



SteerROVER

Steerable Motorized Scanner

User's Manual

10-004209-01EN [Q7750159] — Rev. 2
May 2018

This instruction manual contains essential information on how to use this Olympus product safely and effectively. Before using this product, thoroughly review this instruction manual. Use the product as instructed. Keep this instruction manual in a safe, accessible location.

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This document was prepared with particular attention to usage to ensure the accuracy of the information contained therein, and corresponds to the version of the product manufactured prior to the date appearing on the title page. There could, however, be some differences between the manual and the product if the product was modified thereafter.

The information contained in this document is subject to change without notice.

Part number: 10-004209-01EN [Q7750159]

Rev. 2

May 2018

Printed in Canada

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List of Abbreviations

EFUP	environment-friendly use period
GFCI	ground fault circuit interrupter
OD	outside diameter

Labels and Symbols

Safety-related and labels and symbols and manufacturing and rating-information labels are attached to the instrument or engraved at the locations shown in Figure i-1 on page 2, Figure i-2 on page 3, and Figure i-3 on page 3. Label details are provided in Table 1 on page 4. Symbol explanations are provided in Table 2 on page 6 and Table 3 on page 15. If any of the labels or symbols are missing or illegible, please contact Olympus.

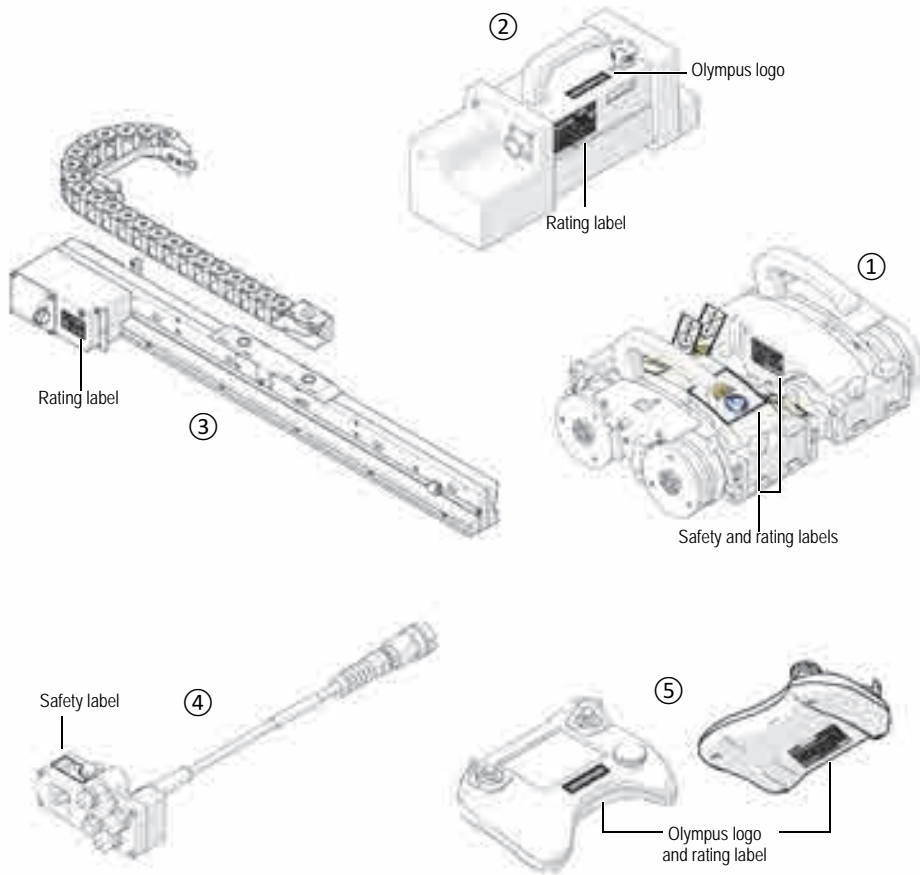


Figure i-1 Label locations on scanner and accessories

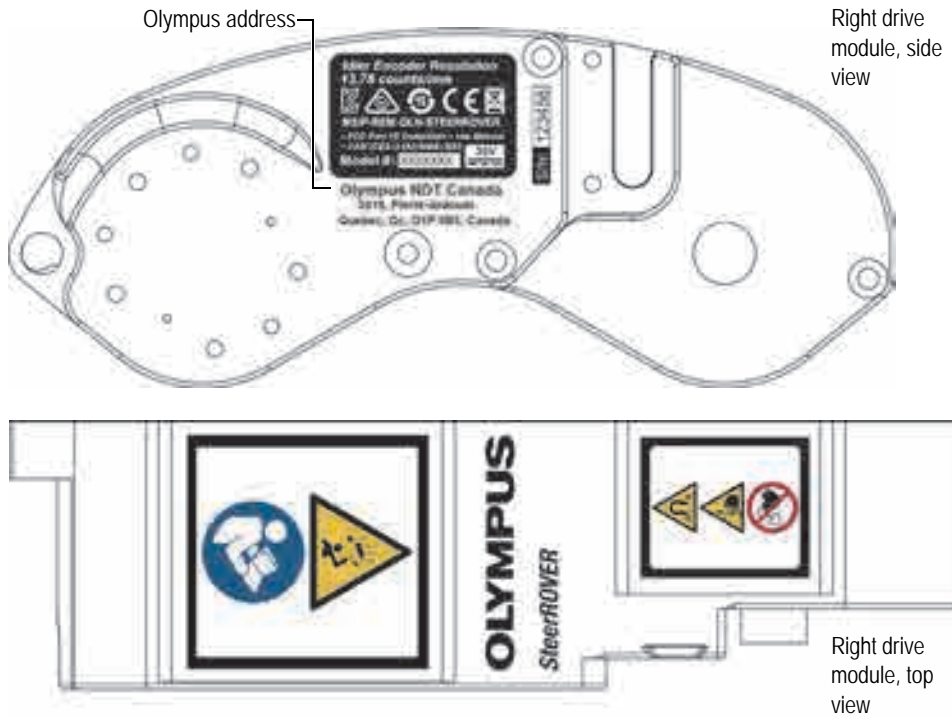


Figure i-2 Label and engraving locations on the SteerROVER right drive module



Figure i-3 Label and engraving locations on the SteerROVER left drive module

Table 1 SteerROVER labels





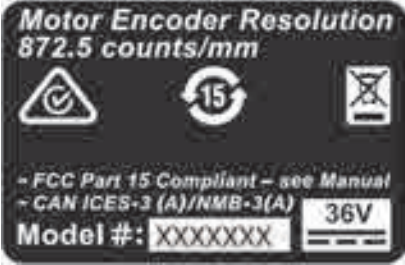
ID no.	Part	Labels
①	Drive modules	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; padding: 5px; display: flex; flex-direction: column; align-items: center;">  </div> <div style="border: 1px solid black; padding: 5px; display: flex; flex-direction: column; align-items: center;">  </div> </div> <p style="margin-top: 5px;">Module casing</p> <div style="margin-top: 10px; text-align: center;">  </div> <p style="margin-top: 5px;">Module cables</p> <div style="margin-top: 10px; text-align: center;">  <p style="margin-top: 5px;">Right drive module</p> </div> <div style="margin-top: 10px; text-align: center;">  <p style="margin-top: 5px;">Left drive module</p> </div> </div>

Table 1 SteerROVER labels (continued)







ID no.	Part	Labels
②	Power controller	 
③	Raster arm	
④	Umbilical	
⑤	Handheld controller	 

Table 2 Markings on equipment








Content	Description
	<p>The CE marking is a declaration that this product conforms to all the applicable directives of the European Community. See the <i>Declaration of Conformity</i> for details. Contact your Olympus representative for more information.</p>
	<p>The direct current symbol</p>
 	<p>The WEEE symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately.</p>
<p>MODEL #</p>	<p>The model number</p>
<p>S/N:</p>	<p>The serial number</p>
	<p>The regulatory compliance mark (RCM) label indicates that the product complies with all applicable standards, and has been registered with the Australian Communications and Media Authority (ACMA) for placement on the Australian market.</p>
	<p>The China RoHS mark indicates the product's Environment-Friendly Use Period (EFUP). The EFUP is defined as the number of years for which listed controlled substances will not leak or chemically deteriorate while in the product. The EFUP for the SteerROVER has been determined to be 15 years. Note: The Environment-Friendly Use Period (EFUP) is not meant to be interpreted as the period assuring functionality and product performance.</p>

Table 2 Markings on equipment (continued)

Content	Description
	<p>Seller and user shall be noticed that this equipment is suitable for electromagnetic equipment for office work (class A) and it can be used outside home.</p> <p>The MSIP code for the SteerROVER is the following: MSIP-REM-OLN-STEERROVER.</p>

Important Information — Please Read Before Use

Intended Use

The SteerROVER is designed to perform nondestructive inspections on industrial and commercial materials.



WARNING

Do not use the SteerROVER for any purpose other than its intended use. It must never be used to inspect or examine human or animal body parts.

Instruction Manual

This instruction manual contains essential information on how to use this Olympus product safely and effectively. Before using this product, thoroughly review this instruction manual. Use the product as instructed.

Keep this instruction manual in a safe, accessible location.

IMPORTANT

Some of the details of components and/or software images in this manual may differ from your instrument's components or software display. However, the principles remain the same.

Instrument Compatibility

Confirm that the SteerROVER is compatible with the ancillary equipment being used.



CAUTION

Always use equipment and accessories that meet Olympus specifications. Using incompatible equipment could cause equipment malfunction and/or damage, or human injury.

Repair and Modification

The SteerROVER contains user-serviceable parts. See “Maintenance” on page 199 for information about authorized repairs and maintenance.



WARNING



ELECTRICAL SHOCK HAZARD. To avoid the risk of electric shock, disconnect the power controller when servicing the equipment. The power controller is powered even when the E-stop push-button is latched in the off position.



WARNING

MAGNETIC MATERIAL. The wheels of the SteerROVER produce an extremely strong magnetic field which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices, or other electronics.

Tools, magnets, and metal objects can cut, pinch or entrap hands and fingers.
HANDLE WITH CARE.

Those with pacemakers or ICDs must stay at least 25 cm (10 in.) away at all times.



CAUTION

In order to prevent human injury and/or equipment damage, do not disassemble, modify, or attempt to repair the instrument.

Safety Symbols

The following safety symbols might appear on the instrument and in the instruction manual:



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.



Laser warning symbol

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

Safety Signal Words

The following safety signal words might appear in the documentation of the instrument:



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.

Note Signal Words

The following note signal words could appear in the documentation of the instrument:

IMPORTANT

The IMPORTANT signal word calls attention to a note that provides information that is important or essential to the completion of a task.

NOTE

The NOTE signal word calls attention to an operating procedure, practice, or the like, that requires special attention. A note also denotes related parenthetical information that is useful, but not imperative.

TIP

The TIP signal word calls attention to a type of note that helps you apply the techniques and procedures described in the manual to your specific needs, or that provides hints on how to effectively use the capabilities of the product.

Safety

Before turning on the instrument, verify that the correct safety precautions have been taken (see the following warnings). In addition, note the external markings on the instrument, which are described under “Safety Symbols.”

Warnings



WARNING

General Warnings

- Carefully read the instructions contained in this instruction manual prior to turning on the instrument.

- Keep this instruction manual in a safe place for further reference.
- Follow the installation and operation procedures.
- It is imperative to respect the safety warnings on the instrument and in this instruction manual.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment could be impaired.
- Do not install substitute parts or perform any unauthorized modification to the instrument.
- Service instructions, when applicable, are for trained service personnel. To avoid the risk of electric shock, do not perform any work on the instrument unless qualified to do so. For any problem or question regarding this instrument, contact Olympus or an authorized Olympus representative.
- Do not touch the connectors directly by hand. Otherwise, a malfunction or electric shock may result.
- Do not allow metallic or foreign objects to enter the device through connectors or any other openings. Otherwise, a malfunction or electric shock may result.



WARNING



Electrical Warnings

- Before operating this instrument using mains electricity, you must connect the protective earth terminal of the instrument to the protective conductor (mains) of the power cord. The mains plug shall only be inserted into a socket outlet provided with a protective earth contact. Never negate the protective action by using an extension cord (power cable) without a protective conductor (grounding).
- Only use fuses with the required rated current, voltage, and specified type (normal-blow, slow-blow, quick-acting, etc.). Do not use repaired fuses or short-circuited fuse holders, doing so could cause electric shock or create a fire hazard.
- If there is any possibility that the ground protection could be impaired, you must make the instrument inoperative and secure it against any unintended operation.
- The instrument must only be connected to a power source corresponding to the type indicated on the rating label.



CAUTION

If an unauthorized power supply cord is used to power the instrument or charge the batteries, Olympus cannot guarantee the electrical safety of the equipment.

Warnings Symbols

Table 3 Warning symbols





Symbol	Description
	<p>WARNING! The SteerROVER is designed for a specific use. Using the SteerROVER outside of its intended use is dangerous. Severe injury or death could result. Read and understand this manual before using the SteerROVER.</p>
	<p>WARNING! FALLING OBJECT HAZARD. The area below a SteerROVER must be kept clear at all times. A clearly marked NO ENTRY ZONE must be cordoned off directly below the area of scanner operation (see “No Entry Fall Zone” on page 17 for additional details).</p> <p>WARNING! FALLING OBJECT HAZARD. Failure to comply with the warnings, instructions, and specifications in this manual could result in SEVERE INJURY or DEATH.</p>
 	<p>WARNING! MAGNETIC MATERIAL. The wheels of the SteerROVER produce an extremely strong magnetic field that may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices or other electronics.</p> <p>Tools, magnets and metal objects can cut, pinch or entrap hands and fingers. HANDLE WITH CARE.</p> <p>People with pacemakers or ICDs must stay at least 25 cm (10 in.) away.</p>

Table 3 Warning symbols (continued)










Symbol	Description
	WARNING! Metal objects can cut, pinch, or entrap hands and fingers.
	WARNING! LASER RADIATION. The laser guide emits laser radiation. Do not view directly with optical instruments. Class 1M laser product.
	WARNING! ELECTRICAL CORDS CAN BE HAZARDOUS. Misuse can result in FIRE or DEATH by ELECTRICAL SHOCK. Inspect thoroughly before each use. Do NOT use if damaged. Do NOT use when wet. Keep away from water. Do NOT drive, drag, or place objects over cord.
	WARNING! LIFTING HAZARD. The SteerROVER case can be heavy. Single person lifting could cause injury. Two person lifting recommended.
	WARNING! Do NOT operate scanner in the presence of volatile substances.
	WARNING! Do NOT operate scanner in an explosive environment.

Table 3 Warning symbols (continued)

Symbol	Description
	<p>CAUTION! DO NOT operate the SteerROVER scanner on an inspection surface that is electrically connected to a component that is being welded.</p>
	<p>CAUTION! Do not disconnect under load. Shut off power before connection or disconnecting. Permanent damage to electronics could occur.</p>
	<p>Emergency Stop. This symbol indicates emergency stop button.</p>

No Entry Fall Zone

The area below a SteerROVER scanner must be kept clear at all times. A clearly marked NO ENTRY FALL ZONE must be cordoned off directly below the area of scanner operation, according to the dimensions shown below.

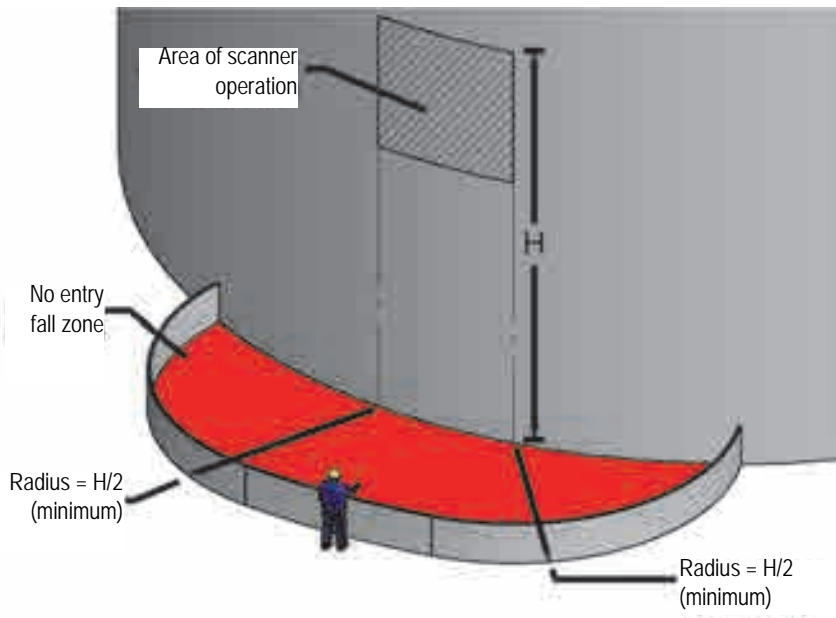


Figure i-4 No entry fall zone

Example: If inspecting a tank that is 6 m (20 ft) tall, the No Entry Fall Zone radii must be no smaller than 3 m (10 ft) from the area below the area of crawler operation.

Equipment Disposal

Before disposing of the SteerROVER, check your local laws, rules, and regulations, and follow them accordingly.

CE (European Community)



This device complies with the requirements of both directive 2014/30/EU concerning electromagnetic compatibility and directive 2014/35/EU concerning low voltage. The CE marking indicates compliance with the above directives.

WEEE Directive



In accordance with European Directive 2012/19/EU 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 your local Olympus distributor for return and/or collection systems available in your country.

China RoHS

China RoHS is the term used by industry generally to describe legislation implemented by the Ministry of Information Industry (MII) in the People's Republic of China for the control of pollution by electronic information products (EIP).



The China RoHS mark indicates the product's Environment-Friendly Use Period (EFUP). The EFUP is defined as the number of years for which listed controlled substances will not leak or chemically deteriorate while in the product. The EFUP for the SteerROVER has been determined to be 15 years.

Note: The Environment-Friendly Use Period (EFUP) is not meant to be interpreted as the period assuring functionality and product performance.

“中国 RoHS”是一个工业术语，一般用于描述中华人民共和国信息工业部（MII）针对控制电子信息产品（EIP）的污染所实行的法令。



电气电子产品
有害物质
限制使用标识

中国 RoHS 标识是根据“电器电子产品有害物质限制使用管理办法”以及“电子电气产品有害物质限制使用标识要求”的规定，适用于在中国销售的电气电子产品上的电气电子产品有害物质限制使用标识。

注意：电气电子产品有害物质限制使用标识内的数字为在正常的使用条件下有害物质不会泄漏的年限，不是保证产品功能性的年限。

产品中有害物质的名称及含量

部件名称		有害物质					
		铅及其化合物 (Pb)	汞及其化合物 (Hg)	镉及其化合物 (Cd)	六价铬及其化合物 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
主体	机构部件	×	○	○	○	○	○
	光学部件	×	○	○	○	○	○
	电气部件	×	○	○	○	○	○
附件		×	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。
 ○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。
 ×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T26572 规定的限量要求。

Korea Communications Commission (KCC)

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다 .

EMC Directive Compliance

This equipment generates and uses radio-frequency energy and, if not installed and used properly (that is, in strict accordance with the manufacturer's instructions), may cause interference. The SteerROVER has been tested and found to comply with the limits for an industrial device in accordance with the specifications of the EMC directive.

FCC (USA) Compliance

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.
2. This device must accept any interference received, including interference that may cause undesired operation.

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

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, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

ICES-001 (Canada) Compliance

This Class A digital apparatus complies with Canadian ICES-001.

Cet appareil numérique de la classe A est conforme à la norme NMB-001 du Canada.

Warranty Information

Olympus guarantees your Olympus product to be free from defects in materials and workmanship for a specific period, and in accordance with conditions specified in the *Olympus Scientific Solutions Americas Inc. Terms and Conditions* available at <http://www.olympus-ims.com/en/terms/>.

The Olympus warranty only covers equipment that has been used in a proper manner, as described in this instruction manual, and that has not been subjected to excessive abuse, attempted unauthorized repair, or modification.

Inspect materials thoroughly on receipt for evidence of external or internal damage that might have occurred during shipment. Immediately notify the carrier making the delivery of any damage, because the carrier is normally liable for damage during shipment. Retain packing materials, waybills, and other shipping documentation needed in order to file a damage claim. After notifying the carrier, contact Olympus for assistance with the damage claim and equipment replacement, if necessary.

This instruction manual explains the proper operation of your Olympus product. The information contained herein is intended solely as a teaching aid, and shall not be used in any particular application without independent testing and/or verification by

the operator or the supervisor. Such independent verification of procedures becomes increasingly important as the criticality of the application increases. For this reason, Olympus makes no warranty, expressed or implied, that the techniques, examples, or procedures described herein are consistent with industry standards, nor that they meet the requirements of any particular application.

Olympus reserves the right to modify any product without incurring the responsibility for modifying previously manufactured products.

Technical Support

Olympus is firmly committed to providing the highest level of customer service and product support. If you experience any difficulties when using our product, or if it fails to operate as described in the documentation, first consult the user's manual, and then, if you are still in need of assistance, contact our After-Sales Service. To locate the nearest service center, visit the Service Centers page at: <http://www.olympus-ims.com>.

Introduction

Intended Use

The SteerROVER is a remotely operated vehicle with magnetic wheels suitable for driving on ferrous material. Its primary purpose is to move inspection equipment over areas of structures, such as tanks or pipes, made from ferrous materials in industrial environments.

The intended ferrous surface is to:

- Be bare metal for up-side-down surfaces, or
- Be coated to a thickness no greater than:
 - 0.5 mm (0.020 in.) for vertical surfaces
 - 1 mm (0.040 in.) for horizontal surfaces on which the crawler is right-side-up
- Be free of excess rust, scale, ferrous debris, ice, and frost
- Have a minimum thickness of 3 mm (0.120 in.)
- Have a minimum ID of 610 mm (24 in.) for internal circumferential driving
- Have a minimum OD of 70 mm (2.75 in.) for external circumferential driving
- Have a minimum OD of 305 mm (12 in.) for longitudinal driving

The SteerROVER is intended to:

- Be used by trained personnel (see “Intended User” on page 25);
- Operate in an appropriate environment (see “Operating Environment” on page 220).

In addition to the preceding points, when operating at a height greater than 2 m (6 ft), the SteerROVER must be:

- Operated with a proper tether system (see “Tether Requirements and Attachment” on page 30)
- Operated in an orientation such that the umbilical strain relief points downward, or at worst is horizontal
- The SteerROVER backpack is intended to mount objects that meet the following requirements:
 - Have a maximum weight of 1.36 kg (3 lb)
 - Are attached to the SteerROVER via a tether or probe cables strong enough to prevent the object from falling
 - Have smooth edges so as not to cut backpack strap

Unintended Use



WARNING



FALLING OBJECT HAZARD. Failure to comply with the warnings, instructions and specifications in this manual could result in SEVERE INJURY or DEATH.

The SteerROVER is NOT intended for:

- Operation on surfaces that are not clean (ex.: excess rust, scale, ferrous debris, ice, or frost)
- Lifting/lowering objects or people (that is, using the crawler as a crane/elevator)
- Driving over obstacles/obstructions (excluding standard butt welds)
- Operating in ambient temperatures below $-20\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$) or above $50\text{ }^{\circ}\text{C}$ ($122\text{ }^{\circ}\text{F}$)

In addition to the preceding points, operating at a height greater than 2 m (6 ft), the crawler is not intended for:

- Operation without a proper tether system
- Operating up-side-down
- Operating while oriented such that the umbilical strain relief points upward (front of the SteerROVER is lower than the umbilical connection)
- Operating with a probe holder rack containing more than:
 - 6 vertical probe holders, or

- 2 HydroFORM probe holders, or
- 2 heavy duty vertical probe holders
- Operating with objects mounted in the backpack that have a weight greater than 1.36 kg (3 lb) or objects that are not attached to the SteerROVER scanner via a tether or probe cables, or objects with sharp edges




Intended User


The SteerROVER is intended to be used by persons who have read and understood this user manual. For operating at a height greater than 2 m (6 ft), the SteerROVER is intended to be used by two people:

- A person who is trained in rigging and fall protection as well as able to effectively apply the same safety principals to the SteerROVER
- A person who is trained to control the SteerROVER

The SteerROVER is intended to be used by persons without limitations in the physical abilities of the upper and lower limbs, sight, and hearing. The SteerROVER should not be used by anyone with a pacemaker or ICD.

Definition of Symbols

Symbol	Description
	Instructions to “look here” or to “see this part”.
	Denotes movement. Instructing user to carry out action in a specified direction.
	Indicates alignment axis.

Symbol	Description
	Alerts user that view has changed to a reverse angle.

Included Tools

The included 3 mm hex driver is suitable for typical adjustments of SteerROVER modules (see Figure i-5 on page 26).



Figure i-5 3 mm hex driver

Also included in this kit is a 0.375 in. wrench which is used to remove and install probe holder buttons (see Figure i-6 on page 26).



Figure i-6 0.375 in. wrench

The included 3 mm flat driver (see Figure i-7 on page 27) is useful for releasing the flaps of the raster arm's cable tray.

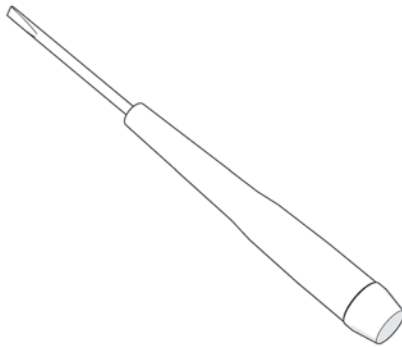


Figure i-7 3 mm flat screwdriver

Optional Tools

There are some specialized adjustments require tools that are not included with this kit (see Figure i-8 on page 27):

- 1.5 mm hex wrench
- 2 mm hex wrench
- 2.5 mm hex wrench
- 3 mm hex wrench



Figure i-8 Example of an optional hex wrench

1. Preparation for Use

1.1 Transportation



CAUTION



PINCH / CRUSH HAZARD. BE CAREFUL when passing the SteerROVER scanner through narrow ferrous (magnetic) openings, such as man-holes. The magnetic drive wheels can cause bodily harm if allowed to slam onto the walls of the opening.

1.2 No Entry Fall Zone



WARNING



FALLING OBJECT HAZARD. The area below the SteerROVER must be kept clear at all times. A clearly marked NO ENTRY FALL ZONE must be cordoned off directly below the area of scanner operation.

The area below a SteerROVER must be kept clear at all times. A clearly marked NO ENTRY FALL ZONE must be cordoned off directly below the area of scanner operation, according to the dimensions shown in Figure 1-1 on page 30.

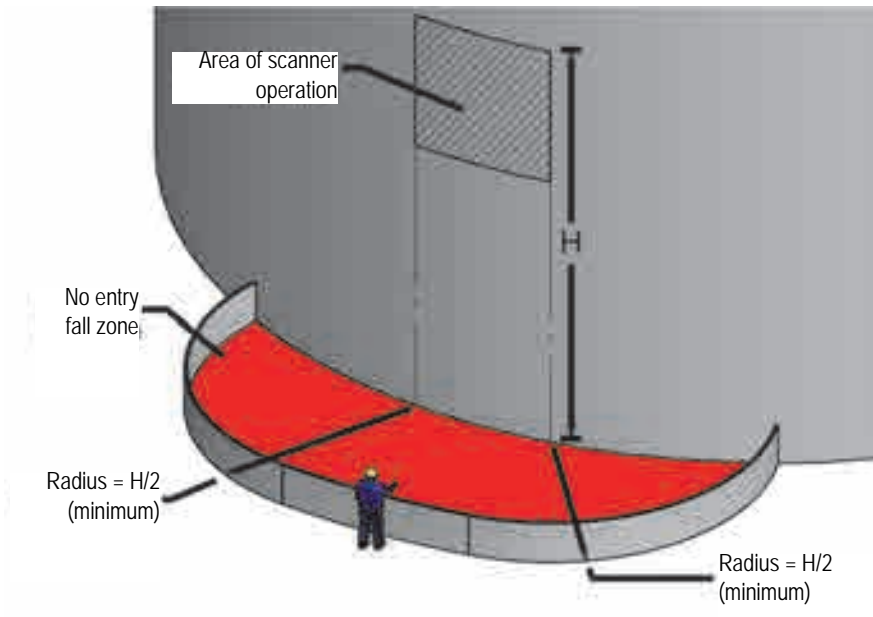


Figure 1-1 No entry fall zone

Example: If inspecting a tank that is 6 m (20 ft) tall, the No Entry Fall Zone radii must be no smaller than 3 m (10 ft) from the area below the area of crawler operation.

1.3 Tether Requirements and Attachment



WARNING



FALLING OBJECT HAZARD. Failure to comply with the warnings, instructions, and specifications in this manual could result in SEVERE INJURY or DEATH.

**WARNING**

To prevent serious human injury and/or death, do NOT operate or place SteerROVER on a surface higher than 2 m (6 ft) without a proper tether held taut at all times.

**WARNING**

Hook the tether hook to the provided lifting sling BEFORE placing the SteerROVER on the surface to be inspected (ex.: tank). IMPORTANT: The tether hook must have a safety latch to prevent accidental disconnection that could result in serious human injury or death.

When used at a height greater than 2 m (6 ft), the SteerROVER scanner MUST be tethered with a proper tether system to prevent the scanner from falling. The tether system must:

- Be capable of safely suspending the SteerROVER from above in case the scanner detaches from the inspection surface;
- Have sufficient capacity to catch and hold a 70 kg (150 lb) load;
- Include a mechanism (that is, a self retracting inertia reel fall arrester) or person to continuously take up slack in the tether as the SteerROVER moves;
- Include a lifting hook with a safety latch to prevent accidental disconnection. The hook must be free of sharp edges that may cut or abrade the provided lifting sling.

Before placing the scanner on the surface to be inspected (ex.: tank), attach the provided lifting sling to the SteerROVER, and then hook the tether hook to the lifting sling.



CAUTION

The overhead attachment point for the tether must be located as close as possible to a location directly above the SteerROVER to minimize dangerous swinging of the scanner should it detach from the inspection surface.

IMPORTANT

Carefully inspect the lifting sling for damage prior to each use. Ensure the tether hook does not have sharp edges that may cut the lifting sling.

1.3.1 Lifting Sling Setup

To secure the lifting sling to the SteerROVER

1. Lift the two tether attachment points (see Figure 1-2 on page 33).

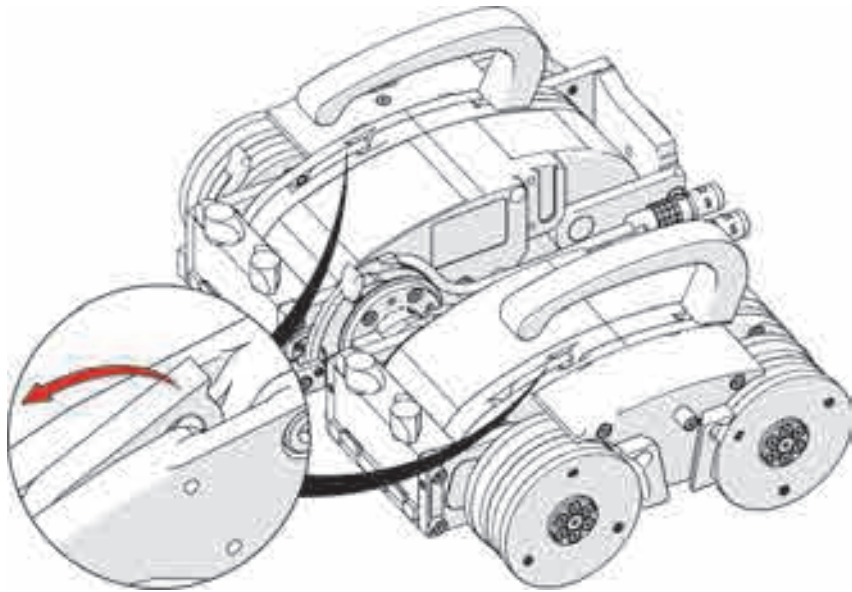


Figure 1-2 Lifting the tether attachment points

2. Simultaneously press the pin's release button and pull the pin from the shackle (see Figure 1-3 on page 33).

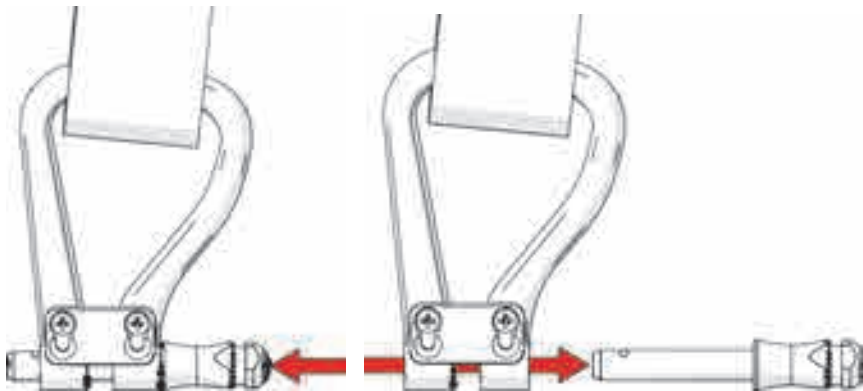


Figure 1-3 Press the pin's release button (*left*) and pull out pin (*right*)

3. Slide the shackle around the tether attachment point (see Figure 1-4 on page 34 [*left*]).
4. Align the tether attachment point and shackle, and then insert the pin while pressing the pin's release button (see Figure 1-4 on page 34 [*right*]).

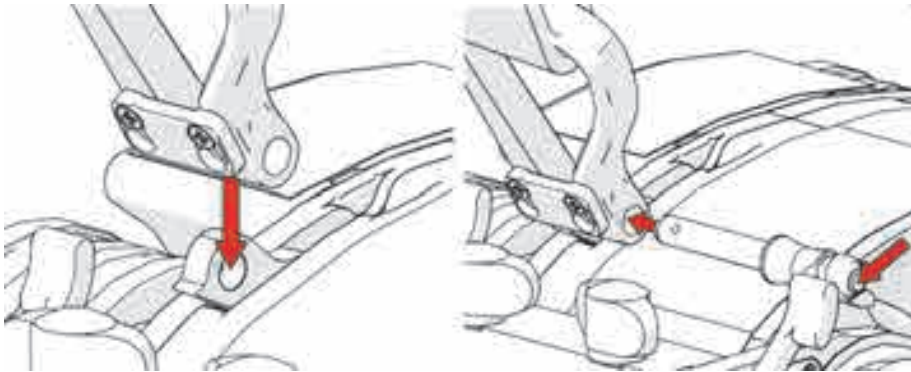


Figure 1-4 Aligning shackle with tether (*left*) and inserting pin (*right*)

NOTE

To ensure that the shackles are facing the right way, see Figure 1-5 on page 35 for the proper (*left*) and incorrect (*right*) orientation of the shackles.

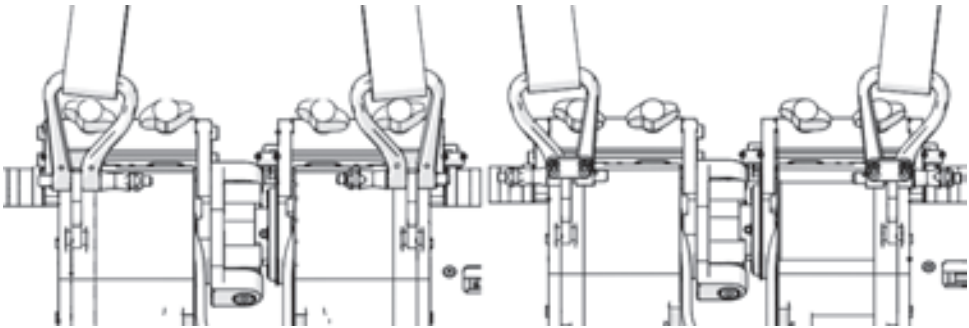


Figure 1-5 Proper shackle (*left*) incorrect shackle (*right*) orientation

1.3.2 Lifting Sling Low-Profile Setup

The shackle plate in conjunction with the tether attachment point provides the necessary clearance for scanning equipment (see Figure 1-6 on page 36). The following adjustment allows low-profile scanning when required.

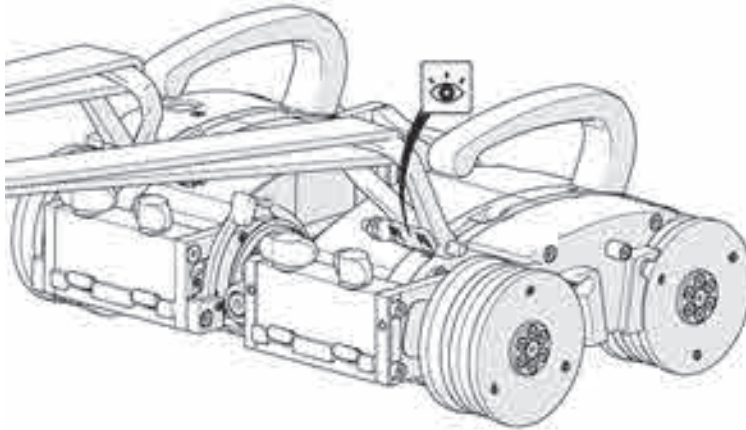


Figure 1-6 Location of the shackle plate

To secure the lifting sling to the SteerROVER

- ◆ Reverse the lifting sling and shackles so the shackles are free to lay down flat, allowing for low-profile sling setup (see Figure 1-7 on page 37).

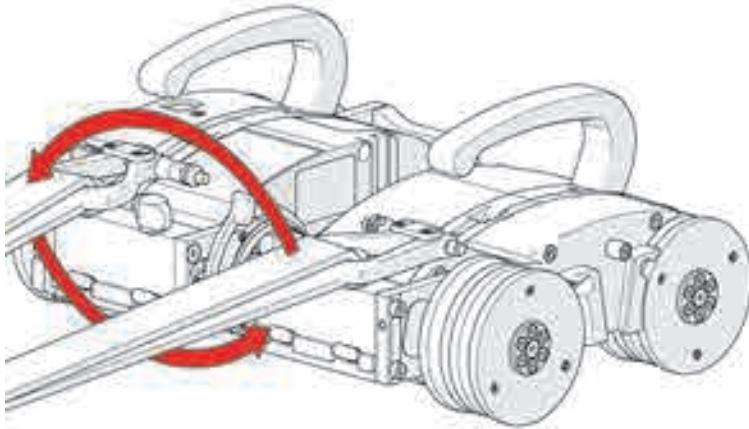


Figure 1-7 Reversing the shackle orientation for low-profile scanning

1.4 Preparation of Inspection Surface



WARNING



FALLING OBJECT HAZARD. The inspection surface must adhere to the conditions outlined in “Intended Use” on page 23 and “Unintended Use” on page 24 of this manual.

To prepare the inspection surface

1. Remove build-up of scale, and other debris (ex.: dirt, ice) from the surface on which the SteerROVER is to drive.
Excessive build-up will cause the wheels to lose magnetic attraction, which may lead to wheel slippage or scanner detachment.
2. Ensure that no obstructions (other than standard butt welds) or voids are in the drive path.

Obstructions and voids could cause the SteerROVER to fall if driven into or over.

3. Ensure that there are no patches of nonferrous material in the drive path of the SteerROVER.

If the scanner drives over a nonferrous patch, it will lose magnetic attraction, which will cause the SteerROVER to fall.

1.5 Compatible Equipment

This section lists the different compatible system components that can be included in the SteerROVER packages or purchased separately (see Figure 1-8 on page 40 and Figure 1-9 on page 41). Available packages are listed in Table 4 on page 38.

NOTE

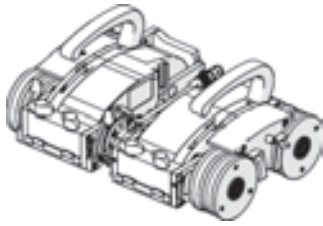
Detailed information and instructions are given for each component in “System Components” on page 93.

Table 4 SteerROVER packages part numbers

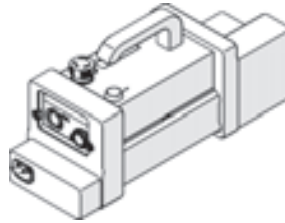
Part number	Package description
Q7500050	SteerROVER scanner and standard accessories inclusion with pivoting probe holder rack including four vertical probe holders for weld inspection and 5 m cables
Q7500051	SteerROVER scanner and standard accessories inclusion with pivoting probe holder rack including four vertical probe holders for weld inspection and 15 m cables
Q7500052	SteerROVER scanner and standard accessories inclusion with pivoting probe holder rack including four vertical probe holders for weld inspection and 30 m cables
Q7500053	SteerROVER scanner and standard accessories inclusion with 600 mm (2 ft) raster arm, heavy duty vertical probe holder, and 7.5 m cables
Q7500054	SteerROVER scanner and standard accessories inclusion with 600 mm (2 ft) raster arm, heavy duty vertical probe holder, and 15 m cables

Table 4 SteerROVER packages part numbers (continued)

Part number	Package description
Q7500055	SteerROVER scanner and standard accessories inclusion with 600 mm (2 ft) raster arm, heavy duty vertical probe holder, and 30 m cables
Q7500056	SteerROVER scanner and standard accessories with 900 mm (3 ft) raster arm, heavy duty vertical probe holder, and 7.5 m cables
Q7500057	SteerROVER scanner and standard accessories inclusion with 900 mm (3 ft) raster arm, heavy duty vertical probe holder, and 15 m cables
Q7500058	SteerROVER scanner and standard accessories inclusion with 900 mm (3 ft) long raster arm, heavy duty vertical probe holder, and 30 m cables



Drive modules



Power controller [P/N: Q7201262]



Handheld controller
[P/N: Q7750089]



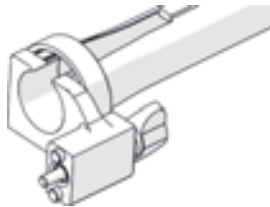
Encoder cable



Controller cable



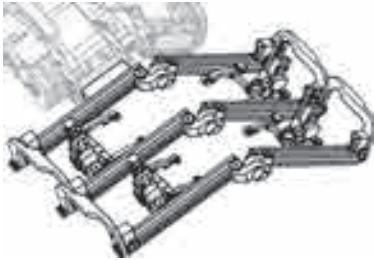
Umbilical



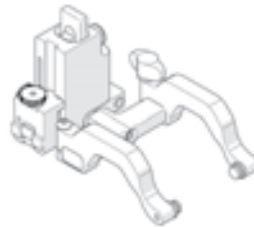
Cable management



Lifting sling



Pivoting probe holder rack [P/N: Q7201258]
(included with weld packages)



Heavy duty vertical probe holder
[P/N: Q7750123] (included in
packages with raster arms)

Figure 1-8 Scanner components

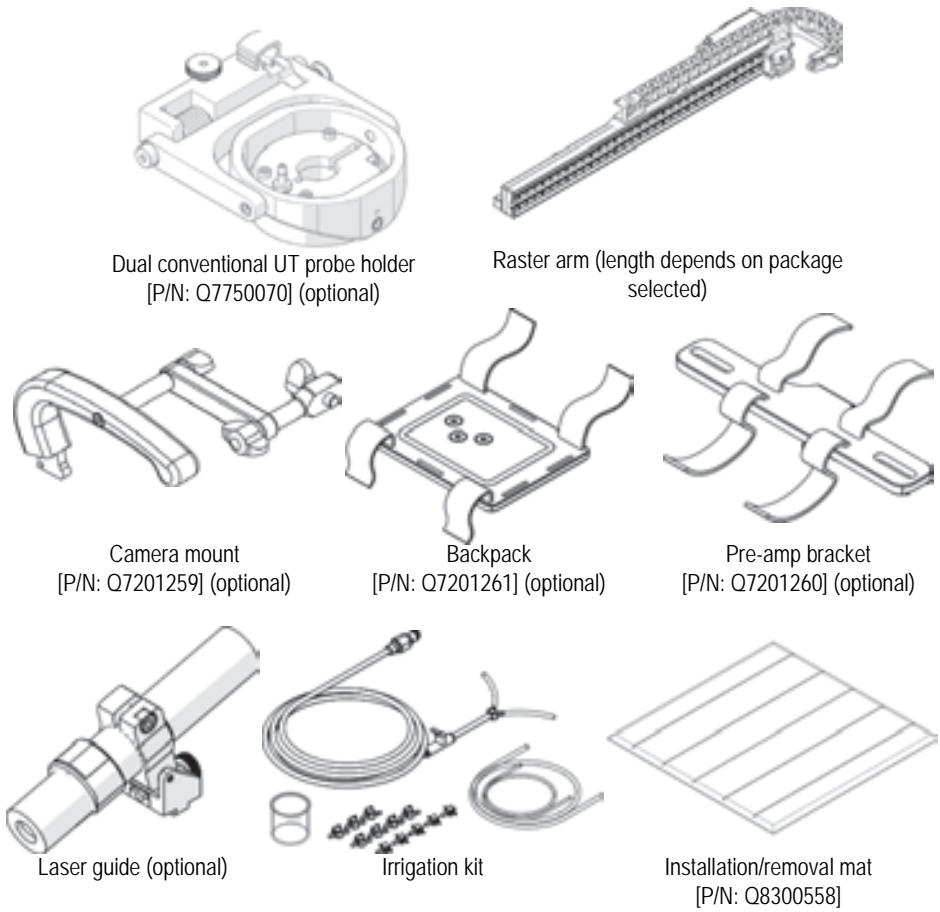
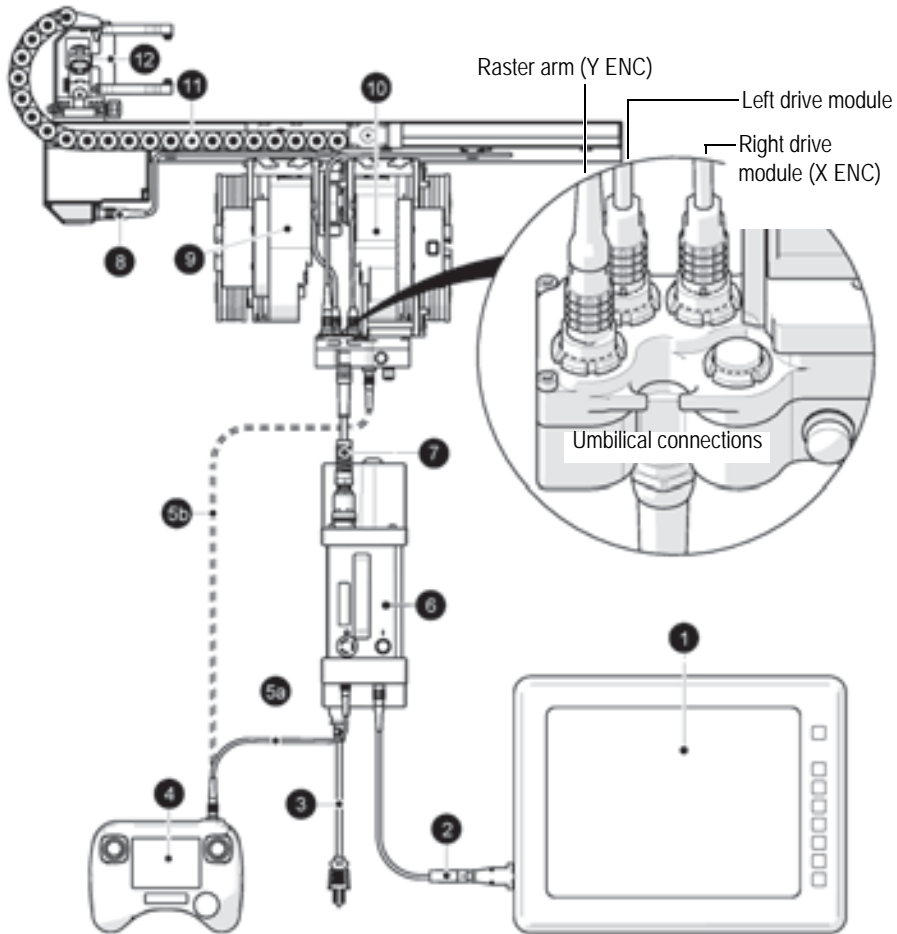


Figure 1-9 Scanner components (continued)

2. Configurations

This chapter contains information on making the connections to configure the SteerROVER for scanning. For a detailed view of the umbilical connectors see Figure 4-31 on page 116.

2.1 Raster Arm and Heavy Duty Vertical Probe Holder



Description	ID	Description	ID	Description	ID
User's instrument	1	Controller cable (alt.)	5b	Right drive module	10
Encoder cable	2	Power controller	6	Raster arm (optional)	11
Power cable	3	Umbilical	7	Heavy duty vertical probe holder (optional)	12
Handheld controller	4	Raster arm cable	8		
Controller cable (main)	5a	Left drive module	9		

Figure 2-1 Raster arm with heavy duty vertical probe holder configuration

To configure the SteerROVER and raster arm with the heavy duty vertical probe holder

**CAUTION**

DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnection. Permanent damage to the electronics could occur.

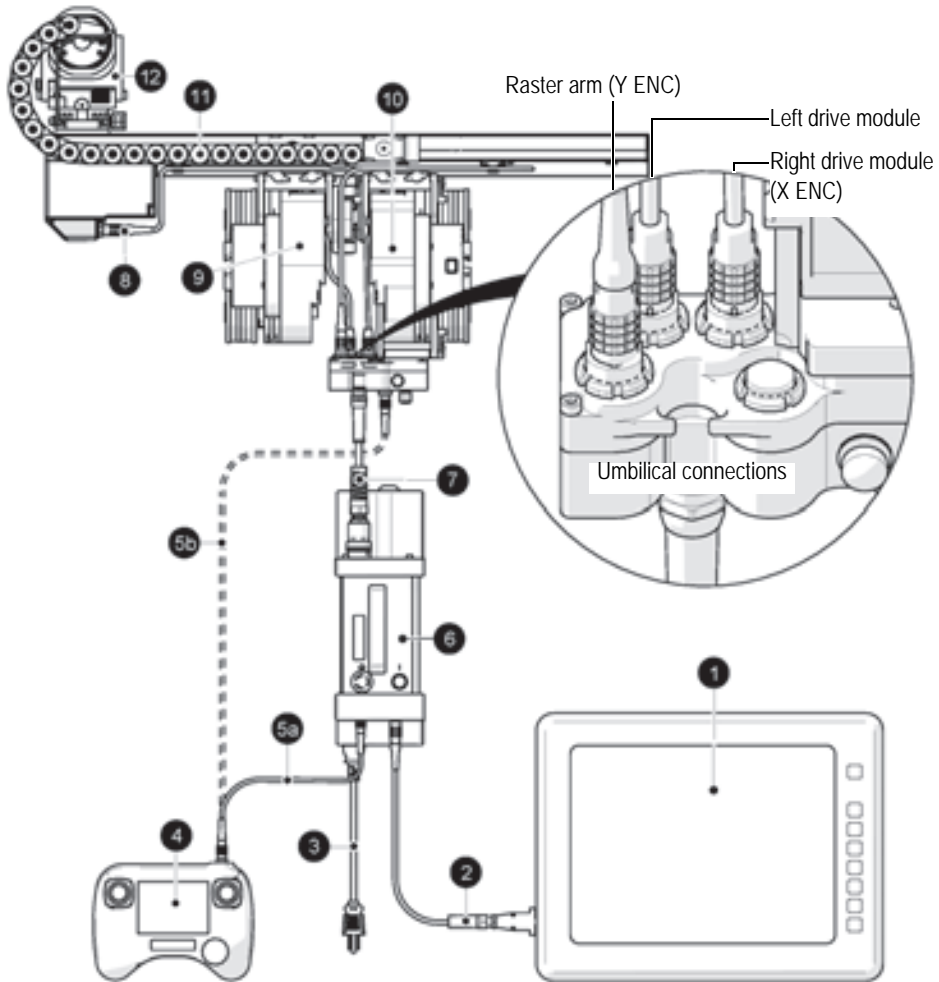
1. Mount and connect the umbilical to the right drive module of the SteerROVER (see Figure 2-1 on page 44).
 2. Connect the umbilical to the power controller.
 3. Connect the handheld controller to the power controller using the controller cable.
-

NOTE

The handheld controller may also be connected directly to the umbilical.

4. Connect encoder cable from the user's instrument to the power controller.
5. Attach raster arm to the SteerROVER (see "Raster Arm Module" on page 121).
6. Connect raster arm cable (see "Setting Up the Raster Arm Cable" on page 128) to the umbilical.
7. Plug the power cable into an appropriate power source (see "Power Requirements" on page 219).

2.2 Raster Arm and Dual Conventional UT Probe Holder



Description	ID	Description	ID	Description	ID
User's instrument	1	Controller cable (alt.)	5b	Right drive module	10
Encoder cable	2	Power controller	6	Raster arm (optional)	11
Power cable	3	Umbilical	7	Dual conventional UT probe holder (optional)	12
Handheld controller	4	Raster arm cable	8		
Controller cable (main)	5a	Left drive module	9		

Figure 2-2 Raster arm and dual conventional UT probe holder configuration

To configure the SteerROVER and raster arm with the dual conventional UT probe holder

**CAUTION**

DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnection. Permanent damage to the electronics could occur.

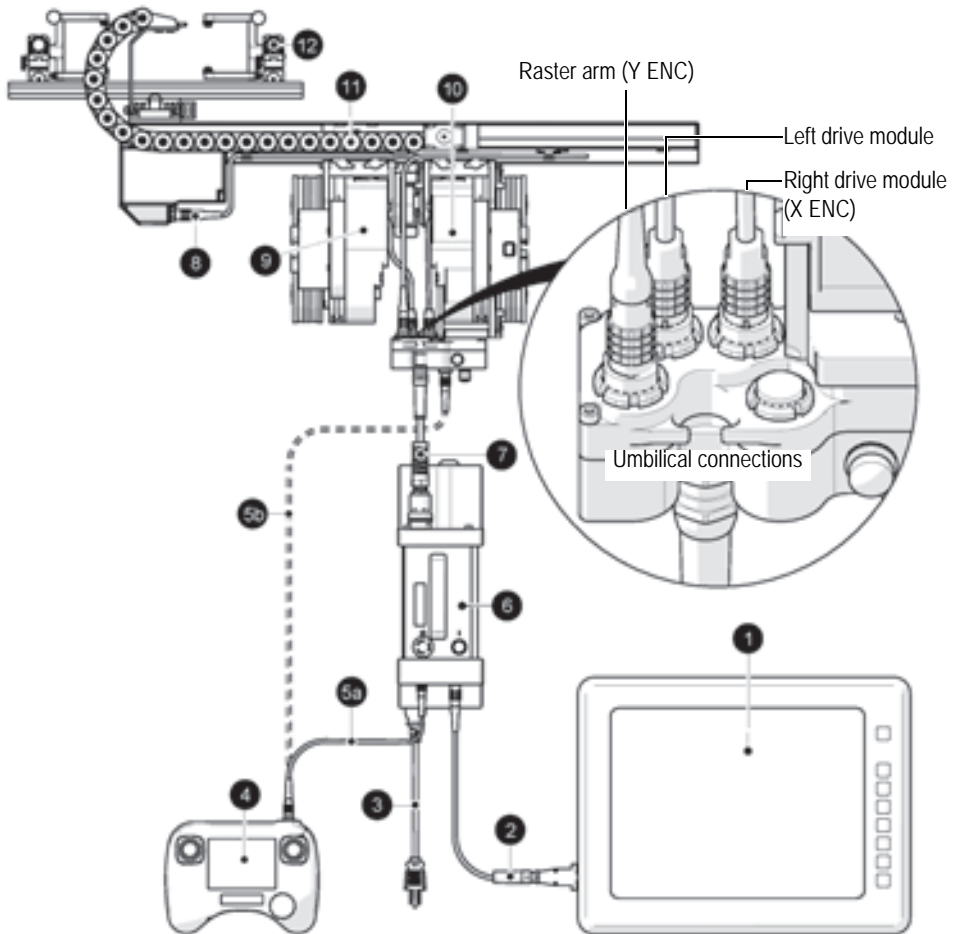
1. Mount and connect the umbilical to the right drive module of the SteerROVER (see Figure 2-2 on page 46).
 2. Connect the umbilical to the power controller.
 3. Connect the handheld controller to the power controller using the controller cable.
-

NOTE

The handheld controller may also be connected directly to the umbilical.

4. Connect the encoder cable from the user's instrument to the power controller.
5. Attach the raster arm to the SteerROVER (see "Raster Arm Module" on page 121).
6. Connect the raster arm cable (see "Setting Up the Raster Arm Cable" on page 128) to the umbilical.
7. Plug the power cable into an appropriate power source (see "Power Requirements" on page 219).

2.3 Raster Arm and Dual Probe Holder



Description	ID	Description	ID	Description	ID
User's instrument	1	Controller cable (alt.)	5b	Right drive module	10
Encoder cable	2	Power controller	6	Raster arm (optional)	11
Power cable	3	Umbilical	7	Dual probe holder (optional)	12
Handheld controller	4	Raster arm cable	8		
Controller cable (main)	5a	Left drive module	9		

Figure 2-3 Raster arm and dual probe holder configuration

To configure the SteerROVER with the raster arm and dual probe holder

**CAUTION**

DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnection. Permanent damage to the electronics could occur.

1. Mount and connect the umbilical to the right drive module of the SteerROVER (see Figure 2-3 on page 48).
 2. Connect the umbilical to the power controller.
 3. Connect the handheld controller to the power controller using the controller cable.
-

NOTE

The handheld controller may also be connected directly to the umbilical.

4. Connect the encoder cable from the user's instrument to the power controller.
5. Attach the raster arm to the SteerROVER (see "Raster Arm Module" on page 121).
6. Connect the raster arm cable (see "Setting Up the Raster Arm Cable" on page 128) to the umbilical.
7. Plug the power cable into an appropriate power source (see "Power Requirements" on page 219).

2.4 Dual Drive Modules with Pivoting Probe Holder Rack

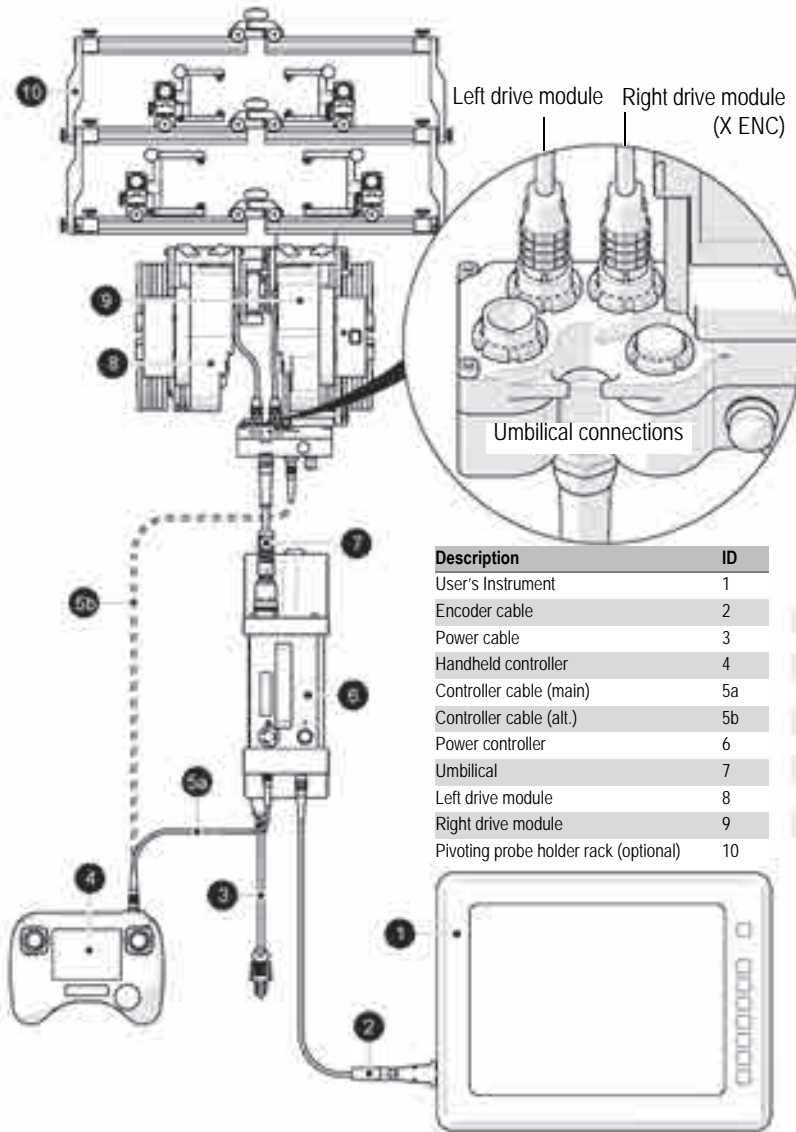


Figure 2-4 Pivoting probe holder rack (optional) configuration

To configure the SteerROVER system for scanning using a probe holder rack, follow these steps (see “Probe Holder Rack” on page 171):

**CAUTION**

DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnection. Permanent damage to the electronics could occur.

To configure the system for scanning using a probe holder rack

1. Connect the power controller to the umbilical (see Figure 2-4 on page 50).
2. Connect the umbilical to SteerROVER scanner.
3. Connect the handheld controller to the power controller using the controller cable.

NOTE

The handheld controller may also be connected directly to the umbilical.

4. Connect the instrument to the power controller using the encoder cable.
5. Mount a configured probe holder rack (see “Probe Holder Rack” on page 171) to the crawler (see “Swivel Mount” on page 95”).

2.5 Dual Drive Modules with Probe Holder Rack for Flange Scanning

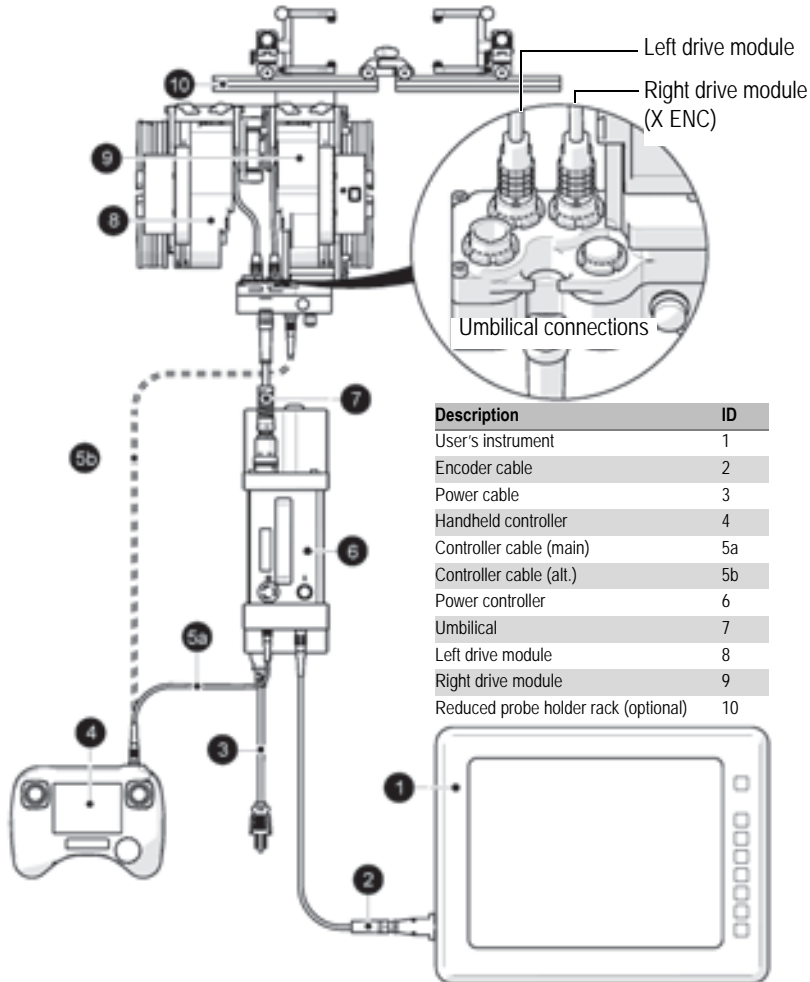


Figure 2-5 Pivoting probe holder rack (optional) configured for flange scanning

To configure the SteerROVER system for scanning using dual drive modules with a pivoting probe holder rack configured for flange scanning, follow this procedure.

To configure the SteerROVER system for flange scanning

**CAUTION**

DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnection. Permanent damage to the electronics could occur.

1. Mount and connect the umbilical to the right drive module of the SteerROVER (see Figure 2-5 on page 52).
 2. Connect the umbilical to the power controller.
 3. Connect the handheld controller to the power controller using the controller cable.
-

NOTE

The handheld controller may also be connected directly to the umbilical.

4. Connect the encoder cable from the user's instrument to the power controller.
5. Plug the power cable into an appropriate power source (see "Power Requirements" on page 219).
6. Attach a configured probe holder rack (see "Pivoting Probe Holder Rack Setup—Flange" on page 182) to the SteerROVER (see "Swivel Mount" on page 95).

2.6 Single Drive Module with Frame Bar

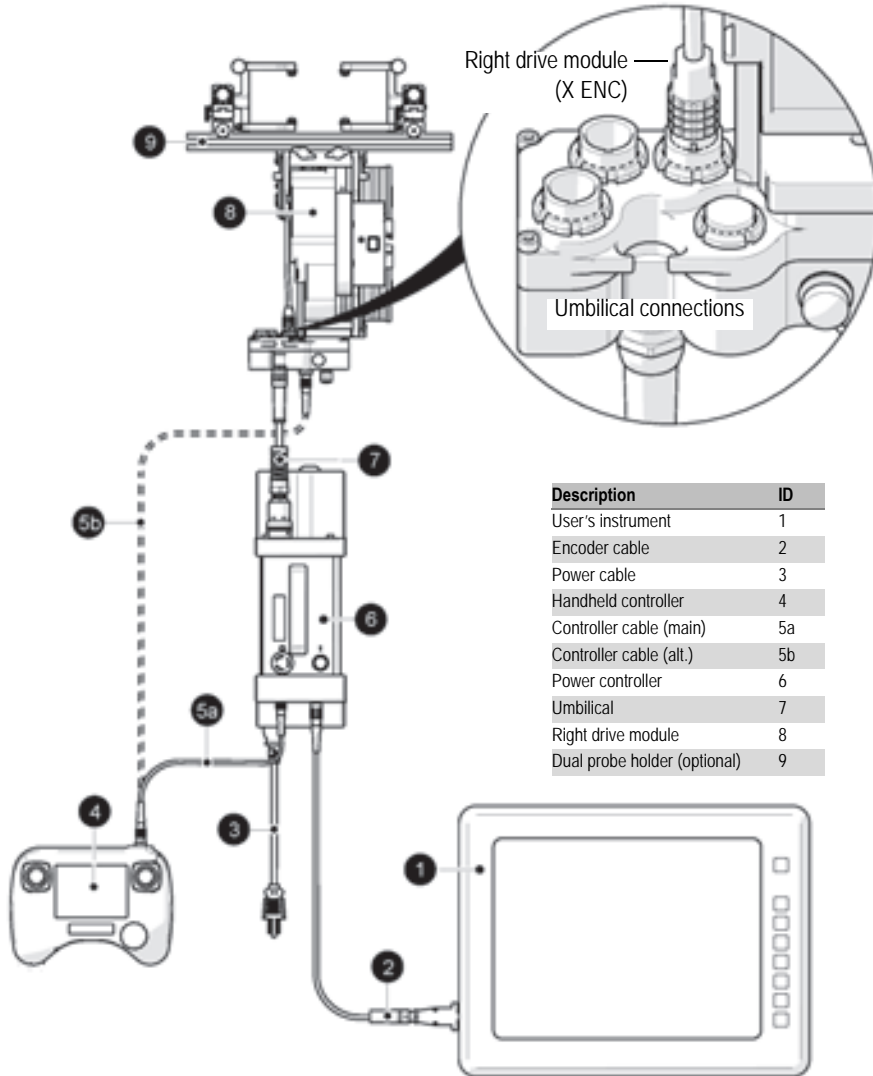


Figure 2-6 Right drive module configuration

To configure the SteerROVER system for scanning using a single drive module with a frame bar, follow these steps.

**CAUTION**

DO NOT DISCONNECT UNDER LOAD. Shut off power before connection or disconnection. Permanent damage to the electronics could occur.

To configure the system for scanning using a single drive module with a frame bar

1. Separate the left and right drive modules (see “Disconnecting/Connecting the Left and Right Drive Modules” on page 106).
2. Mount and connect the umbilical to the right drive module (see Figure 2-6 on page 54).
3. Connect the power controller to the umbilical.
4. Connect the handheld controller to the power controller using the controller cable.

NOTE

The handheld controller may also be connected directly to the umbilical.

5. Connect the encoder cable from the user’s instrument to the power controller.
6. Plug the power cable into an appropriate power source (see “Power Requirements” on page 219).
7. Attach a configured frame bar (see Figure 2-6 on page 54) to the SteerROVER (see “Swivel Mount” on page 95).

3. Operation

**WARNING**

FALLING OBJECT HAZARD. Ensure the umbilical can freely uncoil during operation and does not become snagged. If the umbilical becomes snagged, the SteerROVER may fall and SEVERE INJURY or DEATH could result.

3.1 System Start-Up

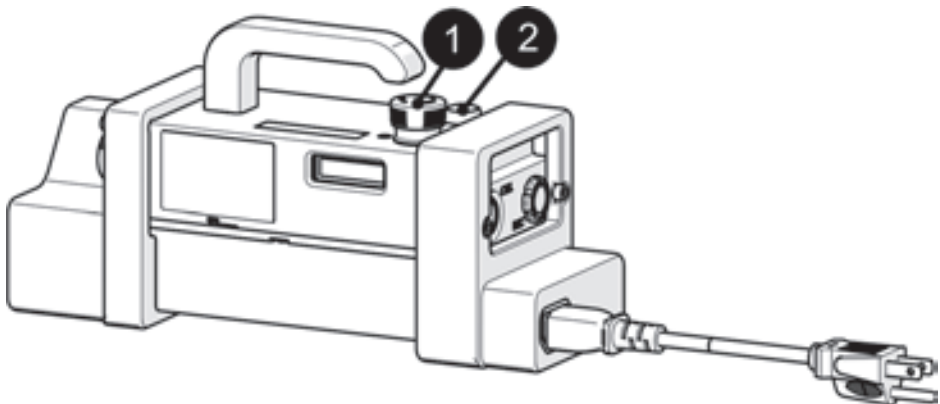


Figure 3-1 Power controller

To start up the system

1. Plug in the power controller to the appropriate power source (see “Power Requirements” on page 219).
2. Connect the components (see “Configurations” on page 43).
3. Locate the red emergency stop push-button on the power controller. Rotate this button clockwise to unlatch item #1 (see Figure 3-1 on page 57).

The green push-button on the power controller activates the system (see item #2, Figure 3-1 on page 57).

A warning message displays on the handheld controller when power has been activated (see Figure 3-2 on page 58).



Figure 3-2 Handheld controller warning message

4. When the dangers of using the SteerROVER are recognized and understood by reading this user’s manual, touch **Ok** to acknowledge the warning.

A second warning message (see Figure 3-3 on page 59) displays requesting assurance that a No Entry Fall Zone has been established (see “No Entry Fall Zone” on page 29) and tether requirements are met (see “Tether Requirements and Attachment” on page 30).



Figure 3-3 Falling object warning

- Acknowledge this warning by touching **Yes**.
The system will now check for attached components and adjust accordingly. When a raster arm is detected, a warning appears indicating the carriage must move to the home position (see Figure 3-4 on page 59).



Figure 3-4 Raster homing

- Ensure the raster arm and carriage are free of interference. If an obstruction is present, touch **Disable**. The raster arm will be disabled until the system is restarted. If there are no obstructions, touch **Ok**.

While the raster arm is performing the homing procedure, the **Homing Raster** screen is displayed.

After the system is initialized, the **Jog Mode** screen will appear (see “Jog Mode” on page 69). The system is now ready for operation.

3.2 Placement of SteerROVER on Inspection Surface



WARNING



FALLING OBJECT HAZARD. Read and understand the proper procedure for using the installation/removal mat. If the SteerROVER installation is done at elevated heights, improper use may cause the scanner to fall and **SEVERE INJURY** or **DEATH** could result.



CAUTION

To prevent equipment damage, do **NOT** handle the SteerROVER using the umbilical cable. Use the provided handles.

IMPORTANT

To place the SteerROVER on the inspection surface, use the scanner installation/removal mat (see Figure 1-9 on page 41) as a spacer between the wheels and the surface on which the SteerROVER is to drive. This is necessary to protect the electronic components within the SteerROVER from damaging shock, should the scanner be slammed directly onto the inspection surface.

To place the SteerROVER on the inspection surface

NOTE

Olympus recommends that two people install the scanner on an inspection surface: one person to lower the SteerROVER to the scan surface and one person to operate the scanner via the handheld controller.

1. After the SteerROVER preparation is complete (see “Preparation for Use” on page 29), raise the front swivel mounts (see “Swivel Mount” on page 95), using the swivel mount adjustment levers (see Figure 3-5 on page 61), and the umbilical mount (see “Umbilical” on page 98) to ensure they will not hinder the wheels from contacting the inspection surface. See Figure 3-6 on page 62 for the correct position.

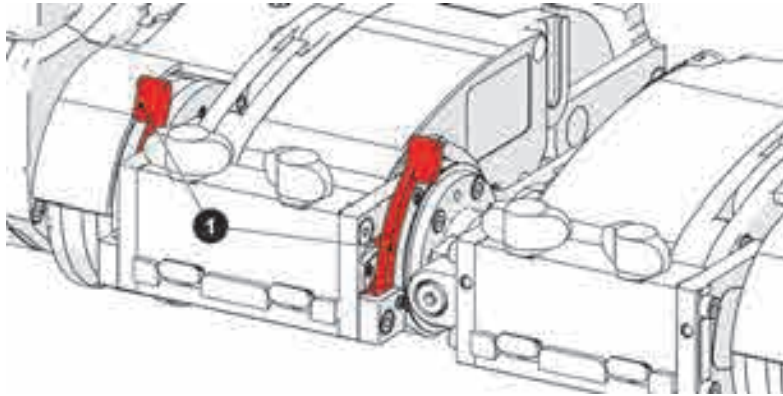


Figure 3-5 Front swivel adjustment levers

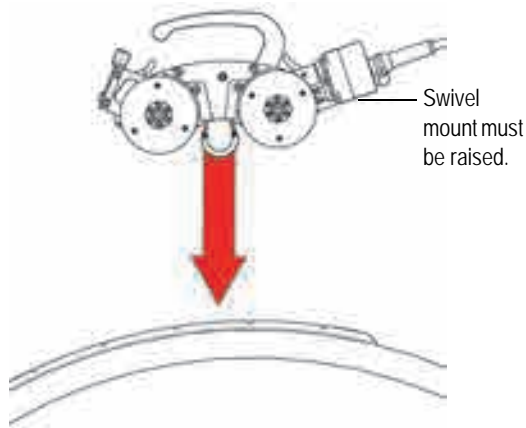


Figure 3-6 Proper swivel mount position

2. Set the SteerROVER to Jog mode (see “Jog Mode” on page 69).
3. Place the installation/removal mat on the inspection surface (Figure 3-7 on page 62).

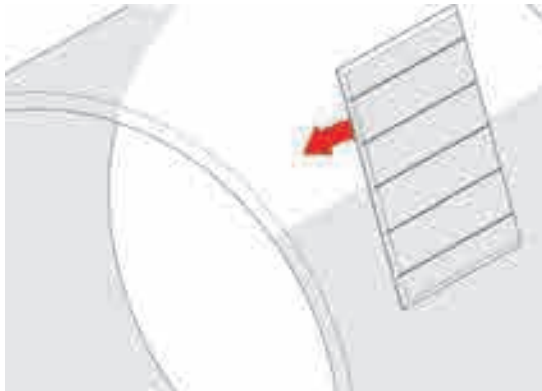


Figure 3-7 Place installation/removal mat

4. Place and hold the SteerROVER on the installation/removal mat (see Figure 3-8 on page 63).

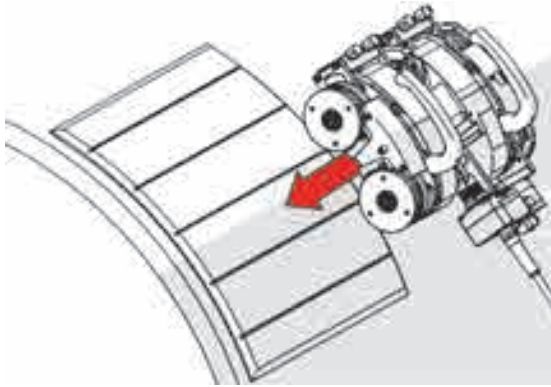


Figure 3-8 Lower SteerROVER to mat

NOTE

Do NOT release SteerROVER when it is placed on the installation/removal mat, until instructed to do so in step 6.

-
5. Ensure all four wheels of the SteerROVER are held firmly against the installation/removal mat.
 6. While holding the SteerROVER, use the Fwd/Rev joystick (see Figure 3-9 on page 64) to carefully drive the scanner (see Figure 3-10 on page 64) off the installation/removal mat and onto the inspection surface (see Figure 3-11 on page 65). When the SteerROVER is securely on the inspection surface the user may let go of the scanner.



Figure 3-9 Drive the SteerROVER

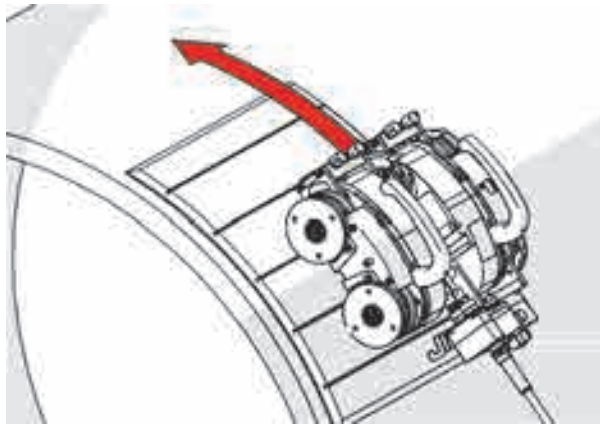


Figure 3-10 Drive SteerROVER off the mat

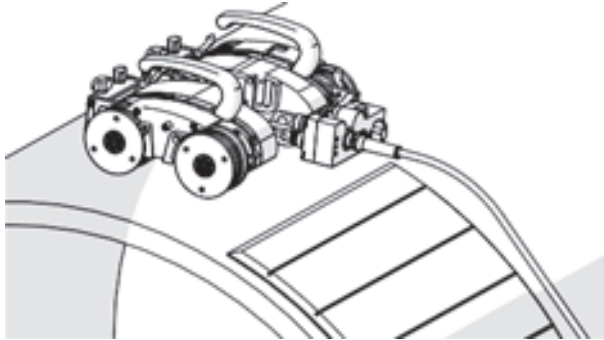


Figure 3-11 Magnetized to surface

TIP

Avoid allowing the drive modules to slam into the inspection surface. This can occur when all four wheels are not in contact with the installation/removal mat while the SteerROVER is driven onto the inspection surface.

-
7. Remove the installation/removal mat from the inspection surface.

TIP

Circumstance may arise when only one person is available for placement of the SteerROVER on a inspection surface. With the system power off, it is possible to place the SteerROVER on the inspection/removal mat and manually push the scanner off the mat and onto the inspection surface.

-
8. Align the front swivel mounts and umbilical mount to the appropriate relationship to inspection surface (see Figure 3-12 on page 66).

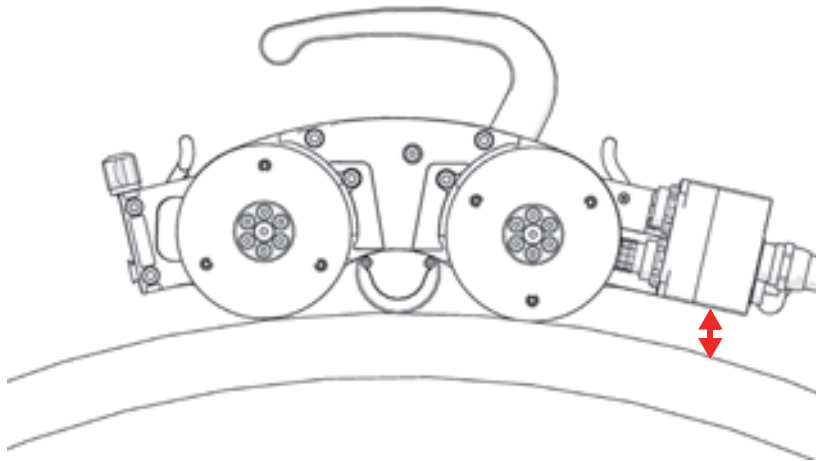


Figure 3-12 Swivel mount aligned parallel to scan surface

3.3 Handheld Controller Layout

This section contains explanations about the components of the handheld controller, including the touchscreen's user interface.



Figure 3-13 Handheld controller

3.3.1 Touchscreen

The handheld controller touchscreen (see Figure 3-13 on page 67) is the primary operator interface for the system. Buttons are indicated on the screen with a 3D border (see Figure 3-14 on page 68).



Figure 3-14 Sample touchscreen buttons

3.3.2 Click Wheel

The click wheel (see Figure 3-13 on page 67) provides a redundant system control that may be used instead of the touchscreen. A blinking box around a button indicates the click wheel selection. Rotating the click wheel selects different buttons on the screen. Press the click wheel to choose the button currently selected.

3.3.3 Joysticks

The joysticks are used to control the system. The left joystick controls the forward/reverse movement of the SteerROVER (see Figure 3-13 on page 67). The right joystick function is selected on screen. Right joystick functions include SteerROVER steering or raster arm movement.

3.4 Main Mode Selection Screen



Figure 3-15 Mode Select screen

The **Mode Select** screen (see Figure 3-15 on page 68) offers four modes of operation for the system:

- Jog Mode (see “Jog Mode” on page 69)
- Latched Jog Mode (see ““Latched Jog Mode” on page 73)
- Two Axis Scan¹ (see “Two Axis Scan Mode” on page 73)
- System Utilities (see “System Utilities Screen” on page 80)

3.4.1 Jog Mode

Jog mode manually controls the system movement using the joystick.

NOTE

Jog mode is the default selection when the system is first activated.

When a raster arm is connected (see “Raster Arm Module” on page 121), both the SteerROVER and raster arm information is displayed (see Figure 3-16 on page 69). When a raster arm is not connected, only the SteerROVER scanner’s information is displayed (see Figure 3-17 on page 70) under **Crawler**.



Figure 3-16 Jog mode with raster arm

1. Only appears when a raster arm is detected/present.

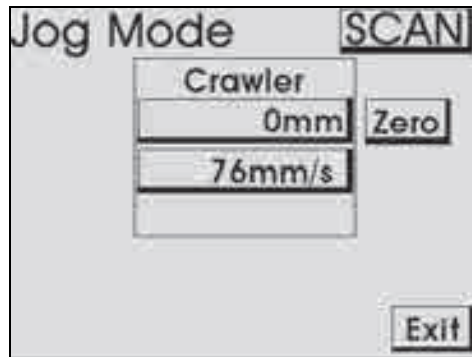


Figure 3-17 Jog mode showing the position and speed of the SteerROVER

Button Identification

The following descriptions identify the buttons of the **Jog Mode** screen (see Figure 3-18 on page 70 and Figure 3-19 on page 72) and explain their functions.

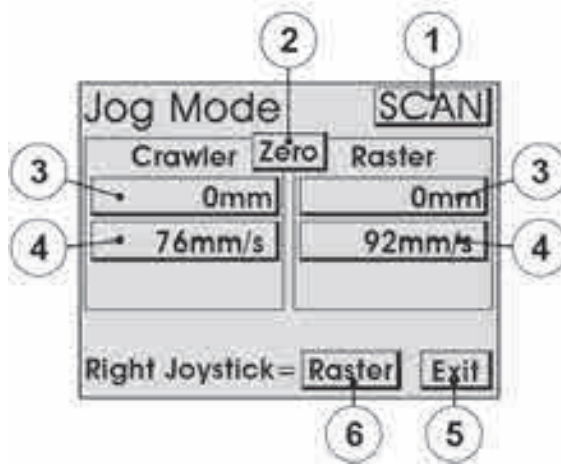


Figure 3-18 Jog mode button identification

(1) Scan/Rapid button

Used to quickly switch between SteerROVER speeds. The speed in either mode can be manually set to the user's preference. Rapid mode also changes the steering sensitivity according to the user settings.

TIP

Fine adjustments of speed can be made in the **User Settings** screen (see "User Settings Screen" on page 81").

(2) Zero button

Sets the current position to zero for all modules.

(3) Module position button[s]

Displays the current position of the SteerROVER and the raster arm. Press to set the position to any value using the **Edit** screen. When a module position is modified, the position will be modified for all other system modes. When the right SteerROVER module is connected, the position displayed under **Crawler** refers to the position of the auxiliary idler encoder, which is located between the drive module's wheels.

NOTE

This function only zeroes the number displayed on the SteerROVER handheld controller. It does not zero the position used in the data acquisition instrument.

(4) Module rate button[s]

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.

(5) Exit button

Exits Jog mode and returns to the **Mode Select** screen.

(6) Raster/Steer button

Indicates and selects the function of the right joystick when a raster arm is present. The right joystick controls either the raster arm position or the SteerROVER steering.

Left Joystick

Moves the SteerROVER forward or backward at a speed proportional to the joystick displacement.

Right Joystick

- When **Steer** is selected, the right joystick is used to steer the SteerROVER when it is moving forward or backward. The steering sensitivity of the joystick for both scan and rapid speeds may be set in the **User Settings** screen.
- When **Raster** is selected, the right joystick is used to control the raster arm movement. The system automatically limits movement to the mechanical end limits of the raster arm.

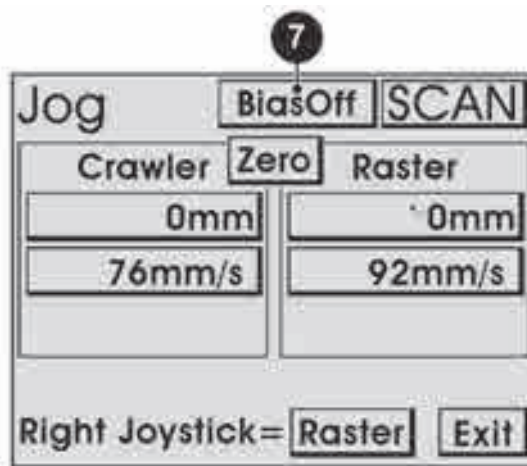


Figure 3-19 Jog mode button identification–Bias button

(7) Bias On/Bias Off button

When the **Steering Bias** setting is set to any value other than zero (see “User Settings Screen” on page 81), this button will be displayed to allow the set steering bias for the right steering joystick to be turned **On** and **Off**.

Steering Bias enables you to set a fixed steering value when the steering joystick is in the neutral position.

3.4.2 Latched Jog Mode

Identical to standard jog mode, Latched Jog mode adds forward or reverse SteerROVER scanner (or “crawler”) movement at the selected scan rate. This eliminates the need to manually hold the left joystick (see “Jog Mode” on page 69).

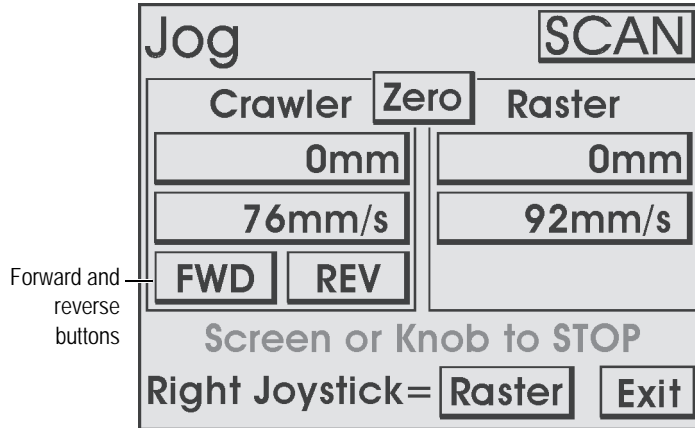


Figure 3-20 Latched Jog mode button identification–Bias button

FWD and REV buttons

The **FWD** and **REV** buttons are located on the **Crawler** tab. Press the **FWD** or **REV** button to drive the SteerROVER at the current maximum scan rate. When the SteerROVER is in motion, the raster joystick is still enabled. Touching the handheld controller’s touchscreen or pressing the click wheel stops the SteerROVER scanner’s movement.

NOTE

The **FWD** and **REV** buttons are not displayed in rapid mode.

3.4.3 Two Axis Scan Mode

The Two Axis Scan mode allows scanning to be performed using the SteerROVER as one axis of movement and a raster arm module as the second axis of movement.

NOTE

Two Axis Scan mode is not available unless the raster arm module is connected.

3.4.3.1 Two Axis Scan Setup Screen

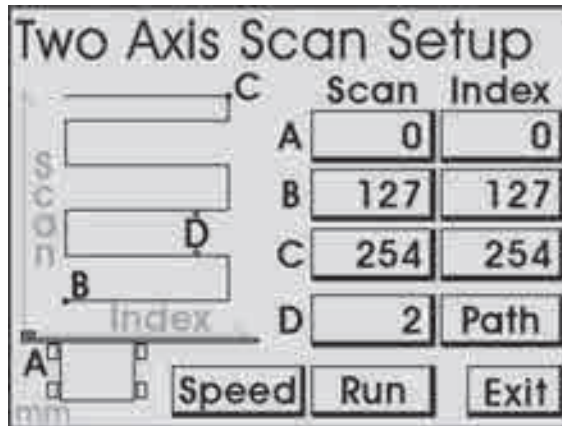


Figure 3-21 The Two Axis Scan Setup screen

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

Point A

The current position of the SteerROVER 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 (index increment distance value).

TIP

Scan determines the SteerROVER scanner's movement. *Index* determines the raster arm movement.

The diagram (see Figure 3-21 on page 74) indicates the scan functions that may be entered. Each point and setting (A, B, C, D) corresponds to a coordinate entry button on the right side of the screen.

A typical scan 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.

The units of measurement used is displayed in the bottom left-hand corner of the screen.

Path button

Toggles between a horizontal (see Figure 3-22 on page 75) or vertical (see Figure 3-23 on page 76) scan path.

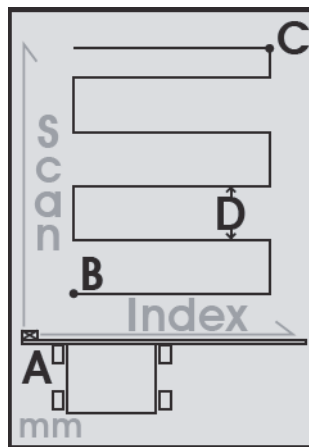


Figure 3-22 Horizontal scan path

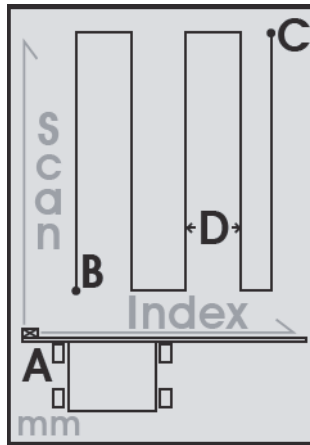


Figure 3-23 Vertical scan path

Speed button

Accesses the **Scan Speeds** screen (see “Scan Speeds Screen” on page 77).

Run button

Initiates a check of the input values to ensure they are within the system capabilities. When a scan pattern is invalid, a warning will be displayed (see Figure 3-24 on page 76). Pressing **OK** returns to the **Two Axis Scan Setup** screen, allowing correction of the error.



Figure 3-24 Run button error

When no issues are detected, the **Scan** screen is enabled (see “Two Axis Scan Screen” on page 78).

3.4.3.2 Scan Speeds Screen

The **Scan Speeds** screen (see Figure 3-25 on page 77) is where you adjust speed settings for two axis scanning.

TIP

Scan speeds may be adjusted in the **Jog Mode** or **User Settings** screen.

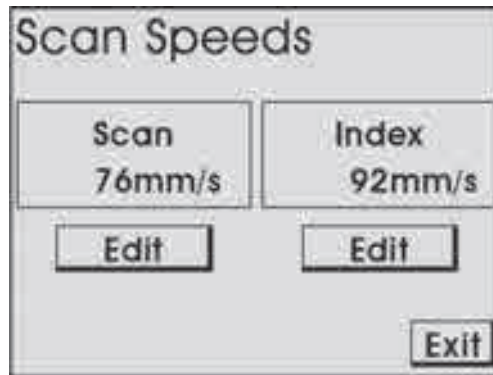


Figure 3-25 Scan speeds

Edit buttons

Allows adjustment to the corresponding axis speed.

Exit button

Returns to the **Two Axis Scan Setup** screen.

3.4.3.3 Two Axis Scan Screen

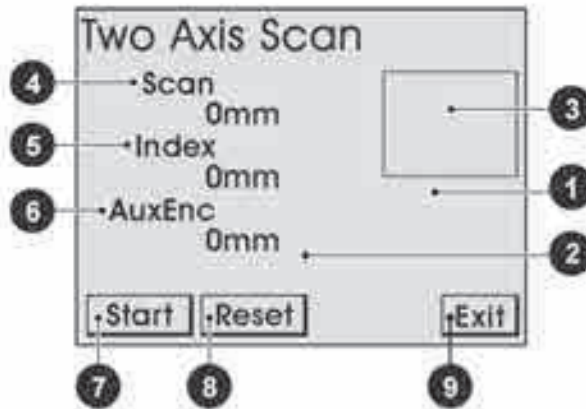


Figure 3-26 The Two Axis Scan screen

The **Two Axis Scan** screen initiates and monitors the two axis scan (see Figure 3-26 on page 78). The screen displays a visual representation of the scan area. The small circle (2) indicates the A position. The square (3) indicates the scan area described by the B and C positions.

The blinking cross hair (2) indicates the current scanner position.

The current position of the scan (4) and index (5) axis are displayed.

When a right drive module is detected with an auxiliary encoder, the auxiliary encoder position (6) is displayed.

Start/Stop button (7)

Starts or stops the scan sequence. When a scan has been stopped while in progress, the **Start** button resumes the scan.

Reset button (8)

Returns the scanner to the A position. Press the **Start** button to begin the scan sequence from the initial setting.

Exit button (9)

Exits and returns to the **Two Axis Scan Setup** screen.

During a scan, a graphical representation of the scanner path is displayed (see Figure 3-27 on page 79).

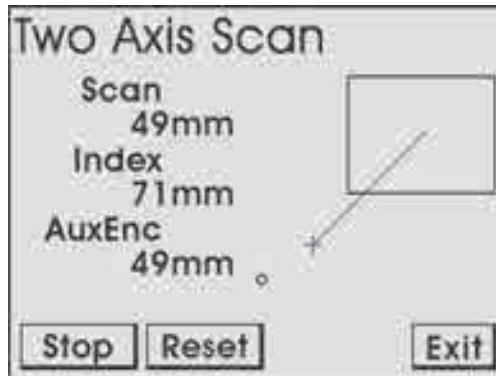


Figure 3-27 Scan path

When the scanner reaches the scan area, the graphic zooms to display that scan area. The scan path is illustrated (see Figure 3-28 on page 79) as the scan sequence takes place.

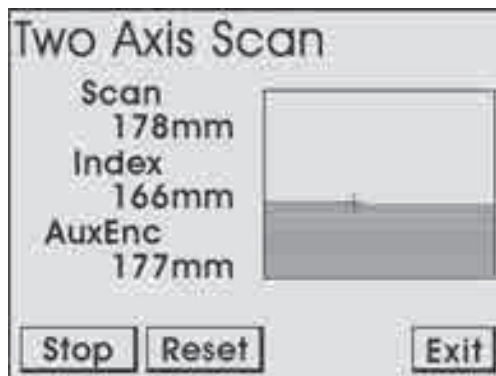


Figure 3-28 Scan path close up

Pressing **Exit** stops all scanning and motion. If the SteerROVER is not in the A position a warning appears (see Figure 3-29 on page 80). The warning alerts you that the A position of the scanner will be changed to the current position.

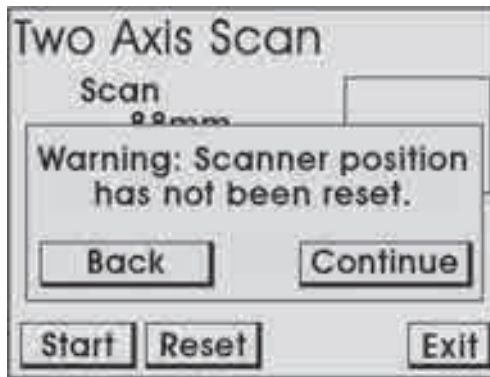


Figure 3-29 Exit warning

Press **Back** to return to the **Two Axis Scan** screen to reset the scanner and maintain original A position. Press **Continue** to reset the A position and return to the **Two Axis Scan Setup** screen.

3.4.4 System Utilities Screen

The **Utilities** screen provides access to the setup, diagnostics, and user preference settings (see Figure 3-30 on page 81).

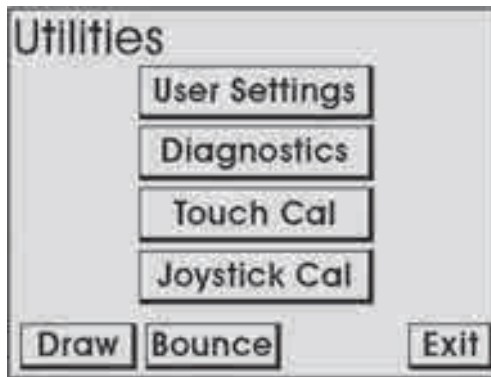


Figure 3-30 The Utilities screen

User Settings button

Accesses the **User Settings** screen allowing for various user preferences to be adjusted.

Diagnostics button

Enters the **Diagnostic** screens, which may be used to monitor system components and function.

Touch Cal button

Used to initiate the **Touch Calibration** screen.

Joystick Cal button

Used to enter the **Joystick Calibration** screen.

Draw button

Enters the mode used to test the touchscreen accuracy and response.

3.4.4.1 User Settings Screen

The **User Setting** screen enables you to customize the system to your preferences. The blinking highlighted box indicates the current selection (see Figure 3-31 on page 82). Use the click knob or **Up** and **Down** buttons to select different settings (see Table 5 on page 82).

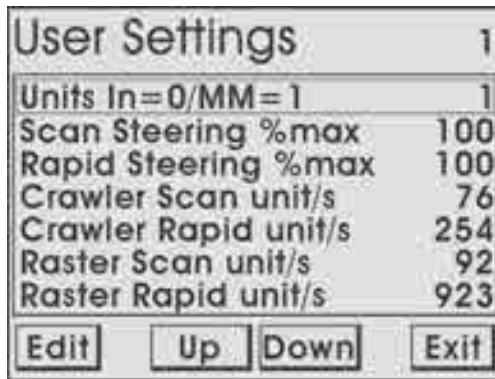


Figure 3-31 The User Settings screen

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

The **Exit** button directs to the **System Utilities** screen (see "System Utilities Screen" on page 80).

Table 5 User settings

Title	Description	Valid range	Default
Units In = 0/MM = 1	Changes the measurement units used for display and user entry. When set to 0, units measure in inches. When set to 1, units measure in millimeters.	0–1	1
Scan Steering %max	Sets the steering limit maximum when using the Jog mode scan setting. Lower values make the steering joystick less sensitive and more accurate, enabling better control following a guide or feature. Units are a percentage of the maximum system allowed.	0–100	100

Table 5 User settings (continued)

Title	Description	Valid range	Default
Rapid Steering %max	Sets the steering limit maximum when using the Rapid setting within Jog mode. Recommended to be left at 100 to allow maximum scanner maneuverability.	0–100	100
Crawler Scan unit/s	Sets the SteerROVER scan rate in the current units/second. This setting can also be changed through the Jog or Two Axis Scan Speed screens.	0–254 mm/s (0–10 in./s)	76 mm/s (3.0 in./s)
Crawler Rapid unit/s	Sets the SteerROVER rapid rate in the current units/second. This setting can also be changed through the Jog screen.	0–254 mm/s (0–10 in./s)	254 mm/s (10 in./s)
Raster Scan unit/s	Sets the raster arm scan rate in the current units/second. This setting can also be changed through the Jog or Two Axis Scan Speed screens.	5–762 mm/s (0.2–30 in./s)	762 mm/s (30 in./s)
Raster Rapid unit/s	Sets the raster arm 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 in./s)

Table 5 User settings (continued)

Title	Description	Valid range	Default
Raster Flip 0/1	Sets the raster arm orientation. When the raster arm is mounted with the motor housing to the left of the SteerROVER, the appropriate setting is 1. When the raster arm is mounted with the motor housing to the right of the SteerROVER, the appropriate setting is 0. When this setting is changed, the system must be rebooted.	0–1	1
Steering Bias +/-%	Sets a steering bias for the steering joystick, which may be turned on and off in Jog mode. Setting this to anything other than 0 will show the bias button on the Jog screen. Steering bias enables you to set a fixed steering value when the steering joystick is in its neutral position.	0	30 to +30

3.4.4.2 Diagnostics Screens

Several diagnostic screens enable various system functions to be monitored. Navigate to the different diagnostic screens using the **PREV** and **NEXT** buttons. The **Exit** button returns to the **System Utilities** screen (see “System Utilities Screen” on page 80).

NOTE

The diagnostic information requires an in depth understanding of the underlying technologies and programming in the system. Not all functions and information are explained in this manual.

Detected Modules

This screen indicates the system software version, and it displays which modules were detected when the system was activated (see Figure 3-32 on page 85).

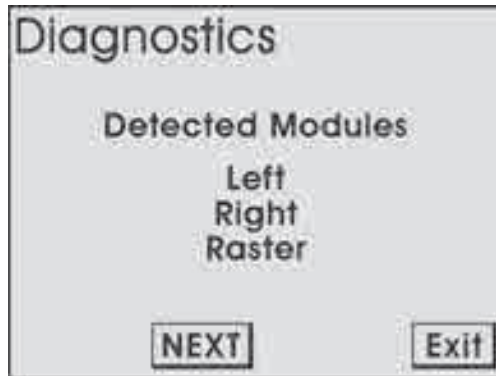


Figure 3-32 The Detected Modules screen

System 1

The **System 1** diagnostic screen displays general system function information (see Figure 3-33 on page 85).

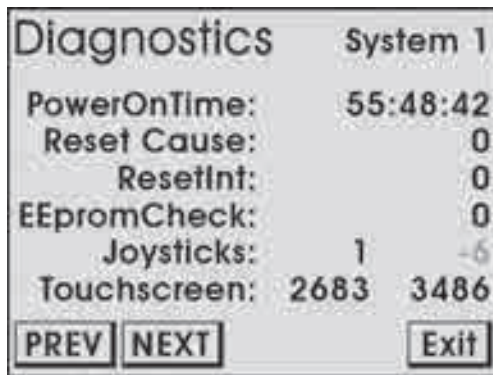


Figure 3-33 The System 1 Diagnostics screen

PowerOnTime

The total accumulative time the handheld controller has been powered.

Joysticks

Indicates the raw position reading from the joysticks.

Touchscreen

Indicates the raw position reading from the last touchscreen contact.

System 2

Additional general system function information is displayed on the **System 2** screen (see Figure 3-34 on page 86). An empty button is provided to allow testing of the click wheel.



Figure 3-34 The System 2 Diagnostics screen

Free Timer

Value from a free running system timer. If this timer is static, an internal controller issue is present.

Scrollwheel

Counter indicating the rotary position of the click wheel.

Scrollbutton

Indicates the status of pressing the click wheel.

System 3

The **System 3** screen displays additional system information (see Figure 3-35 on page 87). The information provided does not typically assist the user.

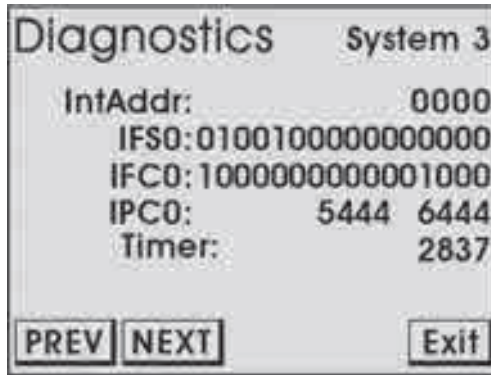


Figure 3-35 The System 3 Diagnostics screen

LeftDrv, RightDrv, or Raster

The **LeftDrv**, **RightDrv**, and **Raster** diagnostic screens provide information regarding the status of each motorized module. A screen is available for these components if they are detected upon system start-up (see Figure 3-36 on page 87 and Figure 3-37 on page 88).

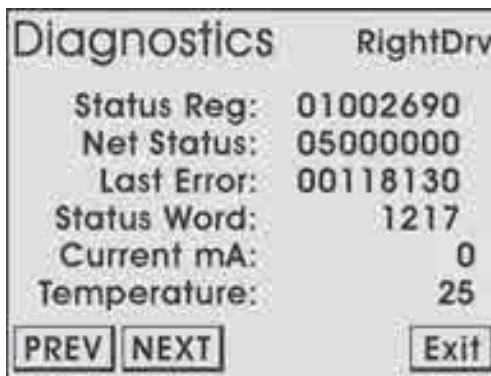


Figure 3-36 The RightDrv Diagnostics screen

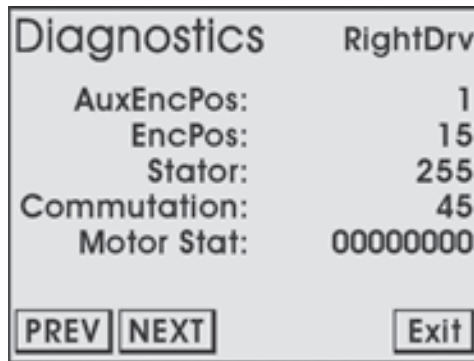


Figure 3-37 The RightDrv Diagnostics screen with encoder

Current mA

Displays the output of the module to the motor. The current (mA) displayed is directly proportional to the motor's output torque. This reading can be used to check if the control system is responding to forces on the module's motor.

Temperature

Internal temperature reading of the module in degrees Celsius.

AuxEncPos

Displays the position of the auxiliary encoder in counts when it is connected to the module. When the auxiliary encoder is moved, this number changes. When the encoder is moved from its current position and then back to that exact same position, this number also returns to its original position.

EncPos

The position of the module's motor encoder in counts.

3.4.4.3 Touch Calibration Screen



Figure 3-38 The Touch calibration screen

This option allows calibration of the touchscreen. Typically, this should not be necessary.

Touch the screen as the markers appear in the four corners of the screen.

TIP

Olympus recommends that the markers be touched with a small object to enhance the touch position accuracy during calibration.

The new calibration is stored immediately when the fourth marker is pressed. The calibration utility exits and return to the **System Utilities** screen. To abort the calibration, the system power may be turned off before the last marker is pressed.

3.4.4.4 Joystick Calibration Screen

Typically joystick calibration is only necessary when a joystick off-center error is detected upon start up (see Figure 3-39 on page 90).



Figure 3-39 Joystick error

This calibration may also be used when a joystick function does not appear to be properly centered.

Current readings of the joysticks are displayed in the **Joystick Calibration** screen (see Figure 3-40 on page 91). When the numbers are not near zero, press the **Calibrate** button to recalibrate to 0. The new calibration is stored when the **Exit** button is pressed.

It may be necessary to validate that the calibration is centered by testing each joystick in both directions. If one direction results in a greater offset from zero, it may be necessary to position the joystick in the middle of the difference, and then press **Calibrate**. For example, if pressing the joystick in one direction and releasing it gives a value of 10, yet doing the same in the other direction gives a value of -50, move the joystick until the value reaches -20 and then press **Calibrate**.



Figure 3-40 The Joystick Calibration screen

3.4.4.5 Draw Utility

The draw utility may be used to test the function of the touchscreen (see Figure 3-41 on page 91). Exit the utility by pressing the click wheel.



Figure 3-41 Draw utility

3.4.4.6 High Internal Temperature Screen



CAUTION



HOT SURFACE. The handles and the body of the SteerROVER may be hot to the touch. To avoid human injury, use appropriate protective equipment when removing the SteerROVER from a high temperature surface.

When the system approaches its maximum operating temperature, the high internal temperature screen will display (see Figure 3-42 on page 92). When this alert screen is displayed, all motor and system function ceases.

Press **OK** to reactivate the system to remove the SteerROVER from the scan surface.



Figure 3-42 High internal temperature screen

4. System Components

4.1 Handheld Controller

The handheld controller is used to manipulate a SteerROVER scanner installed on an inspection surface (see Figure 4-1 on page 93). User settings and scan information are edited using the handheld controller. The handheld controller is connected to the power controller or the umbilical with the controller cable (see Figure 1-8 on page 40).



Figure 4-1 Handheld controller

The handheld controller contains the complete system program and must be connected for the system to operate. When a software upgrade is necessary, the handheld controller is the only component required.

The handheld controller is not watertight and is not intended to be used in extremely wet environments. The handheld controller uses a resistive touchscreen; care should be taken to not use sharp or gritty objects on the screen as the touch membrane can scratch. If the screen is damaged, all programmed functions can still be accessed using the click wheel.



CAUTION



Do NOT connect the handheld controller while the system is activated. Do not disconnect under load. Shut off power before connection or disconnecting. Permanent damage to electronics could occur.

4.2 Right Drive Module

The right drive module includes the encoder, umbilical connections, and accessory mounting point. When connected with the left drive module the SteerROVER scanner is able to steer on an inspection surface (see Figure 4-2 on page 95).



WARNING



MAGNETIC MATERIAL. The wheels of the SteerROVER produce an extremely strong magnetic field that may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices, or other electronics. People with pacemakers or ICDs must stay at least 25 cm (10 in.) away.

NOTE

Steering is limited on smaller diameter inspection surfaces.

It is possible to use the right drive module independently to carry out weld scanning when steering is not required and/or overall scanner size is a concern.

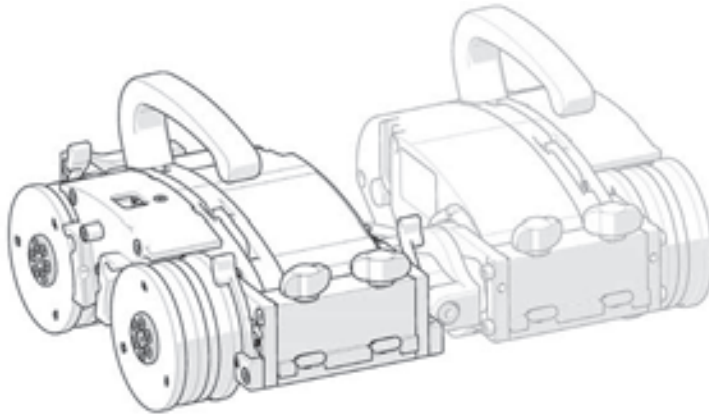


Figure 4-2 Right drive module

4.2.1 Swivel Mount

Located at the front of the right drive module, the swivel mount is used to connect scanning accessories such as a raster arm module or probe frame system.

Rotate the two black wing knobs to loosen the dovetail jaws (see Figure 4-3 on page 95). Slide the accessory's frame bar along the dovetail jaws. Rotate the two black wing knobs to clamp the frame system/raster arm in place.

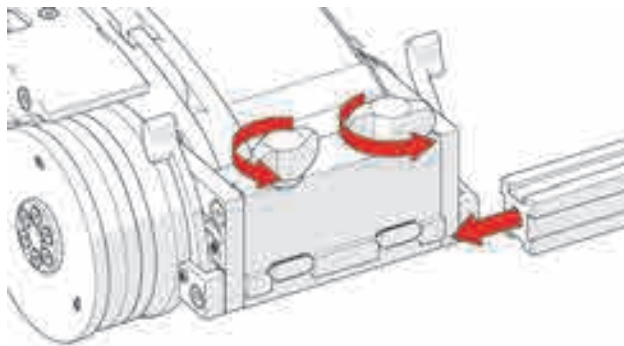


Figure 4-3 Frame bar installation

The front mount uses two levers to lock the front mount at the desired angle (see Figure 4-4 on page 96).

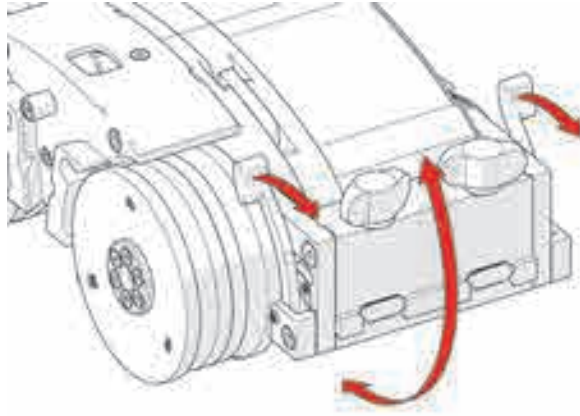


Figure 4-4 Swivel mount angle

Alternatively, accessories can also be mounted straight to the swivel mount. Rotate the black wing knobs aligning the dovetail jaws with the mount's grooves (see Figure 4-5 on page 96). Press the frame bar or accessory to the swivel mount (see Figure 4-6 on page 97) and tighten the black wing knobs.

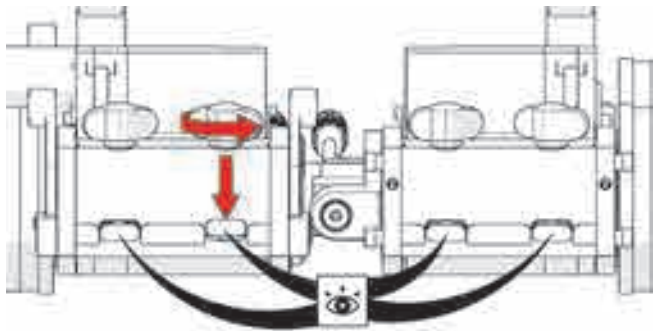


Figure 4-5 Align dovetail jaws

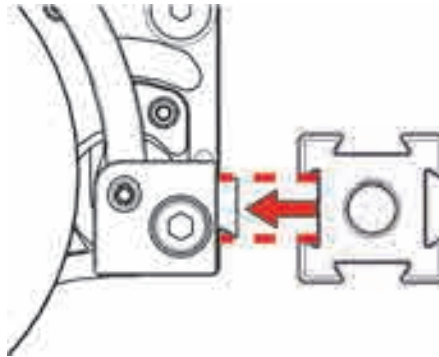


Figure 4-6 Mount frame bar

TIP

Alternate mounting procedure is possible (see “Swivel Mount” on page 95 for additional details).

The etched line near the base of the swivel mount can be used to align the front swivel mount to a horizontal position (see Figure 4-7 on page 97 and Figure 4-8 on page 98).

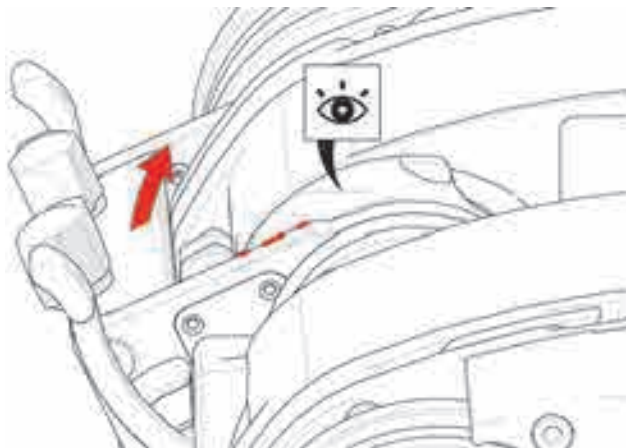


Figure 4-7 Pivot swivel mount

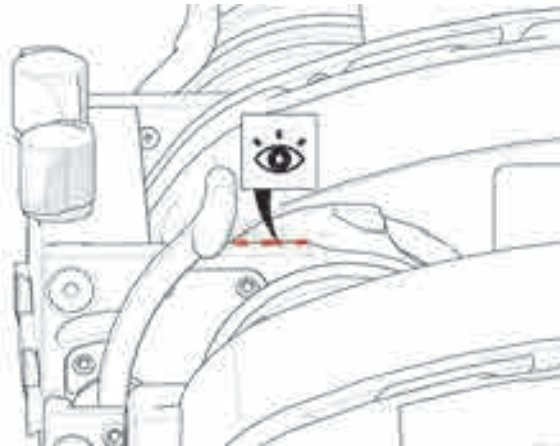


Figure 4-8 Align swivel mount with etched line

NOTE

The front mount must be horizontal when using the pivoting probe holder rack to scan longitudinally on piping.

4.2.2 Umbilical

To mount the umbilical to the SteerROVER

1. Connect the umbilical by first plugging in the SteerROVER scanner's connector (see Figure 4-9 on page 99).

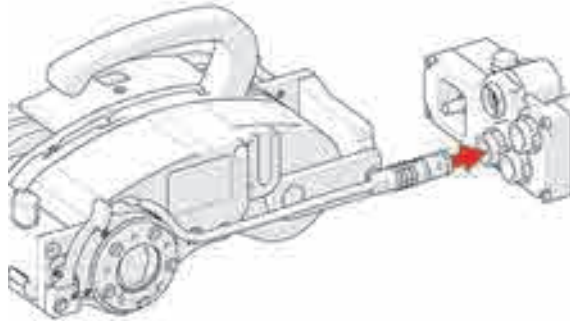


Figure 4-9 Connect to umbilical

2. Align the umbilical to the umbilical mount of the drive module (see Figure 4-10 on page 99).

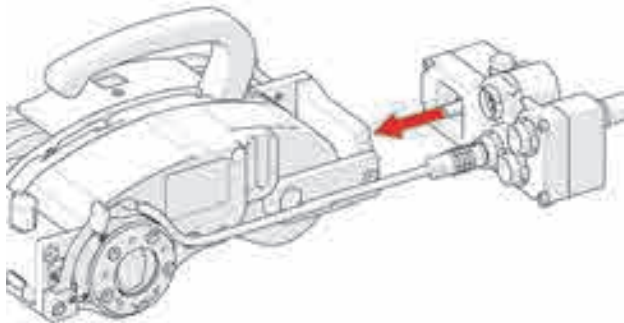


Figure 4-10 Align with drive module mount

3. Fasten the umbilical to the SteerROVER scanner's umbilical mount by tightening the black wing knob (see Figure 4-11 on page 100).

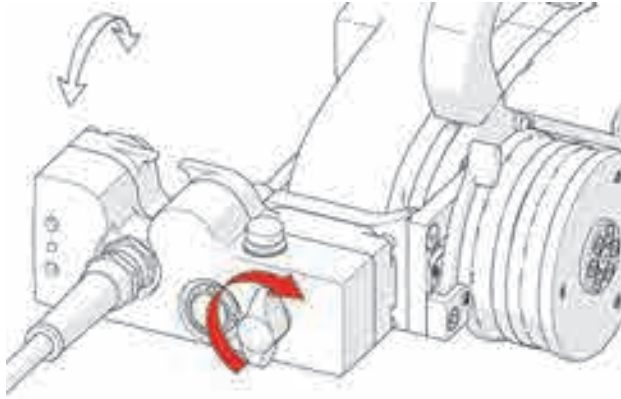


Figure 4-11 Tighten the black wing knob

4. Use the lock lever to position the umbilical mount at the desired angle (see Figure 4-12 on page 101). The SteerROVER scanner's umbilical mount can pivot to allow low profile scanning.

NOTE

Always ensure the right drive module's umbilical mount is rotated and locked in the position closest to the scan surface without making contact.

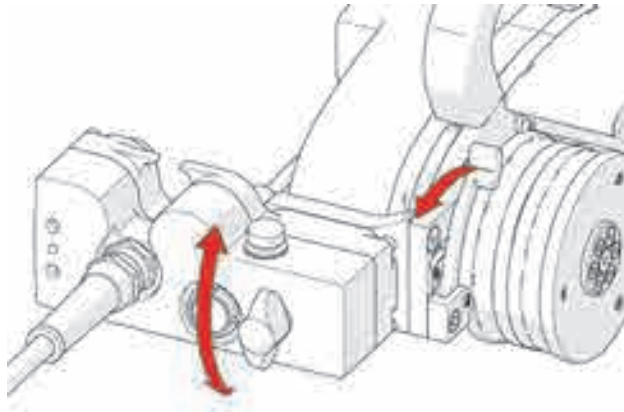


Figure 4-12 Adjust umbilical mount angle



WARNING



FALLING OBJECT HAZARD. When scanning at heights greater than 2 m (6 ft), failure to set the umbilical height as described below may cause the SteerROVER to fall and SEVERE INJURY or DEATH could result.

5. If you are scanning at heights greater than 2 m (6 ft), set the umbilical so that it is parallel to the scanning surface. Do not have the umbilical pivoted away from the inspection surface (see Figure 4-13 on page 102 and Figure 4-14 on page 102).

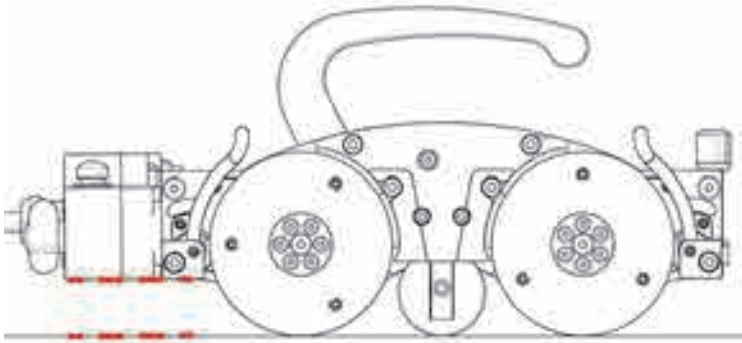


Figure 4-13 Correct umbilical mount alignment

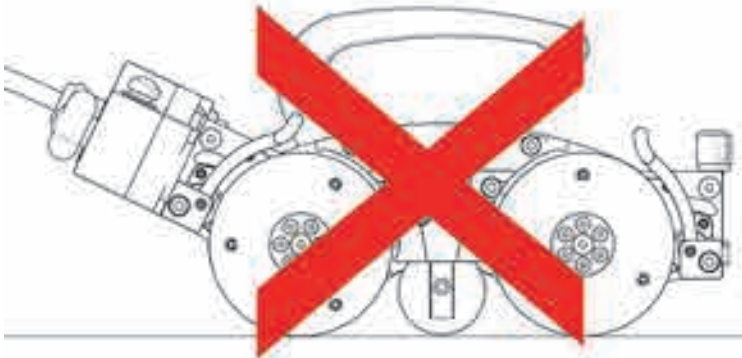


Figure 4-14 Incorrect umbilical mount alignment

4.2.3 Encoder

The right drive module includes an independent encoder wheel (see Figure 4-15 on page 103). This encoder wheel provides accurate encoding even in the event of drive wheel slip. The spring loaded encoder wheel maintains scan surface contact through all listed scan diameter sizes (see “Scanner Operation Specifications” on page 218).

Adjustment of the encoder wheel is not required.

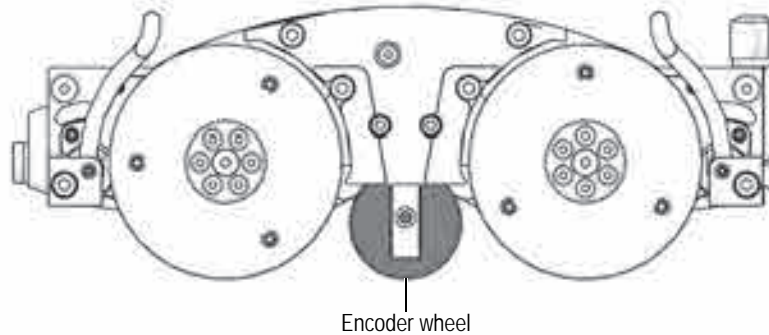


Figure 4-15 Encoder wheel

4.2.4 Handle

The handle can be removed to achieve low profile scanning.

To remove the handle

1. Lift the handle lock latch (see Figure 4-16 on page 103).

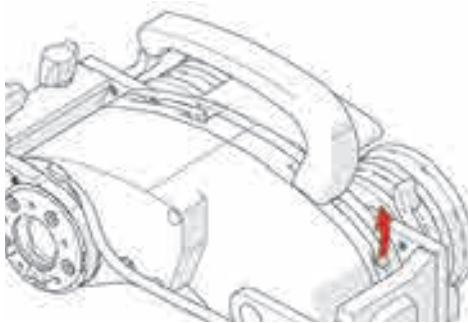


Figure 4-16 Lift the handle lock latch

2. Pivot the handle nose downward (see Figure 4-17 on page 104).

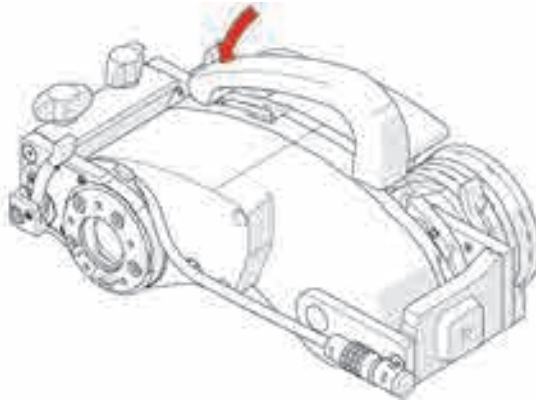


Figure 4-17 Pivot handle nose downward

3. Pull the handle up to remove it from the SteerROVER drive module (see Figure 4-18 on page 104). To reinstall the handle, perform the preceding steps in reverse.

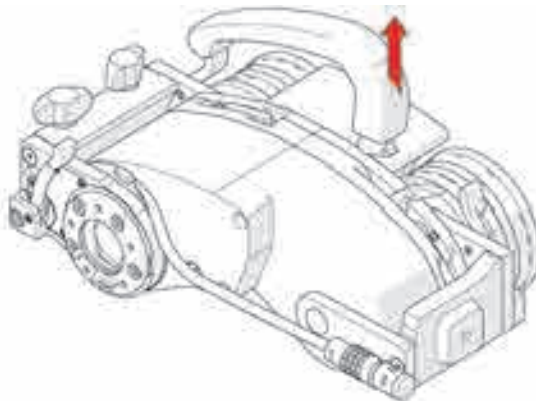


Figure 4-18 Lift the handle to remove it

4.2.5 Dovetail Accessory Mount

Affix optional accessories, such as the backpack, to the SteerROVER using the dovetail accessory mount (see Figure 4-19 on page 105).

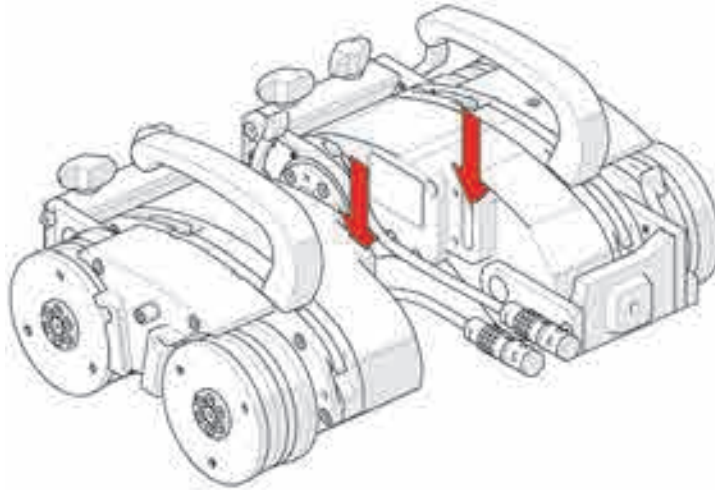


Figure 4-19 Dovetail accessory mounts

4.3 Left Drive Module

The left drive module is only used in conjunction with the right drive module (see Figure 4-20 on page 106). Combining both modules allows the SteerROVER scanner to steer on an inspection surface.



WARNING



MAGNETIC MATERIAL. The wheels of the SteerROVER produce an extremely strong magnetic field that may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices, or other electronics. People with pacemakers or ICDs must stay at least 25 cm (10 in.) away.

NOTE

Steering is limited on smaller diameter inspection surfaces.

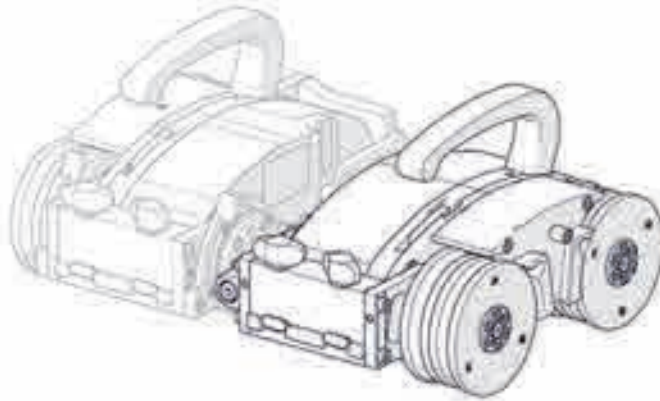


Figure 4-20 Left drive module

4.3.1 Disconnecting/Connecting the Left and Right Drive Modules



CAUTION



PINCH POINT HAZARD. Keep fingers clear of pinch points when connecting/disconnecting the left and right drive modules.

TIP

This operation is best performed by two people.

To disconnect the left and right drive modules

1. Locate the release pin at the bottom of the SteerROVER (see Figure 4-21 on page 107). Using the supplied 3 mm hex driver, press the pin while rotating the two modules (see Figure 4-22 on page 107).

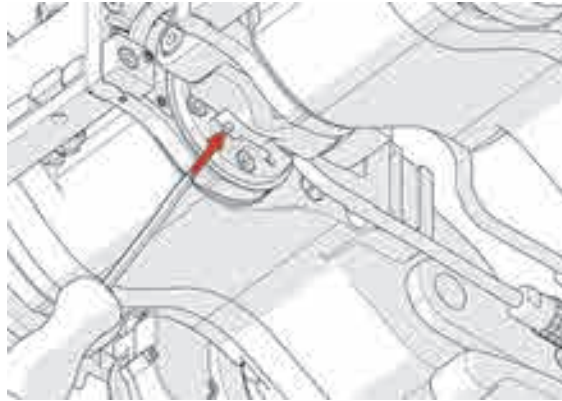


Figure 4-21 Press release pin

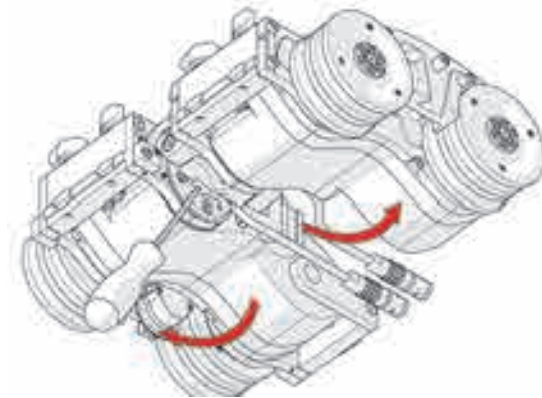


Figure 4-22 Press pin and rotate modules

2. Continue rotating the two modules until they are 90° perpendicular (see Figure 4-23 on page 108), and then gently pull the two modules apart (see Figure 4-24 on page 108).

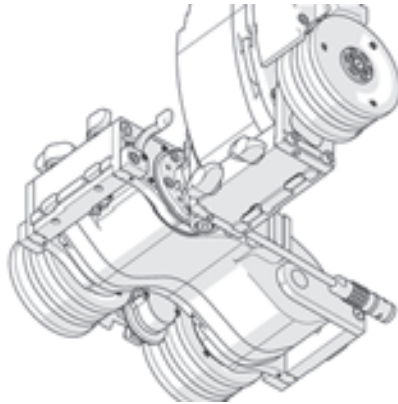


Figure 4-23 Rotate modules to 90°

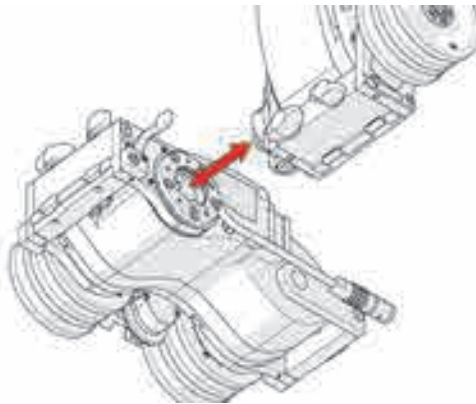


Figure 4-24 Pull modules apart

3. Label the left drive module with a magnetic warning that is clearly visible.

**WARNING**

MAGNETIC MATERIAL. The wheels of the SteerROVER produce an extremely strong magnetic field that may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices, or other electronics. People with pacemakers or ICDs must stay at least 25 cm (10 in.) away.

4. Use the provided caps to protect the connection pivots from dirt, dust, mud, etc. (see Figure 4-25 on page 109).
-

NOTE

When the drive modules are separated, it is imperative that the connection pivots remain free of dirt, sand, mud, etc. If contamination of the pivots occurs, clean the pivots thoroughly. After you have cleaned the pivot connections so they are completely free of debris, apply a liberal amount of antiseize compound to the connection pivots of both drive modules.

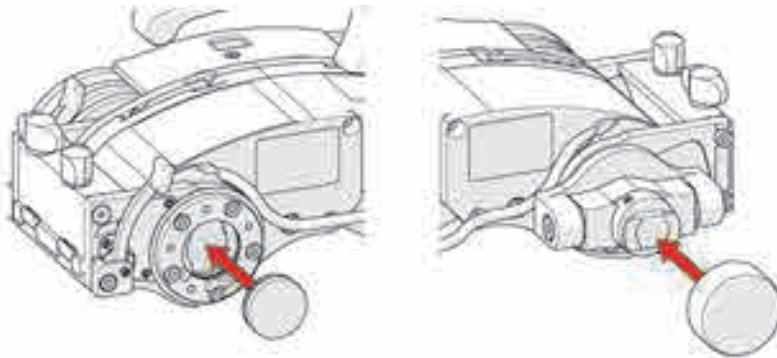


Figure 4-25 Use caps on the connection pivots

5. To connect the left and right drive modules, perform steps 1 to 4 in reverse.
-

4.3.2 Connecting the Umbilical to the Left Drive Module

When the drive modules have been connected using the procedure in “Disconnecting/Connecting the Left and Right Drive Modules” on page 106, before you can begin scanning, the left drive module needs to be connected to the umbilical.

To connect the umbilical to the left drive module

- ◆ Connect the cord of the left drive module to the 8-pin connector of the umbilical indicated in Figure 4-26 on page 110. For a detailed view of the umbilical connections, see “Umbilical” on page 114.

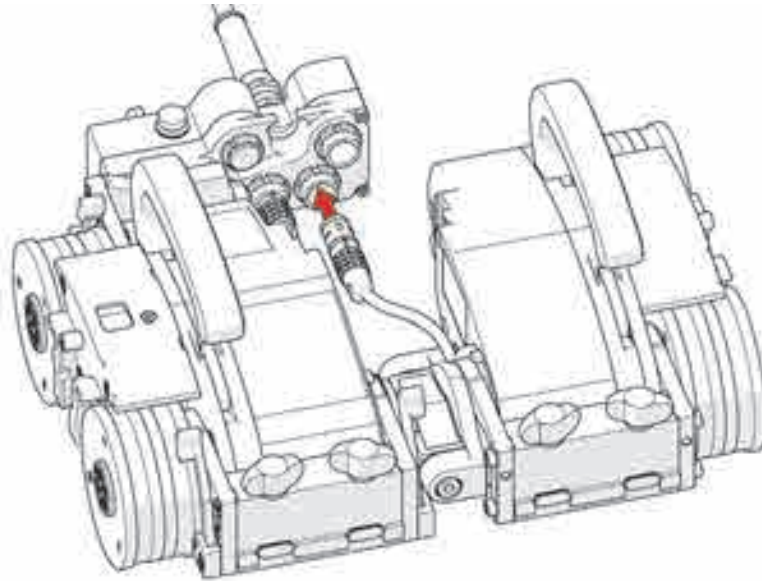


Figure 4-26 Connecting the left drive module to the umbilical

4.3.3 Swivel Mount

Located at the front of the left drive module, the swivel mount is used to connect scanning accessories such as a raster arm or probe frame system.

Rotate the two black wing knobs to loosen the dovetail jaws. Slide the accessory's frame bar along the dovetail jaws. Rotate the two black wing knobs to clamp the frame system/raster arm in place (see Figure 4-27 on page 111).

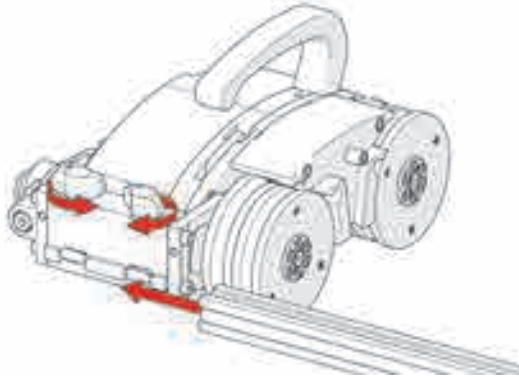


Figure 4-27 Frame bar installation

The front mount pivots freely and cannot be locked in a fixed position (see Figure 4-28 on page 111). When a frame bar is connected to both dovetail mounts on the two modules, this free movement allows the scanner to flex while steering.

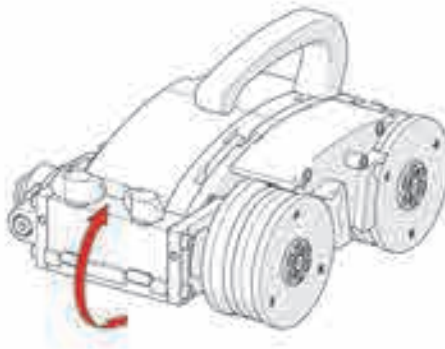


Figure 4-28 Swivel mount angle

TIP

An alternate mounting procedure is possible (see “Swivel Mount” on page 95 for additional details).

4.3.4 Encoder

The left drive module’s motor encoder can be used to output encoder signals to an instrument (see “Encoder Failure” on page 208 for additional details).

4.3.5 Handle

The handle on the left drive module is removed and attached in the same way as the handle on the right drive module. See “Handle” on page 103 for instructions.

4.3.6 Dovetail Accessory Mount

The dovetail accessory mount on the left drive module works in the same way as the mount on the right drive module. See “Dovetail Accessory Mount” on page 104 for instructions.

4.4 Power Controller

The SteerROVER power controller converts power from a 100–240 VAC, 50/60 Hz, 3.5 A power source to 36 VDC, 8.9 A (see Figure 4-29 on page 113). A start/stop safety circuit and physical ON and OFF push-buttons are integrated into the supply.

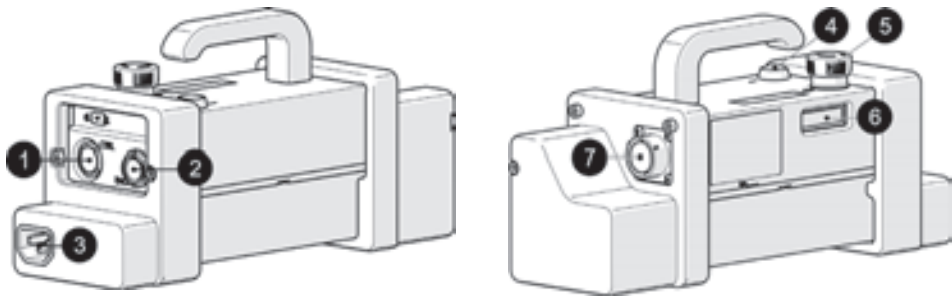


Figure 4-29 Power controller

The following list describes the functions of the components of the power controller using Figure 4-29 on page 113 as a reference.

- Activate power to the SteerROVER by pressing (and releasing) the green button (4).
- The red stop button (5) latches down when pressed; this stop button shuts down the system. Twist the stop button clockwise to return to the released position. This must be done before power can be activated.
- The control cable connects to the CTRL socket (1).
- The encoder cable connects to the ENC socket (2)
- The status LCD screen (6) displays the power controller system's status.
- Connect the umbilical to the umbilical connection (7) located at the rear of power supply.

In the event of a break in the stop circuit (the stop circuit runs through the power controller cable, umbilical, and the SteerROVER's emergency stop button) power will shut off.



WARNING



There are no user serviceable components inside the power controller. Dangerous voltages can be present inside the case. Do NOT open, or serious human injury could result. Return it to Olympus for repair.



CAUTION

Before use, always inspect the power cable and plug for damage. The power controller should not be used if visible damage is present. Use of damaged components may be a safety hazard.

Only use the power controller with a properly grounded source. The safety of the power controller relies on the provision of a proper ground connection. In environments with moisture present, a ground fault circuit interrupter (GFCI) must be used to ensure operator safety.

NOTE

Some generators or DC-AC inverters may introduce significant levels of noise to the system. This may degrade overall system performance or reduce the system life expectancy. Use of generators or DC-AC inverters is not recommended and are used at the operator's risk.

The power connection [(3) in Figure 4-29 on page 113] of the power controller is used to connect the power controller to a suitable 100–240 VAC, 50/60 Hz grounded power source capable of supplying a minimum of 5 A.

4.5 Umbilical



WARNING



FALLING OBJECT HAZARD. Ensure the umbilical can freely uncoil during operation and does not become snagged. If the umbilical becomes snagged, the SteerROVER may fall and **SEVERE INJURY** or **DEATH** could result.

**CAUTION**

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

**CAUTION**

Do not disconnect under load. Shut off power before connection or disconnecting. Permanent damage to electronics could occur.

The umbilical is the backbone of the SteerROVER system (see Figure 4-30 on page 115). It provides all power, network distribution, as well as encoder signal transmission. Circuitry is incorporated into the umbilical to protect or isolate all signals. The umbilical provides separation between the power controller and the SteerROVER. Various umbilical lengths are available from 5 m to 30 m (16.4 ft to 98.4 ft) long.

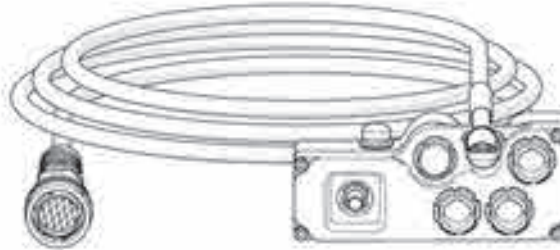
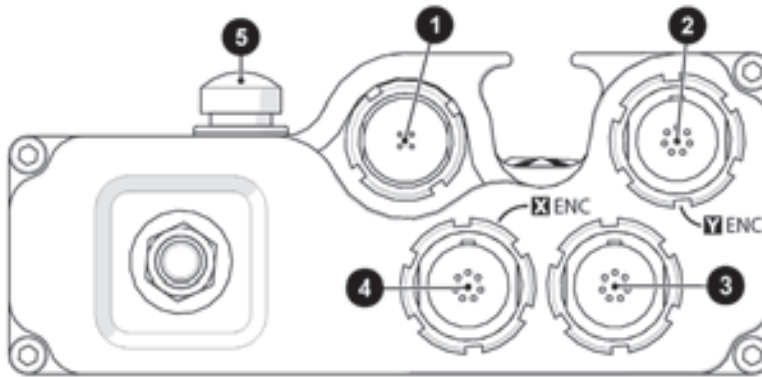


Figure 4-30 Umbilical cable

Multiple 4-pin and 8-pin LEMO receptacles are located on both ends of the umbilical. Any 4-pin connector can be plugged into any 4-pin receptacle. Any 8-pin connector can be plugged into any 8-pin receptacle (see Figure 4-31 on page 116 and Figure 4-32 on page 117). System power and network wiring are identical on each type of plug.

The only difference is that the 8-pin receptacle encoder pin wiring is unique to either the primary X [(4) in Figure 4-31 on page 116] or secondary Y (2) encoder axis. The third unlabeled receptacle (3) contains no encoder wiring.



ID	Description
1	Not used
2	8-pin connector for raster arm
3	8-pin connector for left drive module (nonencoded)
4	8-pin connector for right drive module (encoded)
5	Emergency stop

Figure 4-31 Umbilical connectors (scanner side)

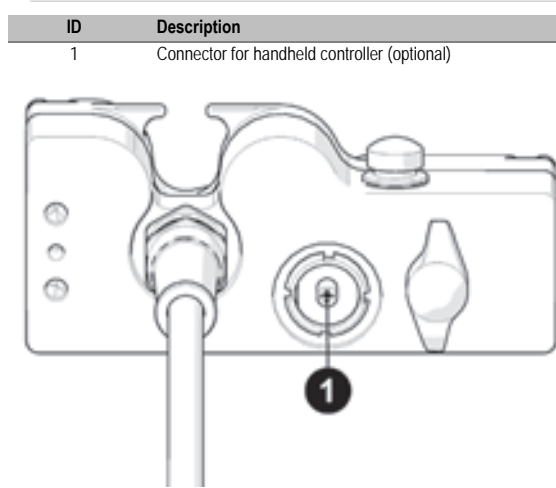


Figure 4-32 Umbilical connector (cable side)

TIP

Cables may be plugged into any 8-pin receptacle. This only affects which encoder signal is transmitted to the umbilical's 10-pin encoder output connector plug.

The red button ([5] in Figure 4-31 on page 116) located on the umbilical provides an emergency off button to the entire system. When pressed, all power to the SteerROVER scanner system is disengaged. To restore system power, it is necessary to press the green power button located on the power controller (see "Power Controller" on page 112).



CAUTION

Terminating system power may cause the SteerROVER to freewheel down when operating in a vertical orientation. To prevent equipment damage, ensure the tether is attached as close as possible to a location directly above the SteerROVER.

All modules connect using the umbilical:

- The motorized left and right drive modules connect to any of the 8-pin LEMO receptacles on the SteerROVER umbilical.
- The module connected to the Y-ENC 8-pin LEMO will transmit encoder signals through the umbilical as the second encoder axis. Typically, the raster arm is connected to the Y-ENC receptacle.
- The module that is connected to the X-ENC 8-pin LEMO transmits encoder signals through the umbilical as the first encoder axis. Typically, the right drive module is connected to the X-ENC receptacle.
- The unlabeled 8-pin LEMO does not support encoder signals. Typically, the left drive module is connected to the unlabeled receptacle.
- In the event of an auxiliary encoder failure with the right drive module, the right and left drive modules connectors may be swapped (see “Encoder Failure” on page 208 for instructions). This transmits encoder signals from the left drive module through the umbilical.

The umbilical contains a built-in circuit that buffers encoder signals in addition to providing isolation and protection to user instrumentation. The isolator requires 5 VDC from your instrument and this is built into the supplied encoder cables.

NOTE

Troubleshooting by way of simple continuity checks through the umbilical are not effective due to the isolation circuit.

Static, spike, and signal conditioning are built into the umbilical for the network signals. Power fuses are provided within the umbilical for the power distribution to the various receptacles. When troubleshooting, if a module is not functioning properly when plugged into a receptacle, it may be plugged into any other matching receptacle.

4.6 Controller Cable



CAUTION

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

The controller cable connects the handheld controller to the umbilical. 36 VDC and network signals are used in the cable (see Figure 4-33 on page 119).



Figure 4-33 Controller cable

Both controller cable connectors are identical and interchangeable. The cable may be plugged into the 4-pin receptacle on the power controller or the SteerROVER scanner's umbilical.

4.7 Encoder Cable



CAUTION

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

The encoder cable connects the SteerROVER system to your instrument. This cable allows transmission of necessary two axis position signals from the SteerROVER system to the instrument (see Figure 4-34 on page 120). The encoder cable also provides 5 VDC from your instrument to the encoder isolation circuitry within the umbilical breakout housing.

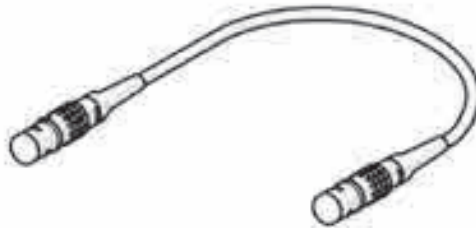


Figure 4-34 Encoder cable

One end of the cable connects to the ENC socket of the power controller and the other cable end connects to your instrument. The provided encoder cable is compatible with OmniScan SX, OmniScan MX2, and FOCUS PX instruments.

4.8 Raster Arm Module

The motorized raster arm adds two axis automated scan capabilities to the SteerROVER (see Figure 4-35 on page 121).

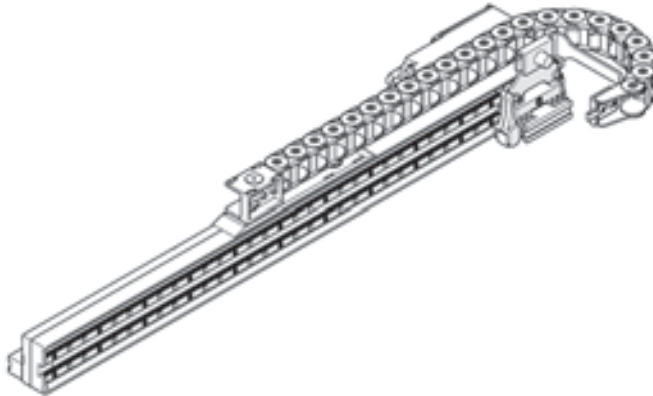


Figure 4-35 Raster arm module

The raster arm can carry many different probes for various types of corrosion scans, including conventional 0° transducers, phased array probes, as well as scanning devices such as the Olympus HydroFORM. The handheld controller is used to setup all the parameters of the scan (see “Two Axis Scan Mode” on page 73 for additional details).

4.8.1 Mounting a Raster Arm—Flat or Circumferential



WARNING



When the raster arm is mounted in both the left hand and right hand swivel mounts, operation must be limited to driving in the circumferential direction. Only very slight corrective steering is permitted. Excessive steering may cause the SteerROVER to fall and SEVERE INJURY or DEATH could result.

To mount a raster arm for flat or circumferential scanning

1. Loosen all four black wing knobs on both modules, and then slide the raster arm's mounting rail onto the dovetail jaws of one of the modules (see Figure 4-36 on page 122).

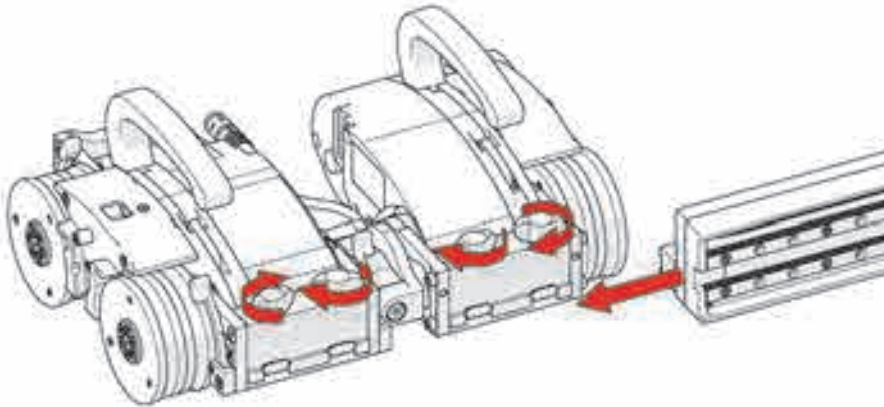


Figure 4-36 Slide onto one swivel mount

2. Release the swivel mount levers and pivot the swivel mount to align with the mounting rail of the raster arm. Slide the raster arm on to the remaining module's swivel mount and tighten all four black wing knobs (see Figure 4-37 on page 123).

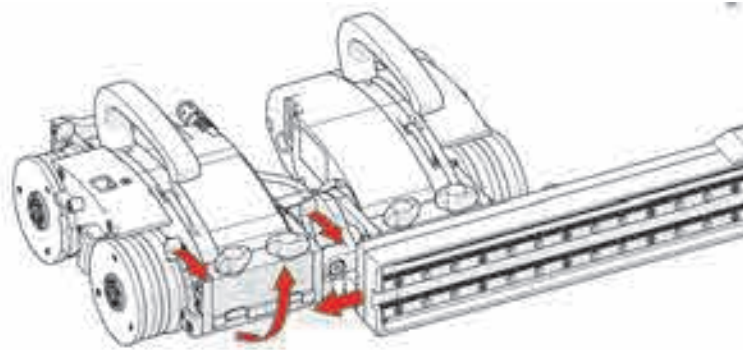


Figure 4-37 Properly mounted raster arm

4.8.2 Mounting a Raster Arm—Longitudinal

To mount a raster arm for longitudinal scanning

1. Using the 3 mm hex driver, attach the probe holder mount (optional; P/N: Q8301377) to the mounting rail of the raster arm (see Figure 4-38 on page 123).

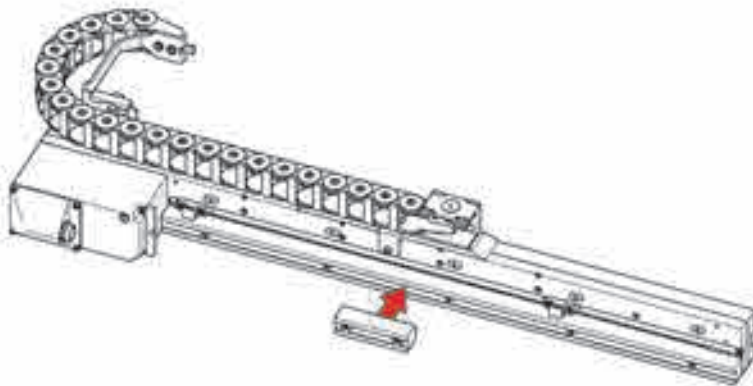


Figure 4-38 Attach the probe holder mount to the mounting rail

2. Loosen the two black wing knobs of the right drive module. Affix the raster arm with the probe holder mount onto the dovetail jaws of the right drive module's swivel mount (see Figure 4-39 on page 124).

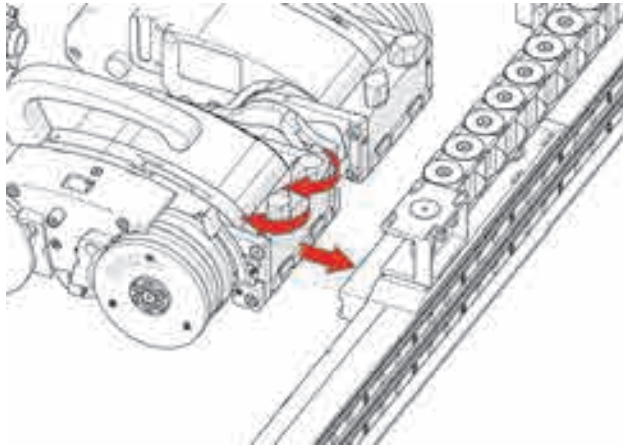


Figure 4-39 Mount raster arm to the right drive module's swivel mount

3. Tighten the two black wing knobs.

4.8.3 Attaching a Cable Tray

To attach the cable tray

1. Attach the cable tray's magnetic end to the magnetic base on the raster arm. Ensure the four divots are aligned with notches on the magnetic end (see Figure 4-40 on page 125).

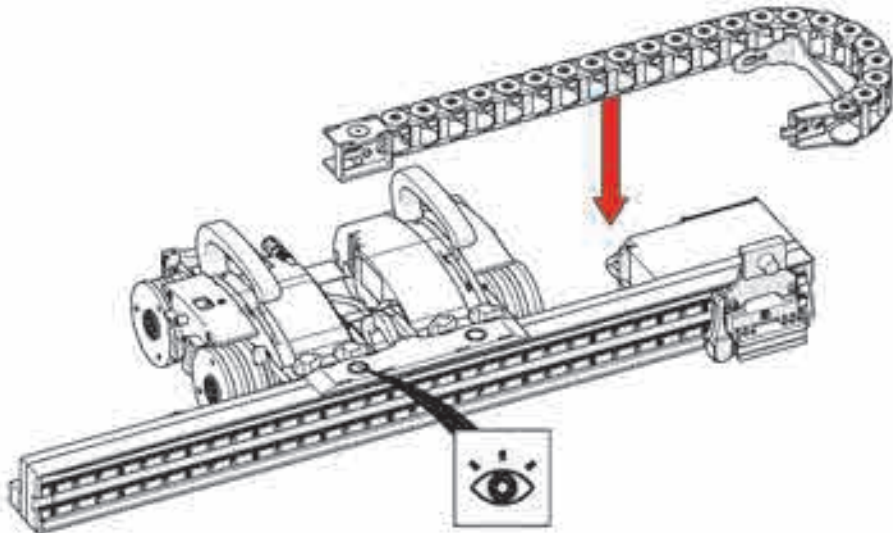


Figure 4-40 Attaching the cable tray

2. Press the cable tray bracket into the rear of the carriage bracket (see Figure 4-41 on page 126).

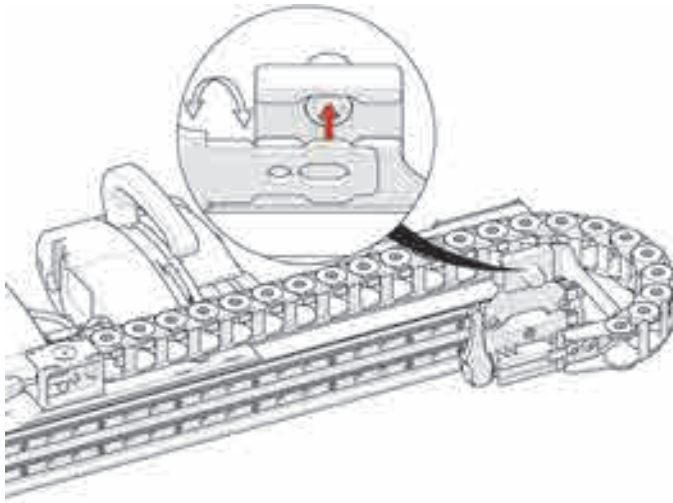


Figure 4-41 Press bracket to carriage

3. Slide the cable tray bracket until it locks in place (see Figure 4-42 on page 126).

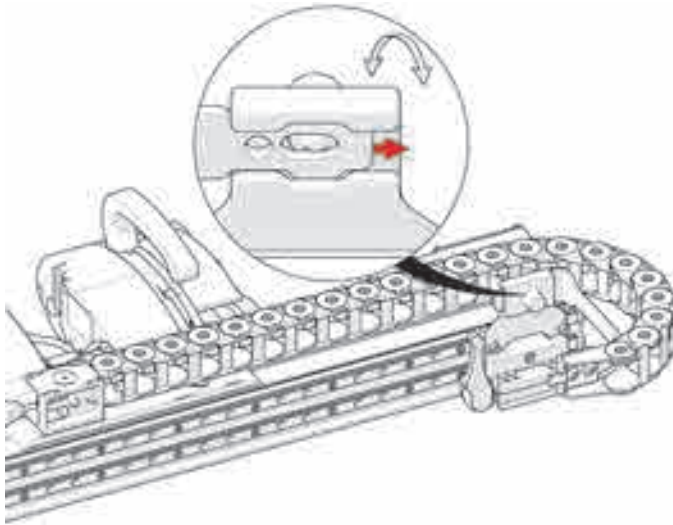


Figure 4-42 Slide bracket attaching to carriage

TIP

The cable tray can be flipped over and reversed to switch which side of the raster arm the cable tray protrudes.

4.8.4 Routing Cables through the Cable Tray

To route cables through the cable tray

1. Using a small 3 mm flat screw driver, unclip the flaps of the cable tray (see Figure 4-43 on page 127).

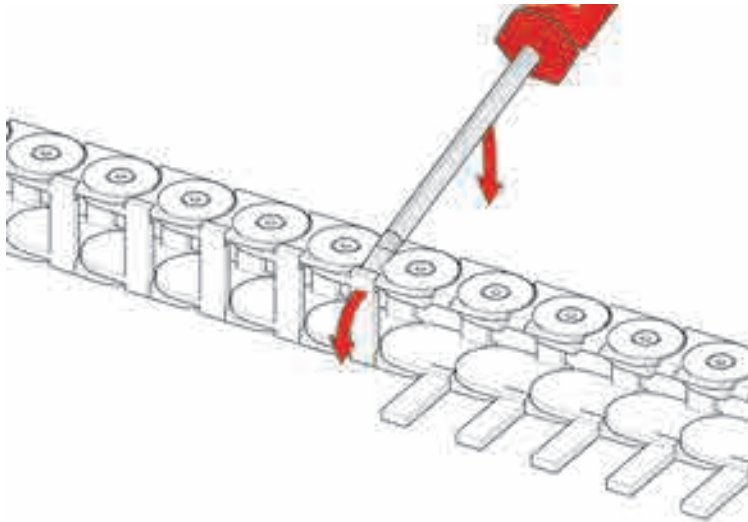


Figure 4-43 Unclip flaps from cable tray

2. Route all hoses and cables into the cable tray. Clip the flaps to trap the cables in the cable tray (see Figure 4-44 on page 128).

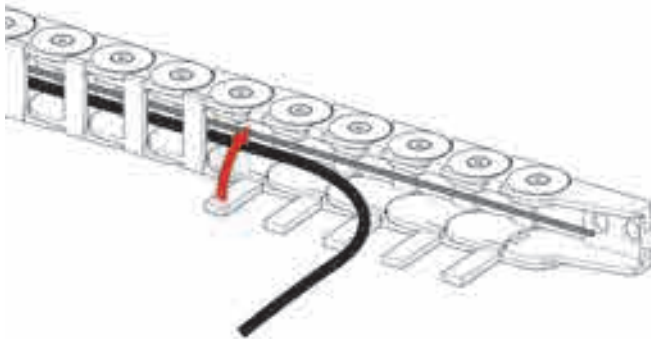


Figure 4-44 Route cabling and close flaps

TIP

The cable routing process can be made more convenient by removing several flaps in a row at the same time.

4.8.5 Setting Up the Raster Arm Cable

The raster arm cable connects the raster arm module to the umbilical. The cable provides the 36 VDC and network connections to the raster arm module and transmits the raster arm encoder signals to the umbilical (see Figure 4-45 on page 129).



Figure 4-45 Raster arm cable

Both raster arm cable connectors are identical and interchangeable. Plug one end of the cable to the raster arm and the opposite end is connected to the umbilical. Typically, the raster arm cable is connected to the Y-ENC port of the umbilical to supply its encoder as the second encoder signal via the umbilical and encoder cable to the acquisition instrument.

The raster arm cable may be connected to any of the other 8-pin receptacles on the umbilical for troubleshooting or nonstandard configurations.



CAUTION

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



CAUTION



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

To set up the raster arm cable

1. Plug the supplied raster arm cable into the raster arm's connector (see Figure 4-46 on page 130) located on the raster arm encoder housing.

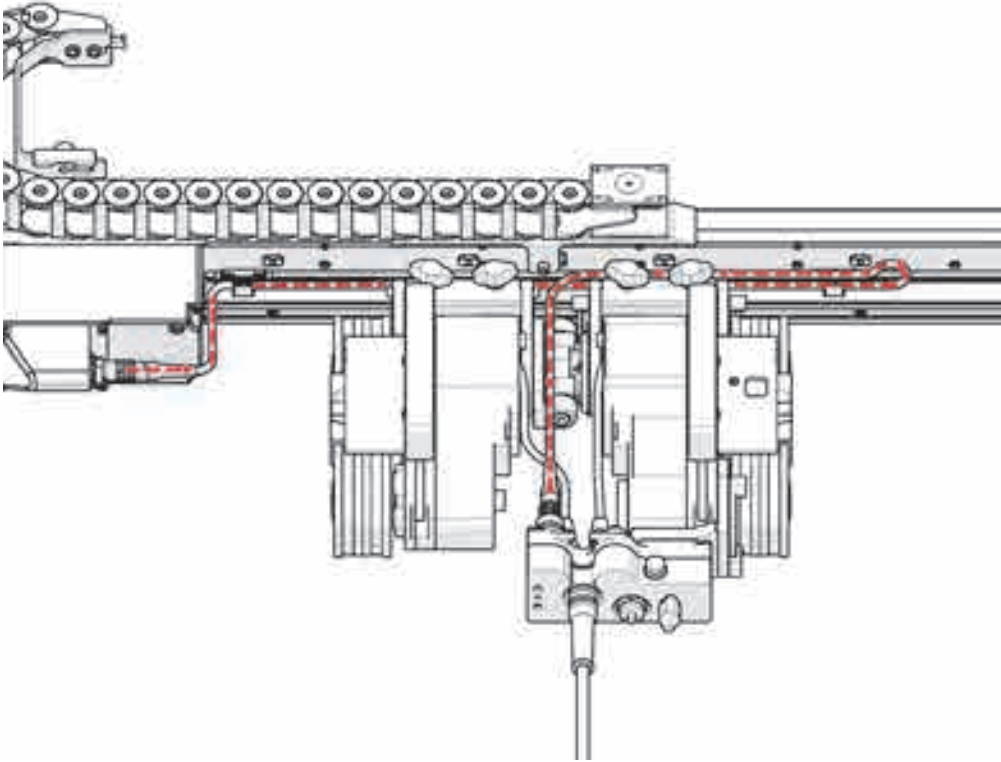


Figure 4-46 Raster arm cable routing

2. Pinch the cable into the first cable bracket on the side of the raster arm encoder housing.
3. Route the cable through the adjustable clips on the raster arm (see Figure 4-47 on page 131).
These clips slide along the raster arm, allowing the raster arm cable to be positioned as required.

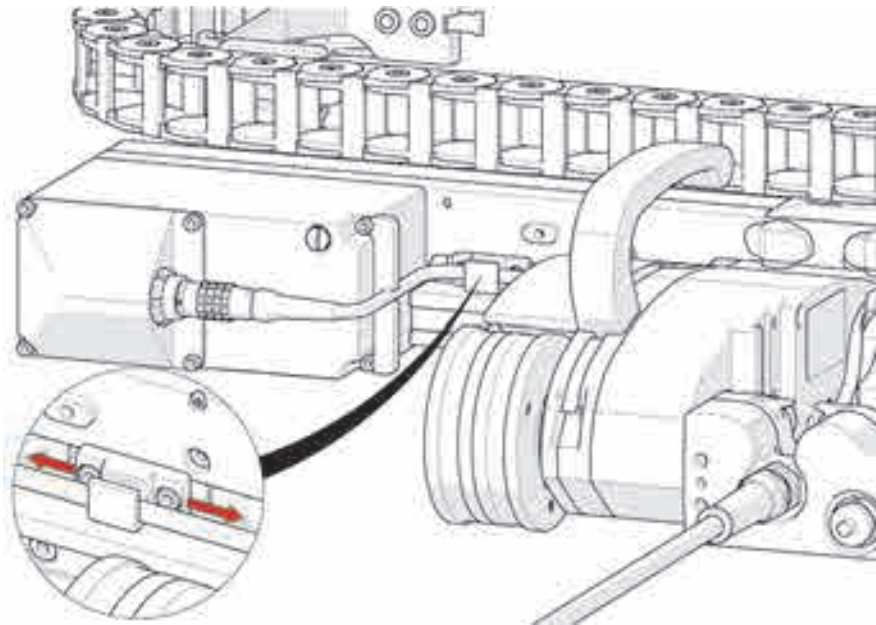


Figure 4-47 Adjustable cable clips



CAUTION

To prevent cable damage, make sure that the cable clears the scanner wheels.

IMPORTANT

Do not tighten or loosen the clip screws. These clip screws have been specially torqued by the manufacturer to allow for friction movement.

The clips have the ability to accommodate two cables when necessary to route excess cabling (see Figure 4-48 on page 132).

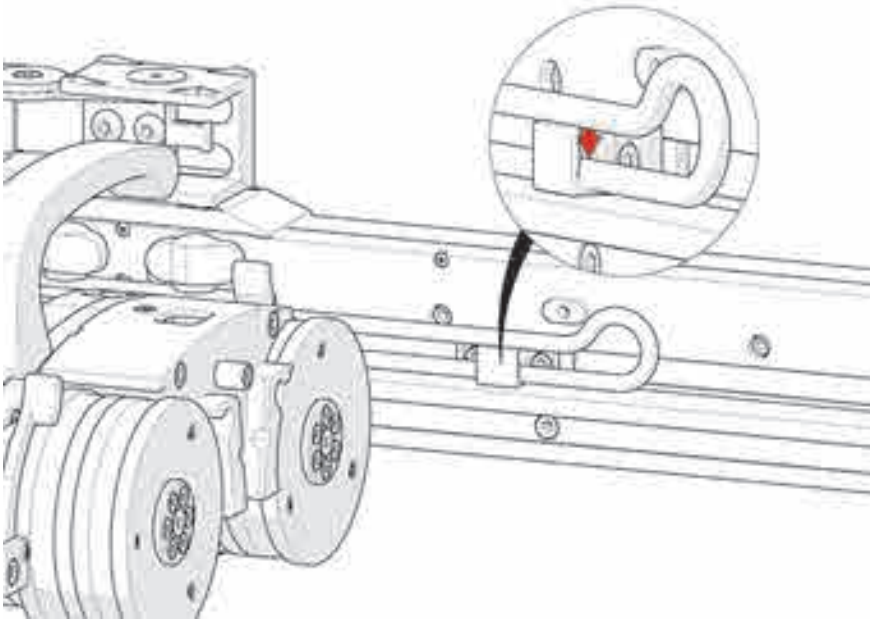


Figure 4-48 Route cable through the clip twice

4.8.6 Mounting Probe Holders

See “Heavy Duty Vertical Probe Holder” on page 150 for instructions on mounting the probe holders.

4.9 Probe Holders

This section provides information on the components of the probe holders and how to set up and use them.

4.9.1 Vertical Probe Holder

Figure 4-49 on page 133 and Table 6 on page 133 identify the components of the vertical probe holder.

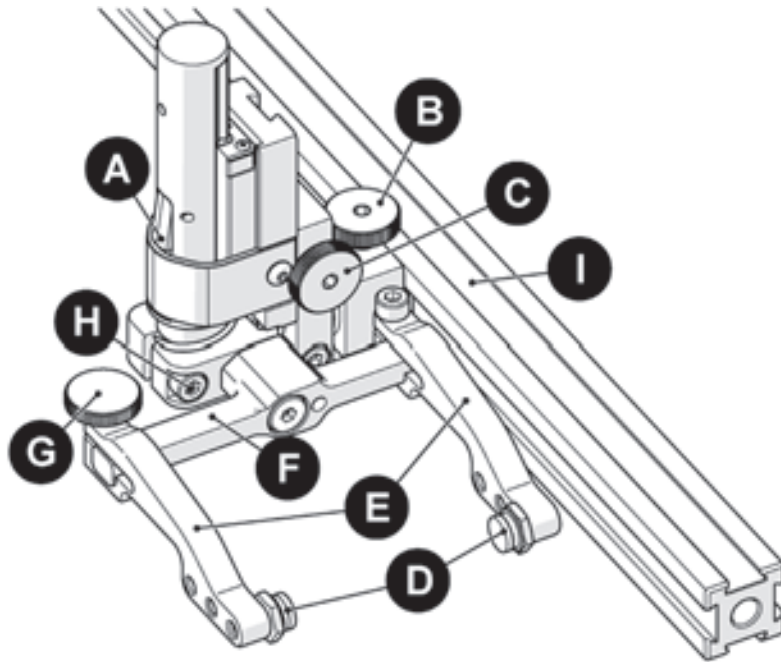


Figure 4-49 Vertical probe holder

Table 6 Vertical probe holder components

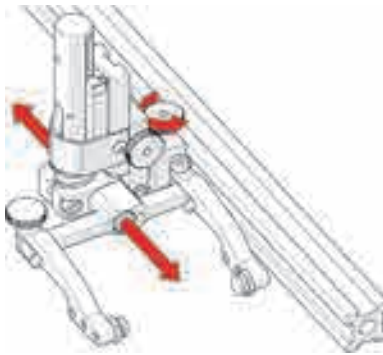
Item	Description
A	Latch
B	Probe holder adjustment knob
C	Vertical adjustment knob
D	Pivot buttons
E	Probe holder arms
F	Yoke
G	Probe holder arm adjustment knob

Table 6 Vertical probe holder components (continued)

Item	Description
H	Transverse adjustment screw
I	Frame bar

4.9.1.1 Probe Holder Setup

The probe holder adjustment knob allows the probe holder to be attached to a frame bar, and it also enables horizontal positioning on a frame bar (see Figure 4-50 on page 134).

**Figure 4-50 Adjust on frame bar**

The vertical adjustment knob is used to adjust the height of the probe holder (see Figure 4-51 on page 135).

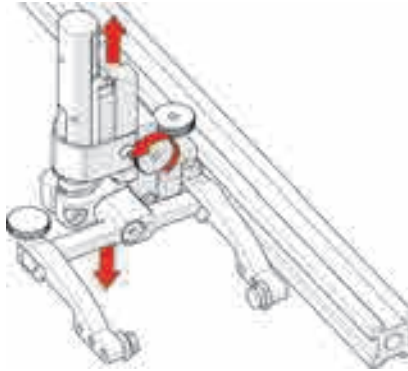


Figure 4-51 Vertical adjustment

Position the pivot buttons where necessary. When a narrow scanning footprint is required, use the pivot button holes that are closest to the yoke (see Figure 4-52 on page 135).

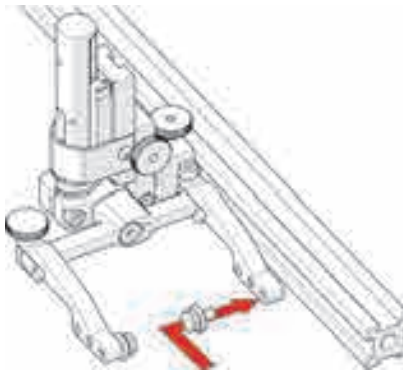


Figure 4-52 Place buttons

TIP

Probe pivoting may be impeded when it is closer to the yoke.

To mount a UT wedge in the probe holder

1. Position the wedge on the inner probe holder arm (see Figure 4-53 on page 136).

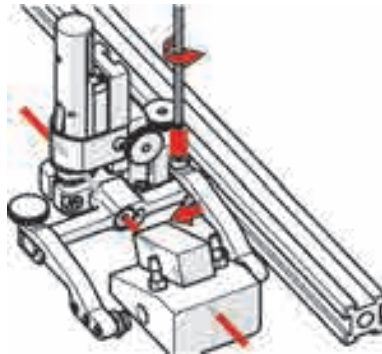


Figure 4-53 Adjust inner arm

TIP

The probe holder yoke can accommodate many different probe and wedge sizes of varying widths. It is best to center the wedge with the yoke's pivot axis. This can reduce wedge "rocking" when scanning. Position the inner probe holder arm accordingly using the supplied 3 mm hex driver.

2. Loosen the probe holder arm adjustment knob (see Figure 4-54 on page 137), and slide the probe holder arm along the yoke, pinching the wedge in place.

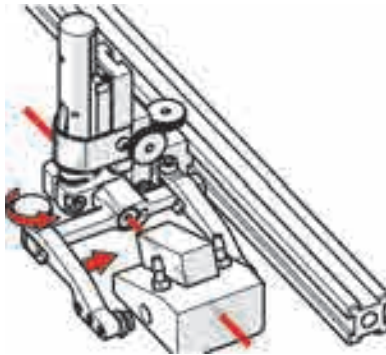


Figure 4-54 Adjust outer arm

3. Tighten the probe holder arm adjustment knob (see Figure 4-55 on page 137).

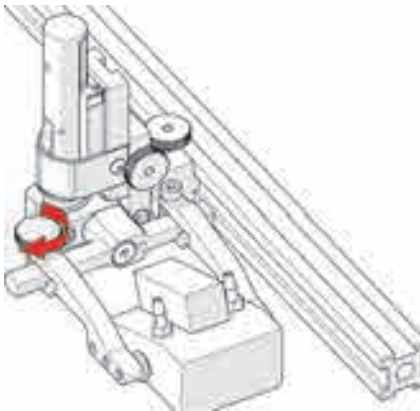


Figure 4-55 Tighten arm knob

4.9.1.2 Probe Holder Vertical Adjustment

To adjust the probe holder vertically

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 (see Figure 4-56 on page 138).

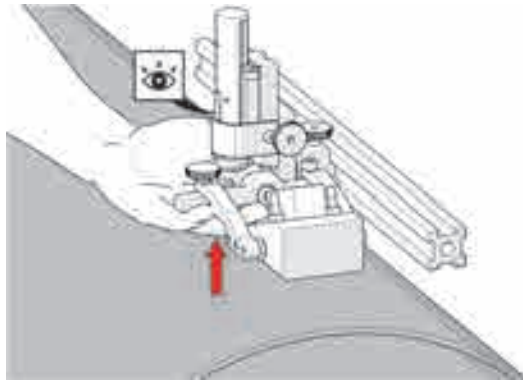


Figure 4-56 Latch probe holder

2. Loosen the vertical adjustment knob and slide the probe holder down until the wedge is approximately 6 mm (0.25 in.) above inspection surface (see Figure 4-57 on page 138), and then tighten the vertical adjustment knob.

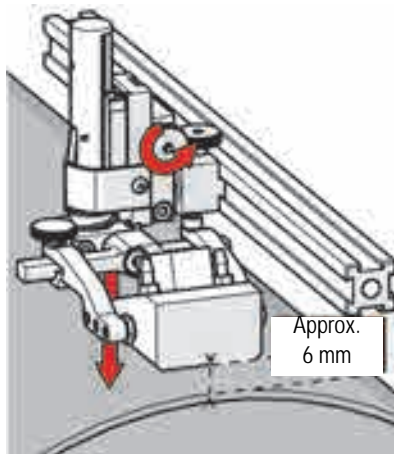


Figure 4-57 Lower toward scan surface

3. Lift the yoke slightly and press the latch button (see Figure 4-58 on page 139), then slowly lower it toward scanning surface to apply spring pressure to the wedge (see Figure 4-59 on page 139).

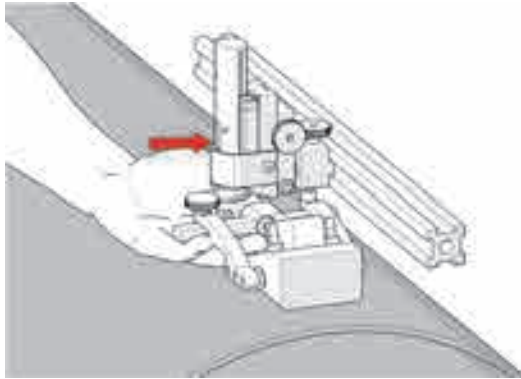


Figure 4-58 Press latch button

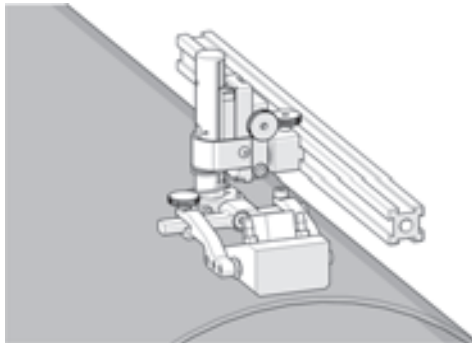


Figure 4-59 Lower toward scan surface

TIP

If less spring force is desired, see step 2 and place the wedge approximately 20 mm (0.75 in.) above inspection surface.

4.9.1.3 Probe Holder Transverse Adjustment

To adjust the probe holder's transverse angle

1. Ensure the probe holder is in the latched, upper position (see Figure 4-56 on page 138).
2. Using the supplied 3 mm hex driver, loosen the transverse adjustment screw, and rotate the yoke about the vertical shaft achieving the desired angle (see Figure 4-60 on page 140).

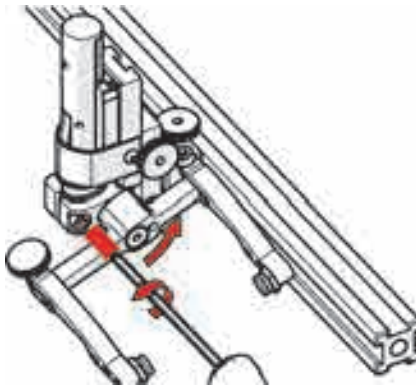


Figure 4-60 Loosen 3 mm screw

3. Tighten the transverse adjustment screw (see Figure 4-61 on page 141).

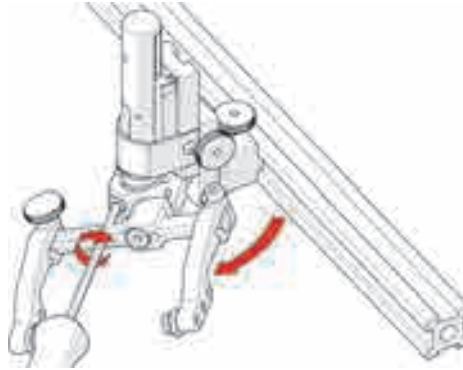


Figure 4-61 Rotate and tighten

4. To return the transverse adjustment to neutral (90°), the probe holder must be in the latched, upper position (see Figure 4-56 on page 138). Rotate the yoke until the stop post contacts the base of the probe holder, and then tighten the transverse adjustment screw (see Figure 4-62 on page 141).

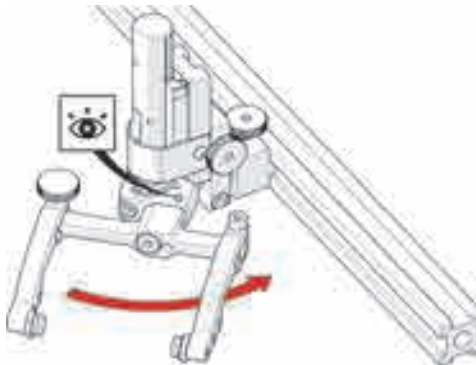


Figure 4-62 Stop post locates 90°

4.9.1.4 Probe Holder Longitudinal Adjustment

To adjust the probe holder's vertical angle for longitudinal scanning

1. Ensure the probe holder is in the latched, upper position (see Figure 4-56 on page 138).
2. Using the supplied 3 mm hex driver, loosen the longitudinal adjustment screw (see Figure 4-63 on page 142).

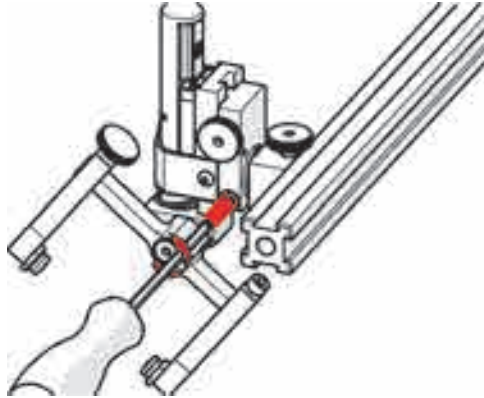


Figure 4-63 Loosen 3 mm screw

3. Rotate the main body of the probe holder until it is at the desired angle (see Figure 4-64 on page 143).

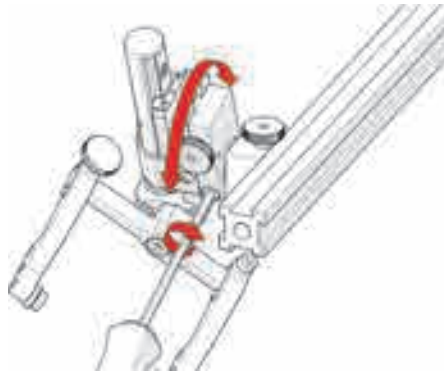


Figure 4-64 Rotate to position

4. Tighten the longitudinal adjustment screw (see Figure 4-64 on page 143).
5. To return the longitudinal adjustment to neutral (90°), line up the longitudinal adjustment indicator markers (see Figure 4-65 on page 143).

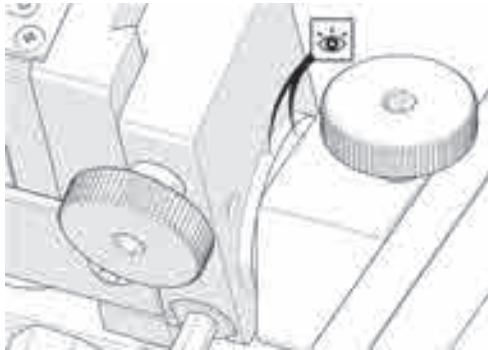


Figure 4-65 Line up markers

4.9.1.5 Probe Holder Left/Right Conversion

To convert the probe holder from left to right

NOTE

To perform this operation, the 1.5 mm hex wrench is required.

1. Ensure the probe holder is in the latched, upper position (see Figure 4-56 on page 138).
2. Using the supplied 3 mm hex driver, unscrew the yoke pivot screw and remove the yoke (see Figure 4-66 on page 144).

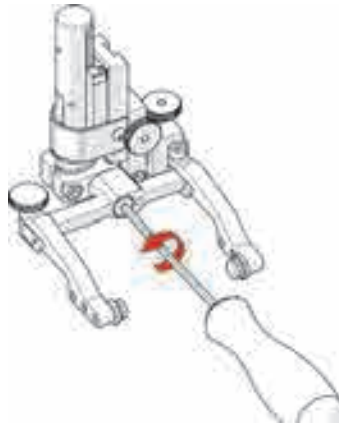


Figure 4-66 Unscrew yoke pivot screw

3. Loosen the probe holder arm adjustment knob and the arm clamp screw. Slide the probe holder arms off the yoke (see Figure 4-67 on page 145).

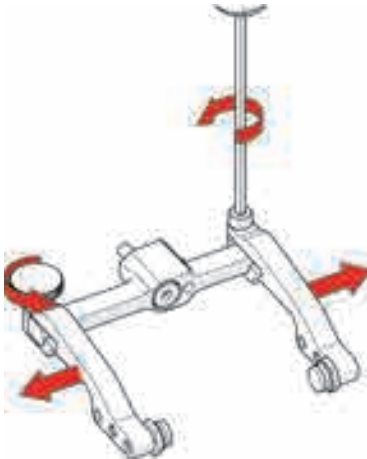


Figure 4-67 Remove probe holder arms

4. Flip the yoke 180° and reverse the probe holder arms (see Figure 4-68 on page 145).

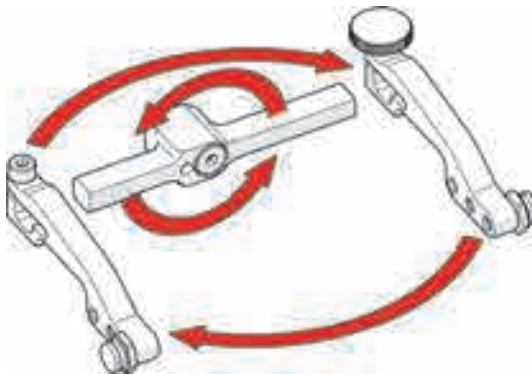


Figure 4-68 Flip yoke and reverse arms

5. Place the pivot buttons on the inside of the probe holder arms, using the 0.375 in. wrench (see Figure 4-69 on page 146).

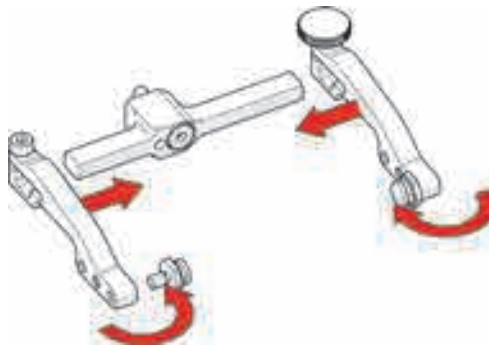


Figure 4-69 Attach arms and move buttons

6. Mount the yoke to the opposite side of the base using the supplied 3 mm hex driver (see Figure 4-70 on page 146).

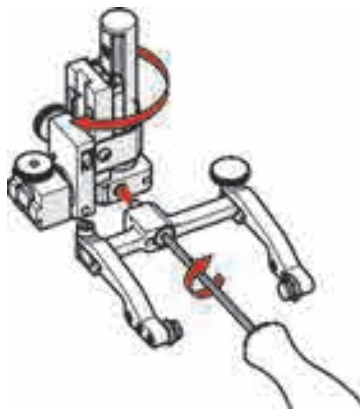


Figure 4-70 Screw yoke to opposite side

TIP

Keep the yoke level with the base to ensure that there are 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 until it has cleared all obstructions. Do not remove stop post (see Figure 4-71 on page 147).

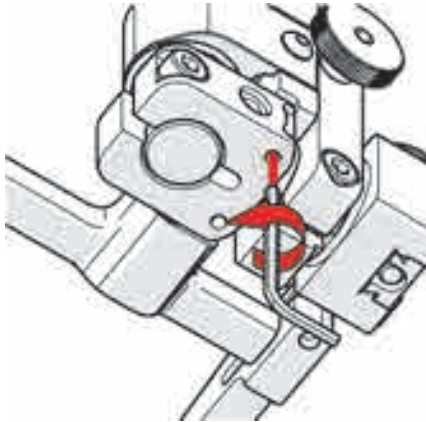


Figure 4-71 Lower 90° stop post

8. Raise the stop post on the opposite side until the side of the post clearly contacts the 90° stop point on the probe holder's base (see Figure 4-72 on page 147).

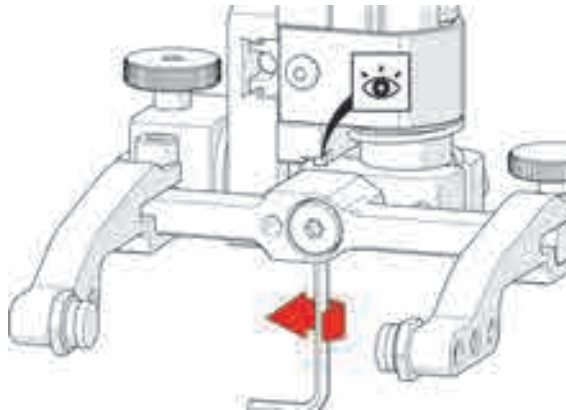


Figure 4-72 Raise opposite 90° stop post

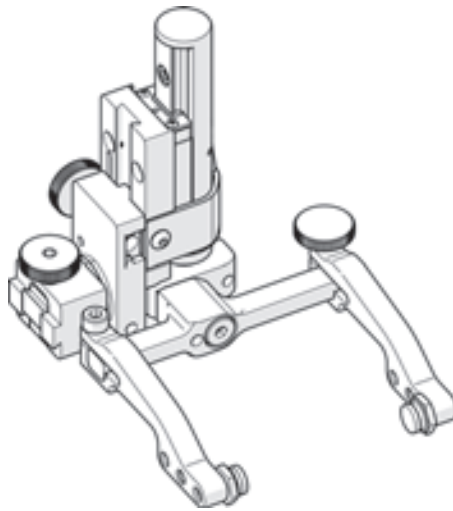


Figure 4-73 Reversed probe holder

4.9.2 Pivoting HydroFORM Probe Holder (Optional)

The pivoting HydroFORM probe holder is designed to function with the Olympus HydroFORM scanner (not provided).

To use pivoting HydroFORM probe holder

1. Rotate the probe holder adjustment knob (see Figure 4-74 on page 149), and attach the probe holder to a probe holder mount of a raster arm or to a frame bar.

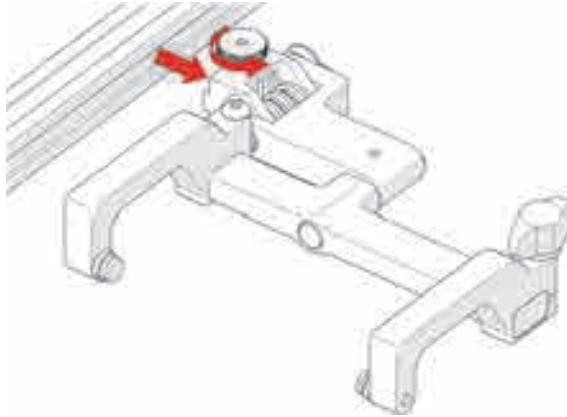


Figure 4-74 Attach probe holder

The probe holder arm adjustment knob can be rotated (see Figure 4-75 on page 149). This allows placement of the HydroFORM by positioning the probe holder arm accordingly.

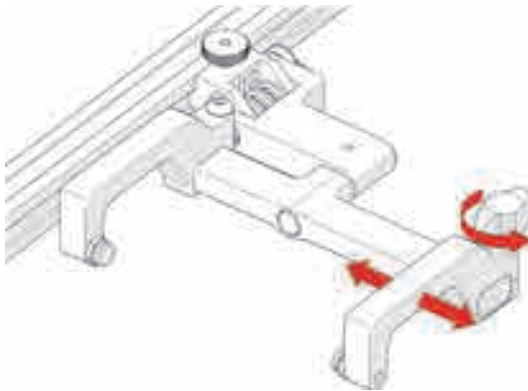


Figure 4-75 Arm adjustment

2. Lift the probe holder slightly and pull the latch to release the probe holder's spring tension (see Figure 4-76 on page 150).

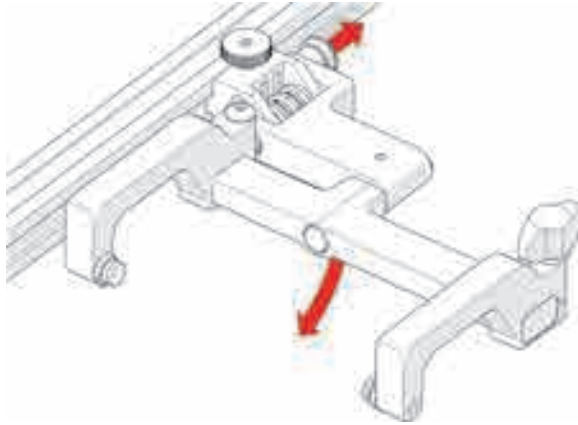


Figure 4-76 Lift and pull latch

4.9.3 Heavy Duty Vertical Probe Holder

Figure 4-77 on page 151 and Table 7 on page 151 identify the components of the heavy duty vertical probe holder.

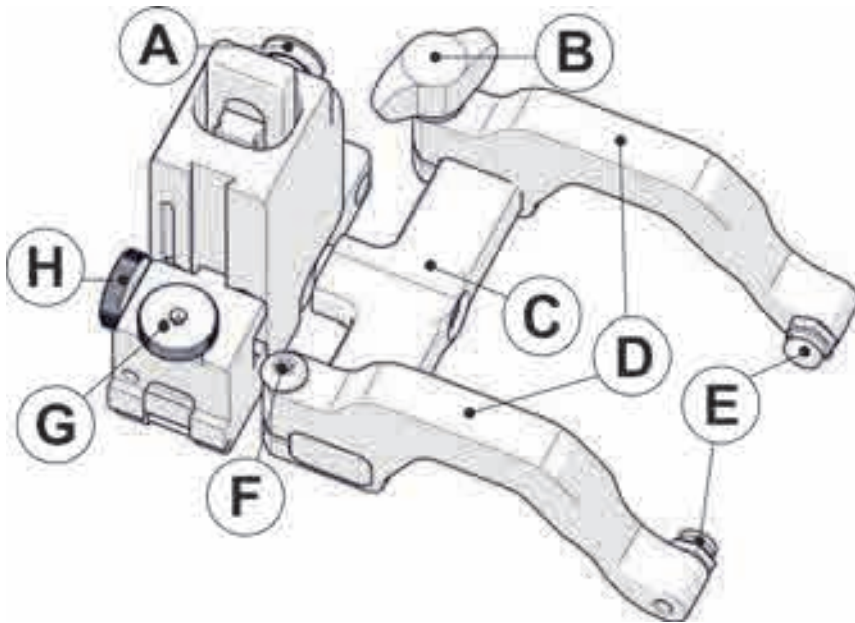


Figure 4-77 Heavy duty vertical probe holder

Table 7 Heavy duty vertical probe holder

ID	Description
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

4.9.3.1 Probe Holder Setup

To set up the probe holder

1. Loosen the probe holder adjustment knob, and mount the heavy duty vertical probe holder's dovetail jaw to the carrier (see Figure 4-78 on page 152).

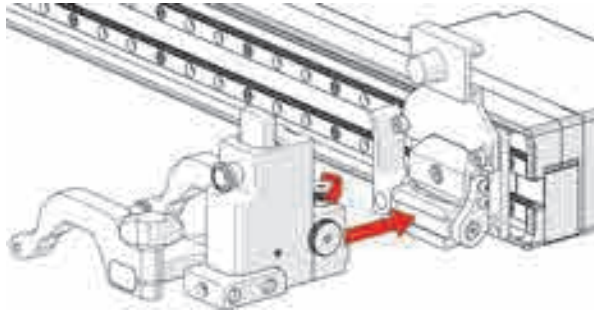


Figure 4-78 Mount probe holder to carrier

The vertical adjustment knob is used to adjust the height of the heavy duty vertical probe holder (see Figure 4-79 on page 152). This adjustment also controls the probe holder's spring tension.

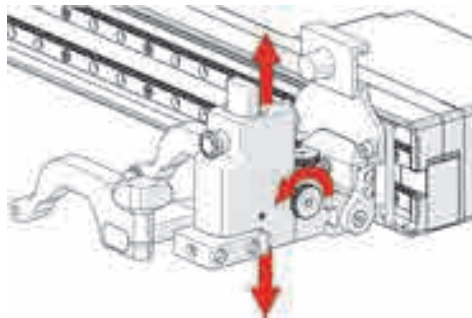


Figure 4-79 Vertical adjustment

2. Loosen the probe holder adjustment knob, and remove the outer probe holder arm (see Figure 4-80 on page 153).

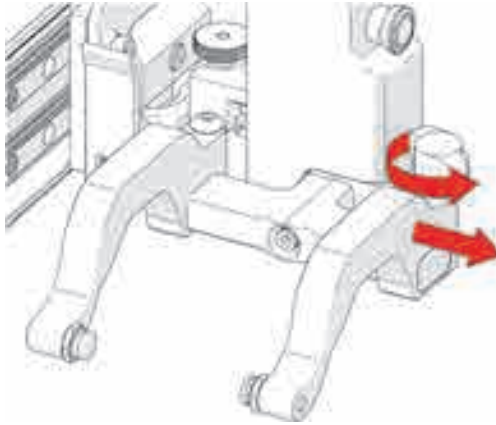


Figure 4-80 Remove outer arm

3. Loosen the arm clamp screw (see Figure 4-81 on page 153).
4. Place the wedge on the pivot button of the inner probe holder arm (see Figure 4-81 on page 153).

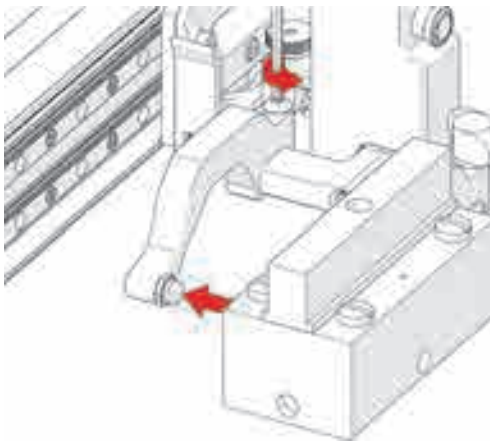


Figure 4-81 Adjust inner arm

5. Align the middle of the wedge with the center of the yoke (see Figure 4-82 on page 154).

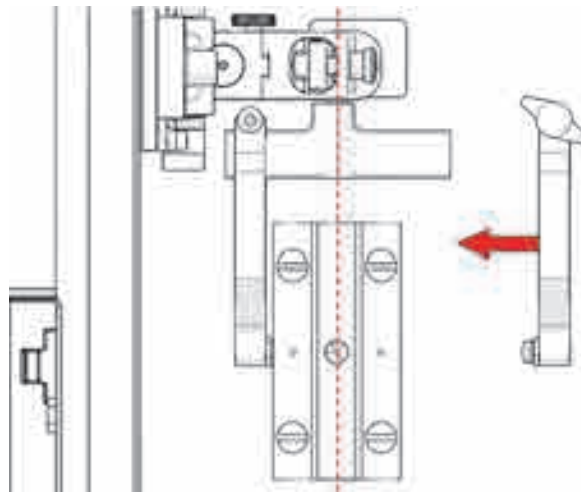


Figure 4-82 Remove outer arm

6. Tighten both the probe holder adjustment knob and the arm clamp screw, while ensuring the wedge remains centered with the yoke (see Figure 4-83 on page 154).

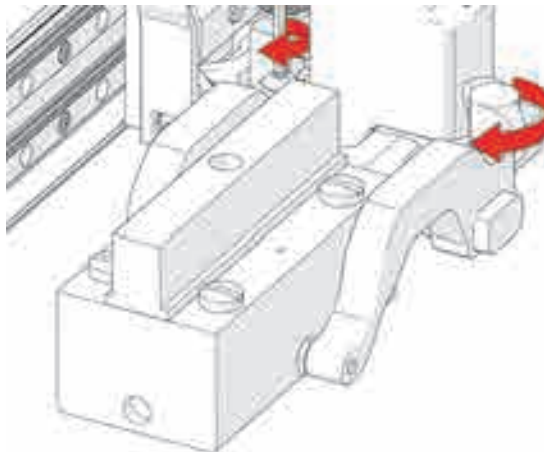


Figure 4-83 Pivot buttons

4.9.3.2 Probe Holder Vertical Adjustment

To adjust the probe holder vertically

1. Gently lift the heavy duty probe holder and simultaneously pull the latch to unlock the probe holder (see Figure 4-84 on page 155).

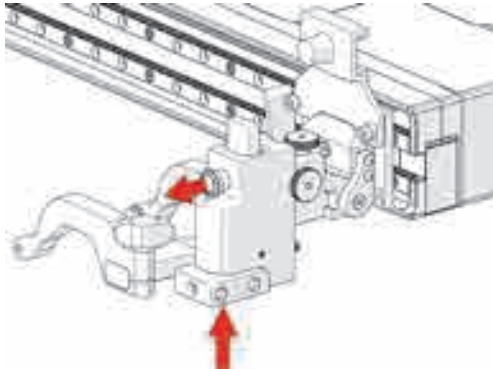


Figure 4-84 Press up and pull latch

2. Slowly lower the probe holder toward the scan surface (see Figure 4-85 on page 155).

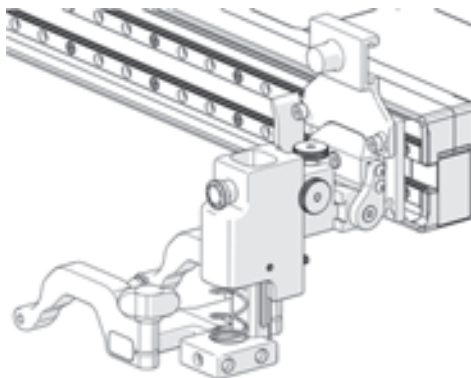


Figure 4-85 Lowered toward scan surface

4.9.3.3 Probe Holder Left/Right Conversion

To convert the probe holder from left to right

1. Using the supplied 3 mm driver, unscrew the yoke (see Figure 4-86 on page 156).

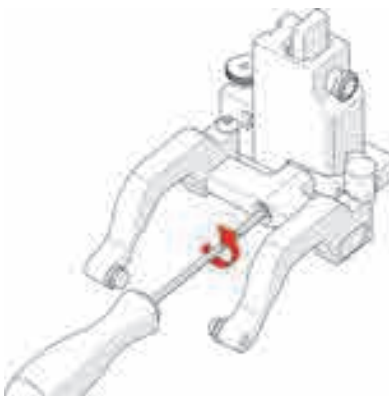


Figure 4-86 Remove yoke

2. Position the yoke and arms to the opposite side of the probe holder (see Figure 4-87 on page 156).

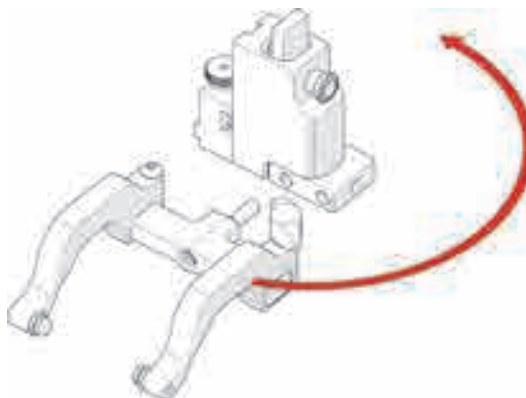


Figure 4-87 Orient to opposite side

3. Loosen the arm clamp screw and the probe holder arm adjustment knob, allowing removal of the probe holder arms (see Figure 4-88 on page 157).

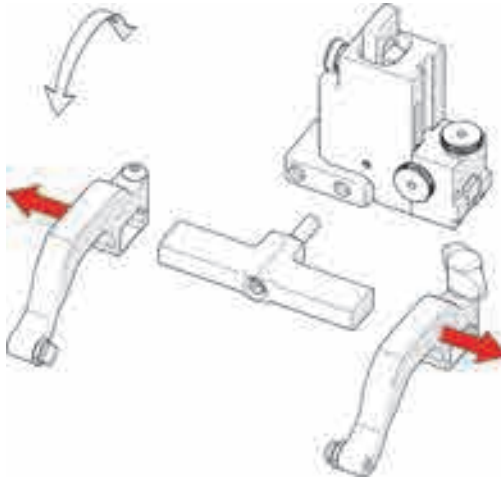


Figure 4-88 Remove probe holder arms

4. Reverse the position of the removed arms so they are at opposite sides of the yoke (see Figure 4-89 on page 157).

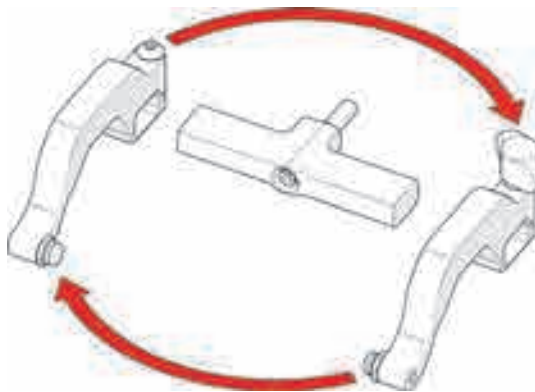


Figure 4-89 Reverse position around yoke

5. Position the pivot buttons so they are on the inside of the probe holder arms (see Figure 4-90 on page 158).

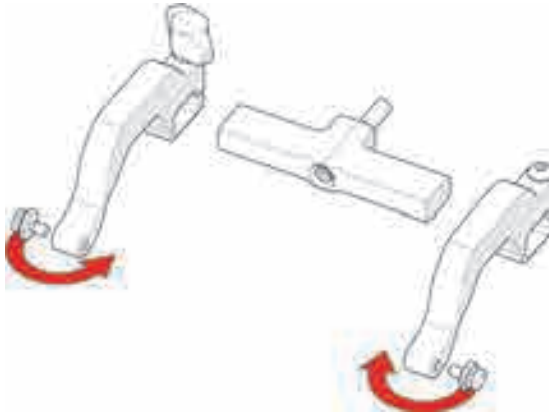


Figure 4-90 Position pivot buttons

6. Place the probe holder arms on the yoke, and tighten the arm clamp screw and probe holder adjustment knob (see Figure 4-91 on page 158).

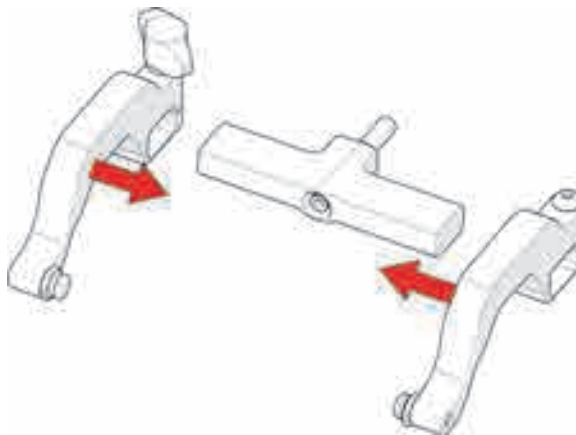


Figure 4-91 Place arms back onto yoke

7. Use the supplied 3 mm driver to screw the yoke to the probe holder.

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.

4.9.3.4 Probe Holder 90° Adjustment

To adjust the probe holder 90 degrees

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

4.9.4 Dual Conventional UT Probe Holder (Optional)

Follow these steps when using the dual conventional UT probe holder in conjunction with a raster arm.

To install the dual conventional UT probe holder on a raster arm

1. The supplied cable clip is offered as a means of cable management, but it is not typically used with the raster arm. Pinch the clip to remove it if necessary (see Figure 4-92 on page 160).

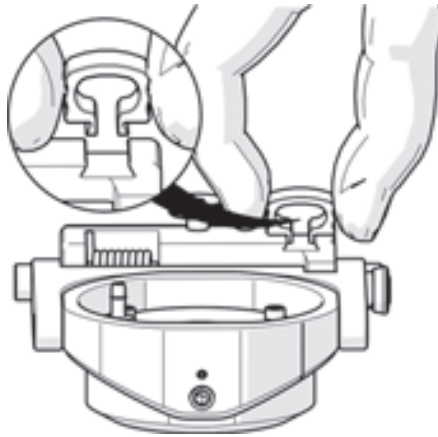


Figure 4-92 Pinch the cable clip to remove

NOTE

It is necessary to remove the mounting bracket of the dual conventional UT probe holder if attached.

2. Rotate the probe holder adjustment knob (see Figure 4-93 on page 161).

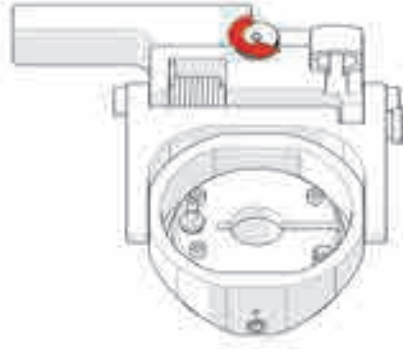


Figure 4-93 Loosen knob

3. Remove the mounting bracket (see Figure 4-94 on page 161).



Figure 4-94 Remove bracket

4. Insert the dovetail jaw of the dual conventional UT probe holder (see Figure 4-95 on page 162) in the pivot nose mount of the raster arm.

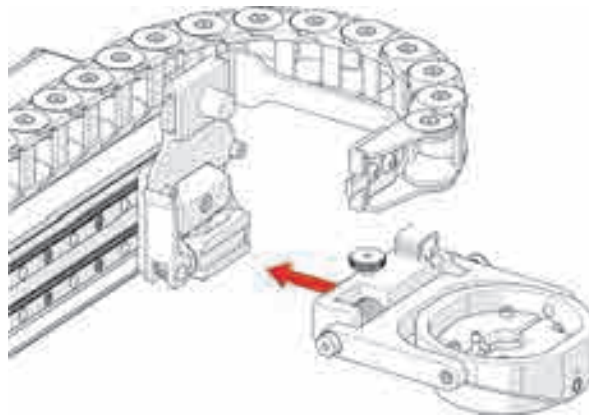


Figure 4-95 Insert the dovetail jaw in raster arm pivot nose

5. Tighten the probe holder adjustment knob (see Figure 4-96 on page 162).

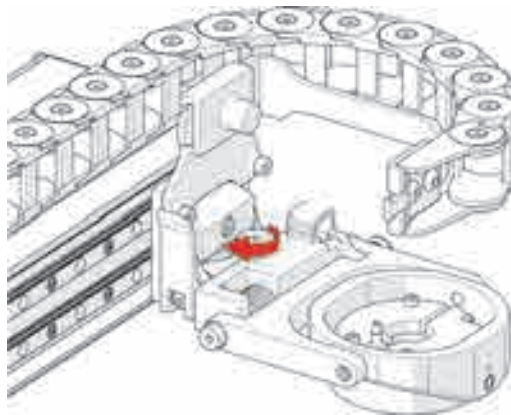


Figure 4-96 Tighten knob

6. Release the two levers on the swivel mount to allow pivoting of the raster arm (see Figure 4-97 on page 163).

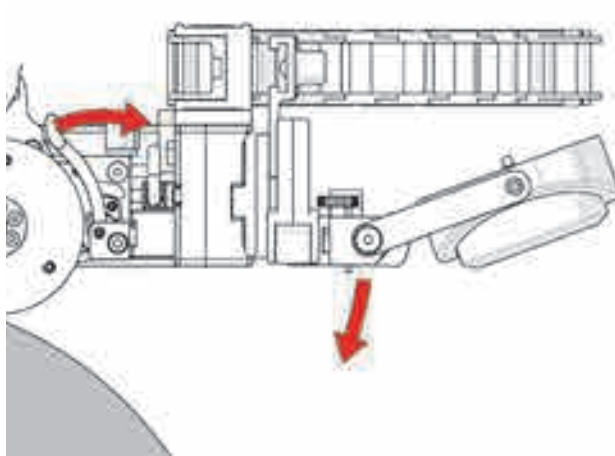


Figure 4-97 Pivot raster arm

7. Align the raster arm so that it is parallel with the tangent of the scan surface (see Figure 4-98 on page 163).

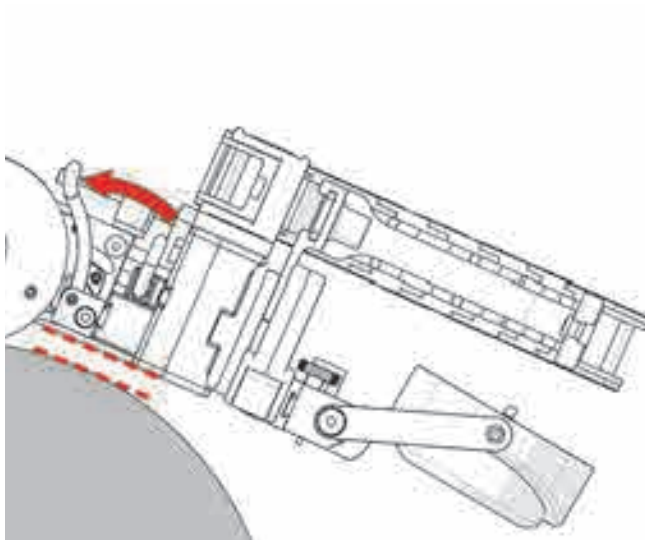


Figure 4-98 Align parallel with scan surface

8. Engage the swivel mount levers to hold the position of the raster arm.
9. Release the raster arm pivot nose latch (see Figure 4-99 on page 164).

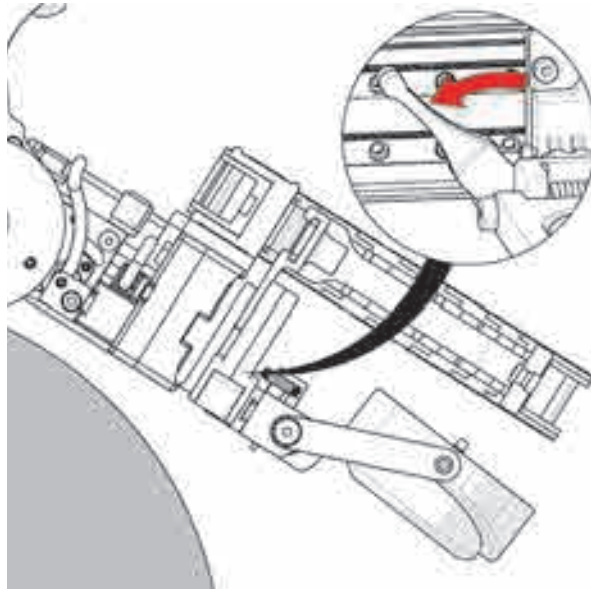


Figure 4-99 Adjust raster arm pivot nose

10. Lower the probe holder to a minimum of 20 mm (0.75 in.) above the scan surface, and latch the raster arm at this position (see Figure 4-100 on page 165).

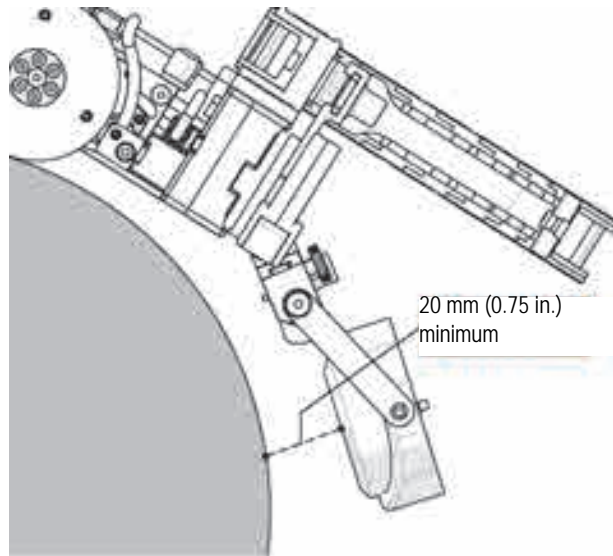


Figure 4-100 Latch the raster arm pivot nose

11. Gently lift the probe holder (see Figure 4-101 on page 166 [1]).
12. Pull the probe holder latch (see Figure 4-101 on page 166 [2]).
13. Lower the probe holder gently to the scan surface (see Figure 4-101 on page 166 [3]).

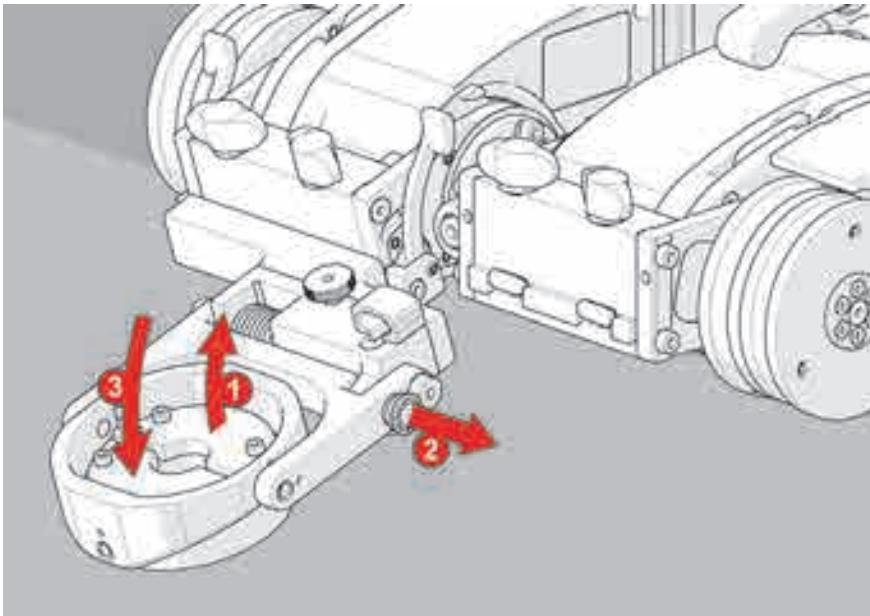


Figure 4-101 Pull probe latch to release dual conventional UT probe holder

4.9.5 Dual Probe Holder Configuration

To mount two probe holders to the raster arm, follow the procedure below.

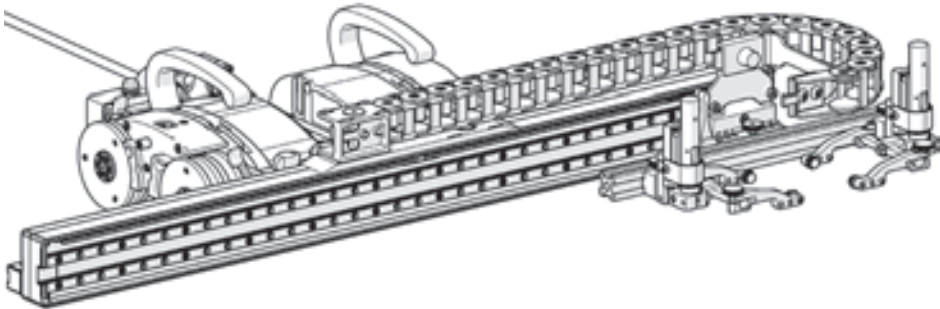


Figure 4-102 Raster arm with two probe holders

NOTE

To prevent equipment damage, do not mount more than two probe holders to the front of the raster arm.

To install dual probe holders

1. Remove the cable tray (see “Attaching a Cable Tray” on page 124).
2. Using the supplied 3 mm hex driver, remove the raster arm pivot nose (female) from the raster arm (see Figure 4-103 on page 168).

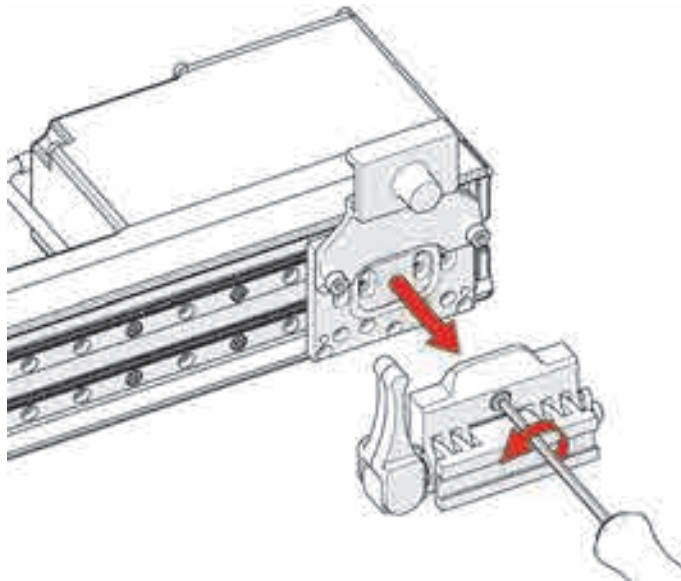


Figure 4-103 Remove pivot nose

3. Release the side lever of the raster arm pivot nose (male) and angle the raster arm pivot nose downward (see Figure 4-104 on page 168).

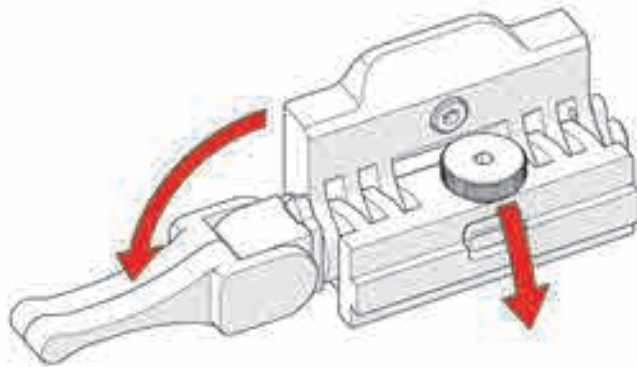


Figure 4-104 Angle pivot nose down

4. Mount the (male) pivot nose (sold separately) to the raster arm (see Figure 4-105 on page 169).

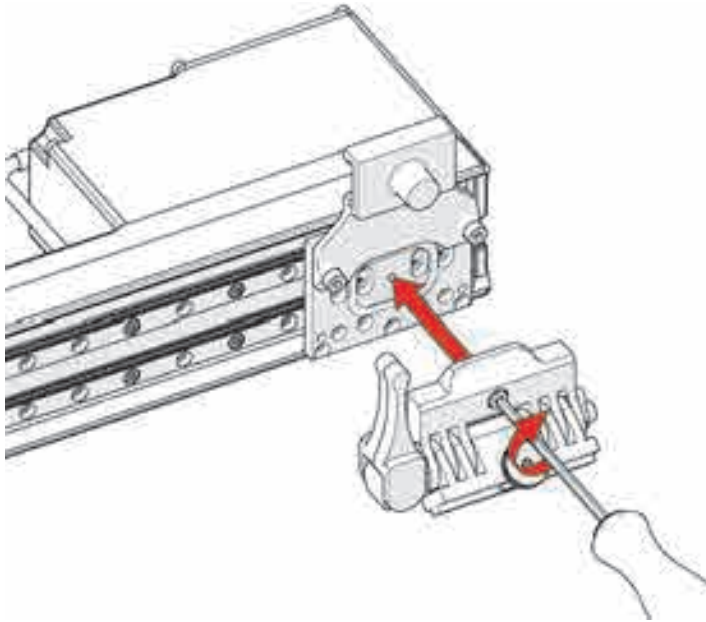


Figure 4-105 Install the male pivot nose

5. Mount a frame bar to the raster arm pivot nose (see Figure 4-106 on page 170).

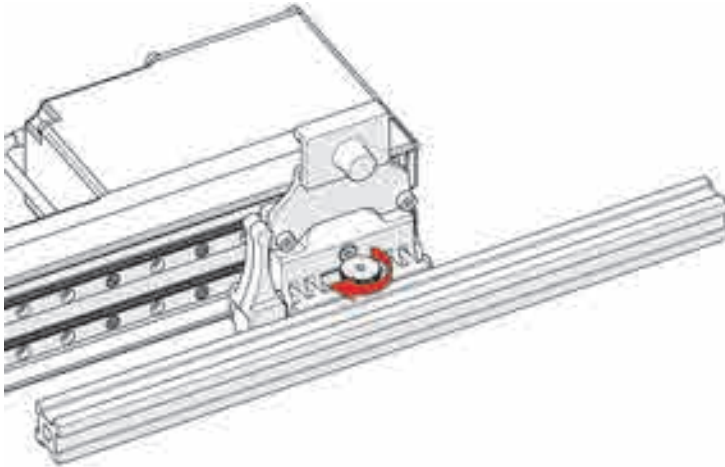


Figure 4-106 Mount frame bar

6. Follow the steps in “Probe Holder Setup” on page 134 to mount and set up the vertical probe holders (see Figure 4-107 on page 170).

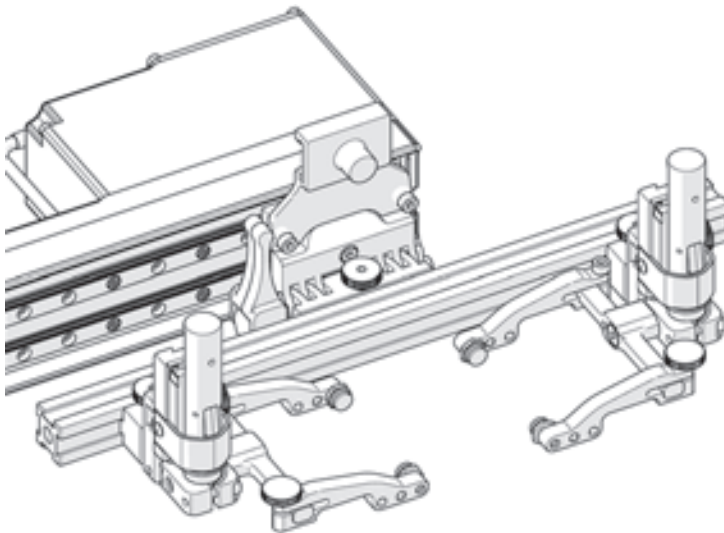


Figure 4-107 Mount dual probe holders

4.10 Probe Holder Rack

This section provides information on probe holder rack components and how to set up and use them.

NOTE

Although the images in the instructions in “Probe Holder Rack—Flat or Circumferential” on page 171 contain images of a probe holder rack with straight, nonpivoting frame bars, the same principles apply to the pivoting probe holder rack.

4.10.1 Probe Holder Rack—Flat or Circumferential

The probe holder rack adds weld scanning capability to the SteerROVER motorized scanner (see Figure 4-108 on page 172). This frame uses four (4) vertical probe holders. Additional frame components allow up to six probes to be used.

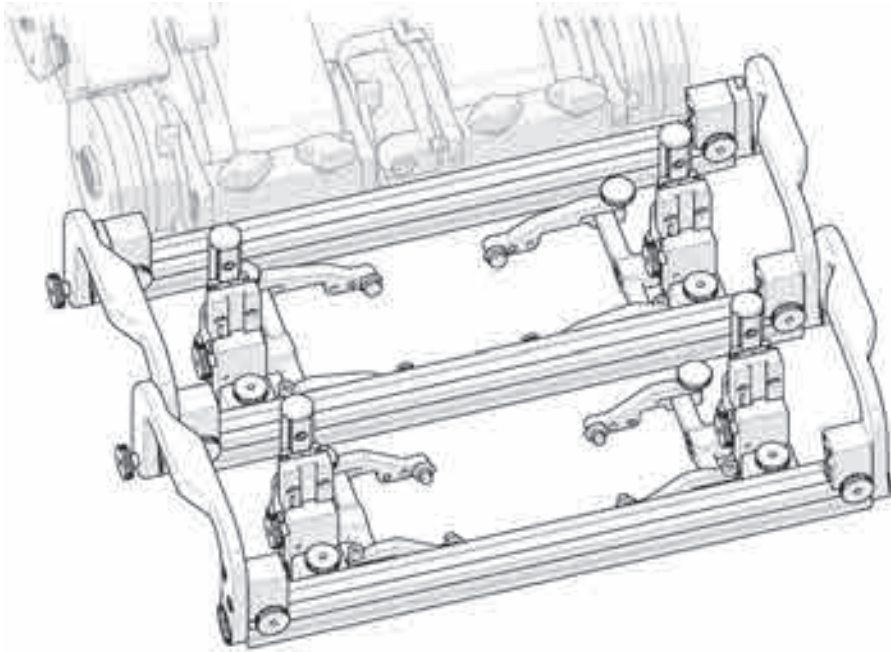


Figure 4-108 Probe holder rack

To set up the probe holder rack

1. Attach the wedges to the probe holders that will be used (see “Probe Holder Setup” on page 134 for additional details).
2. Affix the probe holders, with attached wedges, to the probe holder rack. Place the secondary probe holder at the front of the rack (1) and place the primary probe holders at the rear (2) (see Figure 4-109 on page 173).

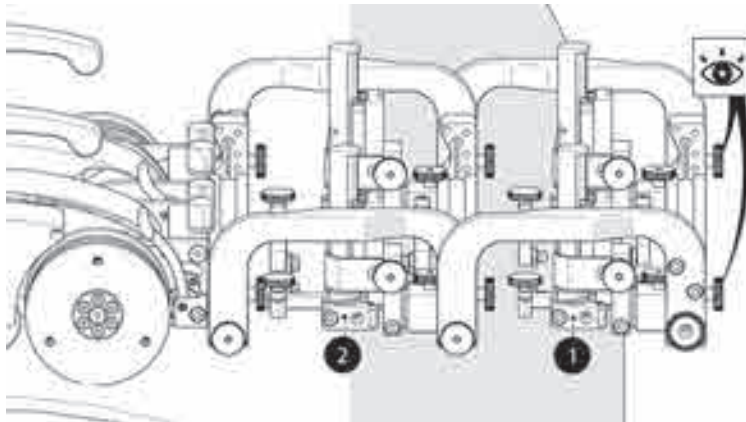


Figure 4-109 Position primary and secondary probe holders

TIP

Because of the larger size of phased array wedges, scan results are generally improved when pulling or dragging them.

-
3. Mount the probe holder rack to the SteerROVER (see “Swivel Mount” on page 110 for additional details). When mounting the probe holder rack, ensure the attachment knobs are at the front (not the scanner side) [see Figure 4-110 on page 174].



CAUTION

To avoid mechanical failure, the pivoting probe holder rack with four probes must only be mounted directly to the SteerROVER scanner (see “Dual Drive Modules with Pivoting Probe Holder Rack” on page 50). The raster arm is only able to support the weight of a probe holder bar with two (2) probes.

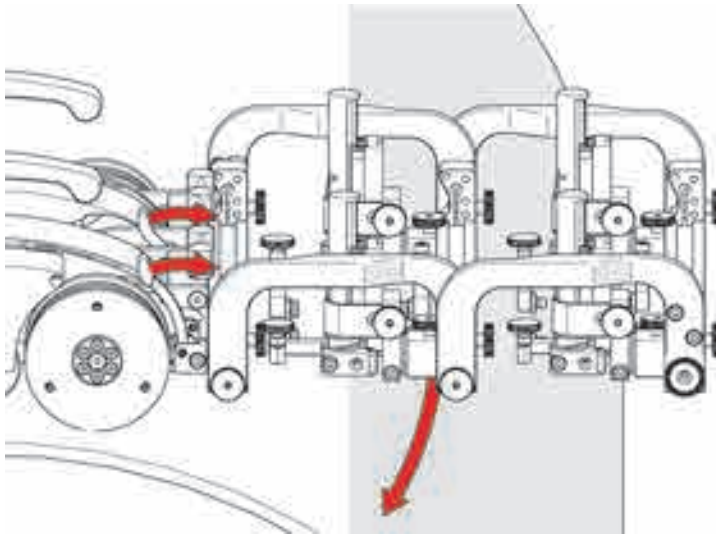


Figure 4-110 Align swivel mount with scan surface

4. Release the two swivel mount levers (see Figure 4-110 on page 174) to position the swivel mount parallel to the scan surface (see Figure 4-111 on page 174). When alignment with scan surface is achieved, lock the SteerROVER scanner's swivel mount levers.

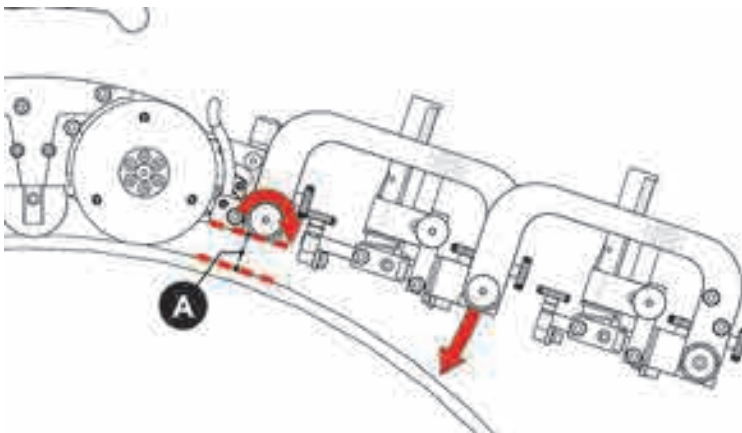


Figure 4-111 Set rear rotational adjustment knob

5. Loosen the rear rotational adjustment knob to lower the rear section of the rack toward the inspection surface (see Figure 4-111 on page 174). Ensure that gap B (see Figure 4-112 on page 175) is no smaller than gap A (see Figure 4-111 on page 174).

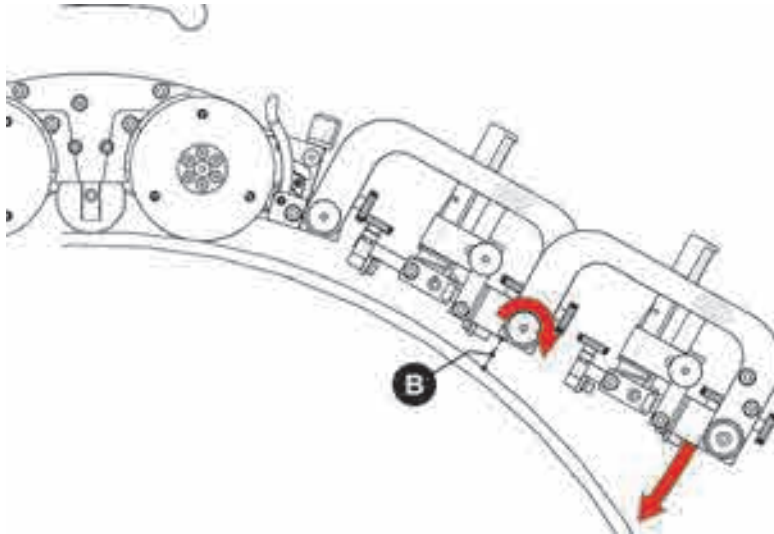


Figure 4-112 Set front rotational adjustment knob

6. Loosen the front rotational adjustment knob (see Figure 4-112 on page 175) to lower the front section of the rack toward the inspection surface, ensuring that gap C (see Figure 4-113 on page 176) is no smaller than gap A (see Figure 4-111 on page 174).

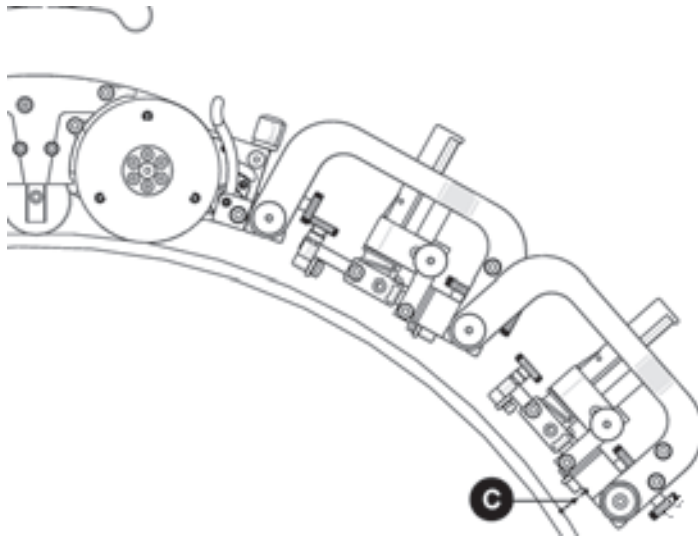


Figure 4-113 Align probes with the scan surface tangent

4.10.2 Pivoting Probe Holder Rack

The pivoting probe holder rack uses vertical probe holders (see Figure 4-114 on page 177). The SteerROVER can guide as many as 6 probes in the longitudinal and circumferential direction.

NOTE

A minimum OD of 305 mm (12 in.) is required for longitudinal scanning.

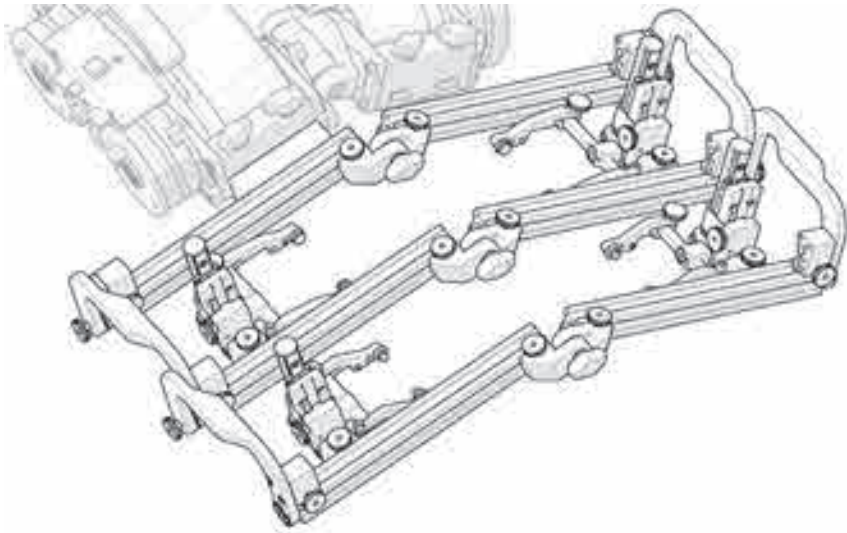


Figure 4-114 Pivoting probe holder rack

4.10.2.1 Mounting a Pivoting Probe Holder Rack



WARNING

FALLING OBJECT HAZARD. The pivoting probe holder rack is to be mounted only in the right-hand swivel mount. Mounting it in both the left-hand and right-hand swivel mounts may cause the SteerROVER to fall and **SEVERE INJURY** or **DEATH** could result.

To mount a pivoting probe holder rack

1. Attach the wedges that are to be used with the probe holders (see “Probe Holder Setup” on page 134 for instructions).
2. Affix the probe holders, with attached wedges, to the probe holder rack (see Figure 4-115 on page 178):
 - a) Place the secondary probe holders at the front of the rack (1).
 - b) Place the primary probe holders at the rear of the rack (2).

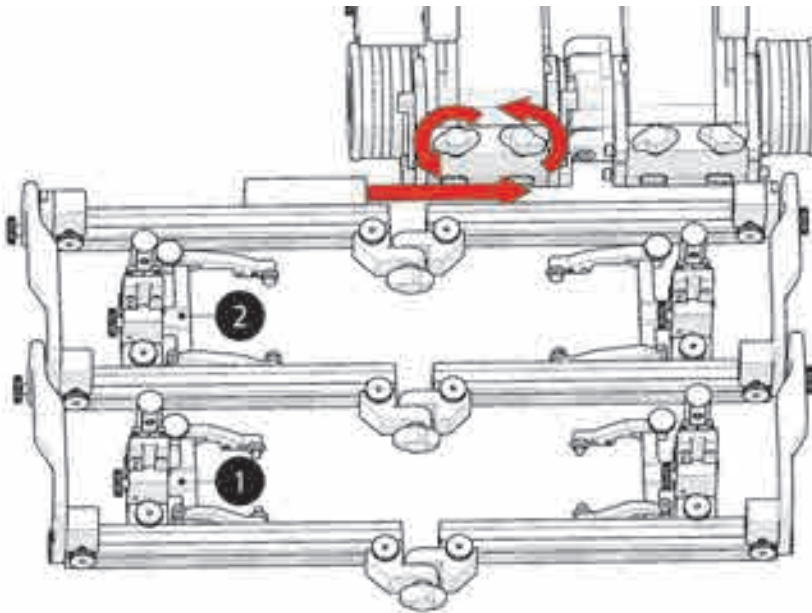


Figure 4-115 Connect rack to right drive module

TIP

Phased array wedges are designed to be pulled along a scan surface.

3. Mount the pivoting probe holder rack to the SteerROVER scanner (see “Swivel Mount” on page 110 for additional details).

4.10.2.2 Pivoting Probe Holder Rack Setup—Longitudinal



WARNING

FALLING OBJECT HAZARD. When scanning in the longitudinal direction with the pivoting probe holder rack, operation must be limited to driving in the longitudinal direction only. Only very slight corrective steering is permitted. Excessive steering may cause the SteerROVER to fall and SEVERE INJURY or DEATH could result.

To set up the pivoting probe holder rack for longitudinal scanning

1. Loosen the pivot wing knobs at the center of the rack system (see Figure 4-116 on page 180).
-

NOTE

The swivel mount must be in a horizontal position during longitudinal scanning (see “Swivel Mount” on page 95).

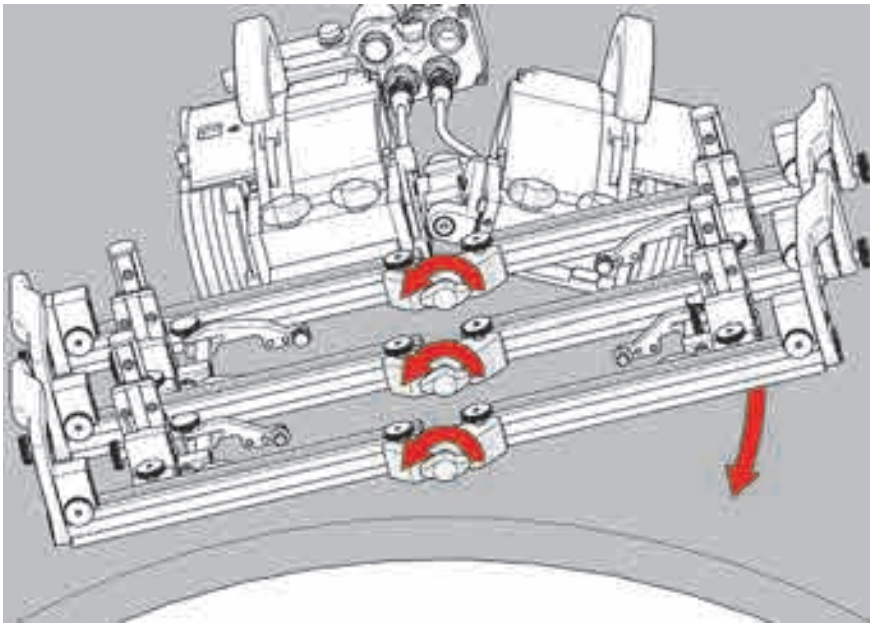


Figure 4-116 Loosen the pivot wing knobs

2. Lower the left side of the rack system to align with the tangent of the scan surface, and then tighten the pivot wing knobs (see Figure 4-117 on page 181).

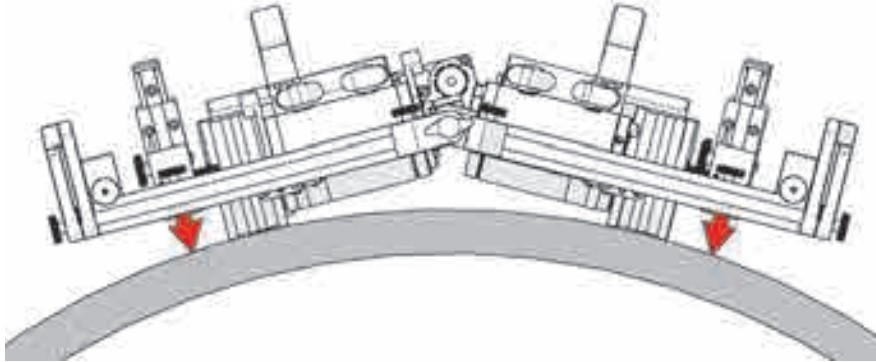


Figure 4-117 Tighten pivot wing knobs

3. Lower the vertical probe holders (see “Probe Holder Vertical Adjustment” on page 137).
4. Ensure the probe holder arms are parallel to the scan surface (see Figure 4-118 on page 181 and “Probe Holder Longitudinal Adjustment” on page 142 for additional details).

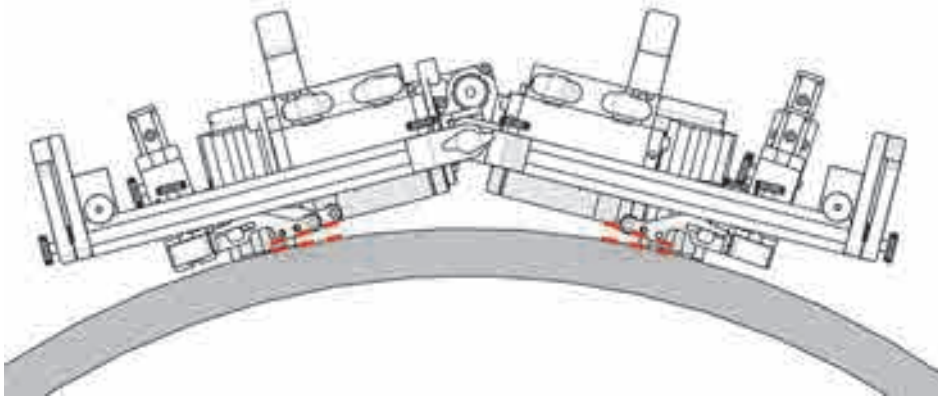


Figure 4-118 Correct probe holder longitudinal adjustment

4.10.2.3 Pivoting Probe Holder Rack Setup—Circumferential

See “Probe Holder Rack—Flat or Circumferential” on page 171 for instructions on how to set up the pivoting probe holder rack for circumferential scanning.

4.10.2.4 Pivoting Probe Holder Rack Setup—Flange

NOTE

The laser guide pivot mount can be used with the configuration in this section (see “Laser Guide Pivot Mount” on page 185).

The pivoting probe holder rack may be configured to allow scanning of flanges and the like. The following steps explain how to set up this configuration.

To set up the pivoting probe holder rack for flange scanning

1. Disassemble the pivoting probe holder rack to achieve the setup shown in Figure 4-119 on page 183. Ensure proper placement of the frame bar with the attached mounting point in relation to the SteerROVER scanner.

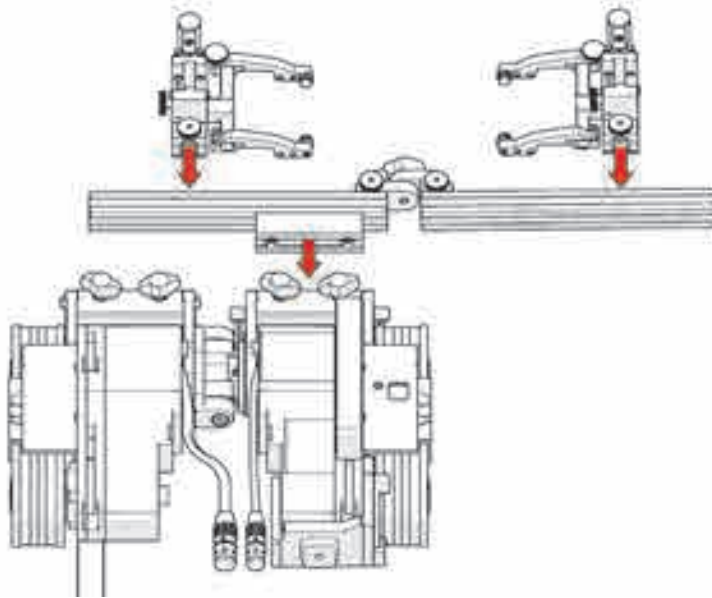


Figure 4-119 Configure assembly and mount to SteerROVER

2. Loosen the pivot wing knob and raise the frame bar to an angle greater than the surface to be scanned (see Figure 4-120 on page 184). Tighten the pivot wing knob and place the SteerROVER on the scan surface (see "Placement of SteerROVER on Inspection Surface" on page 60).

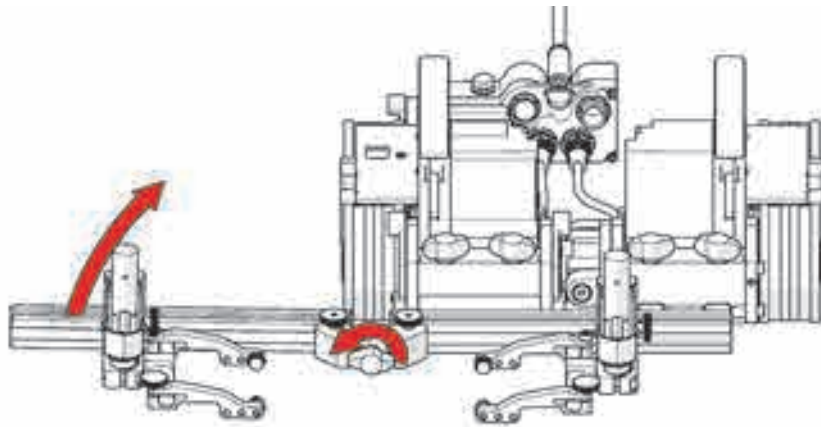


Figure 4-120 Lift frame bar to avoid interference

3. Release the front swivel mount adjustment levers to align the swivel mount parallel to the scan surface (see Figure 4-121 on page 184).

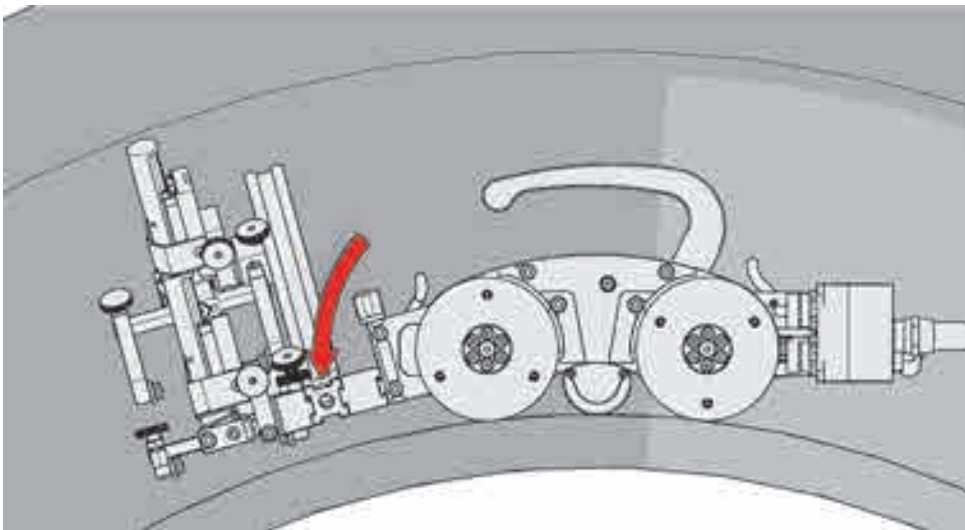


Figure 4-121 Align swivel mount with scan surface

- Loosen the pivot wing knob and align the frame bar parallel with the scan surface (see Figure 4-122 on page 185).

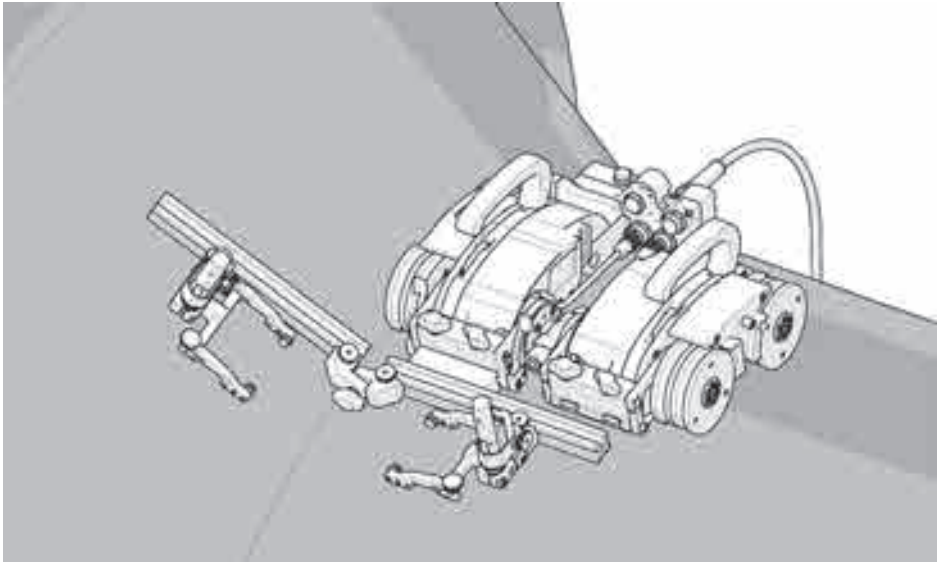


Figure 4-122 Align frame bar with flange scan surface

4.10.2.5 Laser Guide Pivot Mount

A mounting point for the laser guide is included with SteerROVER weld packages (see “Battery-Powered Laser Guide (Optional)” on page 186). To install the pivot mount, see these following instructions.

To install the laser guide pivot mount

- Remove the dovetail bar pivot (1) from one of the sets of probe holder racks (see Figure 4-123 on page 186). The choice of which dovetail bar pivot to remove is at your discretion.
- Attach the laser guide pivot mount (2) to the frame bar (see Figure 4-123 on page 186), tighten the dovetail knobs and the dovetail screws. Ensure a flush alignment of the pivot mount and the frame bar to achieve proper centering of the laser guide pivot mount.

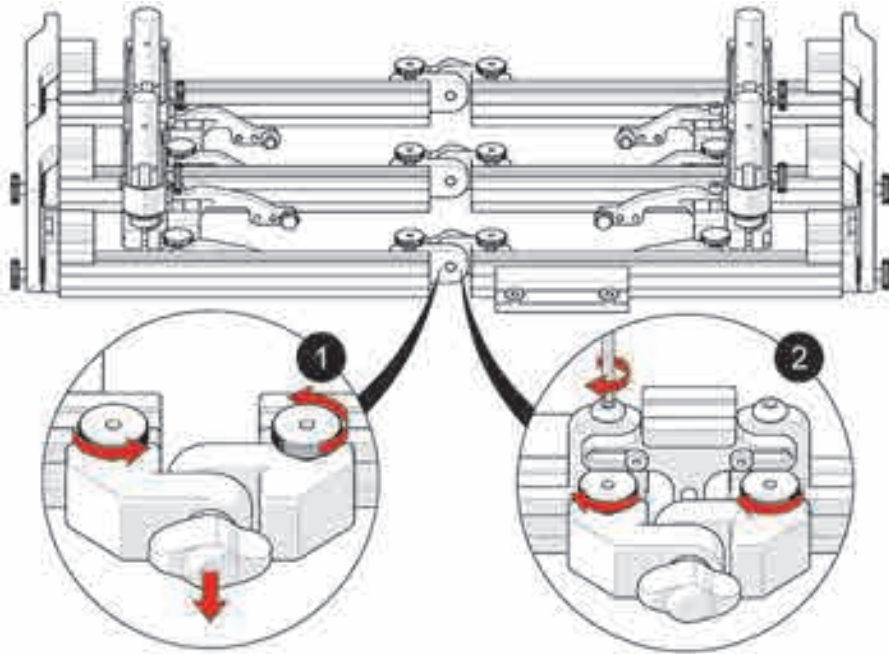


Figure 4-123 Correct probe holder longitudinal adjustment

3. Mount the laser guide (see “Battery-Powered Laser Guide (Optional)” on page 186 for additional details).

4.11 Battery-Powered Laser Guide (Optional)



WARNING



LASER RADIATION. To prevent human injury, do not view directly with optical instruments. Class 1M laser product.

The laser guide provides a reference point to align the SteerROVER to a given path (ex.: a weld) [see Figure 4-124 on page 187].

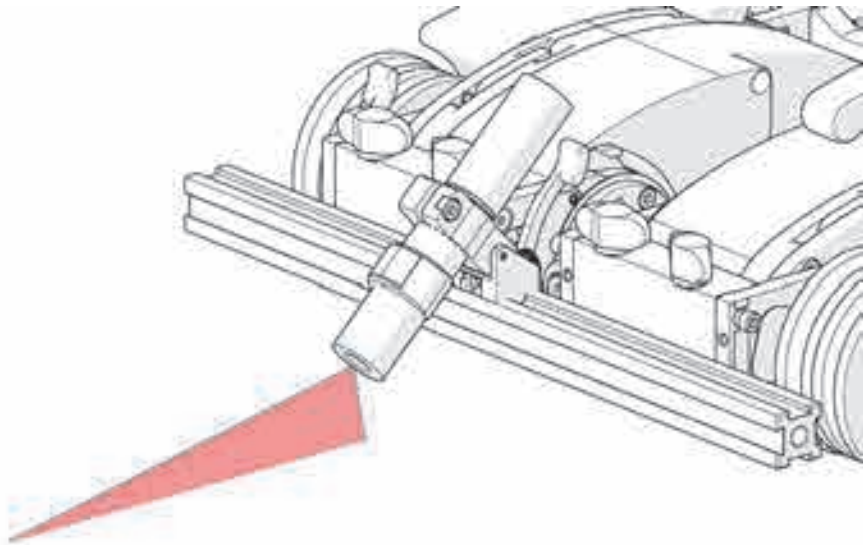


Figure 4-124 Laser guide

To setup and install the laser guide

1. Loosen the laser guide knob.
2. Mount the laser guide on the frame bar, and then tighten the laser guide knob (see Figure 4-125 on page 187).

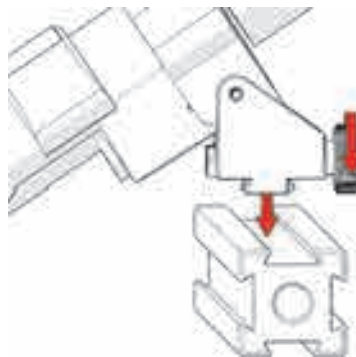


Figure 4-125 Mount on frame bar

3. Adjust the laser guide's friction pivot to direct the laser beam as required (see Figure 4-126 on page 188).

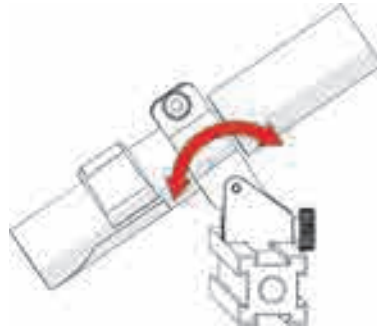


Figure 4-126 Aim guide

4. Loosen the laser guide knob to adjust the side-to-side position as required.
5. Retighten the laser guide knob.

The included perpendicular mount allows for alternate mounting positions when required (see Figure 4-127 on page 188).

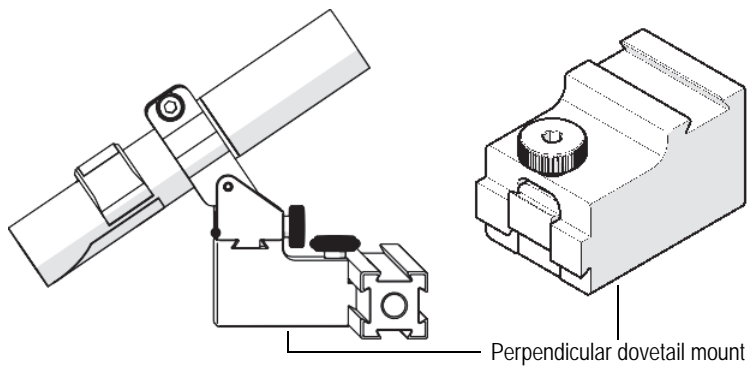


Figure 4-127 Laser guide perpendicular mount

NOTE

The battery-powered laser guide requires one (1) AA battery for operation.

4.12 Cable Management

The cable management is offered in a variety of lengths and provides a means of bundling and protecting cables and hoses that connect to the SteerROVER.

4.12.1 Mounting Cable Management

To mount the cable management

1. Align the cable management clamp with the appropriate mounting position on the umbilical (see Figure 4-128 on page 189).

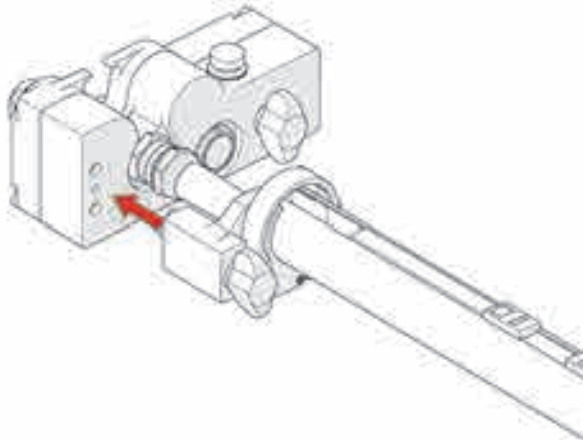


Figure 4-128 Align with umbilical

2. Tighten the cable management clamp wing knob (see Figure 4-129 on page 190).

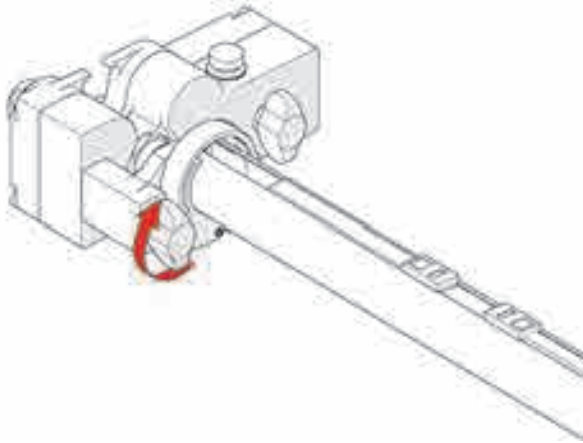


Figure 4-129 Tighten wing knob

4.12.2 Setting Up the Cable Management

To set up the cable management

1. Open the cable management tube and, beginning at the clamp end, start placing the cabling in the tube (see Figure 4-130 on page 190).



Figure 4-130 Insert cables and hoses

2. Follow the cable placement, zipping the tube closed (see Figure 4-131 on page 191).



Figure 4-131 Zip to close

3. After the cable is placed in the entire length of tube, bring the zipper from the opposite end to meet at any point in the middle (see Figure 4-132 on page 191).

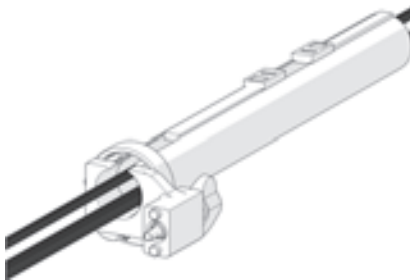


Figure 4-132 Zip opposite end

When necessary, the two zippers may be opened to allow any cables to be routed out of the tube (see Figure 4-133 on page 192).

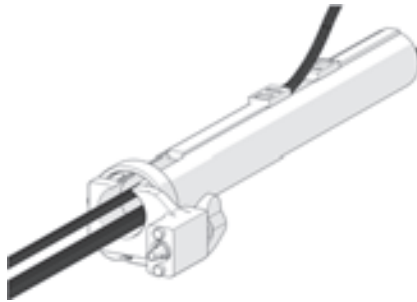


Figure 4-133 Flexible routing

4.12.3 Attaching the Cable Management Clamp

In the event that the tube becomes disconnected from the cable management clamp, follow these instructions to reattach the tube and clamp.

To attach the cable management clamp

1. Loosen the clamp screw using the supplied 3 mm hex driver.
2. Slide the clamp around the tube, and then slide the tube around the outside of the cable management mount (see Figure 4-134 on page 192).

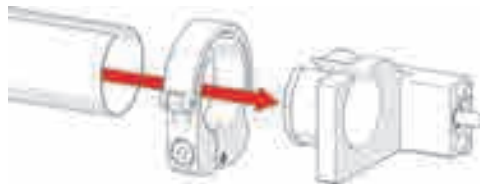


Figure 4-134 Slide tube around mount

3. Align the zipper opening and the cable management clamp opening.
4. Slide the clamp over the tube and cable management mount pinching the tube in between (see Figure 4-135 on page 193).

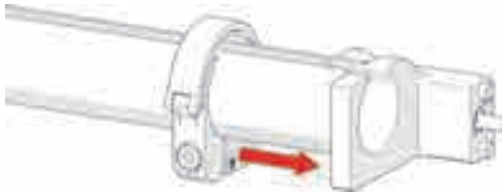


Figure 4-135 Slide clamp onto mount

5. Tighten the clamp screw (see Figure 4-136 on page 193).

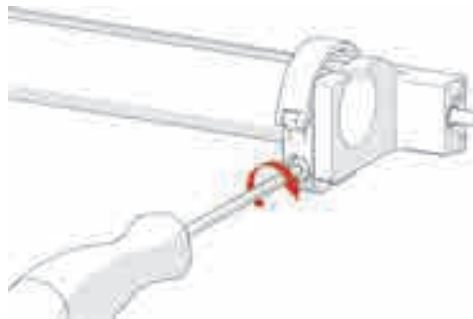


Figure 4-136 Tighten clamp screw

4.13 Backpack (Optional)

The SteerROVER backpack is intended to mount objects (for example, pre-amps, splitters, etc.) that meet the following requirements:

- Have a maximum weight of 1.36 kg (3 lb)
- Are attached to the SteerROVER with a lanyard or probe cables strong enough to prevent the object from falling
- Have smooth edges that will not cut the backpack strap

NOTE

The backpack is only compatible with SteerROVER scanners manufactured after the spring of 2015.

To install and use the backpack

1. Allow the SteerROVER scanner to pivot exposing the inside of the left drive module, and then slide the dovetail nuts of the backpack into the accessory dovetail groove (see Figure 4-137 on page 194).

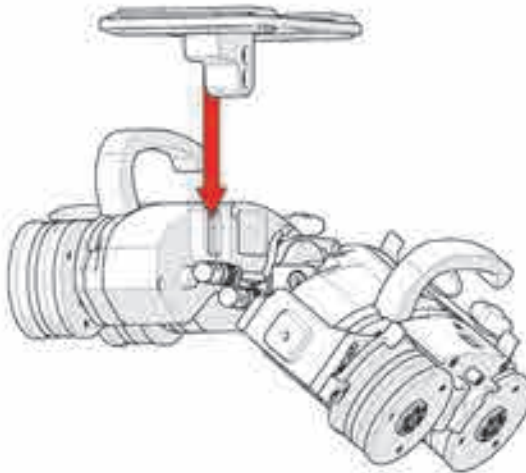


Figure 4-137 Pivot and insert dovetail nut

2. Tighten the two backpack screws using the supplied 3 mm hex driver (see Figure 4-138 on page 195).

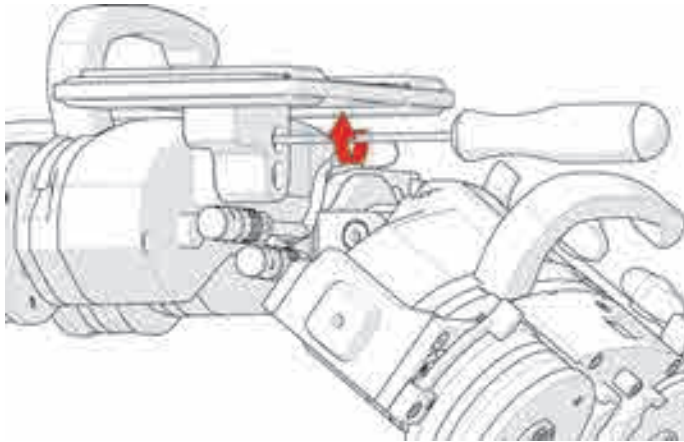


Figure 4-138 Tighten screws

3. Pull the Velcro straps tight around the item on the backpack (see Figure 4-139 on page 195).

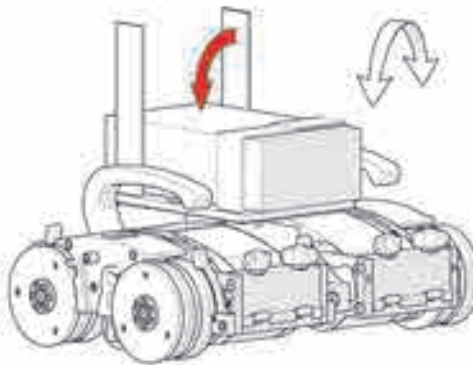


Figure 4-139 Velcro straps to hold item in place

4.14 Pre-Amp Bracket (Optional)

The SteerROVER pre-amp bracket is intended to mount objects (for example, pre-amps, splitters, etc.) that meet the following requirements:

- Have a maximum weight of 1.36 kg (3 lb)
- Are attached to the SteerROVER with a lanyard or probe cables strong enough to prevent the object from falling
- Have smooth edges that will not cut pre-amp bracket's straps

The pre-amp bracket (P/N: Q8300570) mounts to any dovetail groove to hold a pre-amp. Compatible with most standard pre-amps, the adjustable screw mounting channel on the bottom of the bracket is used to attach a pre-amp. The pre-amp bracket also comes with Velcro straps that can be used to hold the pre-amp.

To install and use the pre-amp bracket

1. Insert the Velcro straps as shown in Figure 4-140 on page 196.

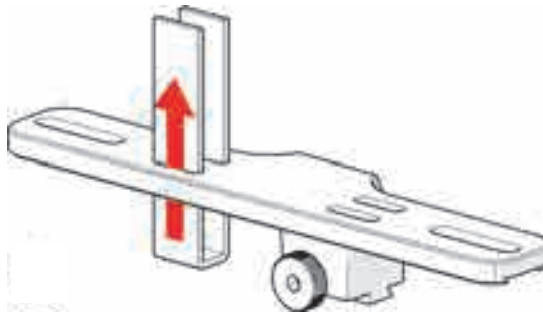


Figure 4-140 Inserting the Velcro straps

2. Place the pre-amp in the bracket, and secure it in place using the Velcro straps (see Figure 4-141 on page 197).

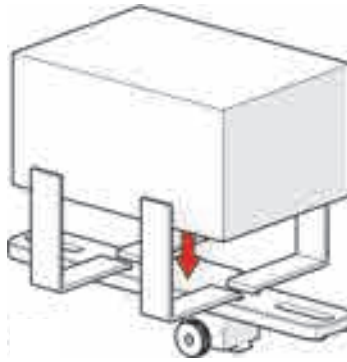


Figure 4-141 Pre-amp in the bracket and Velcro to hold it in place

3. Mount the bracket on a frame bar, and tighten the knob (see Figure 4-142 on page 197).

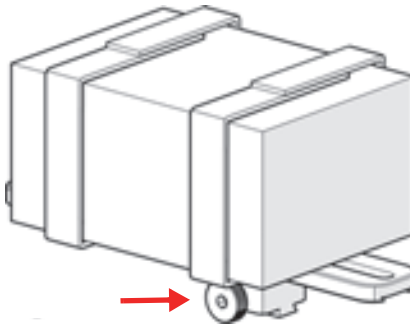


Figure 4-142 Knob to secure the pre-amp bracket on the frame bar

5. Maintenance

5.1 Safety Precautions before Maintenance



WARNING



ELECTRICAL SHOCK HAZARD. To avoid the risk of electric shock, disconnect the power controller when servicing the equipment. The power controller is powered even when the E-stop push-button is latched in the off position.



WARNING



MAGNETIC MATERIAL. The wheels of the SteerROVER produce an extremely strong magnetic field which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices, or other electronics.

Tools, magnets, and metal objects can cut, pinch or entrap hands and fingers.
HANDLE WITH CARE.

Those with pacemakers or ICDs must stay at least 25 cm (10 in.) away at all times.

5.2 Maintenance Schedule

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 SteerROVER scanner, 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.

The SteerROVER system must be maintained according to the following schedule.

Table 8 Maintenance table

Maintenance item	Frequency
Inspect safety apparatus This includes: <ul style="list-style-type: none">• All components of tether system. Replace damaged components as necessary.• Lifting sling on the scanner. If the lifting sling shows signs of damage (ex.: cuts, abrasion, etc) do NOT use.	Every use

Table 8 Maintenance table (continued)

Maintenance item	Frequency
<p>Clean the drive wheels</p> <p>Debris will collect on the magnetic wheels. Remove this debris before every use. An effective cleaning method uses adhesive backed tape (ex.: duct tape) to pull the debris off the wheels.</p>	Every use
<p>Inspect cables and connectors</p> <p>Inspect the umbilical cable, the controller cable, and the power controller cable for damage. Have any damaged cable repaired by a qualified person or replace the cable assembly as necessary.</p> <p>Inspect all connectors for damage or moisture. Straighten bent pins. Dry connectors before using.</p>	Every use
<p>General cleaning</p> <p>Ensure that the scanner stays relatively clean by wiping off any excess dirt or other contaminants after every use.</p>	Every use

6. Troubleshooting

This chapter provides possible solutions to problems that you may encounter when operating the SteerROVER scanner. For any issues that you cannot resolve, see “Technical Support” on page 22.

6.1 Start-Up Issues

Two messages are possible in the event of a start-up issue: “Joystick Off Center” or “Checking Network.”

6.1.1 Joystick Off Center

Upon system start-up, the joystick positions are detected. When a joystick is detected outside the center position, the **Joystick Off Center** screen displays, indicating the joystick will be disabled (see Figure 6-1 on page 204). Press **Ok** to continue system start-up. All system functions will work normally with the exception of movements that require joystick operation.



Figure 6-1 Joystick off center screen

Ensure the handheld controller’s joysticks are free of interference, and then reset the system power to enable joystick control. If no interference of the joystick is present, the joystick calibration may need to be performed (see “Joystick Calibration Screen” on page 89)

6.1.2 Checking Network

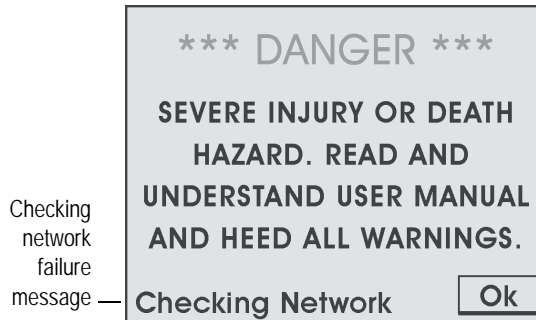


Figure 6-2 The Checking Network message

During start-up, the system initializes the communications to all the devices on the network (see “System Start-Up” on page 57 for start-up instructions). If the network communication fails for any reason, the “Checking Network” message will appear and remain on screen (see Figure 6-2 on page 204).

The following are some likely causes of this failure:

- No devices connected to the network
- A problem with one of the devices
- Cable issue causing the entire network to fail

Check the connections of the devices or try removing one device at a time from the system to isolate the problem device.

NOTE

Always turn off the system power before connecting or disconnecting any devices.

6.2 Startup Override

A system maintenance mode may be accessed to correct system issues. Enter the maintenance mode by pressing the handheld controller click wheel while system power is activated. Continue pressing the handheld controller click wheel until the **Startup Override** screen appears (see Figure 6-3 on page 205).

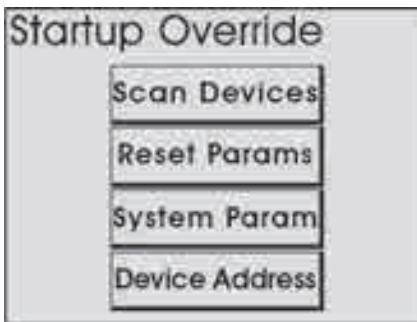


Figure 6-3 The Startup Override screen

6.2.1 Scan Devices

This utility scans the system network for devices. All possible device addresses and speeds are scanned. As devices are found, the address of the device and speed are displayed (see Table 9 on page 206 for common device addresses). When the scanning is complete, power to the system must be cycled (see Figure 6-4 on page 206).

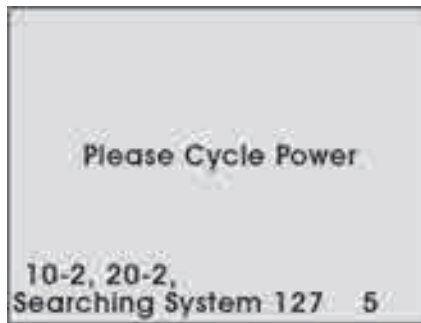


Figure 6-4 The Cycle Power screen—Scan Devices

Table 9 Common addresses

Common addresses	
Raster Module	30
SteerROVER	40

When a device is connected to the system but is not detected, this most likely indicates an internal device problem. Plug the suspect device into a different umbilical port and perform the scan again to confirm the device is faulty.

Normal network speeds will be 2 for all devices. When a device is not operating at the correct speed, the internal software attempts to correct the device speed.

When a device is not operating at the correct speed, it may disrupt communications of the system network. Power should be cycled and the scan restarted.

TIP

Within normal operation, issues with device speed are very rare. Device network speeds are set by the manufacturer and should not deviate.

6.2.2 Reset Parameters

If the system parameters become corrupt or a change is made that prevents the system from functioning properly. All system parameters may be restored to their factory settings by selecting this option. When pressing the **Reset Params** button, the changes occur immediately. Power will need to be cycled for the reset to be complete (see Figure 6-5 on page 207).



Figure 6-5 The Cycle Power screen—Reset Parameters

6.2.3 System Parameters

System parameters are factory set to control a variety of functions. These parameters cannot be modified. However, special circumstances may occur when modification of these parameters could be recommended by Olympus.

Instructions for making changes to the system parameters will only be provided when deemed necessary by Olympus.

6.2.4 Device Address

Each device type in the system is factory assigned a unique identifier. This option allows for these identifiers to be changed in the field. Instructions for making changes to the system parameters will only be provided when deemed necessary by Olympus.

6.3 Encoder Failure

The left drive module's motor encoder, can be used to output encoder signals to an instrument (see "Scanner Operation Specifications" on page 218 for additional details).

NOTE

When the motor encoder is used to track the position, steering may cause wheel slippage, which will affect encoder accuracy.

To output the motor encoder's signal, plug the left drive module's connector into the umbilical's X-ENC socket. Plug the right drive module's connector into the remaining socket (see Figure 6-6 on page 208).

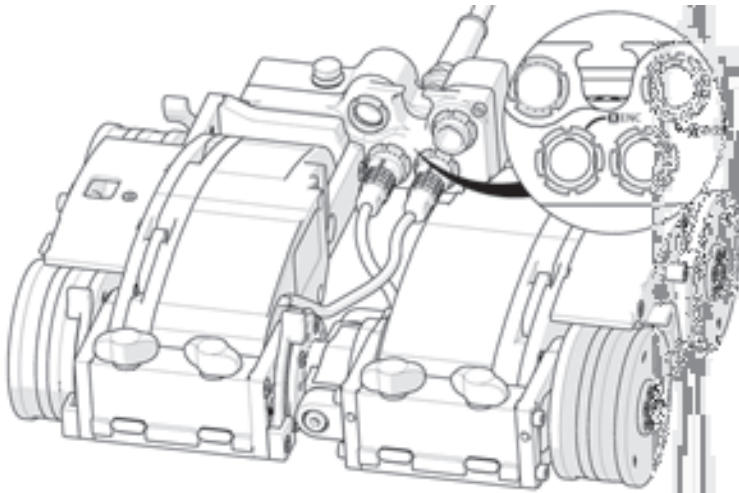


Figure 6-6 Left drive module encoder connection

6.4 Additional Issues

Table 10 on page 209 contains a general list of potential issues, causes, and solutions.

Table 10 Troubleshooting table

Problem	Possible cause	Solution
Handheld controller display does not activate	Input power requirements not met.	Ensure input power meets requirements (see “Power Requirements” on page 219).
	Handheld controller not plugged into power controller.	Plug handheld controller into power controller. Ensure connectors are dry, clean and connector pins are not bent.
	Umbilical cable not properly connected.	Check umbilical cable connections at both ends. Ensure connectors are dry and clean and connector pins are not bent.
	SteerROVER system not started.	Start the SteerROVER system (see “System Start-Up” on page 57).
	Damaged components in the handheld controller, scanner, power controller, or cabling.	Contact Olympus technical support.
Handheld controller display is activated, yet scanner does not drive	Handheld controller is not in correct mode for driving.	See “Operation” on page 57 for additional details.
	Damaged components in the handheld controller, scanner, power controller, or cabling.	Contact Olympus technical support.

Table 10 Troubleshooting table (continued)

Problem	Possible cause	Solution
SteerROVER does not drive and is unreachable	See the possible causes for the first problem in this table.	Try the solutions for problem one. If the scanner is still unresponsive, see “Retrieval of a Stranded Scanner” on page 210.
SteerROVER does not steer properly.	A drive module is dead.	Contact Olympus technical support.
All four wheels do not remain on the inspection surface.	Inspection surface is interfering with underside of the drive module housing(s) due to excessive steering on curved inspection surfaces with OD less than 2.1 m (84 in.).	Do not steer the scanner so severely. Do not use the SteerROVER outside of its intended use (see “Intended Use” on page 23).
Loose raster arm pivot nose	Component adjustment required.	Contact Olympus technical support.

For technical assistance, see “Technical Support” on page 22.

6.5 Retrieval of a Stranded Scanner



WARNING



FALLING OBJECT HAZARD. The tether system must remain active while retrieving the SteerROVER (ex.: a mechanism or person must be continuously taking up the slack in the tether).

Should the SteerROVER scanner become inoperative while out of reach, first attempt the solutions offered in this chapter.

If troubleshooting does not rectify the issue, it may be necessary to retrieve the SteerROVER manually.

It is crucial that the tether system remains active while retrieving the scanner (that is, a mechanism or person must be continuously taking up slack in the tether).

To retrieve the scanner manually

1. Press the E-stop push-button to turn the SteerROVER power off.

NOTE

Under normal conditions, the SteerROVER should begin descending slowly.

2. If the SteerROVER stops descending because of some kind of impediment, use a ladder, personnel lift, or scaffolding to assist the scanner in overcoming the obstacle.

7. Service and Repair

For information about authorized service and repairs, see “Maintenance” on page 199. For any other issues with your SteerROVER scanner, first consult “Troubleshooting” on page 203, and then see “Technical Support” on page 22.

8. Specifications

This chapter contains the specifications for the SteerROVER scanner, such as the physical characteristics and operating environment requirements.

8.1 Scanner General Specifications



WARNING



LIFTING HAZARD. The SteerROVER scanner can be heavy. Single person lifting could cause injury. To prevent serious human injury, two person lifting is recommended.

Table 11 Scanner general specifications

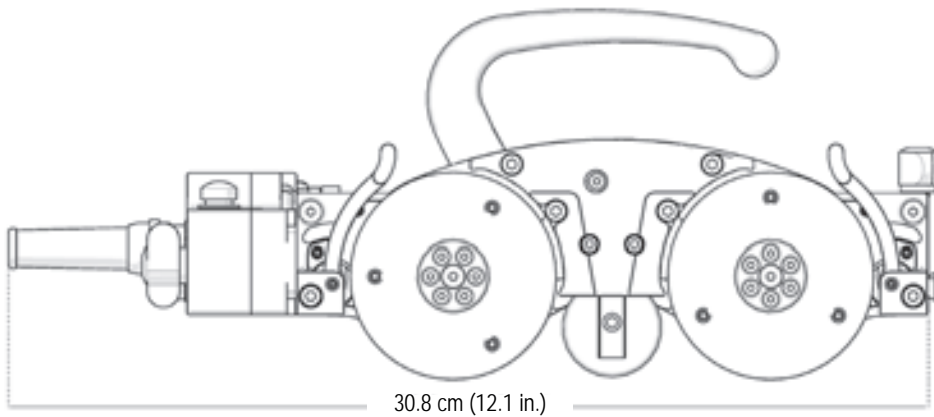
Category	Parameter	Specification
Weight	Scanner weight ^a	7.7 kg (17 lb)
	Raster arm (600 mm) weight	3.36 kg (7.4 lb)
	Raster arm (900 mm) weight	4.04 kg (8.9 lb)
Voltage and power	Voltage	15 V DC to 48 V DC
	Power	320 W

Table 11 Scanner general specifications (continued)

Category	Parameter	Specification
Operating environment	Operating temperature	-20 °C to 50 °C (-4 °F to 122 °F)
	Maximum relative humidity	90 %, noncondensing
	Pollution degree	2
	Altitude	Up to 2000 m (6561 ft)

- a. Dual module configuration excluding case, attachments, umbilical, power controller, and handheld controller.

8.2 Scanner Dimensions

**Figure 8-1 Scanner dimensions—length**

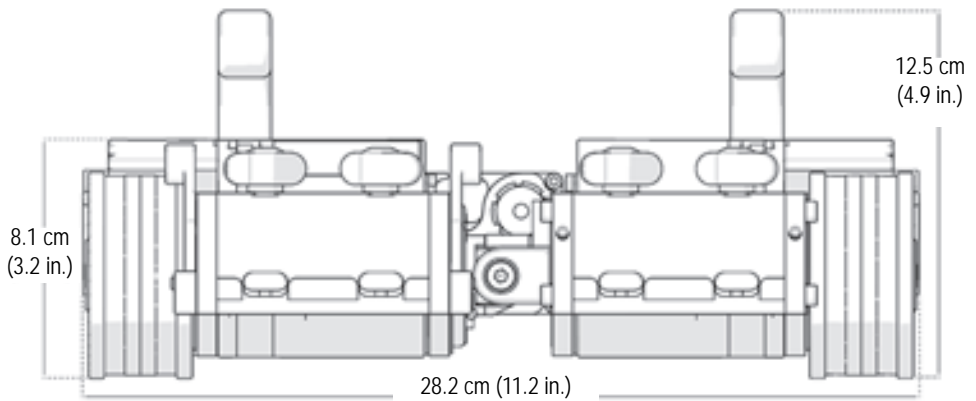


Figure 8-2 Scanner dimensions (dual modules)—width and height

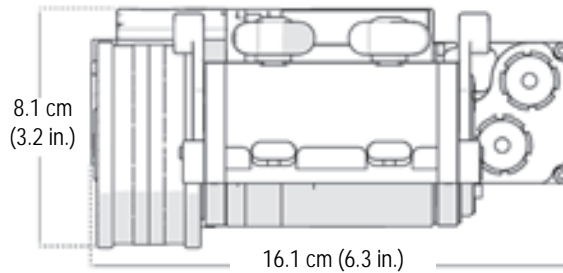


Figure 8-3 Scanner dimensions (single module)—width and height

8.3 Scanner Operation Specifications

Table 12 Scanner operation specifications

Parameter	Specification
Scanner diameter range	<ul style="list-style-type: none"> External, circumferential scans: 70 mm (2.75 in.) OD to flat Internal, circumferential scans: 610 mm (24 in.) ID to flat External, longitudinal scans: 305 mm (12 in.) OD to flat
Right drive module (idler encoder)	13.78 counts/mm (349.9 counts/in.)
Left drive module (motor encoder)	872.5 counts/mm (22162.8 counts/in.)
Raster arm module	240.2 counts/mm (6100.9 counts/in.)
Environmental sealing	Dust tight, water tight (not submersible)
Required radial clearance ^a	70 mm (2.75 in.) on pipes under 200 mm (8 in.) OD and 81.5 mm (3.2 in.) on pipes over 200 mm (8 in.) OD

a. Drive modules only, without backpack and with handles removed.

8.4 Performance Specifications

Table 13 Performance specifications

Parameter	Specification
Maximum vertical payload ^a	10 kg (22 lb)
Drive modules speed	0–25 cm/s (0–10 in./s)
Raster arm module speed	0.5–76.2 cm/s (0.2–30 in./s)

- a. Performance may vary with surface type. Umbilical and attachments are considered payload. Heavy payloads may require reduced speeds.

8.5 Power Requirements



WARNING

A reliable power source must be used to power the SteerROVER. Connections must be secured to prevent accidental disconnection. Power failure may cause the SteerROVER to freewheel down when operating in a vertical orientation. Portable generator usage is not recommended unless accompanied by the use of an uninterruptible power controller.



WARNING

Proper grounding of the power controller is important for safe operation. When a generator is used to supply power to the system (not recommended), the generator must be properly grounded (refer to generator manual).

Power Requirements: 100–240 VAC, 50/60 Hz, 1.4 A

NOTE

The SteerROVER power controller automatically adjusts to the supplied voltage.

8.6 Encoder Interface Specifications

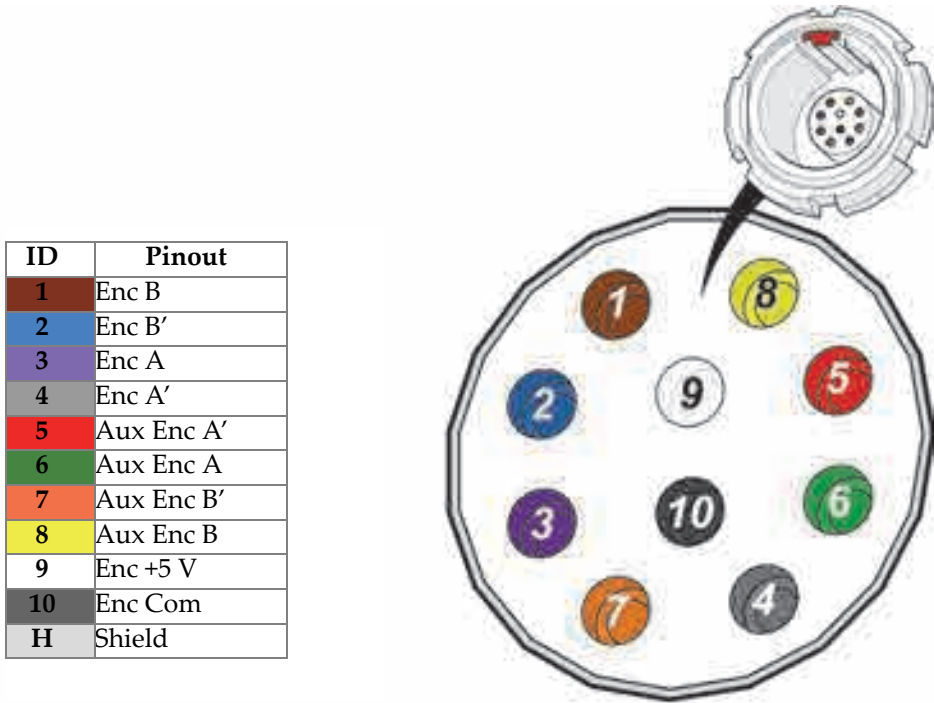


Figure 8-4 Pinout configuration

- Output type: 4 channel quadrature 5 VDC RS422 compatible
- Power: Power must be supplied to the interface
- 5 VDC $\pm 10\%$ power limited to <15 W

8.7 Operating Environment

The SteerROVER is designed for operation in ambient temperatures between $-20\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$) and $50\text{ }^{\circ}\text{C}$ ($122\text{ }^{\circ}\text{F}$).

Appendix: Spare Parts

To order accessories or replacement parts for your SteerROVER system, contact Olympus.

NOTE

These drawings are for ordering parts and not necessarily a list of kit contents.

A.1 SteerROVER Base Scanner

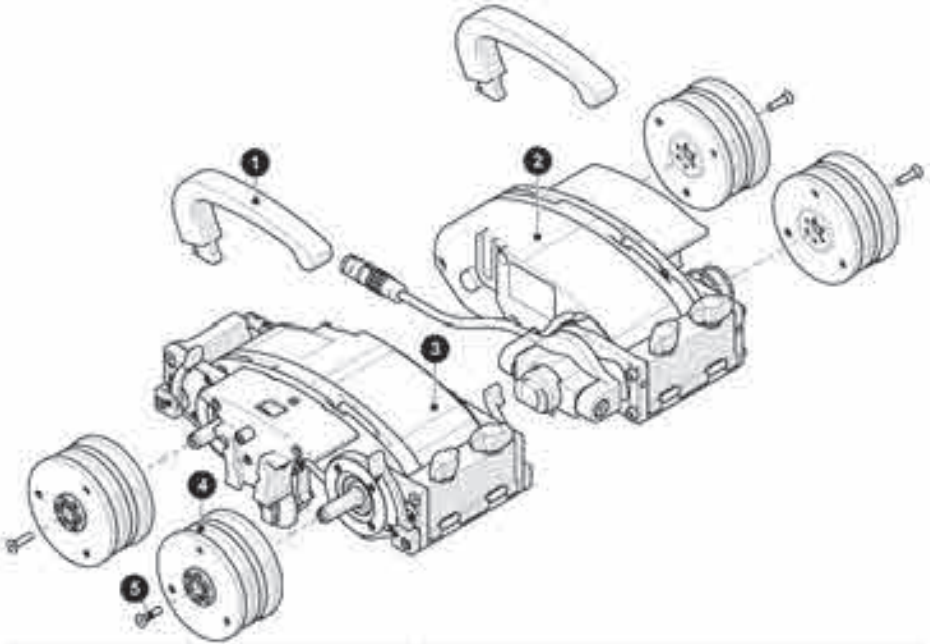


Figure A-1 SteerROVER base scanner

Table 14 SteerROVER base scanner spare parts

ID	Part number	Description
1	Q8301351	Handle
2	N/A	Left drive module
3	N/A	Right drive module
4	Q8301350	Magnetic wheel
5	Q8300549	FHCS, M4 × 0.7 × 16 mm, SST

A.2 Standard Accessories

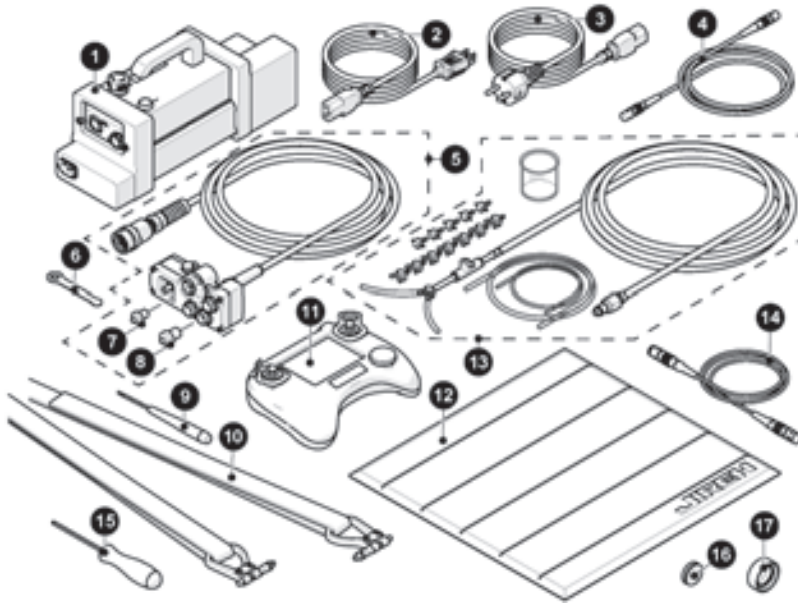


Figure A-2 Standard accessory kit components

Table 15 Standard accessory kit spare parts

ID	Part number	Description
1	Q7750088	Power controller (compatible with North American or European)
2	U8800512	Power cord (North American)
3	Q8300553	Power cord (European)
4	Q8300553	Controller cable

Table 15 Standard accessory kit spare parts (continued)

ID	Part number	Description
5	Q8301390	Umbilical with 5 m cable
	Q8301391	Umbilical with 7.5 m cable
	Q8301392	Umbilical with 15 m cable
	Q8301393	Umbilical with 30 m cable
6	Q8301359	10 mm (0.375 in.) wrench
7	Q8301360	Plug: LEMO receptacle, 10 mm
8	Q8301361	Plug: LEMO receptacle, 12 mm
9	Q8301362	3 mm (0.118 in.) flat driver
10	Q8301352	Lifting sling
11	Q7750089	Handheld controller
12	Q8300558	Installation/removal mat
13	Q8301353	Irrigation kit, 2–4 probe, 5 m tube
	Q8301354	Irrigation kit, 2–4 probe, 7.5 m tube
	Q8301355	Irrigation kit, 2–4 probe, 15 m tube
	Q8301356	Irrigation kit, 2–4 probe, 30 m tube
14	Q8300560	5 m LEMO encoder cable for OmniScan MX2, OmniScan SX, and Focus PX
15	Q8301362	3 mm (0.118 in.) hex driver
16	Q8301357	Cap
17	Q8301358	Cap: scanner hinge cover

A.2.1 Cable Management

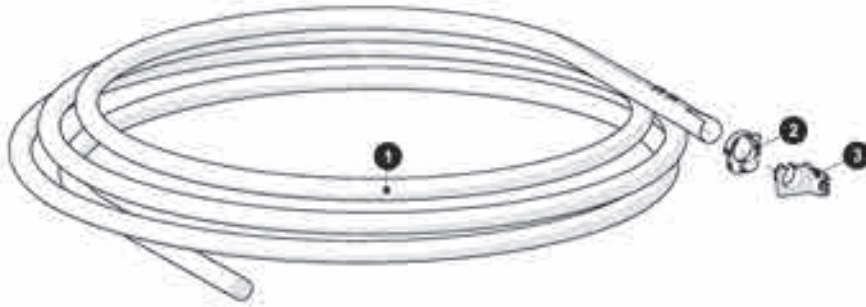


Figure A-3 Cable management parts

Table 16 Cable management part numbers

ID	Part number	Description
1	—	Cable sleeving (see “Cable Management Sleeving” on page 226)
2	Q8300554	Cable management clamp
3	Q8300557	Cable management mount

A.2.2 Cable Management Slewing

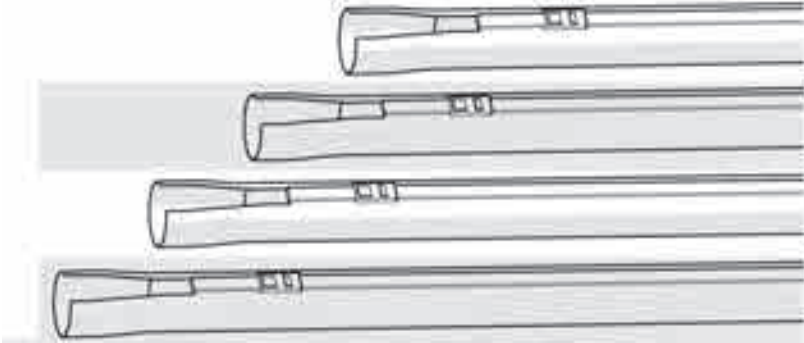


Figure A-4 Cable management slewing sizes

Table 17 Cable management slewing part numbers

Length	Part number
4.5 m (14.8 ft)	Q8301380
7 m (22.9 ft)	Q7750093
9.5 m (31 ft)	Q8301381
14.5 m (47.6 ft)	Q8301382
29.5 m (96.8 ft)	Q7750092

A.3 Raster Arm Module

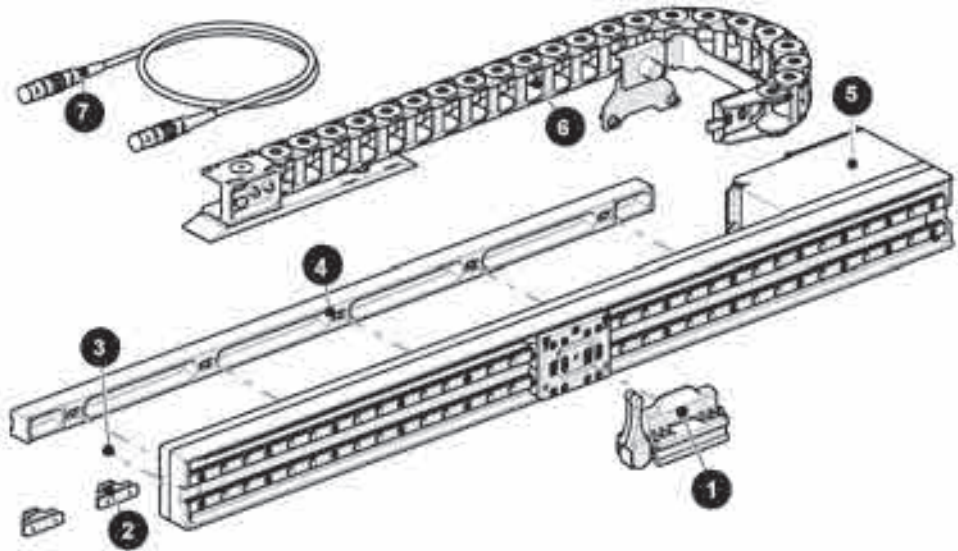


Figure A-5 Raster arm

Table 18 Raster arm module spare parts

ID	Part number	Description
1	Q8300561	Pivot nose (female)
2	Q8300562	Cable management clip
3	Q8300563	Screw M3 × 0.5 × 4 mm
4	—	Mounting rail (see “Mounting Rail” on page 228)
5	—	Base (see “Raster Arm Base” on page 229)
6	—	Cable tray (see “Cable Tray” on page 229)

Table 18 Raster arm module spare parts (continued)

ID	Part number	Description
7	Q8300566	Raster arm cable

Table 19 Raster arm complete kits

Part number	Description
Q7500046	SteerROVER 600 mm raster arm kit
Q7500047	SteerROVER 900 mm raster arm kit
Q7500048	SteerROVER 1160 mm raster arm kit
Q7500049	SteerROVER 300 mm raster arm kit

A.3.1 Mounting Rail

**Figure A-6 Raster arm mounting rail****Table 20 Mounting rail part numbers**

Length	Part number
600 mm (24 in.)	Q8301365
900 mm (35 in.)	Q8301364
1160 mm (46 in.)	Q8301402

A.3.2 Raster Arm Base



Figure A-7 Base for the raster arm

Table 21 Base for raster arm part numbers

Length	Part number
600 mm (24 in.)	Q8301396
900 mm (35 in.)	Q8301397
1160 mm (46 in.)	Q8301398

A.3.3 Cable Tray



Figure A-8 Raster arm cable tray lengths

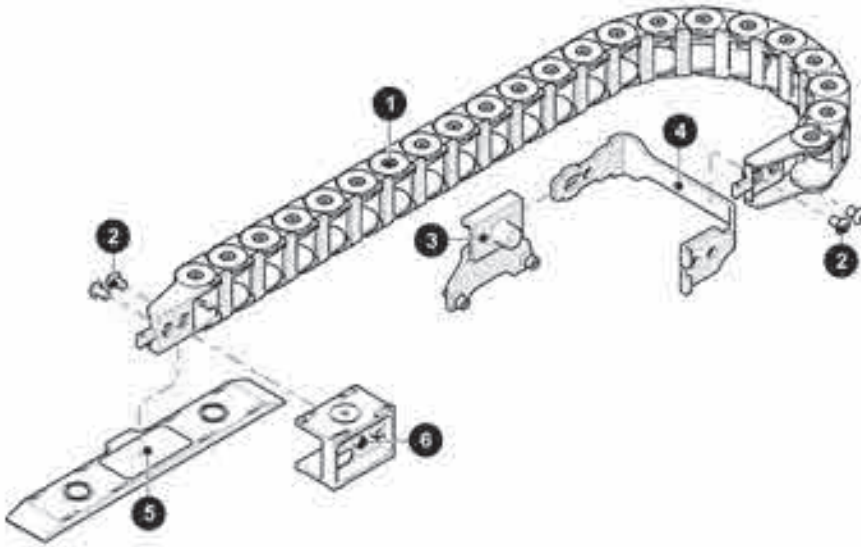
Table 22 Cable tray part numbers

Length	Part number
600 mm (24 in.)	Q8301367
900 mm (35 in.)	Q8301366

Table 22 Cable tray part numbers (continued)

Length	Part number
1160 mm (46 in.)	Q8301368

A.3.4 Cable Tray Parts

**Figure A-9 Cable tray parts****Table 23 Cable tray component part numbers**

ID	Part number	Description
1	—	Cable carrier (see “Cable Carrier” on page 231)
2	Q8301373	BHCS, M5 × 0.8 × 8 mm, SST
3	Q9000038	Carriage bracket
4	Q8301374	Cable tray bracket

Table 23 Cable tray component part numbers (continued)

ID	Part number	Description
5	Q8301375	Magnetic base
6	Q8301376	Magnetic end

A.3.5 Cable Carrier

**Figure A-10 Cable carriers****Table 24 Cable carrier part numbers**

Length	Part number
600 mm (24 in.)	Q8301370
900 mm (35 in.)	Q8301369
1160 mm (46 in.)	Q8301370

A.3.6 Heavy Duty Vertical Probe Holder Components

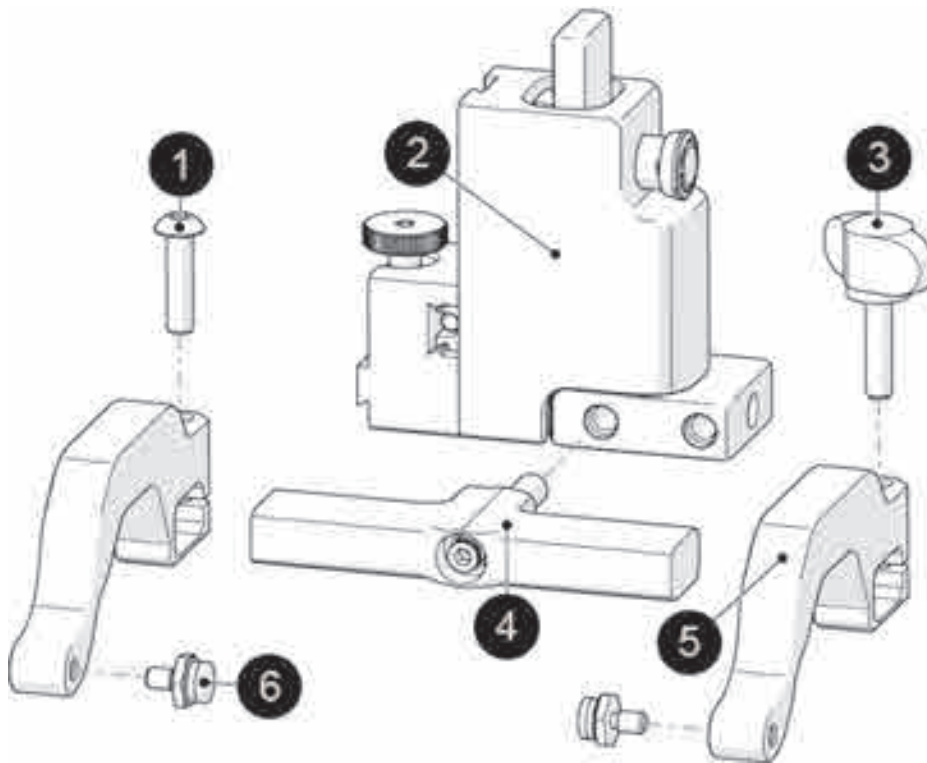


Figure A-11 Heavy duty vertical probe holder

NOTE

The part number of the wide yoke version of the heavy duty vertical probe holder assembly is Q7750123 and it is used to hold the HydroFORM full size cart.

Table 25 Heavy duty vertical probe holder spare parts and part numbers

ID	Part number	Description
1	Q8300592	Arm clamp screw, BHCS, M5 × 0.8 × 20 mm, SST
2	Q8300593	Heavy duty probe holder subassembly
3	Q8300594	Probe holder arm adjustment knob
4	Q8300596	Standard yoke style (S) 8.28 cm (3.259 in.)
	Q8300953	Wide yoke style (W) 12.17 cm (4.791 in.)
5	Q8300595	Probe holder arm
6	U8775198	Pivot button style for Olympus PA wedge

A.4 Pivoting Probe Holder Rack Components

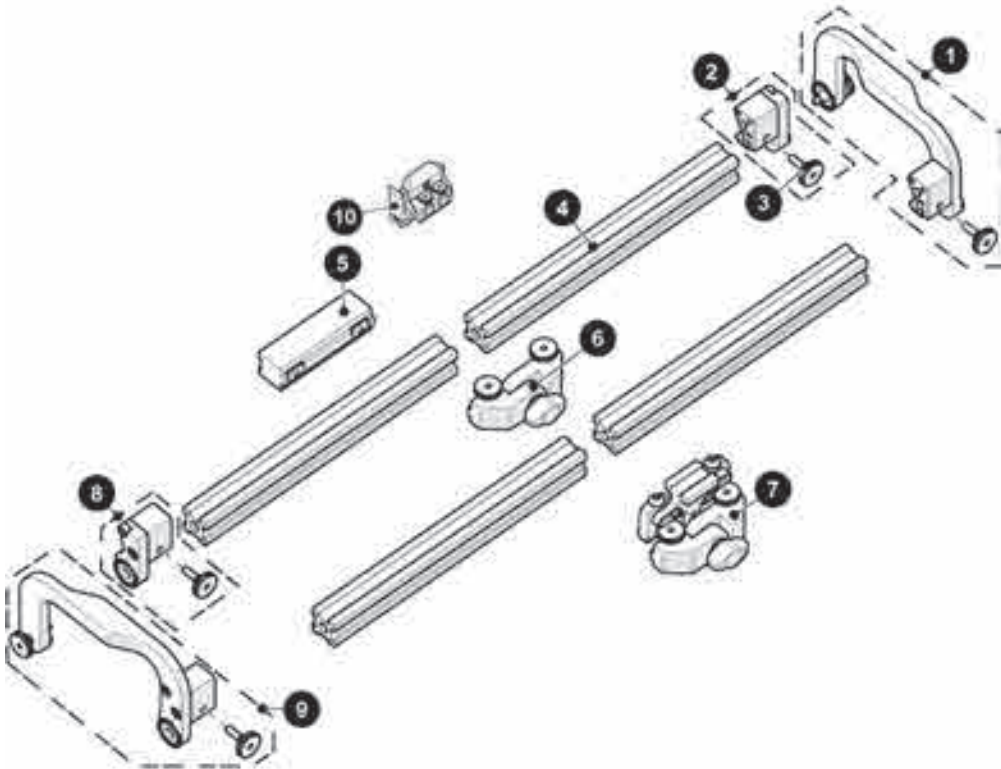


Figure A-12 Pivoting probe holder rack spare parts

Table 26 Pivoting probe holder rack spare parts and part numbers

ID	Part number	Description
1	Q8300573	Vertical probe holder side arm, left
2	Q8300858	Arm mount block, left
3	Q8300574	Knob, M4 × 0.7 × 11.5 mm

Table 26 Pivoting probe holder rack spare parts and part numbers (continued)

ID	Part number	Description
4		Frame bar (see "Frame Bar" on page 235)
5	Q8301377	Probe holder mount
6	Q8301378	Frame bar pivot
7	Q8301379	Laser guide pivot mount
8	Q8300859	Arm mount block, right
9	Q8300567	Vertical probe holder side arm, right
10	Q8301363	Male pivot to mount a probe holder bar with two (2) probes only IMPORTANT NOTE: This pivot is not strong enough to support the weight of the probe holder rack with four (4) probes.

A.4.1 Frame Bar

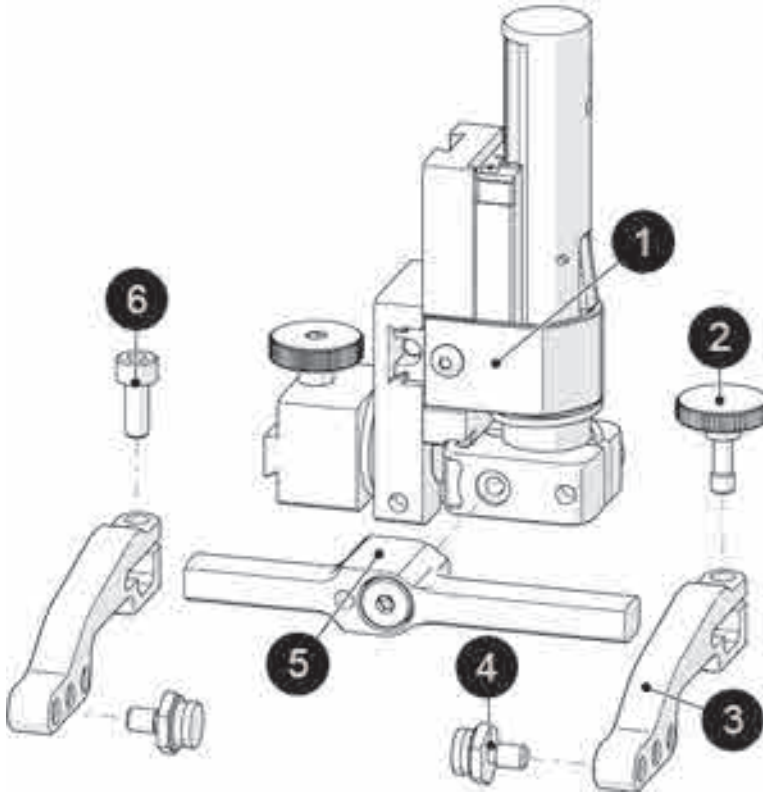
**Figure A-13 Frame bar spare parts****Table 27 Frame bar spare parts and part numbers**

Length	Part number
20 cm (7.87 in.)	Q8301399
35 cm (13.78 in.)	Q8300575

Table 27 Frame bar spare parts and part numbers (continued)

Length	Part number
45 cm (17.72 in.)	U8830732
55 cm (21.65 in.)	U8775161

A.4.2 Vertical Probe Holder Components for Weld Inspection

**Figure A-14 Vertical probe holder**

NOTE

The part number of the vertical probe holder assembly for phased array probe with standard yoke is Q7750121. The part number of the vertical probe holder assembly for the TOFD probe with standard yoke is Q7750126. These probe holders are meant to be used with the pivoting probe holder rack, and they are included with SteerROVER weld packages (see Table 4 on page 38).

Table 28 Vertical probe holder spare parts and part numbers

ID	Part number	Description
1	Q8300576	Vertical probe holder subassembly
2	Q7750010	Knurled knob, M4 × 0.7 × 10 mm, 3 mm stand off, SST
3	Q8300577	Standard arm (A)
	Q7750009	Short arm (B)
	Q8300578	Long arm (C)
4	U8775198	Pivot button (01), hole size 8 mm (0.315 in.) for Olympus PA wedge
	U8775199	Pivot button (02), hole size 5 mm (0.197 in.) for Olympus TOFD wedge
5	Q8300579	Standard yoke (S) 6.27 cm (2.470 in.)
	Q8300580	Wide yoke (W) 7.78 cm (3.064 in.)
6	Q8300568	Arm clamp screw, SHCS, M4 × 0.7 × 10 mm, SST

A.5 Optional Accessories

A.5.1 Pivoting HydroFORM Probe Holder Components

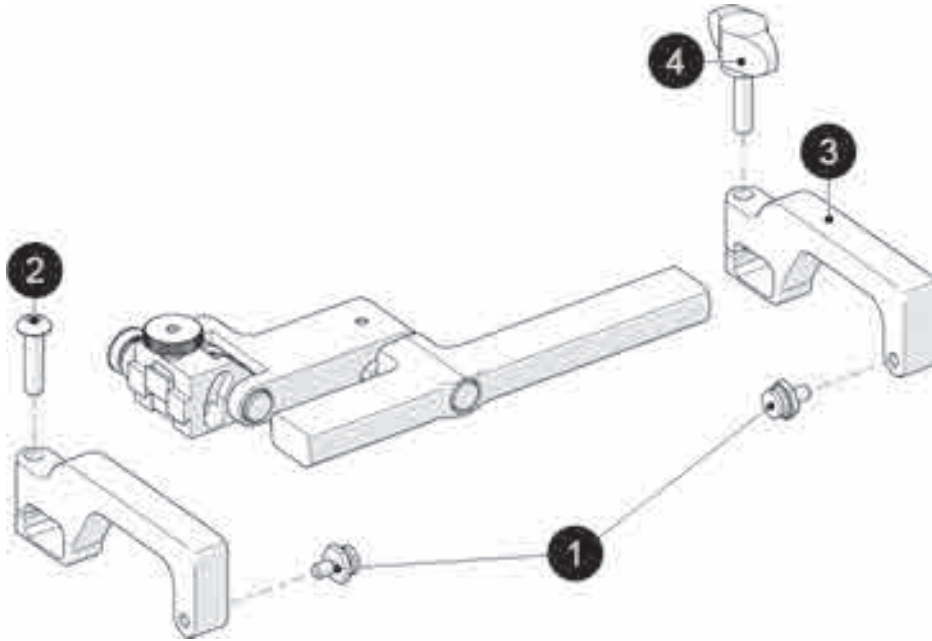


Figure A-15 Pivoting HydroFORM probe holder (P/N: U8775328)

Table 29 HydroFORM probe holder spare parts and part numbers

ID	Part number	Description
1	U8775198	Pivot button style for Olympus PA wedge
2	Q8300592	Arm clamp screw, BHCS, M5 × 0.8 × 20 mm, SST
3	Q8300597	HydroFORM probe holder arm
4	Q8300594	Probe holder arm adjustment knob

A.5.2 Dual Conventional UT Probe Holder Components

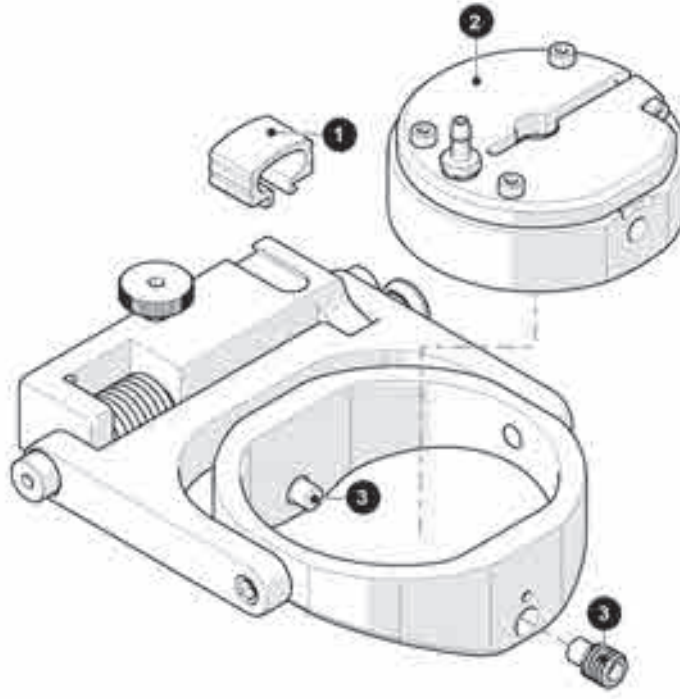


Figure A-16 Dual conventional UT probe holder (P/N: Q7750070)

NOTE

This probe holder (P/N: Q7750070) is compatible with Olympus D790 probes.

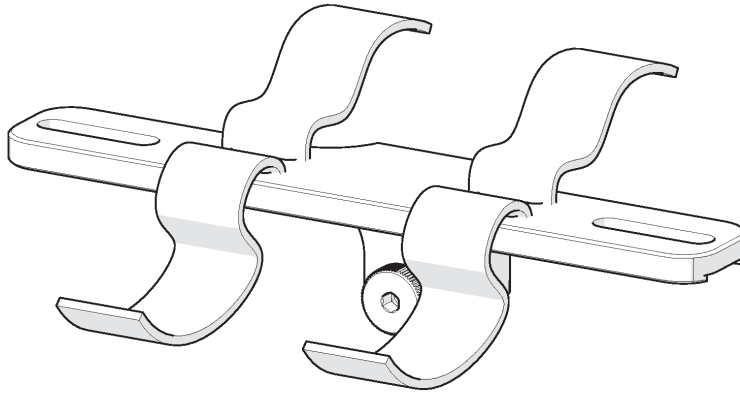
Table 30 Dual conventional UT probe holder spare part numbers

ID	Part number	Description
1	Q8300601	Cable clip
2	Q8300598	Probe holder receptacle and wear plate

Table 30 Dual conventional UT probe holder spare part numbers (continued)

ID	Part number	Description
3	Q8300599	Screw, SHSS, M8 × 1.25 × 12 mm, dog point, SST

A.5.3 Pre-Amp Bracket

**Figure A-17 Pre-amp bracket (P/N: Q7201260)**

A.5.4 Backpack Components

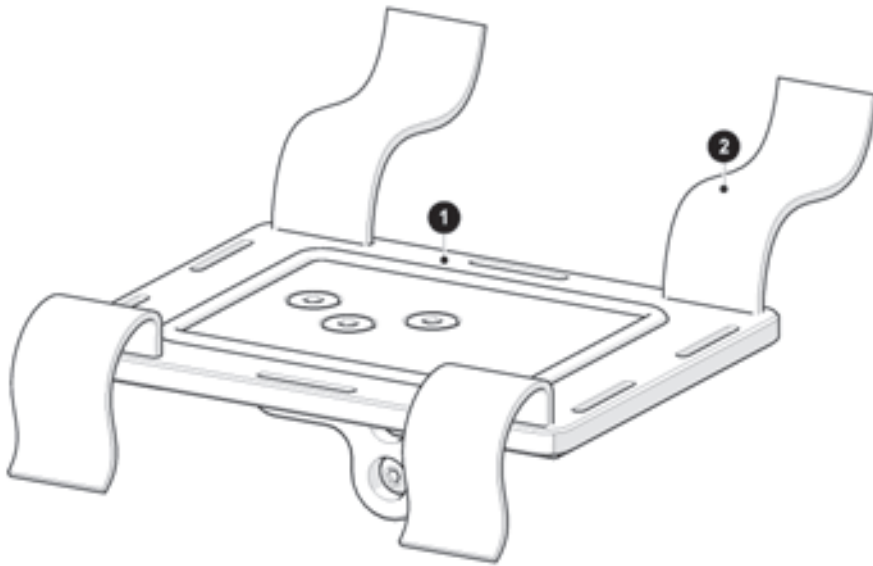


Figure A-18 Backpack spare parts

Table 31 Backpack part numbers

ID	Part number	Description
1	Q7201261	Backpack with Velcro
2	Q8301383	Velcro strap

A.5.5 Battery-Powered Laser Guide Components

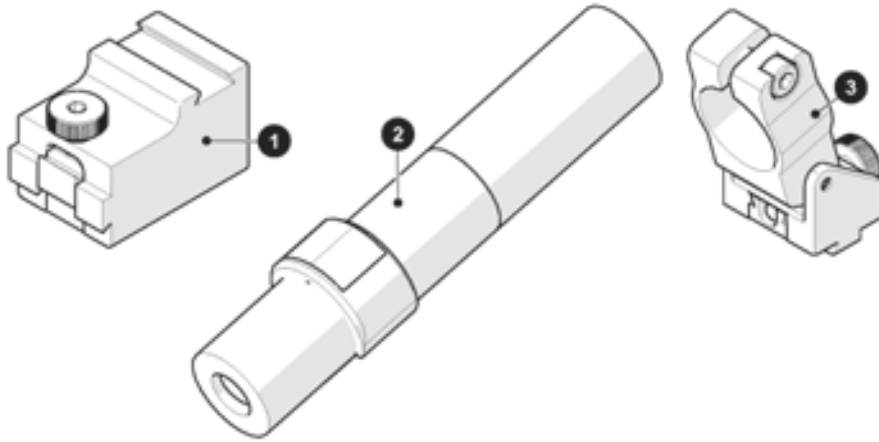


Figure A-19 Laser guide spare parts (or complete kit [PN: Q7750081])

Table 32 Battery-powered laser guide part numbers

ID	Part number	Description
1	Q8301387	Perpendicular dovetail mount
2	Q8301388	Line laser, battery powered, Class 1
3	Q8301389	Pivoting laser clamp
1-3	Q7750081	Complete laser guide kit

A.6 Cases

A.6.1 Scanner and Accessory Cases

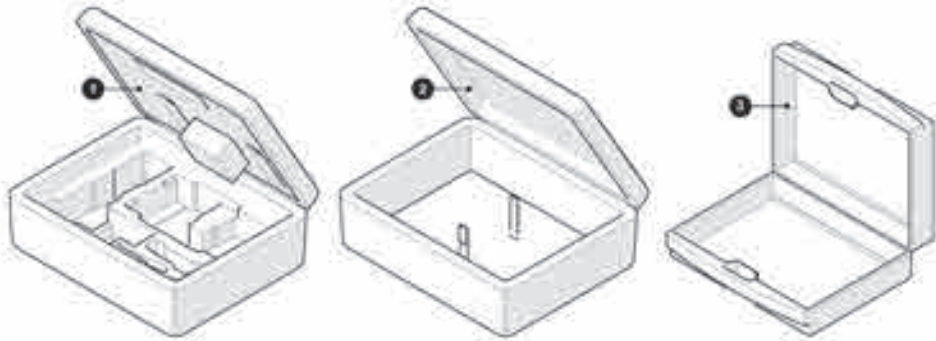


Figure A-20 SteerROVER case options

Table 33 Carrying case part numbers

ID	Part number	Description
1	Q8301384	SteerROVER scanner case
2	Q8301385	Scanner accessories case
3	Q8301386	Umbilical case

A.6.2 Raster Arm Cases

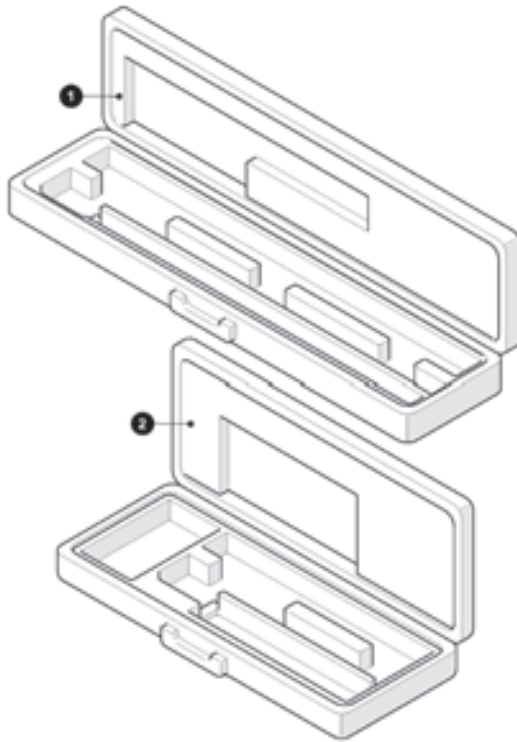


Figure A-21 Raster arm case options

Table 34 Raster arm case part numbers

ID	Part number	Description
1	Q8301371	900 mm raster arm case
2	Q8301372	600 mm raster arm case

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