



■ ROTIX

CE0209 Rev 00.1
3-Axis Nozzle Scanner

J JIREH

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.



CAUTION! 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 **High Temperature 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 54)

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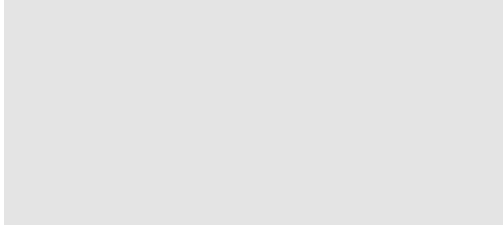
IDENTIFICATION

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	10.2 cm (4 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 and 50° C (-4° F and 122° F).

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

2.1.2. Dimensions and Weight

1	Low profile link width	8 cm (3.2 in)
2	Low profile link depth	25 cm (9.8 in)
3	Low profile link height	6.1 cm (2.4 in)
	Low profile link weight	0.55 kg (1.12 lb)
4	Encoded skew vertical probe holder width	11.6 cm (4.6 in)
5	Encoded skew vertical probe holder depth	13.2 - 14.2 cm (5.2 - 5.6 in)
6	Encoded skew vertical probe holder height	32.2 cm (12.7 in)
	Encoded skew vertical probe holder weight	0.75 kg (1.7 lb)

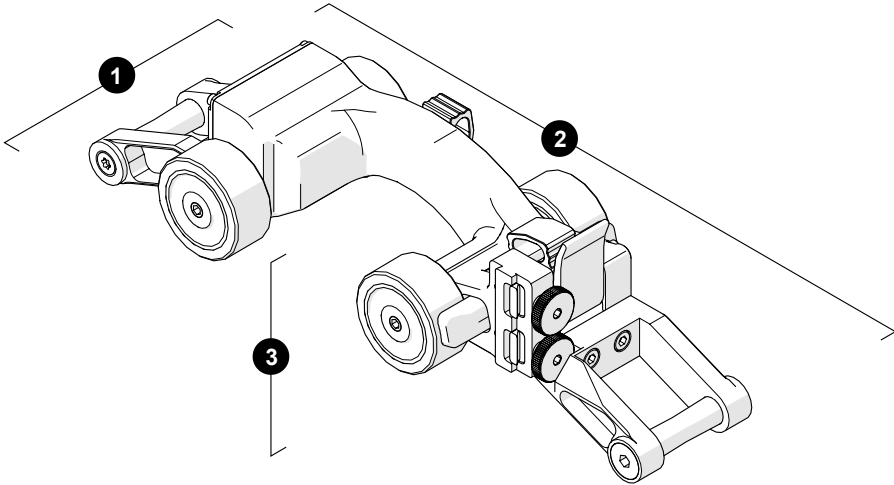


Fig. 1 - Low profile link dimensions

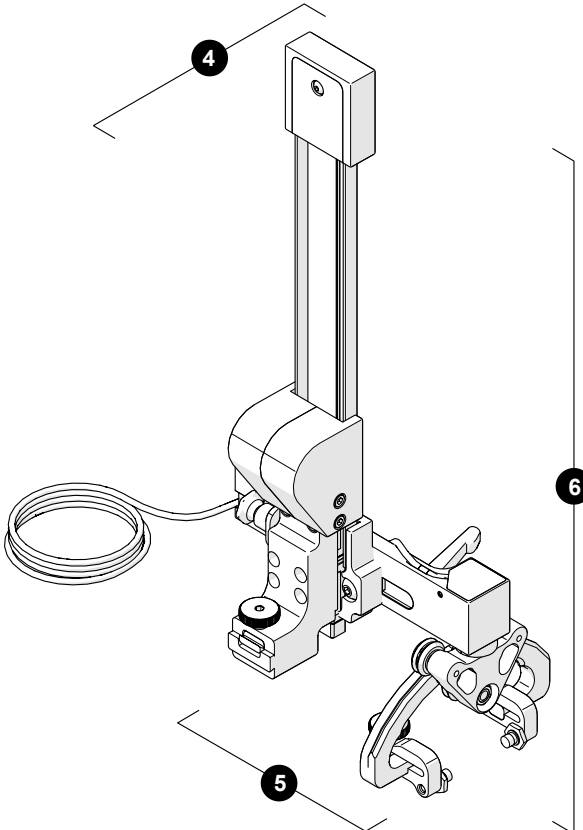


Fig. 2 - Encoded skew vertical probe holder dimensions

2.2.1. Environmental Sealing

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

2.2.2. Performance Specifications

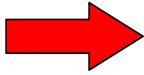
X-Axis encoder resolution	16.3 counts/mm (<i>414.5 counts/inch</i>)
Y-Axis encoder resolution (<i>slider PPS</i>)	161.3 counts/mm (<i>4096.0 counts/inch</i>)
Skew encoder resolution	2.84 counts/deg

DEFINITIONS

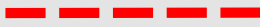
3.1. Definitions of Symbols



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



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



Indicates alignment axis.



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

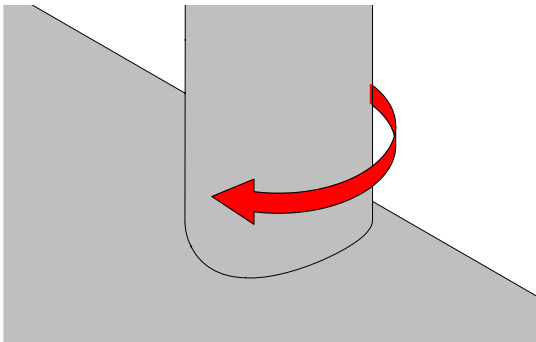


Fig. 3 - Nozzle scanning

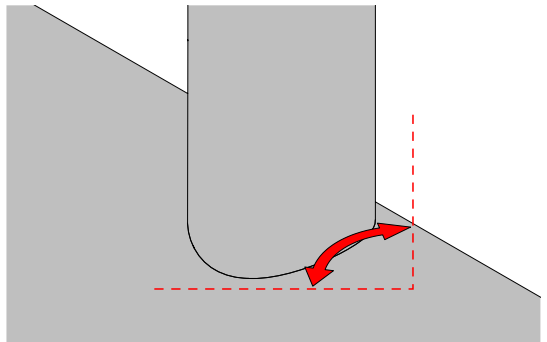


Fig. 4 - Skew

3.2. Definitions of Terms

Nozzle

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

Skew Angle

The probe's direction can be adjusted independently (*Fig. 4*).

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. 5).

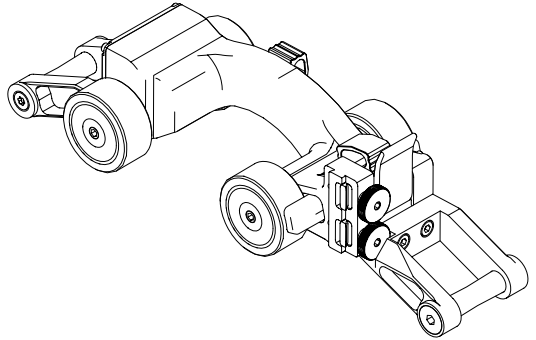


Fig. 5 - Low profile link

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. 6).

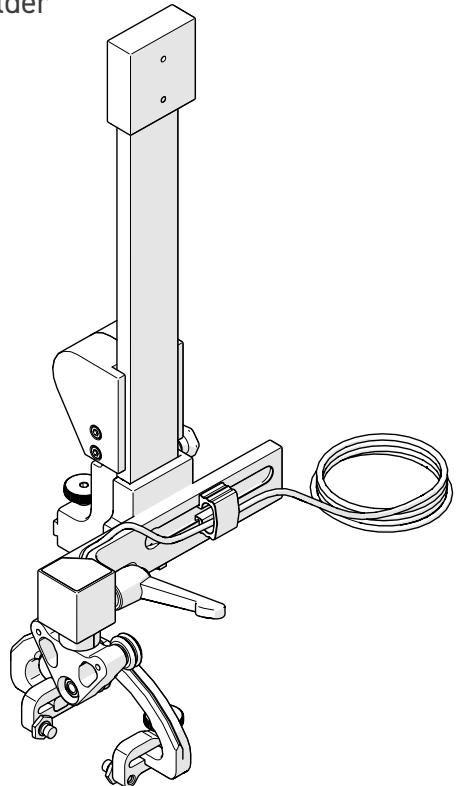


Fig. 6 - Encoded skew vertical probe holder

4.1.3. Frame Bar with Ruler BG0090-

The frame bar with ruler (*Fig. 7*) 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.

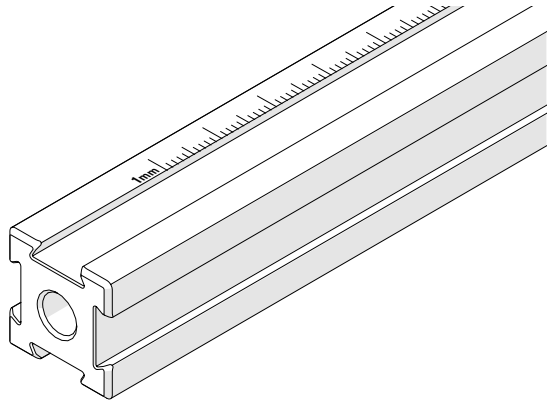


Fig. 7 - Frame bar with ruler

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. 8*).

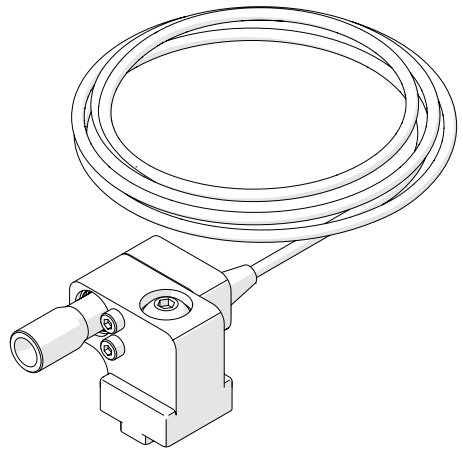


Fig. 8 - Slider PPS encoder

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. 9*).

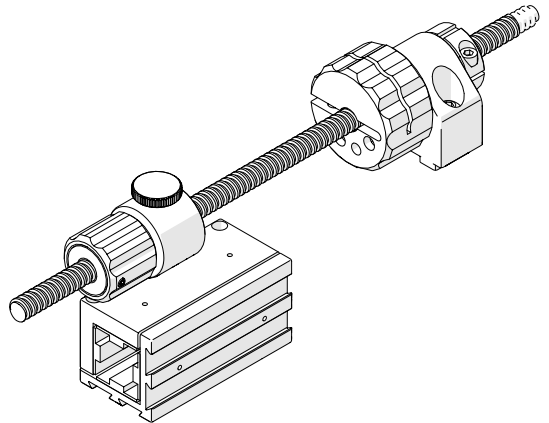


Fig. 9 - Slider probe positing system

4.1.6. QuickLink Components

The QuickLink components fasten a **ROTIX** system circumferentially around a pipe or tube.

4.1.6.1 QuickLink EES004

QuickLinks connect to assemble the required length to mount the system on a pipe (Fig. 10).

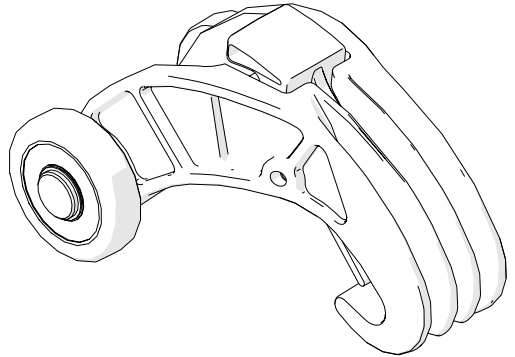


Fig. 10 - QuickLink

4.1.6.2 Dovetail QuickLink EES019

The Dovetail QuickLink connects to QuickLinks, providing a mounting point for accessories such as cable management (Fig. 11).

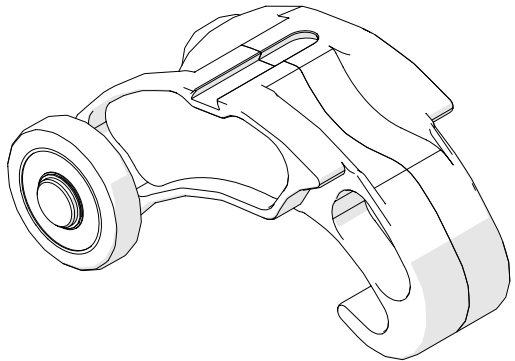


Fig. 11 - Dovetail QuickLink

4.1.6.3 QuickLink Buckle EES014

The QuickLink Buckle enables adjustment of the chain tension and provides the connection point of the QuickLinks assembly (Fig. 12).

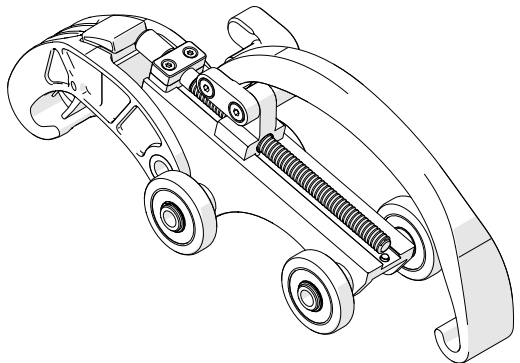


Fig. 12 - QuickLink Buckle

4.1.7. J400 Encoder Cable UMA036-

The encoder cable connects the **ROTIX** system to the user's instrument. (Fig. 13).

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.*

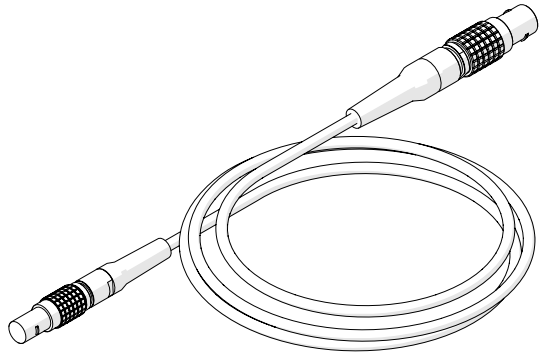


Fig. 13 - J400 Encoder cable

4.1.8. Cable Management, Dovetail Mount CES044-

Cable management provides a means of protecting and organizing cables, tubes and hoses (Fig. 14).

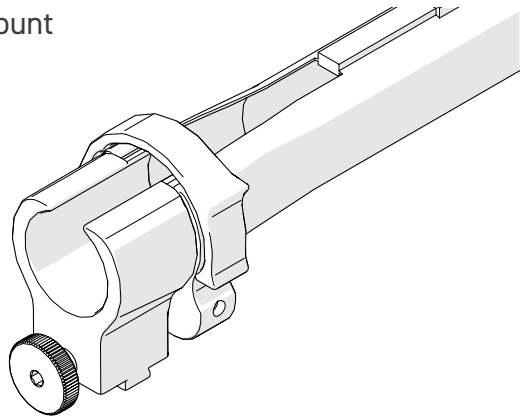


Fig. 14 - Cable Management, Dovetail Mount

4.1.9. Irrigation Kit CMG007

The irrigation kit provides a variety of hoses, fittings, connectors, and splitters commonly used during non-destructive inspection (Fig. 15).

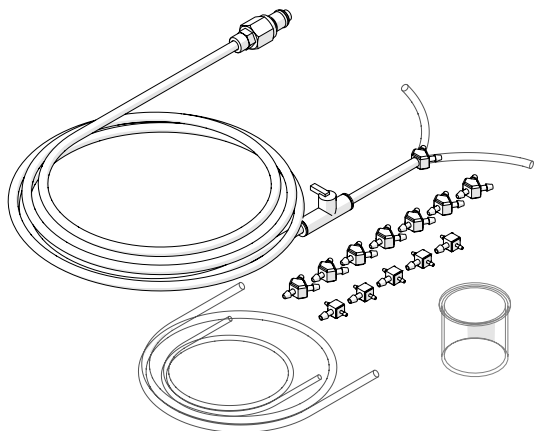


Fig. 15 - Irrigation Kit

4.1.10. Tools

Several tools are included for various scanner and accessory adjustments.

4.1.11. Case

The system is provided with a rugged carrying case.

4.2. Base High Temperature Components

4.2.1. High Temperature Low Profile Link CEA047

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. 16).

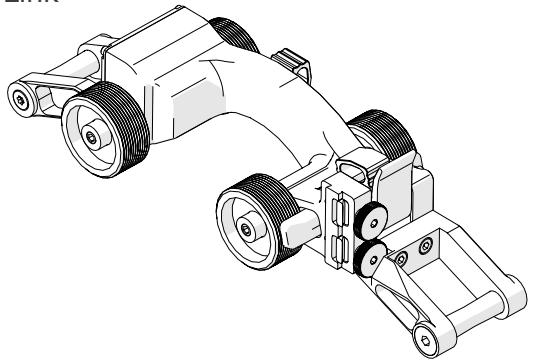


Fig. 16 - High temperature low profile link

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. 17).

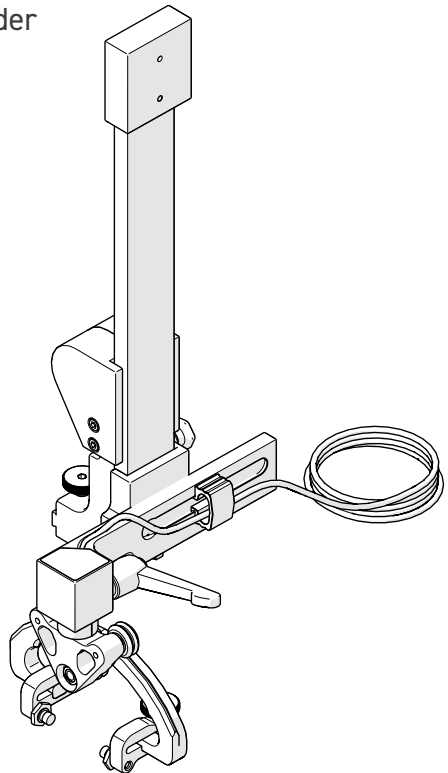


Fig. 17 - Encoded skew vertical probe holder

4.2.3. Frame Bar with Ruler BG0090-

The frame bar with ruler (*Fig. 18*) 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.

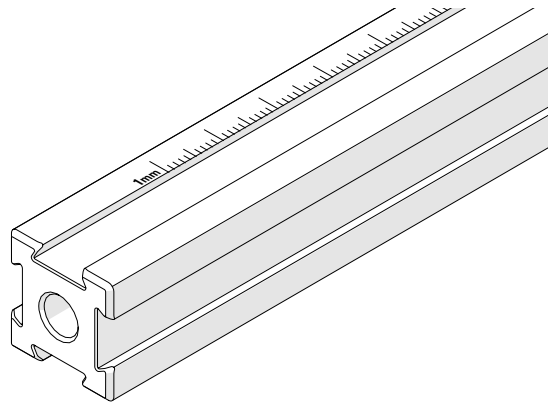


Fig. 18 - Frame bar with ruler

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. 19*).

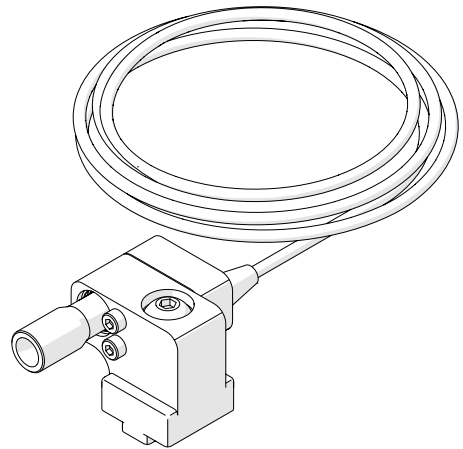


Fig. 19 - Slider PPS encoder

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. 20*).

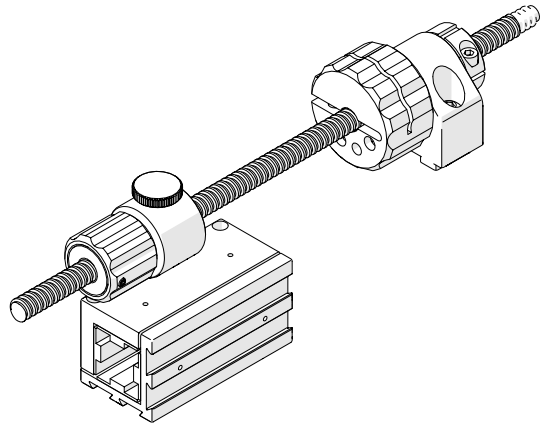


Fig. 20 - Slider probe positing system

4.2.6. QuickLink Components

The QuickLink components fasten a **ROTIX** system circumferentially around a pipe or tube.

4.2.6.1 High Temperature Dovetail QuickLink CES109

Similar to a standard ROTIX - Short Link but with the addition of a dovetail for mounting optional accessories (*Fig. 21*).

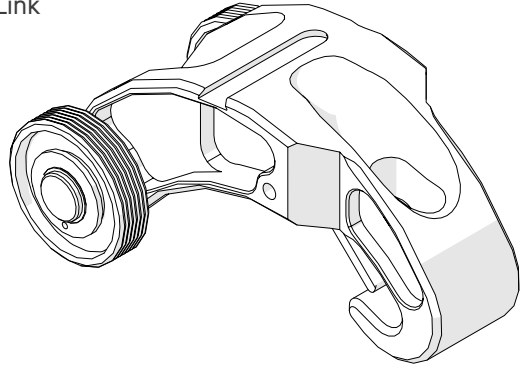


Fig. 21 - High temperature dovetail QuickLink

4.2.6.2 High Temperature QuickLink Buckle CES108

The buckle offers adjustment of the chain system tension and provides the connection point of the chain assembly (*Fig. 22*).

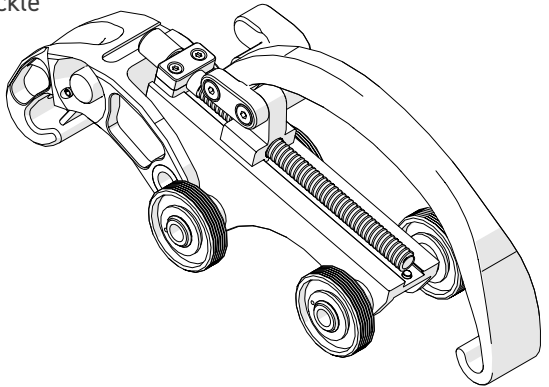


Fig. 22 - High temperature QuickLink buckle

4.2.7. J400 Encoder Cable UMA036-

The encoder cable connects the **ROTIX** system to the user's instrument. (Fig. 23).

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.*

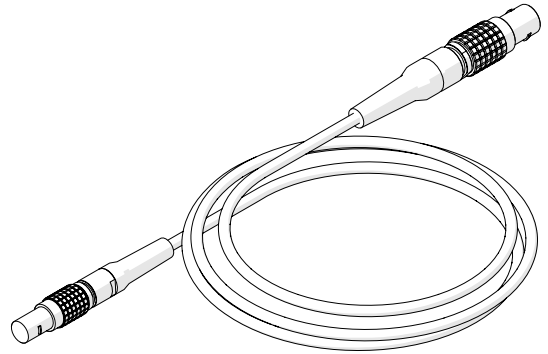


Fig. 23 - J400 Encoder cable

4.2.8. High Temperature Cable Management CES089-

High temperature cable management protects and organizes cables, tubes and hoses (Fig. 24).

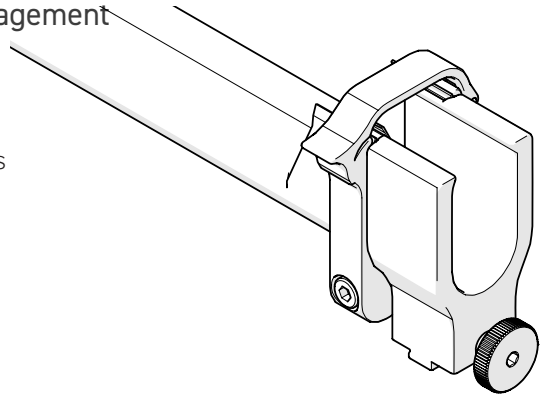


Fig. 24 - High temperature cable management

4.2.9. Irrigation Kit CMG007

The irrigation kit provides a variety of hoses, fittings, connectors, and splitters commonly used during non-destructive inspection (Fig. 25).

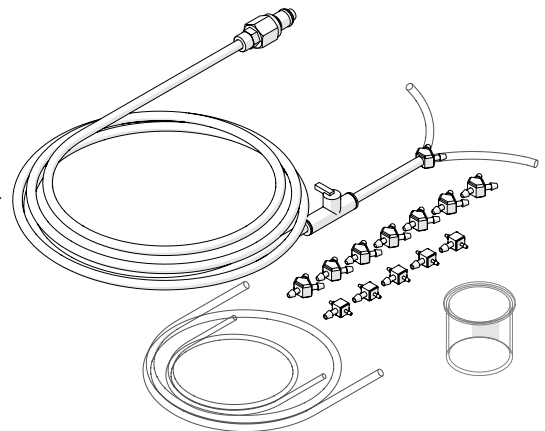


Fig. 25 - Irrigation Kit

4.2.10. Tools

Several tools are included for various scanner and accessory adjustments.

4.2.11. Case

The system is provided with a rugged carrying case.

4.3. Tools

4.3.1. Included tools

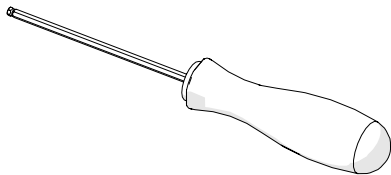


Fig. 26 - 3 mm hex driver

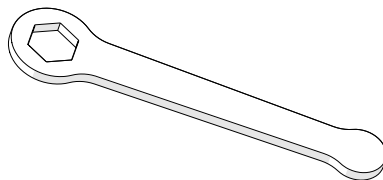


Fig. 27 - 3/8 in wrench

The 3 mm hex driver (*Fig. 26*) is sufficient for all typical operations and adjustments of the **ROTIX**.

The 3/8 in wrench (*Fig. 27*) is used to remove and install pivot buttons on the probe holders.

PREPARATION FOR USE

5.1. Configurations

5.1.1. Nozzle Scanner

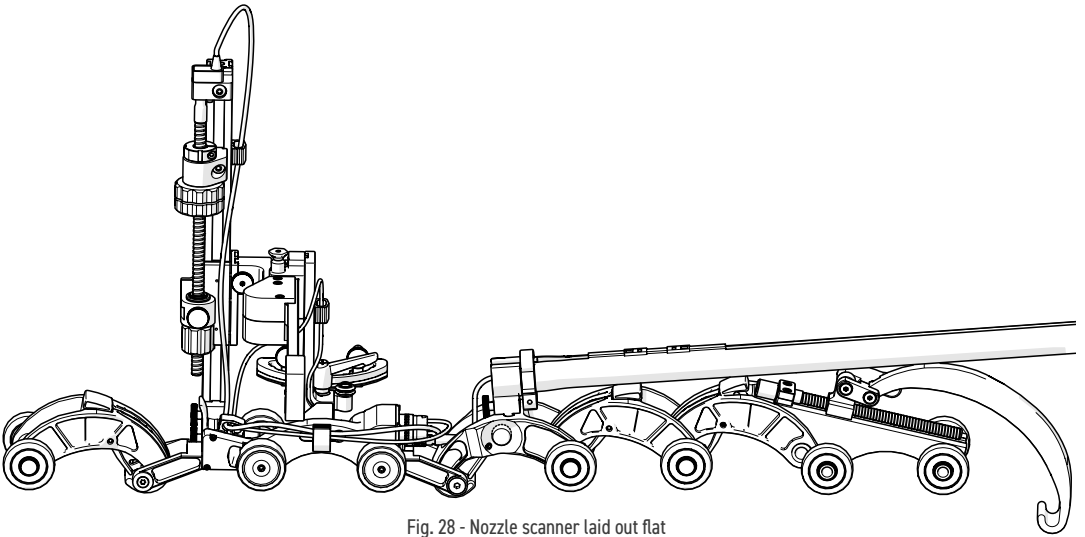


Fig. 28 - Nozzle scanner laid out flat

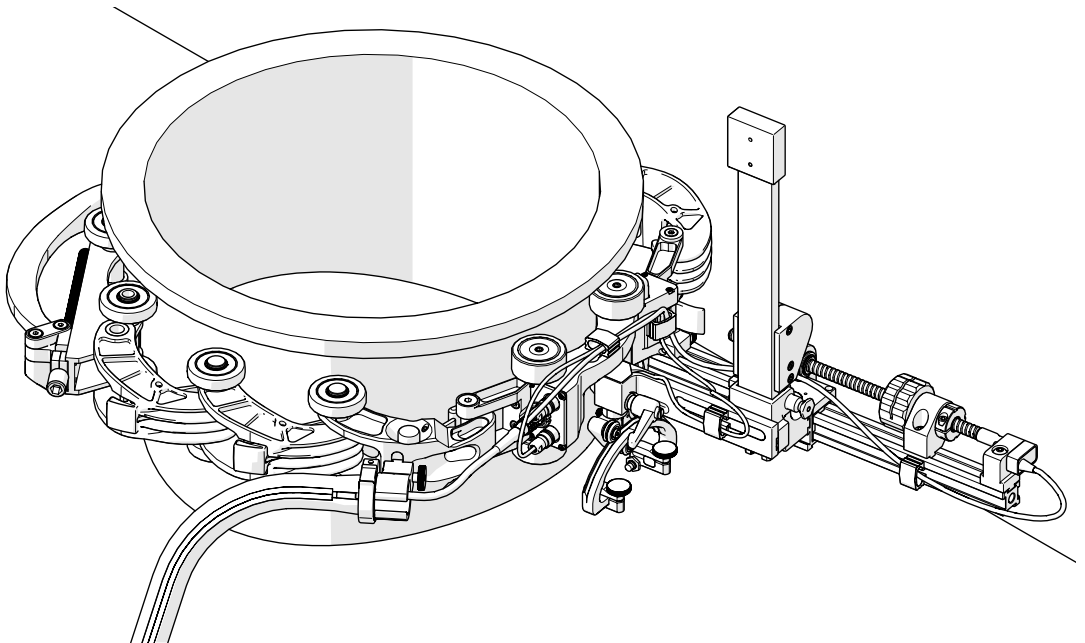


Fig. 29 - Nozzle scanner configuration

5.1.2. High Temperature Nozzle Scanner

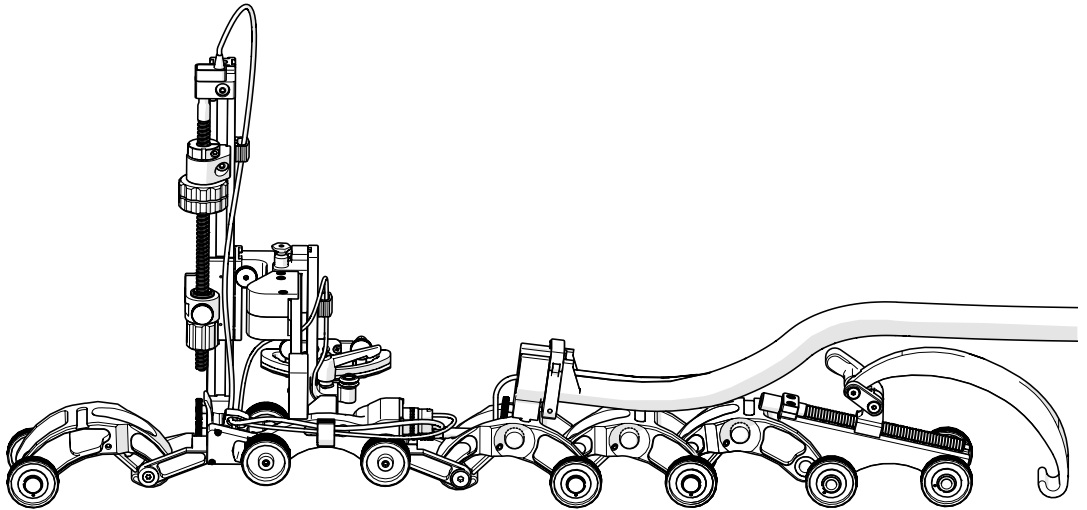


Fig. 30 - High temperature nozzle scanner laid out flat

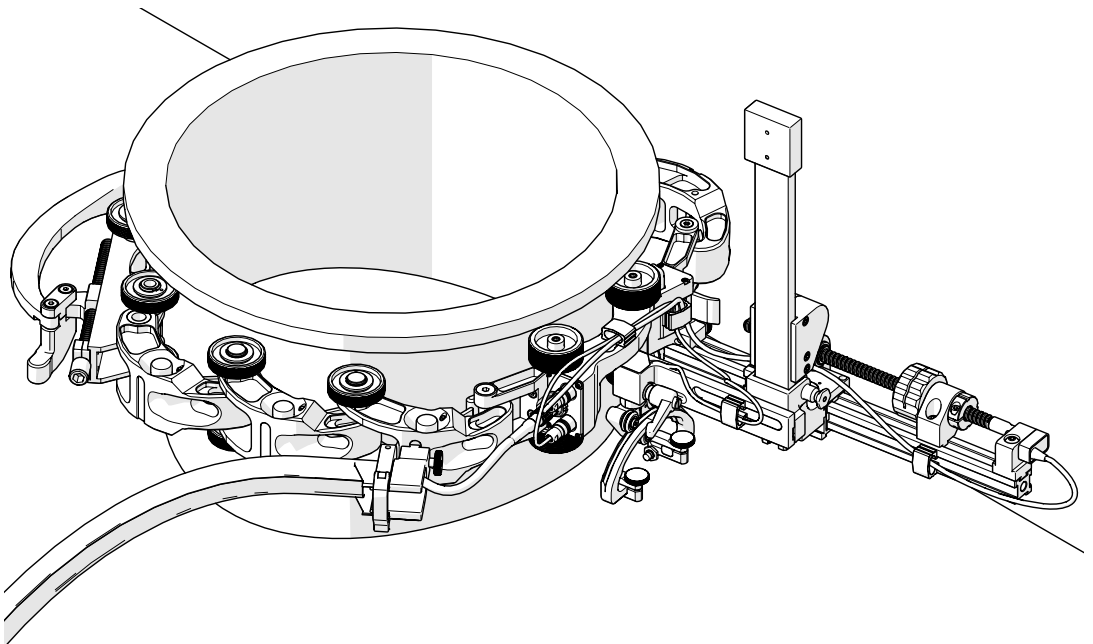


Fig. 31 - High temperature nozzle scanner configuration

5.2. Low Profile Link Adjustment and Setup

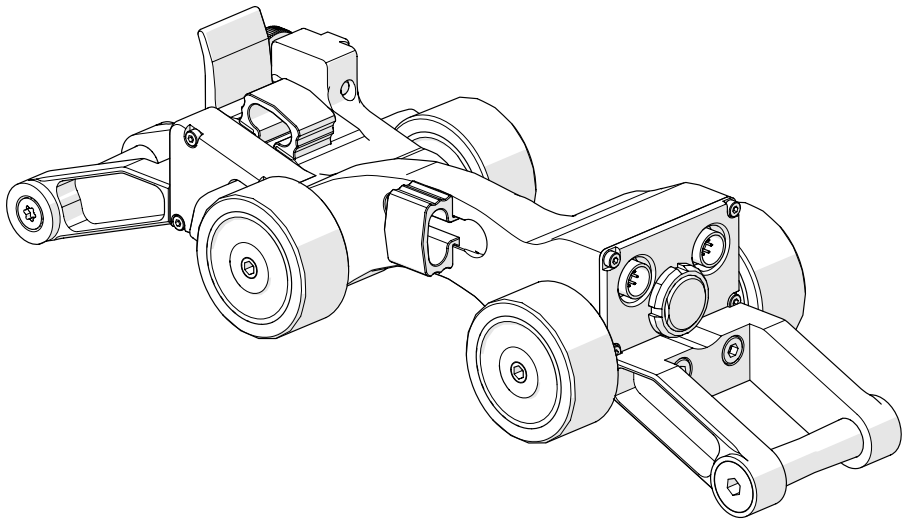


Fig. 32 - ROTIX - Low profile link

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. 33).

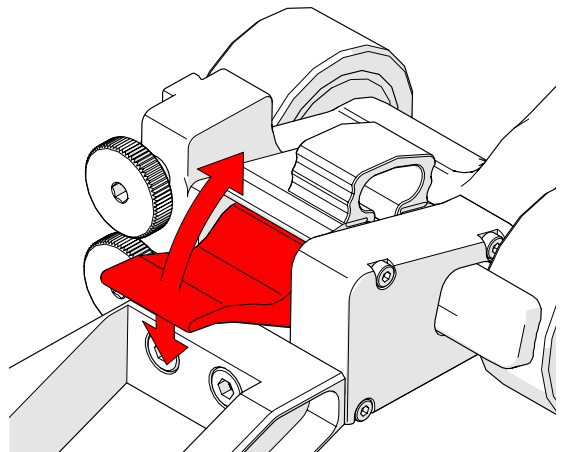


Fig. 33 - Brake lever

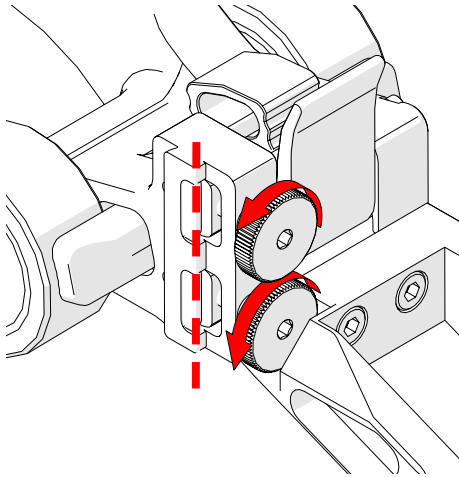


Fig. 34 - Loosen dovetail jaws

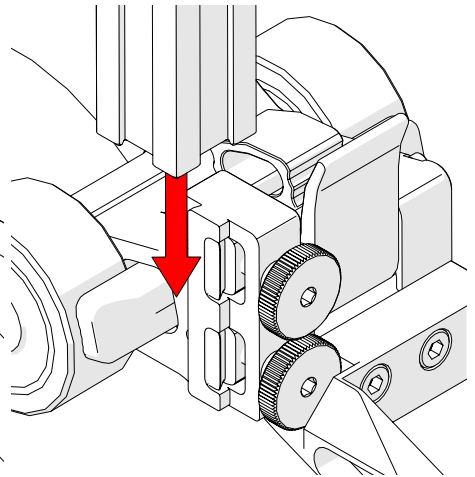


Fig. 35 - Attach frame bar to dovetail

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. 34).
2. Slide the frame bar over the two dovetails of the low profile link (Fig. 35).
3. Tighten the two knobs to secure the frame bar in place (Fig. 36).

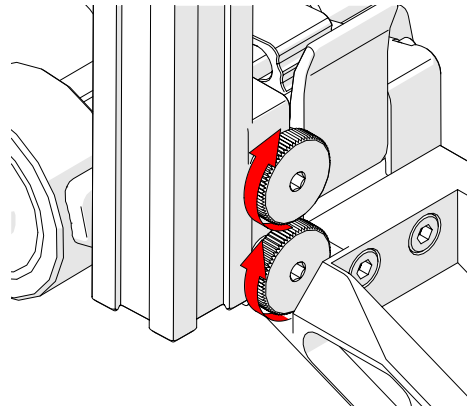


Fig. 36 - Tighten knobs

4. The 3 mm hex driver may tighten and loosen the knobs should additional strength be required (Fig. 37).

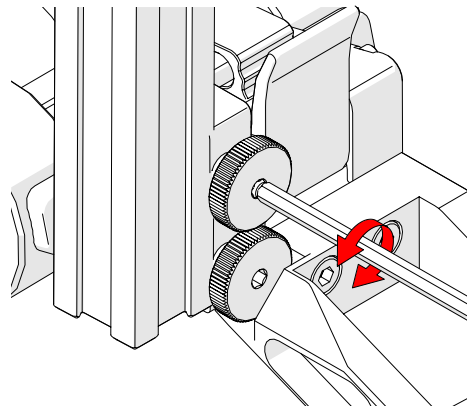


Fig. 37 - Use 3 mm hex driver

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.

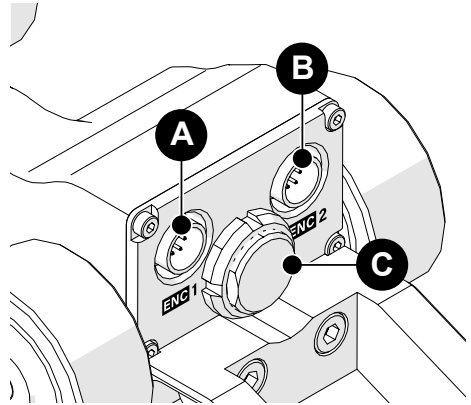


Fig. 38 - Connection identification

5.2.4. Cable Clip

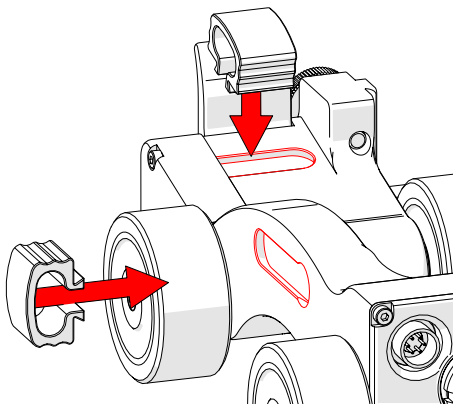


Fig. 39 - Cable clip mounting points

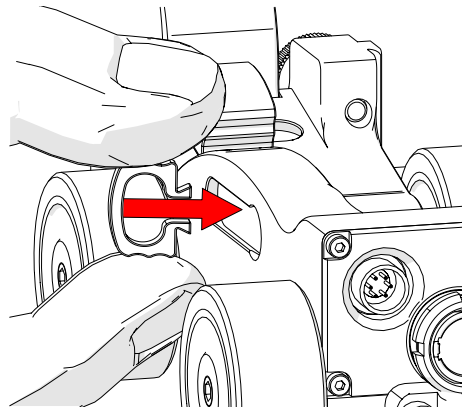


Fig. 40 - Pinch clip and press into place

Locations for cable clips have been provided to assist with cable management (*Fig. 39*). 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. 40*) located on the low profile link.

5.3. Encoded Skew Vertical Probe Holder

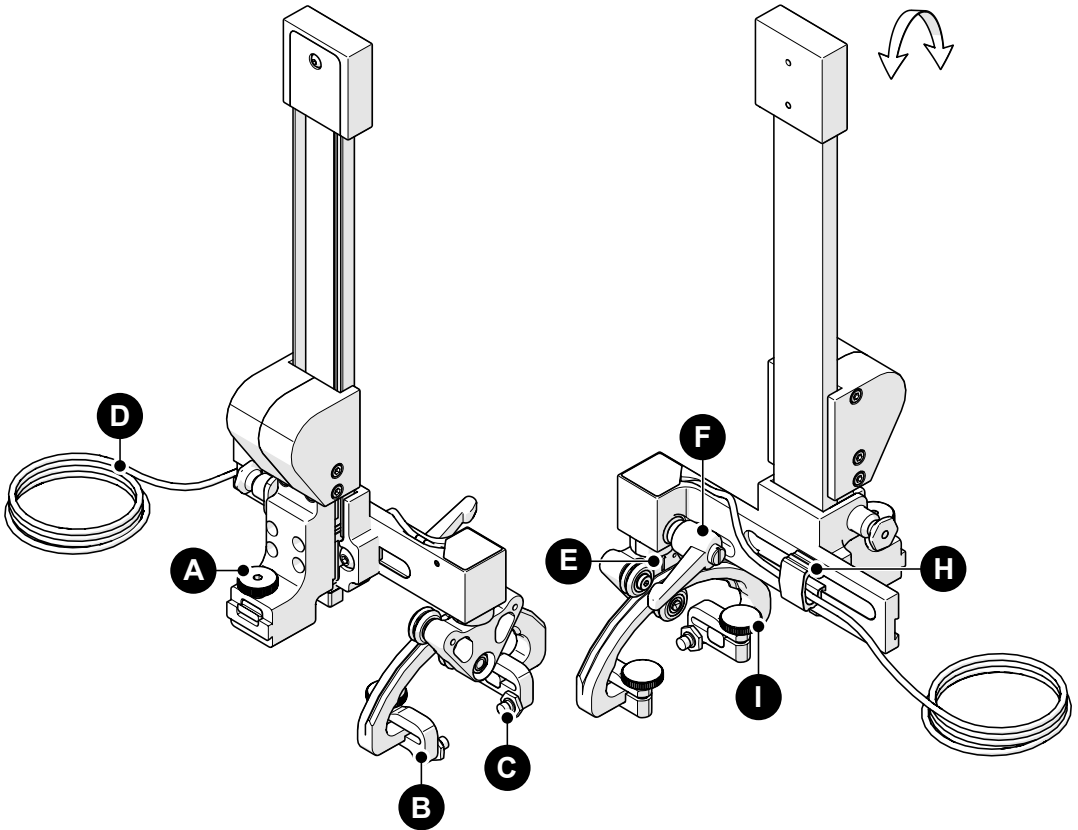


Fig. 41 - Encoded skew vertical probe holder identification

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	<i>Probe Holder Arm Adjustment Knob</i>

5.3.1. Probe Holder Setup

1. Using the supplied 3/8 in wrench (Fig. 27), install the appropriate pivot buttons to the probe holder arms (Fig. 42).

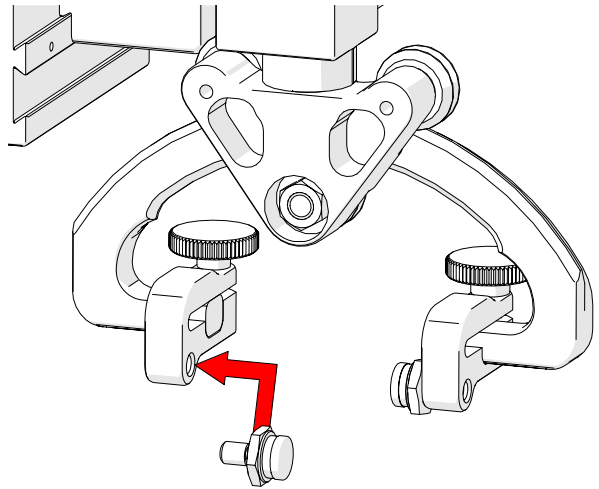


Fig. 42 - Attach pivot buttons

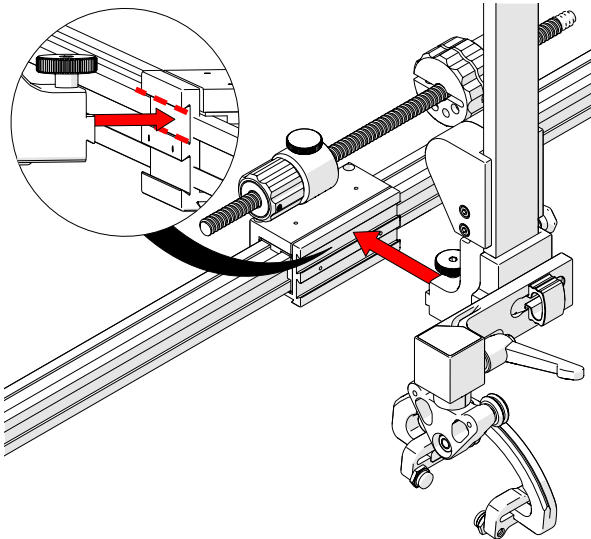


Fig. 43 - Mount to slider pps

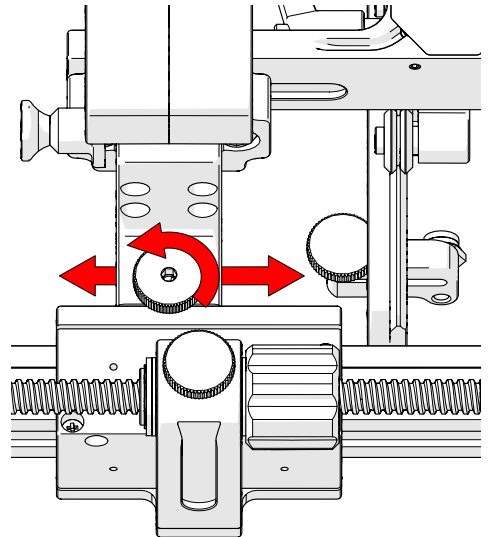


Fig. 44 - Mount to slider pps

2. Loosen the probe holder adjustment knob to attach the encoded skew vertical probe holder to the slider pps slider (Fig. 43).
3. Loosen the knob to position the probe holder horizontally along the slider pps slider (Fig. 44). Tighten the probe holder adjustment knob when positioning is complete.

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

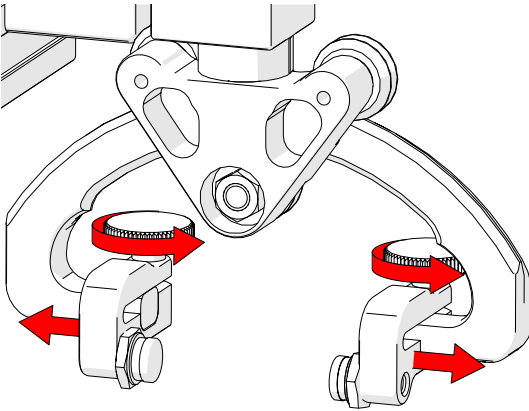


Fig. 45 - Loosen knobs and move arms

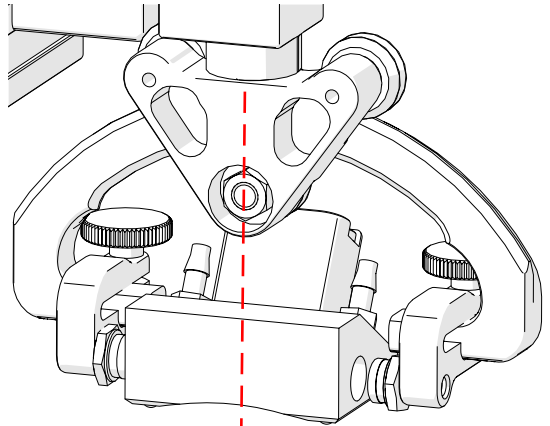


Fig. 46 - Align probe

4. Loosen the two probe holder arm adjustment knobs and move the arms apart to create space for the probe (Fig. 45).
5. Align the probe with the centre of the yoke pivot (Fig. 46).
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. 47).
7. Tighten the two probe holder arm adjustment knobs.

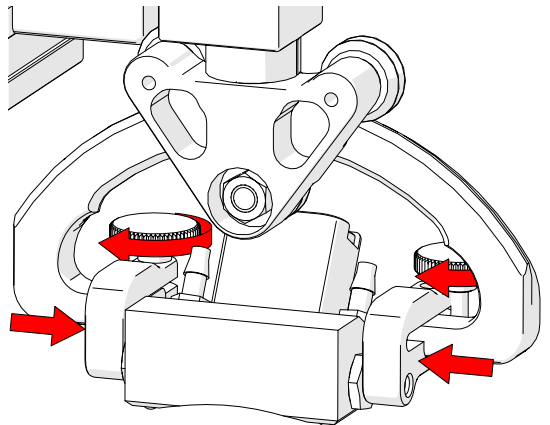


Fig. 47 - Clamp probe with arms and tighten knobs

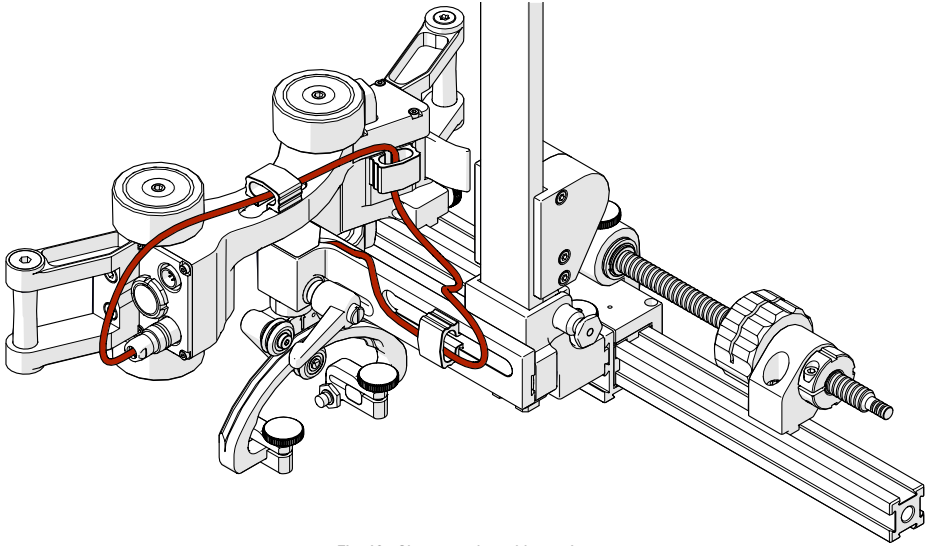


Fig. 48 - Skew encoder cable routing

8. Route the skew encoder cable through the required cable clips (Fig. 48).
9. Plug the skew encoder cable into ENC 2 at the rear of the low profile link (Fig. 48).

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.

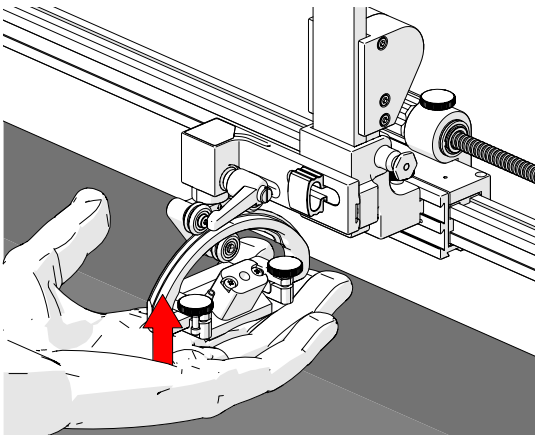


Fig. 49 - Lift probe holder

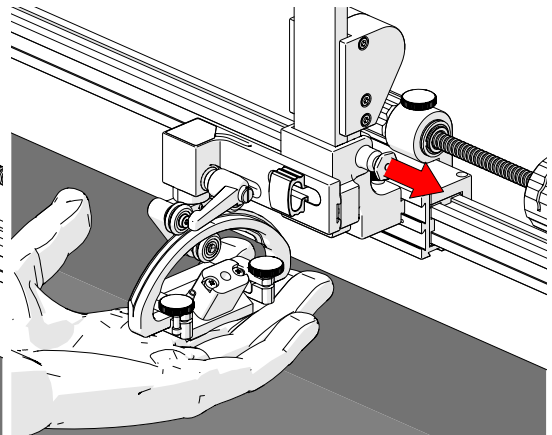


Fig. 50 - Pull latch pin

1. Lift the probe holder slightly to allow the release of the latch pin (Fig. 49).
2. Pull the latch pin (Fig. 50) and slowly lower the probe holder to the scan surface (Fig. 51).

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

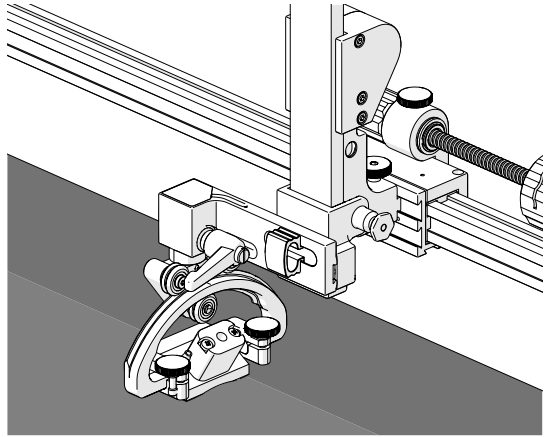


Fig. 51 - Lower probe to inspection surface

5.3.2.3 Latch Pin

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

1. Slightly lift the probe holder (Fig. 49).
2. Pull the latch pin to allow movement of the probe holder (Fig. 52).
3. The release latch pin and probe holder lock when raised to the uppermost position.

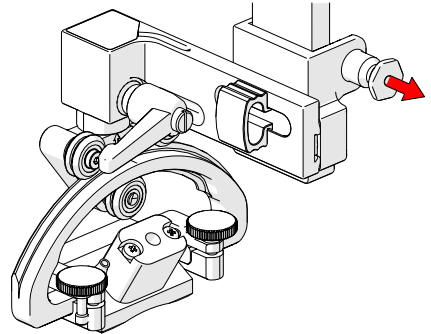


Fig. 52 - Pull latch pin

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. 49).
5. Pull the latch pin and slightly rotate the latch pin left or right (Fig. 53).
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.

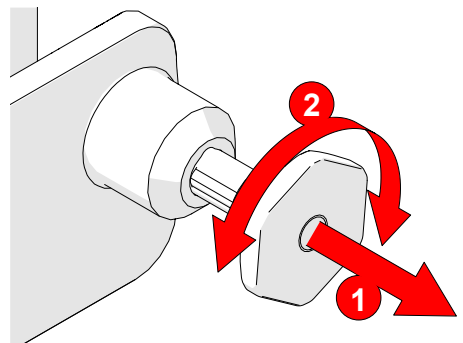


Fig. 53 - Pull latch pin and rotate

5.3.3. Skew Angle Adjustment

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

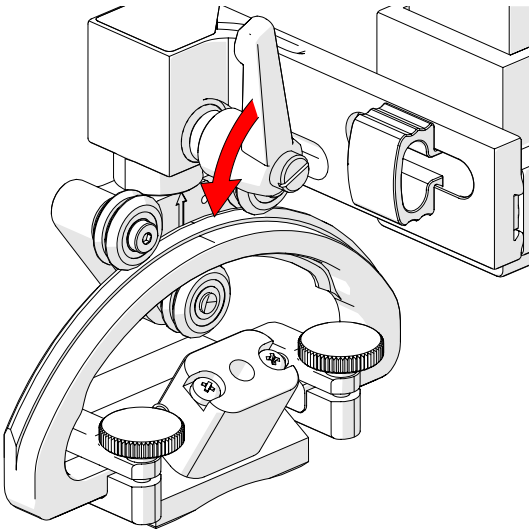


Fig. 54 - Loosen ratchet lever

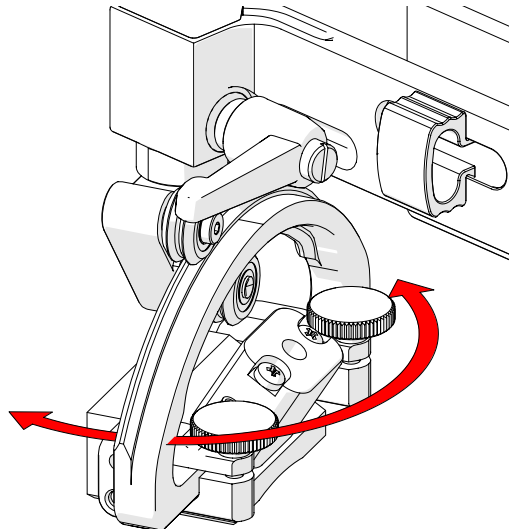


Fig. 55 - Adjust skew angle

1. Loosen the ratchet lever above the yoke (Fig. 54).
2. Rotate the yoke (*Up to 90° in either direction*) to the angle required (Fig. 55).
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 27 for more information*).
4. The engraved arrow above the yoke will align the yoke to the required degree.

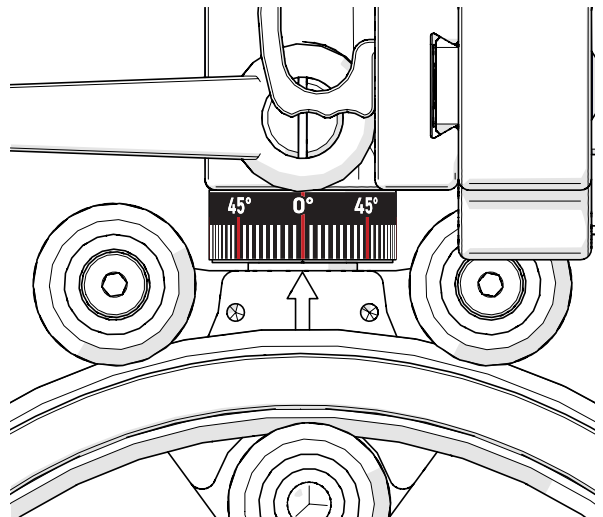


Fig. 56 - Engraved arrow aligns with various degree measurements

5.3.3.5 Ratchet Lever

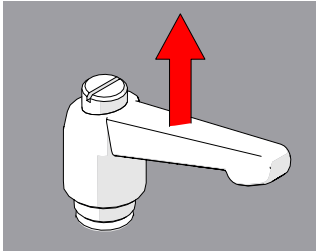


Fig. 57 - Pull ratchet handle

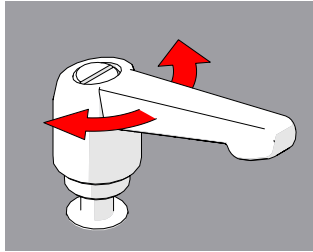


Fig. 58 - Rotate handle

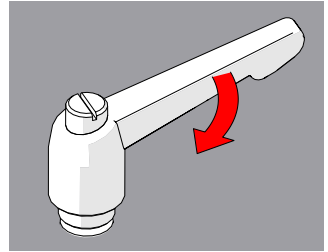


Fig. 59 - Tighten handle

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. 57*).
2. Continue to pull while rotating the lever in the appropriate direction (*Fig. 58*).
3. Release the lever and utilize the new tightening position (*Fig. 59*).

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. 27*) to remove and install pivot buttons in the desired hole location (*Fig. 60*).

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

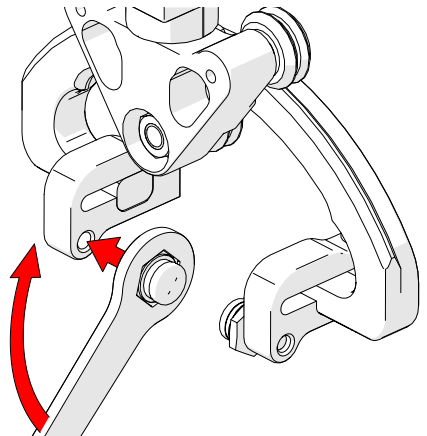


Fig. 60 - - Tighten pivot buttons to probe holder arms

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:

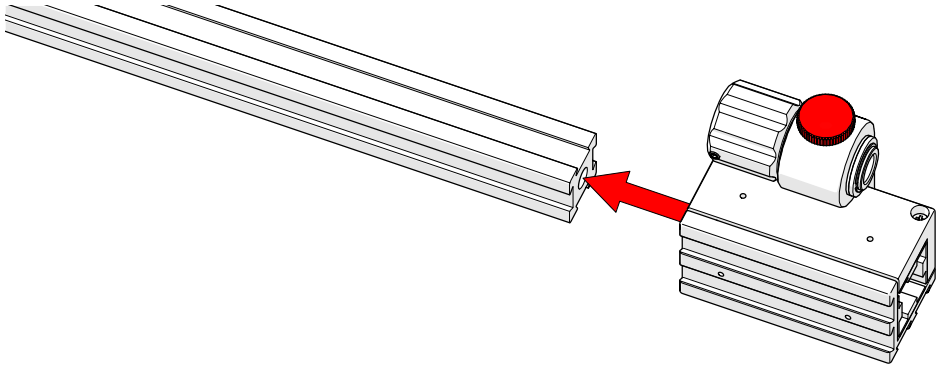


Fig. 61 - Place slider on frame bar and loosen slider lock knob

1. Ease the slider onto the frame bar and push it into position (*Fig. 61*). The slider's friction fit requires an appropriate amount of force to position the slider.
2. Loosen the slider's lock knob (*Fig. 61 - note red highlight*).

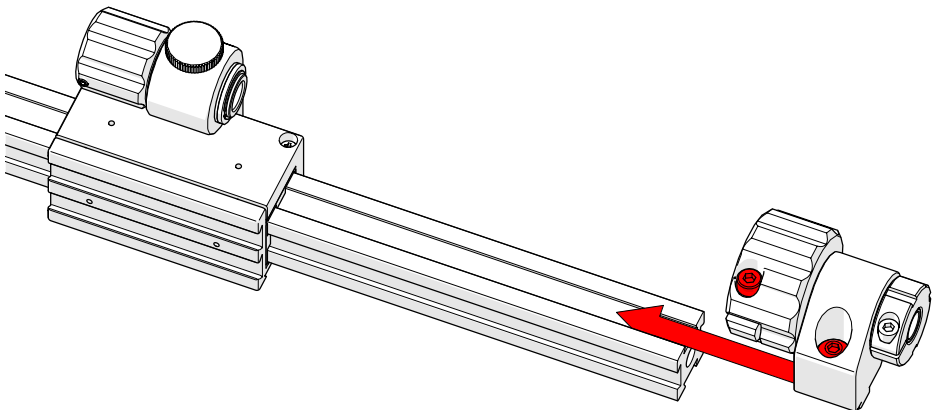


Fig. 62 - Place main knob on frame bar

3. Loosen the main knob's hexagonal screw and lock screw (*Fig. 62 - note red highlight*).
4. Align the dovetail nut of the main knob with the frame bar and slide into position (*Fig. 62*).

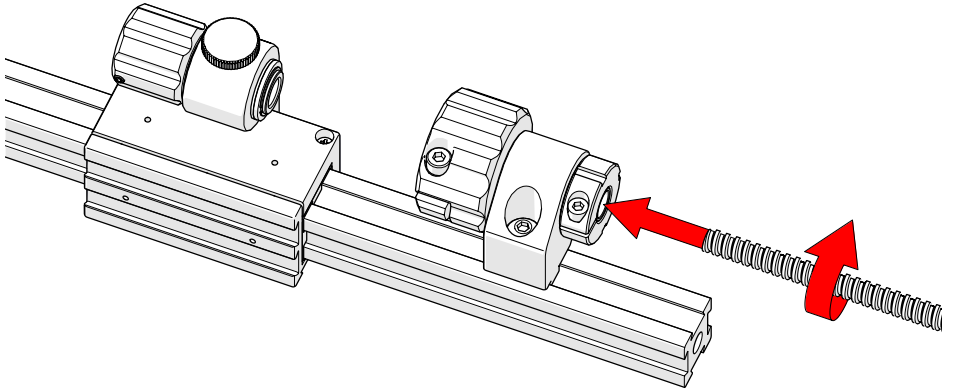


Fig. 63 - Insert leadscrew into main knob and slider

5. Rotate the leadscrew to insert it into the main knob and slider (Fig. 63).

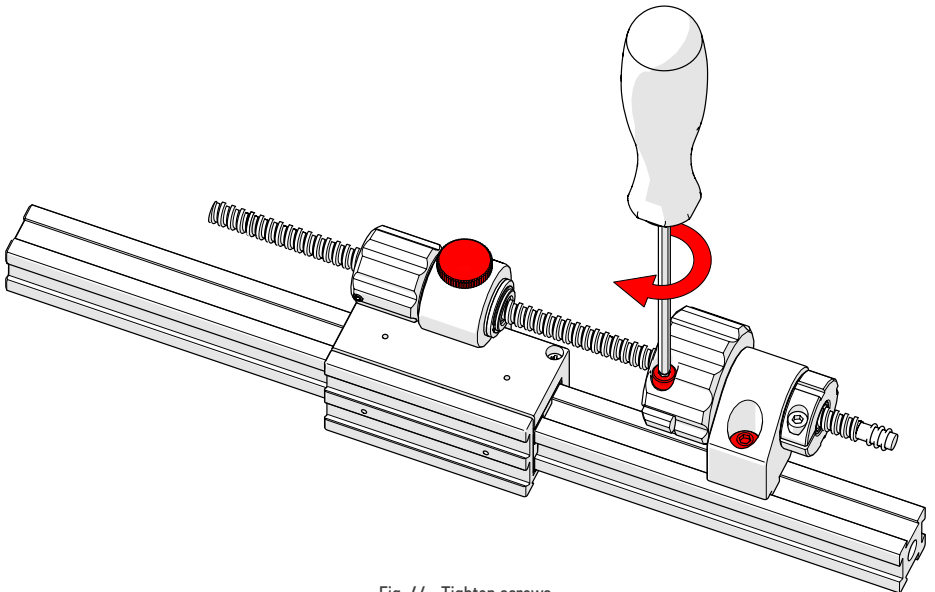


Fig. 64 - Tighten screws

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. 64 - 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.

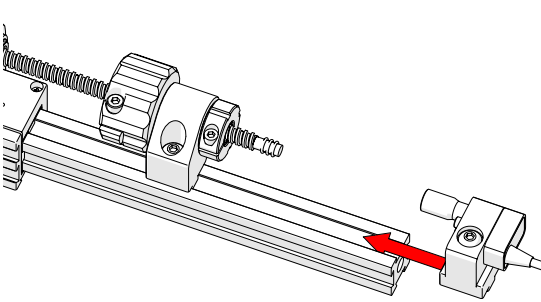


Fig. 65 - Loosen and slide post in place

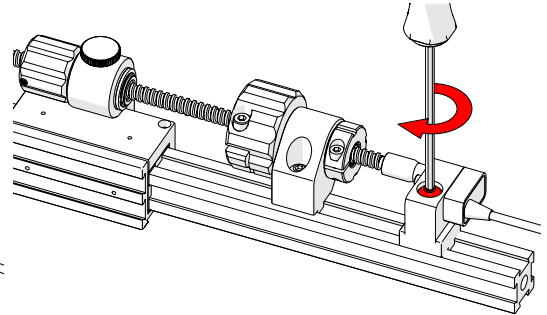


Fig. 66 - Align and mount post

2. Slide the encoder's dovetail nut onto the frame bar (*Fig. 65*) and continue sliding the encoder towards the leadscrew until the leadscrew is pressed snugly into the encoder's coupling (*Fig. 66*).
3. Tighten the encoder's lock screw (*Fig. 66 - note red highlight*).
4. Route the encoder cable to the low profile link (*Fig. 67*).

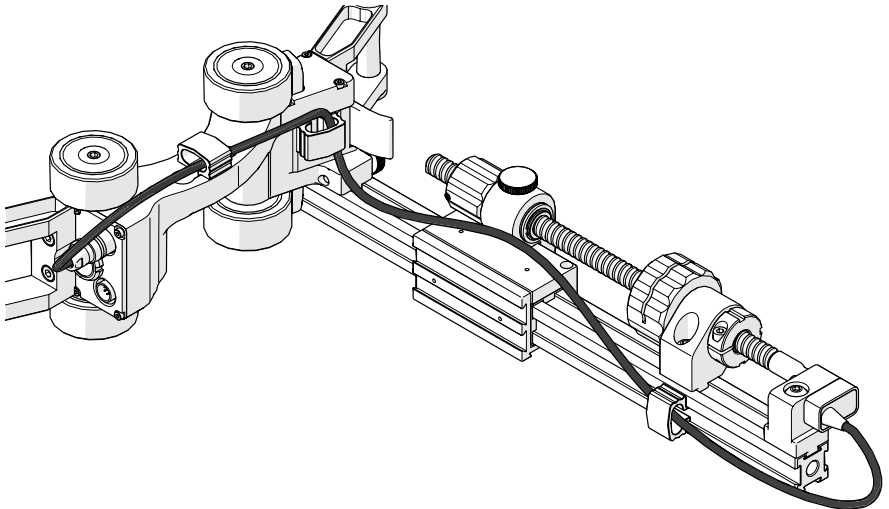


Fig. 67 - Route encoder cable and plug into the low profile link's ENC 1 port

5. Plug the encoder cable into ENC 1 of the low profile link (*Fig. 67*).

5.5. Connecting QuickLinks & Dovetail Links

5.5.1. Connecting QuickLinks

To connect QuickLinks, see the following steps:

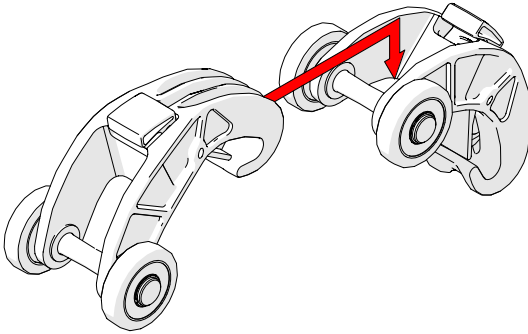


Fig. 68 - Lift the hook over the axle of the QuickLink

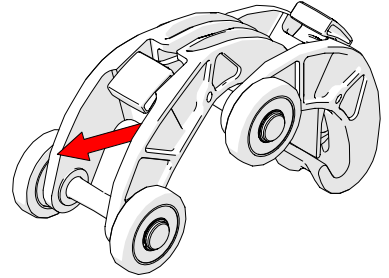


Fig. 69 - Pull the link backwards to secure catch

1. Lift the hook of the QuickLink over the axle of the QuickLink that is to be connected (Fig. 68).
2. Pull the QuickLink until you hear a click that ensures the latch has been set (Fig. 69).

5.5.2. Disconnecting QuickLinks

To disconnect QuickLinks, see the following steps:

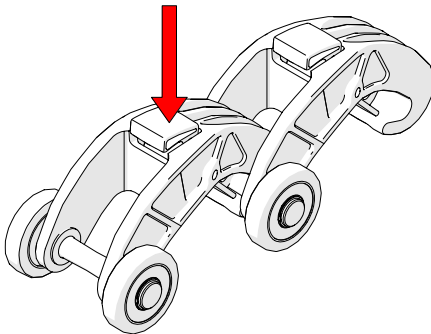


Fig. 70 - Press button

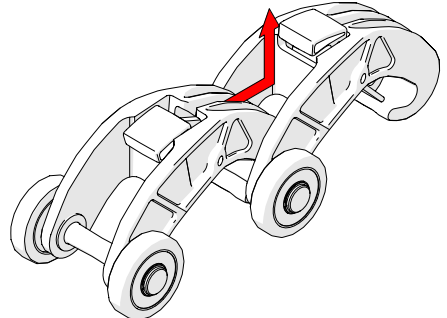


Fig. 71 - Slide QuickLink forward and lift

1. Press the button on the top of the QuickLink (Fig. 70).
2. While pressing the button, slide the QuickLink forward and up, clearing the hook of the QuickLink from the 2nd QuickLink's axle (Fig. 71).

5.5.3. Disconnecting the Dovetail QuickLink

To disconnect Dovetail QuickLinks, see the following steps:

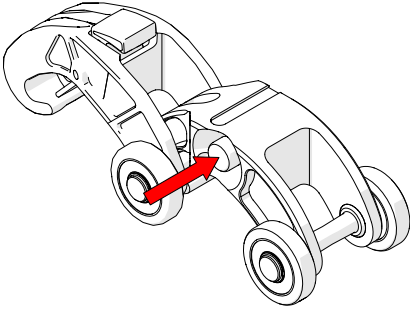


Fig. 72 - Press red button

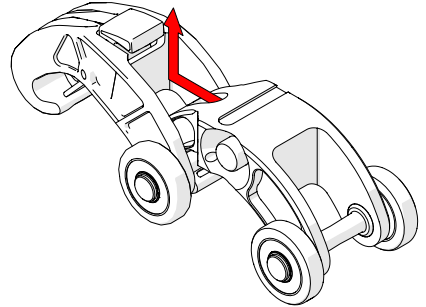


Fig. 73 - Slide Dovetail QuickLink forward and lift

1. Press the button on the side of the Dovetail QuickLink (*Fig. 72*).
2. While pressing the red button, slide the Dovetail QuickLink forward and up, clearing the hook of the Dovetail QuickLink from the 2nd QuickLink's axle (*Fig. 73*).

5.6. Cable Management System

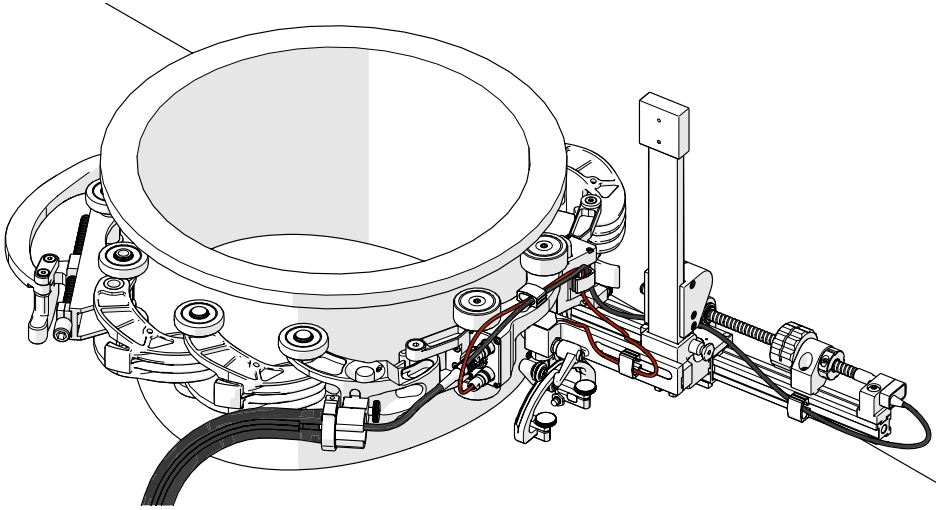


Fig. 74 - Cable management

5.6.1. Cable Management Dovetail Mount

To attach cable management, follow these steps:

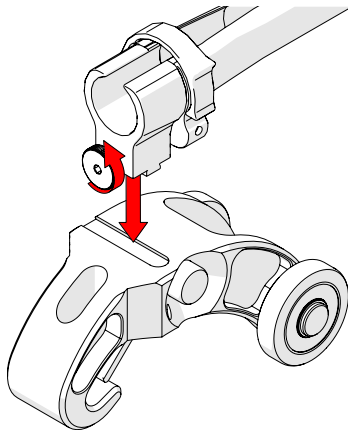


Fig. 75 - Loosen and slide on

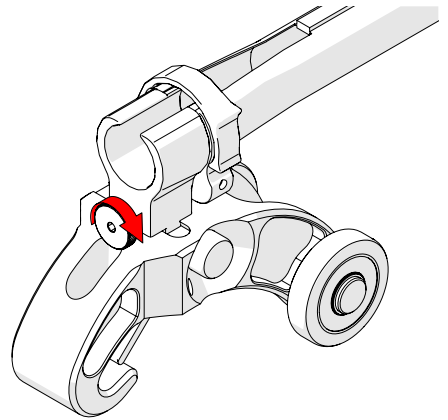


Fig. 76 - Tighten knob

1. Loosen the knob on the cable management dovetail mount. Position the mount onto the Dovetail QuickLink (Fig. 75).
2. Once centred on the Dovetail QuickLink, tighten the cable management's dovetail mount knob (Fig. 76).

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.

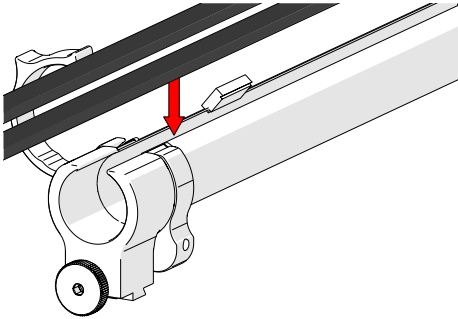


Fig. 77 - Insert cables and hoses

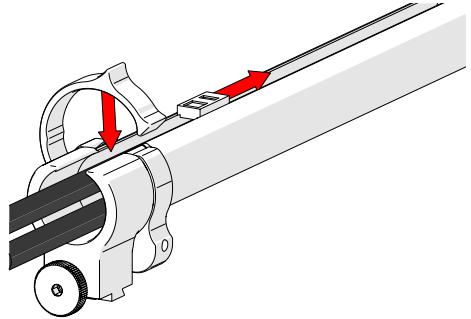


Fig. 78 - Zip up to close

1. Open the zipper of the cable management. Begin at the management's dovetail mount and place the cabling in the sleeving (Fig. 77).
2. Follow the cable placement, zipping the sleeving closed (Fig. 78).

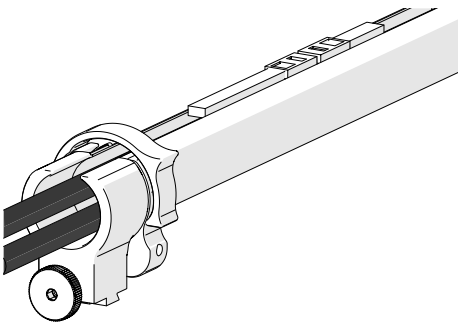


Fig. 79 - Zip opposite end

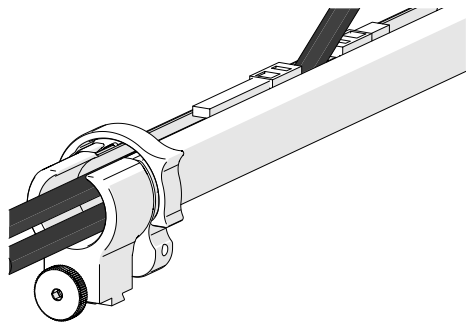


Fig. 80 - Flexibility

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. 79).
4. When necessary, the two zippers may be opened to allow cables to exit the sleeving anywhere between the ends (Fig. 80).

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. 81*). 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. 82*).
4. Tighten the clamp screw (*Fig. 83*).

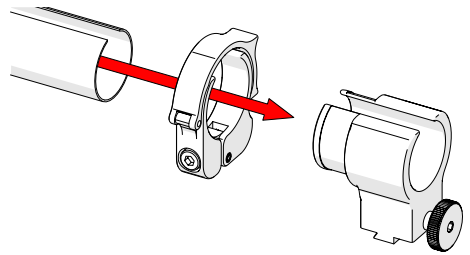


Fig. 81 - Slide tube around mount

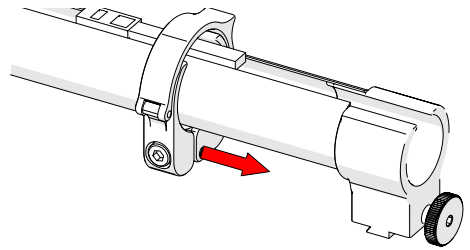


Fig. 82 - Slide clamp onto mount

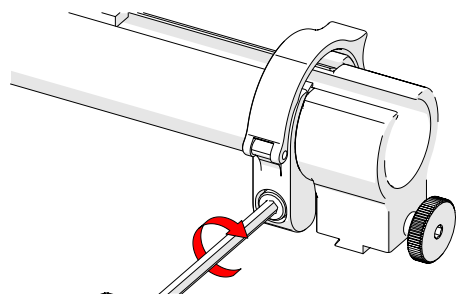


Fig. 83 - Tighten clamp screw

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.

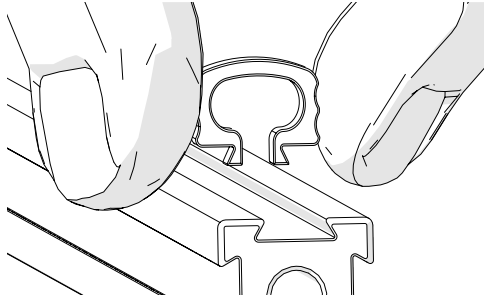


Fig. 84 - Pinch clip

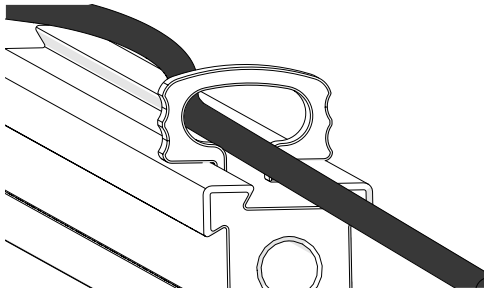


Fig. 85 - Cable clip

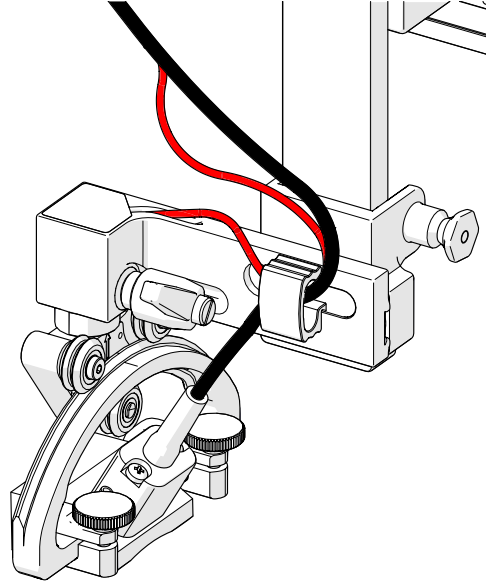


Fig. 86 - Route cables

OPERATION

6.1. Setup of ROTIX on Scanning Surface

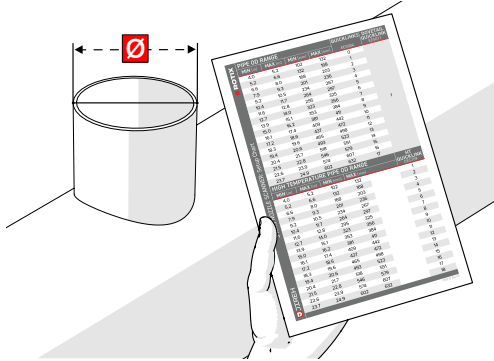


Fig. 87 - Refer to setup chart

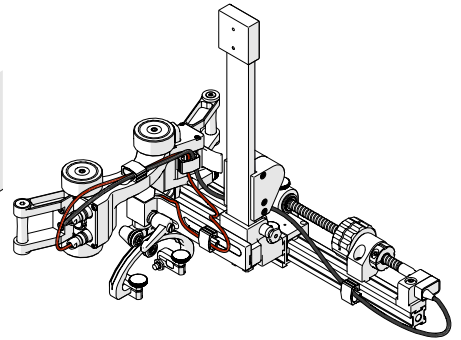


Fig. 88 - Assemble configuration

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. 87).
2. Assemble the appropriate configuration to the low profile link (Fig. 88). Install the wedge and probe to be used (see *Probe Holder Setup* on page 22).

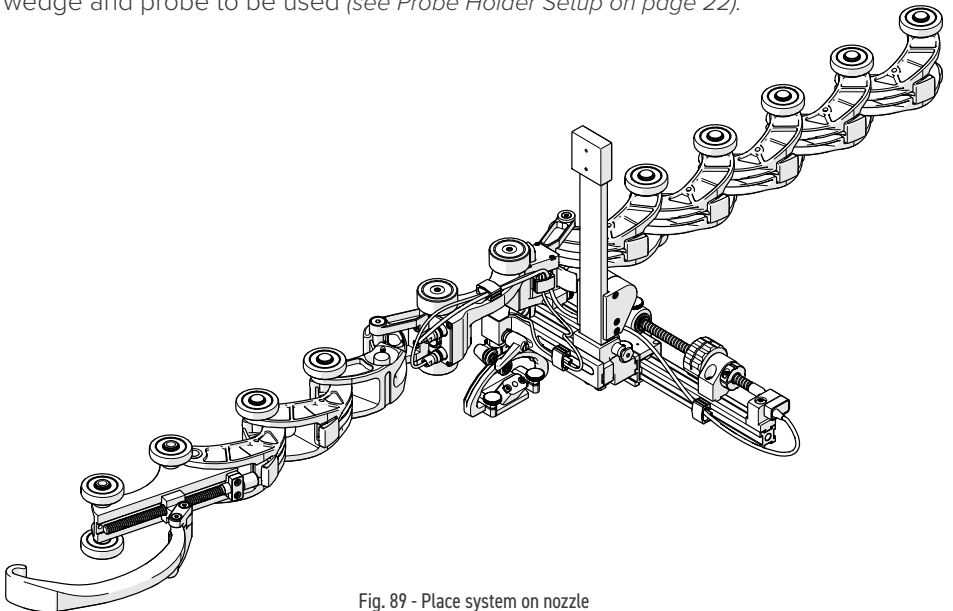


Fig. 89 - Place system on nozzle

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. 89*).
4. Ensure the brake of the low profile link is activated to prevent scanner movement during installation (*see Brake on page 18*).
5. Place the configured assembly around the nozzle to be inspected (*Fig. 90*).

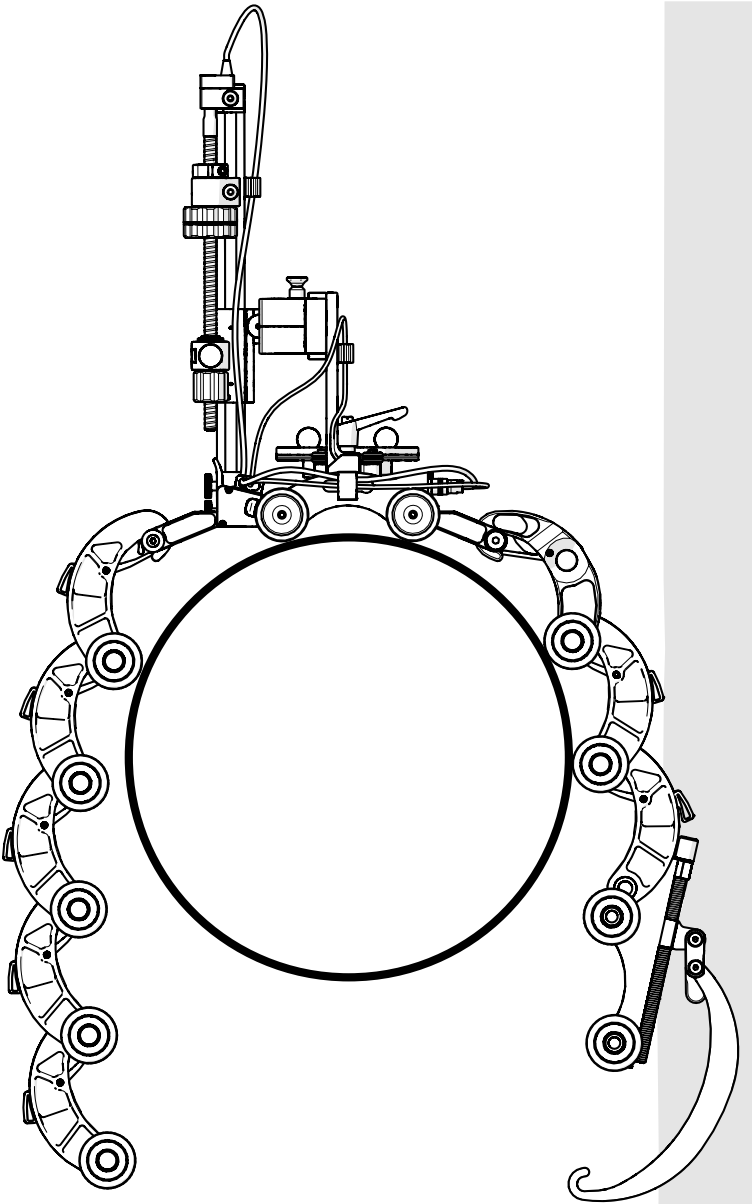


Fig. 90 - Place system on nozzle

- Bring the buckle arm (Fig. 91-1) towards the catch link (Fig. 91-2). Hook the buckle's arm to the middle axle of the catch link. The buckle adjustment knob (Fig. 92-A) may have to be loosened to allow the arm to reach the catch link.

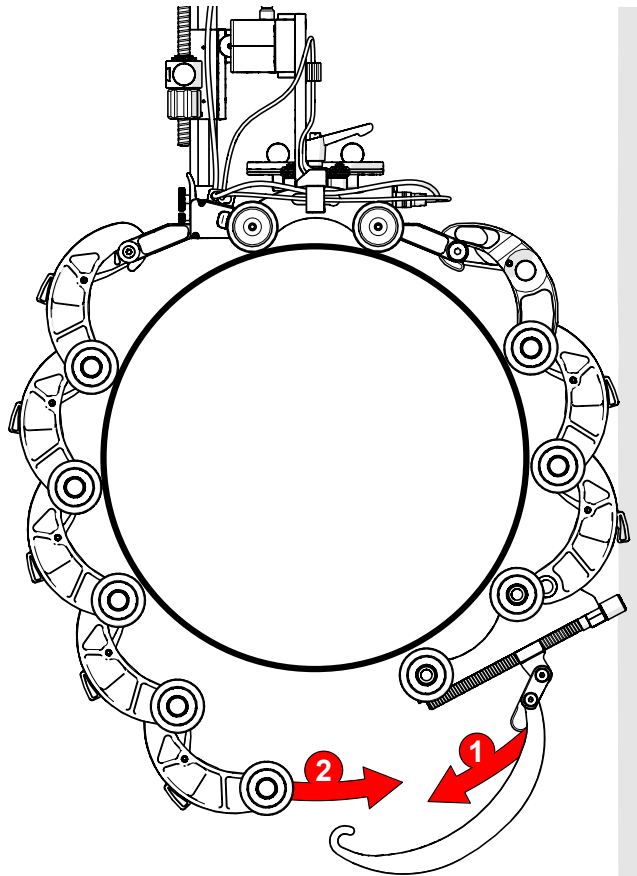


Fig. 91 - Hook buckle to catch link

- The tightness of the **ROTIX** on the pipe can be adjusted using the QuickLink Buckle adjustment knob (Fig. 92-1).

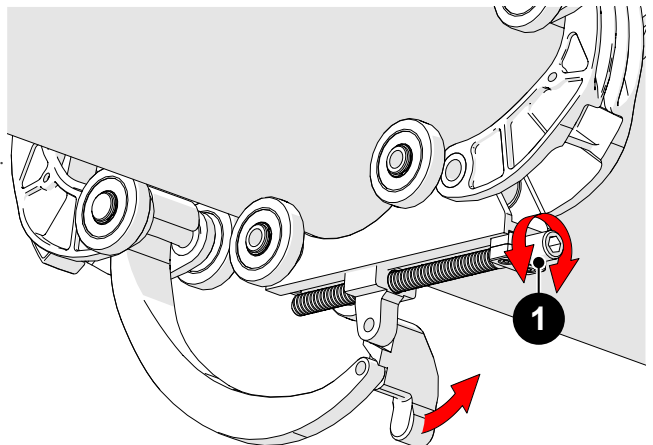


Fig. 92 - Adjust pressure of QuickLink Buckle

8. Rotate the knob until the QuickLink Buckle's lever can be pushed down, locking the QuickLink Buckle in place (Fig. 93).

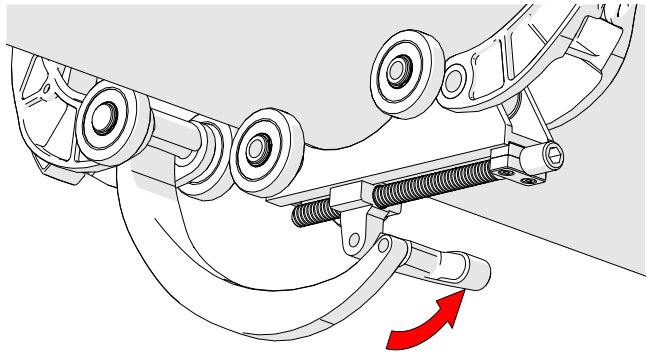


Fig. 93 - Press down to lock

9. Plug in the encoder cable into the main encoder output of the low profile link (Fig. 94). Route all cables and hoses through the cable management (see *Cable Management System* on page 33).

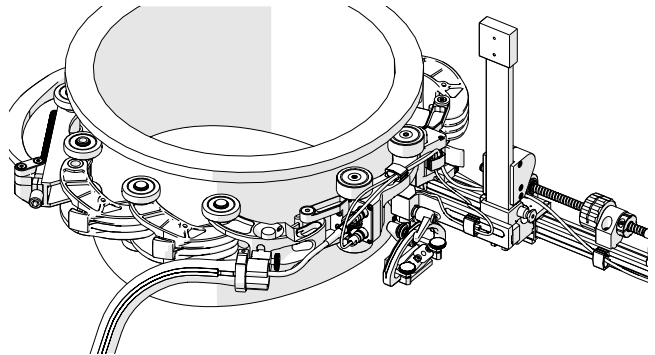


Fig. 94 - Press down to lock

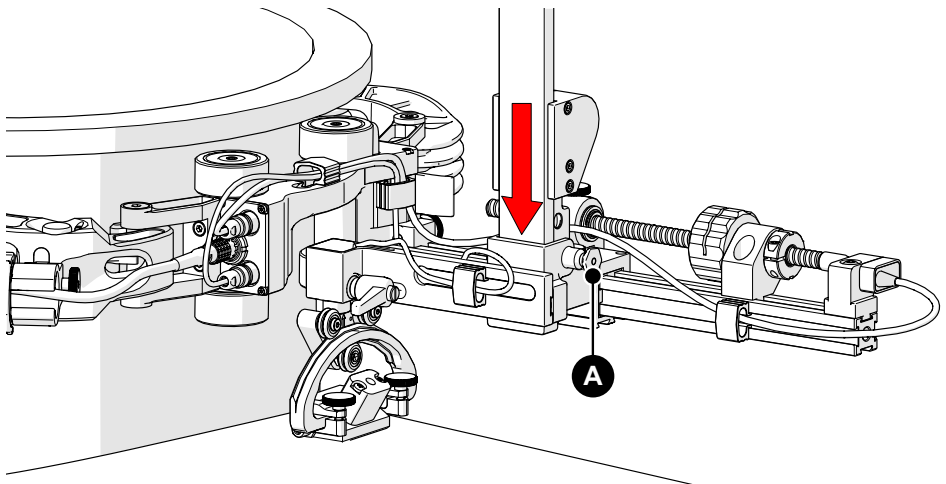


Fig. 95 - Lower probe holder to scan surface

10. Pull the probe holder latch pin (Fig. 95-A) to release the probe holder from the locked position (see *Latch Pin* on page 25 for more information).
11. Lower the probe to the scan surface (see *Encoded Skew Vertical Probe Holder Adjustment* on page 24).

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. 96).

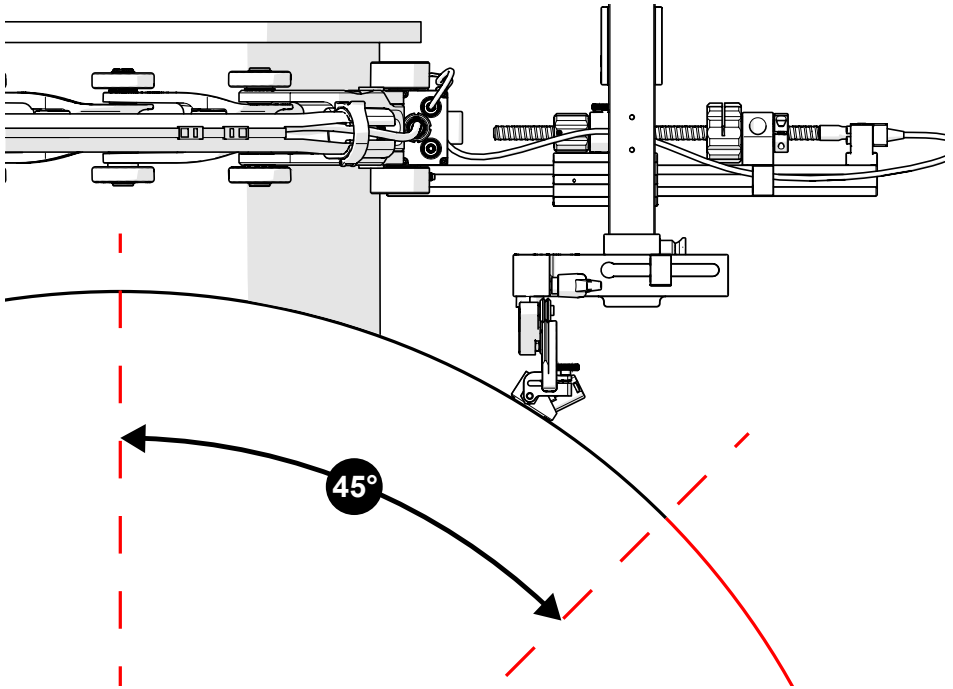


Fig. 96 - Do not scan beyond 45° from the axis of scan surface

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 28).

1. Ensure the slider lock knob (Fig. 97-A) is tight and rotate the main knob to position the slider (Fig. 97).

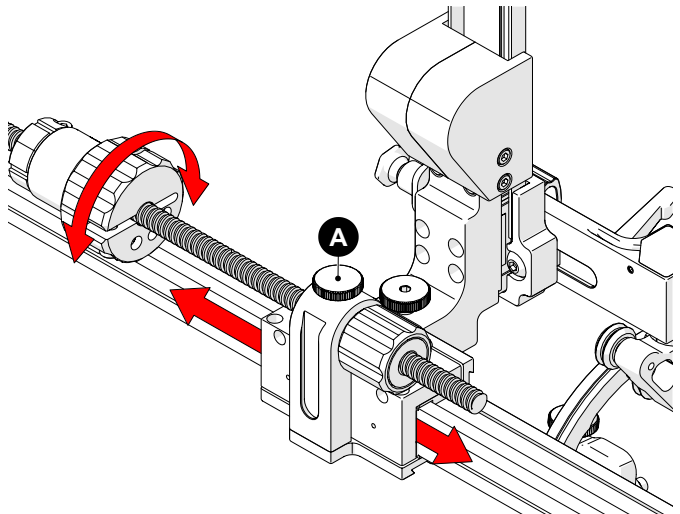


Fig. 97 - Slider positioning

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.

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 24</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

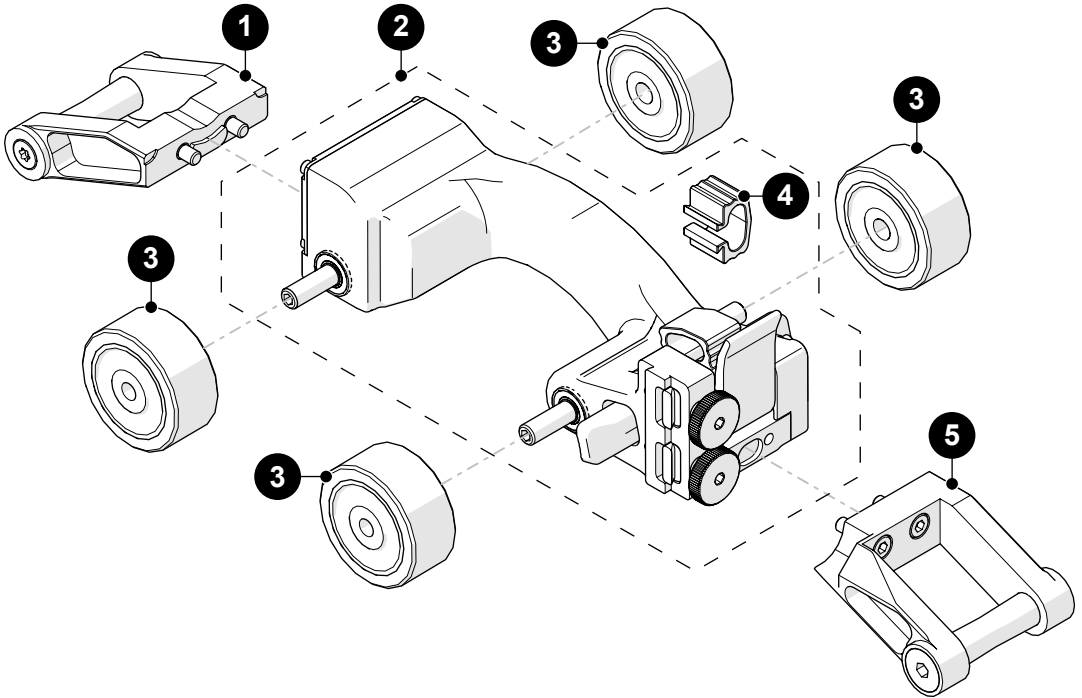


Fig. 98 - Low profile link

Part #	BOM ID	Description
1	CES099	Low profile QuickLink tail
2	CES084	Low Profile Link Subassembly
3	CES012	Non-magnetic wheel
4	BG0091	Cable clip
5	CES098	Low profile QuickLink nose

10.2. Kit Components

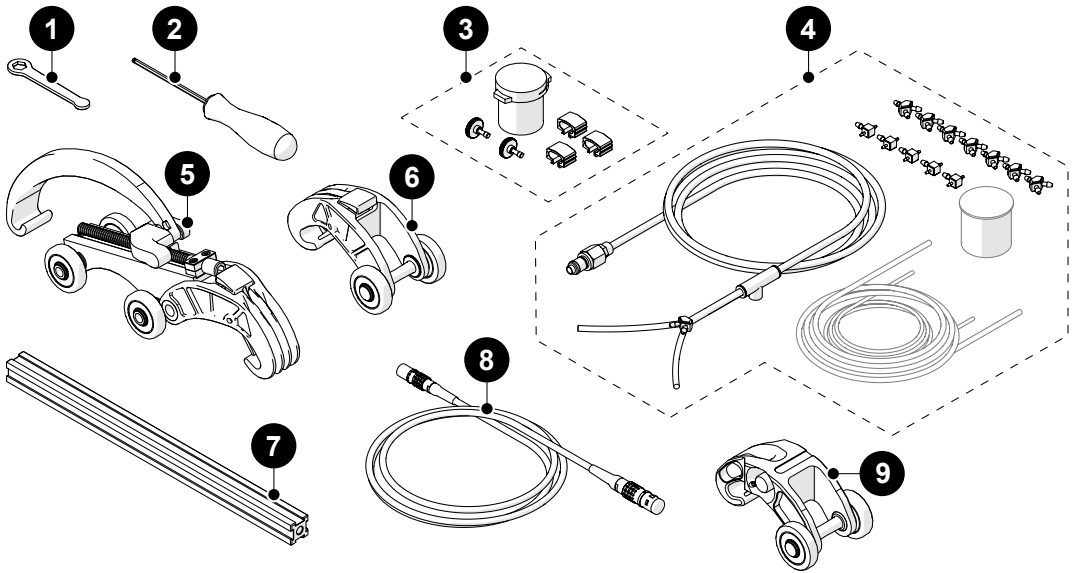


Fig. 99 - Kit contents

Part #	BOM ID	Description
1	EA470	10 mm (3/8 in) wrench
2	EA414	Hex driver, 3 mm (0.118 in)
3	CEG039	ROTIX - Nozzle spare parts kit
4	CMG007	Irrigation kit, 2-4 probe
5	EES014	QuickLink Buckle
6	EES004	QuickLink
7	BG0090_	Frame bar with ruler, 30 cm
8	UMA036_	J400 encoder cable, 5 m (16.4 ft) (see Encoder Connector Type)
9	EES019	Dovetail QuickLink

10.3. High Temperature Low Profile Link

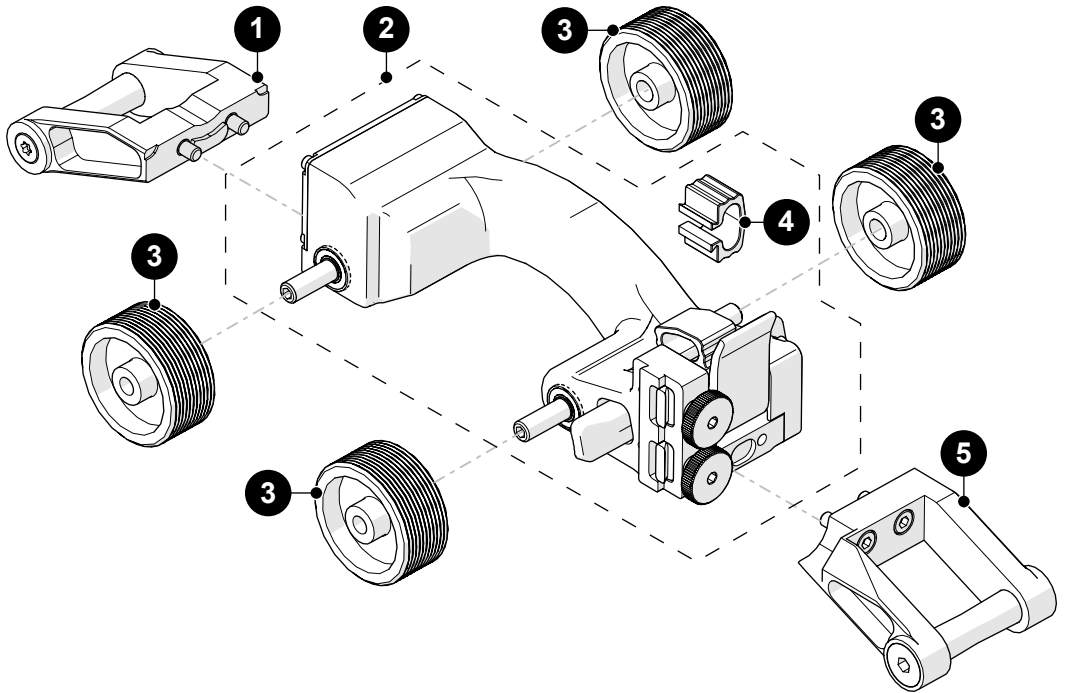


Fig. 100 - High temperature low profile link

Part #	BOM ID	Description
1	CES099	Low profile QuickLink tail
2	CES084	Low Profile Link Subassembly
3	CE0143	High temperature wheel
4	BG0091	Cable clip
5	CES098	Low profile QuickLink nose

10.4. High Temperature Kit Components

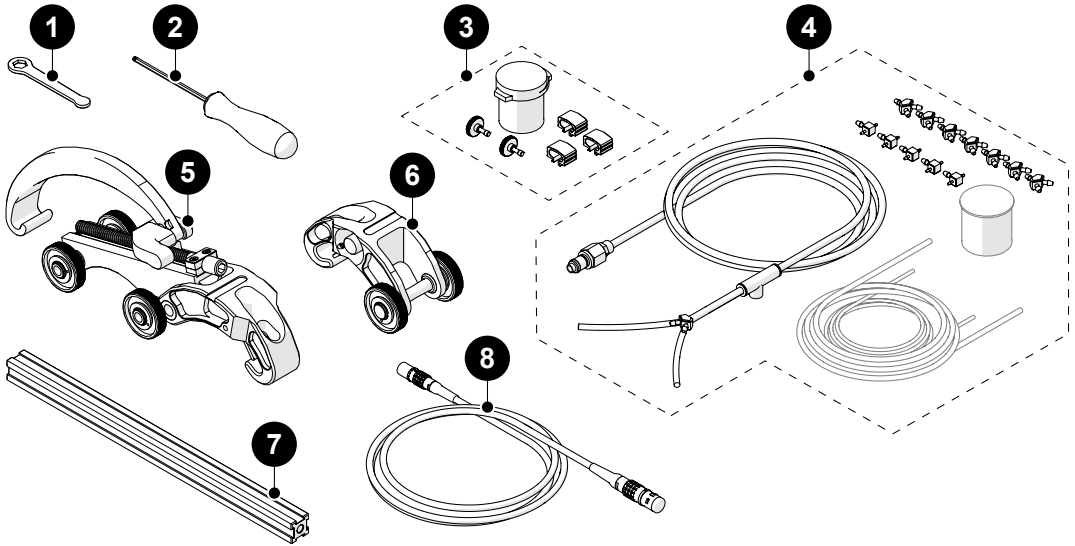


Fig. 101 - High temperature kit contents

Part #	BOM ID	Description
1	EA470	10 mm (3/8 in) wrench
2	EA414	Hex driver, 3 mm (0.118 in)
3	CEG039	ROTIX - Nozzle spare parts kit
4	CMG007	Irrigation kit, 2-4 probe
5	CES108	High temperature QuickLink buckle
6	CES109	High temperature Dovetail QuickLink
7	BG0090_	Frame bar with ruler, 30 cm
8	UMA036_	J400 encoder cable, 5 m (16.4 ft) (see Encoder Connector Type)

10.4.1. 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).

10.4.2. ROTIX Case

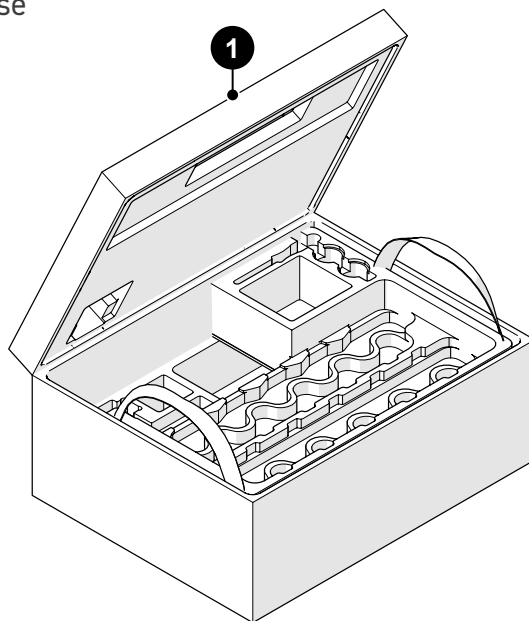
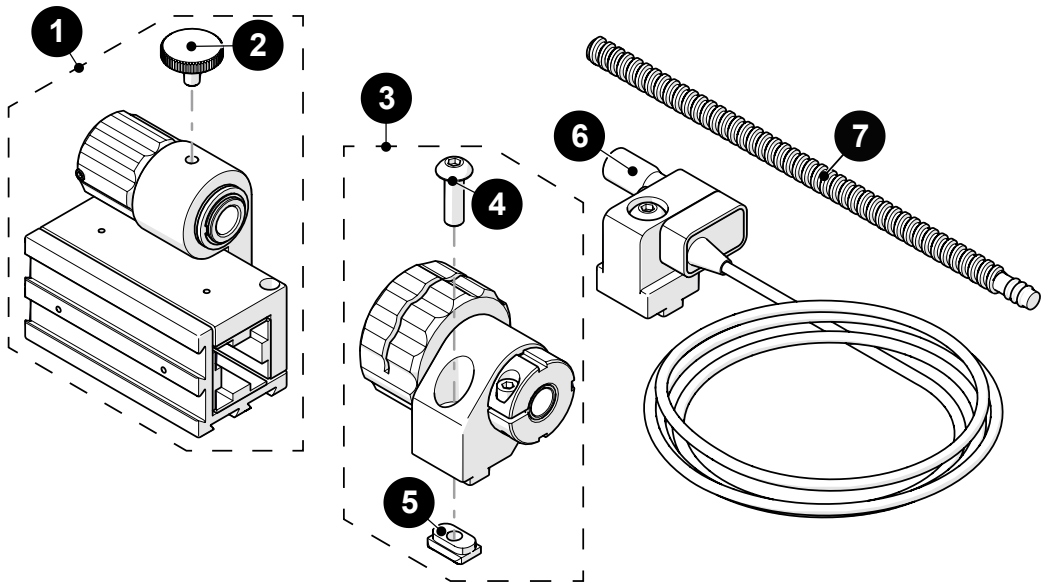


Fig. 102 - ROTIX - nozzle scanner case

Part #	BOM ID	Description
1	CEA039	ROTIX - Nozzle scanner case

10.5. Probe Positioning

10.5.1. 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-__	see <i>Slider PPS Encoded Leadscrew</i>

Fig. 103 - Slider probe positioning system parts

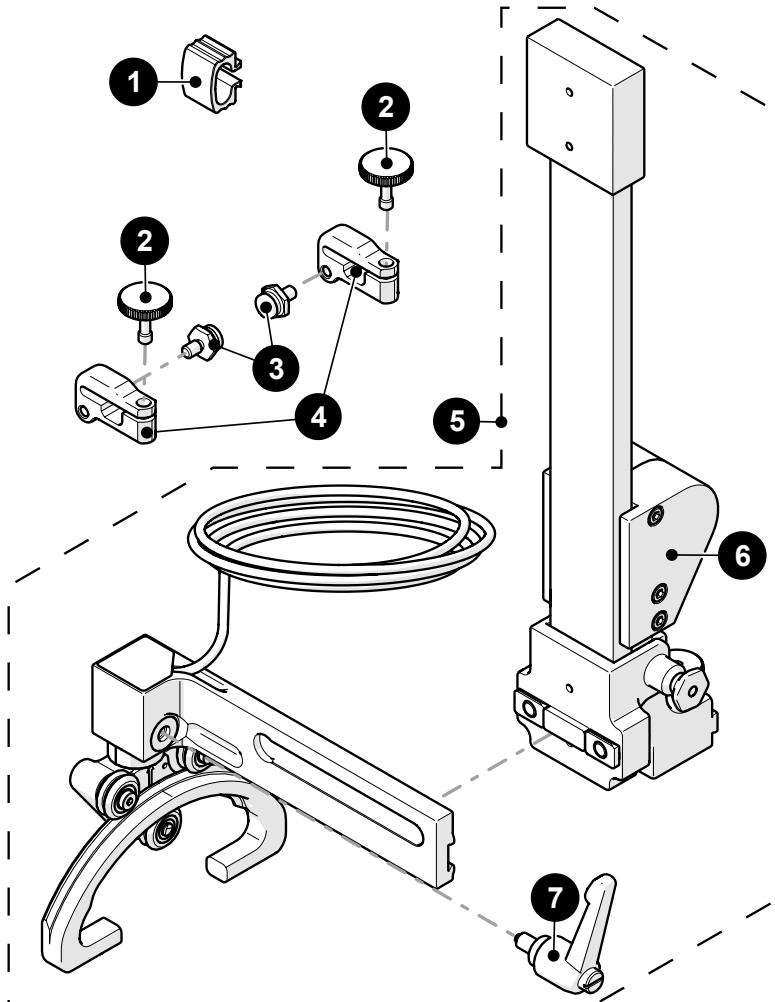
NOTE: Additional leadscrew lengths are available (contact Jireh Industries Ltd. on page 1).

10.5.2. 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. 104 - Slider PPS encoded leadscrew selection

10.6. 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-	<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. 105 - Encoded skew vertical probe holder parts

10.7. Probe Holder Components

10.7.1. 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. 106 - Pivot button selection

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

10.8. Variable Components

10.8.1. Frame Bar with Ruler












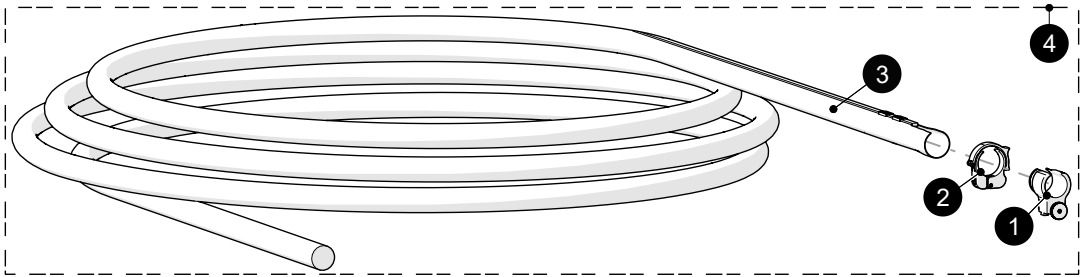
Part #	Length		Part #	Length	
BG0090-05	5 cm (1.97 in)		BG0090-10	10 cm (3.94 in)	
BG0090-15	15 cm (5.91 in)		BG0090-20	20 cm (7.87 in)	
BG0090-25	25 cm (9.84 in)		BG0090-30	30 cm (11.81 in)	
BG0090-35	35 cm (13.78 in)		BG0090-40	40 cm (15.75 in)	
BG0090-45	45 cm (17.72 in)		BG0090-50	50 cm (19.69 in)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

Fig. 107 - Frame bar selection

10.9. Accessories

10.9.1. Cable Management



BOM ID	Part #	Description
1	CES067	Cable Management Mount, Dovetail Mount
2	CES066	Cable Management Clamp, Dovetail Mount
3	<i>See Cable Management Sleeving</i>	
4	CES044- <u> </u>	Cable Management: Dovetail (<i>see cable management sleeving</i>)

Fig. 108 - Cable management

10.9.1.1 Cable Management Sleeving

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

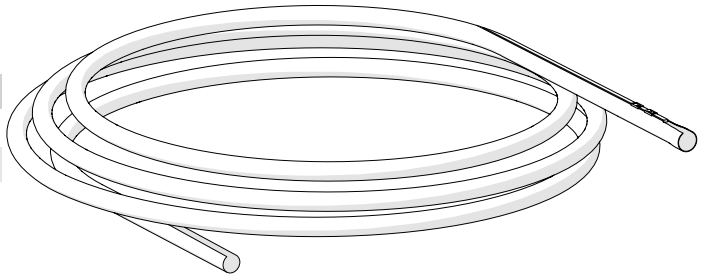
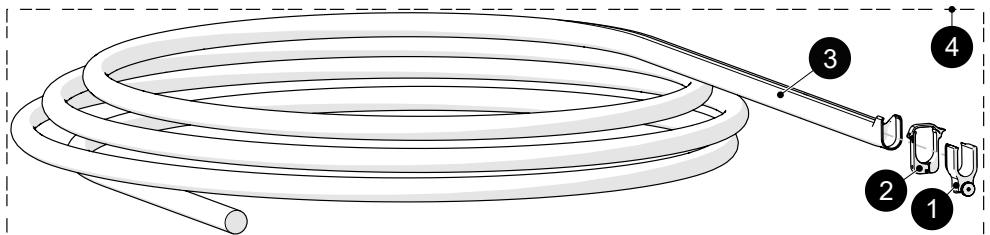


Fig. 109 - Cable management sleeving

10.9.2. High Temperature Cable Management, Dovetail Mount



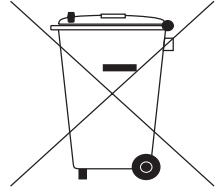
BOM ID	Part #	Description
1	CES090	High Temperature Cable Management Mount
2	CXS114	High Temperature Cable Management Clamp
3	CX0537-04.5	High Temperature Cable Management Sleeving, 4.5 m (14.8 ft)
4	CES089-04.5	High Temperature Cable Management, 4.5 m (14.8 ft)

Fig. 110 - 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.

Jireh Industries Ltd.
53158 Range Road 224
Ardrossan AB T8E 2K4
Canada

Phone: 780-922-4534

jireh.com

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 OD RANGE				QUICKLINKS	DOVETAIL QUICKLINK
MIN (in)	MAX (in)	MIN (mm)	MAX (mm)	EES004	EES019
4.0	5.2	102	132	0	1
5.2	6.6	132	168	1	
6.6	8.0	168	203	2	
7.9	9.3	201	236	3	
9.2	10.5	234	267	4	
10.4	11.7	264	297	5	
11.6	12.8	295	325	6	
12.7	14.0	323	356	7	
13.9	15.1	353	384	8	
15.0	16.2	381	411	9	
16.1	17.4	409	442	10	
17.2	18.6	437	472	11	
18.3	19.6	465	498	12	
19.4	20.6	493	523	13	
20.4	21.7	518	551	14	
21.5	22.8	546	579	15	
22.6	23.9	574	607	16	
23.7	24.9	602	632	17	
HT OD RANGE				HT DOVETAIL QUICKLINK	
MIN (in)	MAX (in)	MIN (mm)	MAX (mm)	CES109	
4.0	5.2	102	132	1	
5.2	6.6	132	168	2	
6.6	8.0	168	203	3	
7.9	9.3	201	236	4	
9.2	10.5	234	267	5	
10.4	11.7	264	297	6	
11.6	12.8	295	325	7	
12.7	14.0	323	356	8	
13.9	15.1	353	384	9	
15.0	16.2	381	411	10	
16.1	17.4	409	442	11	
17.2	18.6	437	472	12	
18.3	19.6	465	498	13	
19.4	20.6	493	523	14	
20.4	21.7	518	551	15	
21.5	22.8	546	579	16	
22.6	23.9	574	607	17	
23.7	24.9	602	632	18	

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Jireh Industries Ltd.
53158 Range Road 224
Ardrossan, Alberta
Canada
T8E 2K4

780-922-4534

jireh.com