



■ ROTIX

CE0120 Rev 05.5
Manual Weld Frame 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! MAGNETIC MATERIAL. The wheels of this device produce a magnetic field which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices or other electronics.



People with pacemakers or ICD's must stay at least 25 cm (10 in) away at all times.



WARNING! Do **NOT** operate scanner in an explosive environment. Do **NOT** operate scanner in the presence of volatile substances.



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 49 for additional details).

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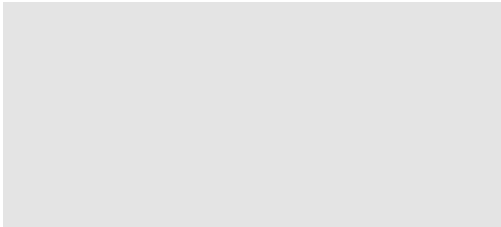
IDENTIFICATION

1.1. Product Brand

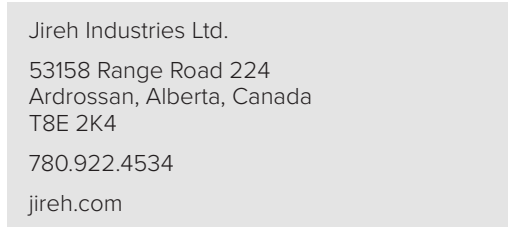
This user manual describes the proper safety precautions, setup and use of the **ROTIX** weld frame scanner.

1.1.1. Manufacturer

Distributor:



Manufacturer:



PRODUCT SPECIFICATIONS

2.1. Intended Use

The **ROTIX** chain scanner is a manually operated scanner which provides encoded probe positions of two or four probes. The double wheel chain components straddle the weld and fasten a scanning frame circumferentially around pipe or tubing.

2.1.1. Operating Limits

	<i>Minimum</i>	<i>Maximum</i>
Pipe/Tube range (2 Probe)	10.1 cm (4 in)	96.5 cm (38 in)
Pipe/Tube range (4 Probe)	11.4 cm (4.5 in)	96.5 cm (38 in)

2.1.2. 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 - 150°C (122°F - 302°F).

2.2. Dimensions and Weight

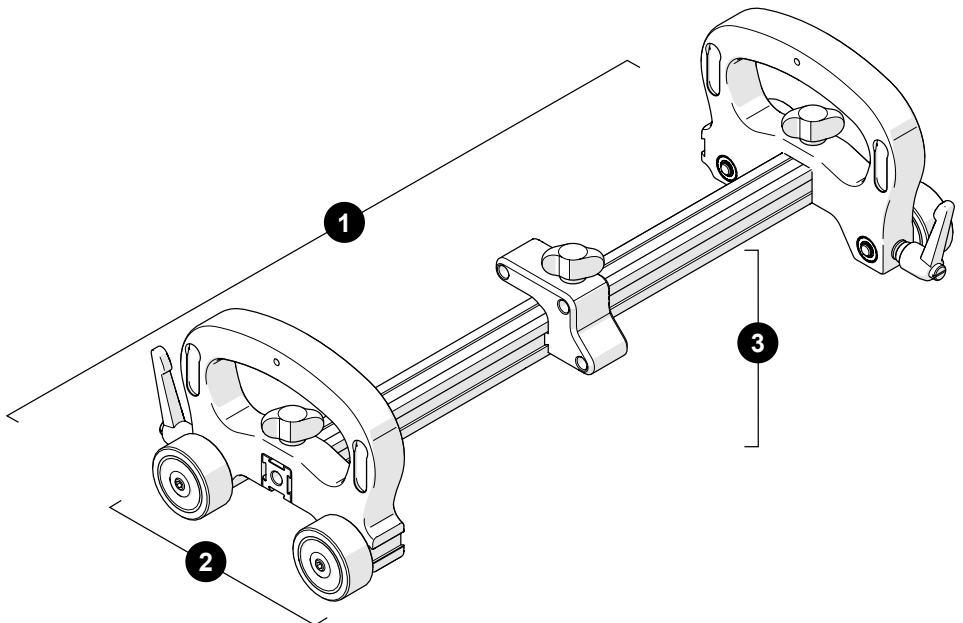


Fig. 1 - Frame dimensions

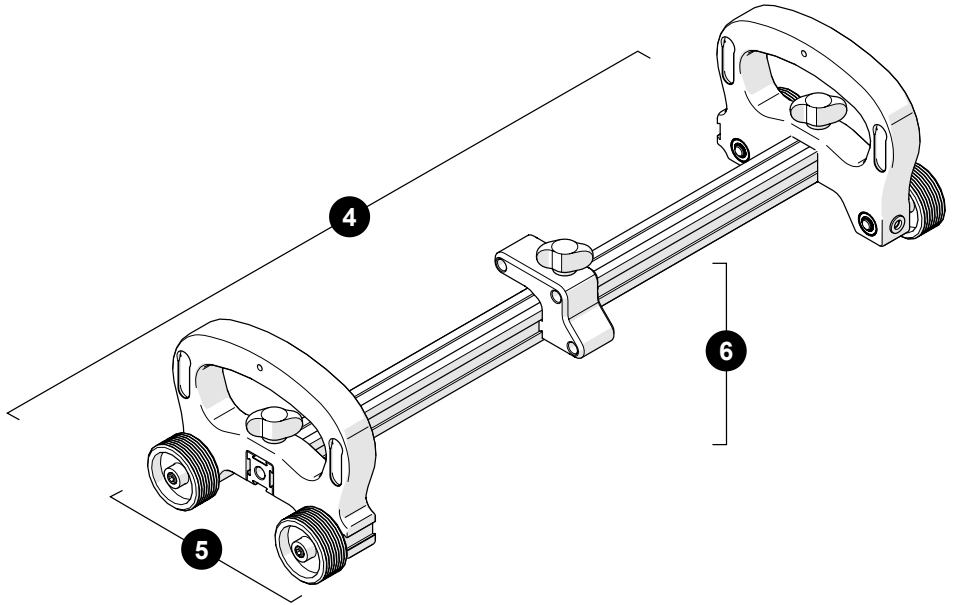


Fig. 2 - High temperature frame dimensions

1:	Frame width (Fig. 1-1):	38.5 cm	(15.2 in)
2:	Frame depth (Fig. 1-2):	17.5 cm	(6.9 in)
3:	Frame height (Fig. 1-3):	10.5 cm	(4.1 in)
4:	HT frame width (Fig. 2-4)	43.5 cm	(17.1 in)
5:	HT frame depth (Fig. 2-5)	12.5 cm	(4.9 in)
6:	HT frame height (Fig. 2-6)	10.5 cm	(4.1 in)
	Encoder cable length	5 m	(16.4 in)

2.3. Environmental Sealing

Watertight (*submersible*) (contact Jireh Industries Ltd. on page 1 for details).

2.4. Performance Specifications

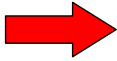
X-Axis encoder resolution	9.05 counts/mm (230.0 counts/in)
High Temperature X-Axis encoder resolution	4.28 counts/mm (108.7 counts/in)

DEFINITIONS

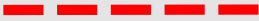
3.1. Definition of Symbols



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



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



Indicates alignment axis.



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

SYSTEM COMPONENTS

4.1. Component Identification

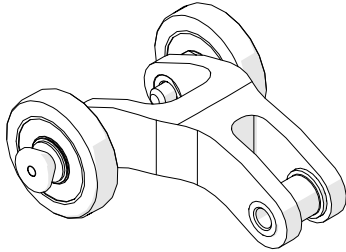


Fig. 3 - Short link
CES033

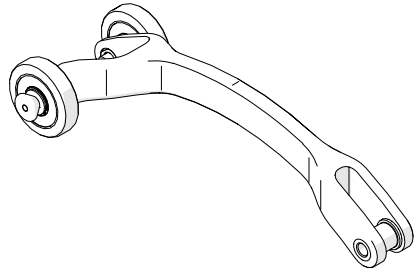


Fig. 4 - Long link
CES034

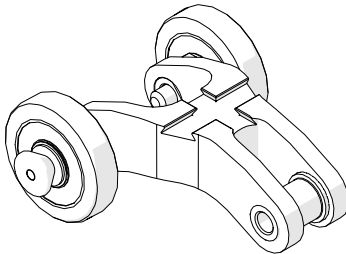


Fig. 5 - Dovetail link
CES040

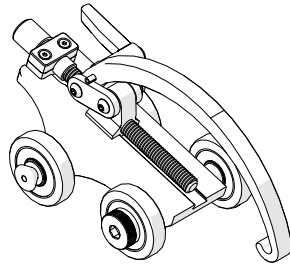


Fig. 6 - Buckle
CES036

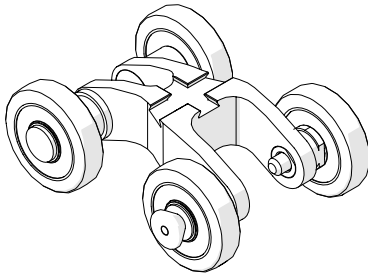


Fig. 7 - Catch link
CES035

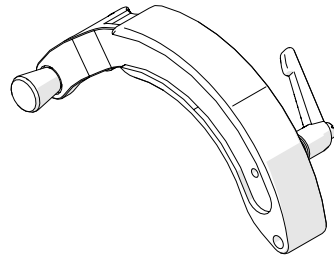


Fig. 8 - Adjustable overtop link
CES031

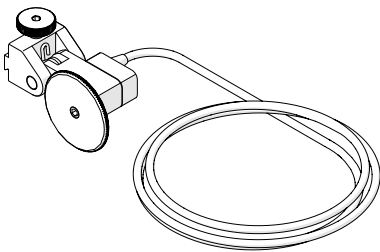


Fig. 9 - Spring-loaded encoder
BGS053-

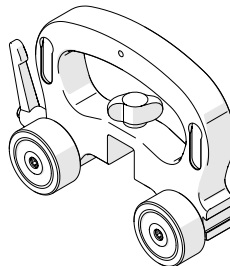


Fig. 10 - Wheel block with handle
CES070

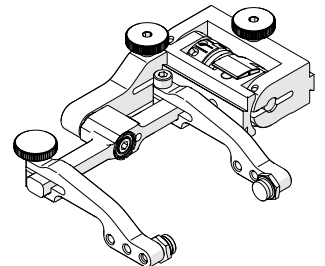


Fig. 11 - Slip joint probe holder
PHA012-

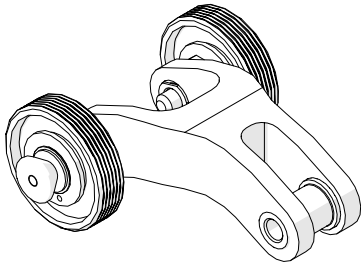


Fig. 12 - High temperature short link
CES074

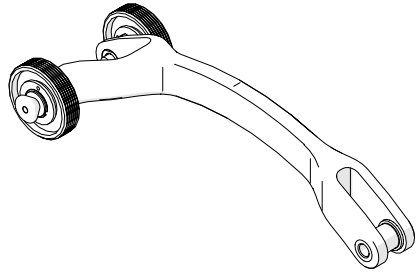


Fig. 13 - High temperature long link
CES075

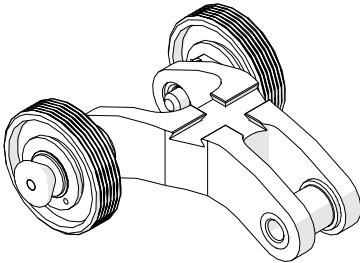


Fig. 14 - High temperature short link
CES076

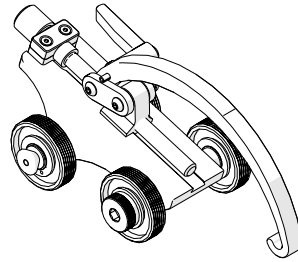


Fig. 15 - High temperature buckle
CES078

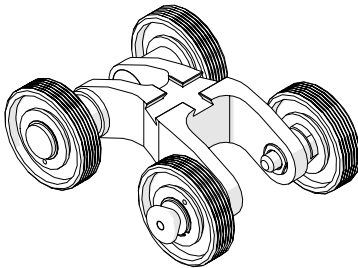


Fig. 16 - High temperature catch link
CES077

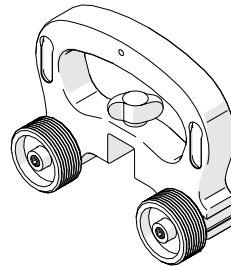


Fig. 17 - High temperature wheel block with handle
CES071

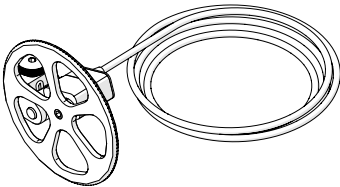


Fig. 18 - High temperature spring-loaded encoder
BGS071-

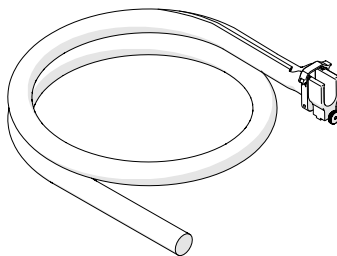


Fig. 19 - High temperature cable management,
dovetail mount
CES089-

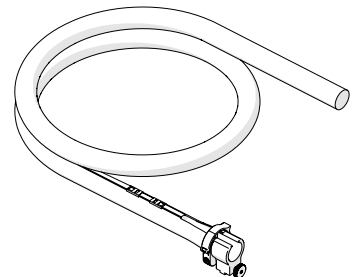


Fig. 20 - Cable management, dovetail mount
CES044-

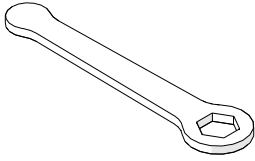


Fig. 21 - 3/8 in wrench
EA470

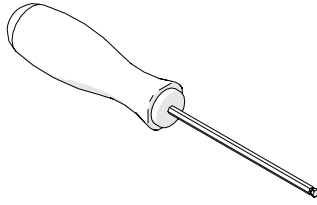


Fig. 22 - 3 mm hex driver
EA414

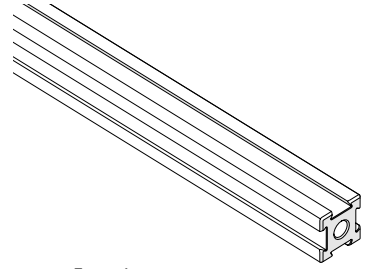


Fig. 23 - Frame bar
BG0038-

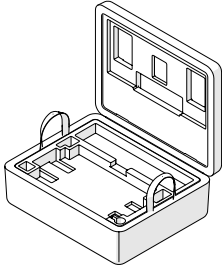


Fig. 24 - ROTIX case
CEA011

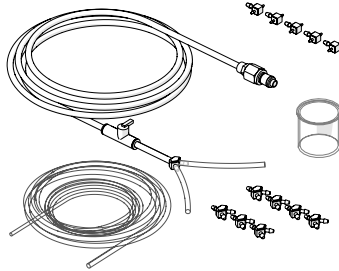


Fig. 25 - Irrigation kit
CMG007

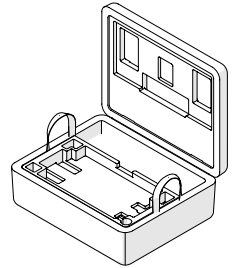


Fig. 26 - ROTIX high temperature case
CEA030

4.2. Tools

4.2.1. Included Tools

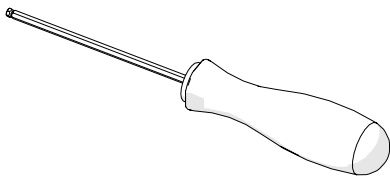


Fig. 27 - 3 mm hex driver

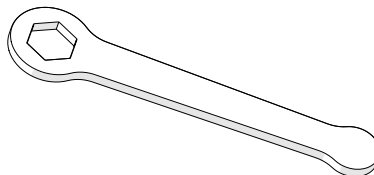


Fig. 28 - 3/8 in wrench

The 3 mm hex driver (*Fig. 27*) is sufficient for all typical operations and adjustments of the **ROTIX**. The 3/8 in wrench (*Fig. 28*) removes and installs pivot buttons on the probe holders.

4.2.2. Optional tools

Some specialized adjustments require tools that are not included in this kit.

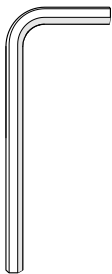


Fig. 29 - 1.5 mm hex wrench

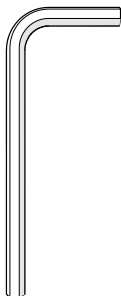


Fig. 30 - 2 mm hex wrench

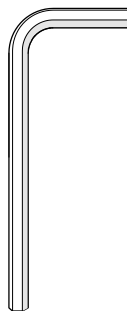


Fig. 31 - 2.5 mm hex wrench

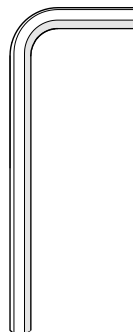


Fig. 32 - 3 mm hex wrench

4.3. Adjustable Overtop Link

The adjustable overtop link provides clearance for probes and wedges.

When low profile scanning is required, the ratchet lever is adjustable.

Loosen the ratchet handle (Fig. 33) and extend or retract the link as required. Tighten the ratchet handle (Fig. 34).

(see Ratchet Lever on page 13)

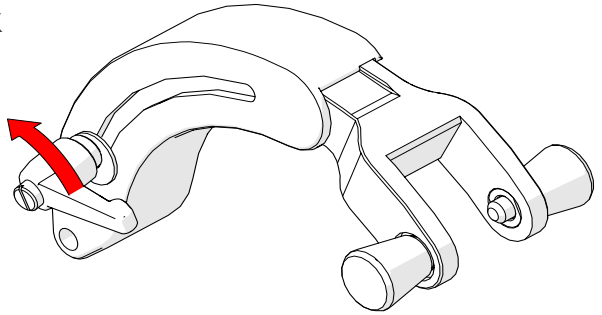


Fig. 33 - Loosen ratchet lever

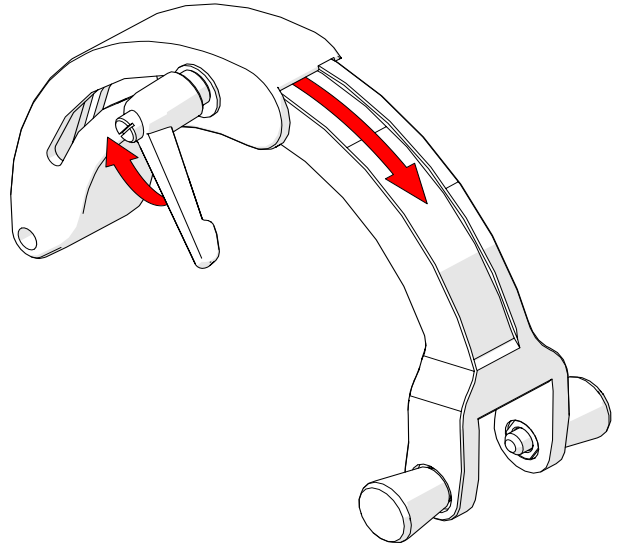


Fig. 34 - Adjust link and tighten ratchet lever

4.4. Wheel Block with Handle

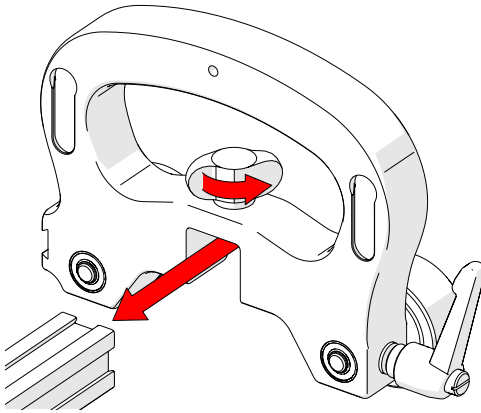


Fig. 35 - Attach to frame bar

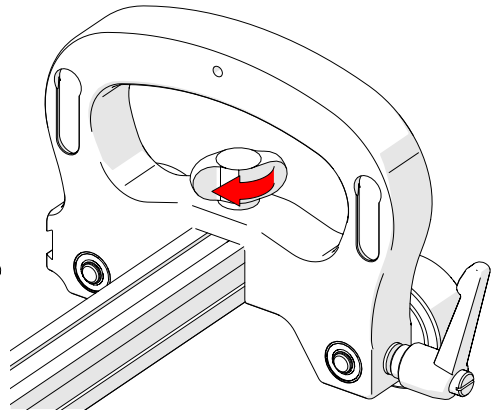


Fig. 36 - Tighten wing knob

The wheel block provides stability and braking to the **ROTIX** system.

The ratchet lever located on the wheel block with handle operates the brake.

Install the wheel block with handle by loosening the black wing knob and sliding the wheel block with handle's dovetail nut onto the frame bar (Fig. 35). Tighten the black wing knob (Fig. 36).

4.4.1. Wheel Removal/Installation

Tightly grip the wheel to be removed by hand. Loosen the wheel from the axle using the supplied 3 mm hex driver (Fig. 27).

TIP: When the brake is engaged, and the scanner is moved, this may loosen the wheels from the axle. Grip the wheel tightly and retighten the axle with the 3 mm hex driver.

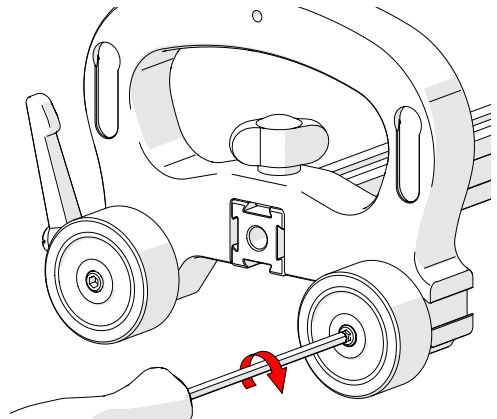


Fig. 37 - Wheel removal/installation

NOTE: The spring-loaded encoder can NOT be mounted to the wheel block with handle when the diameter of the scan surface is less than 30.4 cm (12 in).

4.5. Double Chain Mount

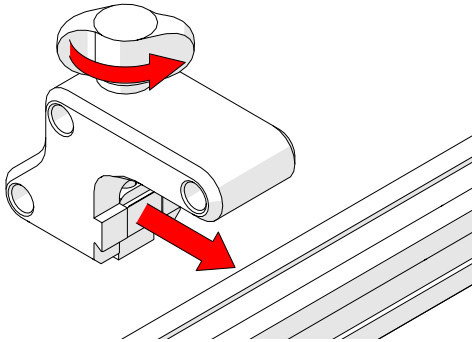


Fig. 38 - Chain mount

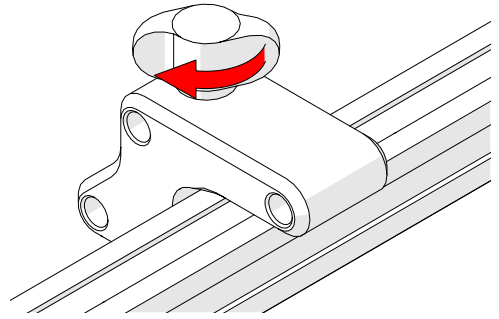


Fig. 39 - Chain mount alignment

The double chain mount provides a connection point for links.

Loosen the double chain mount's dovetail jaw using the black wing knob (Fig. 38). Secure the double chain mount to the frame bar by tightening the black wing knob. (Fig. 39).

The lower hole of the double chain mount is used to connect the chain during two probe scanning. When scanning with four probes (requiring two adjustable overtop links), always connect the adjustable overtop links to the top holes of the double chain mount.

4.6. Cable Clips

Clips have been provided to assist with cable management. Pinch the clip and press it into the dovetail groove of the frame bar.

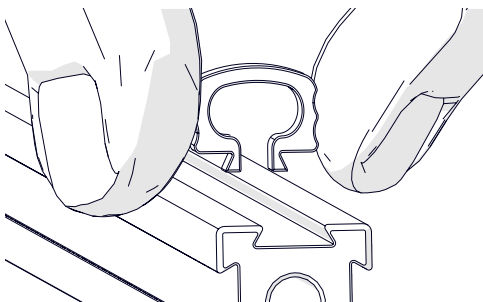


Fig. 40 - Pinch clip

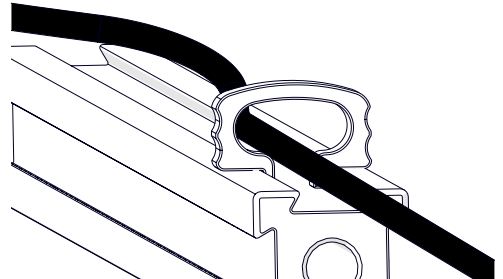


Fig. 41 - Route cables

4.7. Spring-Loaded Encoder

The spring-loaded encoder wheel provides vertical travel while maintaining contact pressure to the scan surface. To install the encoder, follow these steps:

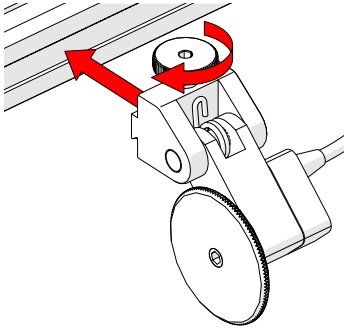


Fig. 42 - Attach to frame bar

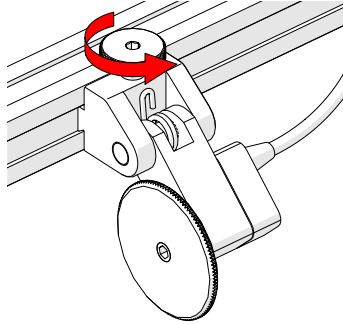


Fig. 43 - Tighten knob

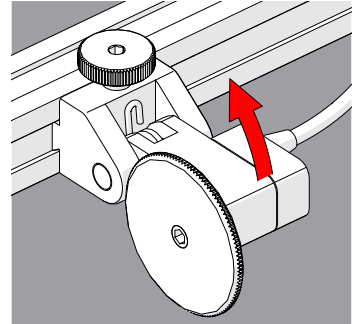


Fig. 44 - Place on scan surface

1. Loosen the encoder's dovetail jaw and mount it to the frame bar (Fig. 42).
2. Tighten the encoder knob (Fig. 43).
3. Spring tension maintains encoder contact with the scan surface (Fig. 44).

NOTE: The spring-loaded encoder can NOT be mounted to the wheel block with handle when the diameter of the scan surface is less than 30.4 cm (12 in).

4.8. Frame Bar

Frame bars (Fig. 45) are used to mount probe holders, probe positioning systems and other accessories (see *Frame Bars* on page 48).

Frame bars are available in a variety of lengths.

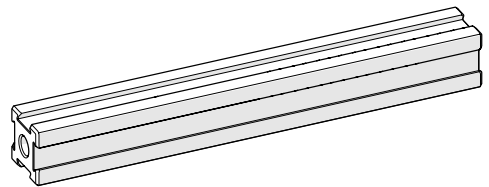


Fig. 45 - Frame bar

4.9. Pivot Buttons

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

Use the supplied 3/8 in wrench (Fig. 28) to remove and install pivot buttons (Fig. 46).

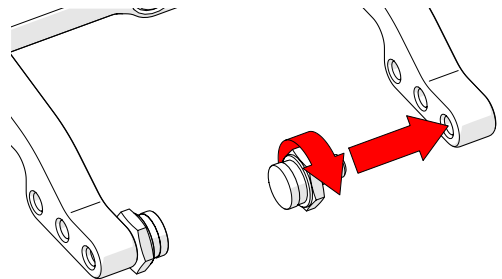


Fig. 46 - Pivot buttons

4.10. Chain Connection

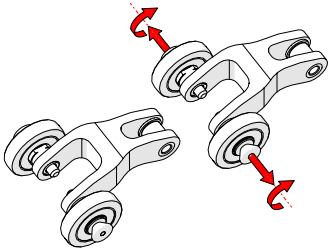


Fig. 47 - Pull out and twist pins

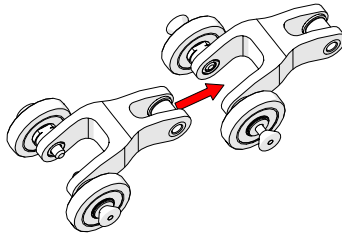


Fig. 48 - Align mounting holes

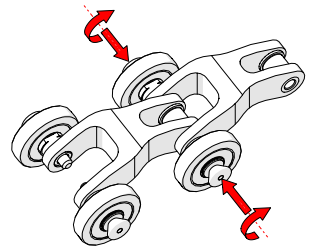


Fig. 49 - Release pins

To connect chain components, see the following steps:

1. Pull the pins out from the wheels and twist a quarter turn latching the pins in a retracted state (Fig. 47).
2. Align the pins with the mounting holes of the component to be connected (Fig. 48).
3. Twist the pins until they unlatch and extend into the hole of the connected component (Fig. 49).

4.11. Ratchet Lever

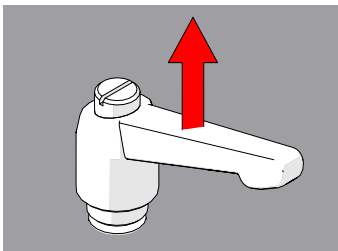


Fig. 50 - Pull ratchet handle

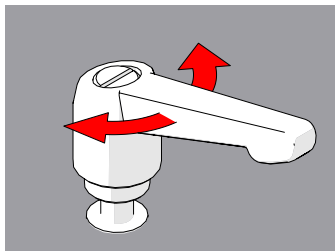


Fig. 51 - Rotate handle

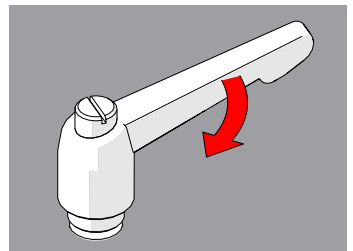
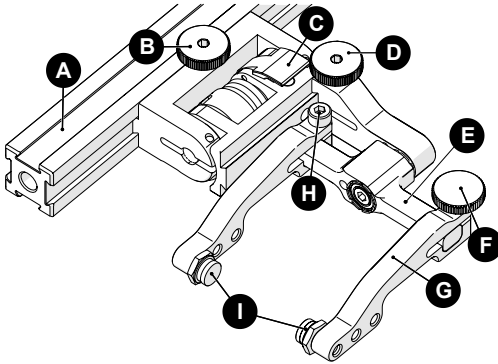


Fig. 52 - Tighten handle

The ratchet levers are used for various locking and braking 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. 50).
2. Continue to pull while rotating the lever in the appropriate direction (Fig. 51).
3. Release the lever and utilize the new tightening position.

4.12. Slip Joint Probe Holder



A	Frame Bar
B	Probe Holder Adjustment Knob
C	Latch
D	Swing Arm Knob
E	Yoke
F	Probe Holder Arm Adjustment Knob
G	Probe Holder Arm
H	Arm Clamp Screw
I	Pivot Buttons

Fig. 53 - Slip Joint Probe Holder

4.12.1. Probe Holder Setup

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

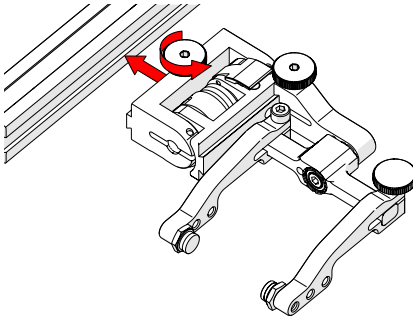


Fig. 54 - Attach to frame bar

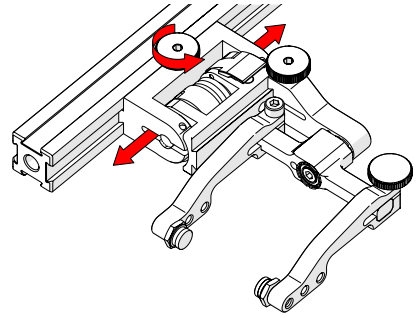


Fig. 55 - Adjust on frame bar

1. Rotate the probe holder adjustment knob and attach the probe holder to a frame bar (Fig. 54).
2. Use the probe holder adjustment knob to position the probe holder along the frame bar (Fig. 55).

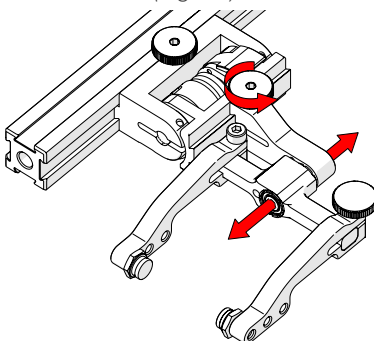


Fig. 56 - Adjust swing arm

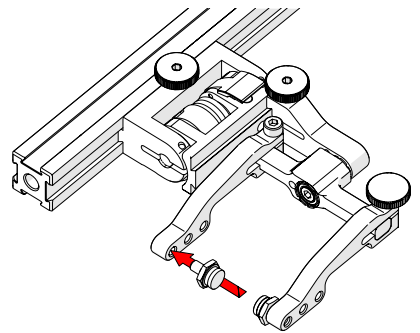


Fig. 57 - Place pivot buttons

3. Use the swing arm knob to position the swing arm (Fig. 56).

TIP: The swing arm is typically used to adjust TOFD center-to-center distance relative to the phased array probes on a four probe configuration (Fig. 119).

4. Using the supplied 3/8 in wrench (Fig. 28), place the pivot buttons as required (Fig. 57).

TIP: If narrow scanning footprint is required, use pivot button holes closest to the yoke. Wedge pivoting may be impeded when closer to the yoke.

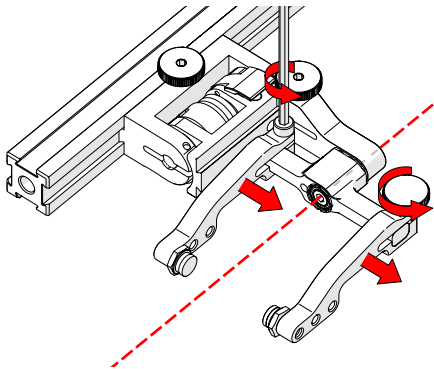


Fig. 58 - Adjust probe holder arms

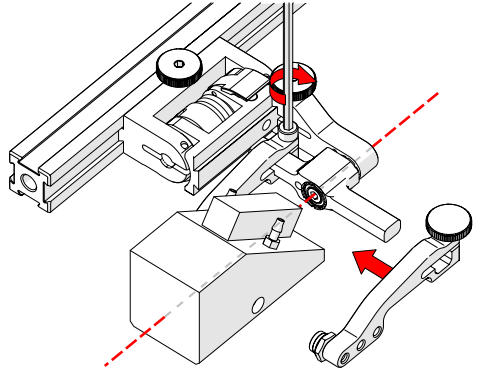


Fig. 59 - Place wedge

5. Loosen the probe holder arm adjustment knob (Fig. 58) and remove the outer probe holder arm from yoke.
6. Adjust the inner probe holder arm as required to best centre the probe on the yoke's pivot axis (Fig. 58).

TIP: The probe holder yoke can accommodate many different probe and wedge sizes of varying widths. When scanning, it is best to centre the wedge with the yoke's pivot axis to reduce wedge tipping. Position the inner probe holder arm accordingly with the centre of the yoke (Fig. 58).

7. Position the wedge on the inner probe holder arm (Fig. 59).
8. Slide the outer probe holder arm along the yoke pinching the wedge in place.
9. Tighten the probe holder arm adjustment knob (Fig. 60).

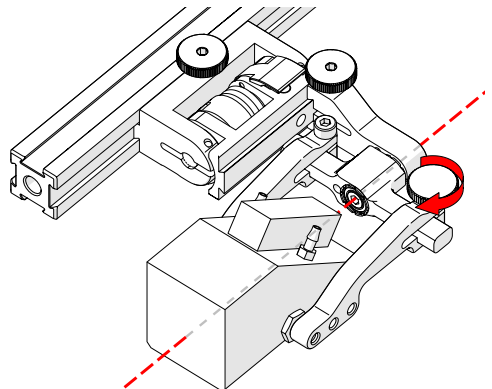


Fig. 60 - Pinch wedge with arm

4.12.2. Probe Holder Adjustment

To adjust the probe holder, follow these steps:

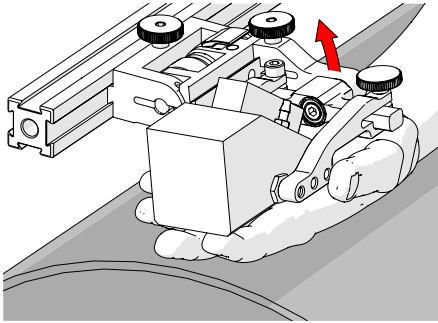


Fig. 61 - Lift to latched position

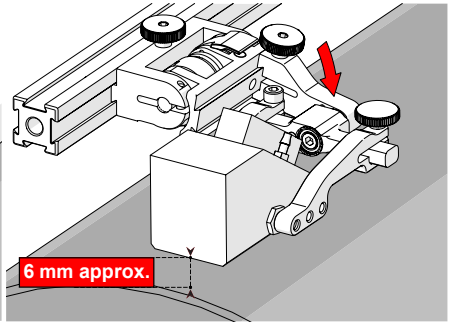


Fig. 62 - Lower to scanning surface

1. Ensure the probe holder is in the latched, upper position (Fig. 61). If the probe holder is already latched, it will only move within the slip joint adjustment range and have no spring tension.
2. Push the probe holder yoke down toward the inspection surface until the wedge is approximately 6 mm (¼ in) above the inspection surface (Fig. 62).

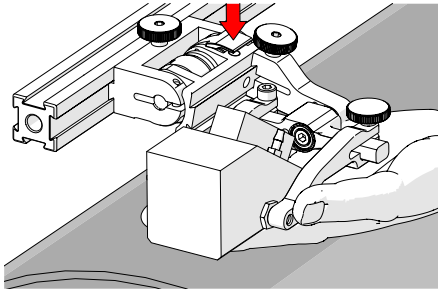


Fig. 63 - Lift and press latch button

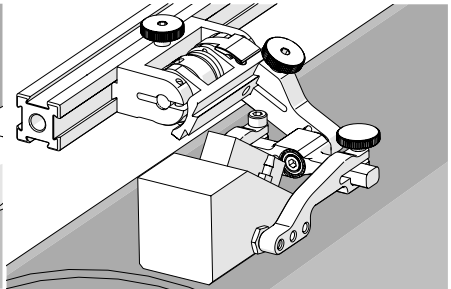


Fig. 64 - Spring-loaded scan position

3. Lift the probe slightly and press the latch button (Fig. 63) to apply spring pressure to the wedge.
4. Gently lower probe holder and wedge to the scanning surface (Fig. 64).

4.12.3. Probe Holder Force Adjustment

It is possible to adjust the tension of the probe holder spring.

NOTE: The 2 mm hex wrench (Fig. 30) and 3 mm hex wrench (Fig. 32) are required to perform this operation.

Light	1 kg	2 lb
Medium	2 kg	4 lb
Heavy	3 kg	6 lb

When configured correctly, these settings exert the indicated spring force on the Probe.

To adjust the probe holder's force, follow these steps:

NOTE: Do not perform this operation on a scanning surface.

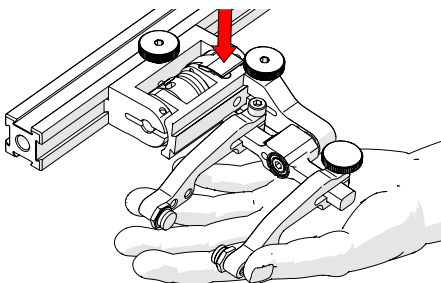


Fig. 65 - Lift slightly and press latch

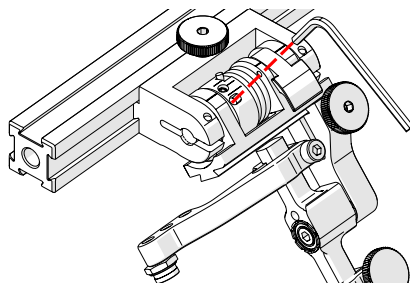


Fig. 66 - Unlatched position

1. Ensure the probe holder is in the upright latched position (Fig. 61).
2. Lift the probe holder slightly and press the latch button (Fig. 65) to release the probe holder to the full 45° degrees.
3. Insert the short arm of a 3 mm hex wrench into the 3 mm slot (Fig. 66).

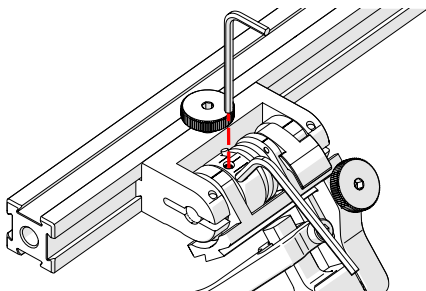


Fig. 67 - Insert hex wrenches

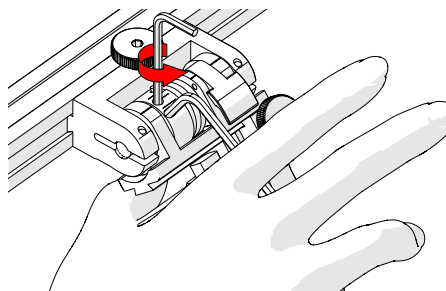


Fig. 68 - Press 3 mm hex wrench down

4. Place the 2 mm hex wrench into the force adjustment screw (Fig. 67).
5. Lightly press the long leg of the 3 mm hex wrench down. Using the 2 mm hex wrench, loosen the force adjustment screw but do not remove it (Fig. 68).
6. Gently apply pressure on the long leg of the 3 mm hex wrench until the force adjustment marker lines up with the desired spring tension. While keeping the markers in line, tighten the force adjustment screw (Fig. 69).

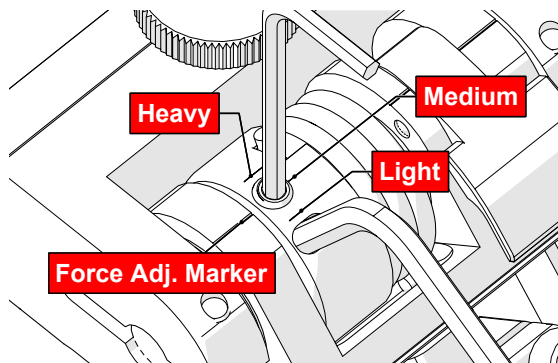


Fig. 69 - Choose desired tension

4.12.4. Slip Joint Probe Holder Left/Right Conversion

To reverse the probe holder, follow these steps:

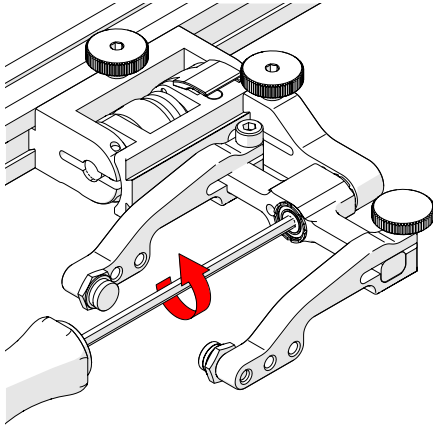


Fig. 70 - Unscrew yoke pivot screw

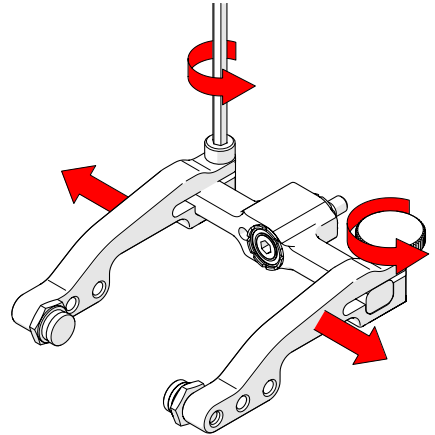


Fig. 71 - Remove arms

1. Unscrew the yoke from the swing arm (Fig. 70).
2. Loosen the probe holder arm adjustment knob and arm clamp screw. Slide the arms from the yoke (Fig. 71).

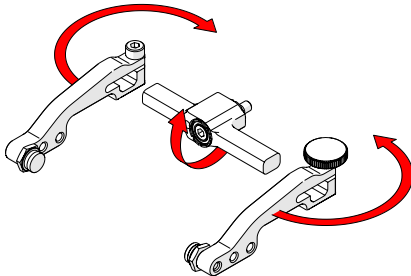


Fig. 72 - Flip yoke and reverse arms

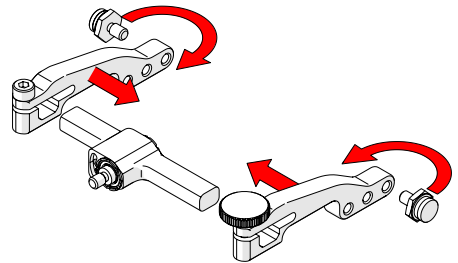


Fig. 73 - Attach arms and move buttons

3. Flip the yoke 180° and reverse the probe holder arms (Fig. 72).
4. Place the pivot buttons on the inside of the probe holder arms (Fig. 73) using a 3/8 in wrench (Fig. 28). Slide the arms onto the yoke and tighten the probe holder arm adjustment knob and the arm clamp screw.

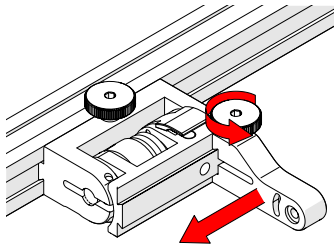


Fig. 74 - Position swing arm

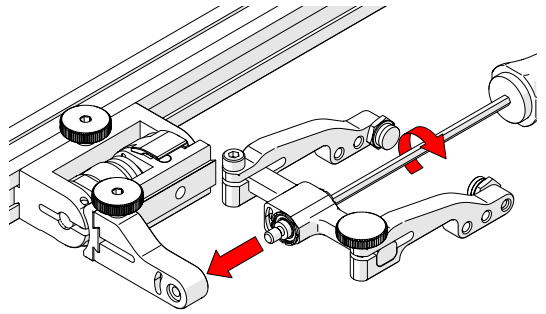


Fig. 75 - Install yoke to swing arm

5. Loosen the swing arm knob and slide the swing arm to the opposite end of the probe holder bracket (Fig. 74) or the preferred position. Tighten the swing arm knob.
6. Using the 3 mm hex driver, screw the yoke pivot screw into the opposite side of the probe holder swing arm (Fig. 75). Ensure the yoke is level to avoid issues with the plunger/set screw.

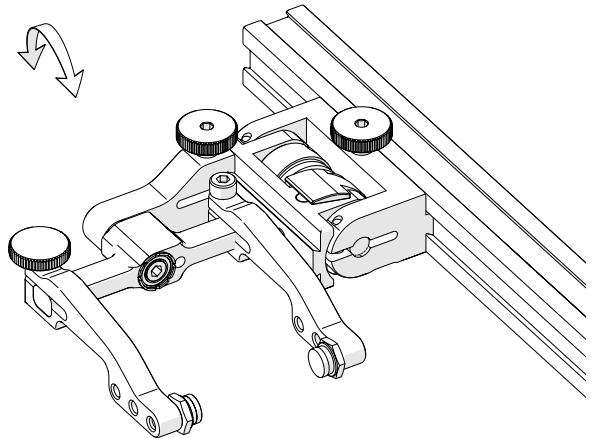


Fig. 76 - Reversed probe holder

4.13. Cable Management System

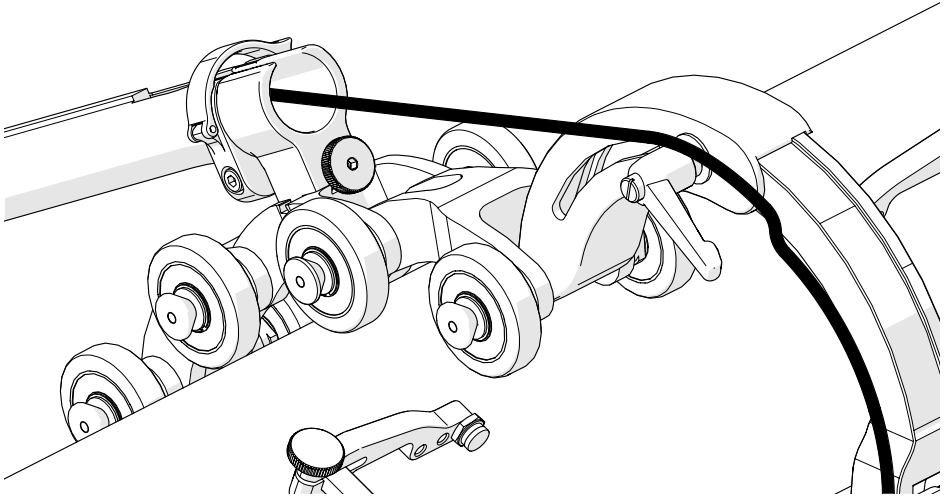


Fig. 77 - Cable management

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

4.13.1. Cable Management Dovetail Mount

To attach the cable management, follow these steps:

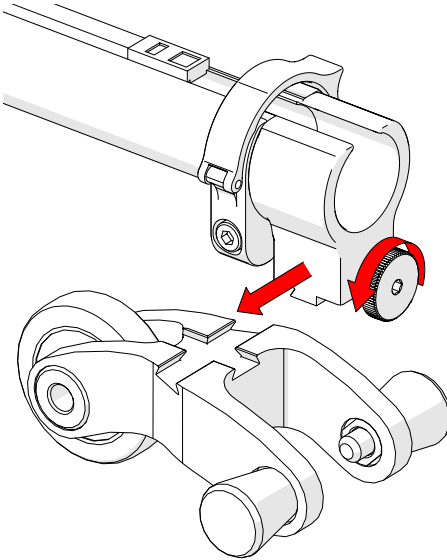


Fig. 78 - Loosen and slide on

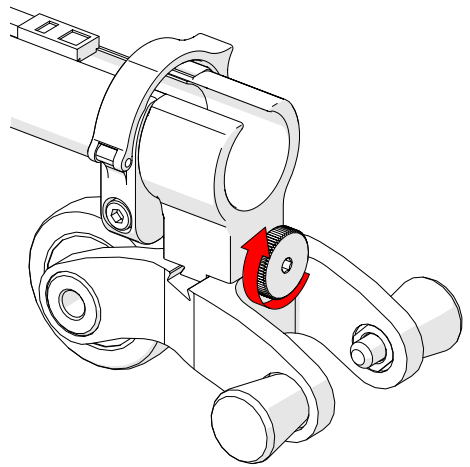


Fig. 79 - Tighten knob

1. Loosen the knob on the cable management dovetail mount. Slide the mount onto the dovetail link (*Fig. 78*).
2. Once centred on the dovetail link, tighten the cable management's dovetail mount knob (*Fig. 79*).

4.13.2. Cable Management Setup

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

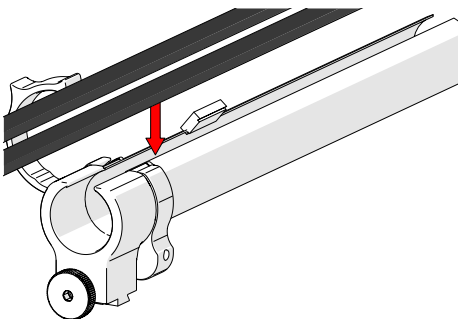


Fig. 80 - Insert cables and hoses

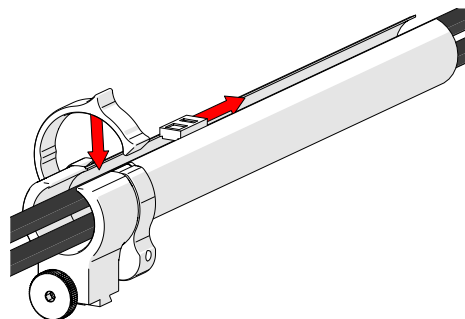


Fig. 81 - Zip up to close

1. Open the cable management. Begin at the tube's dovetail mount and place the cabling in the tube (*Fig. 80*).
2. Follow the cable placement, zipping the tube closed (*Fig. 81*).

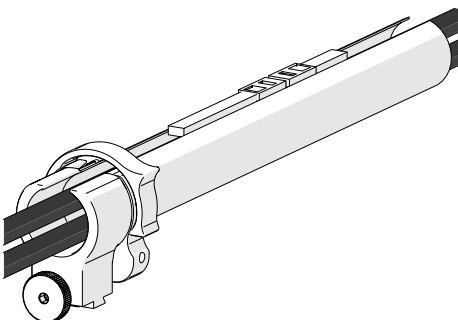


Fig. 82 - Zip opposite end

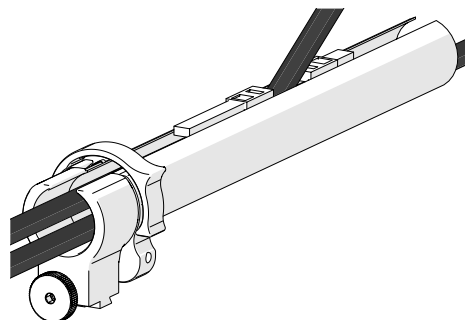


Fig. 83 - Flexibility

3. Once the cable is placed the entire length of the tube, bring the zipper from the tube's opposite end, meeting at any point in the middle (*Fig. 82*).
4. When necessary, the two zippers may be opened to allow cables to exit the tube anywhere between the ends (*Fig. 83*).

4.13.3. Clamp Setup

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

1. Loosen the clamp screw using the supplied 3 mm hex driver.
2. Slide the clamp around the tube first and then slide the tube around the outside of the cable management dovetail mount (Fig. 84). Align the zipper opening and the cable management dovetail mount opening.
3. Slide the clamp over the tube and cable management dovetail mount, pinching the tube in between (Fig. 85).
4. Tighten the clamp screw (Fig. 86).

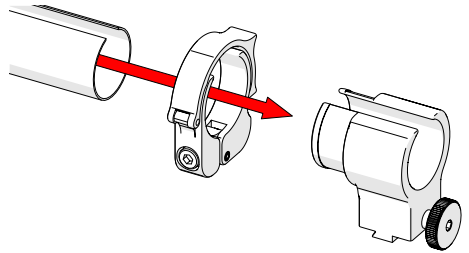


Fig. 84 - Slide tube around mount

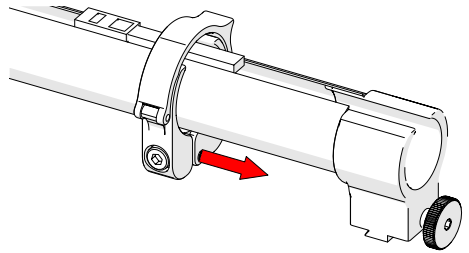


Fig. 85 - Slide clamp onto mount

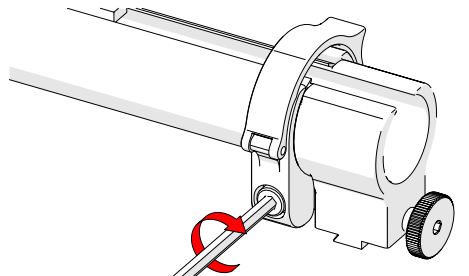


Fig. 86 - Tighten clamp screw

4.14. Reduced Width Scanning Kit

The encoded probe holding link houses the primary encoder and provides a mounting base for probe holders.

To mount/adjust the frame bar, loosen the bar adjustment knobs, insert the frame bar, slide to desired placement, then tighten the frame bar adjustment knobs.

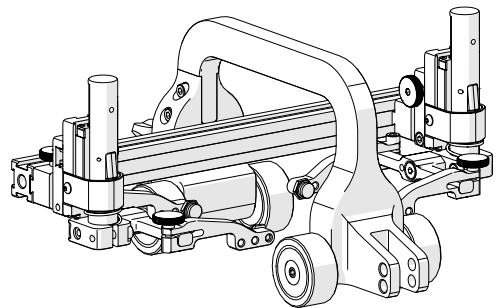


Fig. 87 - Reduced width scanning kit

4.15. Vertical Probe Holder

- A Latch
- B Probe Holder Adjustment Knob
- C Vertical Adjustment Knob
- D Pivot Buttons
- E Probe Holder Arms
- F Yoke
- G Probe Holder Arm Adjustment Knob
- H Transverse Adjustment Screw
- I Frame Bar

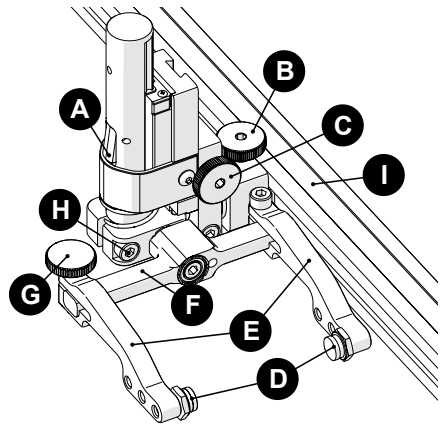


Fig. 88 - Vertical probe holder

4.15.1. Probe Holder Setup

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

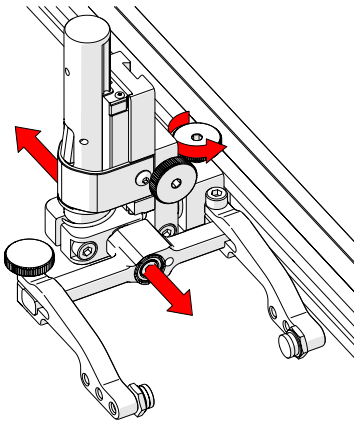


Fig. 89 - Adjust on frame bar

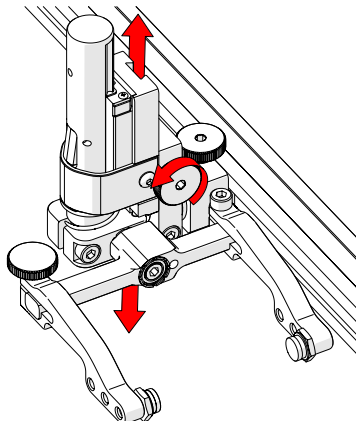


Fig. 90 - Vertical adjustment

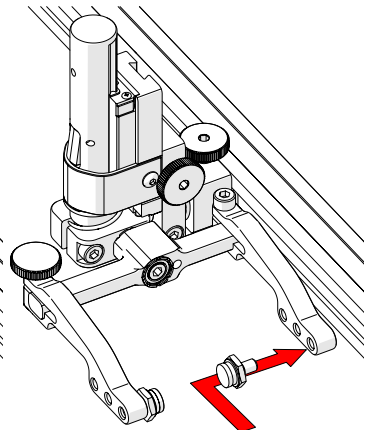


Fig. 91 - Place buttons

1. The probe holder adjustment knob allows the probe holder to be attached to a frame bar, as well as horizontal positioning on a frame bar (Fig. 89).
2. The vertical adjustment knob allows the vertical probe holder height adjustment (Fig. 90).
3. Position the pivot buttons where necessary. When narrow scanning footprint is required, use the pivot button holes closest to the yoke (Fig. 91).

TIP: Probe pivoting may be impeded when closer to the yoke.

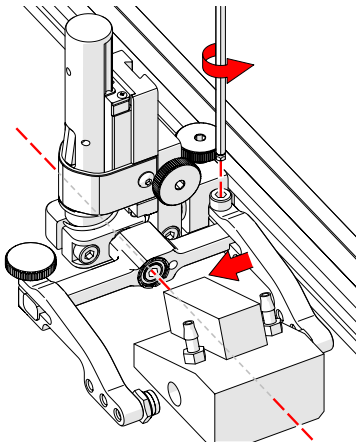


Fig. 92 - Adjust inner arm

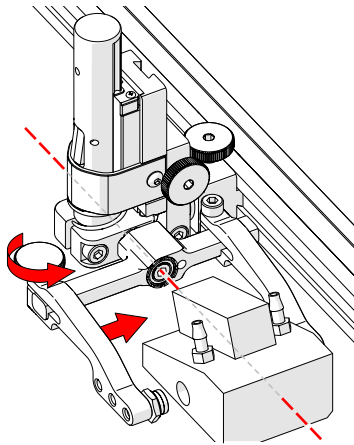


Fig. 93 - Adjust outer arm

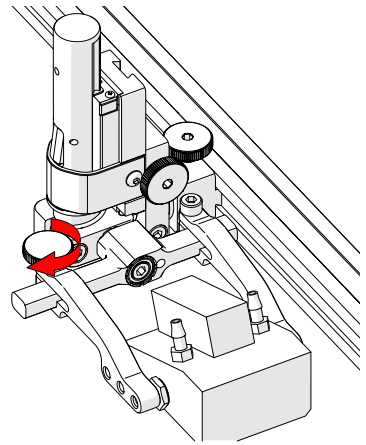


Fig. 94 - Tighten arm knob

4. Position the wedge on the inner probe holder arm.

TIP: The probe holder yoke can accommodate many different probe and wedge sizes of varying widths. It is best to centre the wedge with the yoke's pivot axis. This can reduce wedge tipping when scanning. Position the inner probe holder arm accordingly (Fig. 92) using the supplied 3 mm hex driver (Fig. 27).

5. Loosen the probe holder arm adjustment knob (Fig. 93) and slide the probe holder arm along the yoke pinching the wedge in place.
6. Tighten the probe holder arm adjustment knob (Fig. 94).

4.15.2. Probe Holder Vertical Adjustment

To adjust the probe holder vertically, follow these steps:

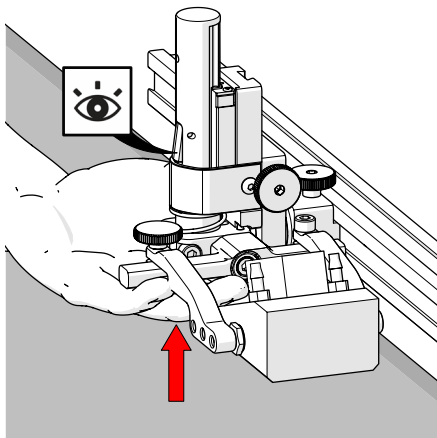


Fig. 95 - Latch probe holder

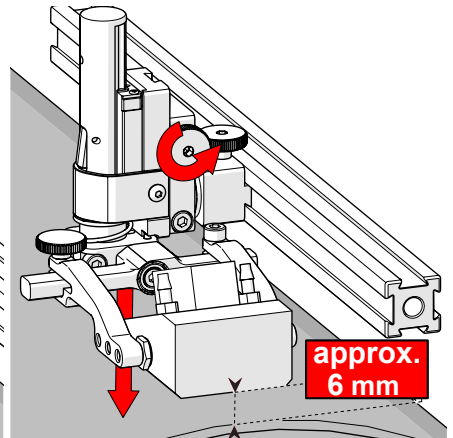


Fig. 96 - Lower toward scan surface

1. Ensure the probe holder is in the the latched, upper position. Lift the probe holder until the latch is fully exposed and snaps out to lock (Fig. 95).
2. Loosen the vertical adjustment knob and slide the probe holder down until the wedge is approximately 6 mm (¼ in) above inspection surface (Fig. 96).
3. Tighten the vertical adjustment knob (Fig. 96).

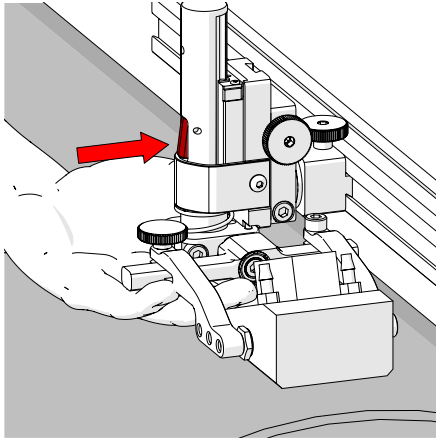


Fig. 97 - Press latch button

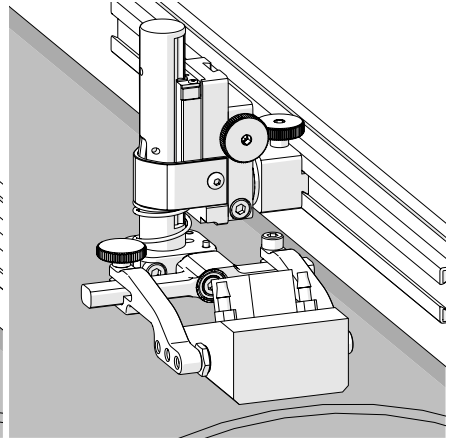


Fig. 98 - Lower toward scan surface

4. Lift the yoke slightly and press the latch button (Fig. 97), then slowly lower towards scanning surface to apply spring pressure to the wedge (Fig. 98).

TIP: If less spring force is desired, refer to step 2 and place the wedge approximately 20 mm (¾ in) above the inspection surface.

4.15.3. Probe Holder Transverse Adjustment

To adjust the probe holder's transverse angle, follow these steps:

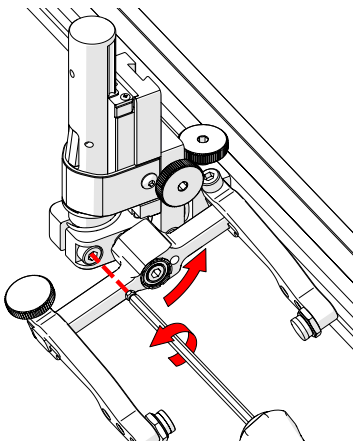


Fig. 99 - Loosen 3 mm screw

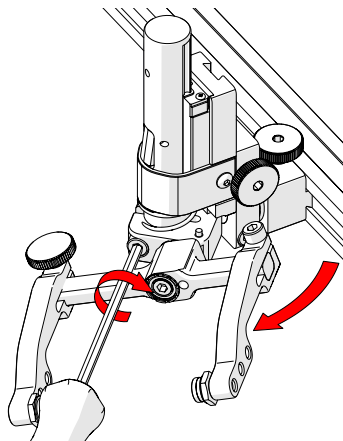


Fig. 100 - Rotate and tighten

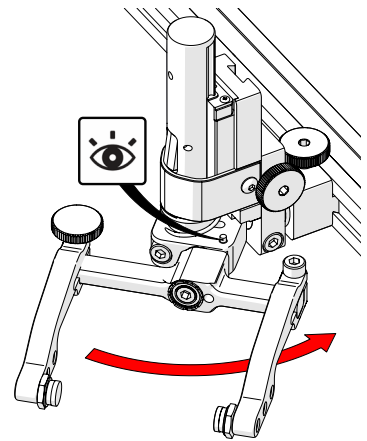


Fig. 101 - Stop post locates 90°

1. Ensure the probe holder is in latched upper position (*Fig. 95*).
2. Using the supplied 3 mm hex driver loosen the transverse adjustment screw (*Fig. 99*) and rotate the yoke about the vertical shaft achieving the desired angle.
3. Tighten the transverse adjustment screw (*Fig. 100*).

To return the transverse adjustment to neutral (90°). The probe holder must be in the latched, upper position (*Fig. 95*). Rotate the yoke until the stop post contacts the base of the probe holder (*Fig. 101*). Then tighten the transverse adjustment screw.

4.15.4. Probe Holder Longitudinal Adjustment

To adjust the probe holder's vertical angle for longitudinal scanning, follow these steps:

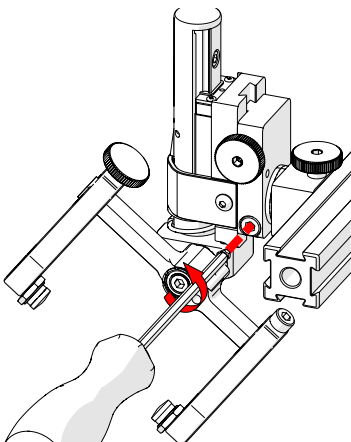


Fig. 102 - Loosen 3 mm screw

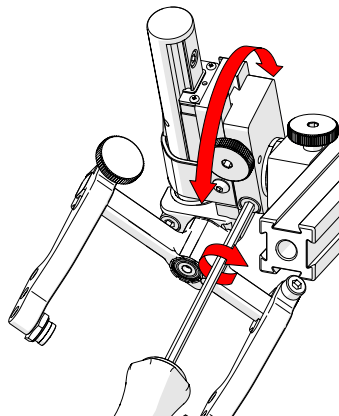


Fig. 103 - Rotate to position

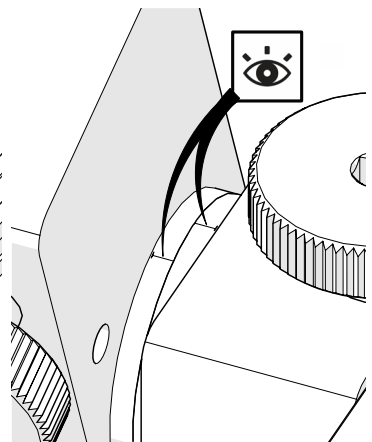


Fig. 104 - Line up markers

1. Ensure the probe holder is in latched, upper position (*Fig. 95*).
2. Using the supplied 3 mm hex driver (*Fig. 27*), loosen the longitudinal adjustment screw (*Fig. 102*).
3. Rotate the main body of the probe holder until it is at the desired angle.
4. Tighten the longitudinal adjustment screw (*Fig. 103*).
5. To return the longitudinal adjustment to neutral (90°). Line up the longitudinal adjustment indicator markers (*Fig. 104*).

4.15.5. Probe Holder Left/Right Conversion

To reverse the probe holder, follow these steps:

NOTE: To perform this operation, the 1.5 mm hex wrench (Fig. 29) is required.

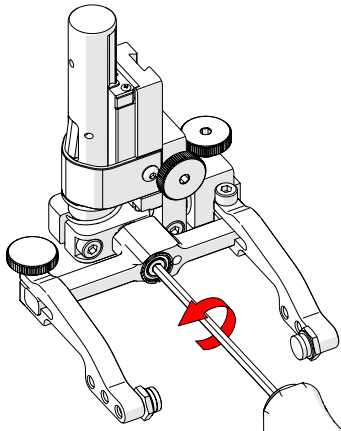


Fig. 105 - Unscrew yoke pivot screw

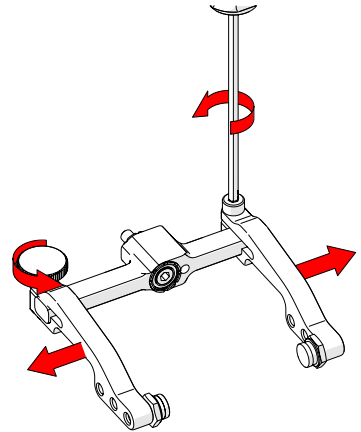


Fig. 106 - Remove probe holder arms

1. Ensure the probe holder is in latched, upper position (Fig. 95).
2. Using the supplied 3 mm hex driver (Fig. 27), unscrew the yoke pivot screw and remove the yoke (Fig. 105).
3. Loosen the probe holder arm adjustment knob and the arm clamp screw. Slide the probe holder arms off the yoke (Fig. 106).

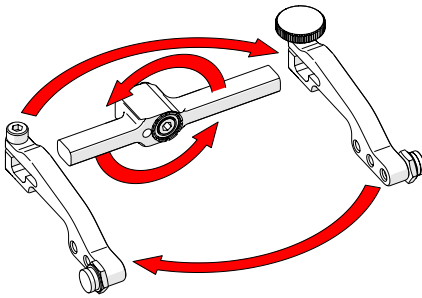


Fig. 107 - Flip yoke and reverse arms

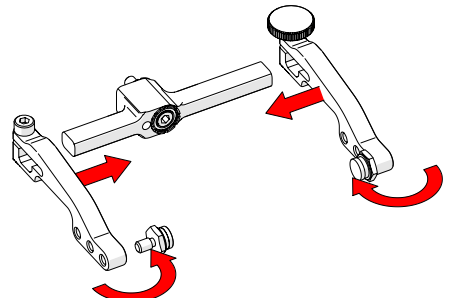


Fig. 108 - Attach arms & move buttons

4. Flip the yoke 180° and swap the probe holder arms (Fig. 107).
5. Place the pivot buttons on the inside of the probe holder arms (Fig. 108) using a 3/8 in wrench (Fig. 28).

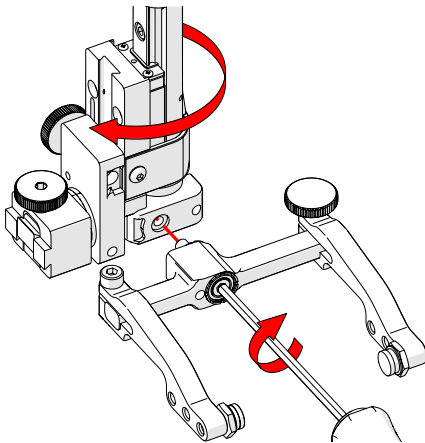


Fig. 109 - Screw yoke to opposite side

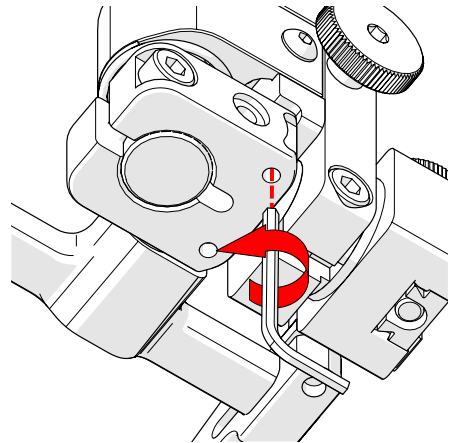


Fig. 110 - Lower 90° stop post

6. Mount the yoke to the opposite side of the base using the supplied 3 mm hex driver (Fig. 109).

TIP: Keep the yoke level with the base to ensure no conflicts with the plunger/set screw attached to the yoke.

7. Locate the recessed M3 screw (stop post) on the bottom of the probe holder. Unscrew the stop post using a 1.5 mm hex wrench until it has cleared all obstructions. Do not remove the stop post (Fig. 110).

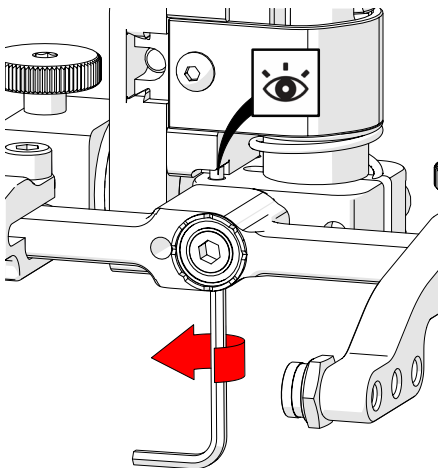


Fig. 111 - Raise opposite 90° stop post

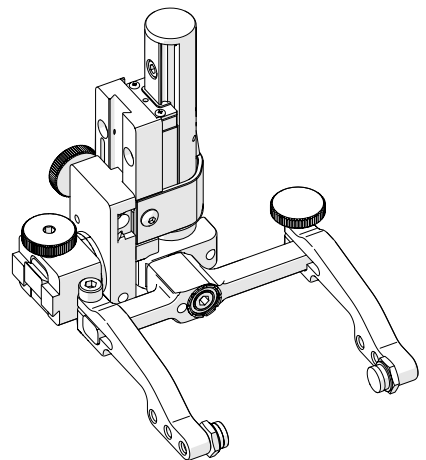


Fig. 112 - Reversed probe holder

8. Raise the stop post on the opposite side until the side of the post contacts the 90° stop point on the probe holder's base (Fig. 111).

4.16. High Temperature Weld Frame Scanner



WARNING! EXTREME HEAT. Use high temperature gloves capable of protection up to 150°C (302°F). Take all precautions to protect hands and body from hot inspection surface.

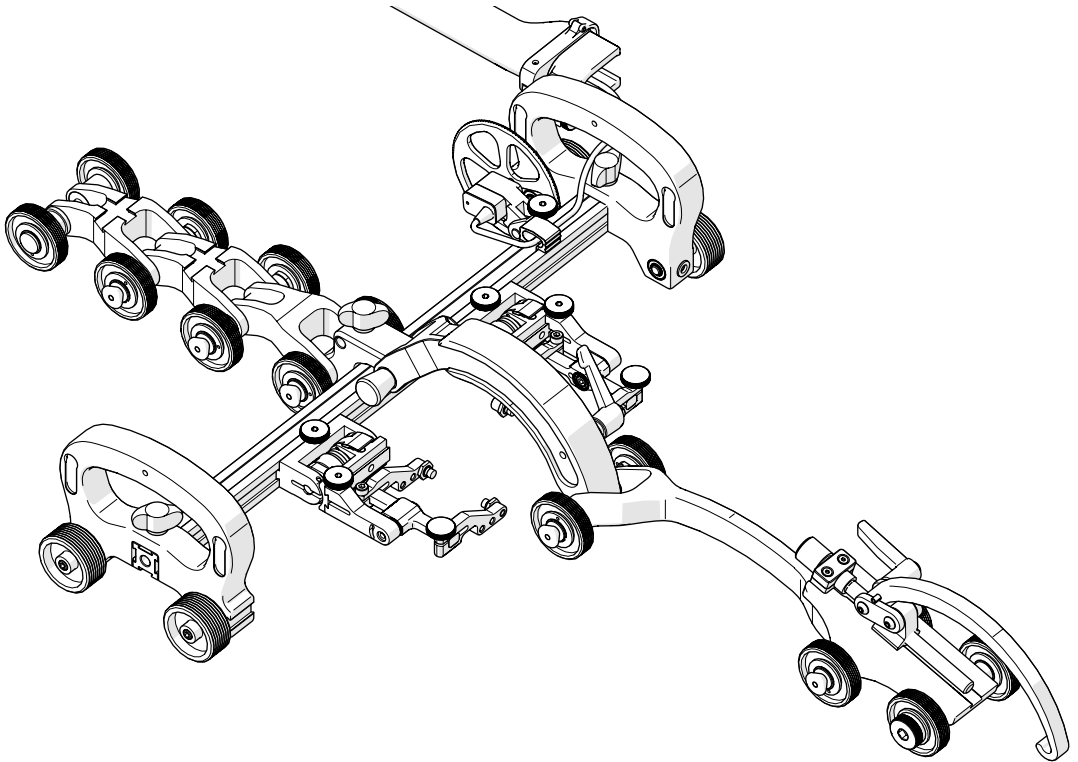


Fig. 113 - ROTIX - High Temperature Weld Frame Scanner

The high temperature weld frame scanner can be used on surfaces with a temperature of up to 150°C (302°F). The components of the high temperature scanner are similar to those of the standard weld frame scanner. As such, the instructions for using the high temperature kit are the same as those found in this user manual.

NOTE: Do **NOT** substitute or use any components, links, wheel blocks, encoder or cable management of the standard weld frame with the high temperature scanner.

4.17. Magnetic Wheel Kit



WARNING! MAGNETIC MATERIAL. The magnetic wheel kit produce a magnetic field which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices or other electronics. People with pacemakers or ICD's must stay at least 25 cm (10 in) away.

When using a chain scanner is not appropriate, the magnetic wheel kit (Fig. 114) can replace the urethane wheels on a **ROTIX** scanner body. Two sets of magnetic wheel kits can also be used on the scanner body to double the magnetic force.

To install or remove wheels (see *Wheel Block with Handle* on page 10).

NOTE: Do not use magnetic wheels with a chain assembly.

NOTE: Magnetic wheels may lose their magnetic properties if heated above 175°F (80°C).

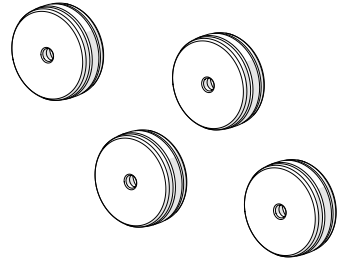


Fig. 114 - Magnetic wheel kit

4.18. Preamp Bracket

The preamp bracket mounts to any dovetail groove to hold a preamp. Compatible with most standard preamps, use the adjustable screw mounting channel on the bottom of the bracket to attach a preamp. The preamp bracket may also be ordered with velcro straps used to hold the preamp.

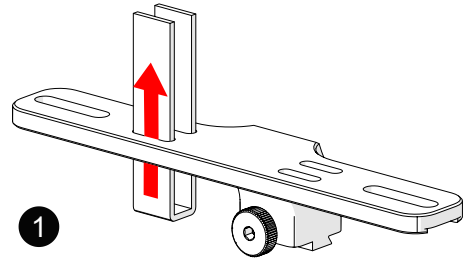


Fig. 115 - Insert velcro straps

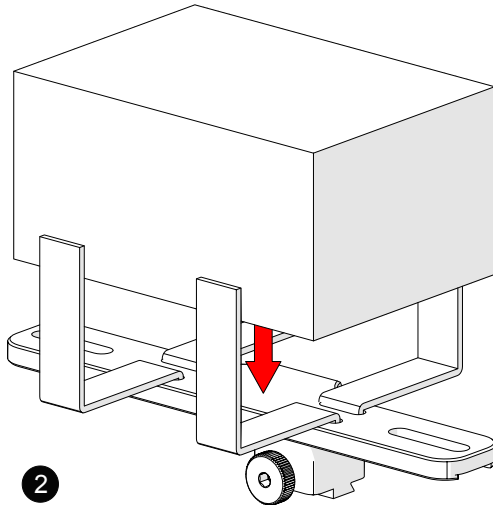


Fig. 116 - Place preamp and wrap velcro

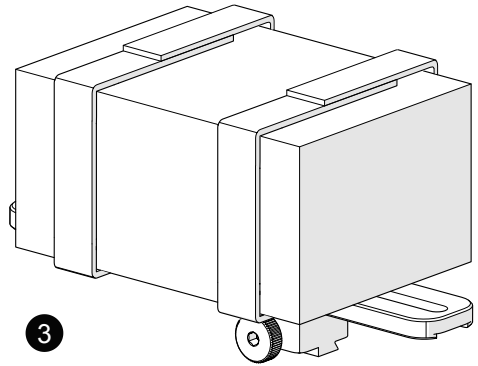


Fig. 117 - Mount bracket on a frame bar

NOTE: Not compatible with the high temperature kit.

CONFIGURATIONS

5.1. Two Probe Scanning

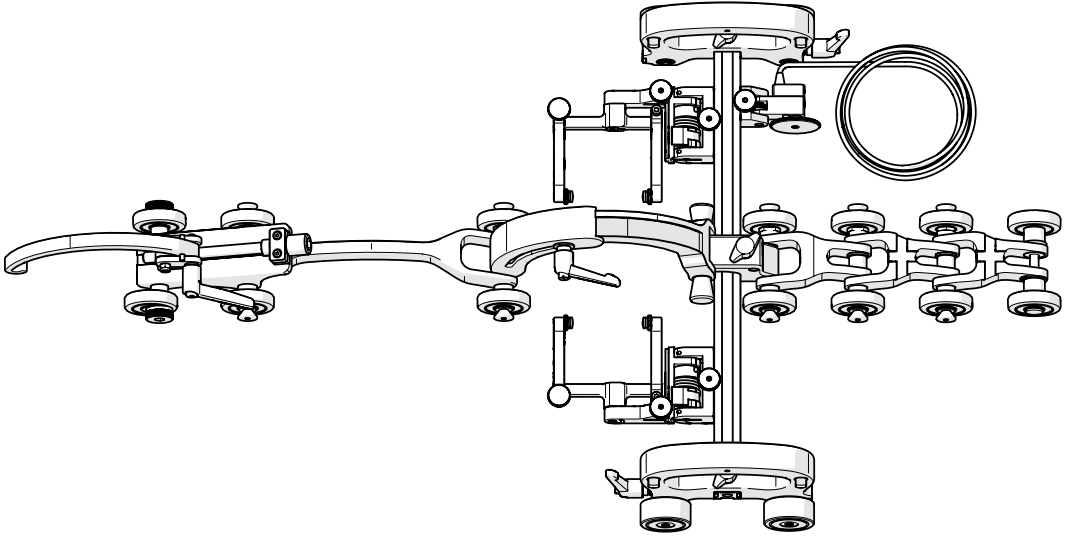


Fig. 118 - Two probe scanning

5.2. Four Probe Scanning

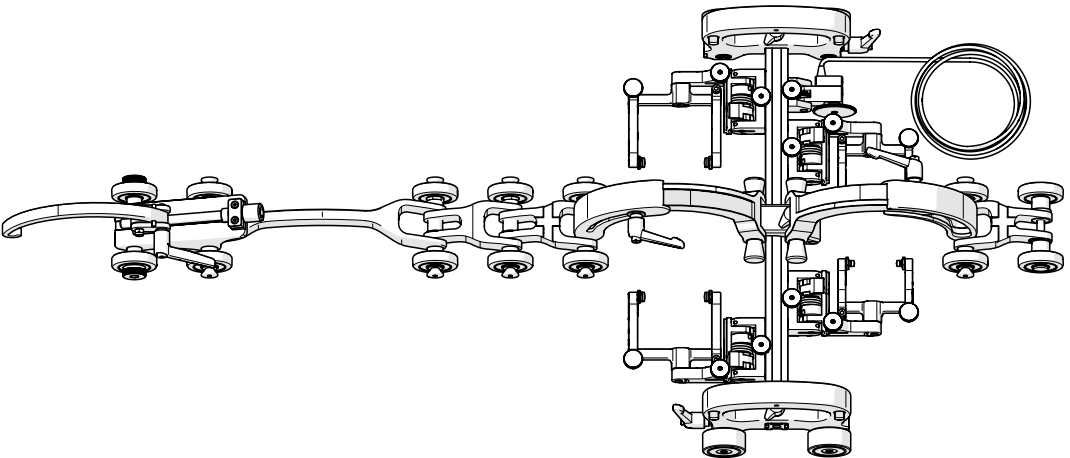


Fig. 119 - Four probe scanning

5.3. Four Probe Cantilever Scanning

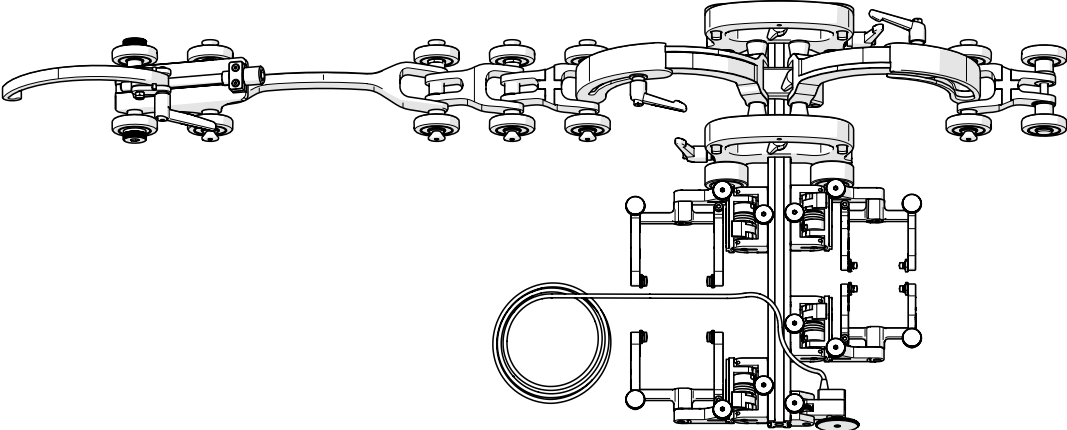


Fig. 120 - Four probe cantilever scanning

OPERATION

6.1. Setup of ROTIX on a Scanning Surface

1. Determine the diameter of the pipe or tube to be scanned. The ROTIX kit and this manual include two setup charts indicating the number of links required based on the pipe diameter or tubing (Fig. 121). Refer to the appropriate chart based on the number of probes to be used when scanning.

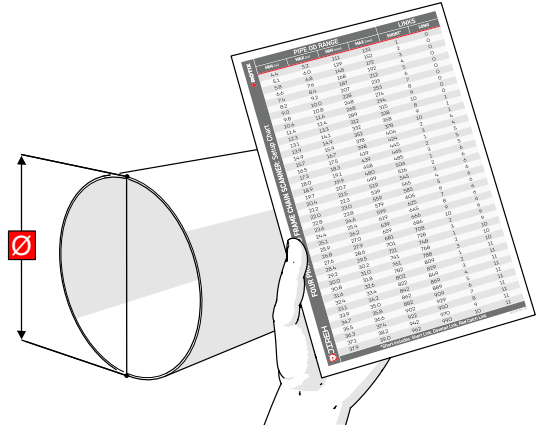


Fig. 121 - Refer to setup chart

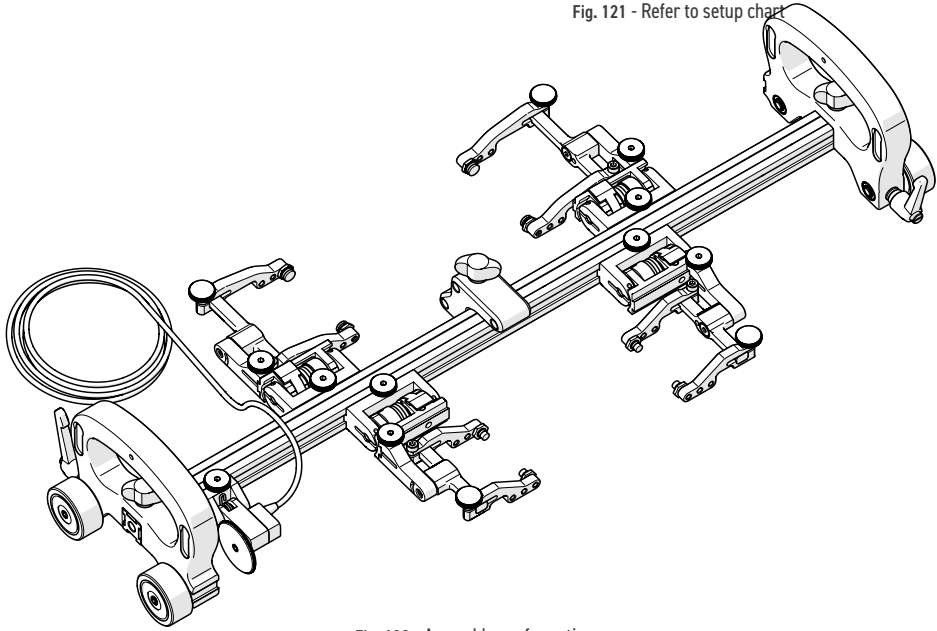


Fig. 122 - Assemble configuration

2. Assemble the appropriate configuration to the frame bar (Fig. 122). Install the wedge and probes that will be used (see Slip Joint Probe Holder on page 14).

TIP: The following example is a four probe configuration for a 30.4 cm (12 in) pipe diameter.

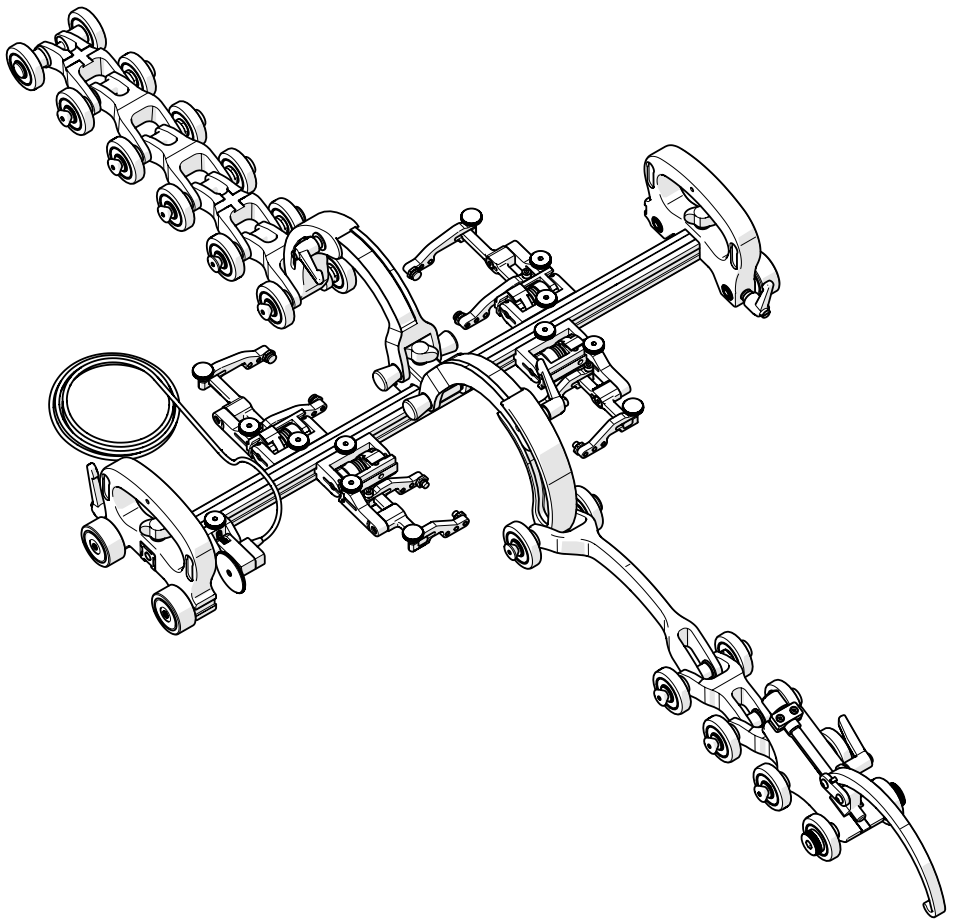


Fig. 123 - Assemble configuration

3. On a flat surface, connect the appropriate number of links (see *Chain Connection* on page 13) as indicated on the **ROTIX** setup chart. Arrange the link setup so the buckle and catch link will be 180° opposite the scanner body (Fig. 123).

TIP: Place the dovetail link 2nd in the chain after the adjustable overtop link.

4. Ensure the wheel block with handle brakes are locked (see *Wheel Block with Handle* on page 10).
5. Drape the configured assembly around the pipe/tube to be inspected (Fig. 124). Ensure the scanner's double wheel chain links straddle the weld.

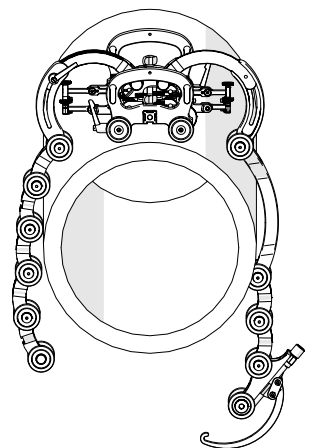


Fig. 124 - Place on pipe

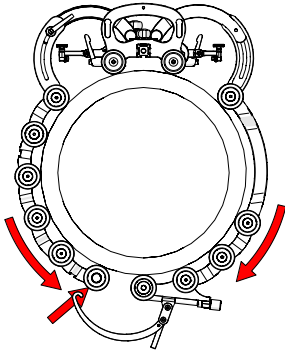


Fig. 125 - Hook buckle to catch link

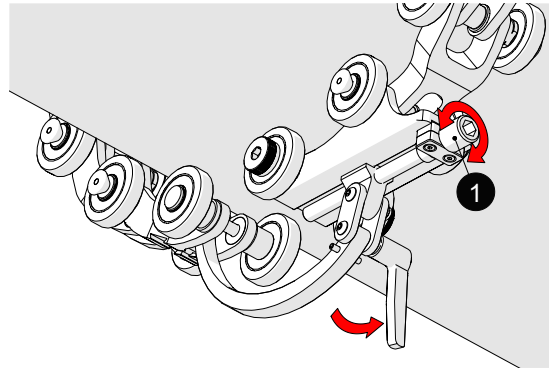


Fig. 126 - Adjust pressure of buckle

6. Bring the buckle arm towards the catch link. Hook the buckle's arm to the middle axle of the catch link (Fig. 125). The buckle adjustment knob (Fig. 126-1) may have to be loosened to allow the arm to reach the catch link (Fig. 126).

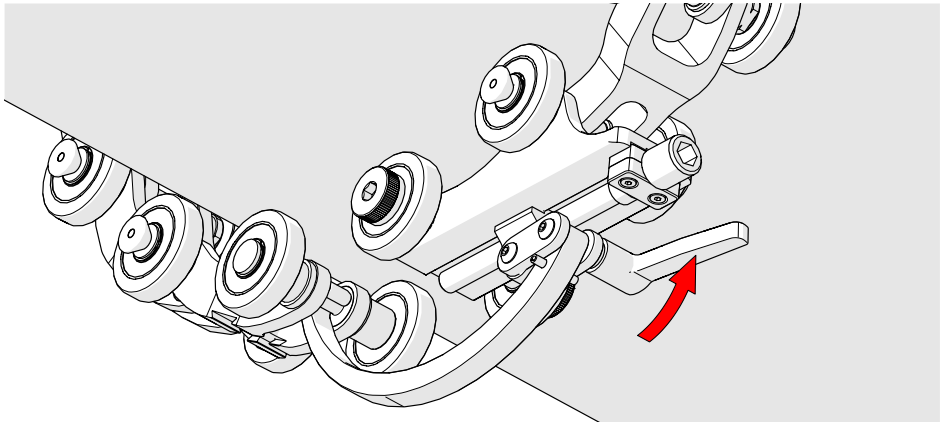


Fig. 127 - Press down to lock

7. Rotate the buckle adjustment knob until the buckle's lever can be pushed down, locking the buckle in place (Fig. 127). The tightness of the **ROTIX** on the pipe can be adjusted using the buckle adjustment knob (Fig. 126-1).

TIP: If additional clearance is required, the buckle's ratchet lever can be pulled out and rotated to various positions (see Ratchet Lever on page 13).

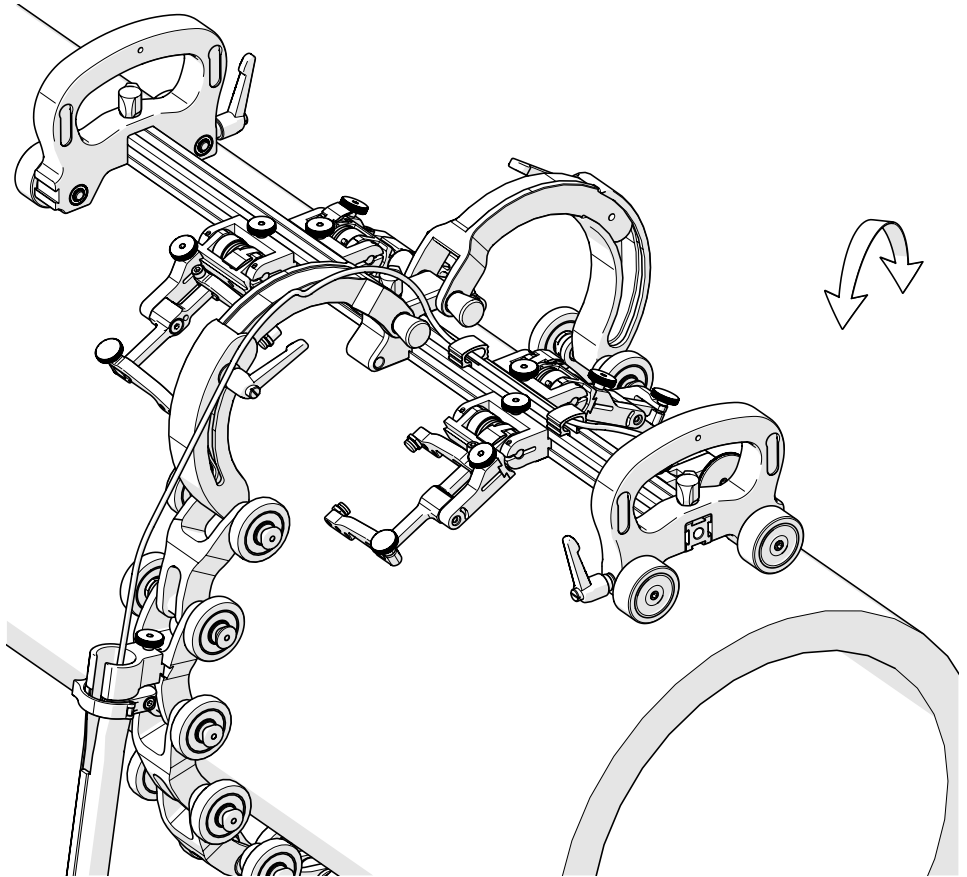


Fig. 128 - Configured four probe configuration

8. Route all cabling and hoses (*Only encoder cable shown*) to the cable management (*see Cable Management System on page 20*).
9. Lower probe holders to the scan surface (*see Slip Joint Probe Holder on page 14*).
10. Release the brakes on the wheel blocks with handle to commence scanning (*see Wheel Block with Handle on page 10*).

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. 6*). 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
The chain is too loose/tight	Incorrect number or combination of links for proper scanner configuration.	Refer to the ROTIX setup chart (see <i>Two Probe Chain Configuration Setup Chart on page 52</i>) or (see <i>Four Probe Chain Configuration Setup Chart on page 53</i>) for the 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 needs to be correctly set up	Adjust the tightness of the buckle (see <i>Setup of ROTIX on a Scanning Surface on page 34</i>)
Insufficient probe contact.	The scanner is not set correctly.	Reconfigure the scanner as per instructions (see <i>Setup of ROTIX on a Scanning Surface on page 34</i>)
	The probe holder needs to be set up correctly.	Reconfigure the probe holder(s) as per instructions (see <i>Probe Holder Vertical Adjustment on page 24</i>).

8.1. Technical Support

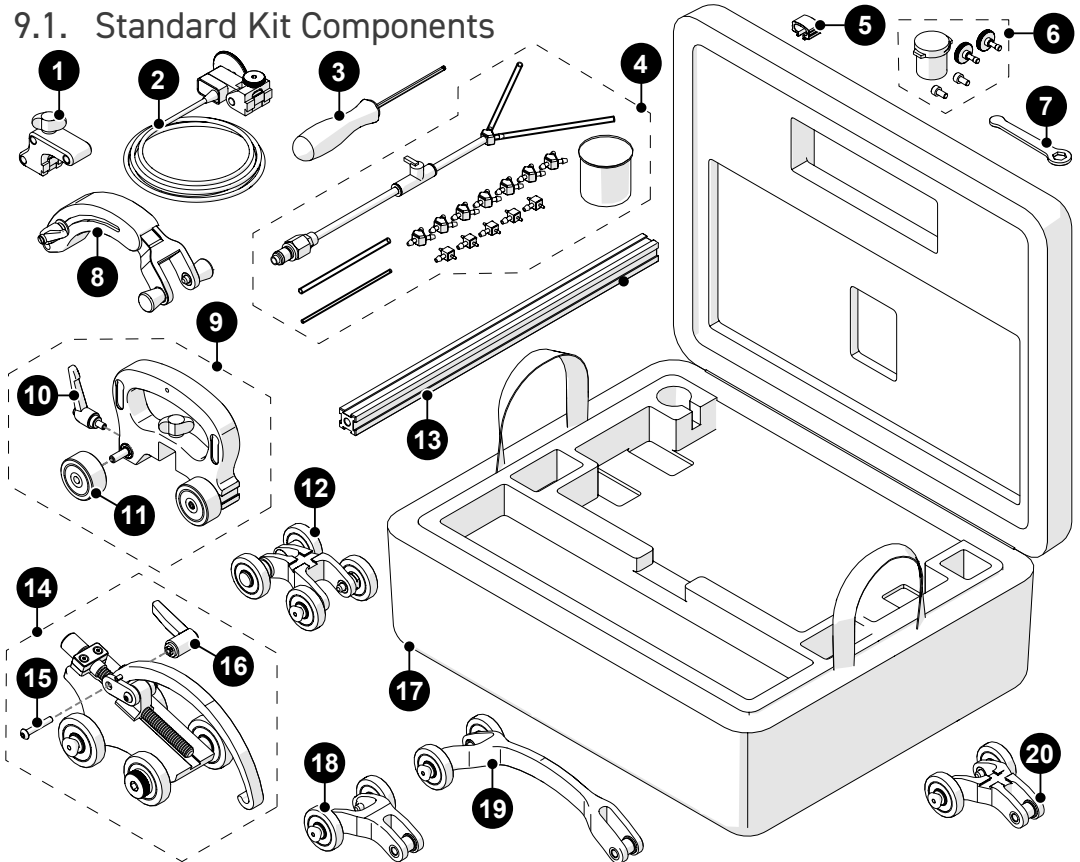
For technical support contact, Jireh Industries (see *“Jireh Industries Ltd.” on page 1*)

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.

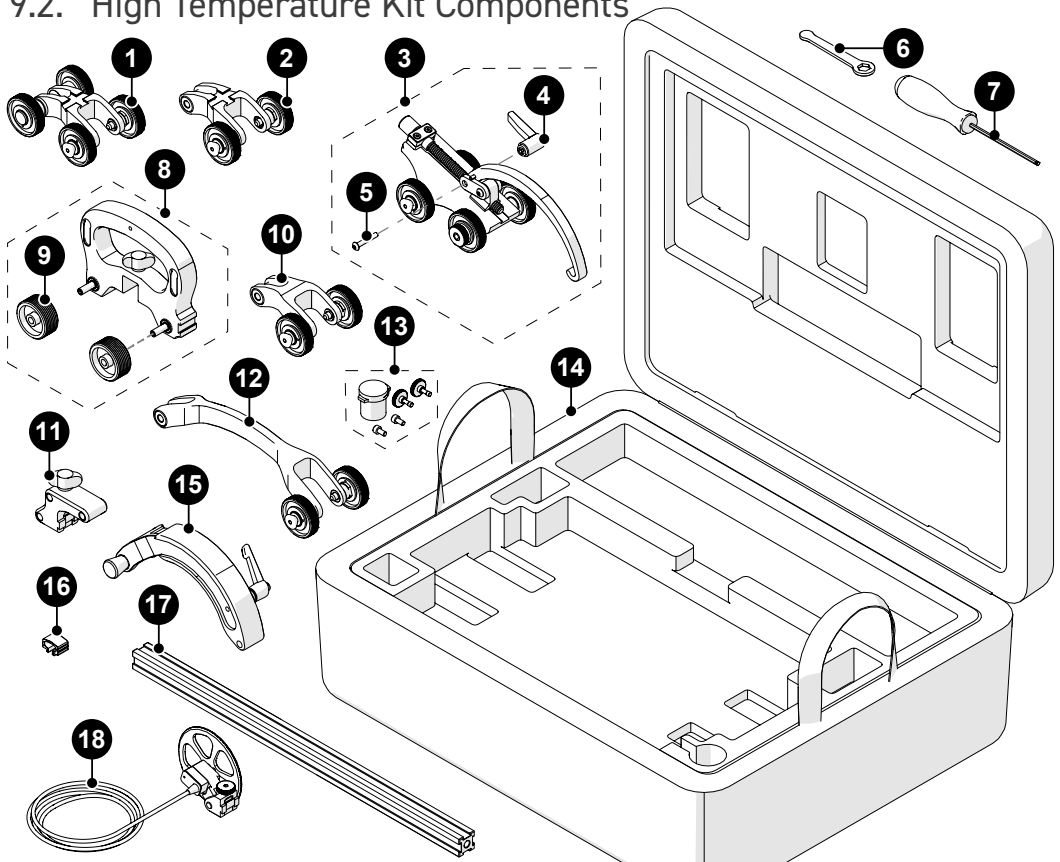
9.1. Standard Kit Components



BOM ID	Part #	Description	BOM ID	Part #	Description
1	CES032	Double Chain Mount	11	CES012	Non-Magnetic Wheel
2	BGS053-X-05	Spring Loaded Enc. (see Enc. Con.)	12	CES035	Double Wheel Catch Link
3	EA414	Hex Driver: 3 mm (0.118 in)	13	BG0038-X	Frame Bar (see Frame Bar)
4	CMG007	Irrigation Kit, 2-4 probe	14	CES036	Double Wheel Buckle
5	BG0091	Cable Clip	15	MD073-025	BHCS, M4x0.7 X 25 mm, SST
6	PHG014	Probe Holder Spare Parts Kit	16	CE0015	Ratchet lever
7	EA470	3/8 in Wrench	17	CEA011	ROTIX Frame Scanner Case
8	CES031	Adjustable Otopost Link	18	CES033	Double Wheel Short Link
9	CES070	Wheel Block With Handle	19	CES034	Double Wheel Long Link
10	BTS018	Brake Handle	20	CES040	Double Wheel Dovetail Link

Fig. 129 - ROTIX standard parts

9.2. High Temperature Kit Components



BOM ID	Part #	Description
1	CES077	High Temperature Catch Link
2	CES076	High Temperature Dovetail Link
3	CES078	High Temperature Buckle
4	CE0015	Ratchet lever
5	MD073-025	BHCS, M4x0.7 X 25 mm, SST
6	EA470	3/8 in Wrench
7	EA414	Hex Driver: 3 mm (0.118 in)
8	CES071	High Temperature Wheel Block with Handle
9	CE0143	High Temperature Wheel
10	CES074	High Temperature Short Link
11	CES032	Double Chain Mount
12	CES075	High Temperature Long Link
13	PHG014	Probe Spare Parts Kit
14	CEA030	ROTIX High Temperature Frame Case
15	CES031	Adjustable Overtop Link
16	BG0091	Cable Clip
17	BG0038-X	Frame Bar (see Frame Bar)
18	BGS071-X-05	High Temperature Spring-Loaded Encoder (see Encoder Connector)

Fig. 130 - ROTIX high temperature parts

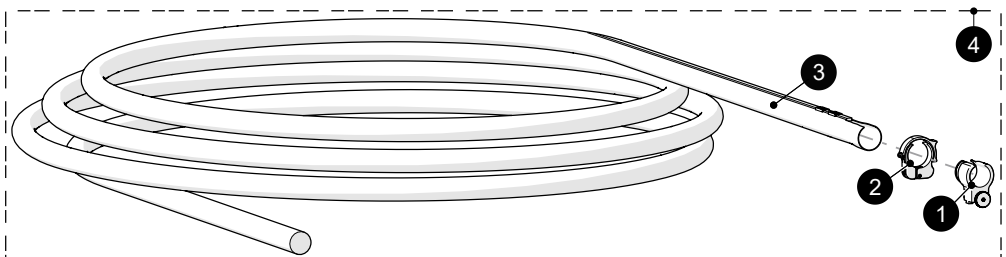
9.2.1. Encoder Connector Type

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 types are available.
(contact Jireh Industries Ltd. on page 1)

9.3. Accessories

9.3.1. Cable Management, Dovetail Mount



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

Fig. 131 - Cable management

9.3.1.1 Cable Management Sleeving

Part #	Length
CX0141	4.5 m (14.7 ft)
CX0145	9.5 m (31.2 ft)

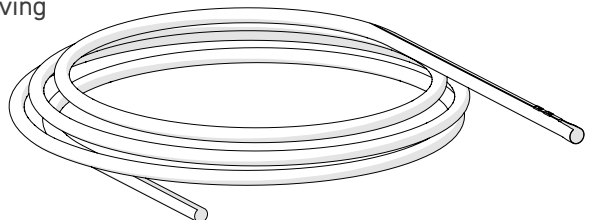
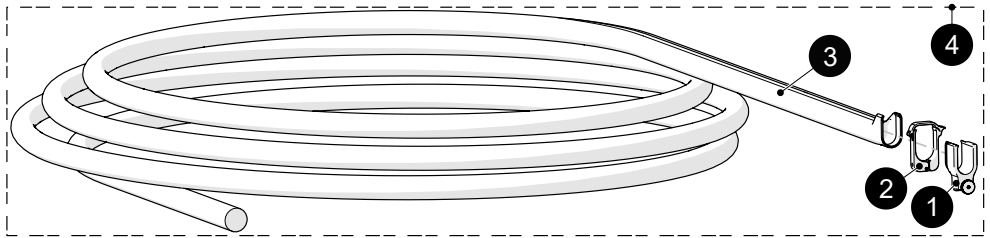


Fig. 132 - Cable management sleeving

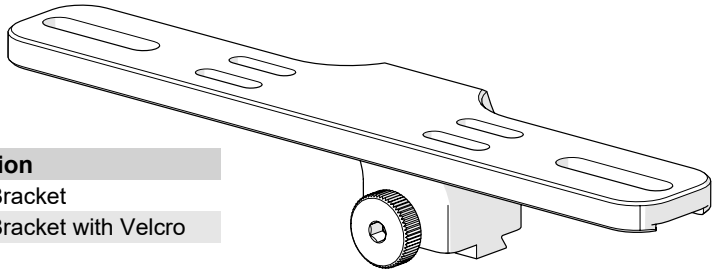
9.3.2. High Temperature Cable Management, Dovetail Mount



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 Sleeve, 4.5 m (14.8 ft)
4	CES089-04.5	High Temperature Cable Management, 4.5 m (14.8 ft)

Fig. 133 - High temperature cable management

9.3.3. Premp Bracket



Part #	Description
CES029	Preamp Bracket
CES029-V	Preamp Bracket with Velcro

Fig. 134 - Preamp bracket

9.3.4. Magnetic Wheel Kit

Part #	Description
BTG014	Magnetic Wheel Kit

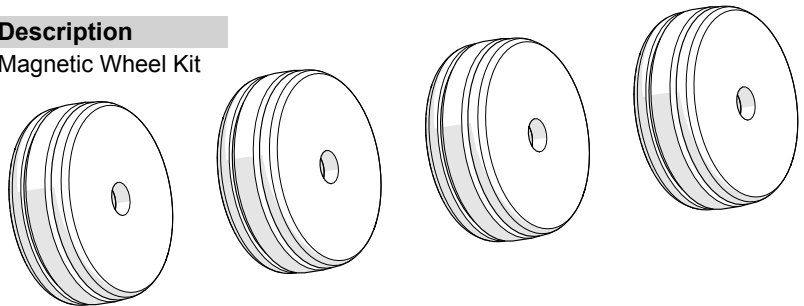
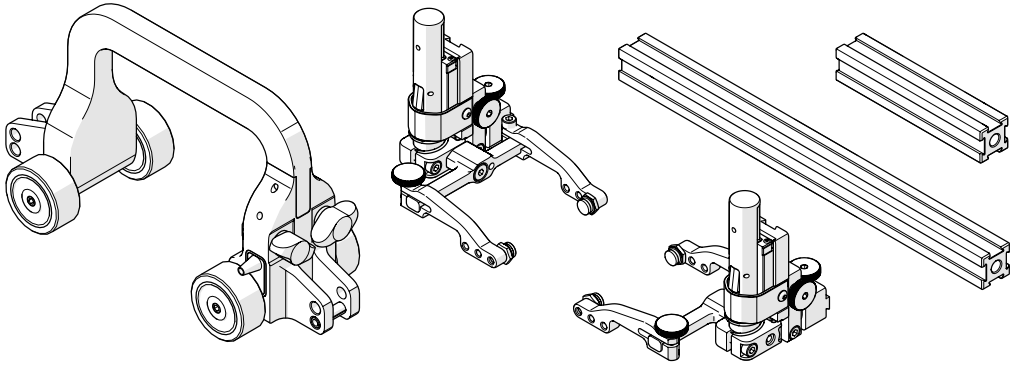


Fig. 135 - Magnetic wheel kit

9.3.5. Reduced Width Scanning Kit

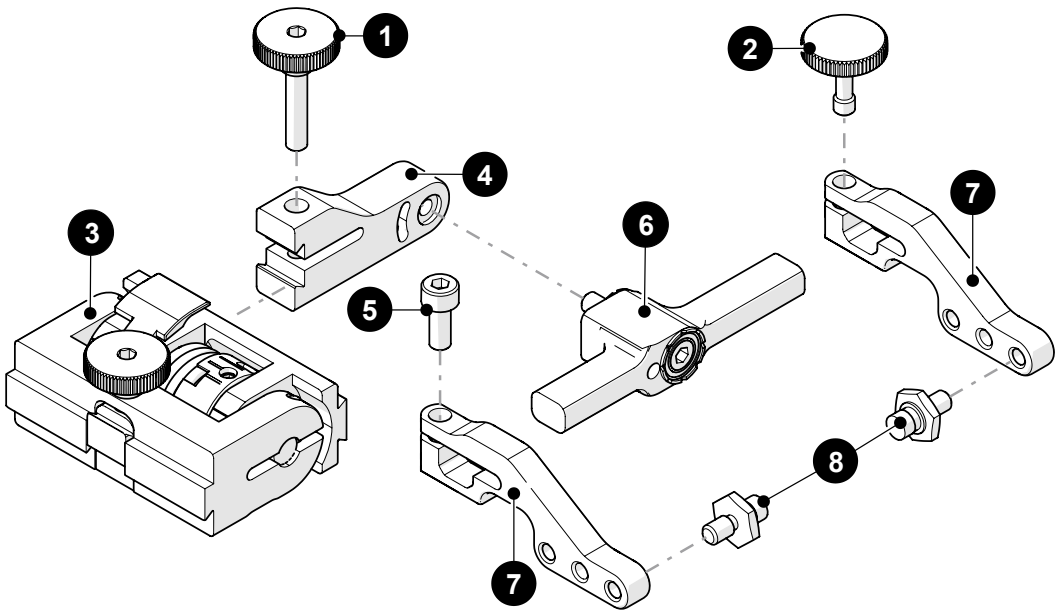


Part #	Description
CEG018-W-XX	Reduced Width Scanning Kit <i>W - Encoder Connector Type (See Encoder Connector Type)</i> <i>XX - Pivot Button Style (See Pivot Button Style)</i>

Fig. 136 - Reduced width scanning kit

9.4. Probe Holders

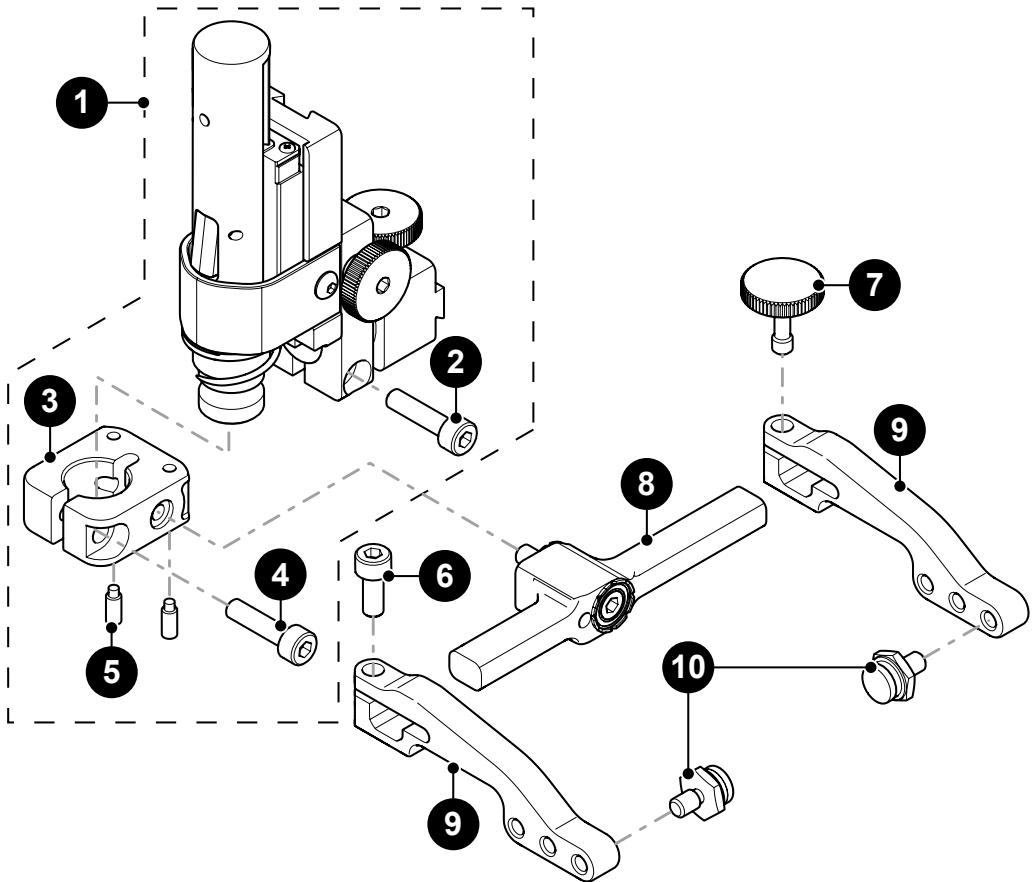
9.4.1. Slip Joint Probe Holder Parts



BOM ID	Part #	Description
1	PH0104	Knurled Knob, M4 x 0.7 x 18 mm, 4 mm stand off, SST
2	PH0082	Knurled Knob, M4 x 0.7 x 10 mm, 3 mm stand off, SST
3	PHS022	Slip Joint Probe Holder Subassembly
4		<i>see Swing Arm Style</i>
5	MD050-010	SHCS, M4 x 0.7 x 10 mm, SST
6		<i>see Yoke Style</i>
7		<i>see Arm Style</i>
8	PH0011-X	Pivot Button Style (<i>see Pivot Button Style</i>)

Fig. 137 - Slip joint probe holder parts

9.4.2. Vertical Probe Holder Parts



BOM ID	Part #	Description
1	PHS028	Vertical Probe Holder Subassembly
2	MA307	Screw, M4x16 mm High Strength SST SHCS
3	PH0087	Vertical Probe Holder Base
4	MD050-016	SHCS, M4 x 0.7 x 16 mm, SST
5	MA096	Screw, M3x8 mm Dog Point Set, SST
6	MD050-010	SHCS, M4 x 0.7 x 10 mm, SST
7	PH0082	Knurled Knob, M4 x 0.7 x 10 mm, 3 mm stand off, SST
8	see Yoke Style	
9	see Arm Style	
10	PH0011-X	Pivot Button Style (see Pivot Button Style)

Fig. 138 - Vertical probe holder parts

9.5. Probe Holder Components

9.5.1. Arm Style



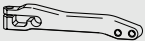







Arm Style	Part #		Arm Style	Part #	
A Standard, Flat	PH0090		B Short, Flat	PH0089	
C Long, Flat	PH0099		D Standard, Drop	PH0093	
E Short, Drop	PH0092		F Long, Drop	PH0094	
G Standard, Extra-Drop	PH0096		H Short, Extra-Drop	PH0095	
I Extra-Short, Flat	PH0159		J Extra-Short, Drop	PH0161	

Fig. 139 - Probe holder arm selection

9.5.2. Yoke Style

Yoke Style	Part #	Length		Yoke Style	Part #	Length	
S Standard	PHS052	6.3 cm (2.47 in)		W Wide	PHS063	7.9 cm (3.06 in)	

Fig. 140 - Probe holder yoke selection

9.5.3. Swing Arm Style

Swing Arm Style	Part #	Length		Swing Arm Style	Part #	Length	
Short	PH0069	4.1 cm (1.61 in)		Long	PH0100	4.6 cm (1.81 in)	

Fig. 141 - Swing arm selection

NOTE: Short swing arm only compatible with standard yoke style.

9.5.4. 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	
11 3 mm (0.118 in) Internal	-		14 4 mm (0.157 in)	-	

Fig. 142 - Pivot button selection

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

9.6. Variable Components

9.6.1. Frame Bars












Part #	Length		Part #	Length	
BG0038-05	5 cm (1.97 in)		BG0038-10	10 cm (3.94 in)	
BG0038-15	15 cm (5.91 in)		BG0038-20	20 cm (7.87 in)	
BG0038-25	25 cm (9.84 in)		BG0038-30	30 cm (11.81 in)	
BG0038-35	35 cm (13.78 in)		BG0038-40	40 cm (15.75 in)	
BG0038-45	45 cm (17.72 in)		BG0038-50	50 cm (19.69 in)	
BG0038-55	55 cm (21.65 in)				

Fig. 143 - Frame bar selection

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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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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APPENDIX

12.1. Two Probe Chain Configuration Setup Chart

PIPE SIZE				LINKS	
MIN (in)	MAX (in)	MIN (mm)	MAX (mm)	SHORT*	LONG
3.8	4.6	97	117	2	0
4.5	5.3	114	135	3	0
5.2	6.1	132	155	4	0
6.0	6.9	152	175	5	0
6.8	7.7	173	196	6	0
7.5	8.5	191	216	7	0
8.3	9.3	211	236	8	0
9.1	10.1	231	257	9	0
9.9	10.9	251	277	10	0
10.7	11.7	272	297	11	0
11.7	12.6	297	320	9	1
12.4	13.4	315	340	10	1
13.2	14.2	335	361	11	1
13.5	14.4	343	366	2	4
14.3	15.2	363	386	3	4
15.0	16.0	381	406	4	4
15.9	16.8	404	427	2	5
16.6	17.6	422	447	3	5
17.4	18.3	442	465	4	5
18.2	19.2	462	488	2	6
19.0	19.9	483	505	3	6
19.7	20.7	500	526	4	6
20.5	21.5	521	546	5	6
21.3	22.3	541	566	6	6
22.1	23.1	561	587	7	6
22.9	23.9	582	607	8	6
23.7	24.7	602	627	9	6
24.5	25.5	622	648	10	6
25.3	26.3	643	668	11	6
26.1	27.1	663	688	3	9
26.9	27.9	683	709	4	9
27.7	28.7	704	729	2	10
28.5	29.5	724	749	3	10
29.2	30.3	742	770	4	10
30.1	31.1	765	790	2	11
30.9	31.9	785	810	3	11
31.6	32.6	803	828	4	11
32.5	33.5	826	851	2	12
33.2	34.2	843	869	3	12
34.0	35.0	864	889	4	12
34.8	35.8	884	909	5	12
35.6	36.6	904	930	6	12
36.4	37.4	925	950	7	12
37.2	38.2	945	970	8	12
38.0	39.0	965	991	9	12
38.8	39.8	986	1011	10	12
39.6	40.6	1006	1031	11	12

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

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12.2. Four Probe Chain Configuration Setup Chart

PIPE OD RANGE				LINKS	
MIN (in)	MAX (in)	MIN (mm)	MAX (mm)	SHORT*	LONG
4.4	5.2	111	133	1	0
5.1	6.0	129	152	2	0
5.8	6.8	148	172	3	0
6.6	7.6	168	192	4	0
7.4	8.4	187	212	5	0
8.2	9.2	207	233	6	0
9.0	10.0	228	253	7	0
9.8	10.8	248	274	8	0
10.6	11.6	268	294	9	0
11.4	12.4	289	315	10	0
12.3	13.3	312	338	8	1
13.1	14.1	332	358	9	1
13.9	14.9	352	378	10	1
14.9	15.9	378	404	2	4
15.7	16.7	398	424	3	4
16.5	17.5	419	445	1	5
17.3	18.3	439	465	2	5
18.0	19.1	458	485	3	5
18.9	19.9	480	506	1	6
19.7	20.7	499	526	2	6
20.4	21.5	519	545	3	6
21.2	22.3	539	565	4	6
22.0	23.0	559	585	5	6
22.8	23.8	579	605	6	6
23.6	24.6	599	625	7	6
24.4	25.4	619	645	8	6
25.1	26.2	639	666	9	6
25.9	27.0	659	686	10	6
26.8	27.9	681	708	2	9
27.6	28.6	701	728	3	9
28.4	29.5	721	748	1	10
29.2	30.2	741	768	2	10
30.0	31.0	761	788	3	10
30.8	31.8	782	809	1	11
31.6	32.6	802	829	2	11
32.4	33.4	822	849	3	11
33.1	34.2	842	869	4	11
33.9	35.0	862	889	5	11
34.7	35.8	882	909	6	11
35.5	36.6	902	929	7	11
36.3	37.4	922	950	8	11
37.1	38.2	942	970	9	11
37.9	39.0	962	990	10	11

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

CE0125 Rev 03



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