



**MOTORIZED
RASTER ARM•HT**

ED0006 Rev 01.1

Motorized High Temperature Probe Positioning

SAFETY WARNINGS / PRECAUTIONS

KEEP THIS MANUAL – DO NOT LOSE

THIS MANUAL IS PART OF THE **RASTER ARM HT** SYSTEM AND MUST BE RETAINED FOR THE LIFE OF THE PRODUCT. PASS ON TO SUBSEQUENT OWNERS.

Ensure any amendments are incorporated with this document.



WARNING! The Raster Arm HT designed for a specific use. Using the Raster Arm HT outside of its intended use is dangerous. Failure to comply with the warnings, instructions, and specifications in this manual could result in **SEVERE INJURY** or **DEATH**. Read and understand this manual before using.



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



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



WARNING! The coolant used in this product contains a 50/50 blend of ethylene glycol based automotive antifreeze and water. Consult the MSDS for hazards associated with the use and handling of this coolant.



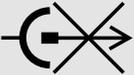
WARNING! FLAMMABLE. The coolant used in this product contains a 50/50 blend of ethylene glycol based automotive antifreeze and water which, in very specific conditions, may be flammable. If a leak develops, remove the RASTER ARM HT from the hot surface immediately. Keep ignition sources away from coolant vapors. Do not use system on surfaces $>350^{\circ}\text{C}$ (662°F).



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.



CAUTION! DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnecting. Permanent damage to electronics could occur.



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 69 for additional details).

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IDENTIFICATION

1.1. Product Brand

This user manual describes the proper safety precautions, setup and use of any length of Raster Arm HT system.

1.2. Manufacturer

Distributor:

Manufacturer:

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

1.3. Compliance Declarations

1.3.1. ISED Emissions Compliance (Canada)

CAN ICES-003(A) / NMB-003(A)

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

1.3.2. FCC Suppliers Declaration of Conformity (United States)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RESPONSIBLE PARTY NAME:	Jireh Industries
ADDRESS:	2955 S Sam Houston Pkwy E Suite 300 Houston, Texas United States 77047
TELEPHONE:	832-564-0626

1.3.3. European Union CE Declarations



Jireh Industries hereby declares that the Raster Arm HT product complies with the essential requirements and other relevant provisions of the following European Union directives:

- 2014/30/EU EMC Directive
- 2014/35/EU Low Voltage Directive
- 2012/19/EU Directive on Waste Electrical and Electronic Equipment
- 2011/65/EU Directive on Restriction of Hazardous Substances (RoHS)

1.3.4. UKCA Declarations



Jireh Industries hereby declares that the Raster Arm HT product complies with the essential requirements and other relevant provisions of the following UK directives.

Title	Edition/Date of Issue
Electromagnetic Compatibility Regulations	2016
Electrical Equipment (Safety) Regulations	2016
Waste Electrical and Electronic Equipment Regulations	2013
Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations	2012

PRODUCT SPECIFICATIONS

2.1. Base Raster Arm HT System

This section outlines the product specifications of the base system. When the base system is used together with compatible components (*Chapter 2.2*), the product specifications of the base system may be superseded. See (*see "Compatible Components" on page 5*).

2.1.1. Intended Use

The Raster Arm HT's primary purpose is to provide raster motion of inspection probes over assets such as pipes, vessels, or storage tanks. It is intended for use with the Parent Products and their limits listed in (*Chapter 2.3*).

2.1.1.1 User

The Raster Arm HT is intended to be used by persons who have read and understand this user manual as well as the user manual of the relevant Parent Products.

2.1.1.2 Operating Environment

The Raster Arm HT is for use in dry industrial environments having ambient temperatures shown below. It is NOT intended for use in explosive environments.

Category	Parameter	Specification
Environment	Minimum ambient temperature	-20°C (-4°F)
	Maximum ambient temperature	50°C (122°F)

2.1.2. Unintended Use

The Raster Arm HT is NOT intended for:

- ▶ use outside of its intended use
- ▶ lifting / lowering objects or people (i.e. using the Raster Arm HT as a crane / elevator)
- ▶ use where obstructions are present, excluding standard weld caps
- ▶ use on any products other than those listed as Parent Products (*see "Parent Products" on page 7*)

2.1.3. Dimensions and Weight

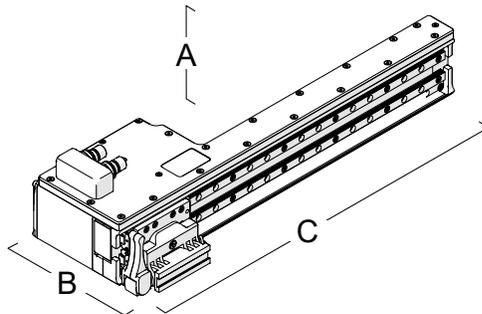


Fig. 1 - 300 mm Raster Arm HT dimensions

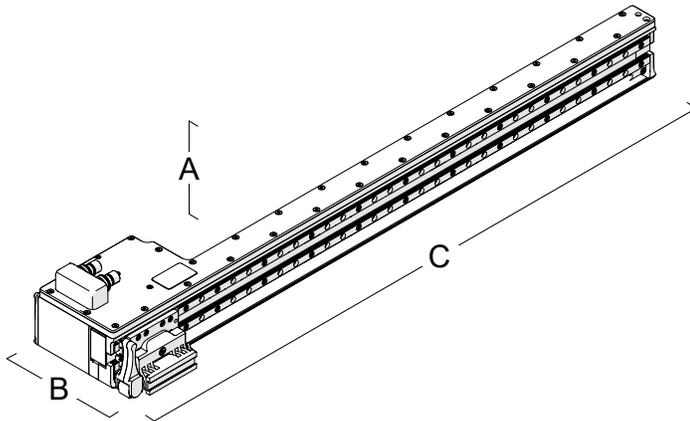


Fig. 2 - 600 mm Raster Arm HT dimensions

Model:	-0300	-0600
A Raster Arm HT height:	8.5 cm (3.4 in)	8.5 cm (3.4 in)
B Raster Arm HT depth:	15.3 cm (6 in)	15.3 cm (6 in)
C Raster Arm HT width:	39.3 cm (15.5 in)	69.3 cm (27.3 in)
Category	Parameter	Specification
EDG001-0300	Weight, Raster Arm HT	11.7 kg (5.3 lb)
EDG001-0600	Weight, Raster Arm HT	16.7 kg (7.6 lb)

2.1.4. Power Requirements



CAUTION! DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnecting. Permanent damage to electronics could occur.

Input Voltage: 25-45VDC

Input Power: 85W

2.1.5. Environmental Sealing

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

2.1.6. Performance Specifications

Category	Parameter	Specification
EDG001-0300	Stroke	300 mm (11.8 in)
EDG001-0600	Stroke	600 mm (23.6 in)
All strokes	Maximum Raster Speed	762mm/s (30 in/s)
	Encoder Resolution	240.2 counts/mm (6101 counts/in)

2.2. Compatible Components

The components listed in this section integrate with the base system to perform certain tasks. Their use may modify the product specifications (*i.e. intended use, power requirements, etc.*) from those of the base system. The specifications listed here supersede those of the base system. If no specifications are listed here, the specifications of the base system remain effective.

2.2.1. Frame Bar BG0038-

The Frame Bar may be mounted on the Raster Arm HT carriage to provide mounting of two Probe Holders for simultaneous raster scanning. This requires the use of the Raster Arm Pivot Nose (Male).

2.2.2. Slip Joint Probe Holder PHA012-

The Slip Joint Probe Holder is intended to provide a probe holding solution for probes and wedges with pivot button holes. It is useful for situations requiring a

lower profile. It is mounted in the dovetail groove of either the Raster Arm Pivot Nose (Female) or the Frame Bar.

2.2.3. Vertical Probe Holder PHA015-

The Vertical Probe Holder is intended to provide a probe holding solution for probes and wedges with pivot button holes. It is mounted in the dovetail groove of either the Raster Arm Pivot Nose (Female) or the Frame Bar.

2.2.4. Heavy Duty Vertical Probe Holder PHS043-

The Heavy Duty Vertical Probe Holder is intended to provide a probe holding solution for larger, heavier probes. It is mounted in the dovetail groove of either the Raster Arm Pivot Nose (Female) or the Frame Bar.

2.2.5. Corrosion Thickness Probe Holder HT PHS078- / PHS082-

The Corrosion Thickness HT Probe Holder is intended to provide a probe holding solution for specific probes or wedges that do not have pivot button holes. It is mounted in the dovetail groove of either the Raster Arm Pivot Nose (Female) or the Frame Bar.

2.3. Parent Products

The Raster Arm HT is intended to be used with one of the Parent Products listed in this section. If the Raster Arm HT's use modifies the product specifications (i.e. intended use, power requirements, etc.) of these Parent Products, the modifications are shown here. The specifications listed here supersede those of the Parent Products. If no specifications are listed here, the specifications of the Parent Products remain effective.

These Parent Products have a User Manual of their own, and shall be referred to for their product specifications.

2.3.1. SKOOT HT SYSTEM DPG001-

The SKOOT is an automated, magnetic crawler. Various attachments may be affixed to the crawler for the purposes of UT inspection.

2.3.1.1 Operating Limits

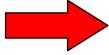
Category	Parameter	Specification
Inspection surface	Minimum OD, longitudinal driving, 19 mm (0.75 in) probe holder stroke 300 mm raster stroke.	1220 mm (4 ft)
	Minimum OD, longitudinal driving, 19 mm (0.75 in) probe holder stroke 600 mm raster stroke	4880 mm (16 ft)
Scanner	Required radial clearance (stick removed, cable carrier removed, circumferential driving)	115 mm (4.5 in)
	Required radial clearance (handles removed, circumferential driving)	200 mm (7.9 in)

DEFINITIONS

3.1. Definitions 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 the user that the view has changed to a reverse angle.

3.2. Definitions of Terms

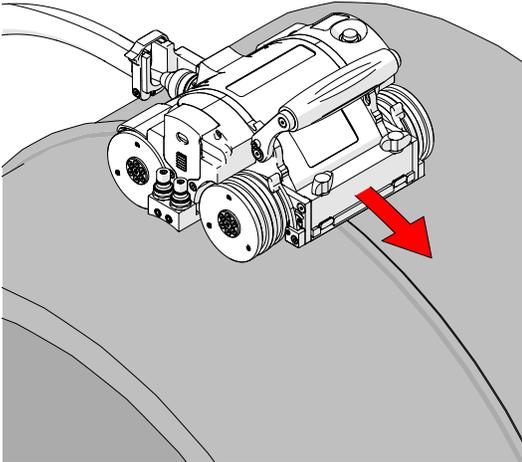


Fig. 3 - Circumferential scanning

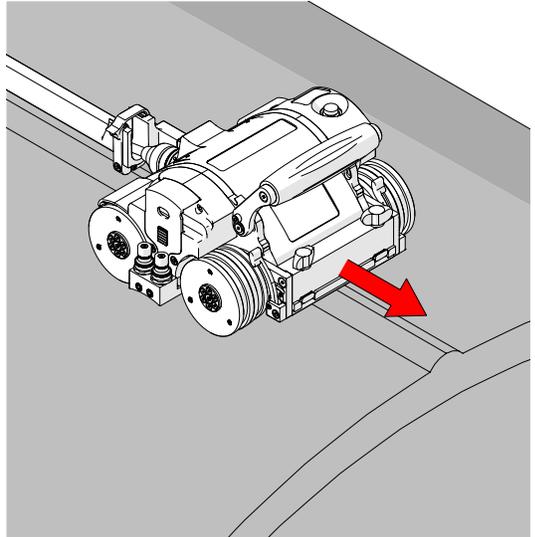


Fig. 4 - Longitudinal scanning

Circumferential

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

Longitudinal

Direction of scan travel is lengthwise of the pipe/tube (Fig. 4).

3.3. Safety Symbols

The following safety symbols might appear on the product and in this document. Read and understand their meaning below:



General warning symbol

This symbol is used to alert the user to potential hazards. All safety messages that follow this symbol shall be obeyed to avoid possible harm or material damage.



Shock hazard caution symbol

This symbol is used to alert the user to potential electric shock hazards. All safety messages that follow this symbol shall be obeyed to avoid possible harm.

3.4. Safety Signal Words

The following safety signal words might appear in this document. Read and understand their meaning below:

DANGER!

The DANGER signal word indicates an imminently hazardous situation. It calls attention to a procedure, practice, or the like that if not correctly performed or adhered to will result in death or serious personal injury. Do not proceed beyond a DANGER signal word until the indicated conditions are fully understood and met.

WARNING!

The WARNING signal word indicates a potentially hazardous situation. It calls attention to a procedure, practice, or the like that if not correctly performed or adhered to could result in death or serious personal injury. Do not proceed beyond a WARNING signal word until the indicated conditions are fully understood and met.

CAUTION!

The CAUTION signal word indicates a potentially hazardous situation. It calls attention to a procedure, practice, or the like that if not correctly performed or adhered to may result in minor or moderate personal injury, material damage, particularly to the product, destruction of part or all of the product, or loss of data. Do not proceed beyond a CAUTION signal word until the indicated conditions are fully understood and met.

SYSTEM COMPONENTS

4.1. Component Identification

4.1.1. Base System

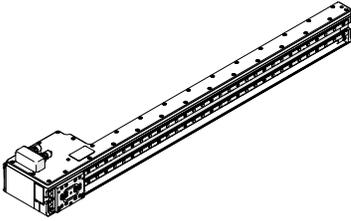


Fig. 5 - Base raster arm HT
EDA002-

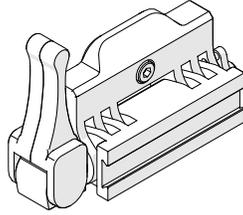


Fig. 6 - Raster arm pivot nose (female)
CWS023

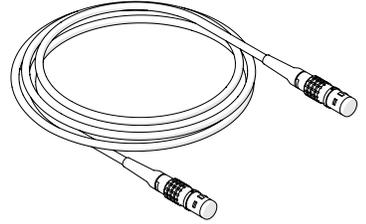


Fig. 7 - Raster arm cable
UMA020-



Fig. 8 - Hose: Red
DPA004-

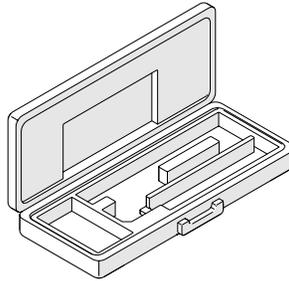


Fig. 9 - Raster arm case 300 mm/600 mm
CWA009

4.1.2. Compatible Components

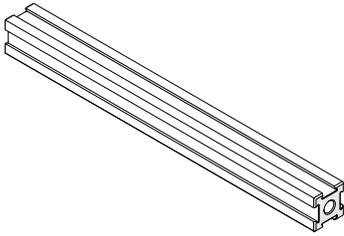


Fig. 10 - Frame bar
BG0038-

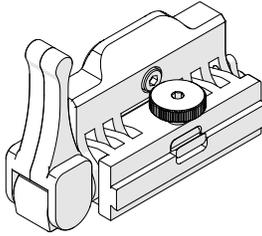


Fig. 11 - Raster arm pivot nose (male)
CWS030

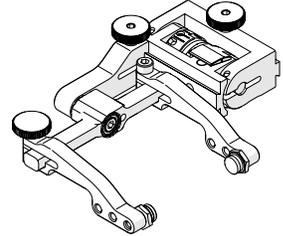


Fig. 12 - Slip joint probe holder
PHA012-

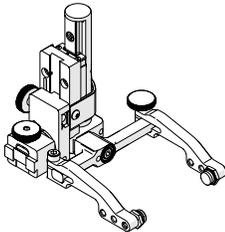


Fig. 13 - Vertical probe holder
PHA015-

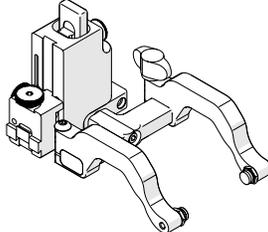


Fig. 14 - Heavy duty vertical probe holder
PHS043-

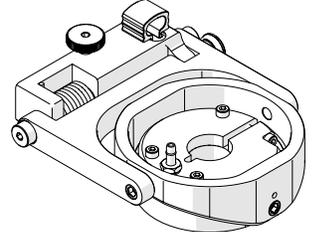


Fig. 15 - Corrosion thickness probe holder HT
PHS078-

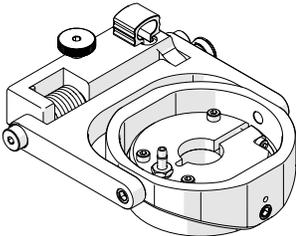


Fig. 16 - Corrosion thickness probe holder HT
PHS082-

4.1.3. Parent Products

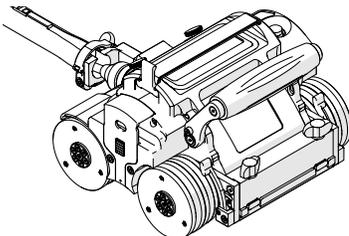


Fig. 17 - SK00T HT system
DPG001-

4.2. Tools

4.2.1. Included Tools

A 3 mm hex driver (Fig. 18) is included in the SKOOT HT system. This driver is suitable for most typical probe holders and Raster Arm HT system adjustments.

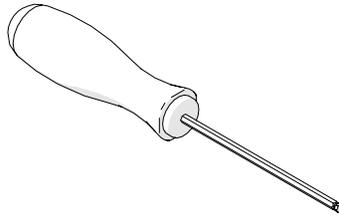


Fig. 18 - 3 mm hex driver

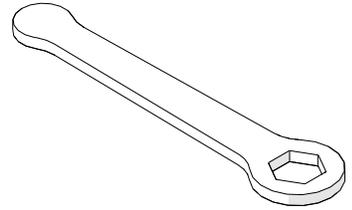


Fig. 19 - 3/8 in wrench

A 3/8 in wrench (Fig. 19) is included in the SKOOT HT system. The 3/8 in wrench is used to remove and install probe holder pivot buttons.

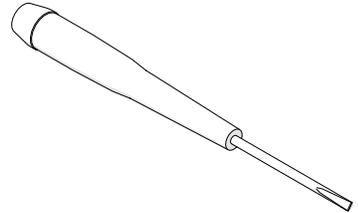


Fig. 20 - 3 mm flat driver

A 3 mm flat driver (Fig. 20) is included in the SKOOT HT system.

4.2.2. Optional Tools

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

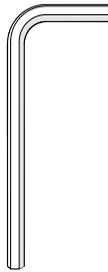


Fig. 21 - 1.5 mm hex wrench

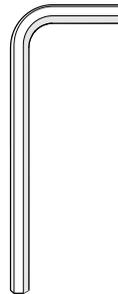


Fig. 22 - 2 mm hex wrench

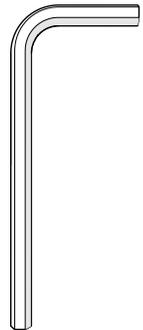


Fig. 23 - 3 mm hex wrench

4.3. Base System Components

4.3.1. Base Raster Arm HT

The Raster Arm HT adds automated 2 axis scan capabilities to a high temperature crawler.

The Raster Arm HT can carry many different types of corrosion probes, including conventional 0° transducers, phased array probes and more.

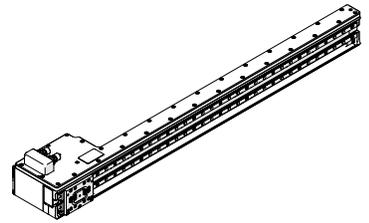


Fig. 24 - Base raster arm HT

4.3.2. Raster Arm Pivot Nose (Female)

The raster arm pivot nose (female) allows probe holders to be affixed to the raster arm.

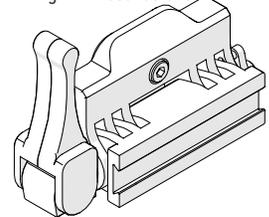


Fig. 25 - Raster arm pivot nose (female)

4.3.3. Raster Arm Cable

The raster arm cable connects the Raster Arm HT to the SKOOT HT. The cable provides the 36VDC and network connections to the Raster Arm HT and transmits the Raster Arm HT encoder signals.

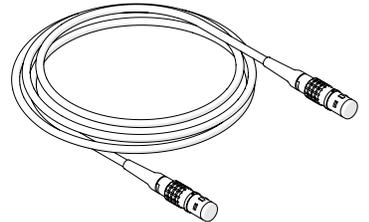


Fig. 26 - Raster arm cable

4.3.4. Hose: Red

A short red hose is provided to connect the Raster Arm HT to the SKOOT HT crawler.



Fig. 27 - Hose: Red

4.3.5. Raster Arm HT Case 300 mm/600 mm

The custom case holds all the components of the Raster Arm HT system.

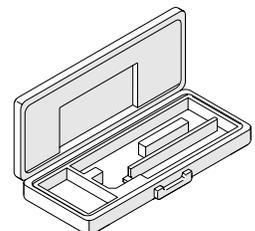


Fig. 28 - Raster arm HT case 300 mm/600 mm

PREPARATION FOR USE

5.1. SK00T HT Configuration

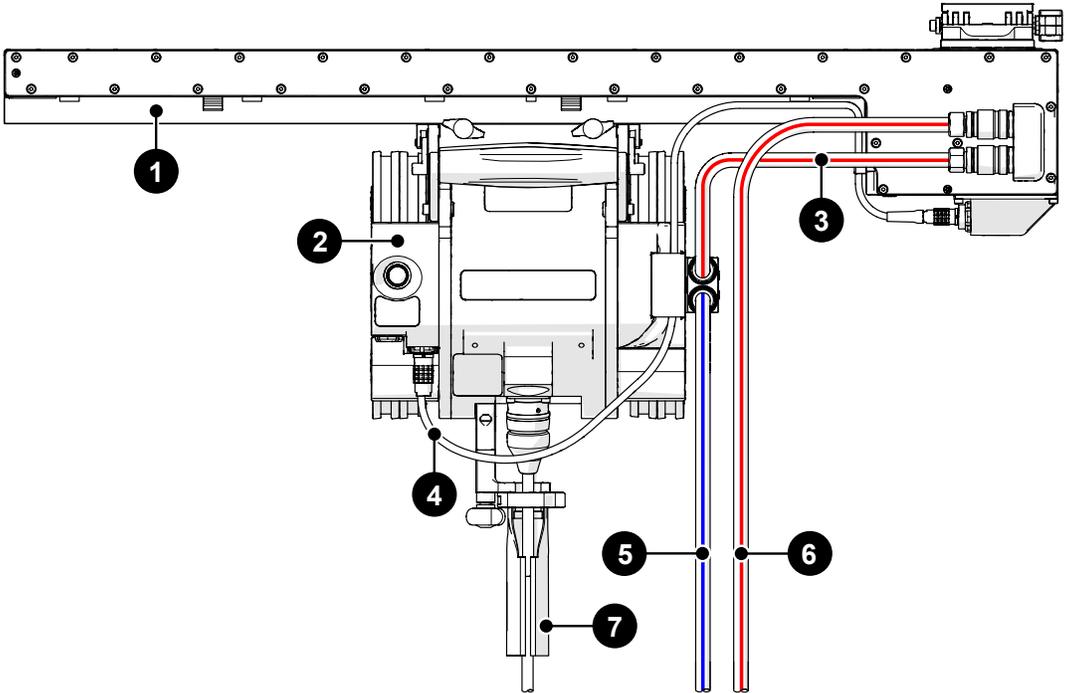


Fig. 29 - Raster Arm HT configuration

BOM ID	Description
1	Raster Arm HT
2	Crawler
3	Short red hose
4	Raster arm cable
5	Red Hose
6	Blue Hose
7	HT Cable Management

To configure a **SKOOT HT** with a Raster Arm HT, follow these steps:



CAUTION! DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnecting. Permanent damage to electronics could occur.



1. Install the **1** Raster Arm HT on the **2** crawler (see *Mounting a Raster Arm HT - Flat or Circumferential Only* on page 19 for additional details).
2. Connect from the **1** Raster Arm HT to the **2** crawler using the **4** raster arm cable (see *"Raster Arm Cable Setup"* on page 20).
3. Connect the **6** long red hose to either port on the **1** Raster Arm HT,
4. Connect the **3** short red hose to a port on the **2** crawler. Connect the opposite end to either port on the **1** Raster Arm HT.
5. Connect the **6** blue hose to the remaining port on the **2** crawler,
6. Attach the **7** HT cable management to the **2** crawler. Route the **5** red hose and the **6** blue hose through the HT cable management. (see *HT Cable Management* on page 23 for additional details).

TIP: (see *Cooler User Manual* for additional details).

5.2. Configurations

5.2.1. Corrosion Thickness Probe Holder

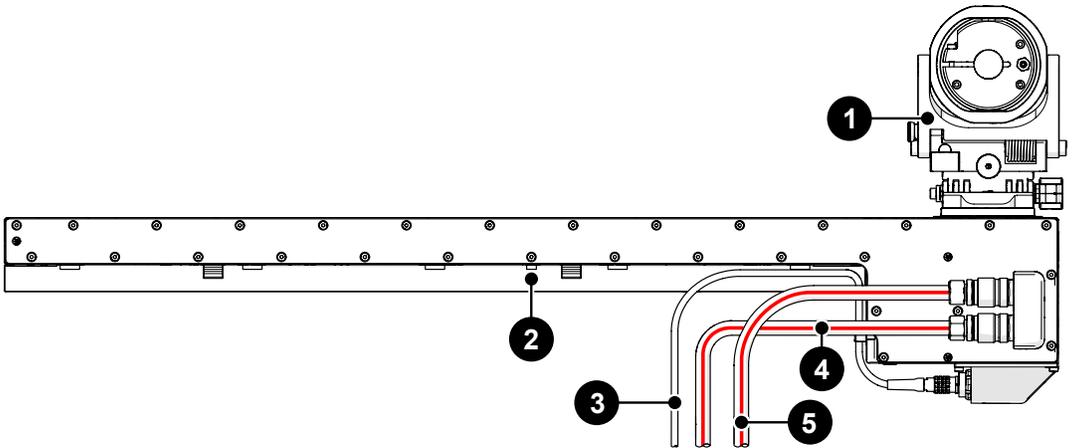


Fig. 30 - Raster Arm HT configuration

BOM ID	Description
1	Corrosion thickness probe holder
2	Raster Arm HT
3	Raster arm cable
4	Red hose
5	Red hose

To configure a Raster Arm HT with a corrosion thickness probe holder, follow these steps (see *Corrosion Thickness Probe Holder* on page 32 for additional details):

1. Install the 1 corrosion thickness probe holder on the 2 Raster Arm HT's pivot nose.
2. Connect the 3 raster arm cable to the 2 Raster Arm HT and the opposite end as required.
3. Connect the 4 5 red hoses as required.

5.2.2. Heavy Duty Vertical Probe Holder

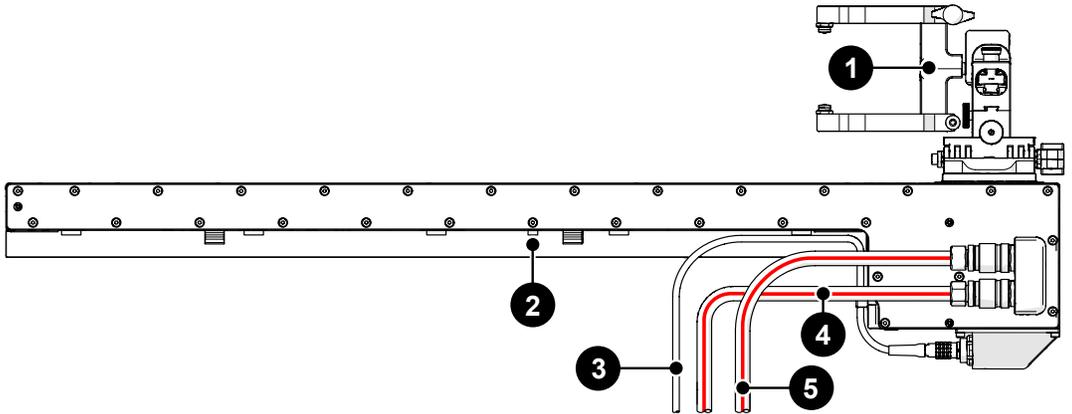


Fig. 31 - Raster Arm HT configuration

BOM ID	Description
1	Heavy duty vertical probe holder
2	Raster Arm HT
3	Raster arm cable
4	Red hose
5	Red hose

To configure a Raster Arm HT with corrosion thickness probe holder, follow these steps (see *Heavy Duty Vertical Probe Holder* on page 25 for additional details):

1. Install the 1 heavy duty vertical probe holder on the 2 Raster Arm HT's pivot nose.
2. Connect the 3 raster arm cable to the 2 Raster Arm HT and the opposite end as required.
3. Connect the 4 5 red hoses as required.

5.2.3. Dual Probe Raster Arm HT

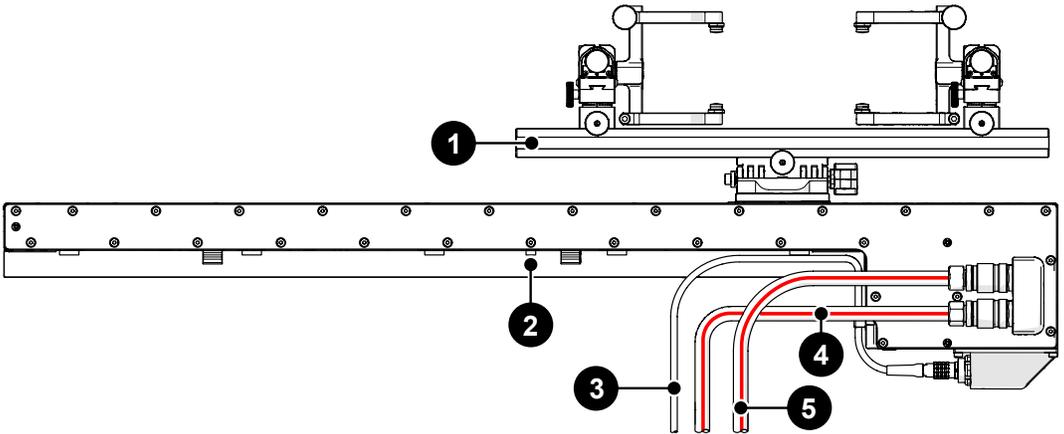


Fig. 32 - Raster Arm HT configuration

BOM ID	Description
1	Heavy duty vertical probe holder
2	Raster Arm HT
3	Raster arm cable
4	Red hose
5	Blue hose

To configure a Raster Arm HT with a dual probe holder, follow these steps (see *Dual Probe Raster Arm HT on page 30 for additional details*):

1. Install the 1 frame bar and vertical probe holders on the 2 Raster Arm HT's pivot nose.
2. Connect the 3 raster arm cable to the 2 Raster Arm HT and the opposite end as required.
3. Connect the 4 5 red hoses as required.

5.3. Mounting a Raster Arm HT - Flat or Circumferential Only

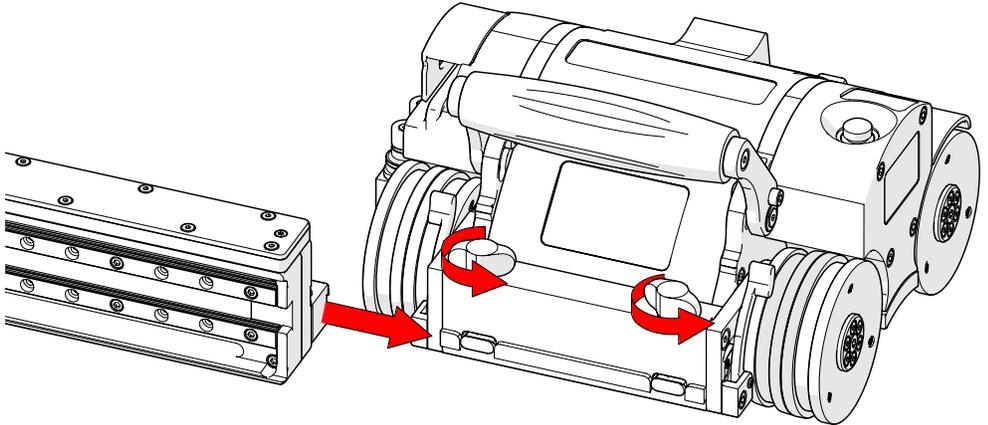


Fig. 33 - Slide onto one swivel mount

1. Loosen the two black wing knobs and slide the Raster Arm HT's mounting rail onto the dovetail jaws of the crawler (*Fig. 33*).

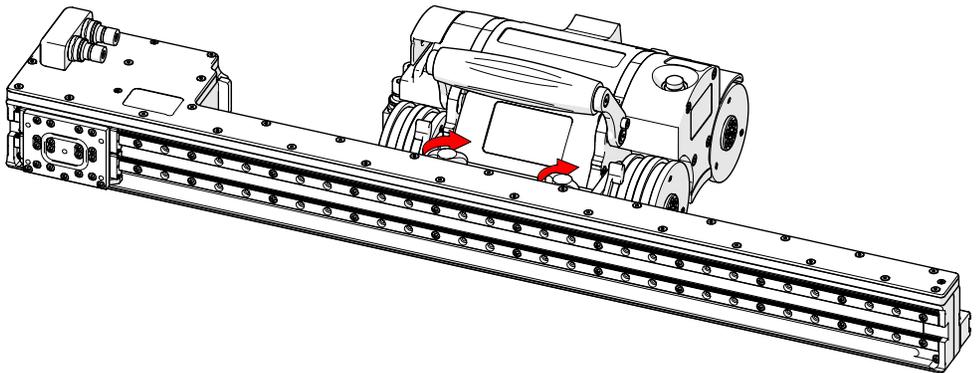


Fig. 34 - Tighten black wing knobs

2. Tighten the two black wing knobs to secure the Raster Arm HT (*Fig. 34*).

5.3.1. Raster Arm Cable Setup



CAUTION! DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnecting. Permanent damage to electronics could occur.

Both connectors on the Raster Arm Cable are identical and interchangeable. Plug one end of the cable to the Raster Arm HT and the opposite end is connected to the crawler.

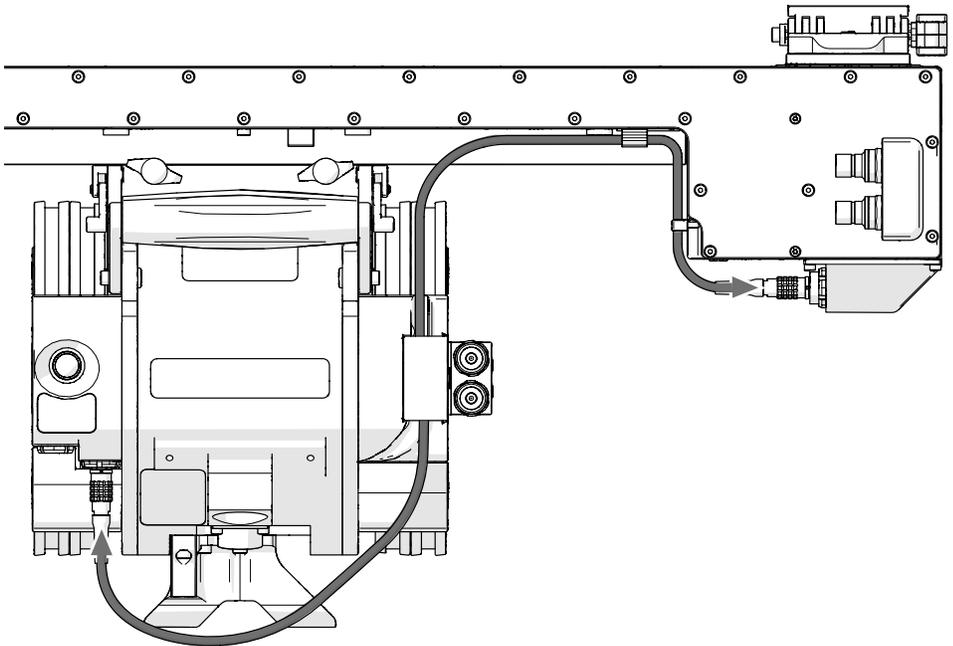


Fig. 35 - Raster arm cable routing

NOTE: Before use, inspect cable and connectors for damage. If any damage is evident, the cable must **NOT** be used. Using damaged cables may be a safety hazard and could also put other system components at risk.

1. Plug the supplied Raster Arm HT cable into the Raster Arm HT's connector (Fig. 35) located on the Raster Arm HT encoder housing. Press the Raster Arm HT cable into the first cable bracket on the side of the Raster Arm HT encoder housing.

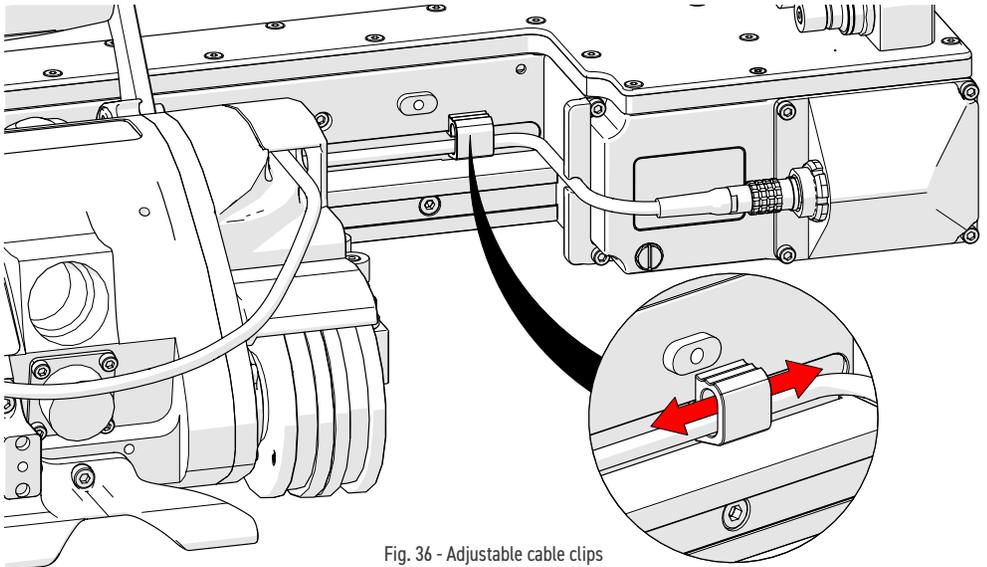


Fig. 36 - Adjustable cable clips

2. Route the Raster Arm cable through the cable management clips and press the clips onto the side of the Raster Arm HT (Fig. 36). These clips slide along the Raster Arm HT, allowing the raster arm cable to be positioned as required.

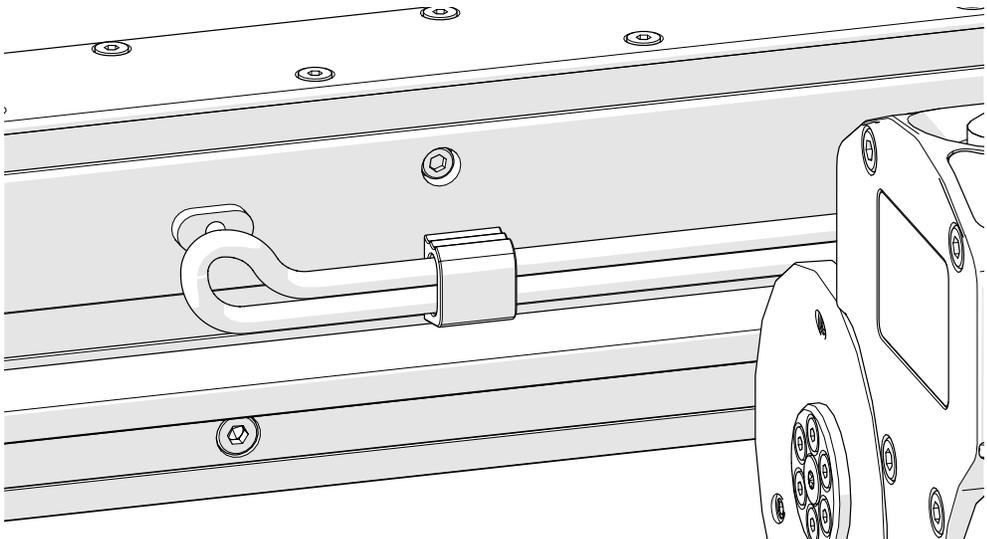


Fig. 37 - Route cable through the clip twice

The cable management clips can accommodate two cables when necessary to route excess cabling (Fig. 37).

5.3.2. Quick Connect Fitting

The quick connect fittings on the top of the Raster Arm HT provide a connection point for hose fittings.

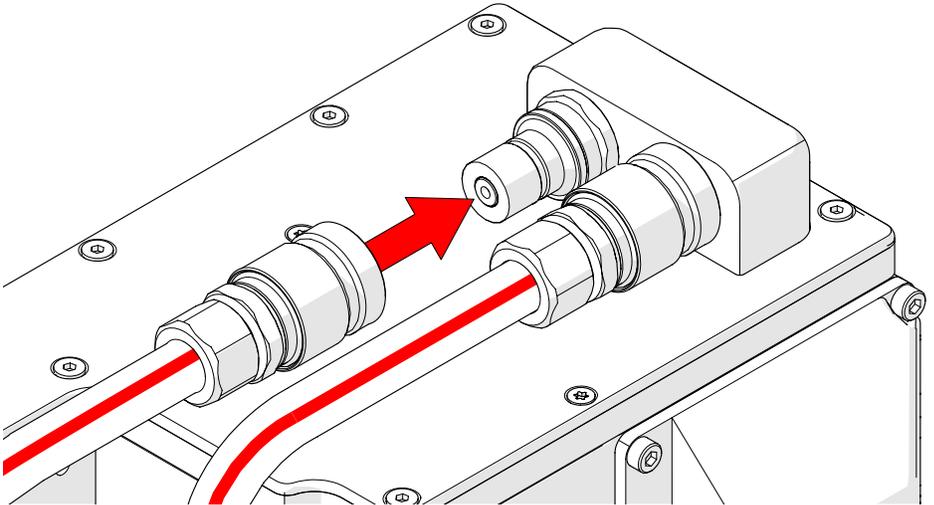


Fig. 38 - Press the hose onto the quick connect

Press the hose fitting onto the quick connect to attach (Fig. 38).

TIP: The red hoses may be connected to either quick connect.

5.4. HT Cable Management

The HT Cable Management is offered in a variety of lengths and provides a means of bundling and protecting cables and hoses that connect to the scanner. To attach the HT Cable Management (see *SKOOT HT User Manual* for additional details).

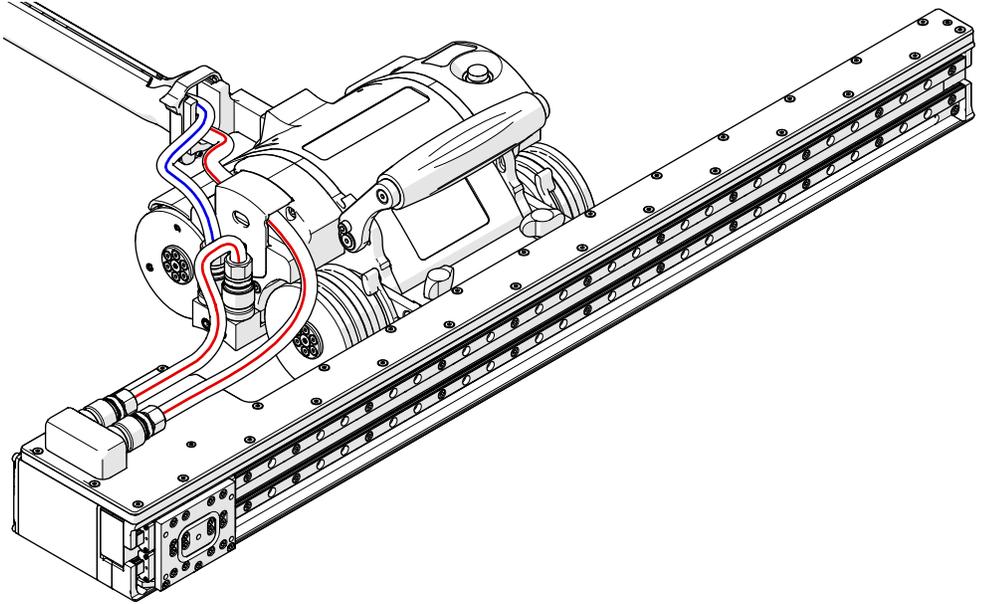


Fig. 39 - HT cable management

5.4.1. Hose Connection and Routing

The hoses carry coolant, which dissipates heat in the various components. The hoses **MUST** be routed through the HT cable management system.

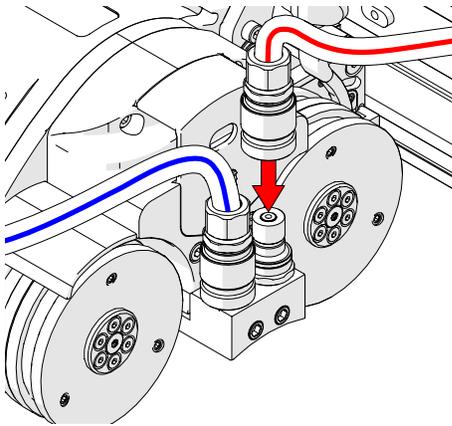


Fig. 40 - Connect hoses to crawler

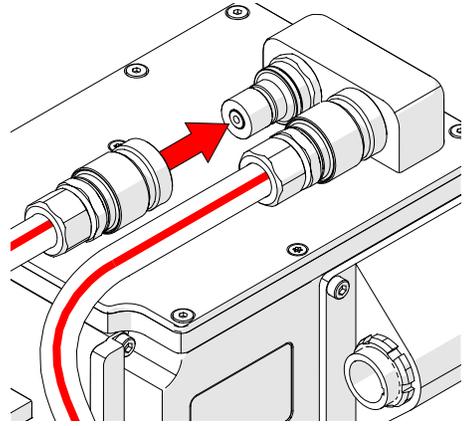


Fig. 41 - Connect hoses to raster arm

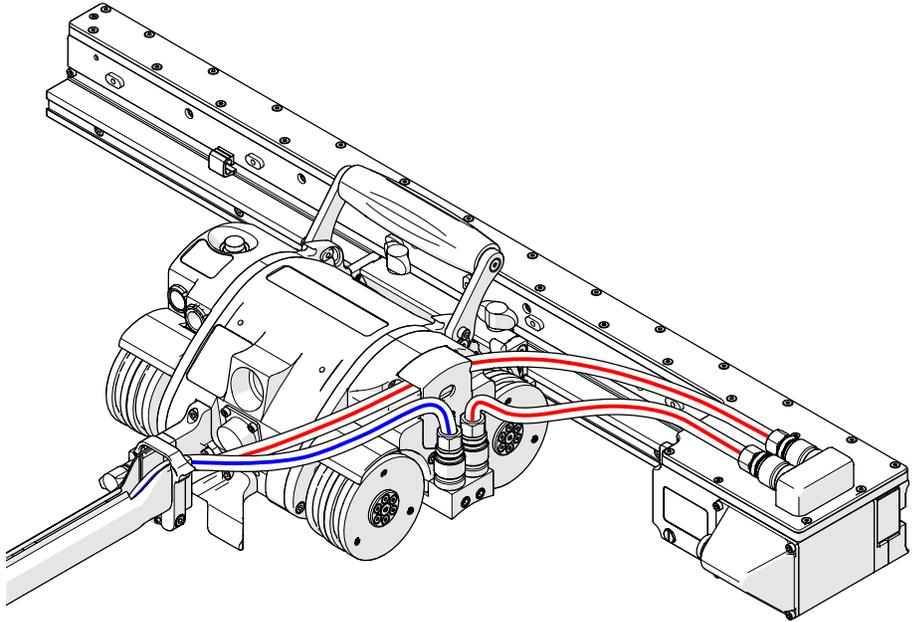


Fig. 42 - Hose routing with raster arm

To route hoses with a Raster Arm HT, follow these steps:

1. Connect the hose fittings to the crawler's quick connect fittings (*Fig. 40*).
2. Connect the hose fittings to the Raster Arm HT's quick connect fittings (*Fig. 41*).
3. Route the hoses through the cable management system and connect them to the Cooler (*Fig. 42*).

5.5. Probe Holders

5.5.1. Heavy Duty Vertical Probe Holder

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

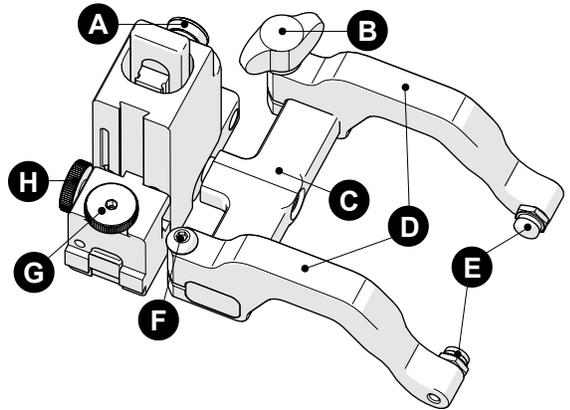


Fig. 43 - Heavy duty vertical probe holder

5.5.1.1 Probe Holder Setup

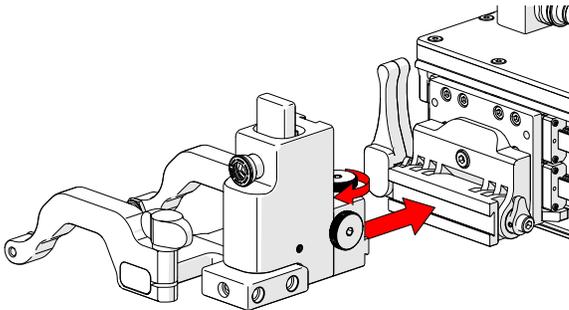


Fig. 44 - Mount probe holder to carrier

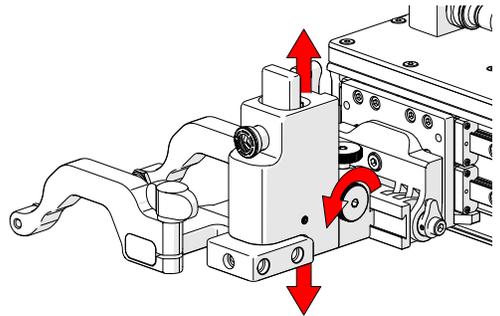


Fig. 45 - Vertical adjustment

1. Loosen the probe holder adjustment knob (Fig. 44) and mount the heavy duty vertical probe holder's dovetail jaw to the carrier.
2. The vertical adjustment knob (Fig. 45) allows the heavy duty vertical probe holder's height adjustment. This adjustment also controls the probe holder's spring tension.

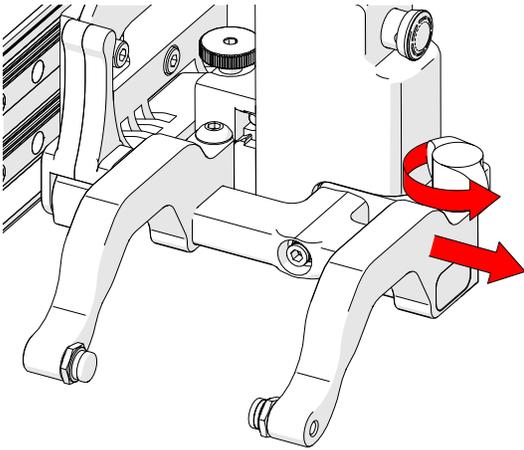


Fig. 46 - Remove outer arm

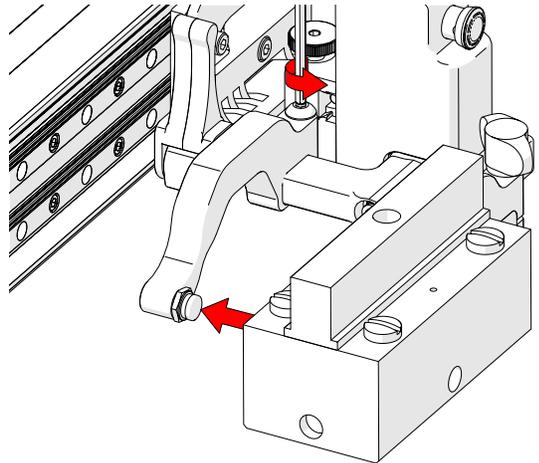


Fig. 47 - Adjust inner arm

3. Loosen the probe holder adjustment knob and remove the outer probe holder arm (Fig. 46).
4. Loosen the arm clamp screw (Fig. 47).
5. Place the wedge on the pivot button of the inner probe holder arm (Fig. 46).

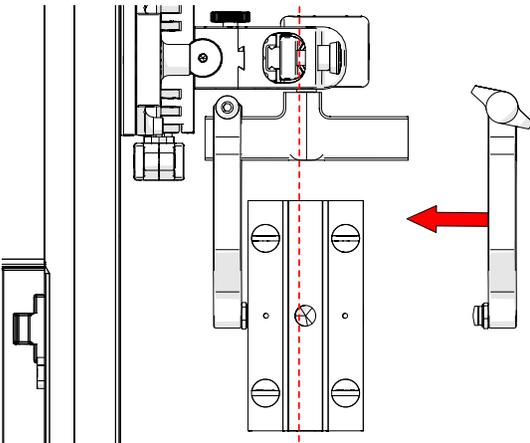


Fig. 48 - Align probe with yoke

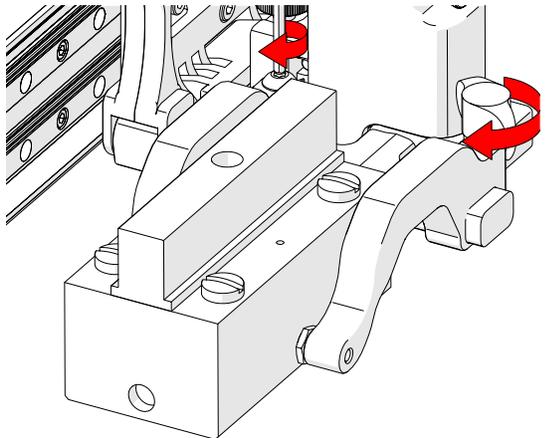


Fig. 49 - Tighten knobs and screws

6. Align the middle of the wedge with the centre of the yoke (Fig. 48).
7. Tighten both the probe holder adjustment knob and the arm clamp screw (Fig. 49) while ensuring the wedge remains centred with the yoke.

5.5.1.2 Probe Holder Vertical Adjustment

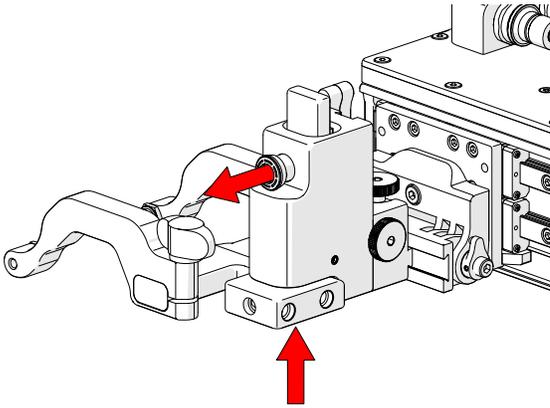


Fig. 50 - Press up and pull latch

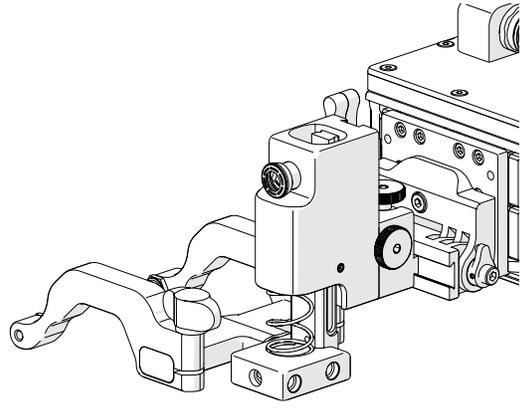


Fig. 51 - Lowered toward scan surface

1. Gently lift the heavy duty vertical probe holder and simultaneously pull the latch (*Fig. 50*). This action will unlock the probe holder. Slowly lower the probe holder towards the scan surface (*Fig. 51*).

5.5.1.3 Probe Holder Left/Right Conversion

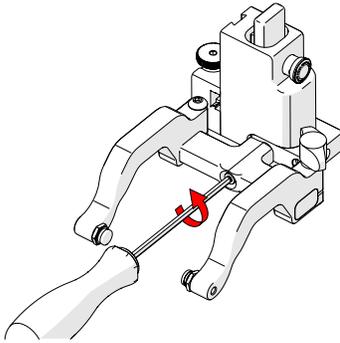


Fig. 52 - Remove yoke

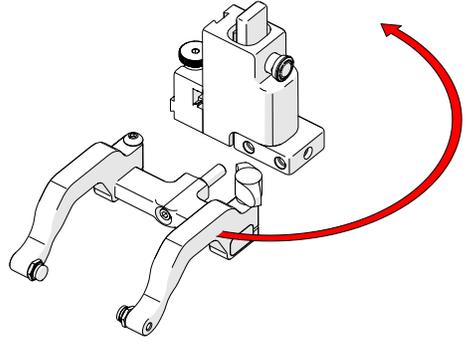


Fig. 53 - Orient to opposite side

1. Using the supplied 3 mm driver, unscrew the yoke (Fig. 52).
2. Position the yoke and arms to the opposite side of the probe holder (Fig. 53).

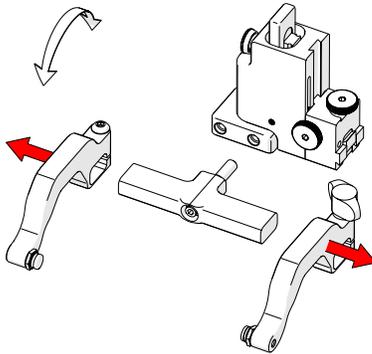


Fig. 54 - Remove probe holder arms

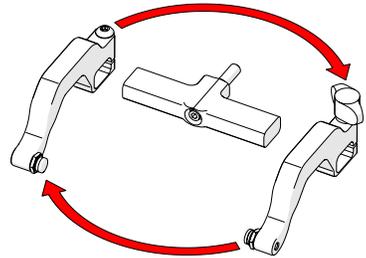


Fig. 55 - Reverse position around yoke

3. Loosen the arm clamp screw and the probe holder arm adjustment knob allowing removal of the probe holder arms (Fig. 54).
4. Position the removed arms on the opposite sides of the yoke (Fig. 55).

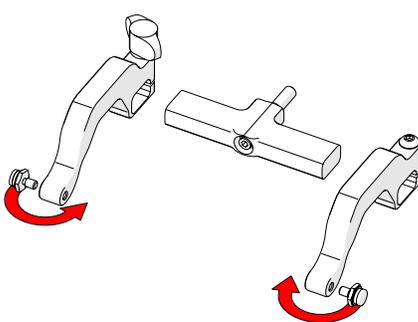


Fig. 56 - Position pivot buttons

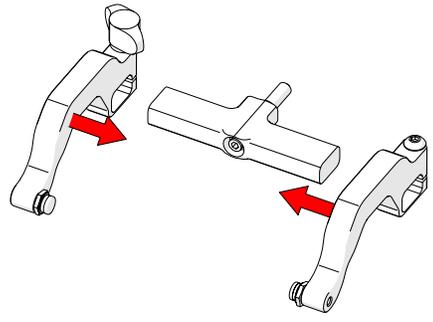


Fig. 57 - Place arms back onto yoke

5. Position the pivot buttons to the inside of the probe holder arms (Fig. 56).
6. Place the probe holder arms on the yoke and tighten the arm clamp screw and probe holder adjustment knob (Fig. 57).
7. Screw the yoke to the probe holder (Fig. 58).

TIP: When using a standard yoke length, position the yoke in the threaded hole closest to the frame bar. When using a long yoke length, position the yoke in the threaded hole furthest from the frame bar.

5.5.1.4 Probe Holder 90° Adjustment

1. Remove the yoke using the supplied 3 mm hex driver (Fig. 52).
2. Orient the yoke to the front of the probe holder and screw the yoke into the threaded hole provided (Fig. 59).

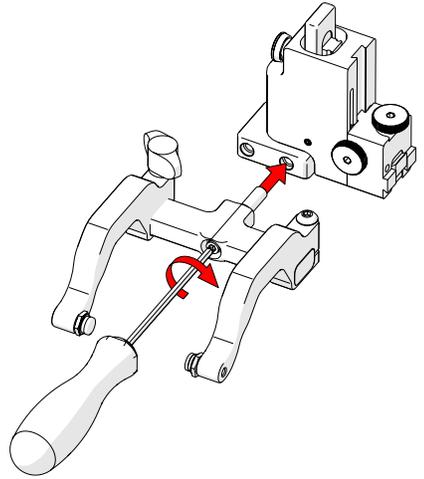


Fig. 58 - Screw into threaded hole

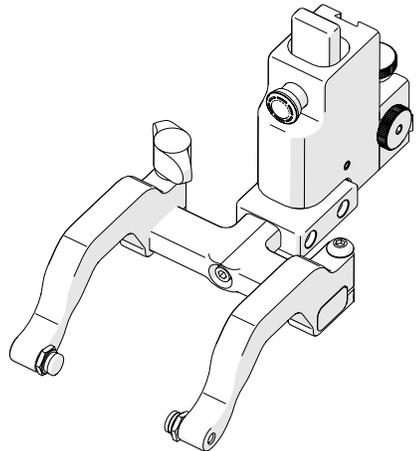


Fig. 59 - 90° probe holder positioning

5.5.2. Dual Probe Raster Arm HT

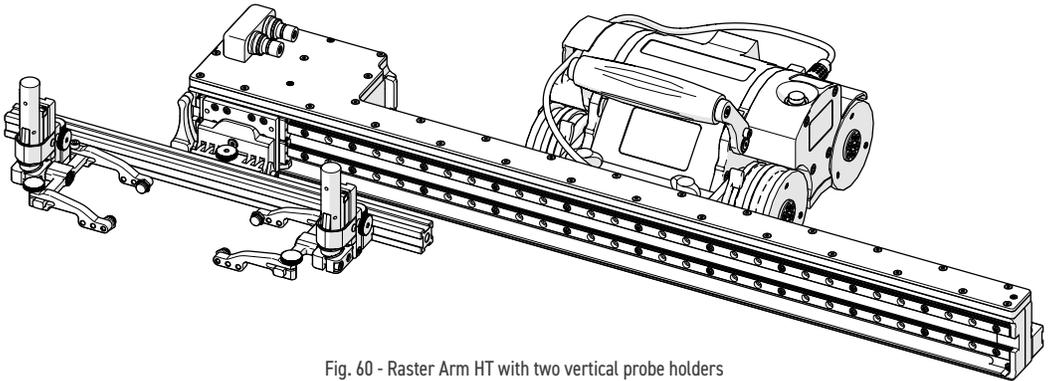


Fig. 60 - Raster Arm HT with two vertical probe holders

To mount two vertical probe holders to the Raster Arm HT, follow these steps:

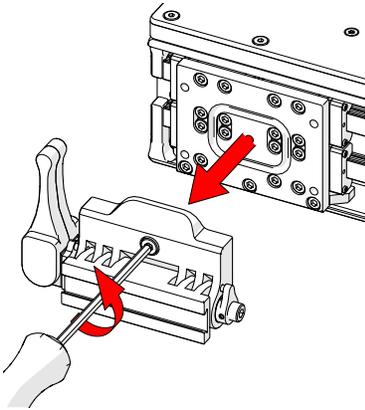


Fig. 61 - Remove pivot nose

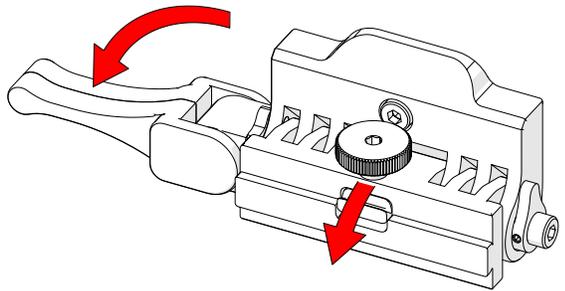


Fig. 62 - Angle pivot nose down

NOTE: Do not mount in excess of 2 probe holders to the front of the Raster Arm HT.

1. Using the supplied 3 mm hex driver, remove the Raster Arm HT pivot nose (*female*) from the Raster Arm HT (Fig. 61).
2. Release the side lever of the Raster Arm HT pivot nose (*male*) and angle the Raster Arm HT pivot nose downward (Fig. 62).
3. Mount the (*male*) pivot nose (*sold separately*) to the Raster Arm HT (Fig. 63).

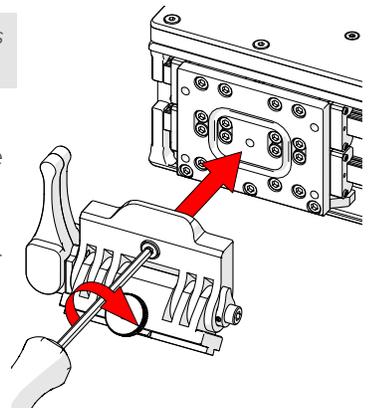


Fig. 63 - Install (male) pivot nose

4. Mount a frame bar to the Raster Arm HT pivot nose (Fig. 64).

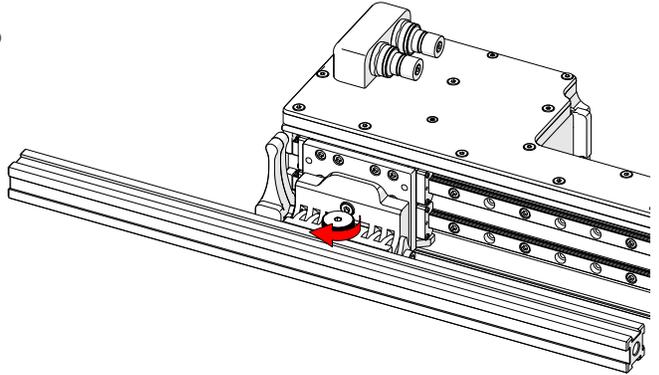


Fig. 64 - Mount frame bar

5. Follow the steps (see "Probe Holder Setup" on page 35) to mount and set up the vertical probe holders (Fig. 65).

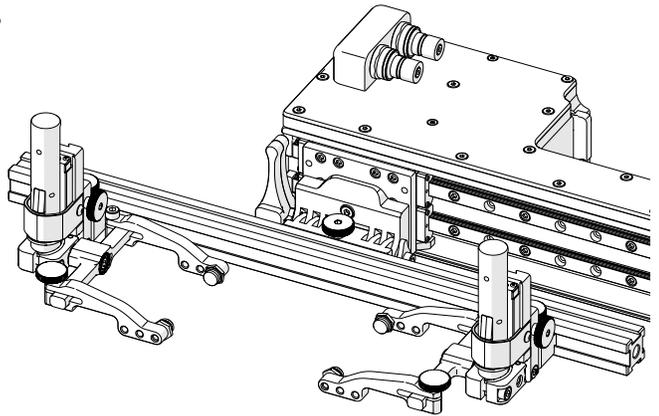


Fig. 65 - Mount probe holders

5.5.3. Corrosion Thickness Probe Holder



DANGER! FALLING OBJECT HAZARD. It is imperative that the steps below be followed to properly set the latched height of the probe holders. If the height of the probe holders is set too low, the crawler may fall and **SEVERE INJURY** or **DEATH** could result.

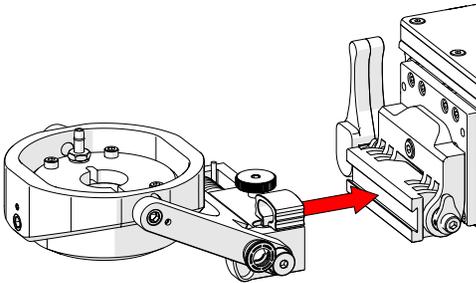


Fig. 66 - Attached to dovetail jaw

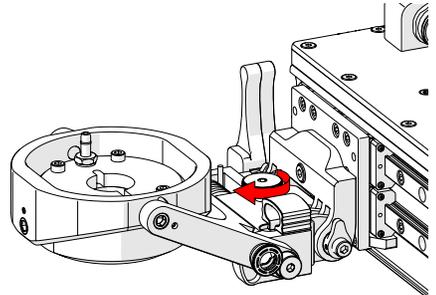


Fig. 67 - Tighten knob

1. Align the dovetail jaw of the corrosion thickness probe holder (Fig. 66) and the pivot mount of the Raster Arm HT.
2. Tighten the probe holder adjustment knob (Fig. 67).

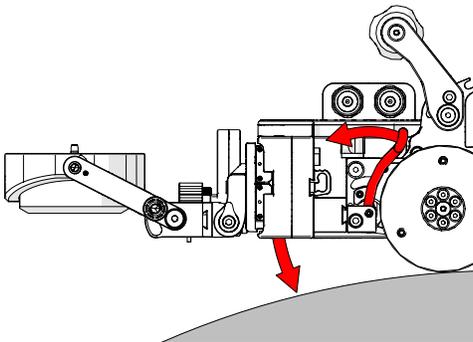


Fig. 68 - Pivot Raster Arm HT

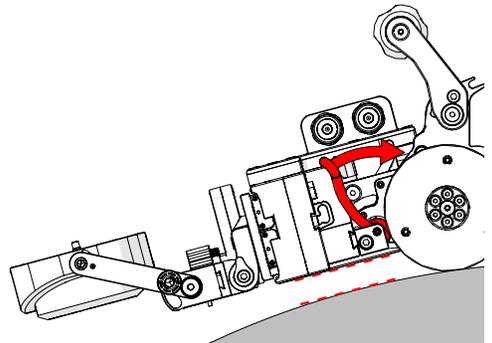


Fig. 69 - Parallel with scan surface

3. Release the two levers on the swivel mount to allow pivoting of the Raster Arm HT (Fig. 68).
4. Align the Raster Arm HT parallel with the tangent of the scan surface (Fig. 69).
5. Engage the swivel mount levers to lock the Raster Arm HT position (Fig. 69).

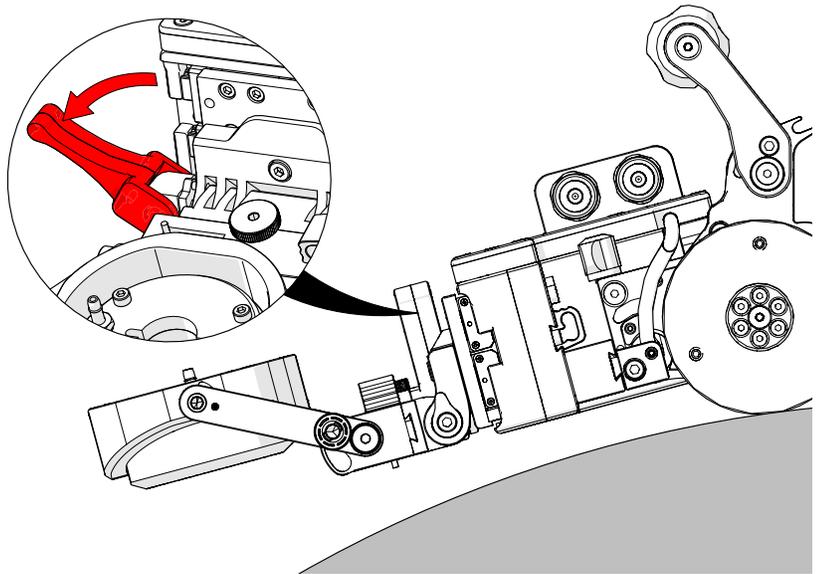


Fig. 70 - Release Raster Arm HT pivot nose latch

6. Release the Raster Arm HT pivot nose latch (Fig. 70).

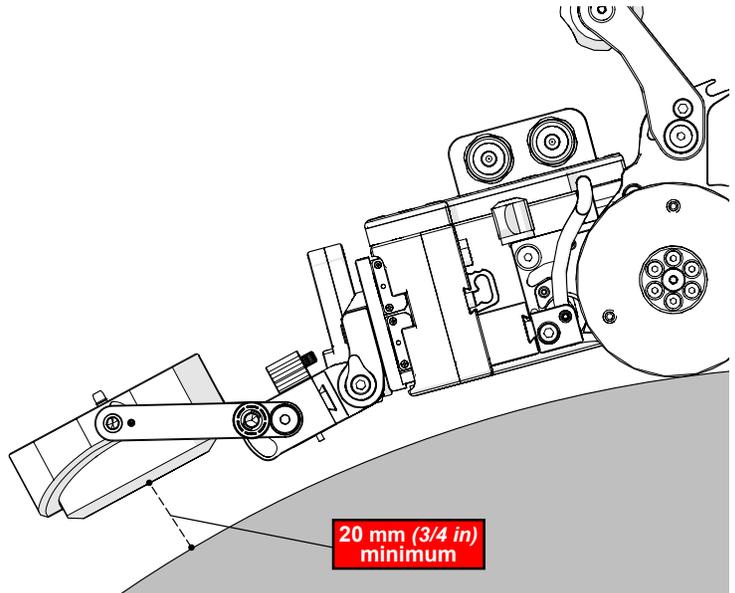


Fig. 71 - Latch pivot nose

7. Lower the probe holder to roughly 20 mm ($\frac{3}{4}$ in) above the scan surface (Fig. 71), and latch the Raster Arm HT pivot nose at this position.

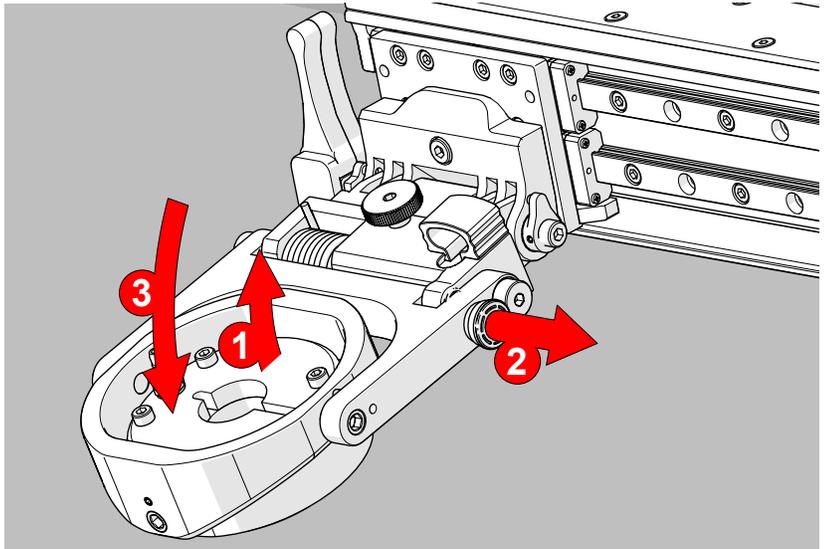


Fig. 72 - Pull probe holder latch to release corrosion thickness probe holder

1. Gently lift the probe holder (*Fig. 72-1*).
2. Pull the probe holder latch (*Fig. 72-2*).
3. Lower the probe holder gently to the scan surface (*Fig. 72-3*).

5.5.4. 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

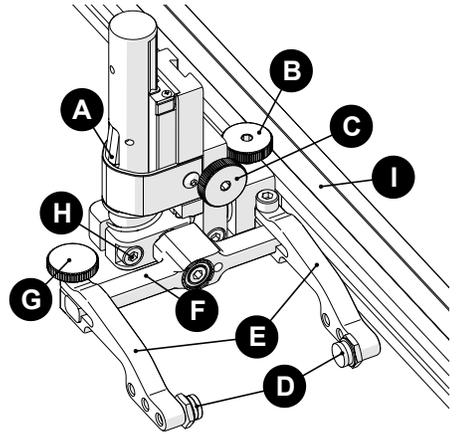


Fig. 73 - Vertical probe holder

5.5.4.1 Probe Holder Setup

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

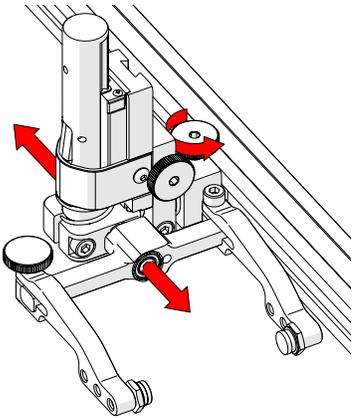


Fig. 74 - Adjust on frame bar

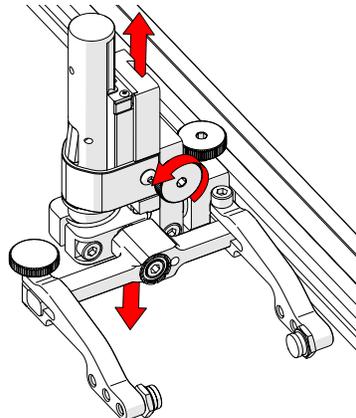


Fig. 75 - Vertical adjustment

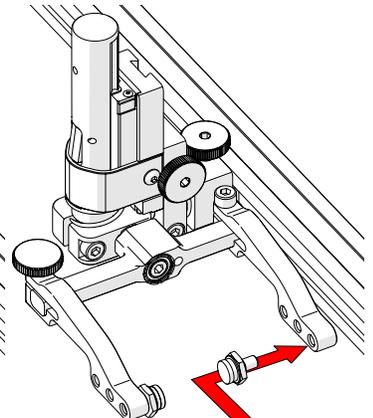


Fig. 76 - Place buttons

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. 74).
2. The vertical adjustment knob allows the vertical probe holder height adjustment (Fig. 75).
3. Position the pivot buttons where necessary. When a narrow scanning footprint is required, use the pivot button holes closest to the yoke (Fig. 76).

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

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

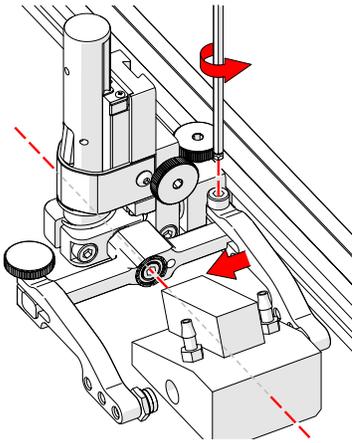


Fig. 77 - Adjust inner arm

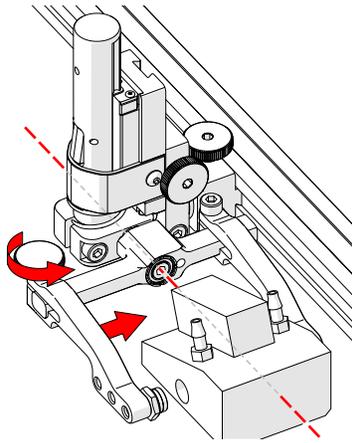


Fig. 78 - Adjust outer arm

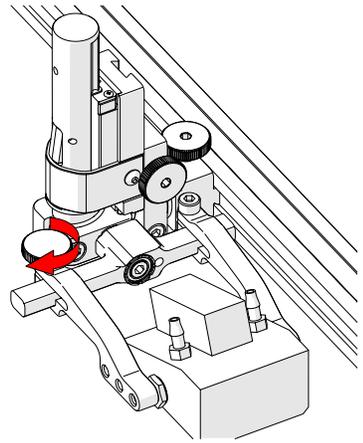


Fig. 79 - Tighten arm knob

4. Position the wedge on the inner probe holder arm (Fig. 77).

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 'rocking' when scanning. Position the inner probe holder arm accordingly (Fig. 77) using the 3 mm hex driver (Fig. 18).

5. Loosen the probe holder arm adjustment knob (Fig. 78) and slide the probe holder arm along the yoke pinching the wedge in place.
6. Tighten the probe holder arm adjustment knob (Fig. 79).

5.5.4.2 Probe Holder Vertical Adjustment

To adjust the probe holder vertically, follow these steps:

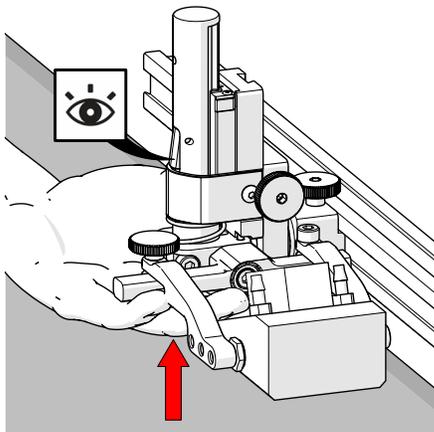


Fig. 80 - Latch probe holder

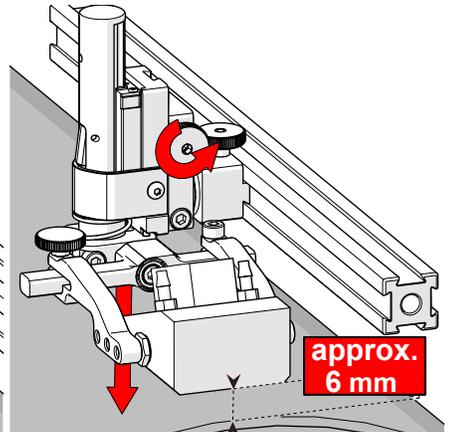


Fig. 81 - Lower toward scan surface

1. Ensure the probe holder is in the latched, upper position. Lift the probe holder until the latch is fully exposed and snaps out to lock (Fig. 80).
2. Loosen the vertical adjustment knob and slide the probe holder down until the wedge is approximately 6 mm ($\frac{1}{4}$ in) above inspection surface.
3. Tighten the vertical adjustment knob (Fig. 81).

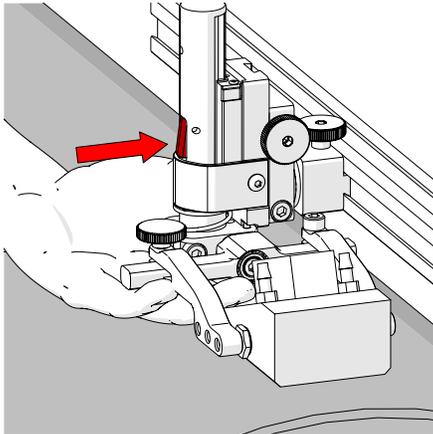


Fig. 82 - Press latch button

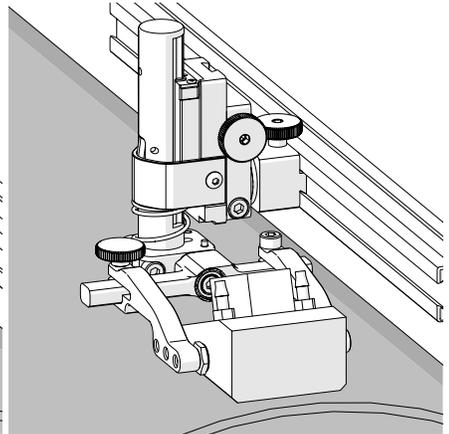


Fig. 83 - Lower toward scan surface

4. Lift the yoke slightly and press the latch button (Fig. 82), then slowly lower towards scanning surface to apply spring pressure to the wedge (Fig. 83).

TIP: If less spring force is desired, refer to step 2 and place the wedge approximately 20 mm ($\frac{3}{4}$ in) above the inspection surface.

5.5.4.3 Probe Holder Transverse Adjustment

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

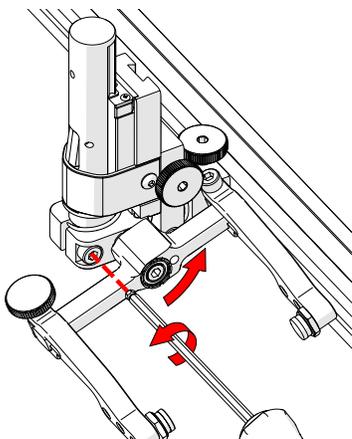


Fig. 84 - Loosen 3 mm screw

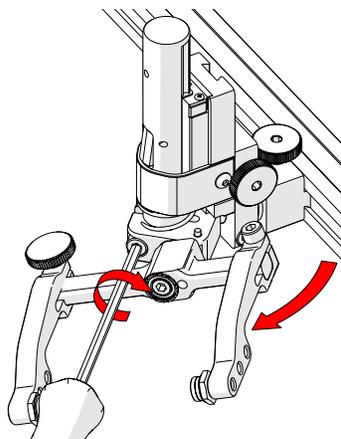


Fig. 85 - Rotate and tighten

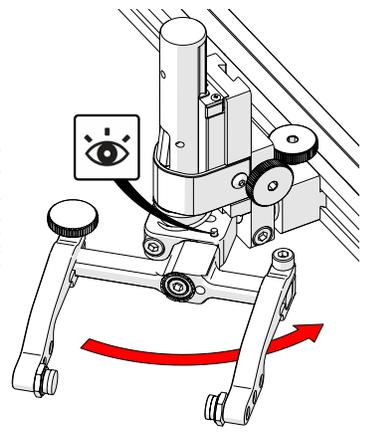


Fig. 86 - Stop post locates 90°

1. Ensure the probe holder is in the latched, upper position (Fig. 80).
2. Using the supplied 3 mm hex driver loosen the transverse adjustment screw (Fig. 84) and rotate the yoke about the vertical shaft achieving the desired angle.
3. Tighten the transverse adjustment screw (Fig. 85).

To return the transverse adjustment to neutral (90°). The probe holder must be in the latched, upper position (Fig. 80). Rotate the yoke until the stop post contacts the base of the probe holder (Fig. 86). Then tighten the transverse adjustment screw.

5.5.4.4 Probe Holder Longitudinal Adjustment

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

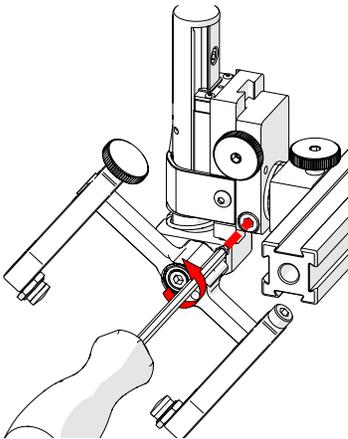


Fig. 87 - Loosen 3 mm screw

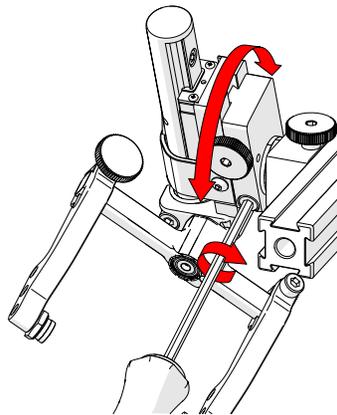


Fig. 88 - Rotate to position

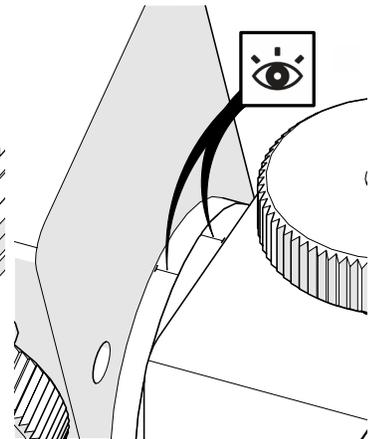


Fig. 89 - Line up markers

1. Ensure the probe holder is in the latched, upper position (Fig. 80).
2. Using the supplied 3 mm hex driver (Fig. 18), loosen the longitudinal adjustment screw (Fig. 87).
3. Rotate the main body of the probe holder until it is at the desired angle (Fig. 88).
4. Tighten the longitudinal adjustment screw (Fig. 88).

To return the longitudinal adjustment to neutral (90°). Line up the longitudinal adjustment indicator markers (Fig. 89).

5.5.4.5 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. 21) is required.

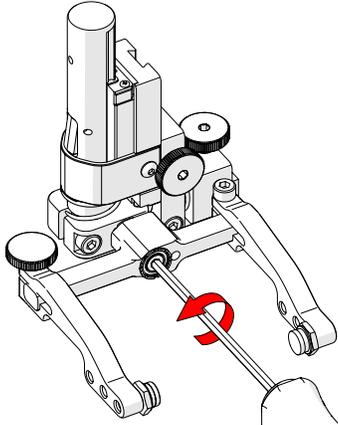


Fig. 90 - Unscrew yoke pivot screw

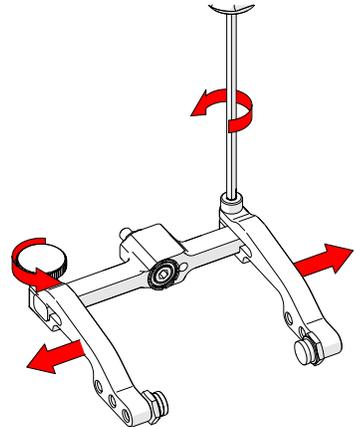


Fig. 91 - Remove probe holder arms

1. Ensure the probe holder is in the latched, upper position (Fig. 80).
2. Using the supplied 3 mm hex driver, unscrew the yoke pivot screw and remove the yoke (Fig. 90).
3. Loosen the probe holder arm adjustment knob and the arm clamp screw. Slide the probe holder arms off the yoke (Fig. 91).

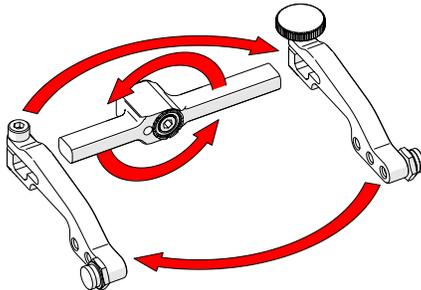


Fig. 92 - Flip yoke and reverse arms

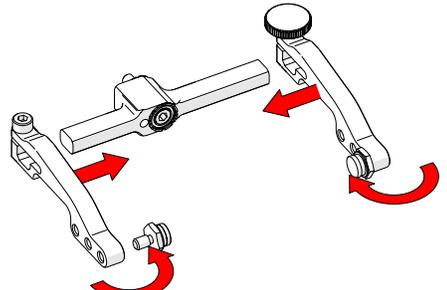


Fig. 93 - Attach arms & move buttons

4. Flip the yoke 180° and reverse the probe holder arms (Fig. 92).
5. Place the pivot buttons on the inside of the probe holder arms (Fig. 19) using a 3/8 in wrench (Fig. 19).

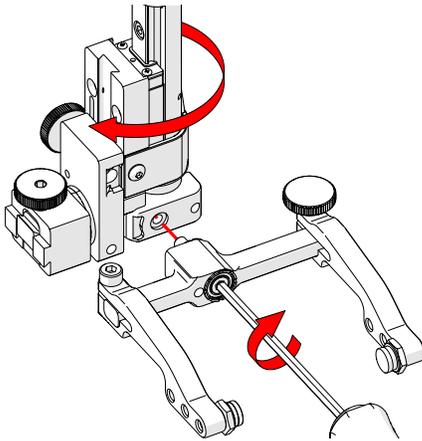


Fig. 94 - Screw yoke to opposite side

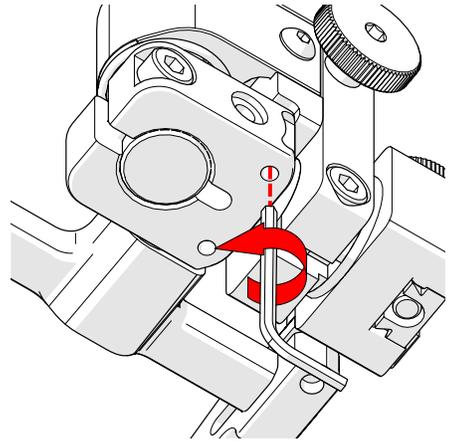


Fig. 95 - Lower 90° stop post

6. Mount the yoke to the opposite side of the base using the supplied 3 mm hex driver (Fig. 94).

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 on the bottom of the probe holder. Unscrew the stop post using a 1.5 mm hex wrench (Fig. 21) until it has cleared all obstructions. Do not remove the stop post (Fig. 95).

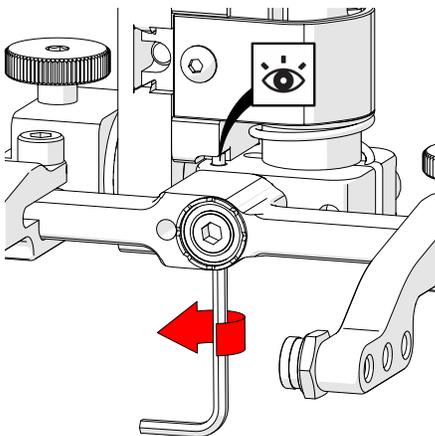


Fig. 96 - Raise opposite 90° stop post

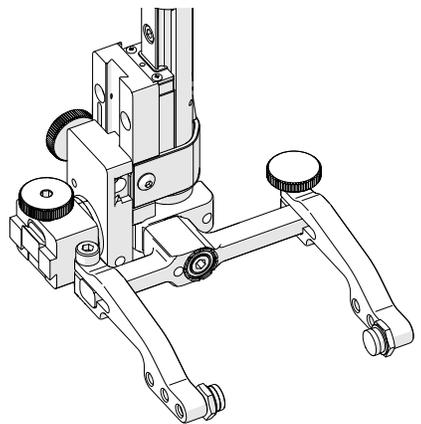
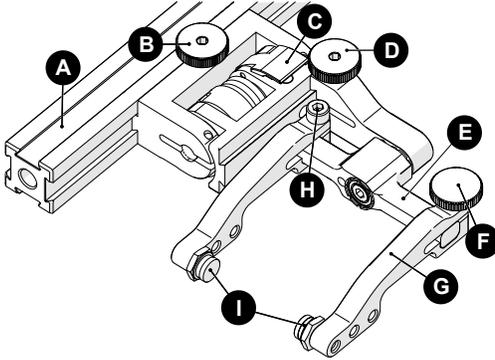


Fig. 97 - Reversed probe holder

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. 96).

5.5.5. 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. 98 - Slip Joint Probe Holder

5.5.5.1 Probe Holder Setup

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

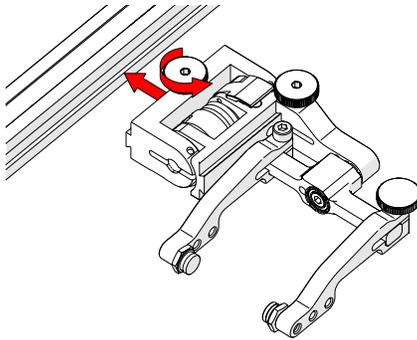


Fig. 99 - Attach to frame bar

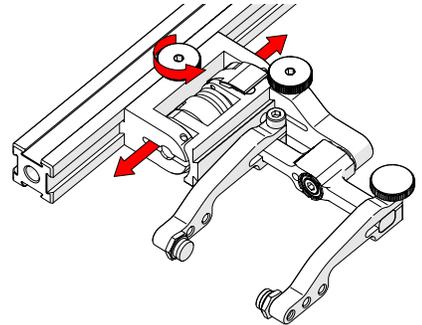


Fig. 100 - Adjust on frame bar

1. Rotate the probe holder adjustment knob and attach the probe holder to a frame bar (Fig. 99).
2. Use the probe holder adjustment knob to position the probe holder along the frame bar (Fig. 100).

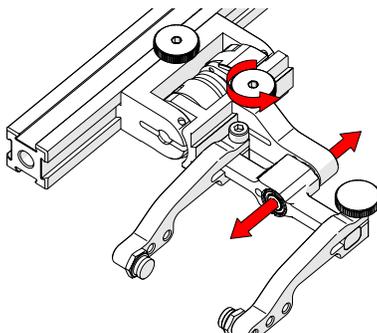


Fig. 101 - Adjust swing arm

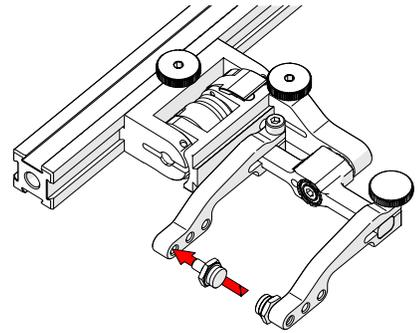


Fig. 102 - Place pivot buttons

3. Use the swing arm knob to position the swing arm (Fig. 101).

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.

4. Using the supplied 3/8 in wrench, place the pivot buttons (Fig. 102) farthest from the yoke for maximum wedge clearance.

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.

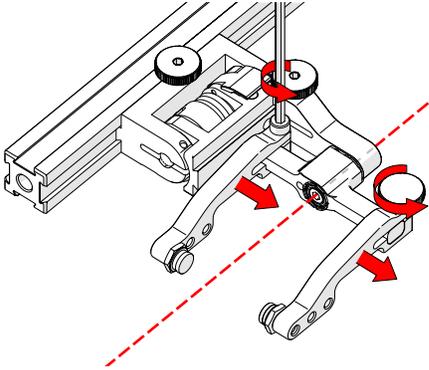


Fig. 103 - Adjust probe holder arms

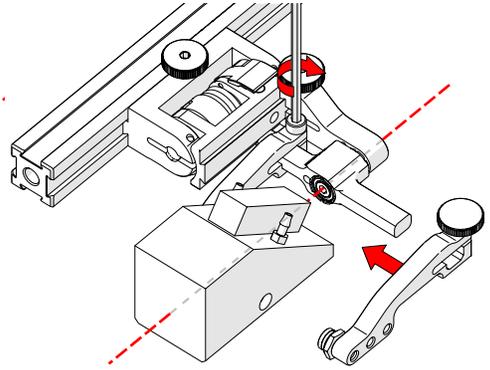


Fig. 104 - Place wedge

5. Loosen the probe holder arm adjustment knob (Fig. 103) 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. 103).

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 to reduce wedge tipping when scanning. Position the inner probe holder arm accordingly with the centre of the yoke (Fig. 103).

7. Position the wedge on the inner probe holder arm (Fig. 104).
8. Slide the outer probe holder arm along the yoke pinching the wedge in place.
9. Tighten the probe holder arm adjustment knob (Fig. 105).

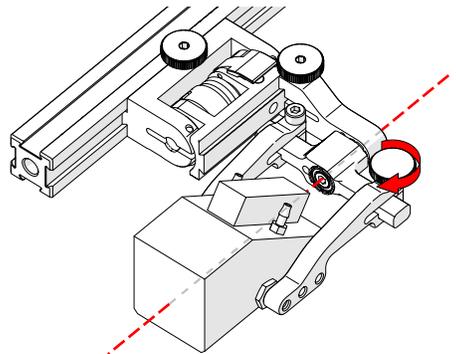


Fig. 105 - Pinch wedge with arm

5.5.5.2 Probe Holder Adjustment

To adjust the probe holder, follow these steps:

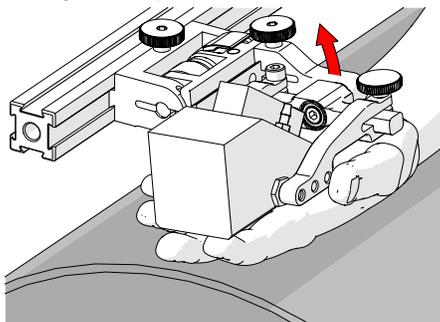


Fig. 106 - Lift to latched position

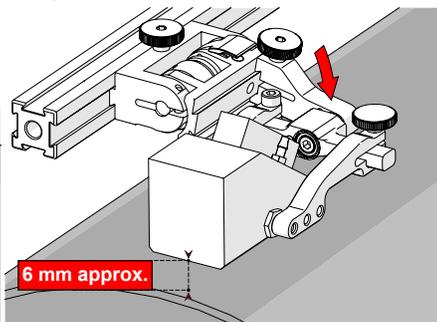


Fig. 107 - Lower to scanning surface

1. Ensure the probe holder is in the latched, upper position (Fig. 106). 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 ($\frac{1}{4}$ in) above the inspection surface (Fig. 107).

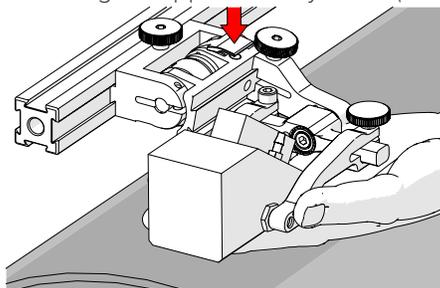


Fig. 108 - Lift and press latch button

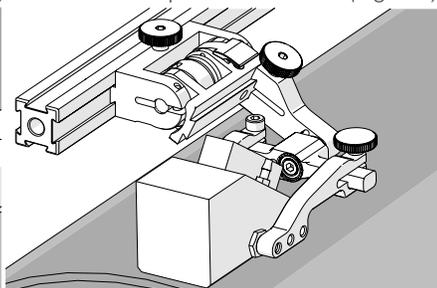


Fig. 109 - Spring loaded scan position

3. Lift the probe slightly and press the latch button (Fig. 108) to apply spring pressure to the wedge.
4. Gently lower probe holder and wedge to the scanning surface (Fig. 109).

5.5.5.3 Probe Holder Force Adjustment

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

NOTE: To perform this operation, the 2 mm hex wrench (Fig. 22) and 3 mm hex wrench (Fig. 18) are required.

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 the scanning surface.

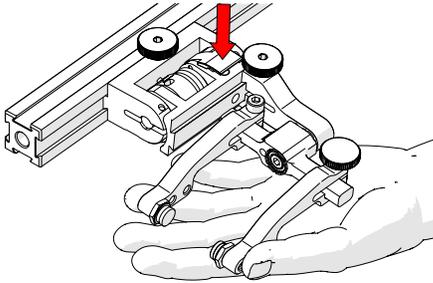


Fig. 110 - Lift slightly and press Latch

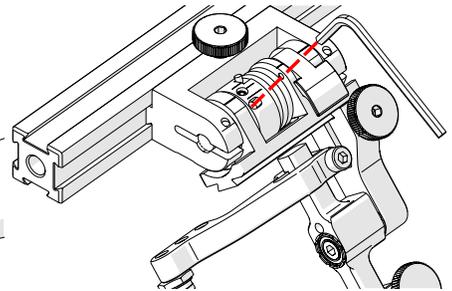


Fig. 111 - Unlatched position

1. Ensure the probe holder is in the upright latched position (Fig. 106).
2. Lift the probe holder slightly and press the latch button (Fig. 110) to release the probe holder the full 45° degrees.
3. Insert the short arm of a 3 mm hex wrench into the 3 mm slot (Fig. 111).

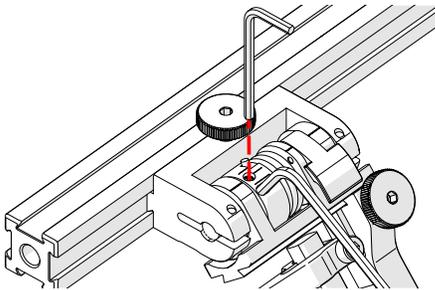


Fig. 112 - Insert hex tools

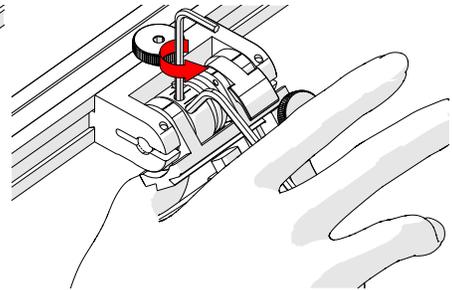


Fig. 113 - Press 3 mm hex wrench down

4. Place the 2 mm hex wrench into the force adjustment screw (Fig. 112).
5. Lightly press the long arm of the 3 mm hex wrench down. Using the 2 mm hex wrench, loosen the force adjustment screw but do not remove it (Fig. 113).
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.

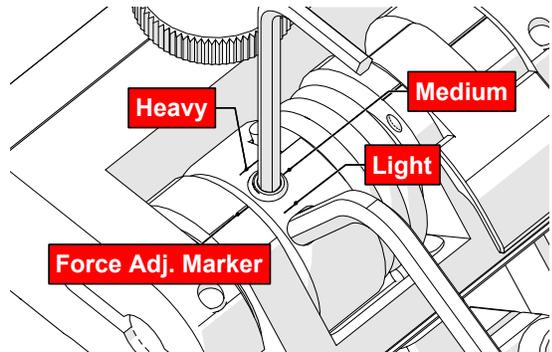


Fig. 114 - Choose desired tension

5.5.5.4 Slip Joint Probe Holder Left/Right Conversion

To reverse the probe holder, follow these steps:

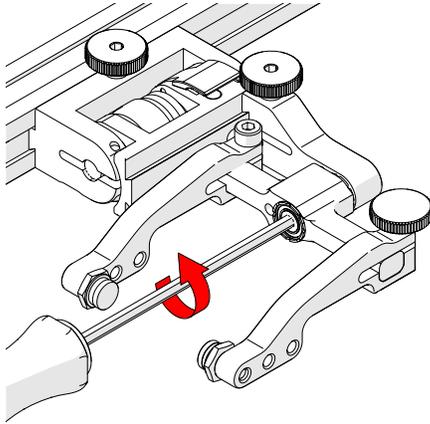


Fig. 115 - Unscrew yoke pivot screw

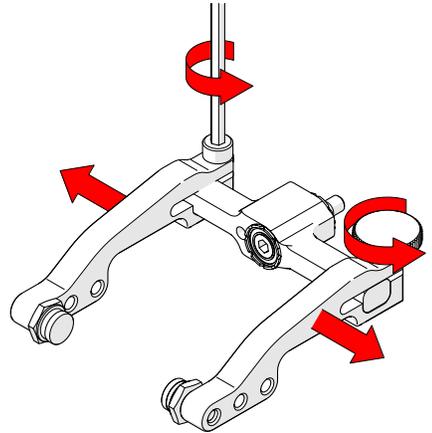


Fig. 116 - Remove arms

1. Unscrew the yoke from the swing arm (Fig. 115).
2. Loosen the probe holder arm adjustment knob and arm clamp screw. Slide the arms from the yoke (Fig. 116).

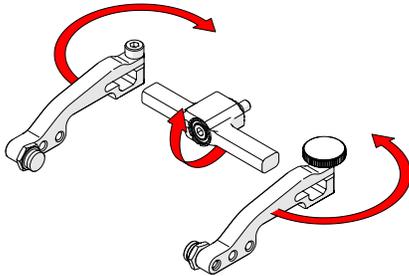


Fig. 117 - Flip yoke and reverse arms

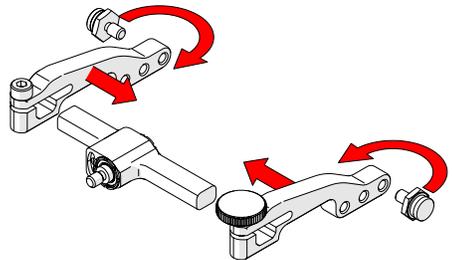


Fig. 118 - Attach arms and move buttons

3. Flip the yoke 180° and reverse the probe holder arms (Fig. 117).
4. Place the pivot buttons on the inside of the probe holder arms (Fig. 118) using a 3/8 in wrench (Fig. 19). Slide the arms onto the yoke and tighten the probe holder arm adjustment knob and the arm clamp screw.

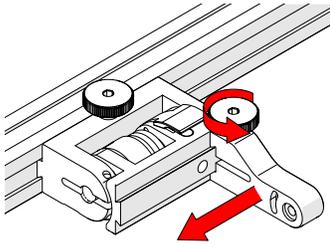


Fig. 119 - Position swing arm

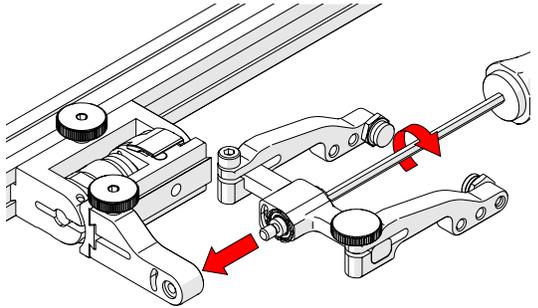


Fig. 120 - Install yoke to swing arm

5. Loosen the swing arm knob and slide the swing arm to the opposite end of the probe holder bracket (Fig. 119) or 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. 120). Ensure the yoke is level to avoid issues with the plunger/set screw.

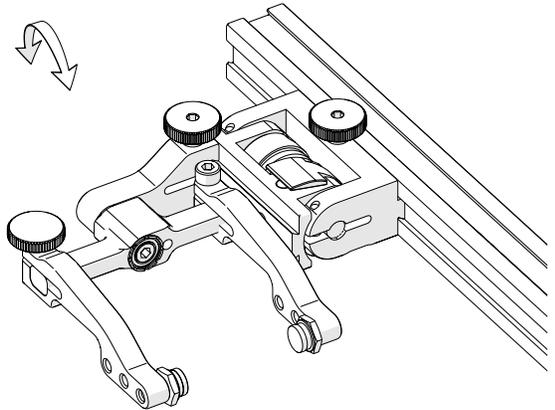


Fig. 121 - Reversed probe holder

OPERATION

Refer to the **SKOOT HT** user manual for preparation, use and operation of the **SKOOT HT**. Powering up the **SKOOT HT** system with the Raster Arm HT connected will activate the Raster Arm HT and various Raster Arm HT control screens described below.

Refer to the **COOLER** user manual for the **COOLER** preparation, use and operation. Ensure the **COOLER** is connected to the Raster Arm HT and is cycling fluid before placing it on any high temperature surface.

6.1. System Startup



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



Fig. 122 - Raster homing warning

When a Raster Arm HT is detected, a warning will appear (Fig. 122), indicating the carriage must move to the home position. Ensure the Raster Arm HT and carriage are free of interference. If an obstruction is present, touch **Disable**. The Raster Arm HT will be disabled until the system is restarted.

While the Raster Arm HT performs the homing procedure, the **Homing Raster** screen will be displayed.

Once the system is initialized, the **Jog Mode** screen will appear (see "Jog and Latched Jog Mode" on page 48). The system is now ready for operation.

6.2. Jog and Latched Jog Mode

With the Raster Arm HT connected to the SKOOT HT, additional controls are included within the Jog and Latched Jog modes (Fig. 123).

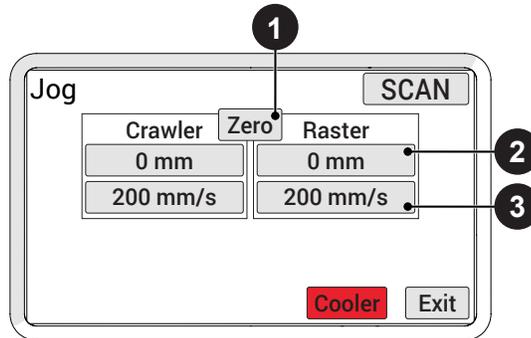


Fig. 123 - Button identification

- | | | |
|----------|------------------------|---|
| 1 | Zero Button | Sets the current position to zero. |
| 2 | Raster Position Button | Displays the current position of the Raster Arm HT. Press to set the position to any value using the Edit screen. When the position is modified, the position will be modified for all other system modes.

NOTE: This function only zeroes the number displayed on the handheld controller. It does not zero the position used in the data acquisition instrument. |
| 3 | Raster Rate Button | Displays the current maximum rate for the selected speed mode. Press to set the maximum rate using the Edit screen. The movement commanded by the joysticks will be limited to the indicated rate. When a rate is modified, the rate will be modified for all other system modes. |

6.3. 2 Axis Scan Mode

The 2 axis scan mode allows scanning to be performed using the crawler as one axis of movement and a Raster Arm HT module as the second axis of motion.

NOTE: 2 axis scan mode will not be available unless the Raster Arm HT module is connected.

6.3.1. 2 Axis Scan Setup Screen

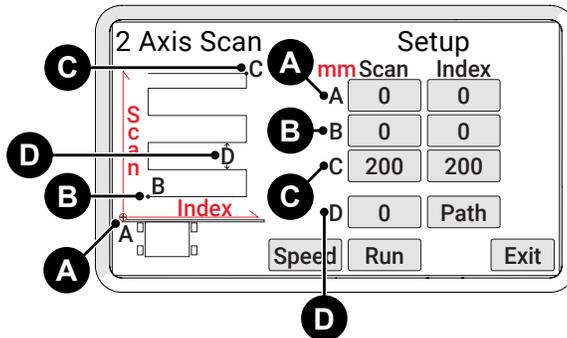


Fig. 124 - 2 axis scan setup

The **2 Axis Scan Setup** screen is used to program the desired scan pattern the system will use.

Each **A, B, C, D**, point and setting in the diagram on the left side of the screen corresponds to a coordinate entry button on the right side of the screen.

Point **A**

The current position of the crawler and index axis. The **A** position may also be set while in the Jog Modes.

Point **B**

The start point of the scan grid. The system will move the scanner and index axis from the **A** point to this point at the start of a scan.

Point **C**

The finish point of the scan grid.

Setting **D**

The distance the system will advance after each sweep.

TIP: Scan determines the crawler movement.

TIP: Index determines the Raster Arm HT movement.

A typical operation begins at the **A** position and moves to the **B** position. Scanning begins at the **B** position and scans using the increment distance **D** until the **C** position is reached.

NOTE: For maximum motion flexibility, negative values are allowed when setting the current or target positions of a motion axis. For an axis that has mechanical constraints, such as a Raster Arm, setting the current position also shifts the limits for the minimum and maximum allowable target positions for the axis.

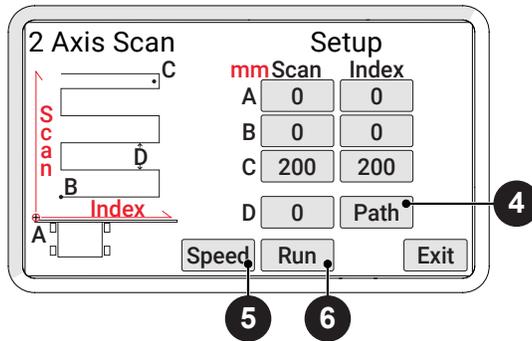


Fig. 125 - 2 axis scan setup

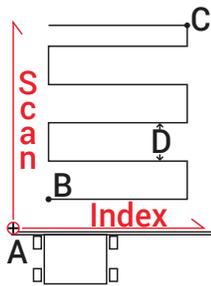


Fig. 126 - Horizontal

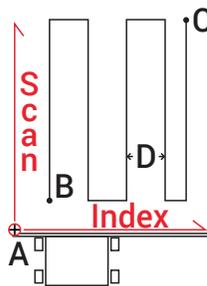


Fig. 127 - Vertical

- 4** Path Button A toggle between a horizontal (Fig. 126) or vertical (Fig. 127) scan path.
- 5** Speed Button Access the **Scan Speed** screen (see "Scan Speeds Screen" on page 51)
- 6** Run Button Initiates a check of the input values to ensure they are within the system's capabilities. When a scan pattern is invalid, a warning will be displayed. Pressing **OK** returns to the **2 Axis Scan Setup** screen allowing correction of the error. When no issues are detected, the **Scan** screen is enabled (see "2 Axis Scan Screen" on page 52).

6.3.1.1 Scan Speeds Screen

Adjust speed settings for the 2 axis scan.

TIP: Scan speeds may also be adjusted in the **Jog Mode** or **User Settings** screens.

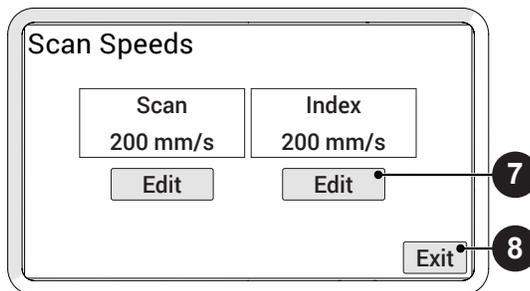


Fig. 128 - Scan speeds

- | | | |
|----------|-------------|---|
| 7 | Edit Button | Allow adjustment to the corresponding axis speed. |
| 8 | Exit Button | Return to the 2 Axis Scan Setup screen. |

6.3.1.2 2 Axis Scan Screen

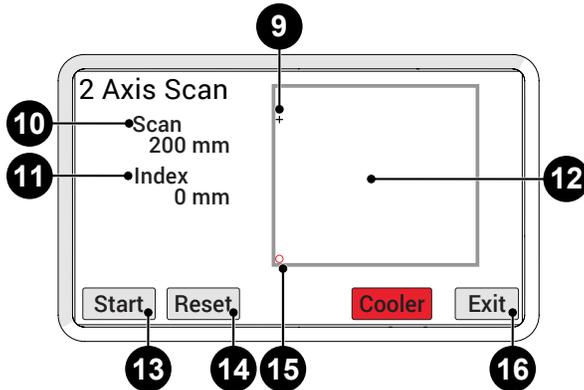


Fig. 129 - 2 axis scan screen

The **2 Axis Scan** screen initiates and monitors the 2 axis scan.

9	Scanner position	The blinking crosshair indicates the current scanner position.
10	Scan	The current position of the crawler.
11	Index	Index position of Raster Arm HT carrier.
12	Summary screen	A visual representation of the scan area.
13	Start/Stop button	Start or stop the scan sequence. When a scan has been stopped while in progress, the start button resumes the scan.
14	Reset button	Return the scanner to the A position. Press the Start Button to begin the scan sequence from the initial setting.
15	Scan location	Small red circle indicates the A position.
16	Exit button	Exit to the 2 Axis Scan Setup screen.

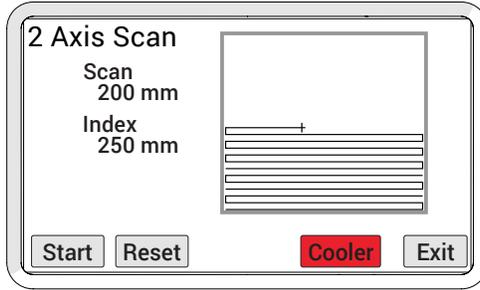


Fig. 130 - Scan path illustrated

When the crawler reaches the scan area, the summary screen displays a graphical representation of the scan area. The scan path will be illustrated as the scan sequence takes place (Fig. 130).

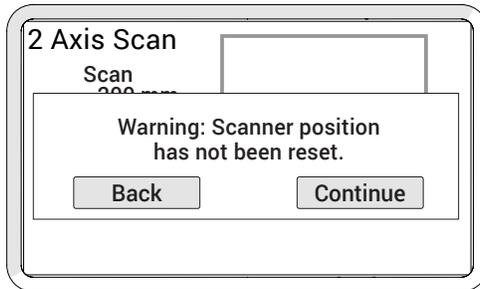


Fig. 131 - Exit warning

Pressing **Exit** stops all scanning and motion. If the scanner is not in the **A** position, a warning appears (Fig. 131). The warning alerts that the **A** position of the scanner will be changed to the current position. Press **Back** to return to the **2 Axis Scan screen** to reset the scanner and maintain the original **A** position. Press **Continue** to reset the **A** position and exit to the **2 Axis Scan Setup** screen.

6.4. User Settings Screen

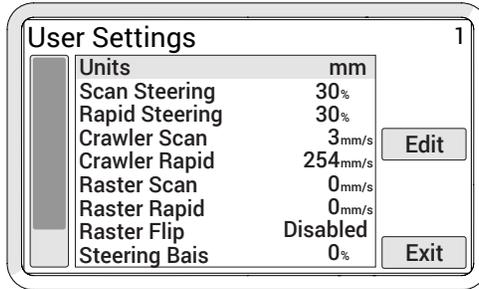


Fig. 132 - User settings screen

Allows a user to customize the settings applicable to the Raster Arm HT.

Press **Edit** to enter the **Edit** screen to apply changes to the selected setting.

Title	Description	Valid Range	Default
Raster Scan unit/s	Sets the Raster Arm HT scan rate in the current units/second. This setting can also be changed through the Jog or 2 Axis Scan Speed screens.	5-762 mm/s (0.2-30 in/s)	76 mm/s (3.0 in/s)
Raster Rapid unit/s	Sets the Raster Arm HT rapid rate in the current units/second. This setting can also be changed through the Jog screen.	5-762 mm/s (0.2-30 in/s)	762 mm/s (30.0 in/s)
Raster Flip	Set Raster Arm HT orientation. When the Raster Arm HT is mounted with the motor housing to the left of the crawler, the appropriate setting is 1. When the Raster Arm HT is mounted with the motor housing to the right of the crawler, the appropriate setting is 0. When this setting is changed, the system must be rebooted.	0-1	Disabled

6.4.1. Diagnostics Screens

Several diagnostic screens allow various system functions to be monitored.

NOTE: *The diagnostic information requires an in-depth understanding of the underlying technologies and programming in the system. Not all functions and information is explained in this manual.*

6.4.1.1 Detected Modules

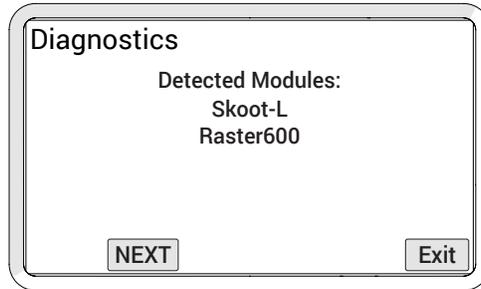


Fig. 133 - Detected modules screen

Raster (*length of raster arm*) will appear when Raster Arm HT is properly connected.

MAINTENANCE

7.1. Safety Precautions Before Maintenance

7.2. Cleaning

General cleaning of all components is important to keep the system working properly. All components that do not have wiring or cables are completely waterproof. Components can be washed with warm water, dish soap and a medium bristle brush. Before using the Raster Arm HT, ensure that all connectors are free of water and moisture.

TIP: All components with wiring, cables or electrical connections are splashproof but not submersible.

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

7.3. Maintenance Schedule

The Raster Arm HT must be maintained according to the following schedule:

Task	Frequency
<p><u>Inspect cables and connectors</u> Inspect the Raster Arm HT cable for damage. Have any damaged cable repaired by a qualified person or replace the cable assembly as necessary.</p> <ul style="list-style-type: none"> ▶ Inspect all connectors for damage or moisture. Straighten bent pins. Dry connectors before using 	Every Use
<p><u>General cleaning</u> Ensure that the Raster Arm HT stays relatively clean by wiping off any excess dirt or other contaminants after every use.</p>	

TROUBLESHOOTING

Problem	Possible cause	Solution
Gives an 'Excessive motor loading' error.	Load on carriage too high, possibly due to:	
	Probe pressure too high	Reduce probe pressure
	Too many probes	Use a maximum of 2 probes
	Probe(s) too heavy	
	Obstacle restricting carriage motion	Clear restrictive obstacle
Loose Raster Arm HT pivot nose	Raster Arm HT too cold	Warm Raster Arm HT
	Linear rail bearings dirty or damaged	Contact manufacturer (<i>see "Jireh Industries Ltd." on page 1</i>)
Raster carriage 'drifts' towards one end and repeatedly strikes the end of travel stop	Component adjustment required.	Contact manufacturer (<i>see "Jireh Industries Ltd." on page 1</i>)
2 Axis Scan Setup Error messages (<i>Fig. 134</i>) or (<i>Fig. 135</i>)	Internal components need repair or replacing	Contact manufacturer (<i>see "Jireh Industries Ltd." on page 1</i>)
	The desired position is outside the mechanical range of travel.	Check zero position, current position and desired position. (<i>see "2 Axis Scan Setup Screen" on page 49 for additional details</i>)

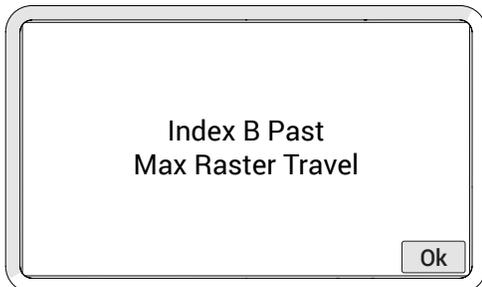


Fig. 134 - Index B error message

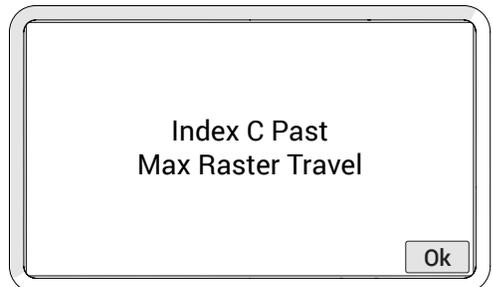


Fig. 135 - Index C error message

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.

9.1. 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 Raster Arm HT 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. Raster Arm HT

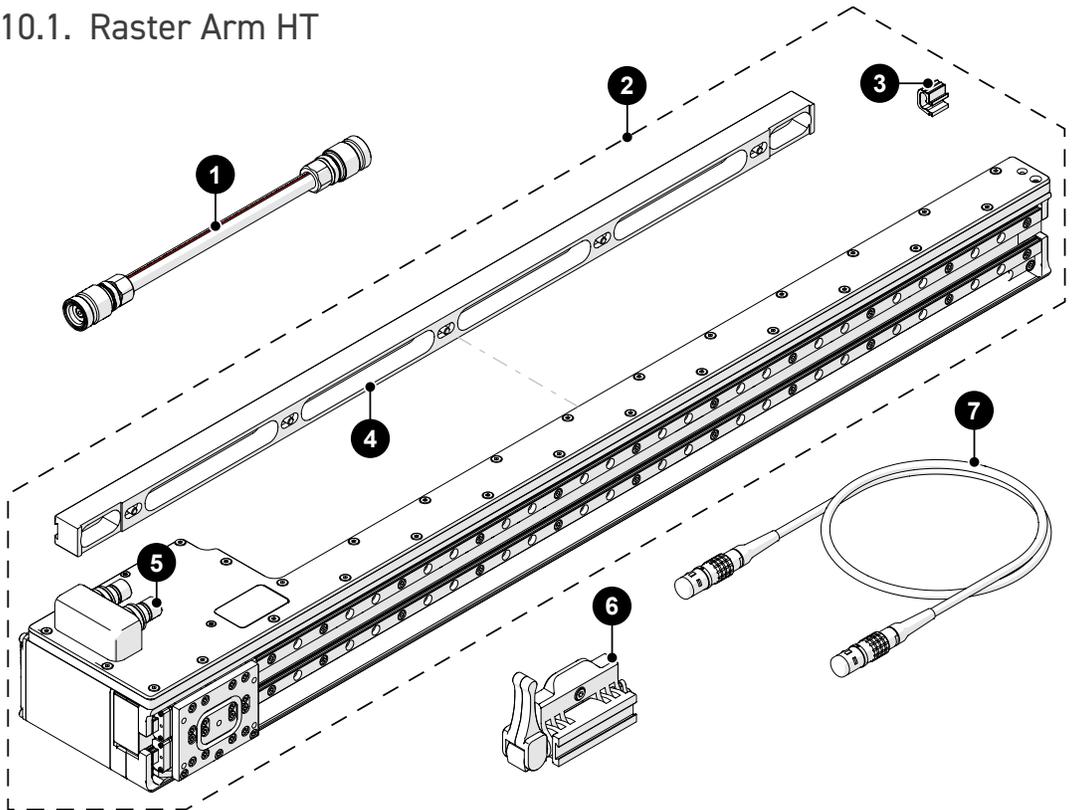
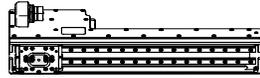


Fig. 136 - Raster Arm HT parts

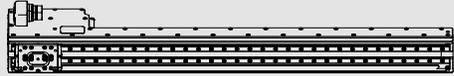
BOM ID	Part #	Description
1	DPA004-RED-0.30	Hose Red, 30 cm
2	<i>see Base Raster Arm HT</i>	
3	CW0096	Cable Management Clip
4	<i>See Mounting Rail</i>	
5	LA125	Quick Connect Fitting
6	CWS023	Raster Arm Pivot Nose (<i>female</i>)
7	<i>see Raster Arm Cable</i>	

10.1.1. Base Raster Arm HT

Part #	Compatible with
EDA002-0300	300 mm (12 in)



EDA002-0600	600 mm (24 in)
-------------	----------------



10.1.2. Mounting Rail

Part #	Compatible with
CWS008-0300	300 mm (12 in)



CWS008-0600	600 mm (24 in)
-------------	----------------



10.1.3. Raster Arm Cable

Part #	Compatible with
UMA020-0.70	300 mm (12 in)



UMA020-0.84	600 mm (24 in)
-------------	----------------



10.2. Hose Spare Parts

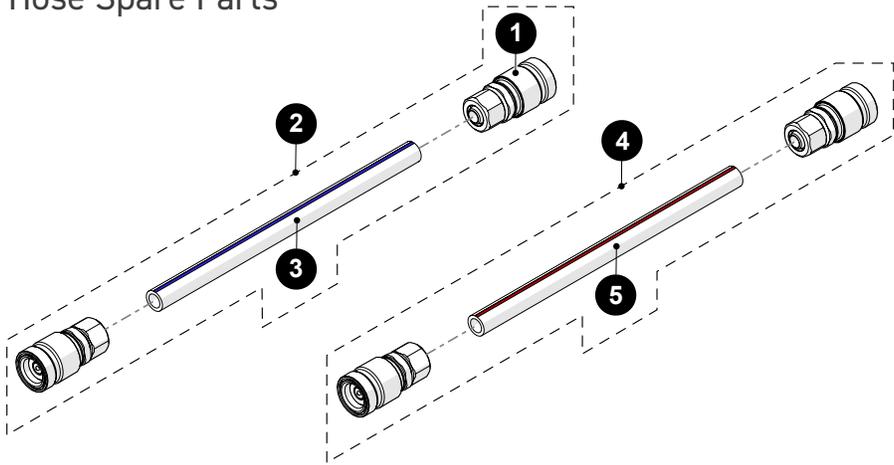


Fig. 137 - Hose spare parts

BOM ID	Part #	Description
1	LA126	Hose Fitting
2	DPA004-BLU-07.5	Hose Blue
3	LA139	Hose Blue, 1/4" ID x 3/8" OD, 7.5 m (25 ft)
4	DPA004-RED-07.5	Hose Red
5	LA140	Hose Red, 1/4" ID x 3/8" OD, 7.5 m (25 ft)

10.3. Raster Arm Pivot Nose (*male*)

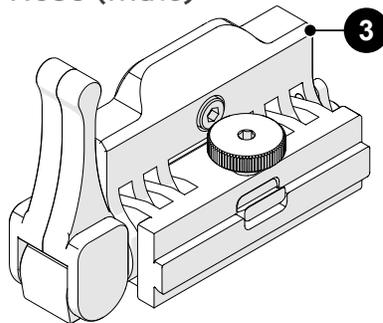
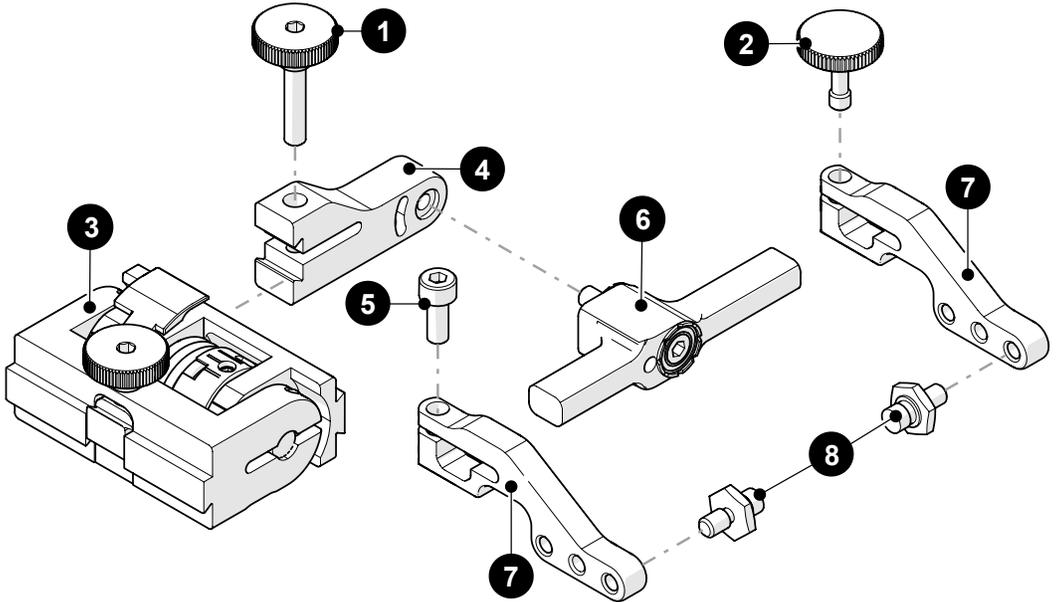


Fig. 138 - Raster arm pivot nose (*male*)

BOM ID	Part #	Description
1	CWS030	Raster Arm Pivot Nose (<i>male</i>)

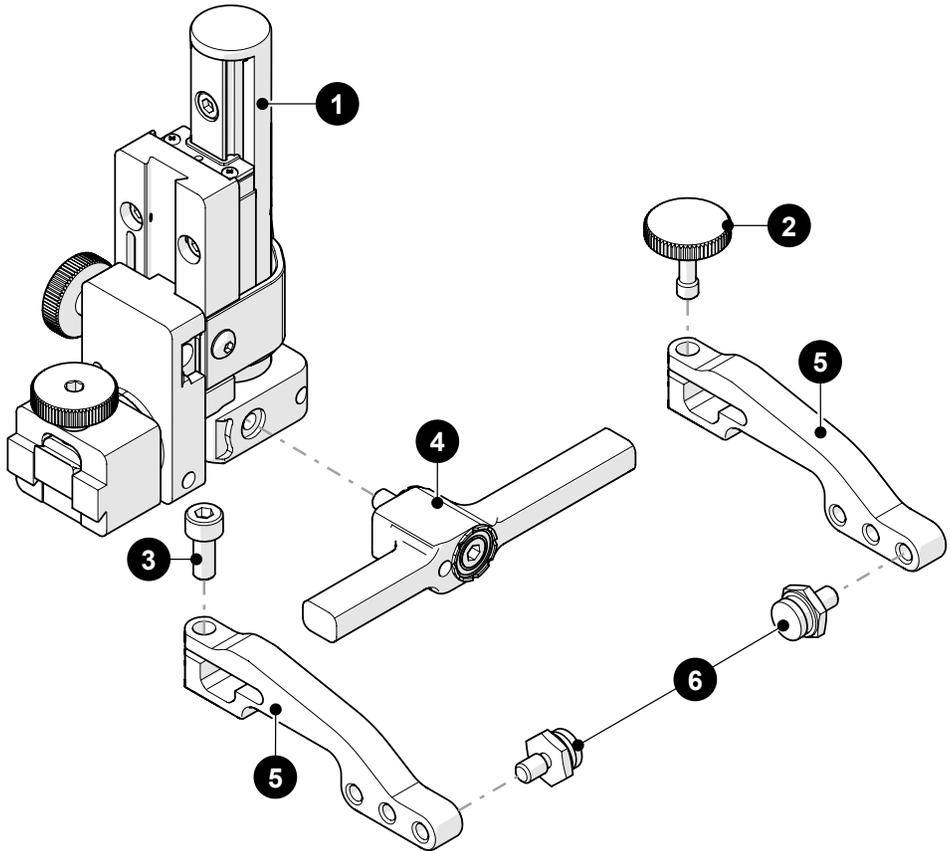
10.4. Slip Joint Probe Holder Parts



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. 139 - Slip joint probe holder parts

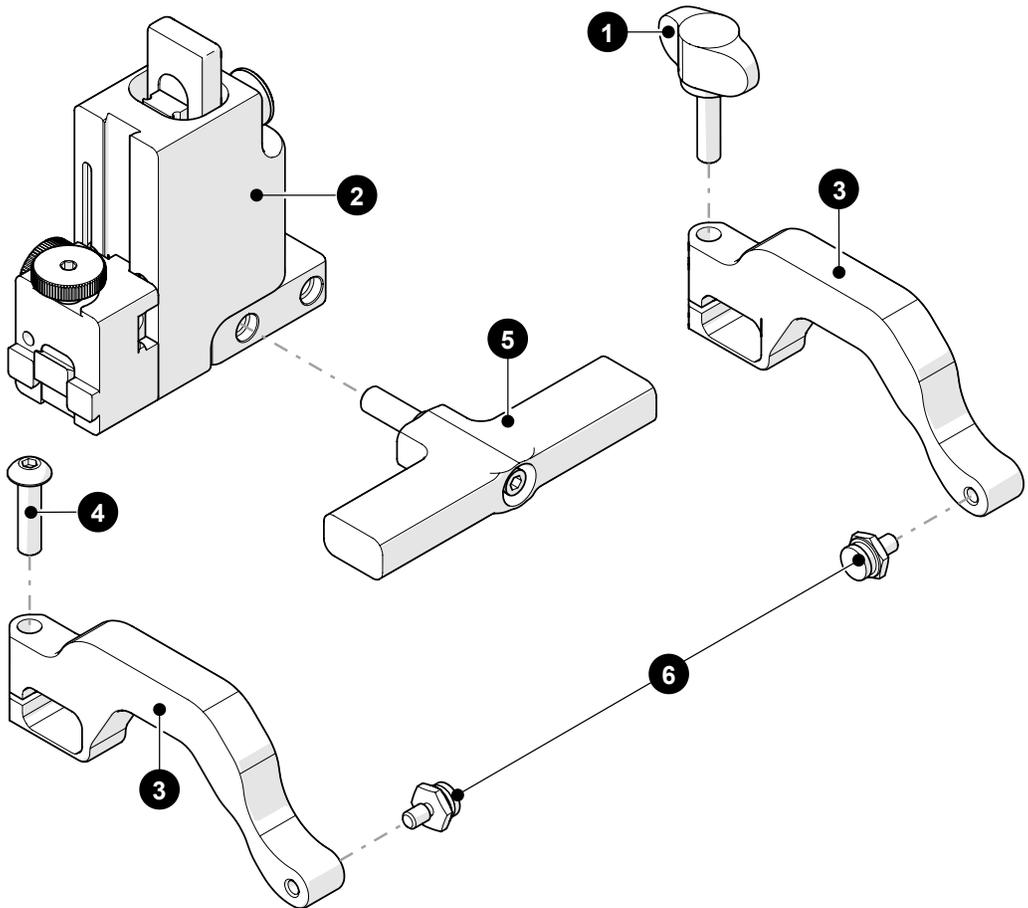
10.5. Vertical Probe Holder Parts



BOM ID	Part #	Description
1	PHS028	Vertical Probe Holder Subassembly
2	PH0082	Knurled Knob, M4 x 0.7 x 10 mm, 3 mm stand off, SST
3	MD050-010	SHCS, M4 x 0.7 x 10 mm, SST
4		see Yoke Style
5		see Arm Style
6	PH0011-X	Pivot Button Style (see Pivot Button Style)

Fig. 140 - Vertical probe holder parts

10.6. Heavy Duty Vertical Probe Holder



BOM ID	Part #	Description
1	EA154	Probe Holder Arm Adjustment Knob
2	PHS049	Heavy Duty Probe Holder Subassembly
3	PH0165	Heavy Duty Probe Holder Arm, Standard, Drop
4	MD074-020	BHCS, M5 x 0.8 x 20 mm, SST
5	<i>See Heavy Duty Yoke Style</i>	
6	PH0011-X	Pivot Button Style (<i>See Pivot Button Style</i>)

Fig. 141 - Heavy duty vertical probe holder parts

10.8. Probe Holder Components

10.8.1. Arm Style

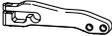
Arm Style	Part #		Arm Style	Part #	
A Standard, Flat	PH0090		B Short, Flat	PH0089	
C Long, Flat	PH0099		D Standard, Drop	PH0093	
E Short, Drop	PH0092		F Long, Drop	PH0094	
G Standard, Extra-Drop	PH0096		H Short, Extra-Drop	PH0095	
I Extra-Short, Flat	PH0159		J Extra-Short, Drop	PH0161	

Fig. 143 - Probe holder arm selection

10.8.2. 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. 144 - Probe holder yoke selection

10.8.3. 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. 145 - Swing arm selection

10.8.4. Heavy Duty Yoke Style

Yoke Style	Part #	Length		Yoke Style	Part #	Length	
S Standard	PHS048	8.3 cm (3.26 in)		W Wide	PHS047	12.2 cm (4.79 in)	

Fig. 146 - Heavy duty probe holder yoke selection

10.8.5. 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. 147 - Pivot button selection

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

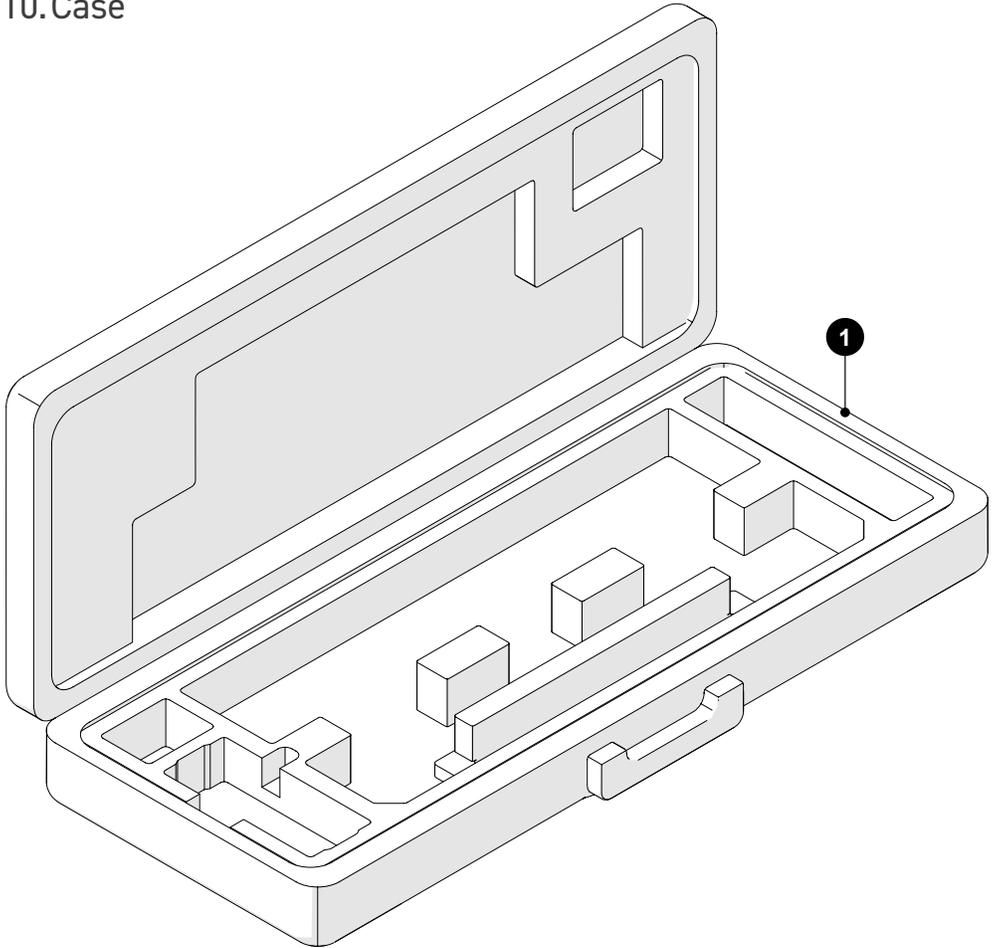
10.9. Variable Components

10.9.1. Frame Bar

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. 148 - Frame bar selection

10.10. Case



BOM ID	Part #	Description
1	CWA009	Raster Arm HT Case

Fig. 149 - Raster arm HT case

DISPOSAL

WEEE Directive

In accordance with European Directive on Waste Electrical and Electronic Equipment (WEEE), this symbol indicated 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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