable Management System

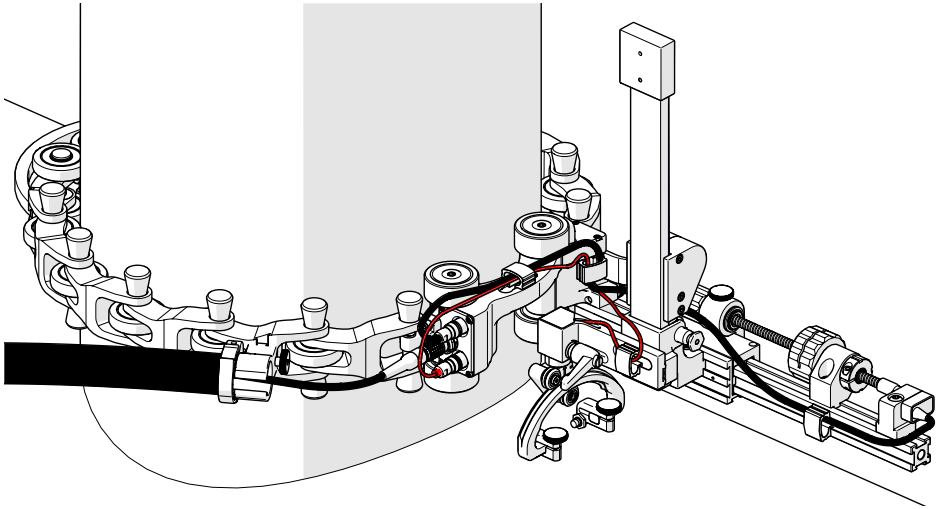


Fig. 81 - Cable management

TIP: When using cable management, ensure the dovetail link is placed 2nd in the chain behind the low profile link.

5.6.1. Cable Management Dovetail Mount

To attach the cable management, follow these steps:

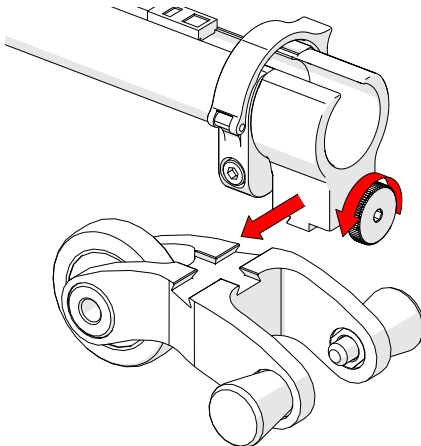


Fig. 82 - Loosen and slide on

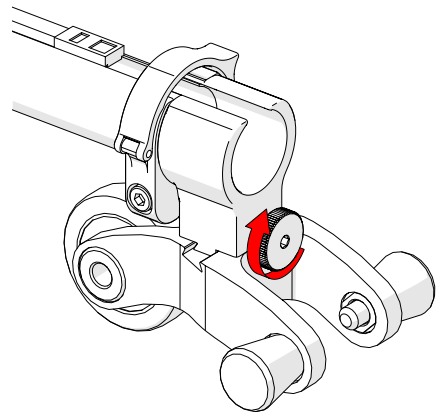


Fig. 83 - Tighten knob

1. Loosen the knob on the cable management dovetail mount. Slide the mount onto the dovetail link (Fig. 82).
2. Once centred on the dovetail link, tighten the cable management's dovetail mount knob (Fig. 83).

5.6.2. Cable Management Setup

Cable management is available in a variety of lengths and provides a means of bundling and protecting cables and hoses that run to a scanner.

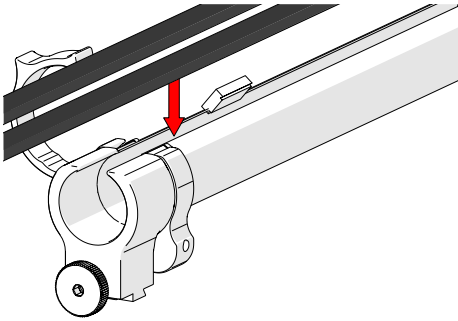


Fig. 84 - Insert cables and hoses

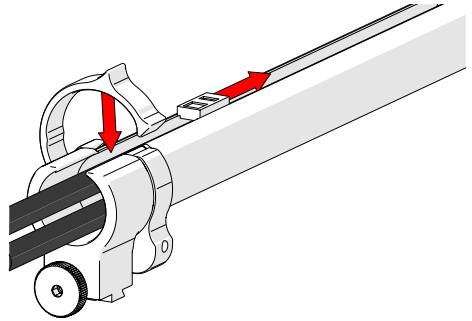


Fig. 85 - Zip up to close

1. Open the zipper of the cable management. Begin at the management's dovetail mount and place the cabling in the sleeving (*Fig. 84*).
2. Follow the cable placement, zipping the sleeving closed (*Fig. 85*).

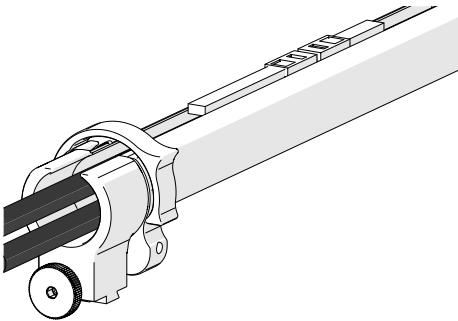


Fig. 86 - Zip opposite end

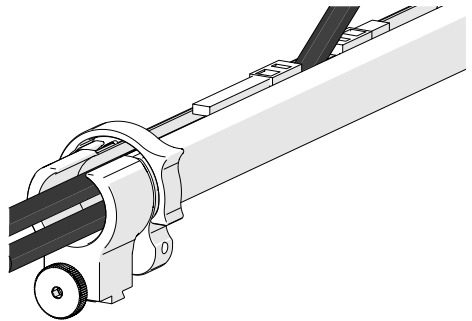


Fig. 87 - Flexibility

3. Once the cable is placed the entire length of the sleeving, bring the zipper from the sleeving's opposite end, meeting at any point in the middle (*Fig. 86*).
4. When necessary, the two zippers may be opened to allow cables to exit the sleeving anywhere between the ends (*Fig. 87*).

5.6.3. Clamp Setup

If the sleeving becomes disconnected from the cable management dovetail mount, follow these instructions to re-attach the sleeving and dovetail mount.

1. Loosen the clamp screw using the supplied 3 mm hex driver.
2. Slide the clamp around the sleeving first and then slide the sleeving around the outside of the cable management dovetail mount (*Fig. 88*). Align the zipper opening and the cable management dovetail mount opening.
3. Slide the clamp over the sleeving and cable management dovetail mount, pinching the sleeving in between (*Fig. 89*).
4. Tighten the clamp screw (*Fig. 90*).

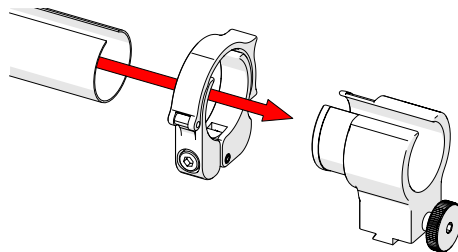


Fig. 88 - Slide tube around mount

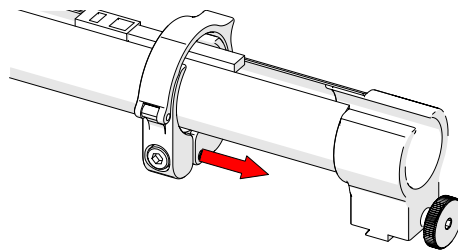


Fig. 89 - Slide clamp onto mount

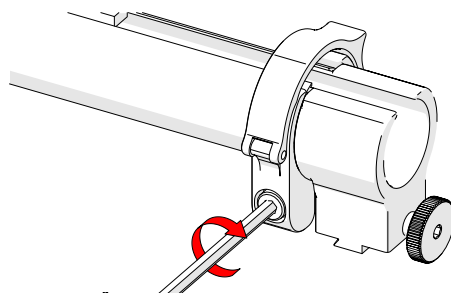


Fig. 90 - Tighten clamp screw

5.7. Cable Clip

Cable clips have been provided to assist with cable management. Pinch the clip and press it into the dovetail groove of the frame bar or the probe holder.

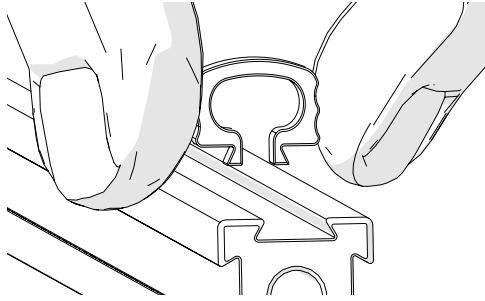


Fig. 91 - Pinch clip

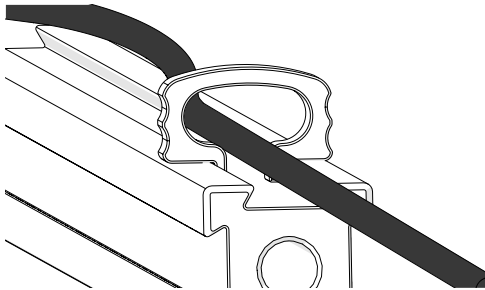


Fig. 92 - Cable clip

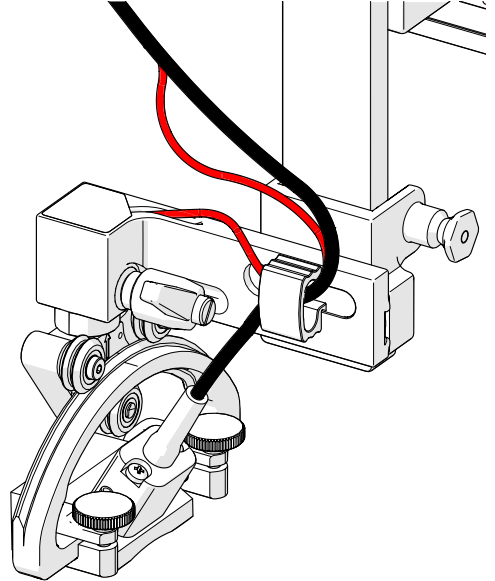


Fig. 93 - Route cables

OPERATION

6.1. Setup of ROTIX on Scanning Surface

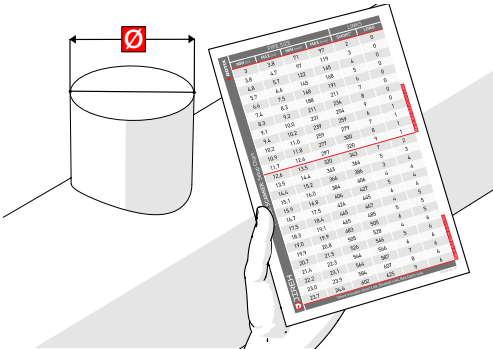


Fig. 94 - Refer to setup chart

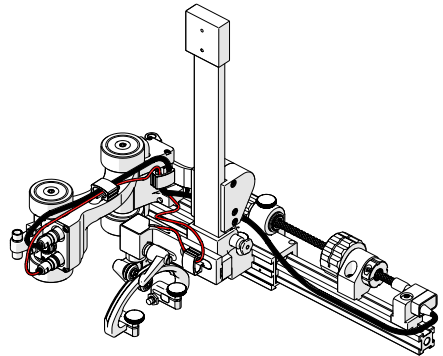


Fig. 95 - Assemble configuration

1. Determine the diameter of the nozzle to be scanned. The **ROTIX** kit includes a setup chart indicating the number of links required based on the pipe diameter or tubing (Fig. 94).
2. Assemble the appropriate configuration to the low profile link (Fig. 95). Install the wedge and probe to be used (see *Probe Holder Setup* on page 23).

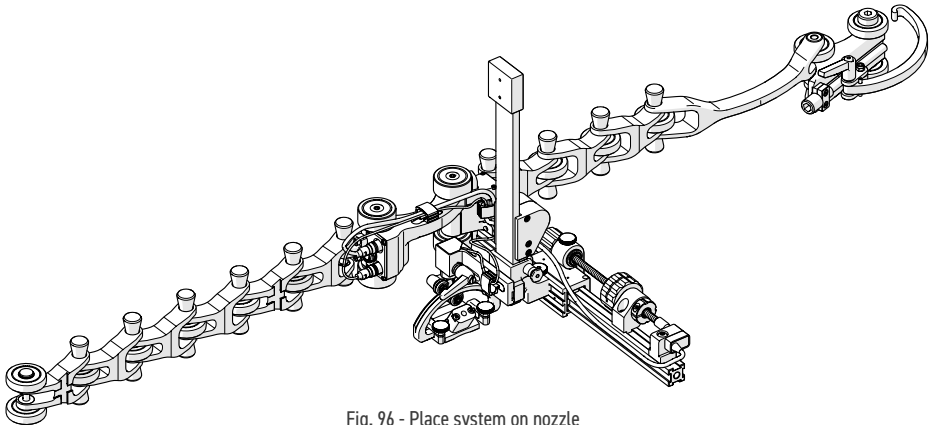


Fig. 96 - Place system on nozzle

TIP: Route cables and hoses through the cable clips as a means of cable management (see *Cable Management System* on page 33).

TIP: This example displays a 30.5 cm (12 in) nozzle diameter configuration.

3. On a flat surface, connect the appropriate amount of links as indicated on the **ROTIX** setup chart. Arrange the link setup so the buckle and catch link will be 180° opposite the low profile link (*Fig. 96*).

TIP: Place the dovetail link 2nd in the chain behind the low profile link (*Fig. 81 on page 33*).

4. Ensure the brake of the low profile link is activated to prevent scanner movement during installation (*see Brake on page 19*).
5. Place the configured assembly around the nozzle to be inspected (*Fig. 97*).

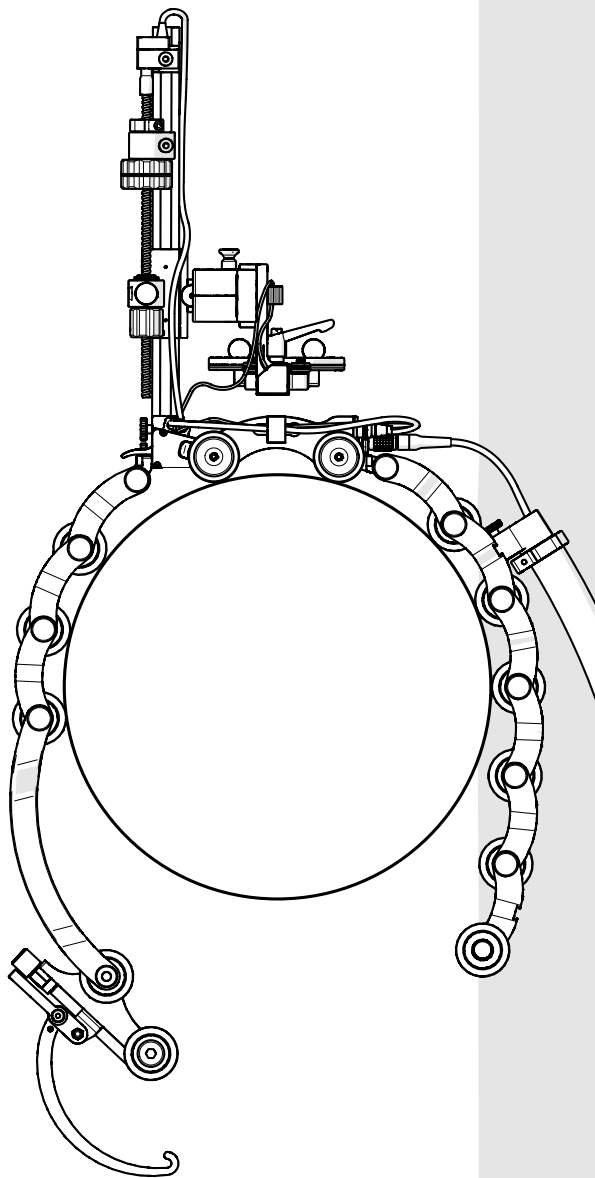


Fig. 97 - Place system on nozzle

6. Bring the buckle arm (Fig. 98-1) towards the catch link (Fig. 98-2). Hook the buckle's arm to the middle axle of the catch link. The buckle adjustment knob (Fig. 99-A) may have to be loosened to allow the arm to reach the catch link.

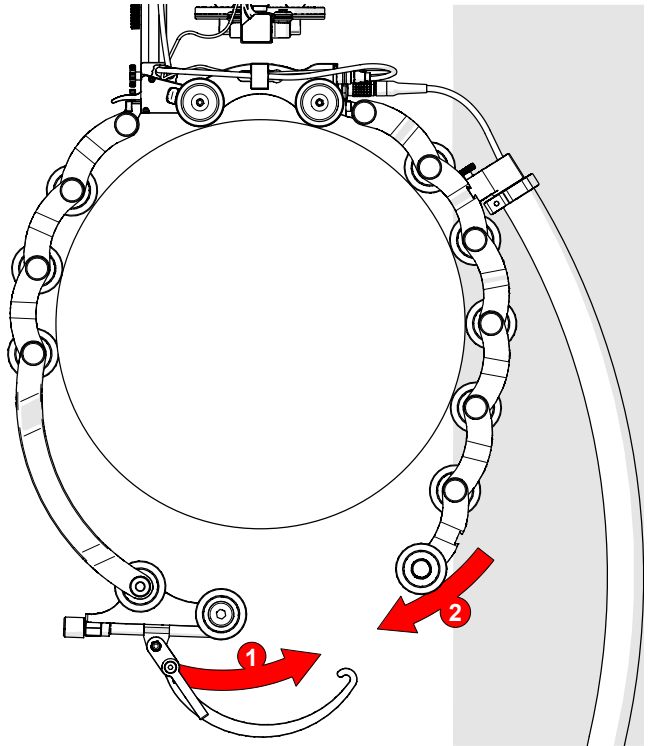


Fig. 98 - Hook buckle to catch link

7. Rotate the knob until the buckle's lever can be pushed down, locking the buckle in place (Fig. 99-3). The tightness of the **ROTIX** on the pipe can be adjusted using the buckle adjustment knob (Fig. 99-A).

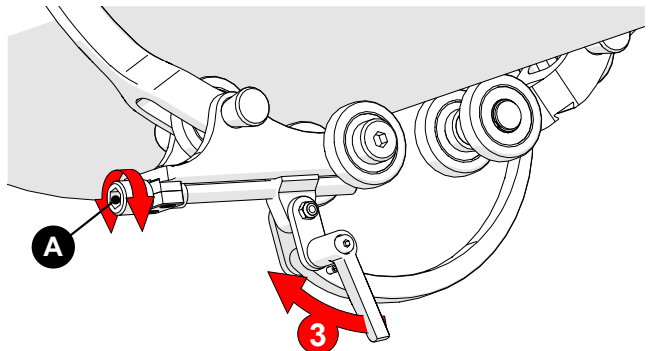


Fig. 99 - Adjust pressure of buckle

TIP: If additional clearance is needed, the handle on the buckle can be pulled out and rotated to various positions (see Ratchet Lever on page 28).

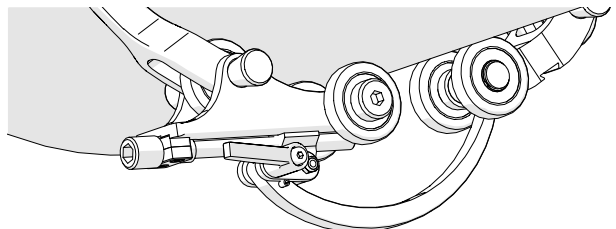


Fig. 100 - Buckle locked

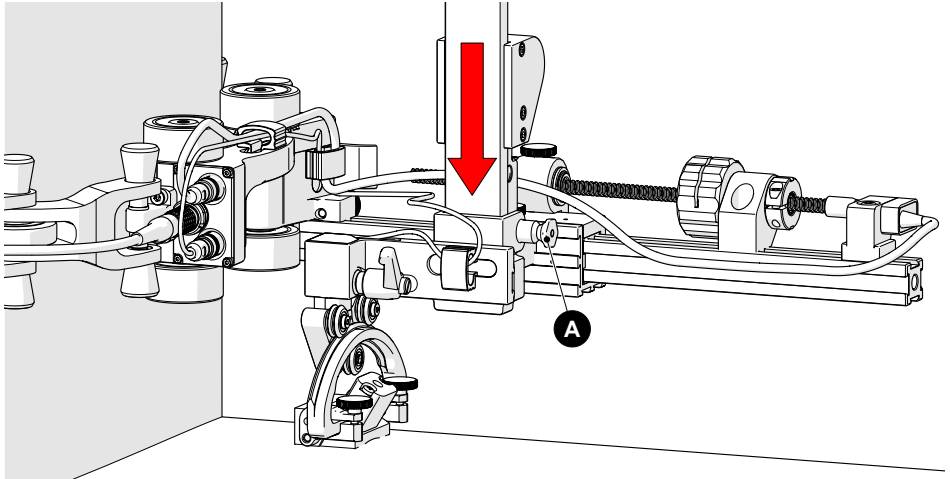


Fig. 101 - Lower probe holder to scan surface

8. Pull the probe holder latch pin (Fig. 101-A) to release the probe holder from the locked position (see *Latch Pin* on page 26 for more information).
9. Lower the probe to the scan surface (see *Encoded Skew Vertical Probe Holder Adjustment* on page 25).

NOTE: To maintain optimal scanner performance, the manufacturer recommends that the user not position the probe holder beyond 45° from the axis of the scan surface's centre point (Fig. 102).

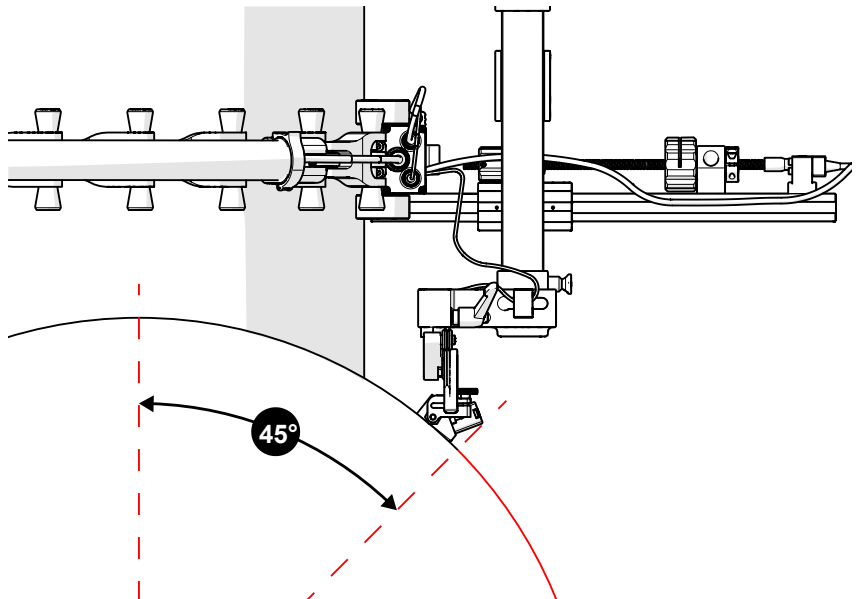


Fig. 102 - Do not scan beyond 45° from the axis of scan surface

6.2. Using a Slider Probe Positioning System *(Slider PPS)*

To set up and install a slider probe positioning system (see *Slider PPS* on page 29).

1. Ensure the slider lock knob (*Fig. 103-A*) is tight and rotate the main knob to position the slider (*Fig. 103*).

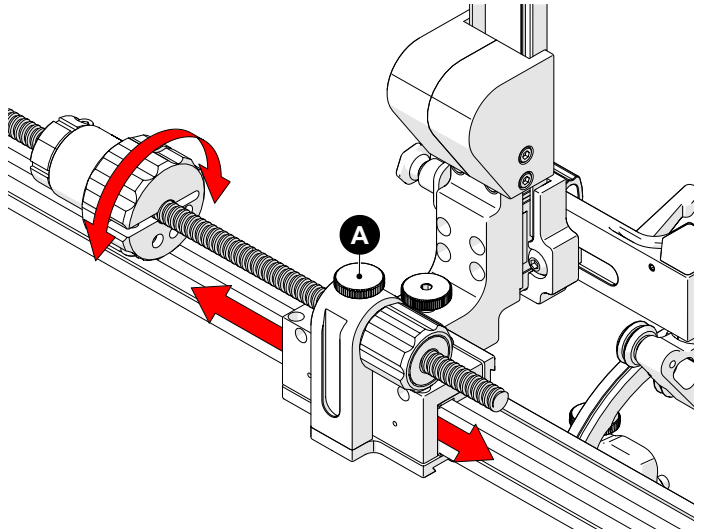


Fig. 103 - Slider positioning

MAINTENANCE

General cleaning of components is important to keep your system working well. All components that have no wiring or cables are completely waterproof. Components can be washed with warm water, dish soap and a medium bristle brush.

After washing your system, use a light oil to lubricate the slide and the adjustment screw on the buckle component (*Fig. 12*). Before using the scanner, ensure all connectors are free of water and moisture.

NOTE: *All components with wiring, cables or electrical connections are splashproof. However, these components are **NOT** submersible.*

NOTE: *Never use strong solvents or abrasive materials to clean your scanner components.*

TROUBLESHOOTING

Problem	Possible Cause	Solution
Chain is too loose/tight.	Incorrect number or combination of links for proper scanner configuration.	Refer to the ROTIX setup chart (see on page 6) for required number of links for the diameter of pipe/tube that is to be scanned. Ensure the correct outer diameter measurement of the pipe/tube. Reset the scanner with the correct number of links.
	The buckle is incorrectly set up.	Adjust the tightness of buckle..
Insufficient probe contact.	Scanner is not set properly.	Reconfigure the scanner as per instructions (see <i>Encoded Skew Vertical Probe Holder Adjustment on page 25</i>).
Issues completing full scan rotation.	The probe holder is 45° past the scan surface centre point.	Do not scan beyond 45° from the axis of the scan surface.

8.1. Technical Support

For technical support, contact Jireh Industries (see *Jireh Industries Ltd. on page 1*).

SERVICE AND REPAIR



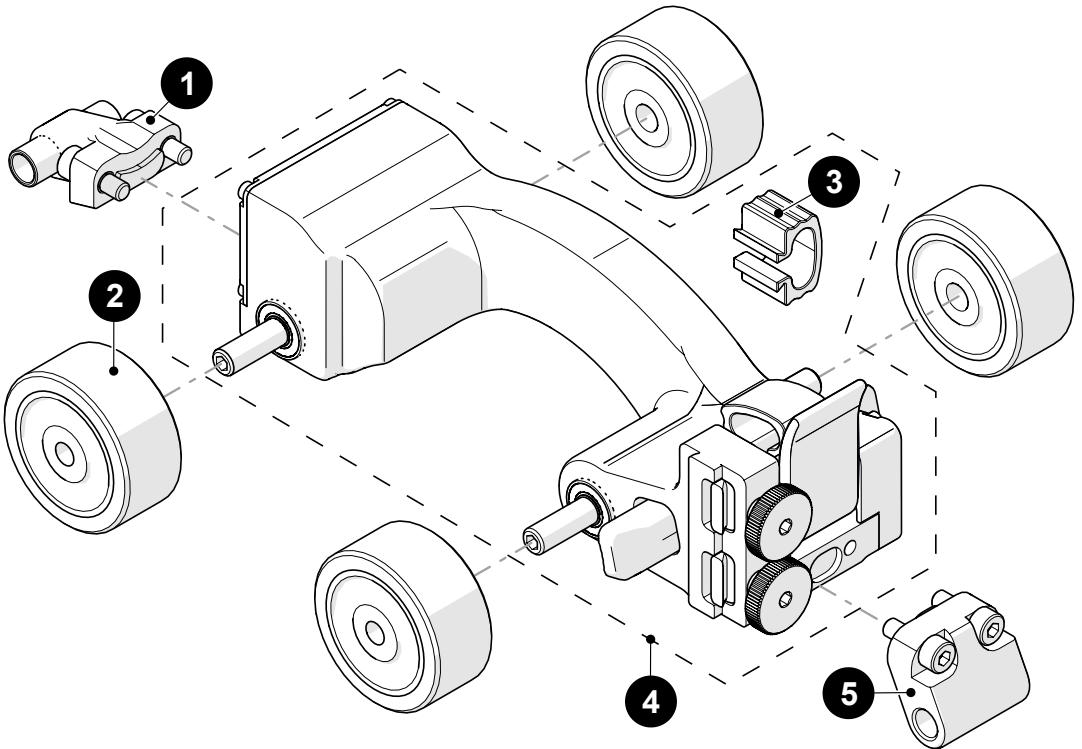
WARNING! DO NOT DISASSEMBLE. No user-serviceable parts. Disassembling any of the components in this product, beyond the instructions in this user manual, could void the regulatory certifications and/or effect the safety of the product.

SPARE PARTS

To order accessories or replacement parts for your **ROTIX** system.
(contact Jireh Industries Ltd. on page 1)

NOTE: These drawings are for parts order. This is not a list of kit contents.

10.1. Low Profile Link



BOM ID	Part #	Description
1	CES082	Low Profile Link Tail
2	CES012	Non-Magnetic Wheel
3	BG0091	Cable Clips
4	CES084	Low Profile Link Subassembly
5	CES083	Low Profile Link Nose

Fig. 104 - Low profile link

10.2. Kit Components

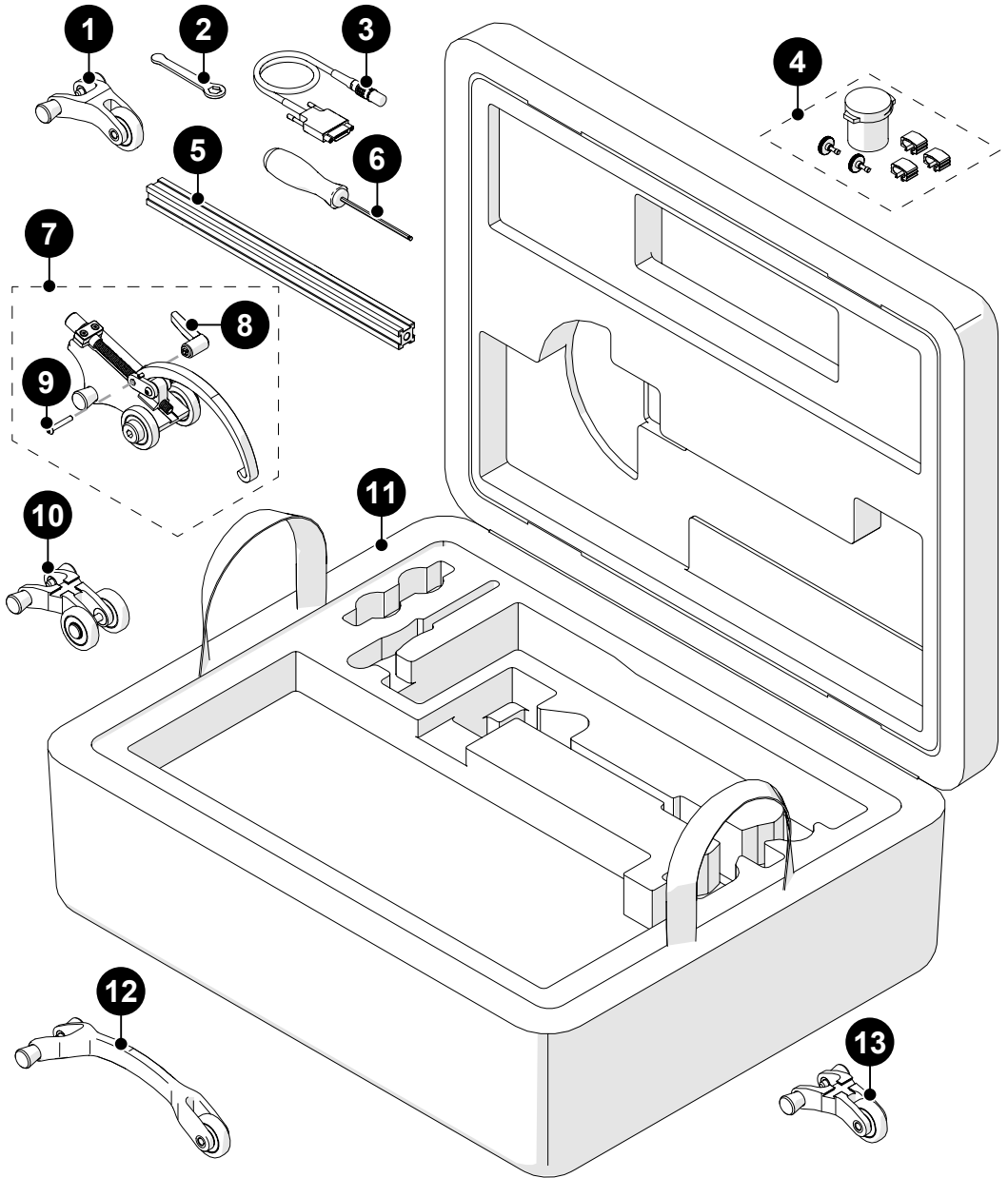


Fig. 105 - Kit contents

BOM ID	Part #	Description
1	CES002	Short Link
2	EA470	3/8 in Wrench
3	UMA036-X-05	J400 Encoder Cable, 5 m (16.4 ft) (see Encoder Connector Type)
4	CEG039	ROTIX - Nozzle Spare Parts Kit
5	BG0090-X	Frame Bar with Ruler, 30 cm
6	EA414	3 mm Hex Driver
7	CES005	Buckle
8	CE0015	Ratchet Lever
9	MD073-025	BHCS, M4x0.7 X 25 mm, SST
10	CES003	Catch Link (Red)
11	CEA025	ROTIX Nozzle Scanner Case
12	CES009	Long Link
13	CES024	Short Link with Dovetail

Fig. 106 - Kit contents

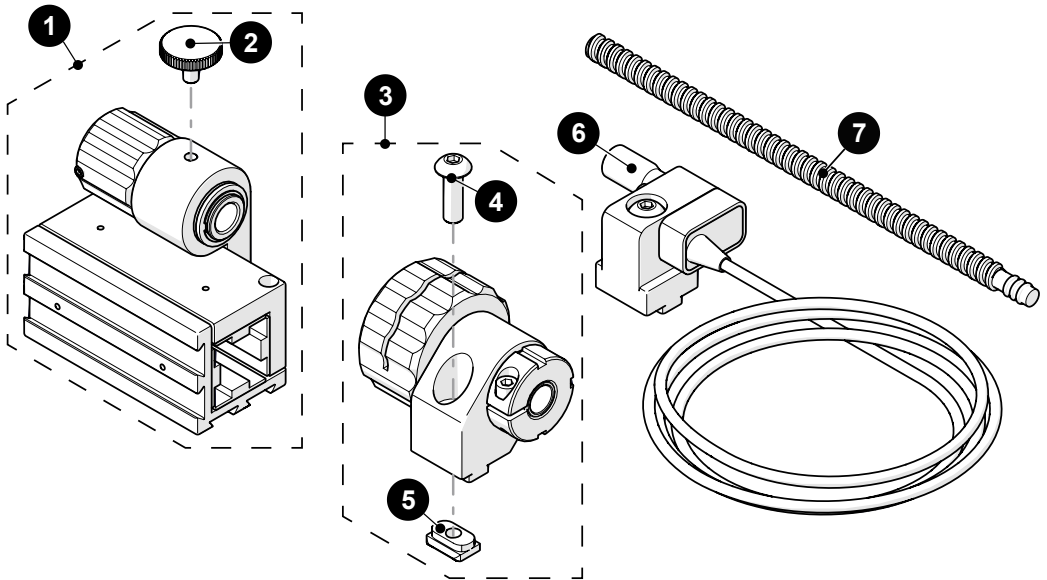
10.2.1. Encoder Connector Type

Connector Type	Company/Instrument	Connector Type	Company/Instrument
B	Olympus OmniScan MX Zetec Topaz	G	Sonotron Isonic 25xx
C	Olympus Focus LT Zetec Z-Scan Eddyfi Ectane 2	U	Sonatest Veo / Prisma
E	Olympus OmniScan SX/MX2/X3 M2M MANTIS/GEKKO LEMO	V	Pragma PAUT
F	TD (<i>Technology Design</i>)	AD	Sonatest Veo / Prisma - Single Axis

NOTE: Additional encoder connector styles are available.
(contact Jireh Industries Ltd. on page 1)

10.2.2. Probe Positioning

10.2.3. Slider Probe Positioning System (*Slider PPS*)



BOM ID	Part #	Description
1	CJS008	Slider PPS Slider
2	EA212	Knurled Knob, M4 x 0.7 x 8 mm, SST
3	CJS001	Slider PPS Main Knob
4	MD074-016	BHCS: M5x0.8 X 16 mm: SST
5	BT0014	Dovetail Nut
6	CJS017-S-0.6	Slider PPS Encoder
7	CJS009-X	see <i>Slider PPS Encoded Leadscrew</i>

Fig. 107 - Slider probe positioning system parts

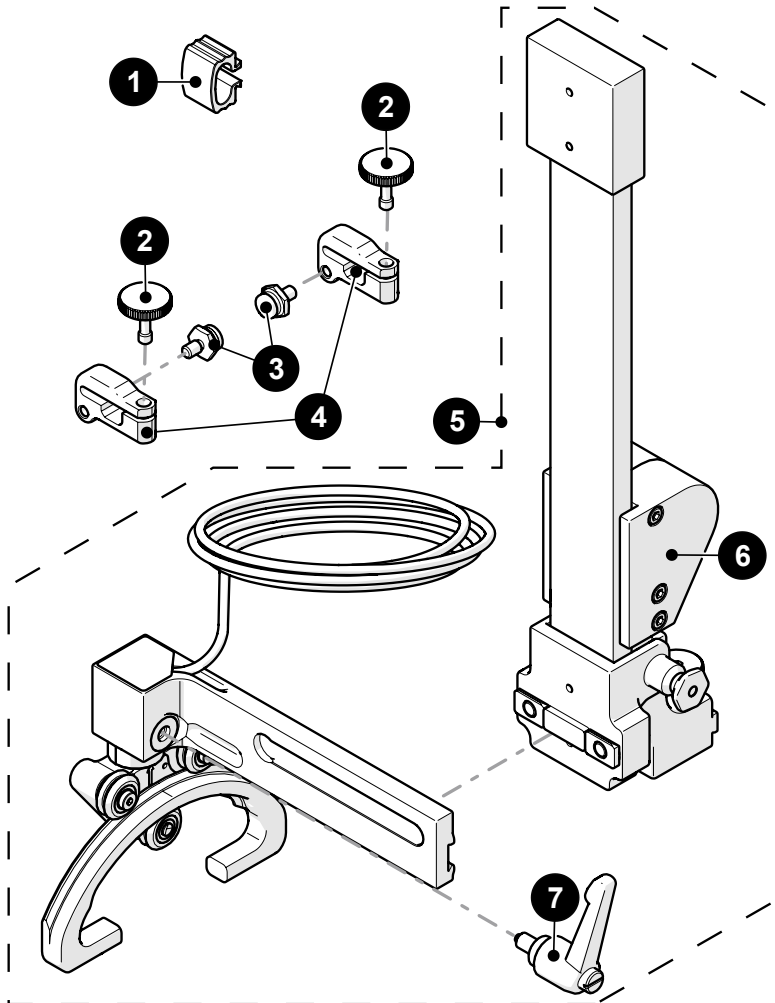
NOTE: Additional leadscrew lengths are available.
(contact Jireh Industries Ltd. on page 1)

10.2.4. Slider PPS Encoded Leadscrew

Part #	Length	Part #	Length
CJS009-16	16 cm (6.3 in)	CJS009-21	21 cm (8.3 in)
CJS009-23	23 cm (9.1 in)	CJS009-28	28 cm (11 in)
CJS009-33	33 cm (13 in)	CJS009-38	38 cm (15 in)
CJS009-43	43 cm (16.9 in)	CJS009-48	48 cm (18.9 in)

Fig. 108 - Slider PPS encoded leadscrew selection

10.3. Encoded Skew Vertical Probe Holder



BOM ID	Part #	Description
1	BG0091	Cable Clip
2	PH0082	Knurled Knob, M4 x 0.7 x 10 mm, SST, 3 mm stand off, SST
3	PH0011-X	<i>see Pivot Button Style</i>
4	PH0237	<i>Arm Style: Nozzle, Extra Short</i>
5	PHS069	Encoded Skew Vertical Probe Holder Subassembly
6	PHS068	Encoded Skew Vertical Probe Holder Slide
7	BTS018	Brake Handle

Fig. 109 - Encoded skew vertical probe holder parts

10.4. Probe Holder Components

10.4.1. Pivot Button Style









	Pivot Hole Size	Wedge Type			Pivot Hole Size	Wedge Type	
01	8.0 mm (0.315 in)	Olympus PA		02	5.0 mm (0.197 in)	Olympus TOFD	
03	2.7 mm (0.106 in)	Sonatest DAAH PA		04	9.5 mm (0.375 in)	-	
06	3.0 mm (0.118 in)	-		07	2.3 mm (0.09 in)	-	
08	Conical Head	-		09	5 mm (0.197 in) Internal	Zetec PA/TOFD	

Fig. 110 - Pivot button selection

NOTE: Additional probe holder pivot button types are available.
(contact Jireh Industries Ltd. on page 1)

10.5. Variable Components

10.5.1. Frame Bar with Ruler












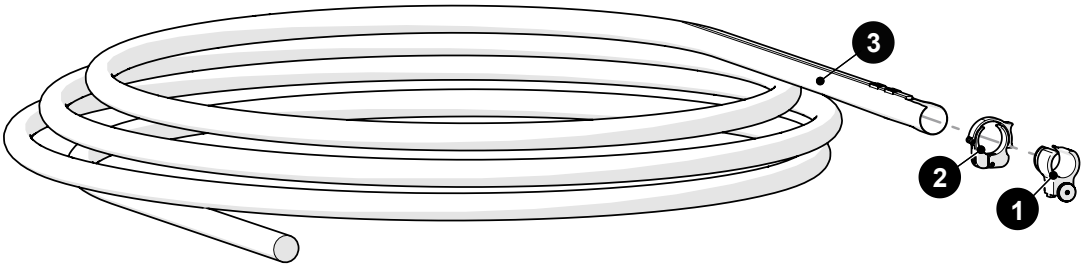
Part #	Length		Part #	Length	
BG0090-05	5 cm (1.97 in)		BG0090-10	10 cm (3.94 in)	
BG0090-15	15 cm (5.91 in)		BG0090-20	20 cm (7.87 in)	
BG0090-25	25 cm (9.84 in)		BG0090-30	30 cm (11.81 in)	
BG0090-35	35 cm (13.78 in)		BG0090-40	40 cm (15.75 in)	
BG0090-45	45 cm (17.72 in)		BG0090-50	50 cm (19.69 in)	
BG0090-55	55 cm (21.65 in)				

Fig. 111 - Frame bar selection

10.6. Accessories

10.6.1. Cable Management



BOM ID	Part #	Description
1	CES067	Cable Management Mount
2	CES066	Cable Management Clamp
3	<i>see Cable Management Sleeving</i>	

Fig. 112 - Cable management

10.6.1.1 Cable Management Sleeving

Part #	Length
CX0141	4.5 m (14.7 ft)
CX0145	9.5 m (31.1 ft)

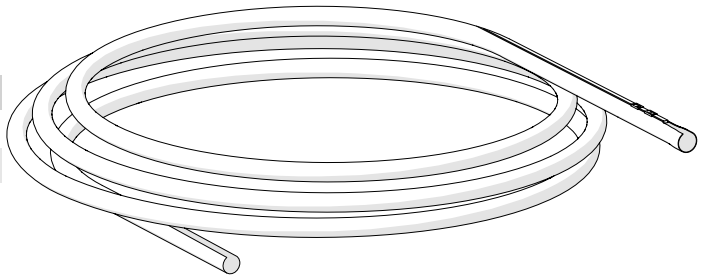
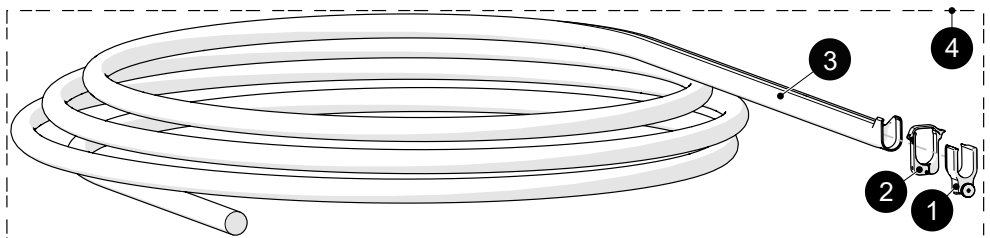


Fig. 113 - Cable management sleeving

10.6.2. High Temperature Cable Management, Dovetail Mount



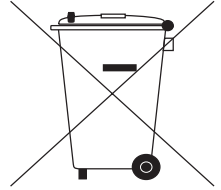
BOM ID	Part #	Description
1	CES090	High Temperature Cable Management Mount
2	CXS114	High Temperature Cable Management Clamp
3	CX0537-04.5	High Temperature Cable Management Sleeving, 4.5 m (14.8 ft)
4	CES089-04.5	High Temperature Cable Management, 4.5 m (14.8 ft)

Fig. 114 - High temperature cable management

DISPOSAL

WEEE Directive

In accordance with European Directive on Waste Electrical and Electronic Equipment (WEEE), this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately. Refer to Jireh Industries for return and/or collection systems available in your country.



LIMITED WARRANTY

WARRANTY COVERAGE

Jireh Industries warranty obligations are limited to the terms set forth below: Jireh Industries Ltd. (“Jireh”) warrants this hardware product against defects in materials and workmanship for a period of THREE (3) YEARS from the original date of purchase. If a defect exists, at its option Jireh will (1) repair the product at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or (3) refund the purchase price of the product. A replacement product/part assumes the remaining warranty of the original product or ninety (90) days from the date of replacement or repair, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Jireh’s property. When a refund is given, your product becomes Jireh’s property.

OBTAINING WARRANTY SERVICE

To utilize Jireh’s warranty service you must ship the product, at your expense, to and from Jireh Industries. Before you deliver your product for warranty service you must phone Jireh and obtain an RMA number. This number will be used to process and track your product. Jireh is not responsible for any damage incurred during transit.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to hardware products manufactured by or for Jireh Industries. This warranty does not apply: (a) to damage caused by accident, abuse, misuse, misapplication, or non-Jireh products; (b) to damage caused by service (including upgrades and expansions) performed by anyone who is not a Jireh Authorized Service Provider; (c) to a product or a part that has been modified without the written permission of Jireh.

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APPENDIX

All brands are trademarks or registered trademarks of their respective owners and third-party entities.

Changes or modifications to this unit or accessories not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

All specifications are subject to change without notice.

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13.1. Chain Configuration Setup Chart

PIPE SIZE				LINKS	
MIN (in)	MAX (in)	MIN (mm)	MAX (mm)	SHORT*	LONG
3	3.8	71	97	2	0
3.8	4.7	97	119	3	0
4.8	5.7	122	145	4	0
5.7	6.6	145	168	5	0
6.6	7.5	168	191	6	0
7.4	8.3	188	211	7	0
8.3	9.2	211	234	8	0
9.1	10.0	231	254	9	0
9.4	10.2	239	259	6	1
10.2	11.0	259	279	7	1
10.9	11.8	277	300	8	1
11.7	12.6	297	320	9	1
12.6	13.5	320	343	7	2
13.5	14.4	343	366	5	3
14.4	15.2	366	386	3	4
15.1	16.0	384	406	4	4
15.9	16.8	404	427	5	4
16.7	17.5	424	445	6	4
17.5	18.4	445	467	4	5
18.3	19.1	465	485	5	5
19.0	19.9	483	505	6	5
19.9	20.8	505	528	4	6
20.7	21.5	526	546	5	6
21.4	22.3	544	566	6	6
22.2	23.1	564	587	7	6
23.0	23.9	584	607	8	6
23.7	24.6	602	625	9	6

Max of 10.2-30.5 cm (4-12 in) Kit

Max of 10.2-60 cm (4-24 in) Kit

*Short includes: Short Link, Dovetail Link, Red Catch Link.



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