MapROVER and MapROVER HT Scanners

User's Manual

DMTA-20081-01EN — Rev. E
February 2024

This instruction manual contains essential information on how to use this Evident 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.

EVIDENT CANADA, INC., 3415, Rue Pierre-Ardouin, Québec (QC) G1P 0B3 Canada

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.

Part number: DMTA-20081-01EN
Rev. E
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Table of Contents

List of Abbreviations

EFUP	environment-friendly use period
HT	high temperature

Important Information — Please Read Before Use

Intended Use

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

WARNING

Do not use the MapROVER 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 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 illustrated in this manual may differ from the components installed on your device. However, the operating principles remain the same.

Device Compatibility

Only use this device with the approved ancillary equipment provided by Evident. Equipment provided by Evident and approved for use with this device is described later in this manual.

CAUTION

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

Repair and Modification

This device does not contain any user-serviceable parts. Opening the device might void the warranty.

CAUTION

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

Safety Symbols

The following safety symbols might appear on the device 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.

 High voltage warning symbol

This symbol is used to alert the user to potential electric shock hazards greater than 1000 volts. All safety messages that follow this symbol shall be obeyed to avoid possible harm.

Safety Signal Words

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

 **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 device:

IMPORTANT

The IMPORTANT signal word calls attention to a note that provides important information, or information 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 device, verify that the correct safety precautions have been taken (see the following warnings). In addition, note the external markings on the device, which are described under “Safety Symbols.”

Warnings

WARNING

General Warnings

- Carefully read the instructions contained in this instruction manual prior to turning on the device.
- 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 device 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 device.
- Service instructions, when applicable, are for trained service personnel. To avoid the risk of electric shock, do not perform any work on the device unless qualified to do so. For any problem or question regarding this device, contact Evident or an authorized Evident 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 Warning

The device must only be connected to a power source corresponding to the type indicated on the rating label.

CAUTION

If a non-approved power supply cord not dedicated to Evident products is used, Evident will not be able to ensure the electrical safety of the equipment.

Battery Precautions

CAUTION

- Before disposing of a battery, check your local laws, rules, and regulations, and follow them accordingly.

- Transportation of lithium-ion batteries is regulated by the United Nations under the United Nations Recommendations on the Transport of Dangerous Goods. It is expected that governments, intergovernmental organizations, and other international organizations shall conform to the principles laid down in these regulations, thus contributing to worldwide harmonization in this field. These international organizations include the International Civil Aviation organization (ICAO), the International Air Transport Association (IATA), the International Maritime Organization (IMO), the US Department of Transportation (USDOT), Transport Canada (TC), and others. Please contact the transporter and confirm current regulations before transportation of lithium-ion batteries.
- For California (USA) only:

  The device may contain a CR battery. The CR battery contains perchlorate material, and special handling may be required. Refer to http://www.dtsc.ca.gov/hazardouswaste/perchlorate.
- Do not open, crush, or perforate batteries; doing so could cause injury.
- Do not incinerate batteries. Keep batteries away from fire and other sources of extreme heat. Exposing batteries to extreme heat (over 80°C) could result in an explosion or personal injury.
- Do not drop, hit, or otherwise abuse a battery, as doing so could expose the cell contents, which are corrosive and explosive.
- Do not short-circuit the battery terminals. A short circuit could cause injury and severe damage to a battery making it unusable.
- Do not expose a battery to moisture or rain; doing so could cause an electric shock.
- Only use an external charger approved by Evident to charge the batteries.
- Only use batteries supplied by Evident.
- Do not store batteries that have less than 40% remaining charge. Recharge batteries to between 40% and 80% capacity before storing them.
- During storage, keep the battery charge between 40% and 80%.
- Do not leave batteries in the MapROVER unit during device storage.

Regulations for Shipping Products with Lithium-Ion Batteries

IMPORTANT

When shipping a Li-ion battery or batteries, be sure to follow all local transportation regulations.

WARNING

Damaged batteries cannot be shipped through normal routes — DO NOT ship damaged batteries to Evident. Contact your local Evident representative or material disposal professionals.

Equipment Disposal

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

BC (Battery Charger - California, USA Community)

The BC marking indicates that this product has been tested and complies with the Appliance Efficiency Regulations as stated in the California Code of Regulations Title 20, Sections 1601 through 1608 for Battery Charger Systems. The internal battery charger within this device has been tested and certified pursuant to the California Energy Commission's (CEC) requirements; this device is listed on the online CEC's (T20) database.

CE (European Conformity)

This device complies with the requirements of directive 2014/30/EU concerning electromagnetic compatibility, directive 2014/35/EU concerning low voltage, and directive 2015/863 which amends 2011/65/EU concerning restriction of hazardous substances (RoHS). The CE marking is a declaration that this product conforms to all the applicable directives of the European Community.

UKCA (United Kingdom)

This device complies with the requirements of the Electromagnetic Compatibility Regulations 2016, the Electrical Equipment (Safety) Regulations 2016, and the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012. The UKCA marking indicates compliance with the above regulations.

RCM (Australia)

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.

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 Evident 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 MapROVER 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.

电器电子产品有害物质限制使用标志

本标志是根据“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器电子产品上的电器电子产品有害物质使用限制标志。

（注意）电器电子产品有害物质限制使用标志内的数字为在正常的使用条件下有害物质等不泄漏的期限，不是保证产品功能性能的期间。

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	×	○	○	○	○	○

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)
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)

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 the home. This device complies with the EMC requirements of Korea.

The MSIP code for the device is the following:

MSIP-REM-OYN-MAPROVER

R-R-OYN-MAPROVER.

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 MapROVER 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

NOTE

This product 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 product is operated in a commercial environment. This product 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 product 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.

IMPORTANT

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

FCC Supplier's Declaration of Conformity

Hereby declares that the product,

Product name: MapROVER
Model: MapROVER

Conforms to the following specifications:

FCC Part 15, Subpart B, Section 15.107 and Section 15.109.

Supplementary information:

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.

Responsible party name:

Evident Scientific, Inc.

Address:

48 Woerd Avenue, Waltham, MA 02453, USA

Phone number:

+1 781-419-3900

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

Evident guarantees your Evident product to be free from defects in materials and workmanship for a specific period, and in accordance with conditions specified in the *Evident Terms and Conditions* available at https://evidentscientific.com/evident-terms/.

The Evident 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 Evident for assistance with the damage claim and equipment replacement, if necessary.

This instruction manual explains the proper operation of your Evident 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, Evident 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.

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

Technical Support

Evident 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 on the Evident Scientific Web site https://www.evidentscientific.com/service-and-support/service-centers/

Introduction

MapROVER Intended Use

The MapROVER scanner 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.

NOTE

Sections in this manual identified with "HT" pertain to the high-temperature version of the MapROVER scanner. Unless stated otherwise, content without HT applies to both the standard and the HT versions of the scanner.

The intended ferrous surface has the following characteristics:

- Bare metal for upside-down surfaces.

OR

- Coated to a thickness no greater than:
  - 0.5 mm (.020 in.) for vertical surfaces.
  - 1 mm (.040 in.) for horizontal surfaces on which the crawler is right-side up.
- Clean and free of excess rust, scale, ferrous debris, ice, and frost.

The intended ferrous part has the following characteristics:

- A minimum thickness of 3 mm (0.120 in.).
- A minimum ID of 686 mm (27 in.) for internal circumferential driving.

- A minimum OD of 64 mm (2.5 in.) for external circumferential driving.
- A minimum OD of 762 mm (30 in.) for longitudinal driving.

For the MapROVER HT, the intended ferrous surface has the following characteristics:

- A minimum OD of 102 mm (4 in.) for external circumferential driving.
- MapROVER HT: a maximum surface temperature of 350°C (662°F).

The MapROVER is intended to be operated:

- By trained personnel (see “Intended User” on page 27).
- In an appropriate environment (see “Operating Environment” on page 212).
- With a proper tethering system (see “Tether Requirements and Attachment” on page 35).

Unintended Use


DANGER


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

The MapROVER is NOT intended for the following use:

- Unattended operation.
- Operation on surfaces that are not clean (ex.: excess rust, scale, ferrous debris, ice, and frost).
- Lifting/lowering objects or people (i.e., using the crawler as a crane/elevator).
- Driving over obstacles/obstructions (excluding standard weld caps).
- Operating in ambient temperatures below −20°C (−4°F) or above 50°C (122°F).

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

- Operation without a properly cordoned off no entry fall zone and/or proper tether system.
- Operation upside-down.

- Operation while oriented such that the umbilical strain relief points upwards (front of the MapROVER scanner is lower than the umbilical connection).

Intended User

The MapROVER scanner is intended to be used by operators who have read and understood this user's manual. For operating at a height greater than 2 m (6 ft), the MapROVER 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 principles to the scanner.
- A person who is trained to operate the scanner.

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

Cooler Intended Use

The cooler provides a flow of cooled coolant for use in actively cooling NDT equipment such as MapROVER HT crawler, HT raster arm, HT wedge and probe cooling systems equipped with cooling passages.

Operating Environment

The cooler is for use in industrial environments having ambient temperatures between −20° C (−4° F) and 40° C (104° F).

User

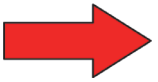
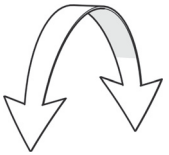
The cooler is intended to be used by persons who have read and understood this user's manual.

Cooler Unintended Use

The cooler is not intended for the following use:

- Outside of the intended use (see “Cooler Intended Use” on page 27).
- At locations where there is an explosion or fire hazard.
- As an open-loop pumping system, such as a couplant pump.

Definition of Symbols

	Instructions to “look here” or to “see this part.”
	Denotes movement. Instructs you to carry out action in a specified direction.
	Indicates alignment axis.
	Alerts you that the view has changed to a reverse angle.

Included Tools

The included 3 mm hex driver is suitable for typical MapROVER scanner and probe holder adjustments (see Figure i-1 on page 29).

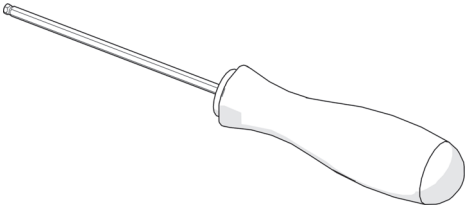


Figure i-1 3 mm hex driver

Also included in this kit is a 0.375 in. wrench, which is used to remove and install probe holder buttons (see Figure i-2 on page 29).

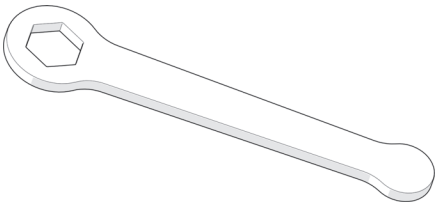


Figure i-2 0.375 in. wrench

The included 3 mm flat driver is useful for releasing the flaps of the raster arm cable tray (see Figure i-3 on page 29).

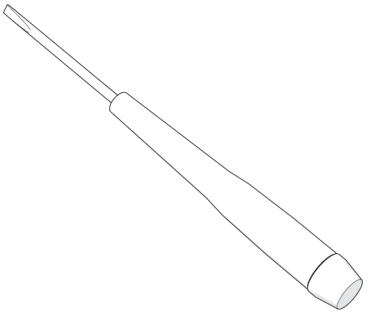


Figure i-3 3 mm flat driver

Optional Tools

Some specialized adjustments require tools that are not included with this kit (see Figure i-4 on page 30):

- 1.5 mm hex wrench
- 2 mm hex wrench
- 2.5 mm hex wrench
- 3 mm hex wrench
- Flat screwdriver
- 15 mm wrench
- 16 mm wrench

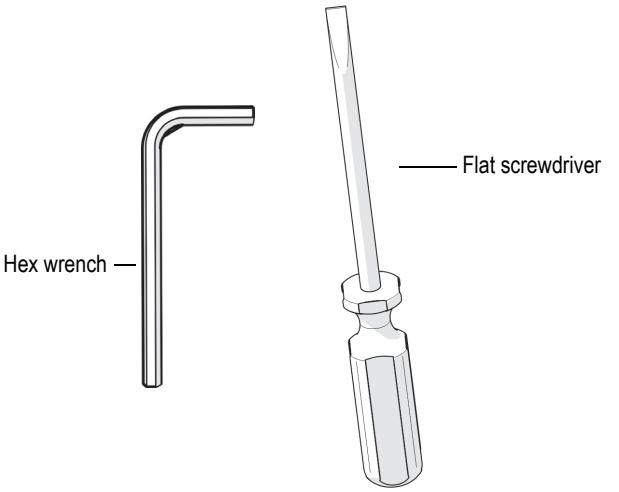


Figure i-4 Optional tools

Cleaning

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

Before using the scanner, ensure that all connectors are free of water and moisture.

NOTE

All components with wiring, cables, or electrical connections are splash proof. However, these components are NOT submersible.

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

1. Preparation for Use

Perform the following preparation tasks outlined in this section before using the MapROVER scanner.

1.1 Transportation

Because the wheels of the scanner are magnetic, you need to pay particular attention when you are carrying it near magnetic metal structures or objects.

CAUTION

PINCH / CRUSH HAZARD. BE CAREFUL when passing the MapROVER crawler through narrow ferrous (magnetic) openings, such as maintenance access 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

DANGER

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

The area below a crawler must be kept clear at all times. A clearly marked NO ENTRY FALL ZONE must be cordoned off directly below the area of crawler operation, according to the dimensions shown in Figure 1-1 on page 34.

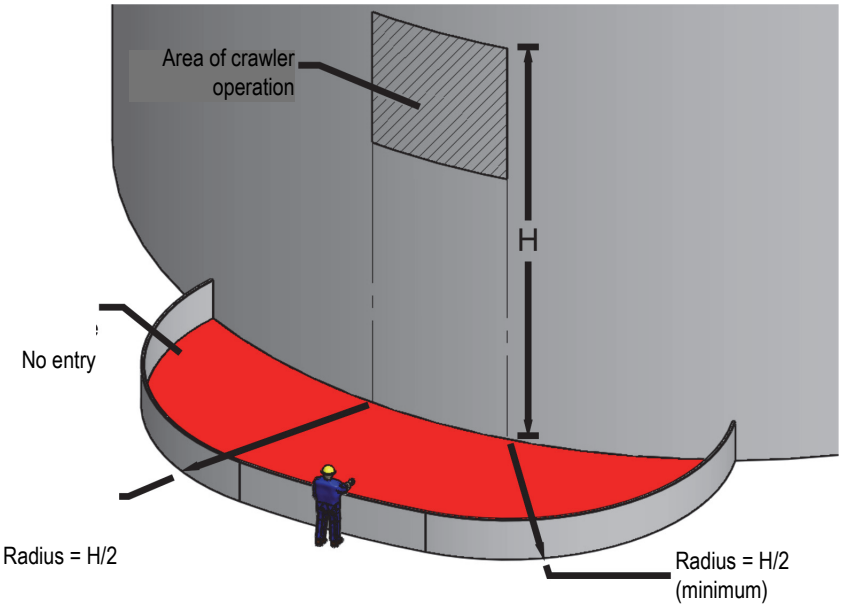


Figure 1-1 No entry fall zone

Example: If you are using the MapROVER scanner to inspect a tank that is 6 m (20 ft) tall, the No Entry Fall Zone radius must be no smaller than 3 m (10 ft) from the area below the crawler operation.

1.3 Tether Requirements and Attachment

DANGER

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 the MapROVER scanner 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 crawler on the surface to be inspected (ex.: tank). IMPORTANT: The tether hook must have a safety latch to prevent accidental disconnection.

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

- Be capable of safely suspending the scanner from above in case it detaches from the inspection surface.
- Have sufficient capacity to catch and hold a 70 kg (150 lb) load.
- Include a mechanism (i.e., self retracting inertia reel fall arrester) or person to continuously take up slack in the tether as the scanner 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 scanner 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 crawler to minimize dangerous swinging of the crawler 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.

To secure the lifting sling to the MapROVER crawler

1. Wrap the supplied lifting sling around the handle of the MapROVER crawler using a choker hold knot (see Figure 1-2 on page 37 and Figure 1-3 on page 37).

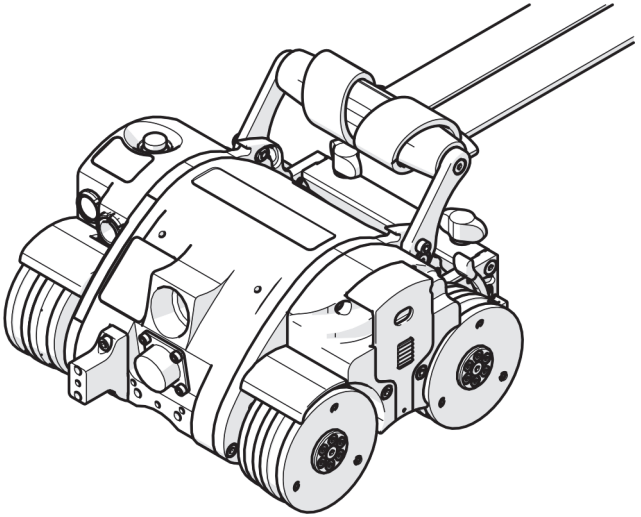


Figure 1-2 Attach the lifting sling with a choker hold knot

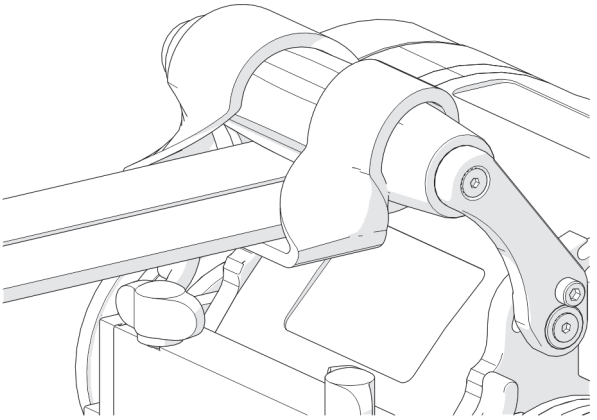


Figure 1-3 Attach the lifting sling with a choker hold knot (closeup view)

2. Ensure that the lifting sling is correctly attached to the MapROVER crawler, and inspect the lifting sling for any damage prior to use.

1.4 Preparation of the Inspection Surface

DANGER

FALLING OBJECT HAZARD The inspection surface must meet the conditions outlined in section “Intended Use” on page 11.

CAUTION

Do NOT operate the crawler on surfaces where ice or frost may be present.

To prepare the inspection surface

1. Remove build-up of scale and other debris (ex.: dirt, ice) from the surface on which the crawler is to drive.

   Excessive buildup will cause the wheels to lose magnetic attraction, which may lead to wheel slippage or crawler detachment.
2. Ensure that no obstructions (other than standard butt welds) or voids are in the crawler’s path.

   Obstructions and voids could cause the crawler to fall if they are driven into or over.
3. Ensure that there are no patches of nonferrous material in the path of the crawler.

   If the crawler drives over a nonferrous patch, it will lose magnetic attraction and this will cause the crawler to fall.

1.5 Scanner Component Identification

The MapROVER system may contain the components shown in Figure 1-4 on page 40 and Figure 1-5 on page 41. The MapROVER HT system contains the components shown in Figure 1-6 on page 42.

NOTE

For more details, see “Setup” on page 47.

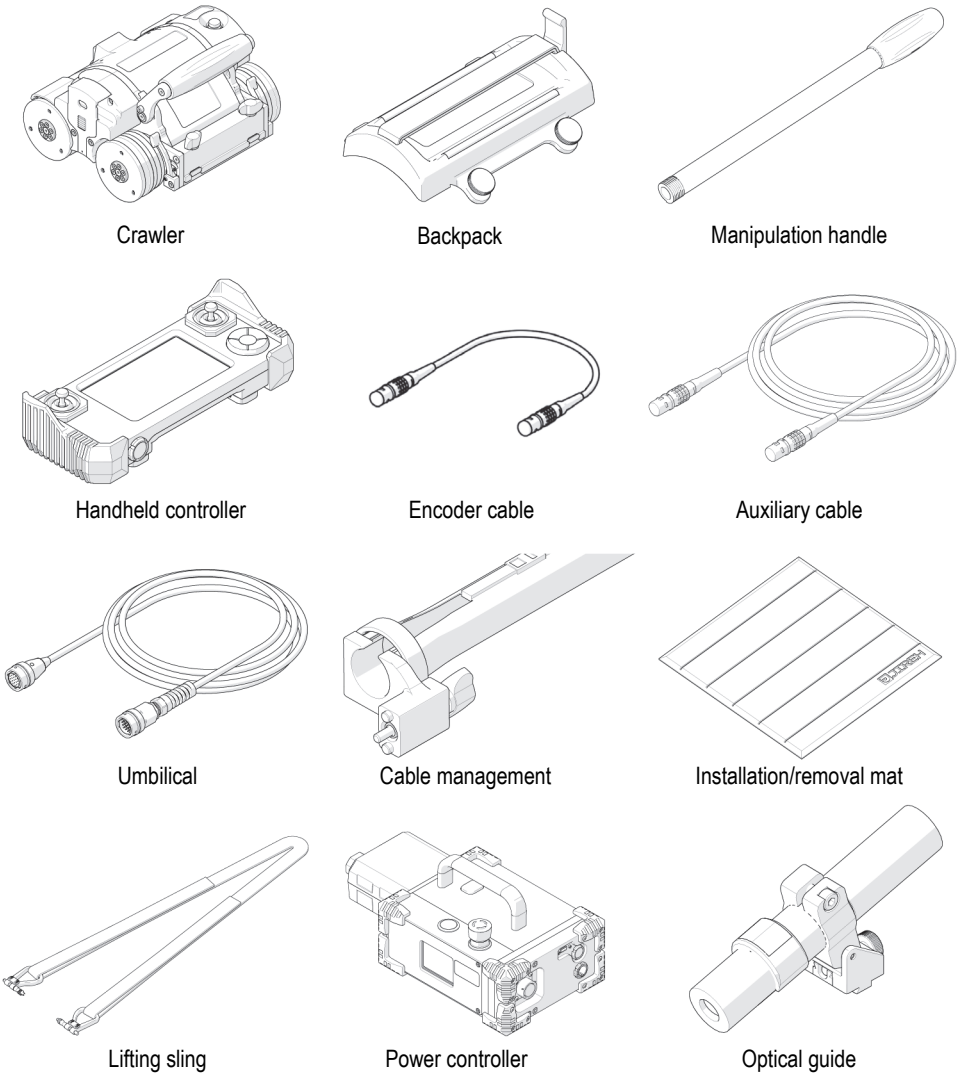
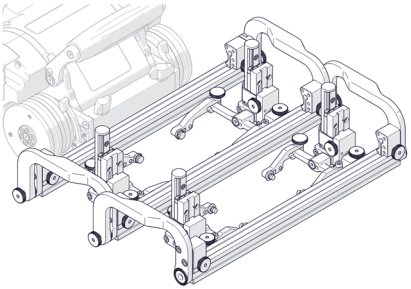
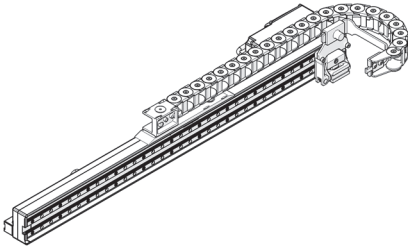


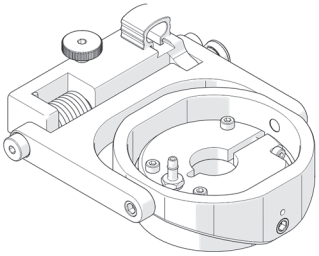
Figure 1-4 Scanner components



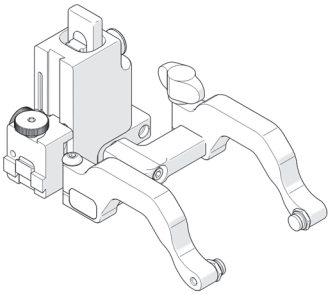
Weld inspection probe holder kit (optional)



Raster arm (600 mm)



Corrosion thickness probe holder (optional)



Heavy duty probe holder

Figure 1-5 Scanner components (continued)

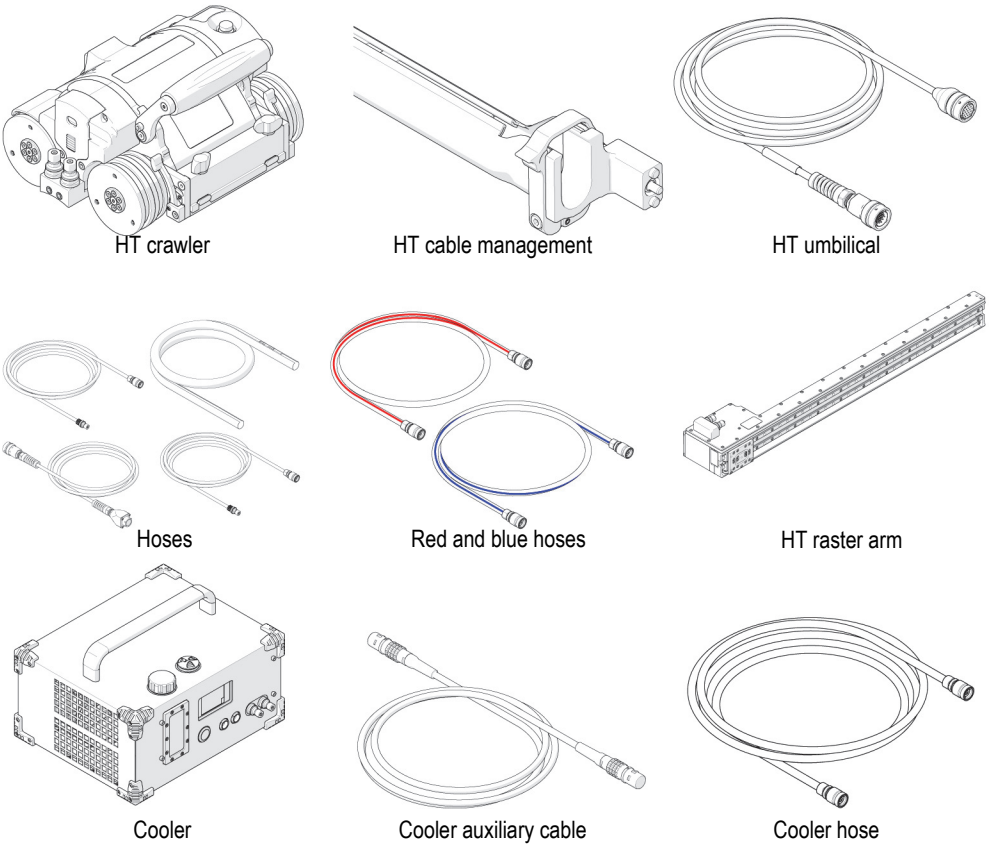
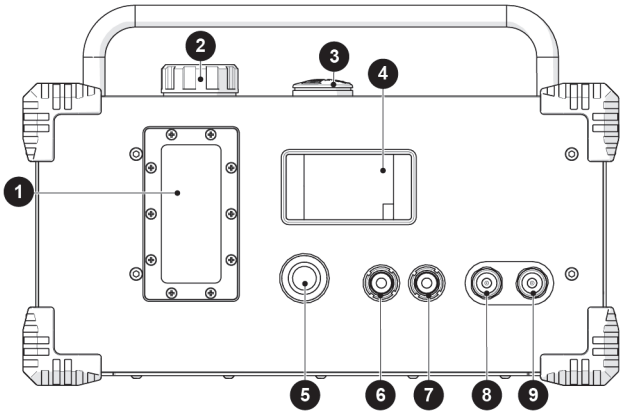


Figure 1-6 MapROVER HT components

1.6 Cooler Identification and Preparation



ID	Description
1	Reservoir window
2	Fill cap
3	Indicator
4	LCD screen
5	Mode button
6	AUX connection
7	AUX connection
8	OUT port
9	IN port

Figure 1-7 Cooler identification

NOTE

The Cooler is to be operated with the handle oriented upwards at all times.

NOTE

Ensure that the Cooler has adequate, unobstructed airflow on all sides during operation.

NOTE

Do not operate the Cooler in ambient temperatures above 40° C (104° F). Operation in low ambient temperatures will yield the best cooling results.

The cooler's pump will not exceed 30 psi.

1.6.1 Reservoir Window

The reservoir window enables you to observe the coolant level.

1.6.2 Fill Cap

Unscrew the fill cap to add additional coolant when instructed via the LCD screen. Use only the recommended coolant (see "Cooler Specifications (HT)" on page 211). Refer to the MSDS sheet for coolant handling instructions.

1.6.3 Cooler Indicator Light

Table 1 Indicator light statuses

	Solid red	Standby mode	System power is connected. An alert will chime every 60 seconds to inform the user that coolant is not flowing.
	Blinking green	Initializing cooler	Pump is running and purging air from the system. This process may take up to 150 seconds, depending on umbilical length.
	Solid green	Normal operation	The pump is operating normally.
	Blinking yellow	Shutdown confirmation	Press the MODE button once during cooling operation to enter Cooler shutdown confirmation. Press the MODE button again to turn off the Cooler. If MODE button is not pressed a second time, the indicator will return to slid green after 5 seconds.

Table 1 Indicator light statuses *(continued)*

	Blinking red	Warning	An auditory alarm is emitted and the warning condition is displayed on the LCD screen.

1.6.4 LCD Screen

The LCD screen displays all the information and warnings related to the cooling system.

1.6.5 Mode Button

The MODE button offers control of the cooling system.

- When the system is in standby, press the MODE button once to activate the cooling system.
- Pressing the MODE button during operation will enter the shutdown confirmation mode. Press the MODE button again (within 5 seconds) to cease Cooler operation.
- Press and hold the MODE button to display detailed Cooler information on the LCD screen.

1.6.6 Auxiliary Connection

Plug in the power supply to either auxiliary connection. Additional accessories may be connected to the additional auxiliary connection.

1.6.7 IN Port

The IN port is a quick connect for the red hose, which contains fluid to be cooled.

1.6.8 OUT Port

The OUT port is a quick connect for the blue hose, which contains cooled fluid.

2. Setup

2.1 Handheld Controller

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.

WARNING

MAGNETIC MATERIAL. The handheld controller produces a strong magnetic field, which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices or other electronics.
People with pacemakers or ICDs must stay at least 10 cm (4 in.) away.

The handheld controller is used to manipulate a scanner installed on an inspection surface (see Figure 2-1 on page 48).

User settings and scan information are edited using the handheld controller. The handheld controller is connected to the power controller with the controller cable (see Figure 1-4 on page 40).

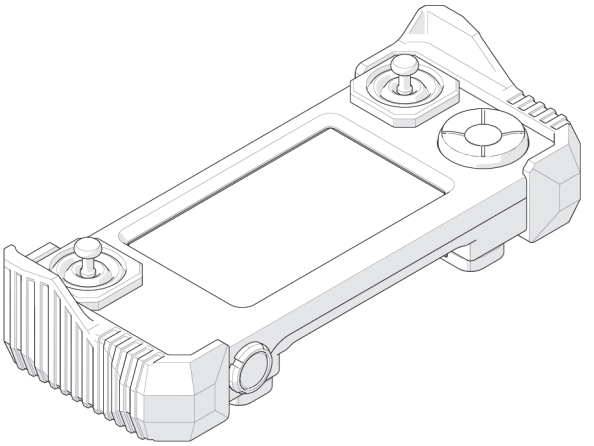


Figure 2-1 Handheld controller

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 has a resistive touch screen; 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 D-pad (see “D-pad” on page 156).

2.1.1 Magnetic Mounts

Magnetic mounts on the rear of the handheld controller assist in preventing the handheld controller from falling (see Figure 2-2 on page 49).

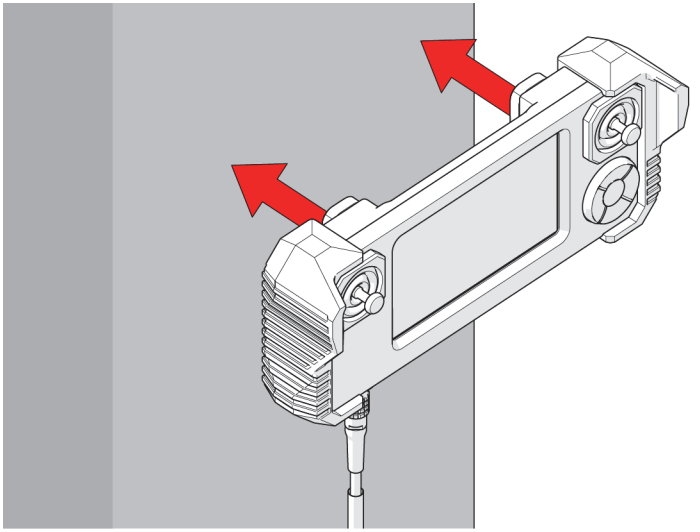


Figure 2-2 Mount to ferrous surfaces

2.2 Crawler

The crawler includes the motor encoder, umbilical connections, and accessory mounting point (see Figure 2-3 on page 49).

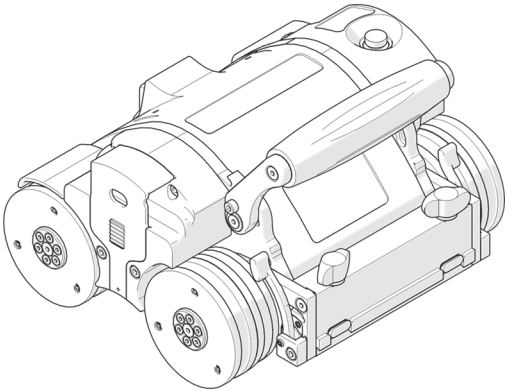


Figure 2-3 Crawler

WARNING

MAGNETIC MATERIAL. The wheels of the crawler 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.

2.2.1 Emergency Off Button

The red button on the top left of the crawler provides an emergency off button to the entire system (see Figure 2-5 on page 50). When pressed, all power to the MapROVER system will disengage.

Figure 2-4 Emergency off

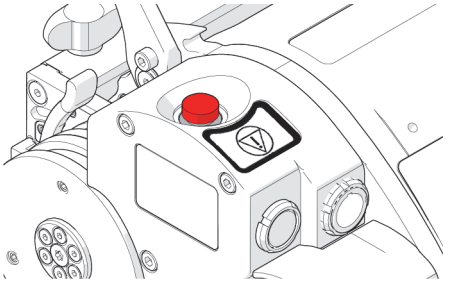


Figure 2-5 Emergency off button

NOTE

Shutting down the system power may cause the crawler to freewheel down when operating in a vertical orientation.

To restore system power, it is necessary to press the power button located on the power controller (see “Encoder Cable” on page 93).

2.2.2 Swivel Mount

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

To install an accessory on the swivel mount

1. Rotate the two black wing knobs to loosen the dovetail jaws (see Figure 2-6 on page 51).
2. Slide the accessory’s frame bar along the dovetail jaws.
3. Rotate the two black wing knobs to clamp the frame system/raster arm in place.

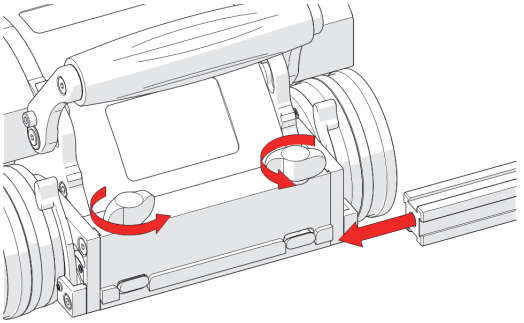


Figure 2-6 Frame bar installation

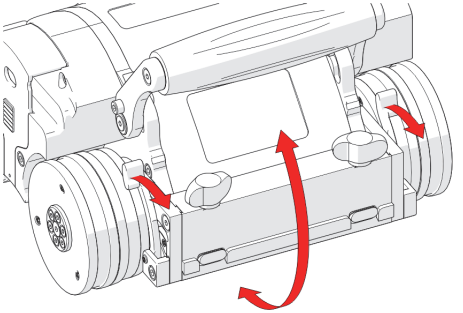


Figure 2-7 Swivel mount angle

4. Alternatively, accessories can also be mounted directly to the swivel mount. Rotate the black wing knobs, aligning the dovetail jaws with the mount's grooves (see Figure 2-8 on page 52).

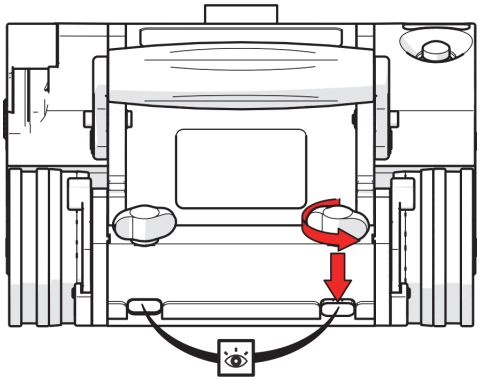


Figure 2-8 Align dovetail jaws

5. Press the frame bar or accessory to the swivel mount (see Figure 2-9 on page 53) and tighten the black wing knobs.

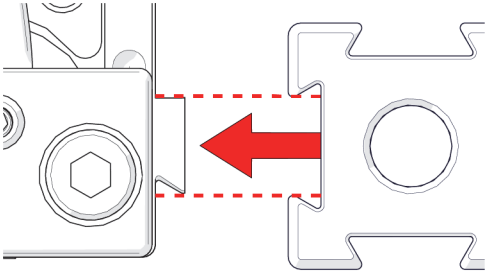


Figure 2-9 Mount frame bar

The front mount utilizes two levers to lock the front mount at the desired angle (see Figure 2-7 on page 52).

TIP

An alternate mounting procedure is possible (see “Swivel Mount” on page 51 for additional details).

The etched line near the base of the swivel mount can be used to align the front swivel mount in a horizontal position (see Figure 2-10 on page 53).

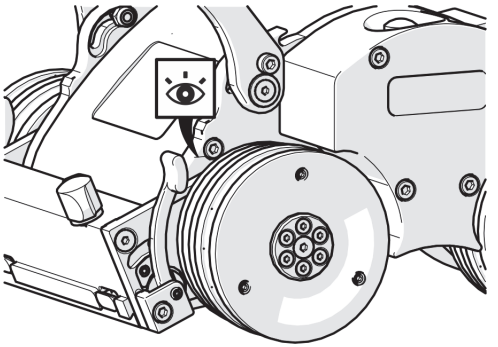


Figure 2-10 Return mount to horizontal position

NOTE

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

2.2.3 Umbilical

To mount the umbilical to the crawler

1. Align the pins of the umbilical to the connector at the rear of the MapROVER (see Figure 2-11 on page 54).

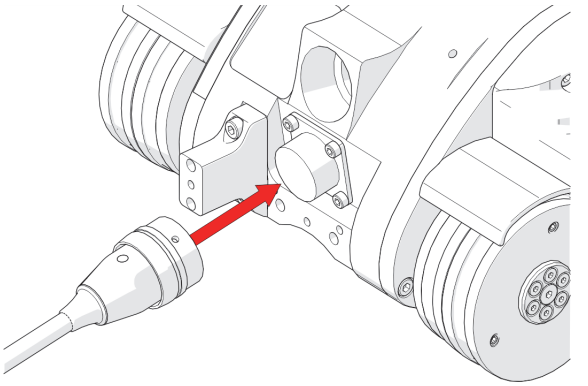


Figure 2-11 Connect to umbilical

2. Twist the umbilical's sleeve clockwise, locking the umbilical in place. (see Figure 2-12 on page 55).

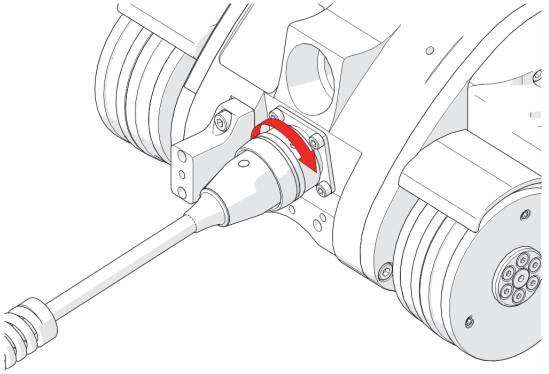


Figure 2-12 Align with crawler's umbilical mount

3. Ensure that the umbilical strain relief never points downwards during operation.

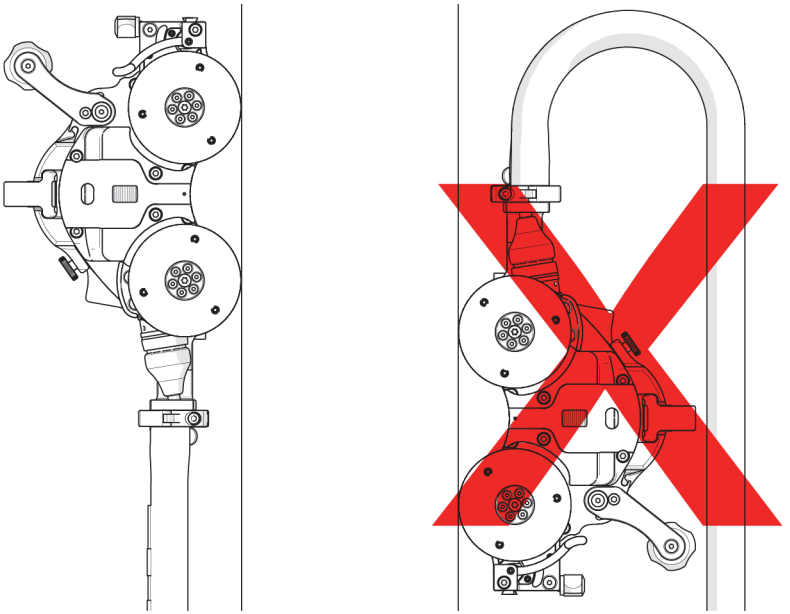


Figure 2-13 Correct and incorrect umbilical use

2.2.4 Encoder

The crawler is equipped with a motor encoder. This is used to output encoder signals to an instrument (see “Scanner Operation Specifications” on page 207).

2.2.5 Handle

The handle can be lowered to achieve low profile scanning.

To lower the handle

1. Use the supplied 3 mm hex driver to loosen the handle lock screws on either side of the handle (see Figure 2-14 on page 56).

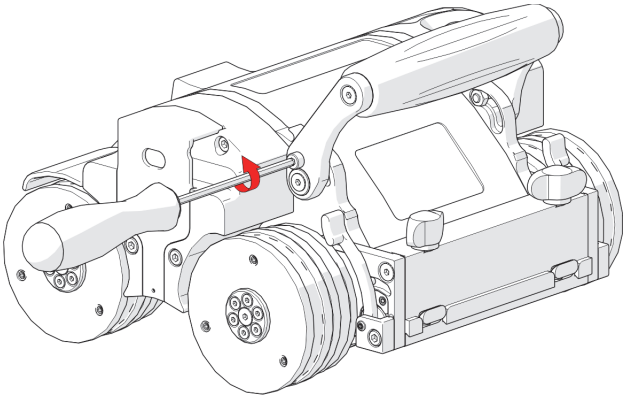


Figure 2-14 Unscrew handle lock screws

2. Pivot the handle as required (see Figure 2-15 on page 57).

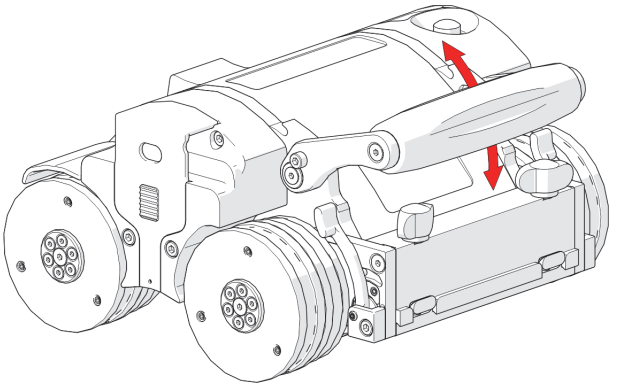


Figure 2-15 Pivot handle as desired

3. Tighten the handle lock screws when complete (see Figure 2-16 on page 57).

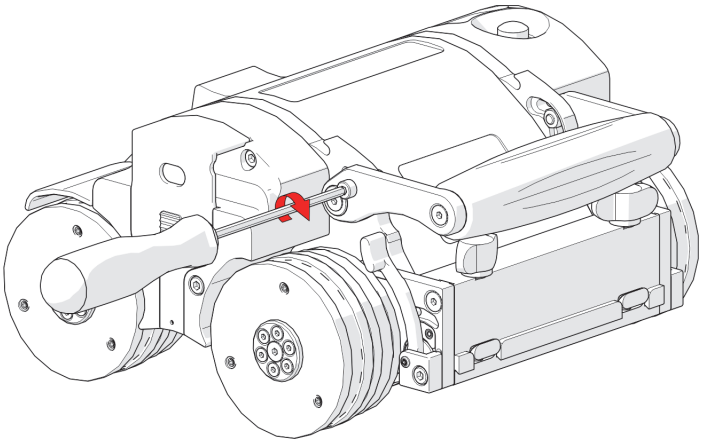


Figure 2-16 Tighten lock screws

2.2.6 Cable Retainer

Located at the on the side of the crawler, the cable retainer offers a means of cable management for cables, hoses, and tubes.

To manage cables using the cable retainer

1. Gently apply pressure to the grooves of the cable retainer and lift (see Figure 2-17 on page 58).

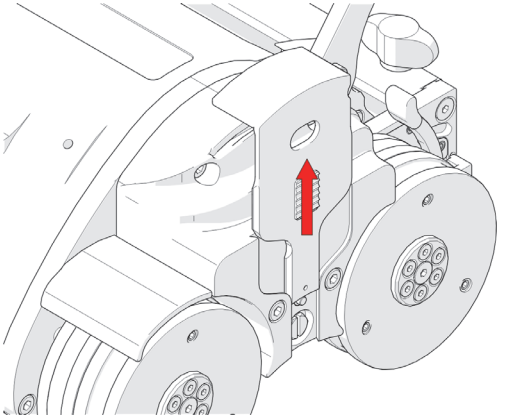


Figure 2-17 Lift retainer by hand

2. Route cables, hoses, or tubes through the retainer, and then press the cable retainer down (see Figure 2-18 on page 58).

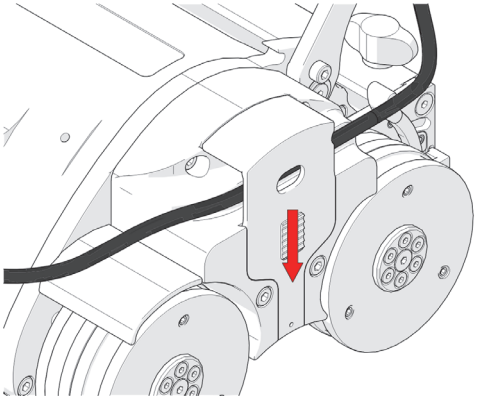


Figure 2-18 Place cables and hoses then close retainer

2.2.7 Manipulation Handle

The manipulation handle provides a means of orienting the scanner (see Figure 2-19 on page 59).

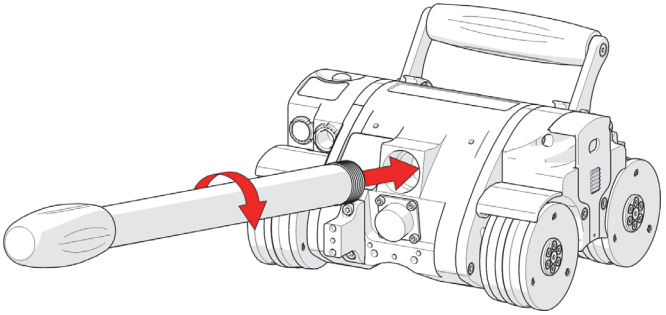


Figure 2-19 Manipulation handle

The handle can be used to set the initial scanner direction as well as occasional orientation correction. The manipulation handle is not intended as a tool for constant adjustment during a scan operation. The handle may be removed when additional scanner clearance is required.

NOTE

Do not use the manipulation handle to remove or install a crawler from a scan surface without the installation/removal mat in place.

2.2.8 Quick Connect Fitting (HT)

Located on the side of the crawler, the quick connect fittings provide a connection point for the hose fittings.

Press the hose fitting onto the quick connect fitting to attach it (see Figure 2-20 on page 60)

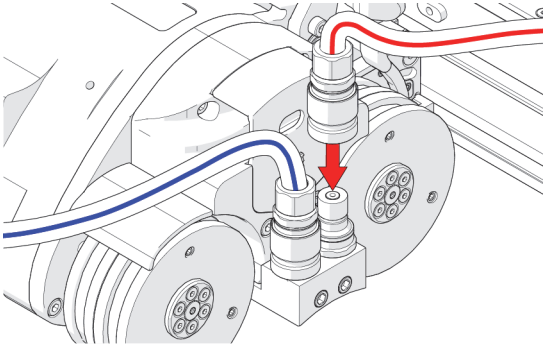


Figure 2-20 Quick connect fitting

2.2.9 Hose Connection and Routing (HT)

The hoses carry coolant that dissipates heat in the crawler and various components. The hoses MUST be routed though the HT cable management system.

The hoses are affixed with quick connect fittings that do not drip or leak when they are connected or disconnected.

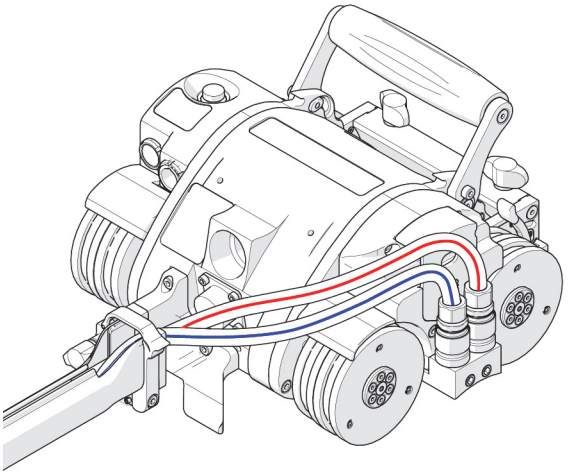


Figure 2-21 Hose routing to crawler

To route the hoses

1. Press the hose fittings onto the quick connect fittings of the crawler (see Figure 2-20 on page 60).
2. Route the hoses through the HT cable management system, and then connect them to the cooler (see Figure 2-21 on page 60)

2.2.10 Disconnecting Hoses (HT)

To disconnect the hoses (HT)

- To disconnect a hose, grasp the sleeve of the hose fitting and pull away from the crawler (see Figure 2-22 on page 61).

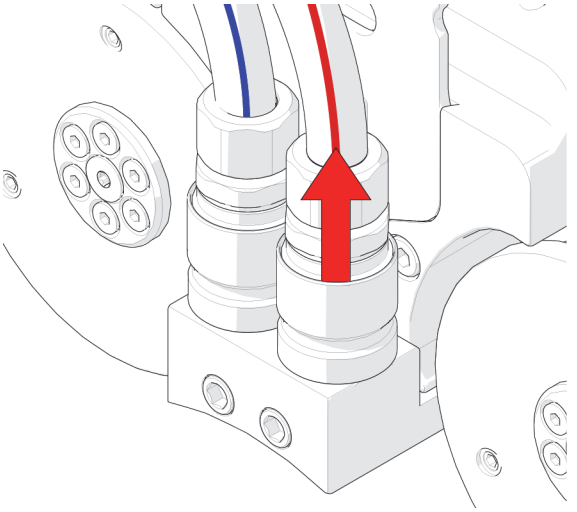


Figure 2-22 Pull sleeve to disconnect

2.3 Power Controller

The power controller accepts 25–45 VDC power from the AC/DC power supply or battery. A start/stop safety circuit and physical ON and OFF push-buttons are integrated into the power controller.

CAUTION

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

WARNING

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

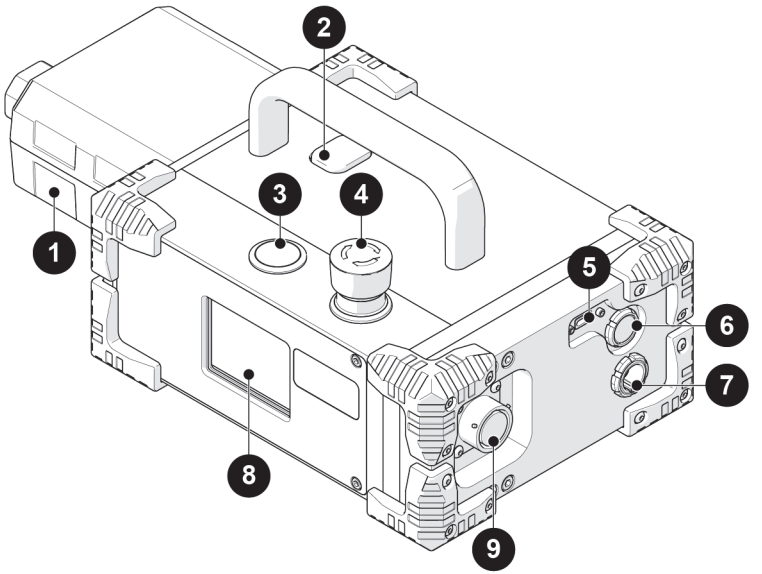


Figure 2-23 Power controller

Table 2 Power controller

1	AC/DC power supply	Connect the plug from a properly grounded source. Use IEC320 cord approved for AC/DC power supply.
2	Release button	Unlatch the AC/DC power supply or battery from the power controller.
3	Power button	Activate system power by pressing (and releasing) the silver button.
4	Emergency off button	The red emergency off button latches down when pressed. This emergency off button shuts down the system. Twist the button clockwise to return to the released position. This must be done before power can be activated.
5	Scanlink™ connector	Connection for Scanlink devices.
6	CTRL socket	Connection for the auxiliary cable.
7	ENC socket	Connection for the encoder cable.
8	Status LCD	Power controller status display.
9	Umbilical connection	Connection for the umbilical.

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

NOTE

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

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.

2.3.1 AC/DC Power Supply

WARNING

ELECTRICAL CORDS CAN BE HAZARDOUS. Misuse of the electrical cords 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.

The AC/DC power supply (Item 1, Figure 2-23 on page 62) 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 amps.

The safety of the power controller relies on the provision of a proper ground connection.

In environments with moisture present, a GFCI (ground fault circuit interrupter) 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.

2.4 Raster Arm Module

The motorized raster arm adds two axis automated scan capabilities to the MapROVER scanner (see Figure 2-24 on page 65).

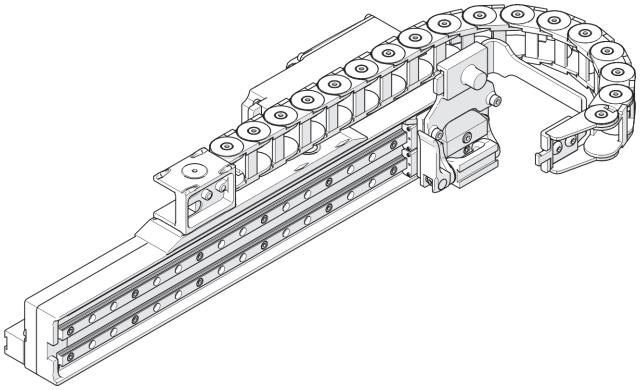


Figure 2-24 Raster arm module

The raster arm can carry many different probes for various types of corrosion scans, including conventional 0° transducers, phased array probes, auxiliary scanners (ex.: the HydroFORM phased array scanner), and more. The MapROVER handheld controller is used to set up all the parameters of the scan (see "Two Axis Scan Mode" on page 164 for additional details).

2.4.1 Mounting a Raster Arm

To mount the raster arm

1. Loosen the two black wing knobs, and then slide the raster arm's mounting rail onto the dovetail jaws of the crawler (see Figure 2-25 on page 66).

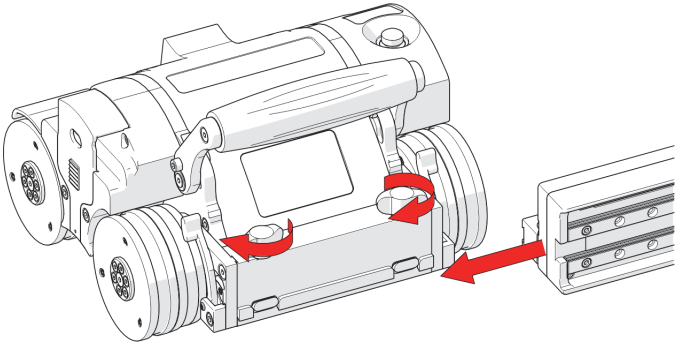


Figure 2-25 Slide onto one swivel mount

2. Tighten the two black wing knobs to secure the raster arm (see Figure 2-26 on page 66).

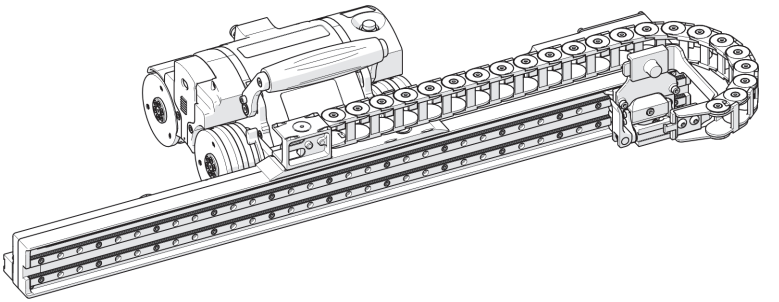


Figure 2-26 Properly mounted raster arm

2.4.2 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 that the four divots are aligned with notches on the magnetic end (see Figure 2-27 on page 67).

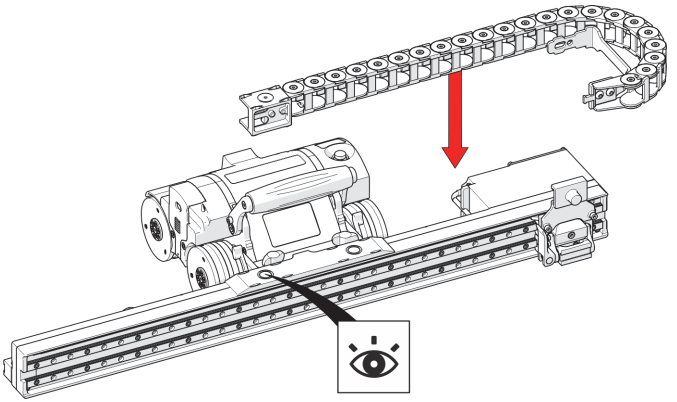


Figure 2-27 Attaching the cable tray

2. Press the cable tray bracket into the rear of the carriage bracket (see Figure 2-28 on page 67).

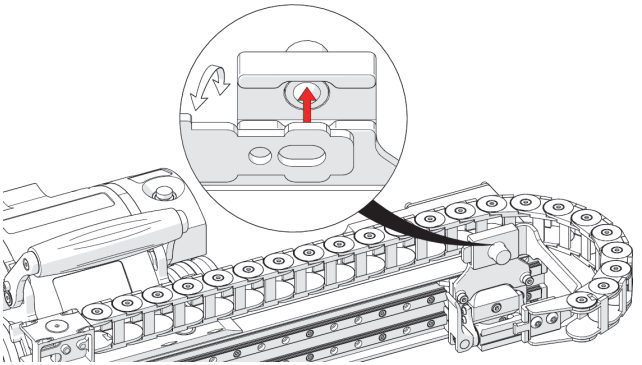


Figure 2-28 Press bracket to carriage

3. Slide the cable tray bracket until it locks in place (see Figure 2-29 on page 68).

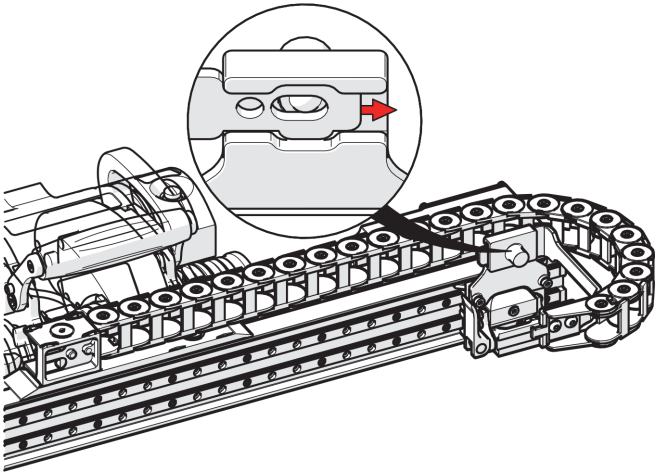


Figure 2-29 Slide bracket attaching to carriage

TIP

The cable tray can be flipped over and reversed to switch the side that it protrudes from the raster arm.

2.4.3 Routing Cables through the Cable Tray

To route cables through the cable tray

1. Using a small flat screw driver, unclip the flaps of the cable tray (see Figure 2-30 on page 69).

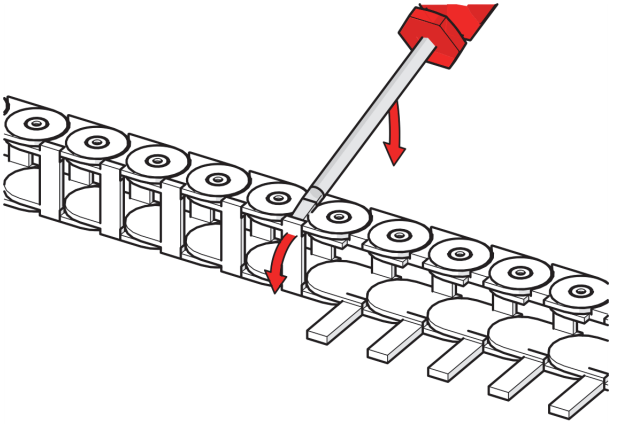


Figure 2-30 Unclip flaps from cable tray

2. Route all hoses and cables into the cable tray, and then clip the flaps to trap the cables in the cable tray (see Figure 2-31 on page 69).

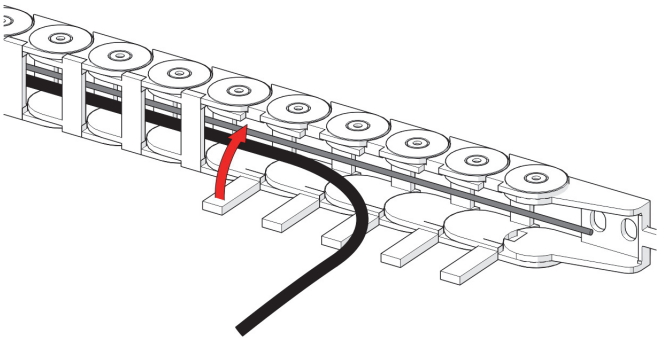


Figure 2-31 Route cabling and close flaps

TIP

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

2.4.4 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 2-32 on page 70)

To set up the raster arm cable

1. Plug the supplied raster arm cable into the raster arm's connector located on the raster arm encoder housing (see Figure 2-32 on page 70).

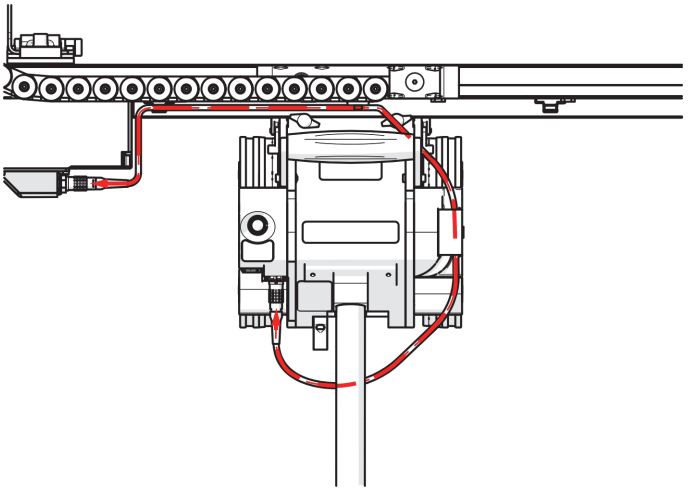


Figure 2-32 Raster arm cable routing

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 2-33 on page 71).

   These clips slide along the raster arm, allowing the raster arm cable to be positioned as required.

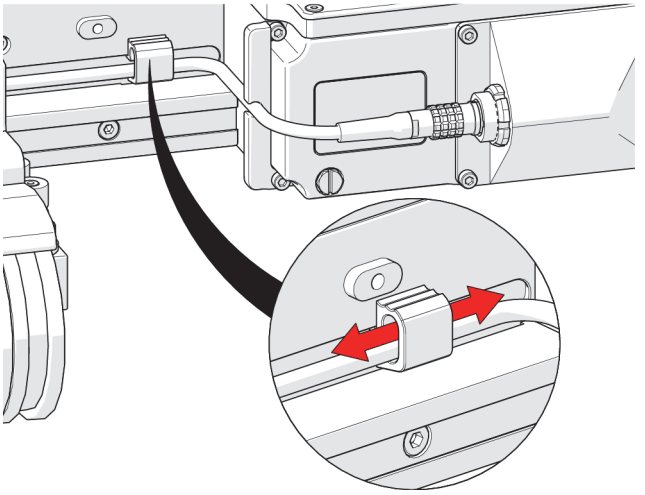


Figure 2-33 Adjustable cable clips

CAUTION

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

TIP

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 2-34 on page 72).

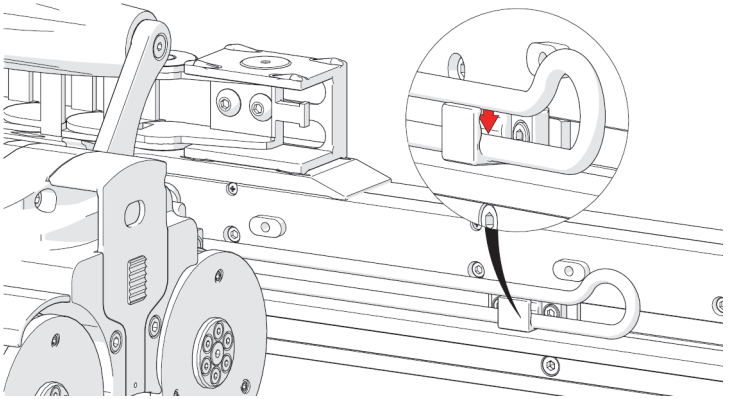


Figure 2-34 Route cable through the clip twice

2.4.5 Mounting Probe Holders

See “Vertical Probe Holder (from Optional Weld Kit)” on page 94 for additional details.

2.4.6 Probe Holder Attachments

2.4.6.1 Corrosion Thickness Probe Holder (Optional)

Follow these steps when using the corrosion thickness probe holder in conjunction with a raster arm.

To mount the corrosion thickness probe holder on the raster arm

1. The supplied cable clip is offered as a means of cable management. Pinch the clip for removal and installation (see Figure 2-35 on page 73).

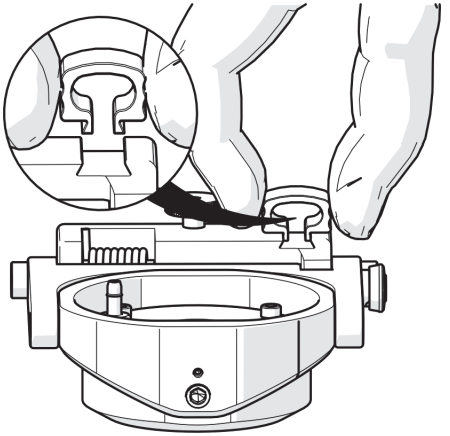


Figure 2-35 Cable clip

NOTE

It is necessary to remove the mounting bracket of the corrosion thickness probe holder if attached.

2. Rotate the probe holder adjustment knob (see Figure 2-36 on page 73).

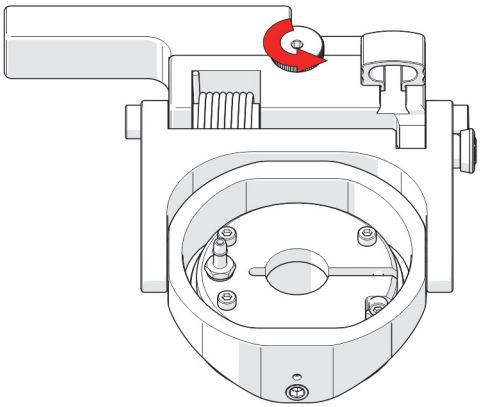


Figure 2-36 Loosen knob

3. Remove the mounting bracket (see Figure 2-37 on page 74).

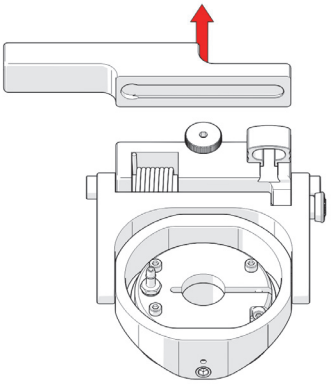


Figure 2-37 Remove bracket

4. Align the dovetail jaw of the corrosion thickness probe holder (see Figure 2-38 on page 74) and the pivot mount of the raster arm.

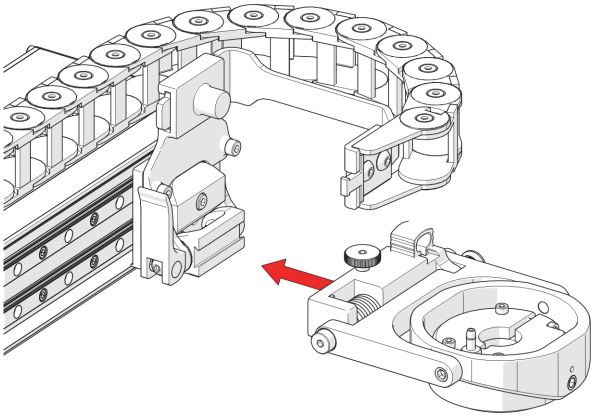


Figure 2-38 Attached to dovetail jaw

5. Tighten the probe holder adjustment knob (see Figure 2-39 on page 75).

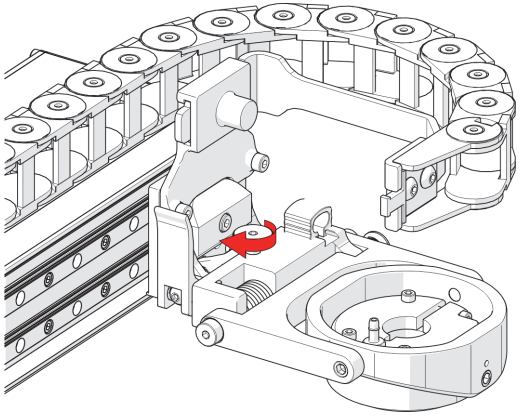


Figure 2-39 Tighten knob

2.4.7 Pivoting the Raster Arm

Adjust the raster arm pivot (see Figure 2-40 on page 75) to align the raster arm parallel with the tangent of the scan surface (see Figure 2-41 on page 76).

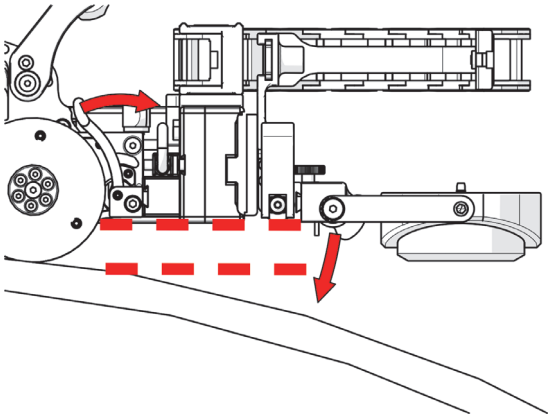


Figure 2-40 Pivot raster arm

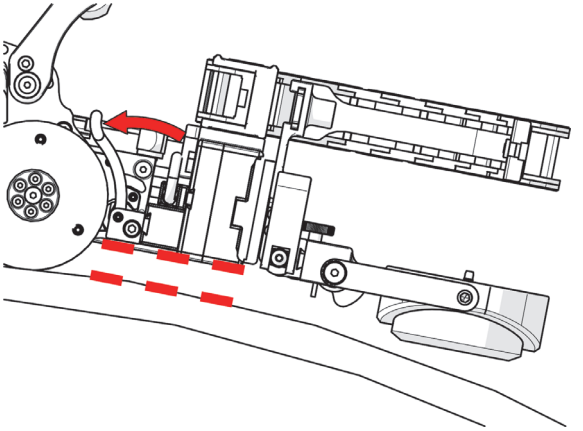


Figure 2-41 Parallel with scan surface

2.4.8 Angling the Pivot Nose toward the Scan Surface

To align the pivot nose to the inspection surface

1. Release the pivot nose latch and angle the probe holder towards the inspection surface (see Figure 2-42 on page 76).

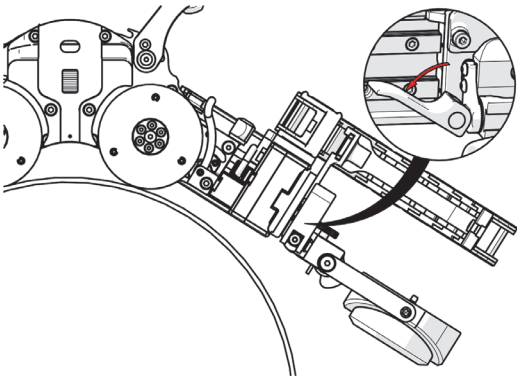


Figure 2-42 Pivot raster arm

2. Lower the probe holder to roughly 6 mm (0.25 in.) above the scan surface, and then latch the pivot nose at this position (see Figure 2-43 on page 77).

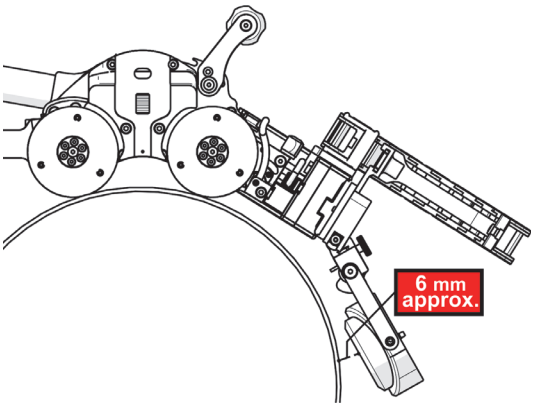


Figure 2-43 Pivot raster arm

2.4.9 Lowering the Probe Holder to Scan Surface

To lower the probe holder to the scan surface

1. Gently lift the probe holder (see Figure 2-44 on page 78).
2. Pull the probe holder latch (see Figure 2-44 on page 78).
3. Lower the probe holder gently to the scan surface (see Figure 2-44 on page 78).

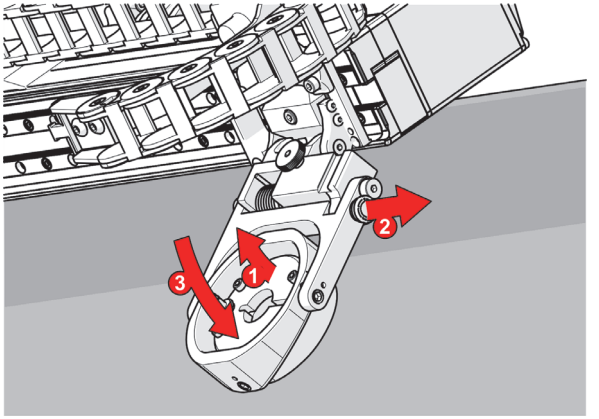


Figure 2-44 Remove pivot nose and carriage bracket

2.4.10 Switching the Raster Arm Orientation

To switch the orientation of the raster arm

NOTE

To complete this process, the raster arm orientation must be set in the user settings of the handheld controller (see "User Settings Screen" on page 172 for additional details).

1. Remove the cable tray (see "Attaching a Cable Tray" on page 66).
2. Loosen all the captured screws from the raster arm mounting rail (see Figure 2-45 on page 79).

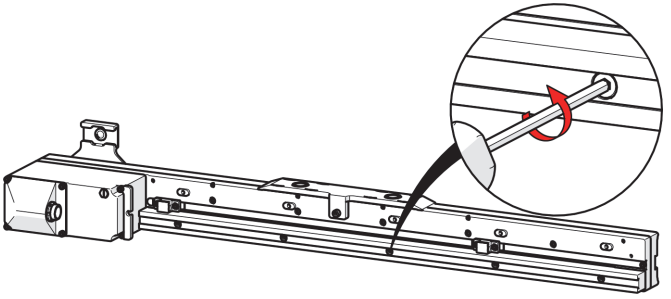


Figure 2-45 Remove raster arm mounting rail

3. Remove the mounting rail from the raster arm.
4. Remove the magnetic base from the raster arm (see Figure 2-46 on page 79).

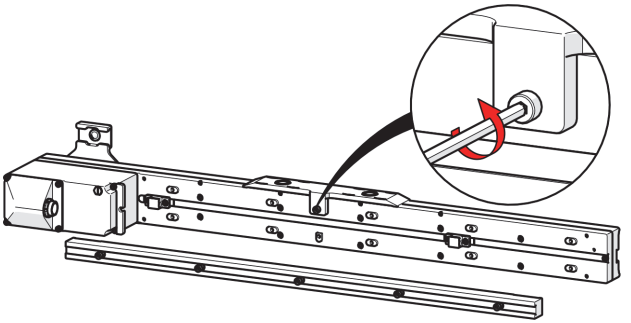


Figure 2-46 Remove magnetic base

WARNING

MAGNETIC MATERIAL. The magnetic base of the raster arm cable tray contains magnetic material. People with pacemakers or ICDs must stay at least 10 cm (4 in.) away.

5. Unscrew the single pivot nose screw using the supplied 3 mm hex driver, and then remove the carriage bracket's two screws (see Figure 2-47 on page 80).

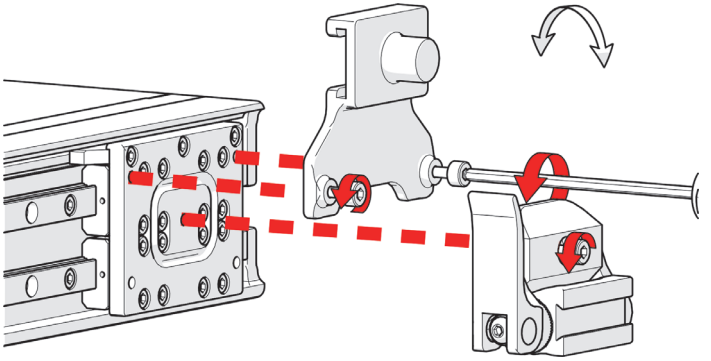


Figure 2-47 Remove pivot nose and carriage bracket

6. Using a 2.5 mm hex tool, remove the socket head cap screw located at the end of the raster arm in the cable clip grove (see Figure 2-48 on page 80).

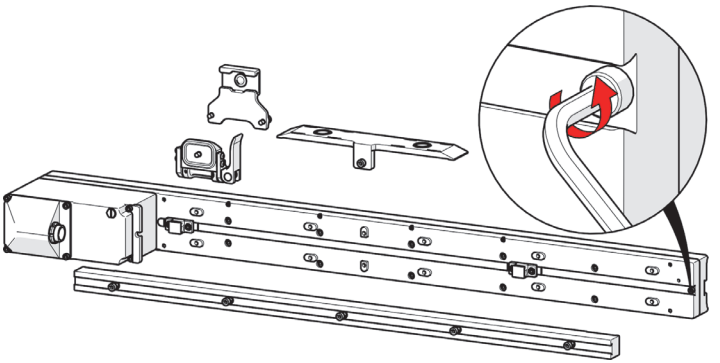


Figure 2-48 Remove screw

7. Slide the cable management clips from the raster arm (see Figure 2-49 on page 81).

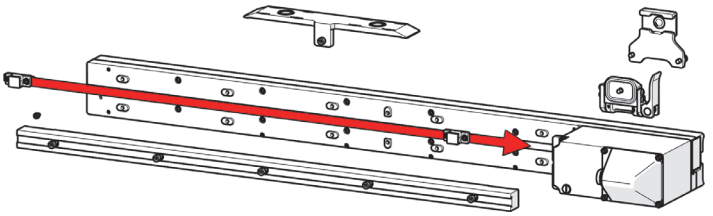


Figure 2-49 Slide cable clips from the raster arm

NOTE

Do not unscrew the clips from the raster arm as the screws have been specifically torqued to provide adequate sliding friction.

8. Rotate the raster arm (see Figure 2-50 on page 81).

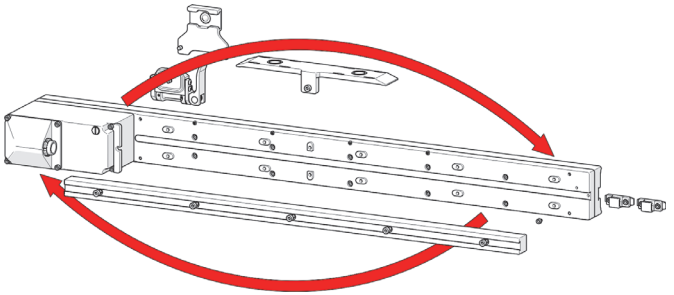


Figure 2-50 Rotate the raster arm

9. Confirm the cable management clips are in proper orientation (see Figure 2-51 on page 82).

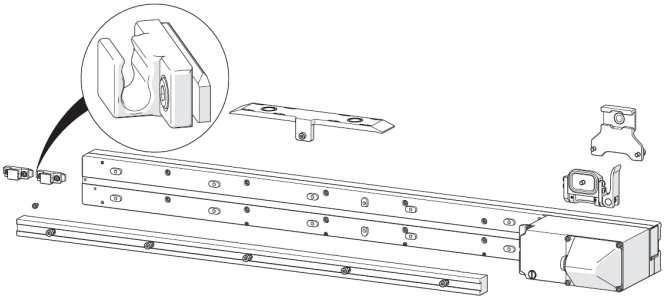


Figure 2-51 Ensure proper cable management clip orientation

10. Slide the cable management clips onto the raster arm (see Figure 2-52 on page 82).

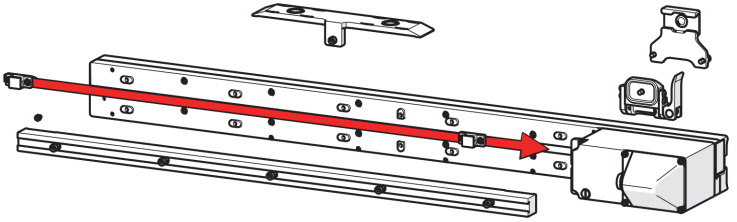


Figure 2-52 Replace cable management clip

11. Replace the socket head cap screw at the end of the raster arm (see Figure 2-53 on page 83).

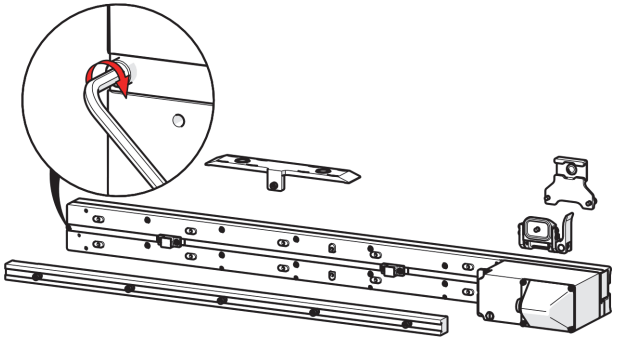


Figure 2-53 Replace socket head cap screw

12. Attach the raster arm's mounting rail below the cable management clips. Align and tighten all the screws on the mounting rail (see Figure 2-54 on page 83).

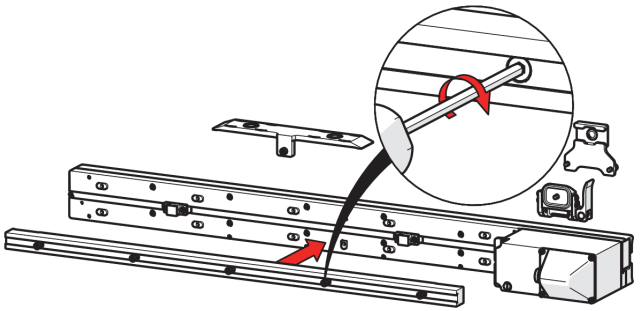


Figure 2-54 Attach mounting rail

13. Align the screw for the cable tray's magnetic base to the center of the raster arm. Tighten magnetic base screw (see Figure 2-55 on page 84).

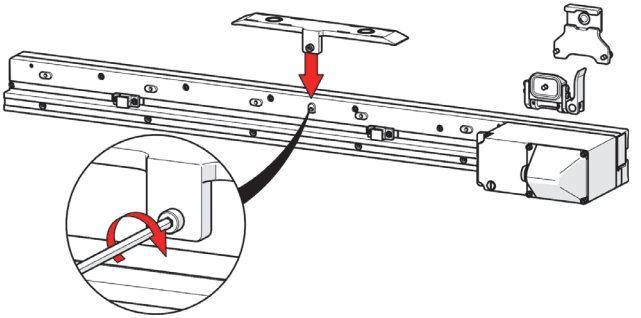


Figure 2-55 Affix the magnetic base to the raster arm

14. Attach the pivot nose to the raster arm carriage (see Figure 2-56 on page 84).

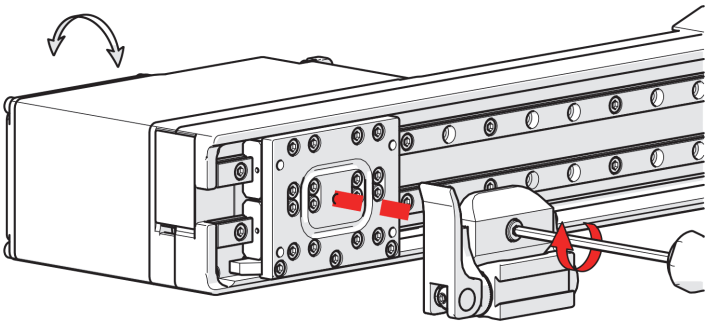


Figure 2-56 Attach the pivot nose to the carriage

15. Attach the carriage bracket to the raster arm carriage (see Figure 2-57 on page 85).

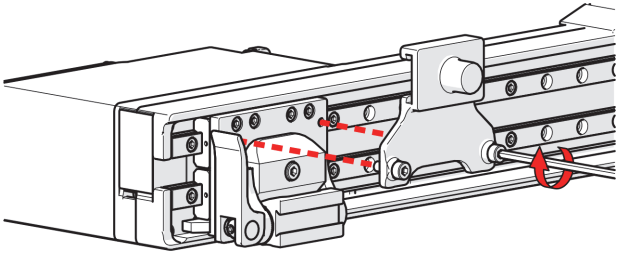


Figure 2-57 Attach the carriage bracket

16. Using the handheld controller, program the raster arm orientation (see “Press Back to return to the Two Axis Scan screen to reset the scanner and maintain the original A position. Press Continue to reset the A position and return to the Two Axis Scan Setup screen.System Utilities Screen” on page 171).

2.4.11 Raster Arm Cable

The raster arm cable connects the raster arm module to the crawler. The cable provides 36 VDC and network connections to the raster arm module and transmits the raster arm encoder signals to the instrument.

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 crawler. The raster arm cable is connected to the auxiliary socket of the crawler (see “Setting up the Raster Arm Cable” on page 70).

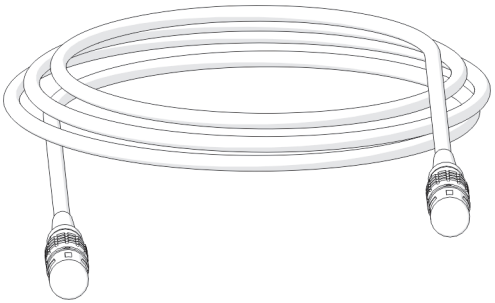


Figure 2-58 Raster arm cable

NOTE

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

2.5 Cooler Setup (HT)

The cooler is to be powered by the power controller using the auxiliary cable.

Blue and red hoses are included with the cooler system. The hoses are affixed with quick connect fittings that do not drip or leak when they are connected or disconnected.

To connect the cooler to a power supply

1. Align the connector's red dot with the top of the AUX port. Press the connector into either AUX port on the cooler (see Figure 2-59 on page 86).
2. Connect the auxiliary cable to the power controller (see Figure 2-59 on page 86).

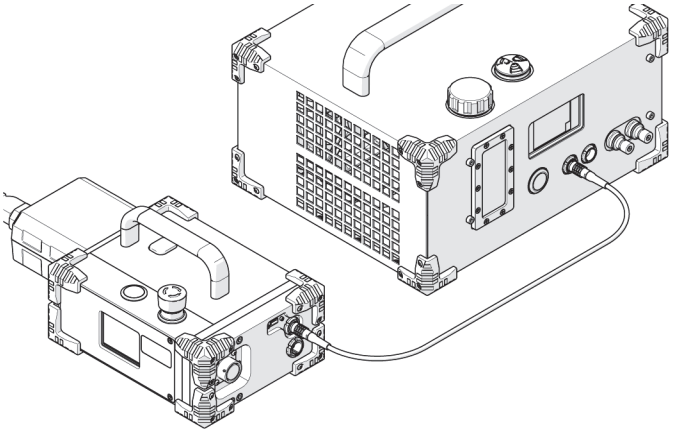


Figure 2-59 Plug auxiliary cable to cooler and power source

To connect the hoses

- Press the hose fitting onto the Cooler's appropriate quick connect fitting.
  - The red hose connects to the IN port (see Figure 2-60 on page 87).
  - The blue hose connects to the OUT port (see Figure 2-60 on page 87).

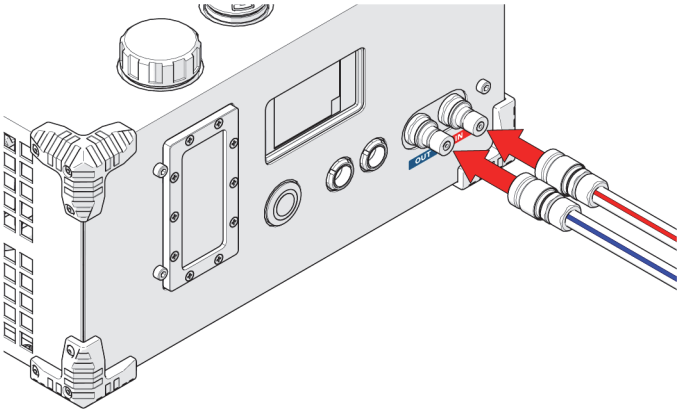


Figure 2-60 Connecting the hoses on the cooler

To disconnect the hoses

1. To disconnect a hose, grasp the sleeve of the hose fitting and pull it away from the cooler (see Figure 2-61 on page 87)

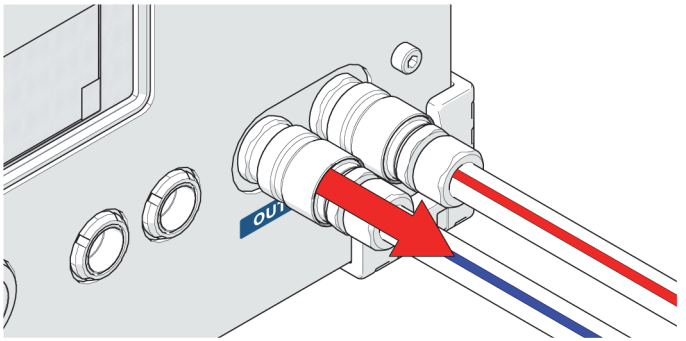


Figure 2-61 Disconnect hose

2.6 HT Raster Arm Cable Management

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

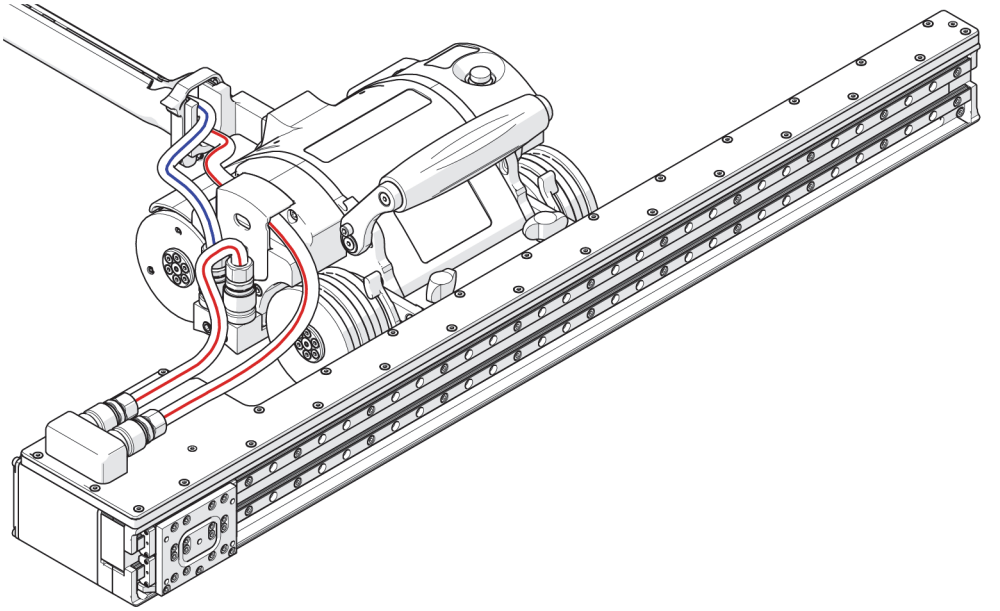


Figure 2-62 HT cable management

2.6.1 Hose Connection and Routing

The hoses carry coolant, which dissipates heat in the various components.

NOTE

The hoses MUST be routed through the HT cable management system.

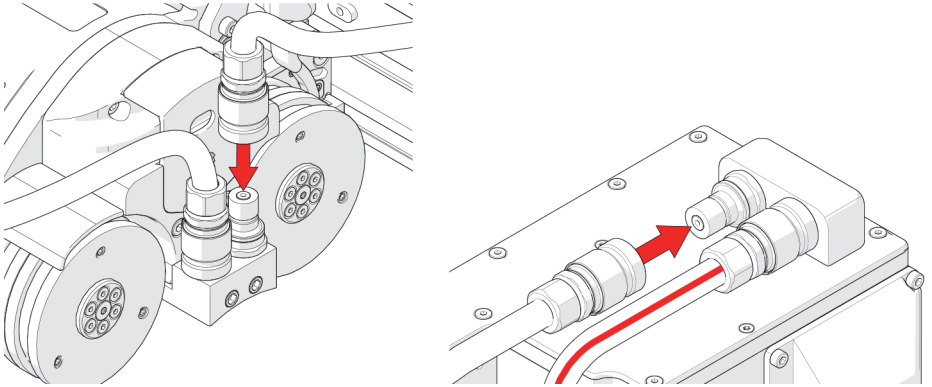


Figure 2-63 Connecting the hoses on the crawler and raster arm

The quick connect fittings on the top of the HT raster arm provide a connection point for hose fittings. Press the hose fitting onto the quick connect to attach (see Figure 2-64 on page 90)

TIP

The red hoses may be connected to either quick connect fitting on the HT raster arm.

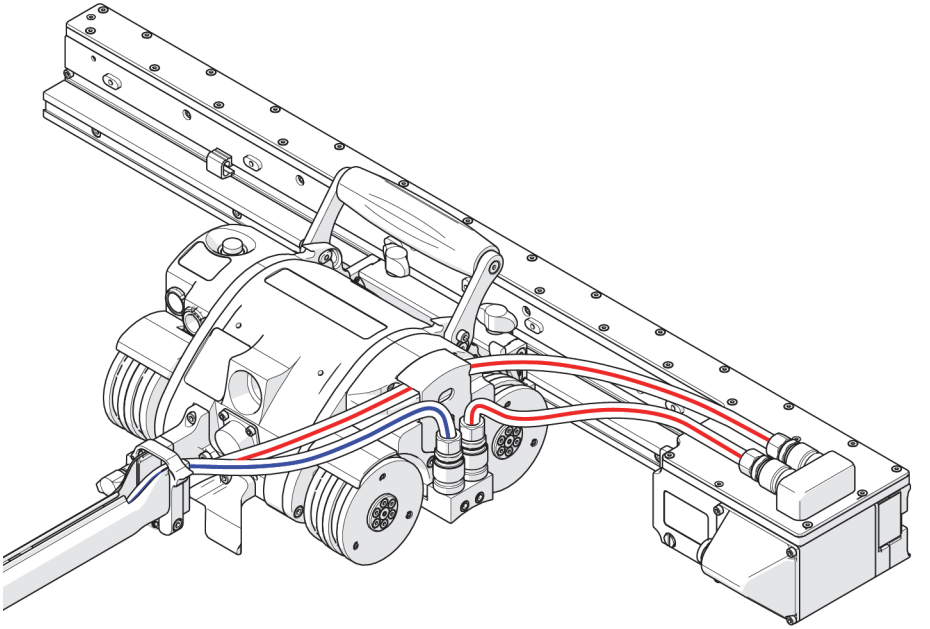


Figure 2-64 Hose routing with raster arm

To route hoses with an HT raster arm

1. Connect the hose fittings to the crawler's quick connect fittings (see Figure 2-63 on page 89).
2. Connect the hose fittings to the HT raster arm's quick connect fittings (see Figure 2-63 on page 89).
3. Route the hoses through the cable management system and connect them to the Cooler (see Figure 2-64 on page 90).

2.7 Battery-Powered Laser Guide (Optional)

WARNING

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

The laser guide provides a reference point to help you maintain the MapROVER scanner aligned on a given path (see Figure 2-65 on page 91).

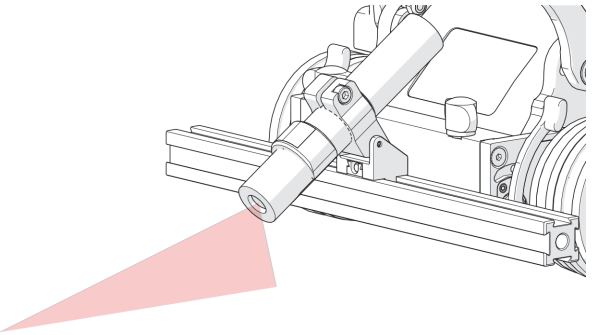


Figure 2-65 Laser guide

To set up 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 2-66 on page 92).

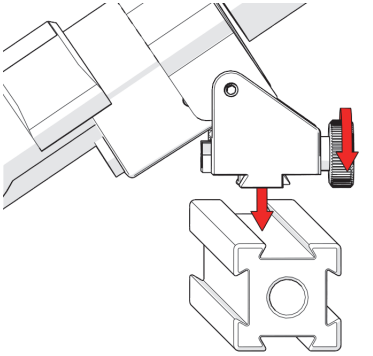


Figure 2-66 Mount on frame bar

3. Adjust the laser guide's friction pivot to aim the guide as required (see Figure 2-67 on page 92).

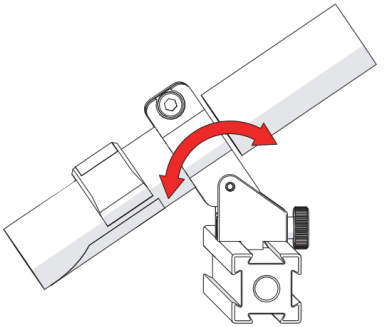


Figure 2-67 Aim guide

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

NOTE

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

2.8 Encoder Cable

The encoder cable connects the MapROVER system to the data acquisition instrument. This cable allows the transmission of two-axis position signals from the MapROVER system to the instrument. The encoder cable also provides 5 VDC from the data acquisition instrument to the encoder isolation circuitry. Various encoder styles are available for various instruments.

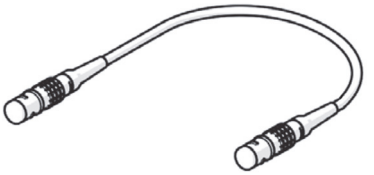


Figure 2-68 Encoder cable

NOTE

Inspect the cable and connectors for damage before use. When damage is apparent, the cable must NOT be used.

2.9 Controller Cable

CAUTION

Before use, inspect the cable and connectors for damage. When any damage is apparent, 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 2-69 on page 94).

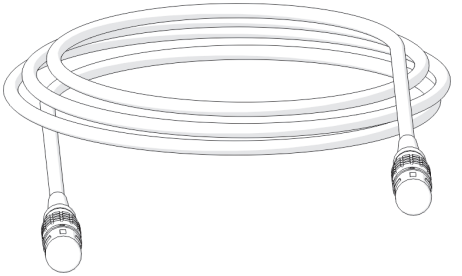


Figure 2-69 Controller cable

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

2.10 Vertical Probe Holder (from Optional Weld Kit)

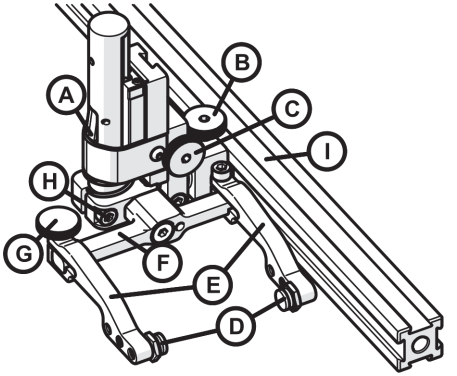


Figure 2-70 Vertical probe holder

Table 3 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
H	Transverse adjustment screw
I	Frame bar

2.10.1 Probe Holder Setup

The probe holder adjustment knob enables the probe holder to be attached to a frame bar and horizontal positioning on a frame bar (see Figure 2-71 on page 95).

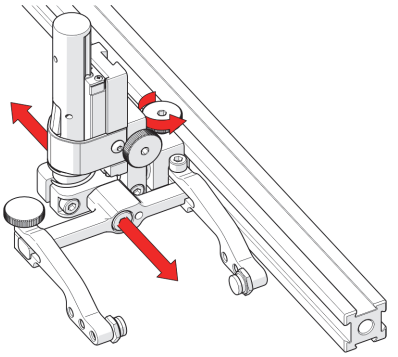


Figure 2-71 Adjust on frame bar

The vertical adjustment knob enables you to adjust the height of the vertical probe holder (see Figure 2-72 on page 96).

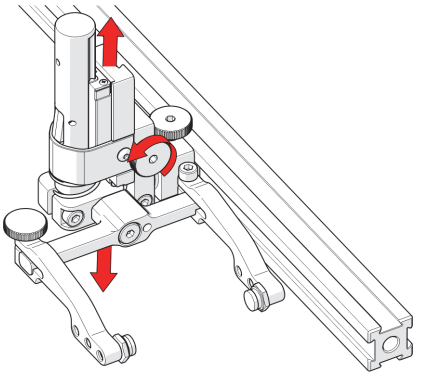


Figure 2-72 Vertical adjustment

Position the pivot buttons where necessary. When a narrow scanning footprint is required, use the pivot button holes closet to the yoke (see Figure 2-73 on page 96).

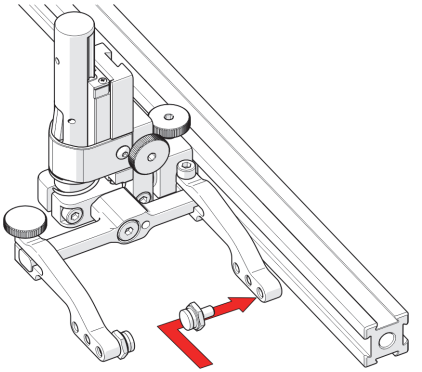


Figure 2-73 Place buttons

TIP

Probe pivoting may be impeded when the probe holder 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 2-74 on page 97).

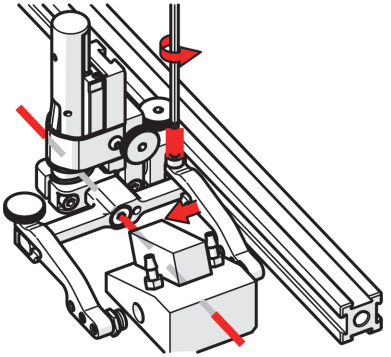


Figure 2-74 Adjust inner arm

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 2-75 on page 98) and slide the probe holder arm along the yoke, pinching the wedge in place.

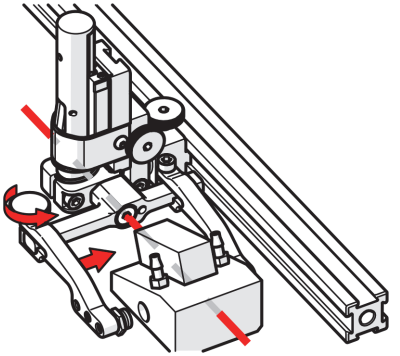


Figure 2-75 Adjust outer arm

3. Tighten the probe holder arm adjustment knob (see Figure 2-76 on page 98).

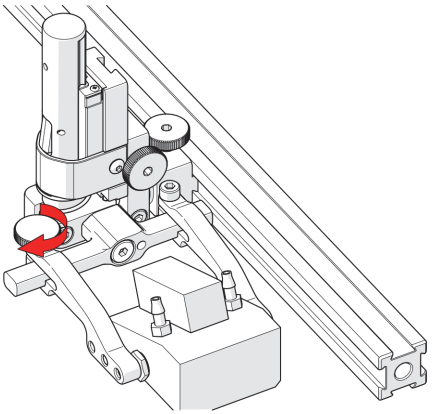


Figure 2-76 Tighten arm knob

2.10.2 Probe Holder Vertical Adjustment

To adjust the probe holder vertically

1. Ensure that the probe holder is latched in the upper position. Lift the probe holder until the latch is fully exposed and snaps out to lock (see Figure 2-77 on page 99).

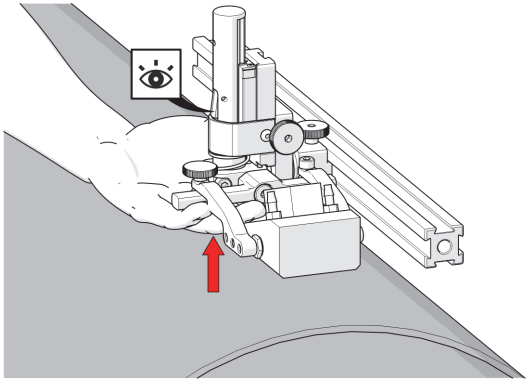


Figure 2-77 Latch probe holder

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.
3. Tighten the vertical adjustment knob (see Figure 2-78 on page 99).

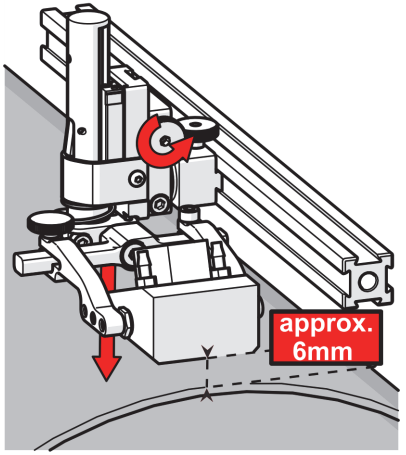


Figure 2-78 Lower toward scan surface

4. Lift the yoke slightly and press the latch button (see Figure 2-79 on page 100), then slowly lower it towards the scanning surface to apply spring pressure to the wedge (see Figure 2-80 on page 100).

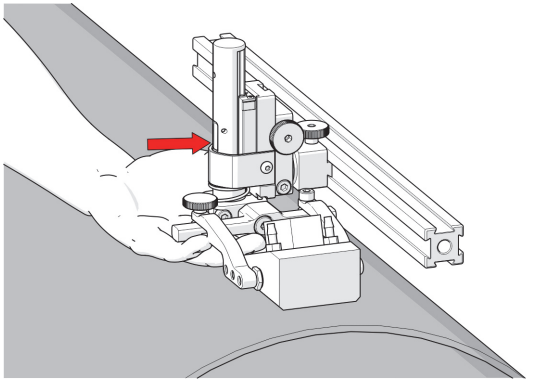


Figure 2-79 Press latch button

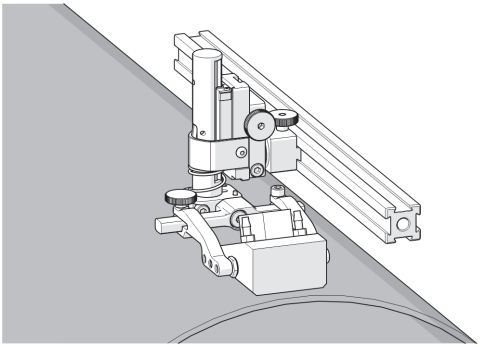


Figure 2-80 Lower toward scan surface

TIP

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

2.10.3 Probe Holder Transverse Adjustment

To adjust the probe holder's transverse angle

1. Ensure that the probe holder is latched in the upper position (see Figure 2-77 on page 99).
2. Using the supplied 3 mm hex driver loosen the transverse adjustment screw and rotate the yoke around the vertical shaft, to acheive the desired angle (see Figure 2-81 on page 101).

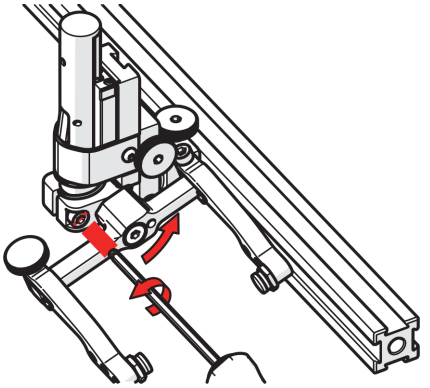


Figure 2-81 Loosen 3 mm screw

3. Tighten the transverse adjustment screw (see Figure 2-82 on page 102).

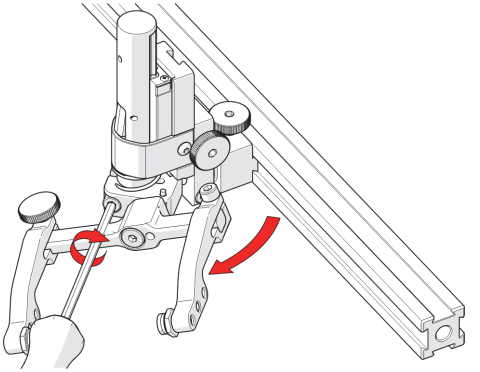


Figure 2-82 Rotate and tighten

To return the transverse adjustment to neutral (90°), ensure the probe holder is latched in the upper position (see Figure 2-77 on page 99). Rotate the yoke until the stop post contacts the base of the probe holder. Then tighten the transverse adjustment screw (Figure 2-83 on page 102).

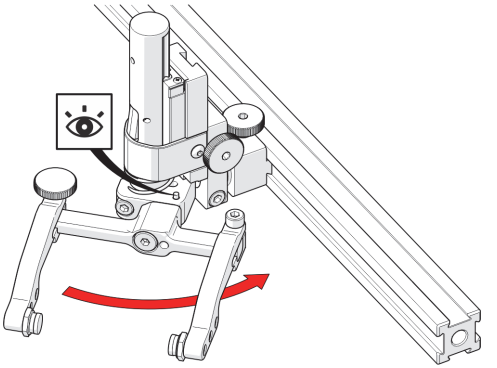


Figure 2-83 Stop post locates 90°

2.10.4 Probe Holder Longitudinal Adjustment

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

1. Ensure that the probe holder is in latched, upper position (see Figure 2-77 on page 99).
2. Using the supplied 3 mm hex driver, loosen the longitudinal adjustment screw (see Figure 2-84 on page 103).

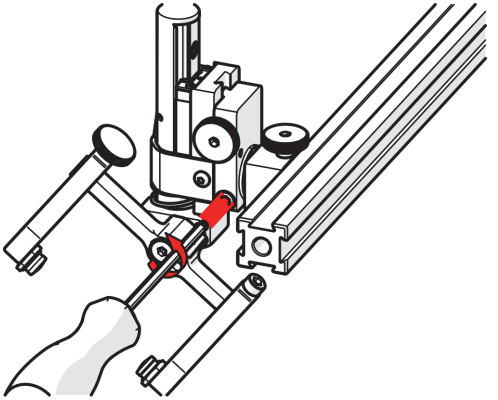


Figure 2-84 Loosen 3 mm screw

3. Rotate the main body of the probe holder until it is at the desired angle (see Figure 2-85 on page 104).

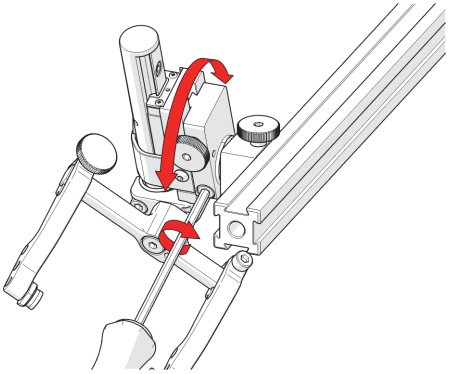


Figure 2-85 Rotate to position

4. Tighten the longitudinal adjustment screw (see Figure 2-85 on page 104).
5. To return the longitudinal adjustment to neutral (90°), line up the longitudinal adjustment indicator markers (see Figure 2-86 on page 104).

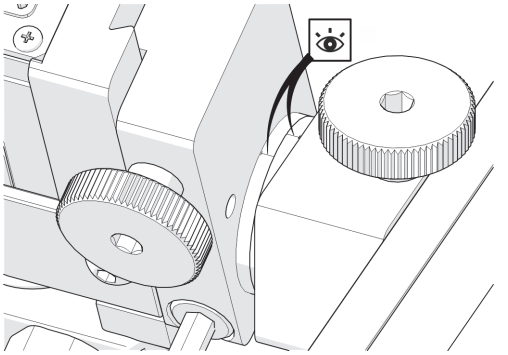


Figure 2-86 Line up markers

2.10.5 Probe Holder Left/Right Conversion

To reverse the probe holder

NOTE

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

1. Ensure that the probe holder is latched in the upper position (see Figure 2-77 on page 99).
2. Using the supplied 3 mm hex driver, unscrew the yoke pivot screw and remove yoke (see Figure 2-87 on page 105).

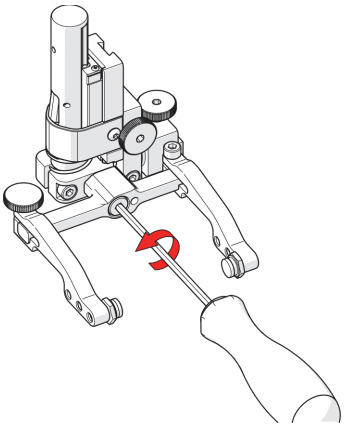


Figure 2-87 Unscrew yoke pivot screw

3. Loosen the probe holder arm adjustment knob and the arm clamp screw. Slide the probe holder arms off the yoke (see Figure 2-88 on page 106).

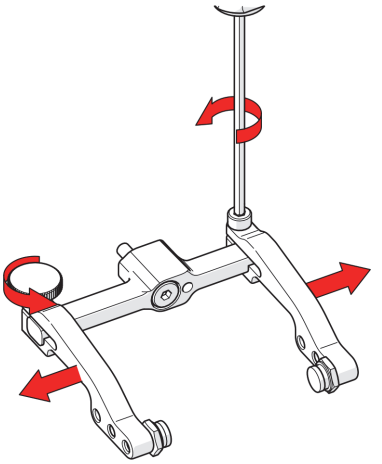


Figure 2-88 Remove probe holder arms

4. Flip the yoke 180° and reverse the probe holder arms (see Figure 2-89 on page 106).

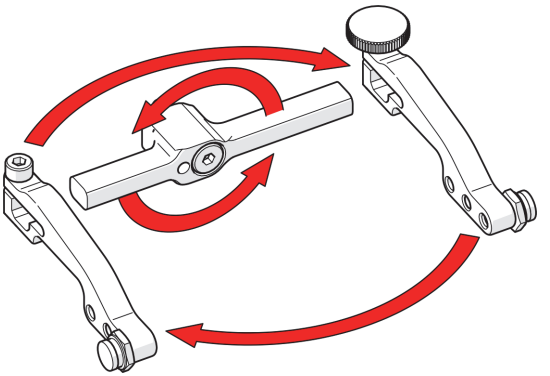


Figure 2-89 Flip yoke and reverse arms

5. Using a 0.375 in. wrench, place the pivot buttons on the inside of the probe holder arms (see Figure 2-90 on page 107).

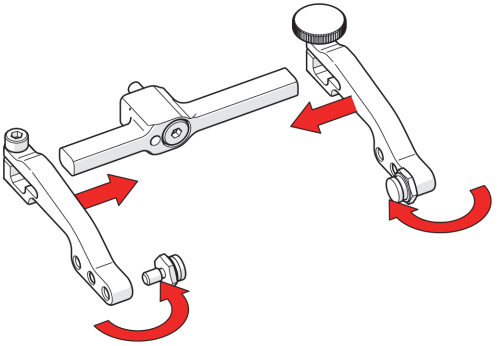


Figure 2-90 Attach arms and move buttons

6. Using the supplied 3 mm hex driver, mount the yoke to the opposite side of the base (see Figure 2-91 on page 107).

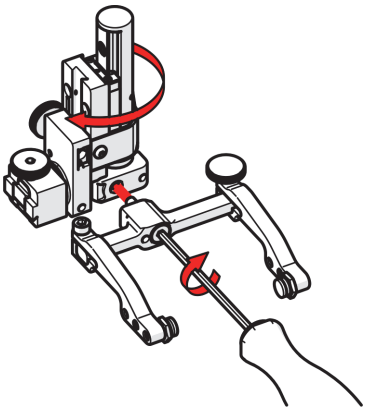


Figure 2-91 Screw yoke to opposite side

TIP

Keep the yoke level with the base to ensure 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. Using a 1.5 mm hex wrench, unscrew the stop postuntil it has cleared all obstructions. Do not remove the stop post (see Figure 2-92 on page 108).

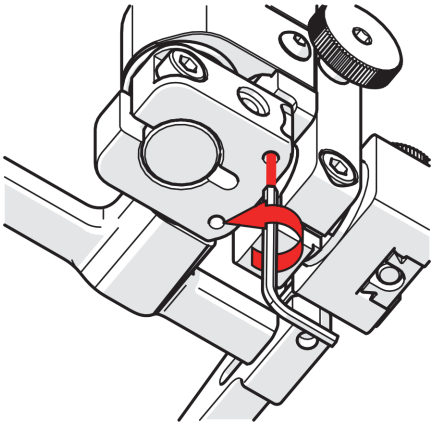


Figure 2-92 Lower 90° stop post

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 2-93 on page 108).

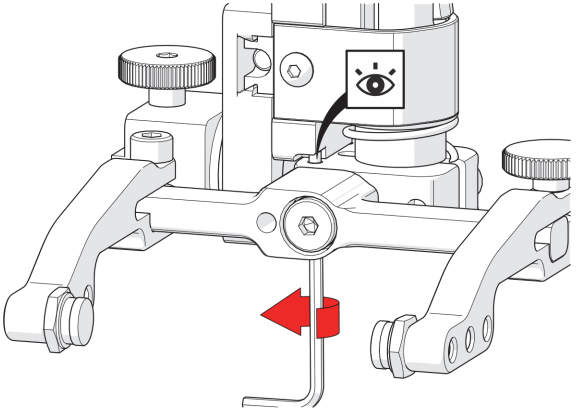


Figure 2-93 Raise opposite 90° stop post

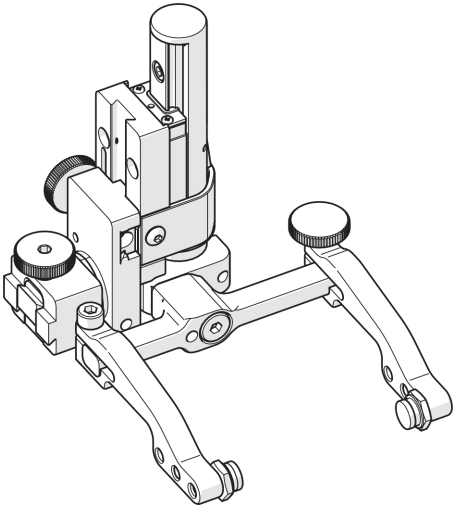


Figure 2-94 Reversed probe holder

2.11 Vertical Probe Holder Frame

The probe holder frame adds weld scanning capabilities to the MapROVER scanner (see Figure 2-95 on page 109). This frame uses 4 vertical probe holders. Additional frame components enable up to eight probes to be used.

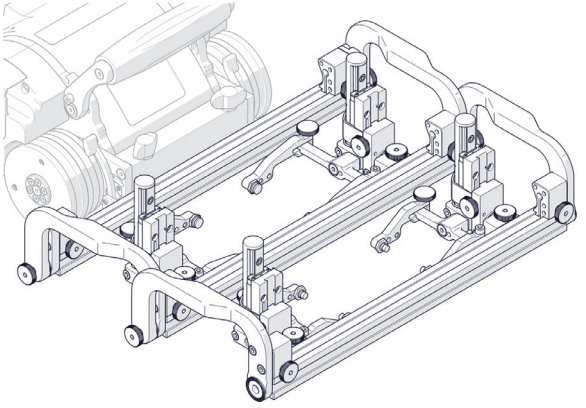


Figure 2-95 Probe holder frame

To set up the probe holder frame

1. Attach the wedges to the probe holders that will be used (see "Probe Holder Setup" on page 95 for additional details).
2. Affix the probe holders (with attached wedges) to the probe holder frame. Place the secondary probe holder at the front of the frame and place the primary probe holders at the rear of the frame bar (see Figure 2-96 on page 110).

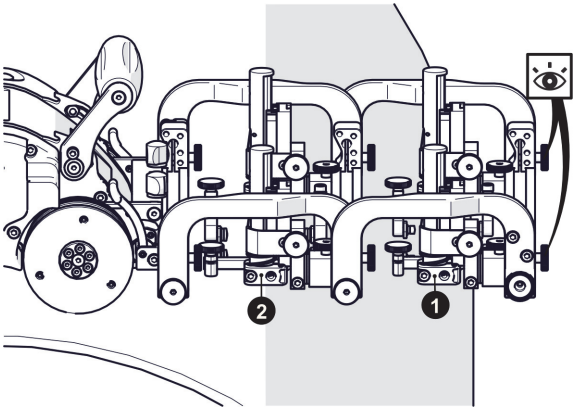


Figure 2-96 Position primary and secondary probe holders

TIP

Because of the large size of phased array wedges, scan results are generally improved when you pull or drag them.

---

3. Mount the probe holder frame to the crawler (see "Cable Retainer" on page 57 for additional details). When mounting the probe holder frame, ensure that the attachment knobs are at the front (noncrawler side) (see Figure 2-97 on page 111).

CAUTION

To avoid mechanical failure, the optional 4-probe weld inspection probe holder kit must be mounted only to the crawler, and not to the raster arm.

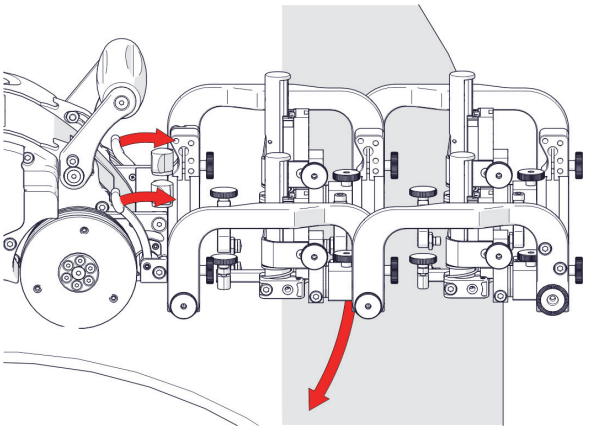


Figure 2-97 Align swivel mount with scan surface

4. Release the two swivel mount levers (see Figure 2-97 on page 111) to position the swivel mount parallel to the scan surface (see Figure 2-98 on page 112). When alignment with scan surface is achieved, lock the crawler swivel mount levers.

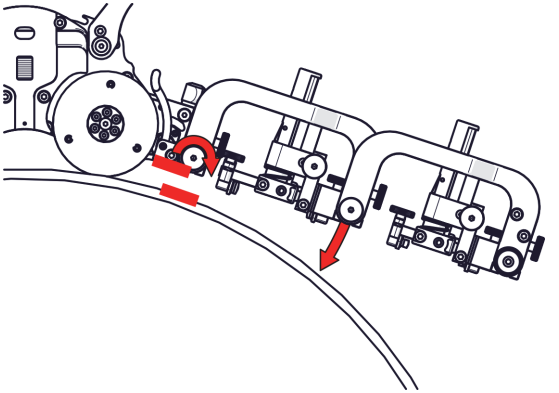


Figure 2-98 Set rear rotational adjustment knob

5. Loosen the rear rotational adjustment knob to lower the weld scan frame toward the inspection surface (see Figure 2-98 on page 112).
6. Loosen the front rotational adjustment knob (see Figure 2-99 on page 112) to align the TOFD probe holders parallel with the scan surface (see Figure 2-100 on page 113).

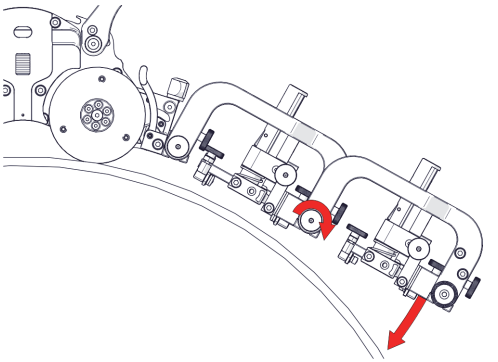


Figure 2-99 Set front rotational adjustment knob

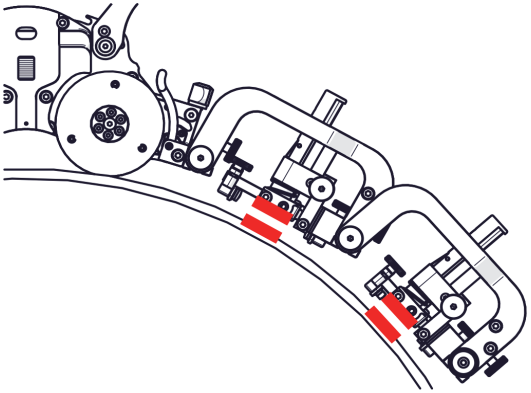


Figure 2-100 Align probes with the scan surface tangent

2.12 Heavy Duty Vertical Probe Holder

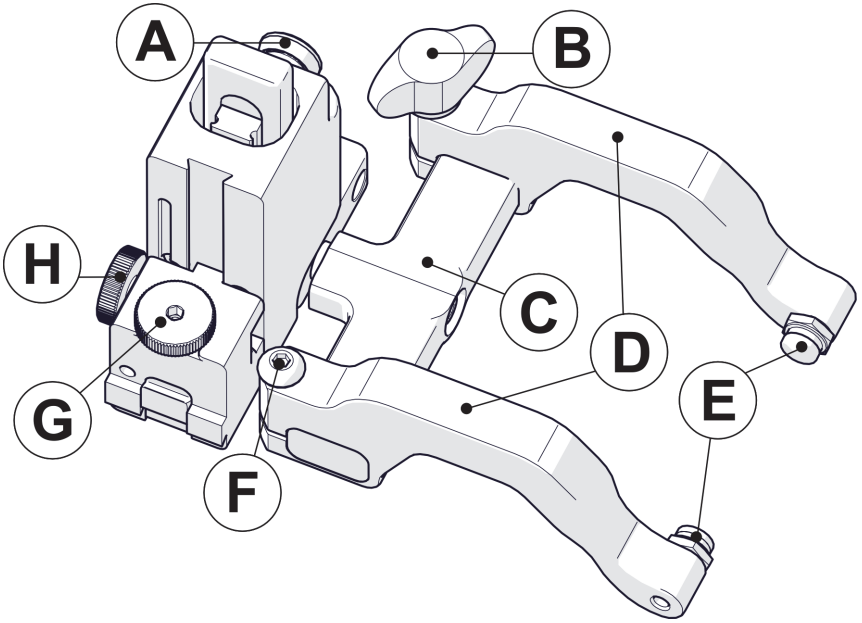


Figure 2-101 Heavy duty vertical probe holder

Table 4 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

2.12.1 Probe Holder Setup

1. Loosen the probe holder adjustment knob and mount the heavy duty vertical probe holder's dovetail jaw to the carrier (see Figure 2-102 on page 114).

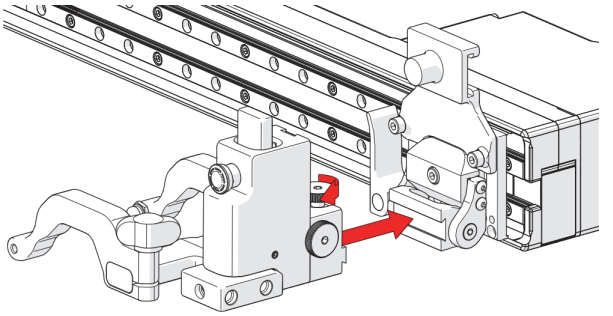


Figure 2-102 Mount probe holder to carrier

The vertical adjustment knob enables you to adjust the height of the heavy duty vertical probe holder (Figure 2-103 on page 115). This adjustment also controls the probe holder's spring tension.

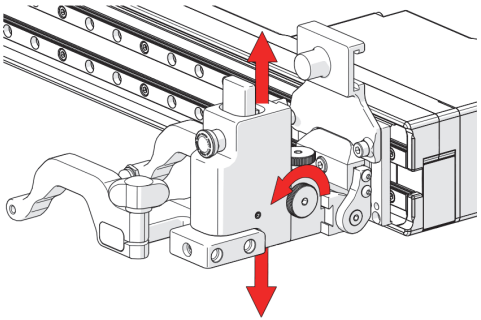


Figure 2-103 Vertical adjustment

2. Loosen the probe holder adjustment knob and remove the outer probe holder arm (see Figure 2-104 on page 115).

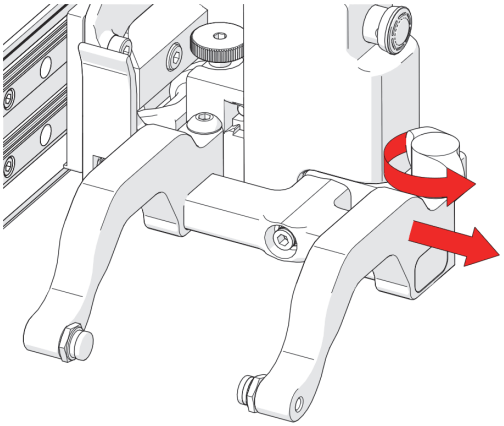


Figure 2-104 Remove outer arm

3. Loosen the arm clamp screw (Figure 2-105 on page 116).
4. Place the wedge on the pivot button of the inner probe holder arm (see Figure 2-105 on page 116).

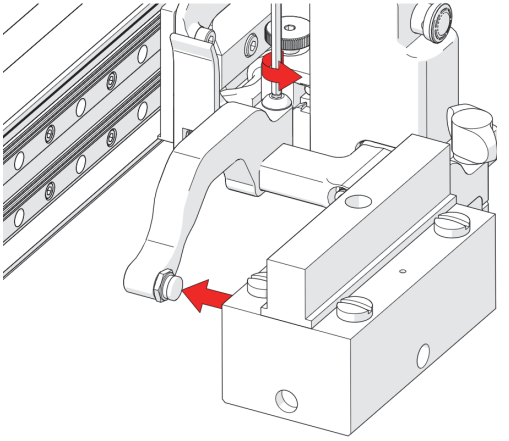


Figure 2-105 Adjust inner arm

5. Align the middle of the wedge with the center of the yoke (see Figure 2-106 on page 116).

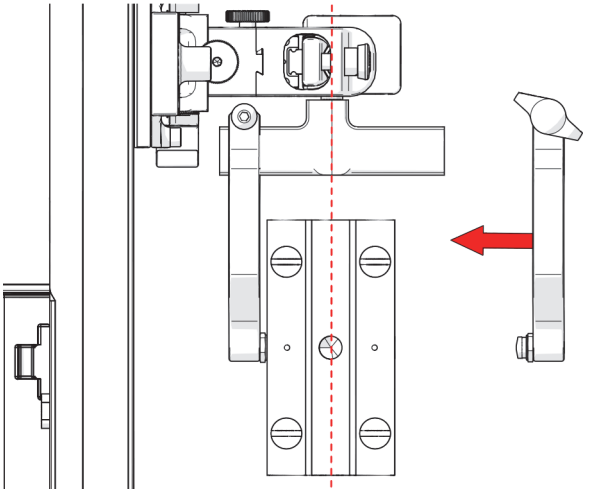


Figure 2-106 Remove outer arm

6. Tighten both the probe holder adjustment knob and the arm clamp screw (see Figure 2-107 on page 117) while ensuring the wedge remains centered with the yoke.

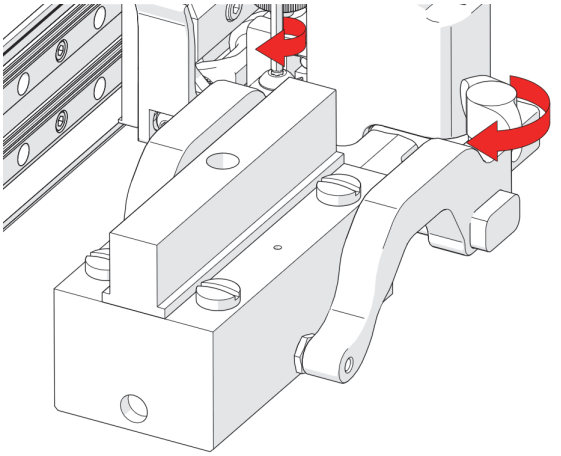


Figure 2-107 Pivot buttons

2.12.2 Probe Holder Vertical Adjustment

1. Gently lift the heavy duty probe holder and simultaneously pull the latch (Figure 2-108 on page 117). This action will unlock the probe holder.

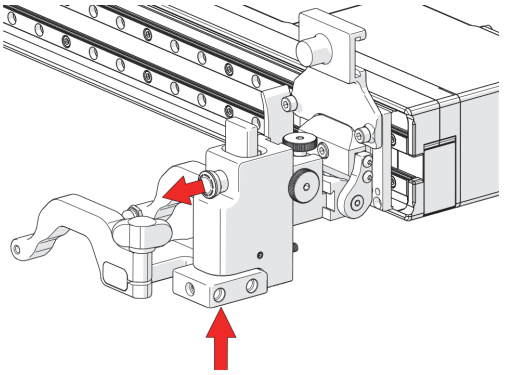


Figure 2-108 Press up and pull latch

2. Slowly lower the probe holder toward the scan surface (see Figure 2-109 on page 118).

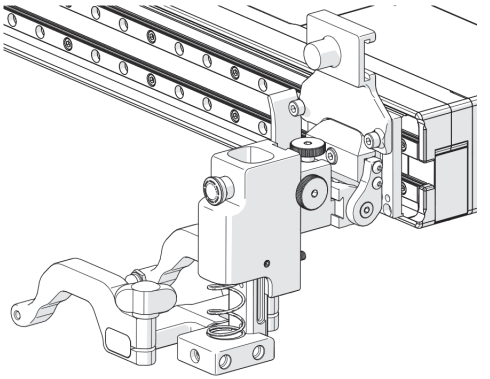


Figure 2-109 Lowered toward scan surface

2.12.3 Probe Holder Left/Right Conversion

1. Using the supplied 3 mm driver, unscrew the yoke (see Figure 2-110 on page 118).

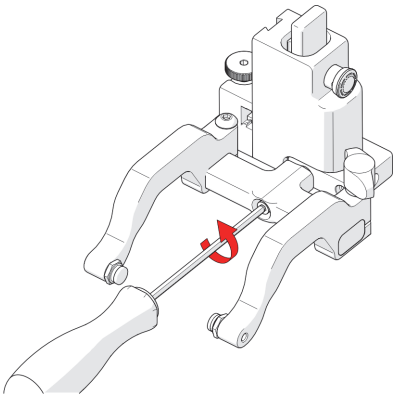


Figure 2-110 Remove yoke

2. Position the yoke and arms to the opposite side of the probe holder (see Figure 2-111 on page 119).

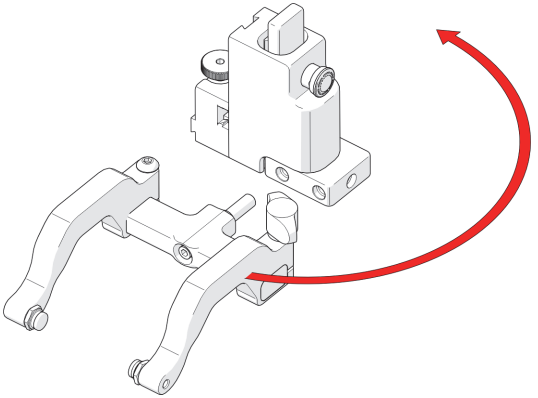


Figure 2-111 Orient to opposite side

3. Loosen the arm clamp screw and the probe holder arm adjustment knob, allowing removal of the probe holder arms (see Figure 2-112 on page 119).

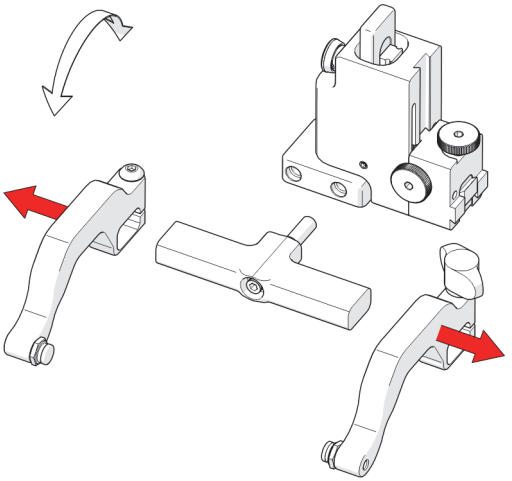


Figure 2-112 Remove probe holder arms

4. Position the removed arms to the opposite sides of the yoke (see Figure 2-113 on page 120).

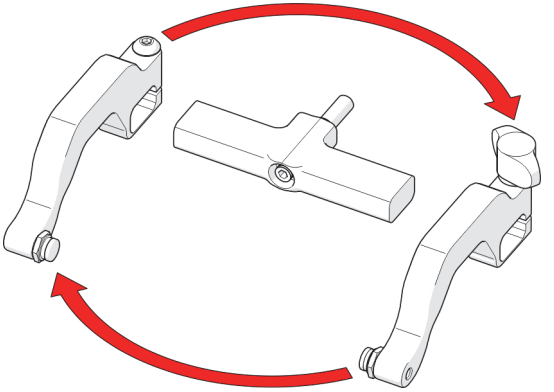


Figure 2-113 Reverse position around yoke

5. Position the pivot buttons to the inside of the probe holder arms (see Figure 2-114 on page 120).

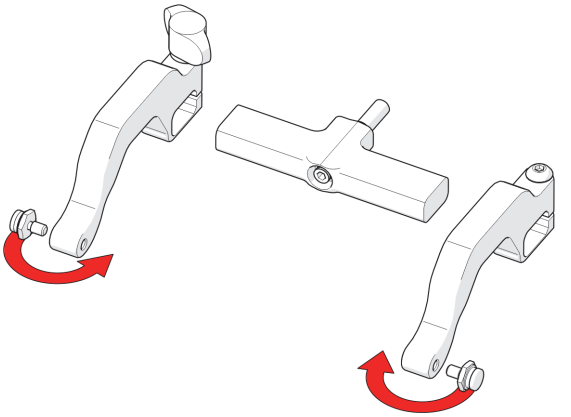


Figure 2-114 Position pivot buttons

6. Place the probe holder arms on the yoke and tighten the arm clamp screw and probe holder adjustment knob (see Figure 2-115 on page 121).

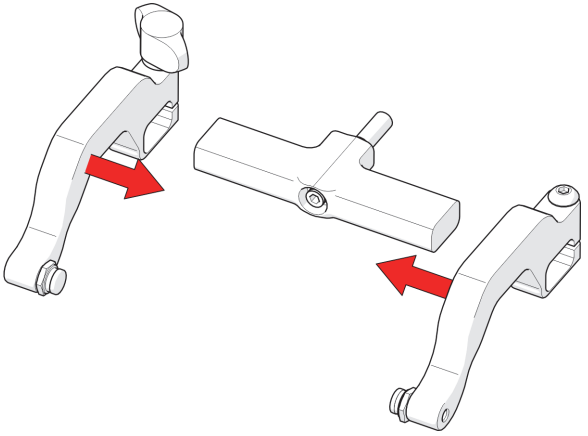


Figure 2-115 Place arms back onto yoke

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.

2.12.4 Probe Holder 90° Adjustment

To adjust the probe holder to 90°

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

2.13 Cable Management

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

2.13.1 Mounting the Cable Management Sleeve

To mount the cable management sleeve

1. Align the cable management clamp with the appropriate mounting position on the user umbilical breakout (see Figure 2-116 on page 122).

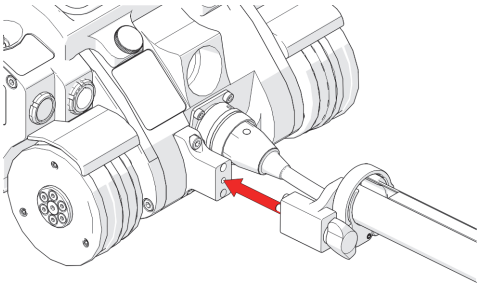


Figure 2-116 Align with umbilical

2. Tighten the cable management clamp wing knob (see Figure 2-117 on page 122).

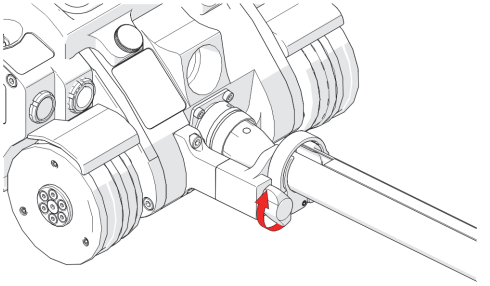


Figure 2-117 Tighten wing knob

2.13.2 Setting Up the Cable Management

To set up the cable management

1. Open the cable management sleeve. Begin at the clamp end and start placing the cabling in the tube (see Figure 2-118 on page 123).

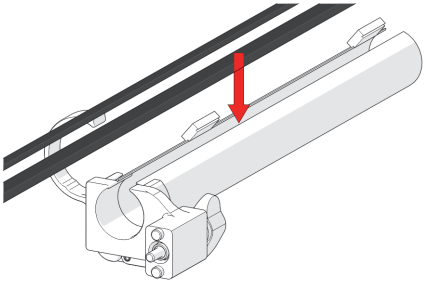


Figure 2-118 Insert cables and hoses

2. As you place the cable in the tube, follow along zipping the tube closed (see Figure 2-119 on page 123).

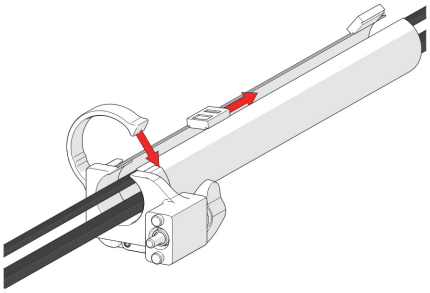


Figure 2-119 Zip to close

3. Once the cable is placed the entire length of tube, bring the zipper from the opposite end to meet at any point in the middle (see Figure 2-120 on page 124).

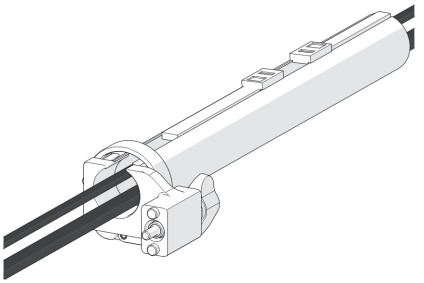


Figure 2-120 Zip opposite end

When necessary, the two zippers may be opened to allow any cables to be routed out of the tube (see Figure 2-121 on page 124).

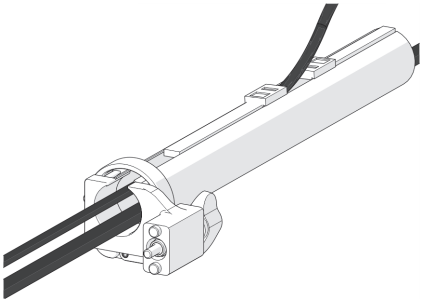


Figure 2-121 Flexible routing

2.13.3 Attaching the Cable Management Clamp

In the event 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. Using the supplied 3 mm hex driver, loosen the clamp screw.
2. Slide the clamp around the tube, and then slide the tube around the outside of the mount (see Figure 2-122 on page 125).

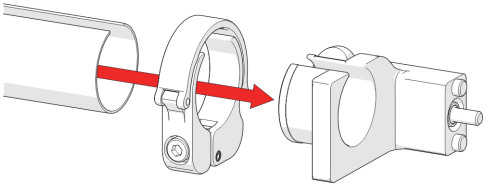


Figure 2-122 Slide tube around mount

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 2-123 on page 125).

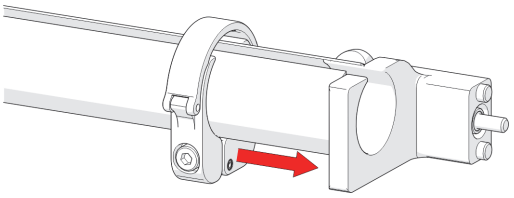


Figure 2-123 Slide clamp onto mount

5. Tighten the clamp screw (see Figure 2-124 on page 125).

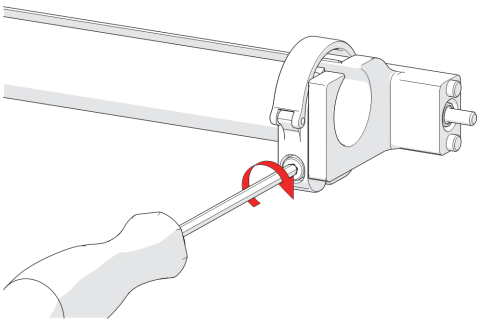


Figure 2-124 Tighten clamp screw

2.14 Pre-Amp Bracket (Optional)

The MapROVER 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 MapROVER with a lanyard or probe cables strong enough to prevent the object from falling.

Have smooth edges that will not cut the pre-amp bracket's straps.

The pre-amp bracket mounts to any dovetail groove to hold a pre-amp. Compatible with most standard pre-amps, use the adjustable screw mounting channel on the bottom of the bracket to attach a pre-amp. The pre-amp bracket may also be ordered with hook and loop straps, which are used to hold the pre-amp (see Figure 2-125 on page 126 to Figure 2-127 on page 127).

To install and use the pre-amp bracket

1. Insert the hook and loop straps as shown in Figure 2-125 on page 126.

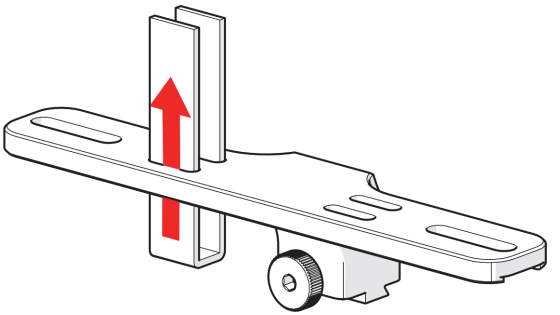


Figure 2-125 Inserting the hook and loop straps

2. Place the pre-amp in the bracket, and secure it in place using the hook and loop straps (see Figure 2-126 on page 127)

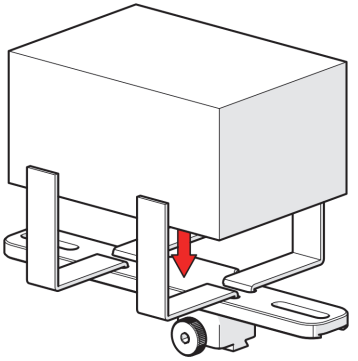


Figure 2-126 Place pre-amp in the bracket and secure with straps

3. Mount the bracket on a frame bar, and tighten the knob (see Figure 2-127 on page 127).

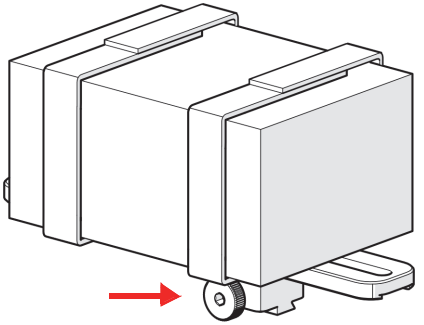
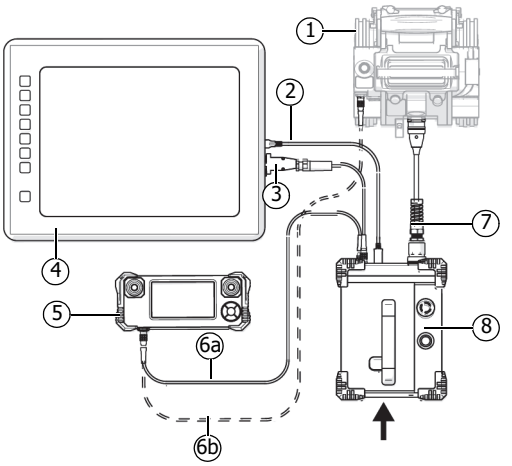


Figure 2-127 Knob to secure the pre-amp bracket on the frame bar

3. Configurations

This chapter contains information on making the connections to configure the MapROVER system for scanning.

3.1 MapROVER Base Configuration



Description	ID
Crawler	1
Scanlink cable	2
Encoder cable	3
User instrument	4
Handheld controller	5
Auxiliary cable	6a
Auxiliary cable (alternate)	6b
Umbilical	7
Power controller	8
AC/DC power supply	9

Figure 3-1 Base configuration

To configure the MapROVER system for scanning using a raster arm module, follow these steps (see “Raster Arm Module” on page 65 for additional details).

CAUTION

Only perform cable connections when power is disconnected. Connecting cables when power is active on can damage electrical components.

To configure the system

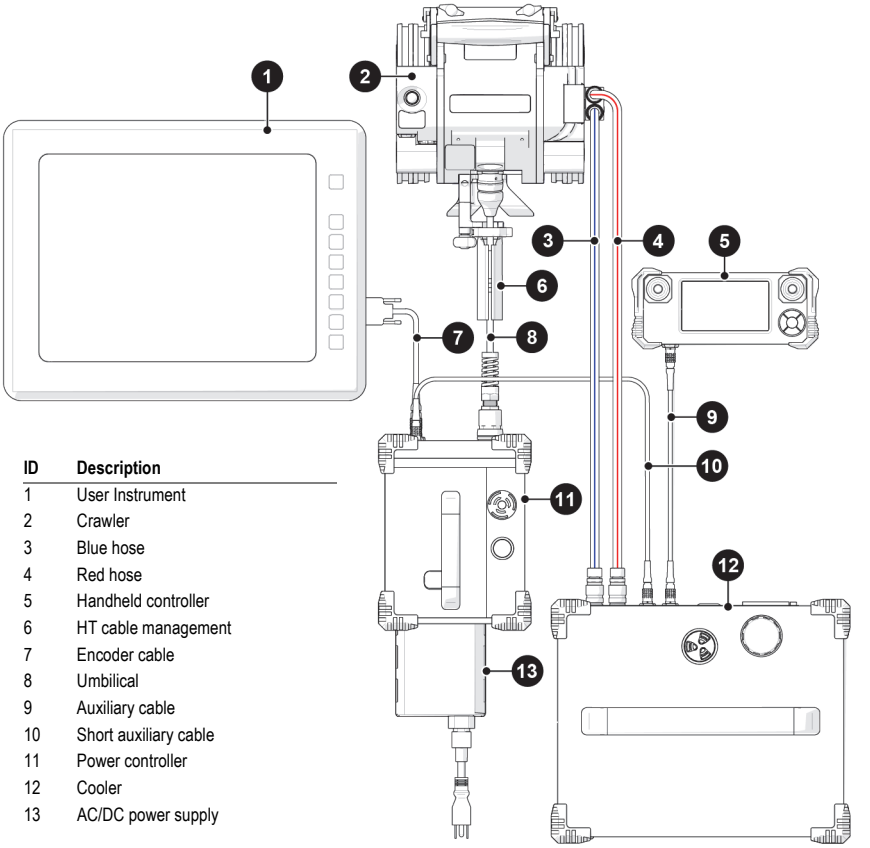
1. Connect the power controller (8) to the crawler using the umbilical (7) (see Figure 3-1 on page 130).
2. Connect the handheld controller (5) to the power controller (8) using the controller cable (3) (see Figure 3-1 on page 130).

NOTE

The handheld controller (5) may also be connected directly to the crawler (1).

3. Connect the instrument (4) to the power controller (8) using the encoder cable (3) (see Figure 3-1 on page 130).
4. Insert the AC/DC power supply (9) into the power controller (8).

3.2 MapROVER HT Base Configuration



ID	Description
1	User Instrument
2	Crawler
3	Blue hose
4	Red hose
5	Handheld controller
6	HT cable management
7	Encoder cable
8	Umbilical
9	Auxiliary cable
10	Short auxiliary cable
11	Power controller
12	Cooler
13	AC/DC power supply

Figure 3-2 HT crawler base configuration

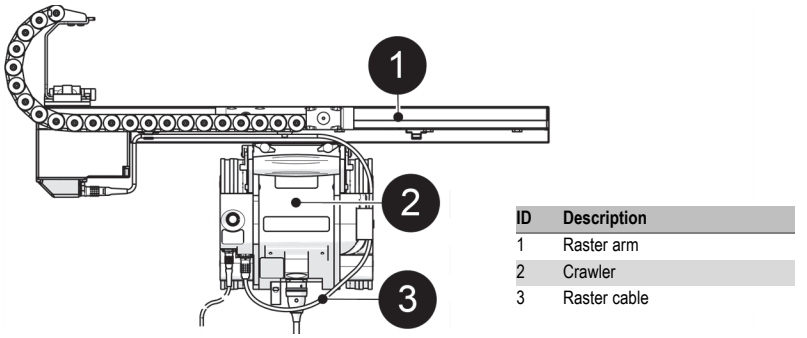
CAUTION

DO NOT DISCONNECT UNDER LOAD. Shut off power before connecting or disconnecting any components. Permanent damage to electronics could occur.

To configure the system

1. Attach the HT cable management (6) to the crawler (2).
2. Connect the power controller (11) to the crawler (2) using the umbilical (8) (see Figure 3-2 on page 132).
3. Connect (5) handheld controller to (12) cooler using the (9) auxiliary cable (see Figure 3-2 on page 132).
4. Connect the (12) cooler to the (11) power controller using the (10) short auxiliary cable.
5. Connect the (3) blue hose to either port on the (2) crawler. Connect the opposite end of the blue hose to the OUT port on the (12) cooler.
6. Connect the (4) red hose to either port on the (2) crawler. Connect the opposite end of the red hose to the OUT port on the (12) cooler.
7. Route the (8) umbilical, (3) blue hose and the (4) red hose through the (6) HT cable management (see "Hose Connection and Routing (HT)" on page 60).
8. Connect (1) your data acquisition instrument to the (11) power controller using the (7) encoder cable.
9. Insert (13) AC/DC power supply into the (11) power controller.

3.3 Crawler with Raster Arm Module



ID	Description
1	Raster arm
2	Crawler
3	Raster cable

Figure 3-3 Raster arm configuration

To configure the MapROVER system for scanning using a raster arm module, follow these steps (see "Raster Arm Module" on page 65 for additional details).

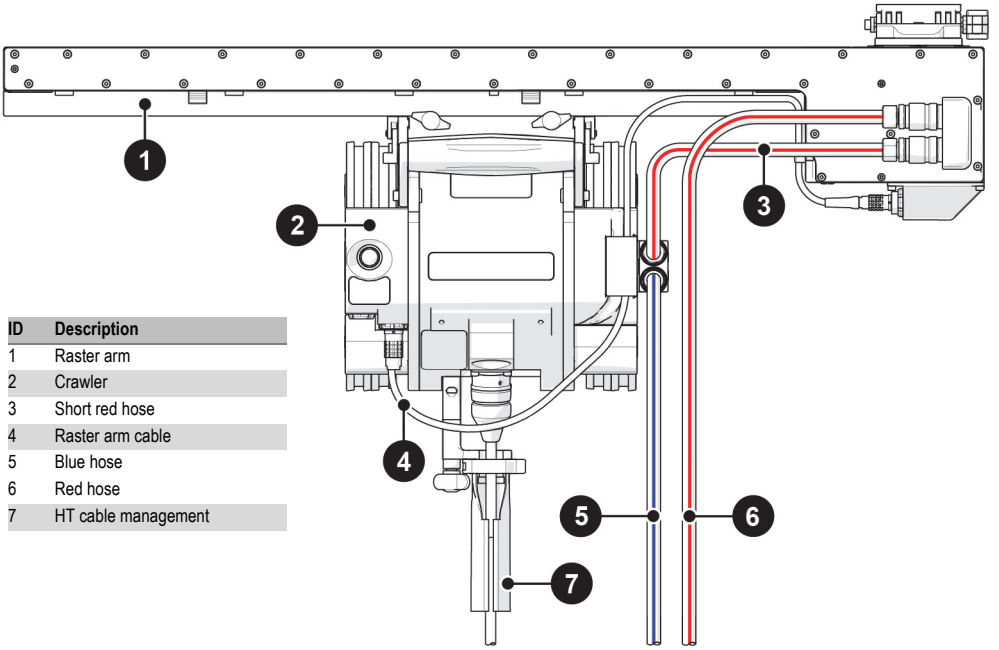
CAUTION

Only perform cable connections when power is disconnected. Connecting cables when power is active on can damage electrical components.

To configure the system for scanning using a raster arm module

1. Mount the raster arm module to the crawler (see Figure 3-1 on page 130 and "Raster Arm Module" on page 65).
2. Connect from the raster arm to the crawler using the raster arm cable (see Figure 3-1 on page 130 and "Setting up the Raster Arm Cable" on page 70).

3.4 HT Crawler and HT Raster Arm

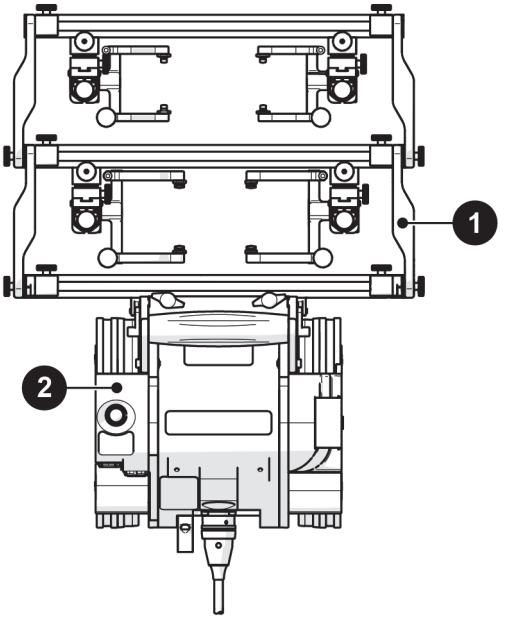


ID	Description
1	Raster arm
2	Crawler
3	Short red hose
4	Raster arm cable
5	Blue hose
6	Red hose
7	HT cable management

Figure 3-4 HT crawler and HT raster arm configuration

1. Install the (1) HT raster arm on the (2) crawler (see “Mounting a Raster Arm” on page 65).
2. Connect the (1) HT raster arm to the (2) crawler using the (4) raster arm cable (see “Setting up the Raster Arm Cable” on page 70).
3. Connect the (6) long red hose to either port on the (1) HT raster arm.
4. Connect the (3) short red hose to a port to the (2) crawler. Connect the opposite end to either port on the (1) HT raster arm.
5. Connect the (6) blue hose to the remaining port on the (2) crawler.
6. Attach the (7) HT cable management to the (2) crawler. Route the (5) red hose and the (6) blue hose through the HT cable management (see “Cable Management” on page 121).

3.5 Crawler with Vertical Probe Holder Frame



Description	ID
Vertical probe holder frame	1
Crawler	2

Figure 3-5 Probe holder frame configuration

To configure the MapROVER system for scanning using a vertical probe holder frame, follow these steps (see “Vertical Probe Holder Frame” on page 109):

CAUTION

DO NOT DISCONNECT UNDER LOAD. Shut off power before connecting or disconnecting any components. Permanent damage to electronics could occur.To configure the system for scanning using a probe holder frame.

1. Mount a configured vertical probe holder frame (see “Vertical Probe Holder Frame” on page 109) to the crawler (see “Swivel Mount” on page 51).

4. Operation

DANGER

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

4.1 System Startup

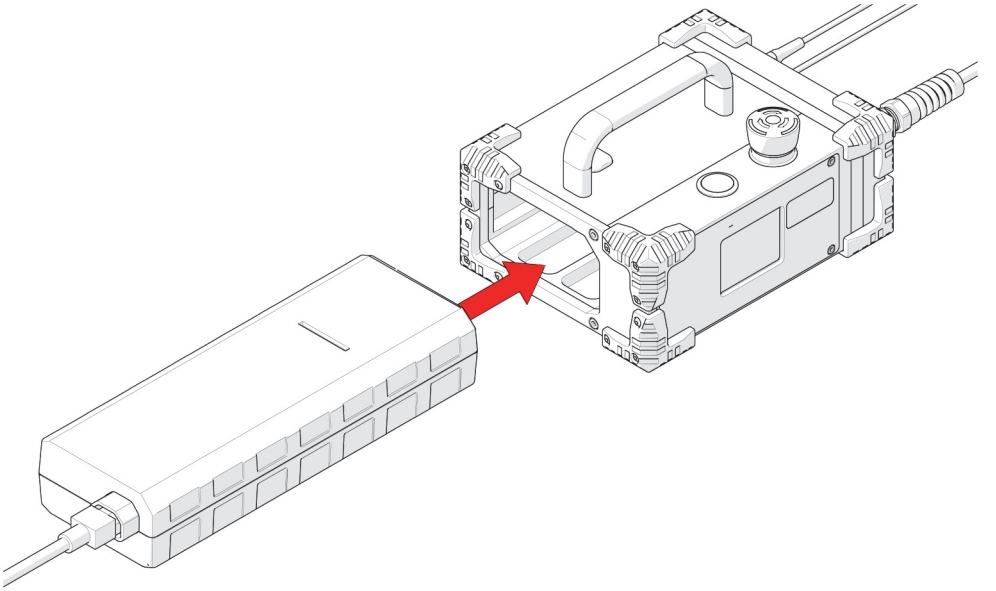


Figure 4-1 Insert power source

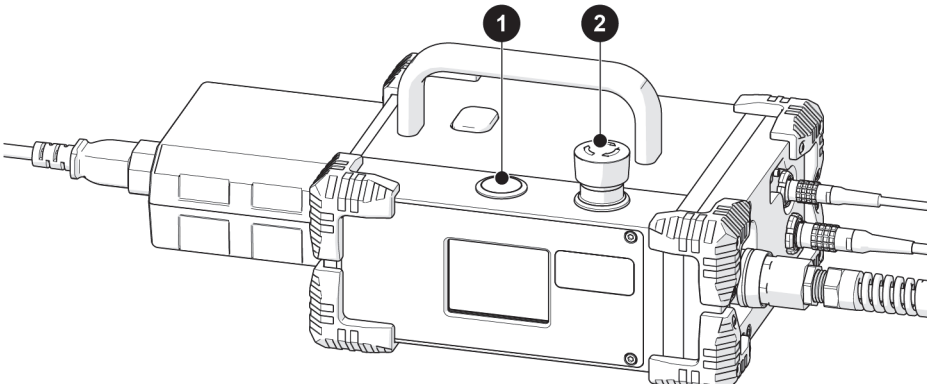


Figure 4-2 Power controller

To start up the system

1. Insert a power source into the power controller dock (see “Power Requirements” on page 209).
2. Connect the components (see “Configurations” on page 129).
3. Locate the red emergency off push-button on the power controller. Rotate this button clockwise to unlatch item #1 (see Figure 4-2 on page 140).

   The green push-button on the power controller activates the system (see item #2, Figure 4-2 on page 140).

   A warning message will display on the handheld controller when the power has been activated (see Figure 4-3 on page 141).

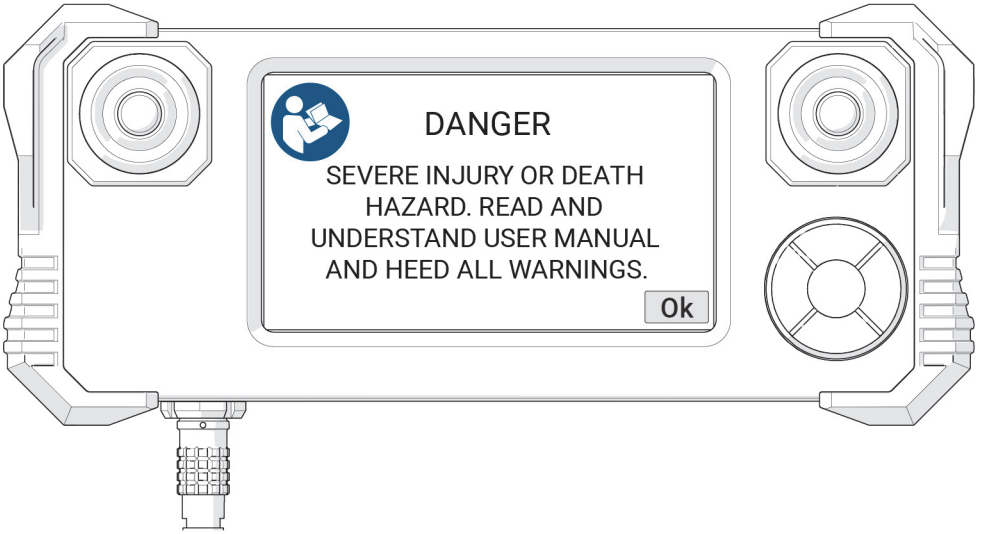


Figure 4-3 Handheld controller warning message

4. Once you have recognized and understood the dangers of using the MapROVER scanner by reading this user’s manual, touch **Ok** to acknowledge the warning.

A second warning message (see Figure 4-4 on page 142) will display requesting assurance that a No Entry Fall Zone has been established (see “No Entry Fall Zone” on page 34) and the tether requirements are met (see “Tether Requirements and Attachment” on page 35).

Figure 4-4 Falling object warning

5. 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 will appear indicating the carriage must move to the home position (see Figure 4-5 on page 142).

Figure 4-5 Raster homing

6. Ensure that 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 will be displayed.

After the system is initialized, the **Jog Mode** screen will appear (see "Jog Mode" on page 157). The system is now ready for operation.

4.2 Cooler Startup (HT)

To activate the cooler system

1. Place the power supply in a dry location and plug the power cord into an appropriate power source.
2. Plug the power supply's LEMO connector into one of the AUX connections on the Cooler (see "Cooler Setup (HT)" on page 86).

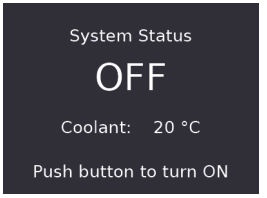


Figure 4-6 Standby screen

3. When power is connected, the Cooler enters standby mode and the indicator appears solid red. The LCD indicates the system status as OFF (see Figure 4-6 on page 143).

Figure 4-7 Initializing screen

4. To activate the Cooler, press the **MODE** button. The system initialization begins, and the indicator blinks green (see Figure 4-7 on page 144).

NOTE: Initializing will time-out if closed-loop flow is not fully established after 3 minutes.

Figure 4-8 Running screen

5. Normal Cooler operation begins when the operating flow is achieved. The Running screen is displayed (see Figure 4-8 on page 144).

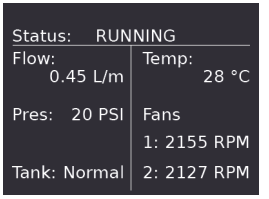


Figure 4-9 Information screen

6. Press and hold the **MODE** button on the cooler to view detailed information on the cooler's LCD screen (see Figure 4-9 on page 144).

4.3 Cooler Shutdown (HT)

To cease cooler operation and enter standby mode

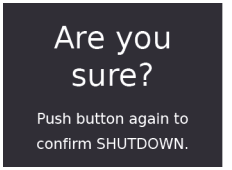


Figure 4-10 Confirmation screen

1. Press the **MODE** button once. A screen confirming Cooler shutdown appears (see Figure 4-10 on page 145), and the indicator blinks yellow. If the **MODE** button is not pressed a 2nd time within 5 seconds, the screen reverts to **Running** status (see Figure 4-8 on page 144).

NOTE: During shutdown confirmation, the system continues to operate normally until the **MODE** button is pressed a second time.

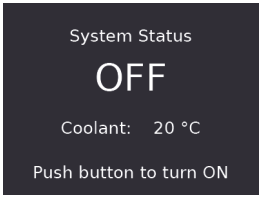


Figure 4-11 Standby screen

2. Press the **MODE** button a second time, and the Cooler enters standby mode (see Figure 4-11 on page 145).

4.4 Placement of Crawler on the Inspection Surface

DANGER

FALLING OBJECT HAZARD. Read and understand the proper procedure for using the installation/removal mat. If the MapROVER 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 MapROVER scanner using the umbilical cable. Use the provided handles.

IMPORTANT

To place the scanner on the inspection surface, use the scanner installation/removal mat (see Figure 1-4 on page 40) as a spacer between the wheels and the surface on which the crawler is to drive. This is necessary to protect the electronic components within the MapROVER from shock damage if the scanner wheels impact the inspection surface with too much force.

To place the crawler on the inspection surface

NOTE

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

1. Ensure that the MapROVER preparation is complete (see “Preparation for Use” on page 33) and system startup has been performed (see .“System Startup” on page 140).
2. Release the front swivel adjustment levers, located at the front of the crawler, to position the front swivel mount (see Figure 4-12 on page 147).
3. Raise the front swivel mounts to ensure that they will not hinder the wheels from contacting the inspection surface (see “Swivel Mount” on page 51).

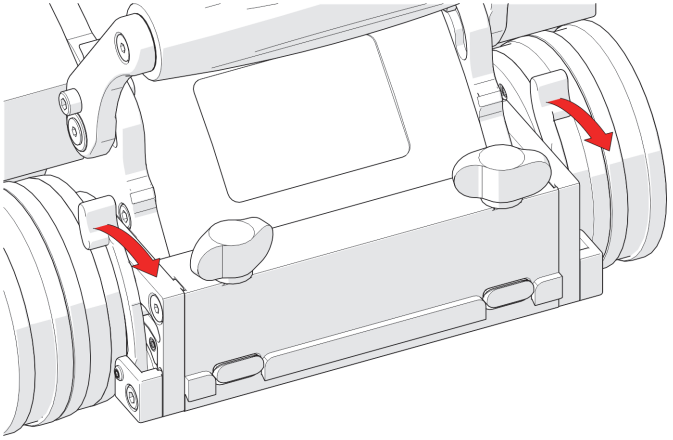


Figure 4-12 Front swivel adjustment levers

4. Set the MapROVER to **Jog** mode (see “Jog Mode” on page 157).
5. Place the installation/removal mat (see Figure 1-4 on page 40) on the inspection surface (see Figure 4-13 on page 148).

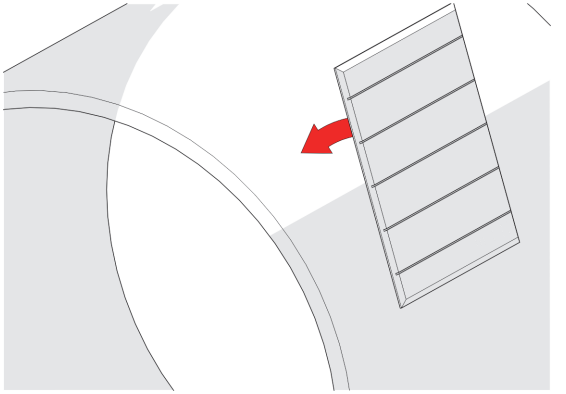


Figure 4-13 Place installation/removal mat

WARNING

MAGNETIC MATERIAL. The installation/removal mat contains magnetic material. People with pacemakers or ICDs must stay at least 10 cm (4 in.) away.

6. Place and hold the MapROVER scanner on the installation/removal mat (see Figure 4-14 on page 148).

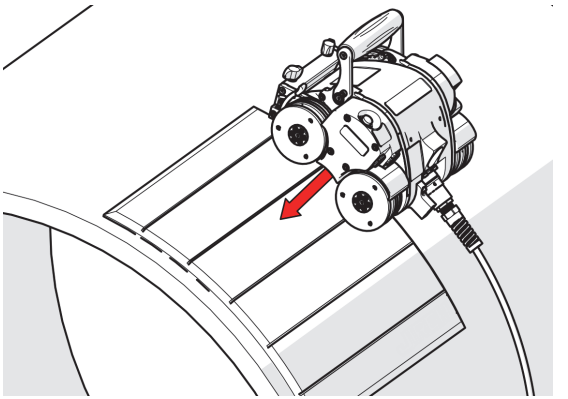


Figure 4-14 Lower the crawler to the mat

NOTE

Do NOT release the MapROVER when it is placed on the installation/removal mat, until instructed to do so in step 8.

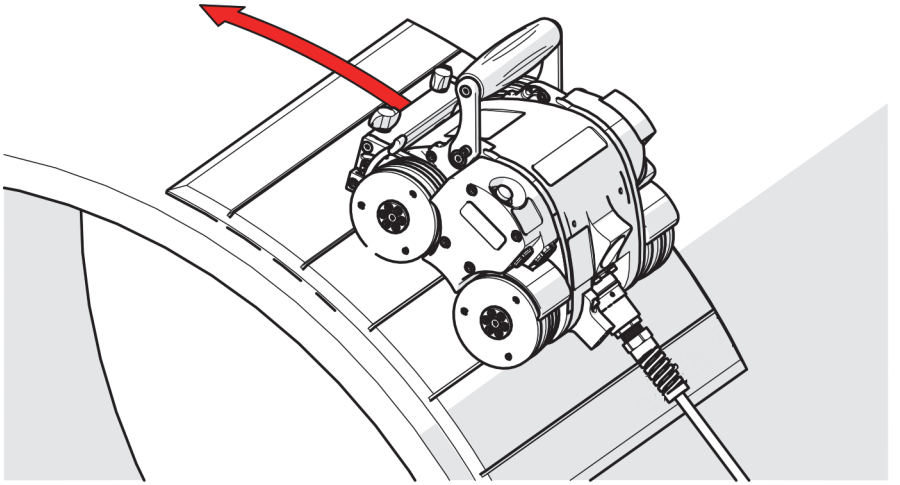
7. Ensure that all four wheels of the MapROVER are held firmly against the installation/ removal mat.
8. While holding the MapROVER, use the Fwd/Rev joystick to carefully drive the scanner off the installation/removal mat and onto the inspection surface. When the MapROVER is securely on the inspection surface, you may let go of the scanner (see Figure 4-15 on page 149 and see Figure 4-16 on page 150).
9. 

Figure 4-15 Drive crawler off the mat

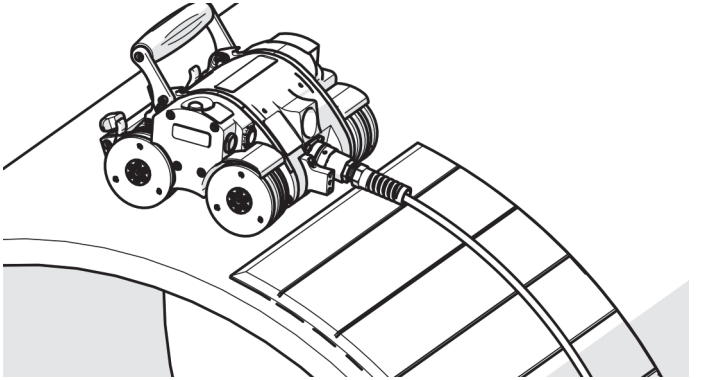


Figure 4-16 Magnetized to surface

TIP

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

10. Remove the installation/removal mat from the inspection surface.

TIP

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

4.5 Placement of HT Crawler on the Inspection Surface


WARNING

HOT SURFACE. The HT crawler may reach temperatures that may cause burns if it comes in contact with bare skin. Wear heat resistant safety gloves when handling.

IMPORTANT

It is important to place the crawler on the inspection surface as instructed, see “To place the HT crawler on the inspection surface” on page 152.
To protect the electronic components within the crawler from damaging shock. The crawler should never be slammed directly onto the surface.

CAUTION

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


WARNING

MAGNETIC MATERIAL. The wheels of the crawler 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.

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

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

CAUTION

Ensure that the Cooler is properly connected and pumping coolant through the MapROVER HT system before placing the crawler on a hot surface, and ensure that it remains pumping until after the crawler is removed from the hot surface. Failure to do so could result in rupture of the tubes due to overheating.

DANGER

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

To place the HT crawler on the inspection surface

NOTE

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

1. Ensure that the crawler preparation is complete (see “Preparation for Use” on page 33) and system startup has been performed (see .“System Startup” on page 140).
2. Release the front swivel adjustment levers, located at the front of the crawler, to position the front swivel mount (see Figure 4-12 on page 147).
3. Raise the front swivel mounts to ensure they will not hinder the wheels from contacting the inspection surface (see “Swivel Mount” on page 51).

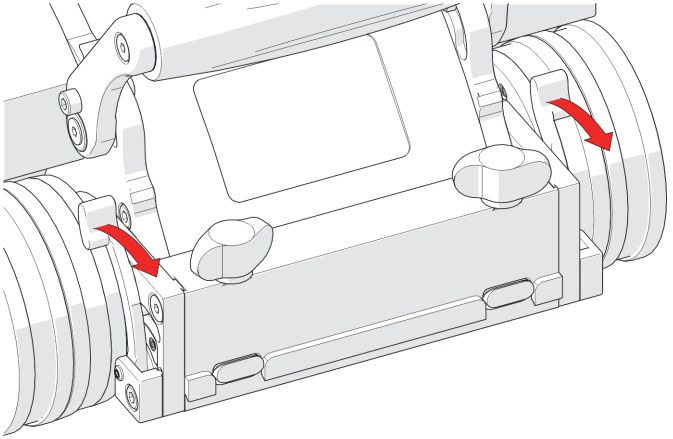


Figure 4-17 Front swivel adjustment levers

4. Ensure that the manipulation handle is installed on the crawler.
5. Ensure that the Cooler is running and pumping fluid to the crawler. Do NOT place a crawler on a heated surface unless the cooler is running properly.
6. While firmly grasping the crawler handle with one hand and the manipulation handle with the other, carefully lower the pry point of the crawler towards the inspection surface with the wheels of the crawler held as high off the surface as possible (see .Figure 4-18 on page 153).

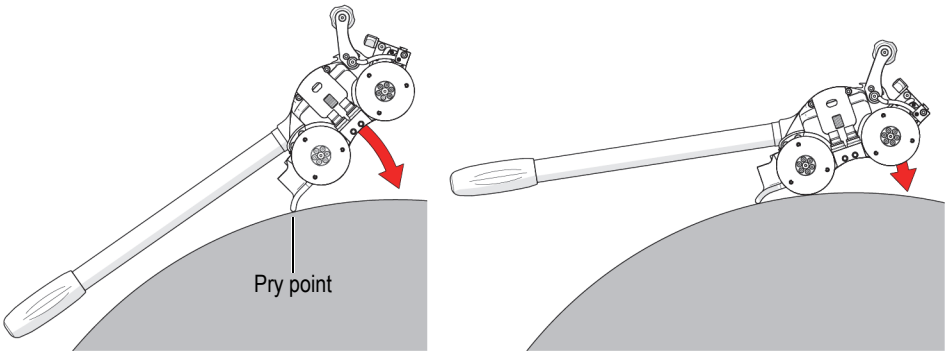


Figure 4-18 Lowering the HT crawler on the surface

7. With a firm grip on the manipulation handle, slowly lower the wheels of the crawler towards the inspection surface (see Figure 4-18 on page 153) until all four wheels contact the surface.

To remove the HT crawler from the inspection surface

1. Ensure that the manipulation handle is installed on the crawler.
2. Firmly grasp the crawler handle with one hand and the manipulation handle with the other, and then carefully press down on the manipulation handle to lower the pry point of the crawler towards the inspection surface (see Figure 4-19 on page 154).

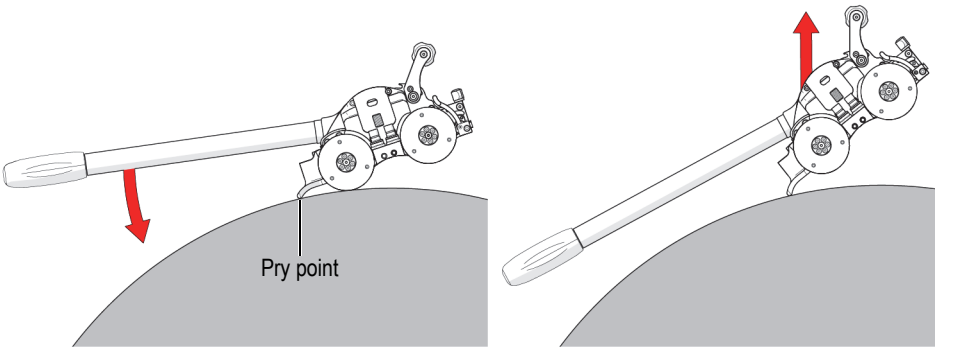
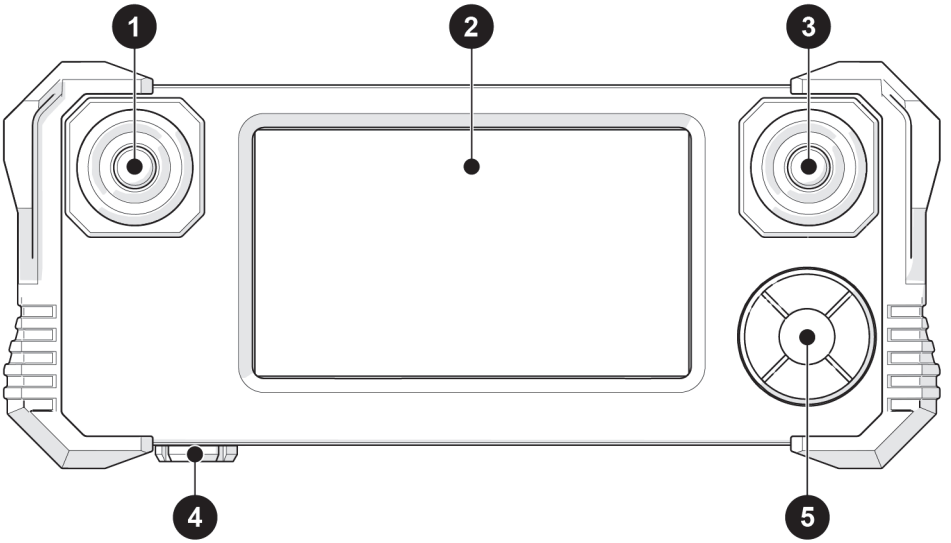


Figure 4-19 Removing the HT crawler from the surface

3. When the two front wheels of the crawler separate from the scan surface, continue to press down on the manipulation handle (see Figure 4-19 on page 154).
4. Pivot the crawler away from the scan surface and lift the crawler using the manipulation handle and the crawler handle (see Figure 4-19 on page 154).

4.6 Handheld Controller Layout

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



ID	Description
1	Fwd/Rev joystick
2	Touch screen
3	Steering/Raster joystick
4	Controller cable connector
5	D-pad

Figure 4-20 Handheld controller

4.6.1 Touch Screen

The handheld controller touch screen (see Figure 4-20 on page 155) is the primary operator interface for the system. Buttons are indicated on the screen with a 3D border (see Figure 4-21 on page 155).

Figure 4-21 Sample touch-screen buttons

4.6.2 D-pad

The D-pad (see Figure 4-20 on page 155) provides a redundant system control that may be used as an alternative to the touch screen. A blinking box around a button indicates the D-pad selection. Pressing the outer buttons of the D-pad selects different buttons on the screen. Press the center button to choose the button currently selected.

4.6.3 Joysticks

The joysticks are used to control the system. The left joystick controls the forward/reverse movement of the MapROVER. The right joystick's function is selected on the screen. Right joystick functions include MapROVER steering or raster arm movement (see Figure 4-22 on page 156).

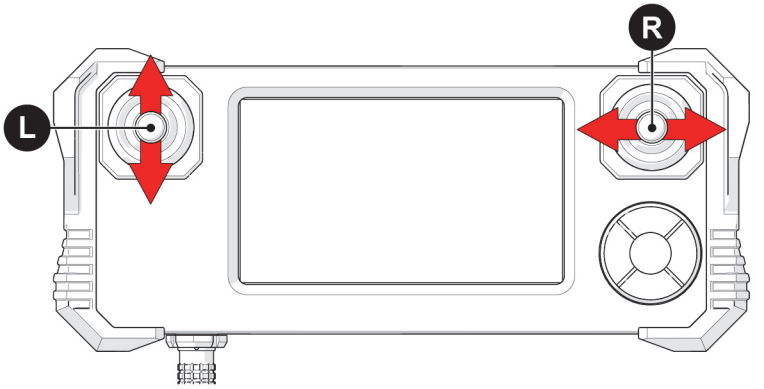


Figure 4-22 Handheld controller joysticks

4.7 Main Mode Selection Screen

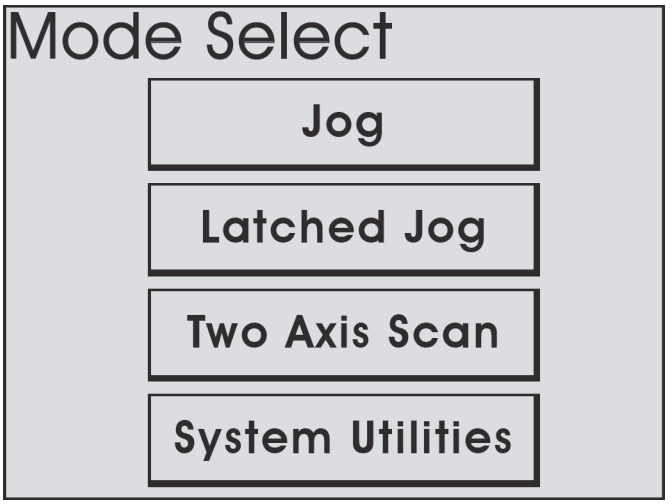


Figure 4-23 Mode Select

The **Mode Select** screen displays the different modes of operation for the system (see Figure 4-23 on page 157):

- Jog Mode (see “Jog Mode” on page 157)
- Latched Jog Mode (see “Latched Jog Mode” on page 163)
- Two Axis Scan (see “Two Axis Scan Mode” on page 164)
- System Utilities (see “Press Back to return to the Two Axis Scan screen to reset the scanner and maintain the original A position. Press Continue to reset the A position and return to the Two Axis Scan Setup screen.System Utilities Screen” on page 171)
- Cooler mode (MapROVER HT) (see “Cooler Mode (HT)” on page 182

4.7.1 Jog Mode

Jog mode enables you to manually control 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 65), both the crawler information and raster information are displayed (see Figure 4-24 on page 158). When a raster arm is not connected, only the crawler information is displayed under **Crawler** (see Figure 4-25 on page 158).

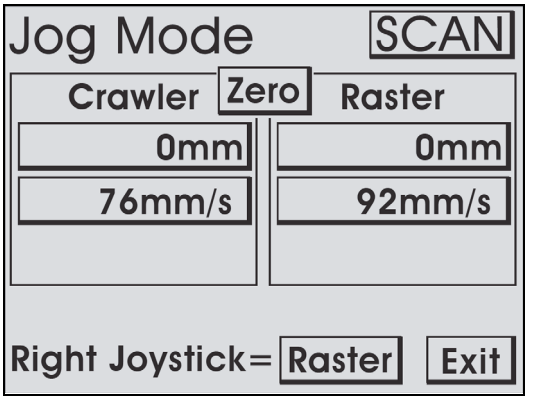


Figure 4-24 Jog mode with raster arm

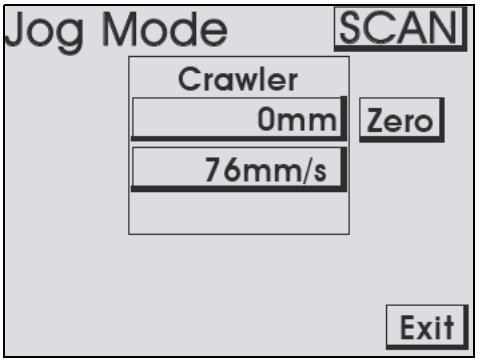


Figure 4-25 Jog mode

Button Identification

The following descriptions identify the buttons of the **Jog Mode** screen and explain their functions (see Figure 4-26 on page 159 and Figure 4-27 on page 161).

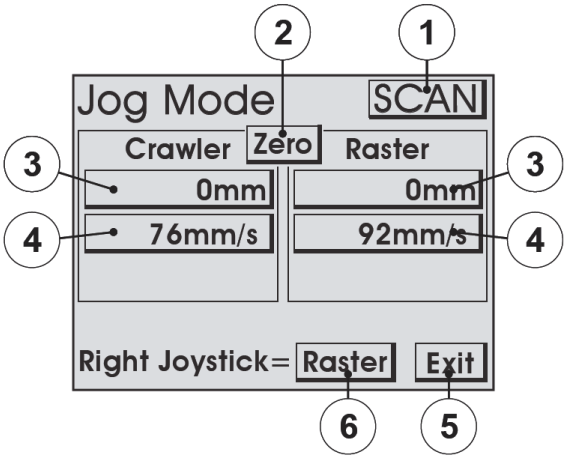


Figure 4-26 Button identification

(1) **Scan/Rapid** button

Used to quickly switch between MapROVER speeds. The speed in either mode can be manually set to the your 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 172").

---

(2) **Zero** button

Sets the current position to zero for all modules.

NOTE

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

(3) Module position button(s)

Displays the current position of the MapROVER 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 MapROVER 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.

(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 MapROVER steering.

Left Joystick

Moves the MapROVER 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 MapROVER 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.

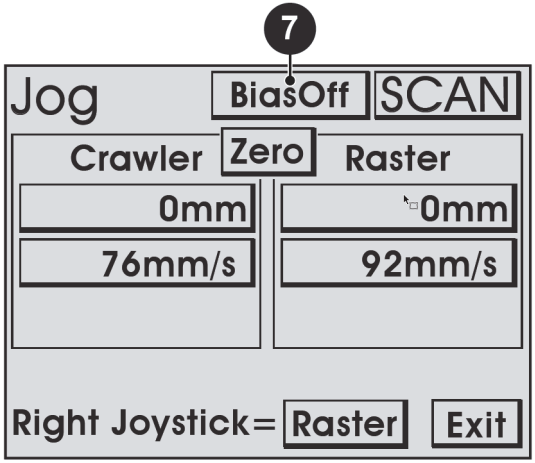


Figure 4-27 Jog mode button identification–Bias button

(7) **Bias On/Bias Off** button

When the **Steering Bias** is set to any value other than zero (see "User Settings Screen" on page 172), 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.

4.7.2 Jog Mode (HT)

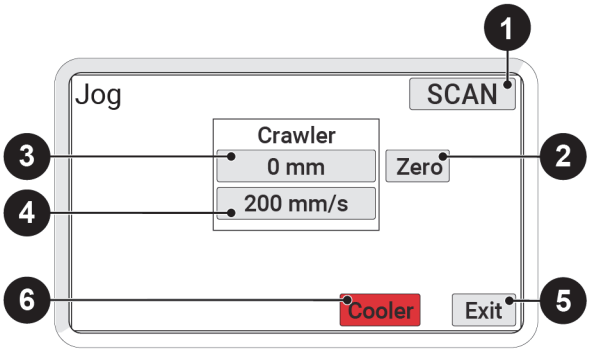


Figure 4-28 Jog mode button identification

Jog mode enables you to manually control the system movement using the joysticks.

(1) **Scan/Rapid** button

Used to quickly switch between MapROVER speeds. The speed in either mode can be manually set to the your 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 172").

---

(2) **Zero** button

Sets the current position to zero for all modules.

NOTE

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

---

(3) Module position button(s)

Displays the current position of the MapROVER 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 MapROVER 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.

(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) **Cooler** button

Press to access the cooler controls. The cooler button will blink rapidly to indicate that the cooler is deactivated and not pumping coolant to the scanner.

4.7.3 Latched Jog Mode

Identical to standard Jog mode, latched jog mode adds buttons for forward and reverse crawler movement at the selected scan rate. This eliminates the need to manually hold the left joystick (see "Jog Mode" on page 157).

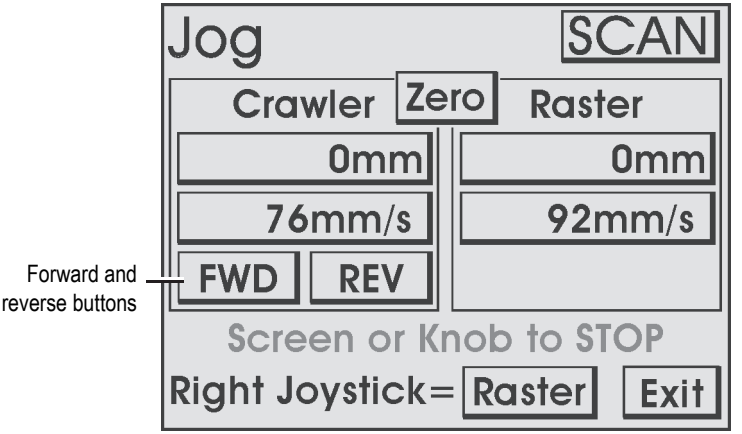


Figure 4-29 Latched Jog mode button identification

FWD and **REV** buttons

The **FWD** and **REV** buttons are located on the **Crawler** tab. Press the **FWD** or **REV** button to drive the MapROVER at the current maximum scan rate. When the MapROVER is in motion, the raster joystick is still enabled. Touching the handheld controller's touch screen or pressing the D-pad center button stops the MapROVER scanner's movement.

NOTE

The **FWD** and **REV** buttons will not be present in rapid mode.

4.7.4 Two Axis Scan Mode

The two axis scan mode enables scanning to be performed using the scanner as one axis of movement and a raster arm module as the second axis of movement.

NOTE

Two axis scan mode will not be available unless the raster arm module is connected.

4.7.4.1 Two Axis Scan Setup Screen

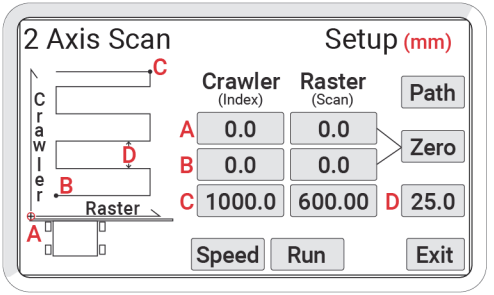


Figure 4-30 The Two Axis Scan Setup screen

The **Two Axis Scan Setup** screen is used to program the desired scan pattern the system will use (see Figure 4-30 on page 165).

Point A

The current position of the scanner 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).

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

NOTE

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

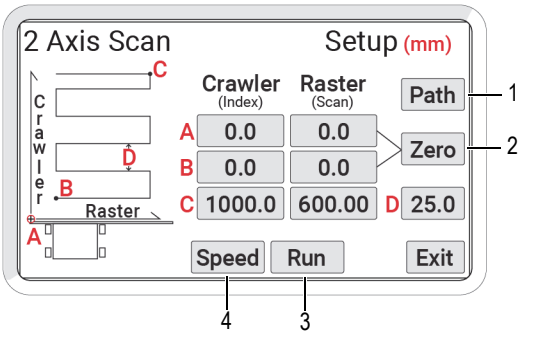


Figure 4-31 Two Axis Scan Setup screen

Path button (1)

Toggles between a horizontal or vertical scan path (see Figure 4-32 on page 166).

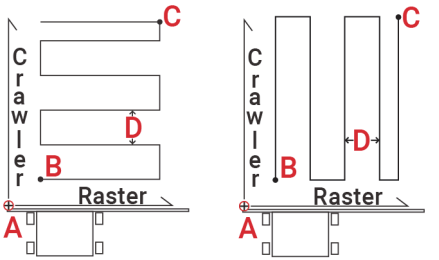


Figure 4-32 Scan paths

Zero button (4)

Set the numerical value for crawler and raster in rows A and B to zero.

Run button (3)

Initiates a check of the input values to ensure that they are within the system capabilities. When a scan pattern is invalid, a warning will be displayed (see Figure 4-33 on page 167). Pressing **OK** returns to the **Two Axis Scan Setup** screen, allowing correction of the error.

When no issues are detected, the **Scan** screen is enabled (see "Two Axis Scan Screen" on page 168).

Speed button (4)

Access the **Scan Speeds** screen (see "Scan Speeds Screen" on page 167).

Figure 4-33 Run button error

4.7.4.2 Scan Speeds Screen

The **Scan Speeds** screen is where you adjust speed settings for the two axis scanning (see Figure 4-34 on page 168).

TIP

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

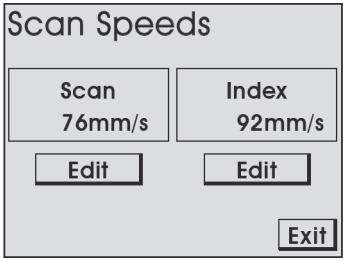


Figure 4-34 Scan speeds

Edit buttons

Enables you to adjust the corresponding axis speed.

Exit button

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

4.7.4.3 Two Axis Scan Screen

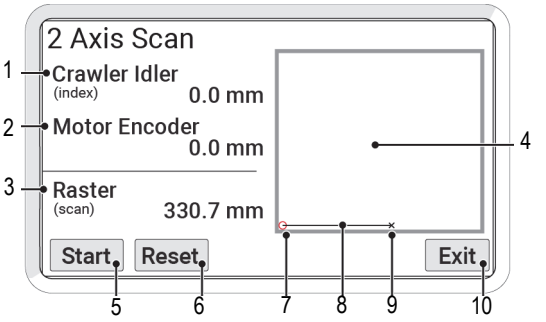


Figure 4-35 The Two Axis Scan screen

The **Two Axis Scan** screen initiates and monitors a two axis scan (see Figure 4-35 on page 168).

Crawler Idler (1)

The current position of the crawler as indicated by the crawler's idler encoder.

NOTE

The crawler position indicated by **Crawler Idler** is typically more accurate than the position indicated by the **Motor Encoder**. The **Motor Encoder** reading is affected by drive wheel slippage whereas the **Crawler Idler** reading is not affected by drive wheel slippage.

Motor Encoder (2)

The current position of the crawler as indicated by the crawler's motor encoder.

Raster (3)

Current position of the raster arm carrier.

Summary screen (4)

A visual representation of the scan area.

Start/Stop button (5)

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

Reset button (6)

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

Scan location (7)

A small red circle indicates the A position.

Scan path (8)

The scan path is illustrated during operation.

Scanner position (9)

The blinking crosshair indicates the current scanner position.

Exit button (10)

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

During a scan, a graphical representation of the scanner path is displayed (see Figure 4-36 on page 170).

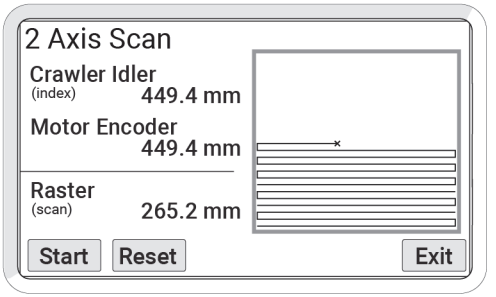


Figure 4-36 Scan path

When the scanner reaches the scan area, the summary screen displays a graphical representation of the scan area. The scan path will be illustrated as the scan sequence takes place (see Figure 4-30 on page 165).

Pressing **Exit** stops all scanning and motion. If the MapROVER is not in the A position a warning appears (see Figure 4-37 on page 170). The warning alerts you that the A position of the scanner will be changed to the current position.

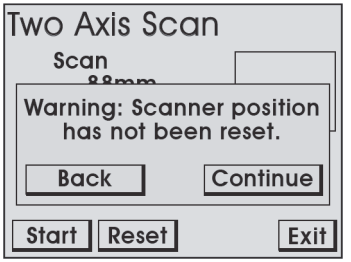


Figure 4-37 Exit warning

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

System Utilities Screen

The **Utilities** screen provides access to the setup, diagnostics and user preference settings (see Figure 4-38 on page 171).

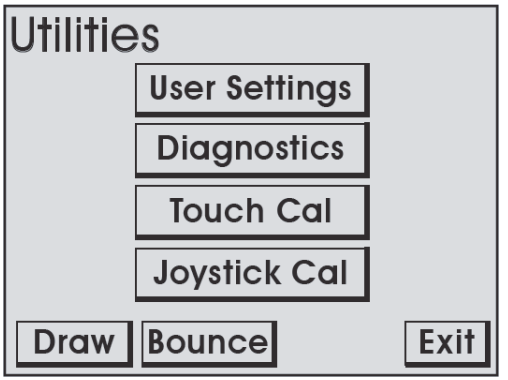


Figure 4-38 Utilities screen

User Settings button

Access the **User Settings** screen, where various user preferences can be adjusted.

Diagnostics button

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

Touch Cal button

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

Joystick Cal button

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

Draw button

Enters mode used to test the touch screen accuracy and response.

4.7.5.1 User Settings Screen

The **User Settings** screen enables you to customize the system to your preferences. The blinking highlighted box indicates the current selection (see Figure 4-39 on page 172). Use the click knob or **Up** and **Down** buttons to select different settings (see Table 5 on page 172).

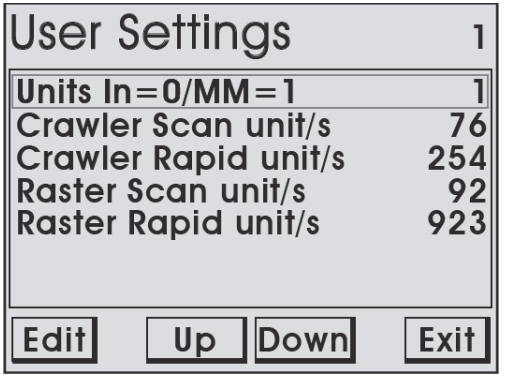


Figure 4-39 User Settings screen

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

Table 5 User settings

Title	Description	Valid range	Default
Units In = 0/MM = 1	Changes the measurement units for display and user entry. When set to 0, the measurement units are in inches. When set to 1, the measurement units are in millimeters.	0–1	1

Table 5 User settings *(continued)*

Title	Description	Valid range	Default
Crawler Scan unit/s	Sets the crawler scan rate in the current units/second. This setting can also be changed through the Jog or Two Axis Scan Speed screens.	5–142 mm/s (0.2–5.6 in./s)	43 mm/s (1.7 in./s)
Crawler Rapid unit/s	Sets the crawler rapid rate in the current units/second. This setting can also be changed through the Jog screen.	5–142 mm/s (0.2–5.6 in./s)	142 mm/s (5.6 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)	76 mm/s (3.0 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	Set raster arm orientation. When the raster arm is mounted with the motor housing to the left of the crawler, the appropriate setting is 1. When the raster arm is mounted with the motor housing to the right of the crawler, the appropriate setting is 0. When this setting is changed, the system must be rebooted.	0–1	1

4.7.5.2 Diagnostics Screens

Several diagnostic screens enable various system functions to be monitored. Navigate to different diagnostic screens using the **PREV** and **NEXT** buttons. The Exit button returns to the **System Utilities** screen.

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

The **Detected Modules** screen indicates the system software version and displays which modules were detected when the system was activated (see Figure 4-40 on page 175). **Raster600** indicates the 600 mm raster arm is connected.

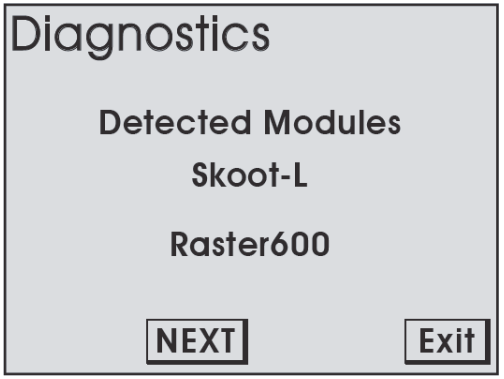


Figure 4-40 Detected Modules screen

System 1

The **System 1** diagnostic screen displays general system function information (see Figure 4-41 on page 175).

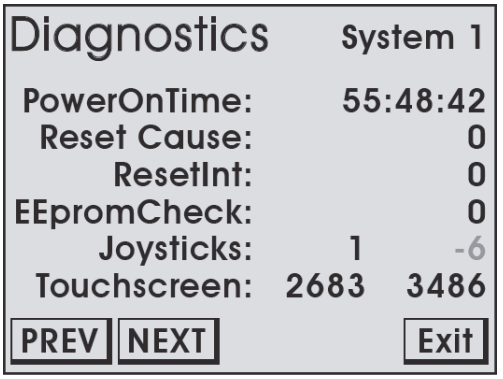


Figure 4-41 System 1 Diagnostics screen

PowerOnTime

The total accumulative time the handheld controller has been powered.

Joysticks

Indicates the raw position reading from the joysticks.

Touch screen

Indicates the raw position reading from the last touch screen contact.

System 2

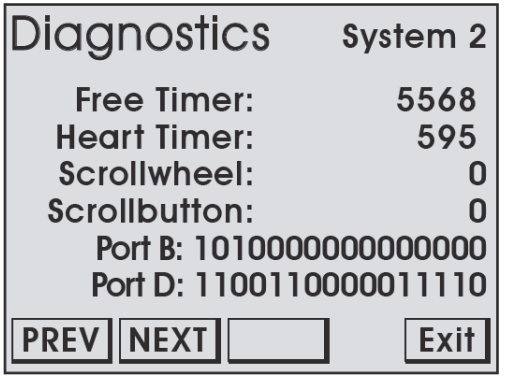


Figure 4-42 System 2 Diagnostics screen

Additional general system function information is displayed on the System 2 screen. An empty button is provided to allow testing of the click wheel.

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. The information provided does not typically assist the user (see Figure 4-43 on page 177).

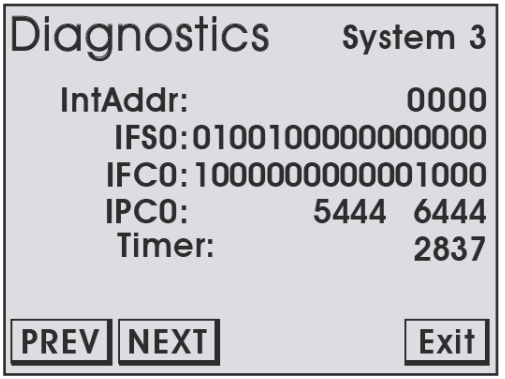


Figure 4-43 System 3 Diagnostics screen

MapROVER, Raster

The MapROVER diagnostic screen provides information regarding the status of the crawler. A separate screen is available for each module detected upon system startup (see Figure 4-44 on page 177 and Figure 4-45 on page 178).

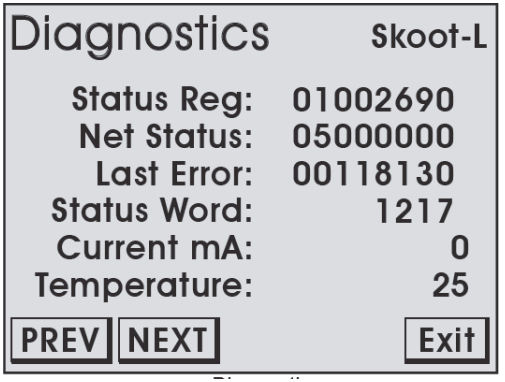


Figure 4-44 Diagnostic screen

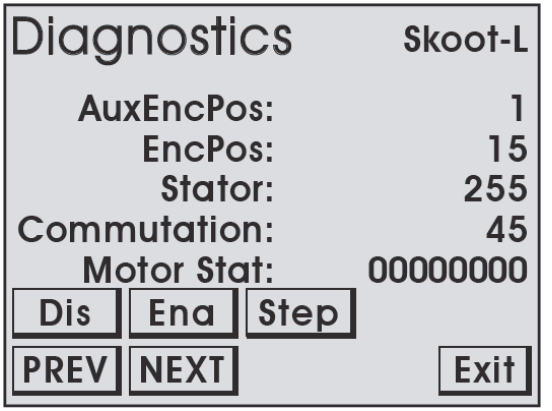


Figure 4-45 Diagnostic screen

Current mA

Displays the output of the crawler 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 modules motor.

Temperature

Internal temperature reading of the crawler in degrees Celsius.

AuxEncPos

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

EncPos

The position of the modules motor encoder in counts.

4.7.5.3 Touch Calibration Screen

Figure 4-46 Touch calibration screen

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

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

TIP

It is recommended 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.

4.7.5.4 Joystick Calibration Screen

Typically joystick calibration is only necessary when a **Joystick off Center** error is detected upon startup (see Figure 4-47 on page 180).

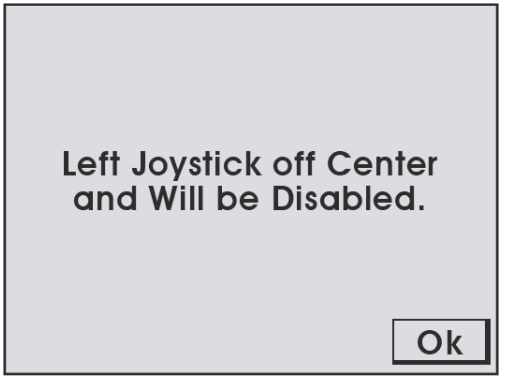


Figure 4-47 Joystick error

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 4-48 on page 181). 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.

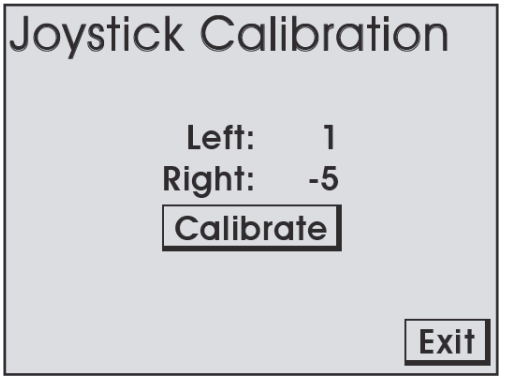


Figure 4-48 Joystick Calibration screen

4.7.5.5 Draw Utility

The draw utility may be used to test the function of the touch screen (see Figure 4-49 on page 181). Exit the utility by pressing the click wheel.

Figure 4-49 Draw utility

4.7.6 Cooler Mode (HT)

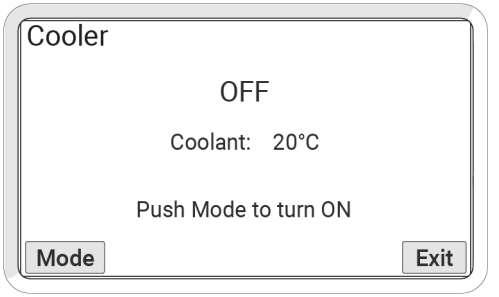


Figure 4-50 Standby screen

The Cooler screen controls cooler operation (see Figure 4-50 on page 182). The Mode button operates as a toggle to activate and deactivate the cooler. The Exit button navigates to the previous screen.

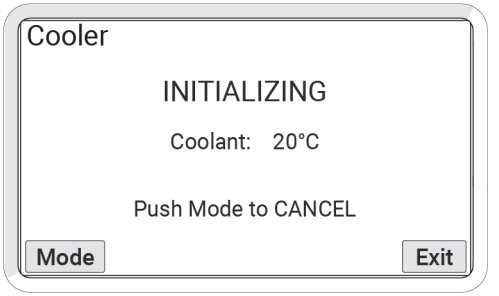


Figure 4-51 Initializing screen

Press the Mode button to activate the cooler. The Initializing screen appears (see Figure 4-51 on page 182).

NOTE

Initializing will time-out if closed-loop flow is not fully established after 3 minutes.

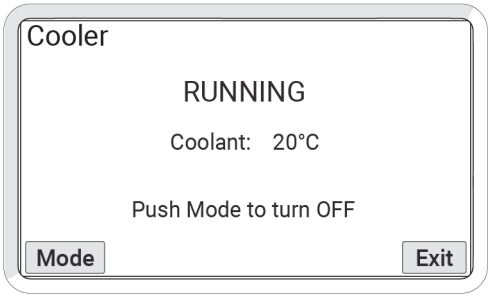


Figure 4-52 Running screen

Normal Cooler operation begins when the operating flow is achieved. The Running screen is displayed (see Figure 4-52 on page 183)

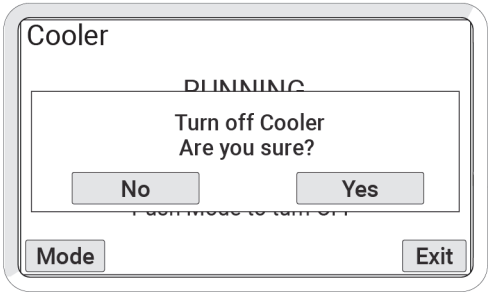


Figure 4-53 Running screen confirmation

While the Cooler is operating normally, pressing the **Mode** button displays a confirmation screen for Cooler shutdown (see Figure 4-53 on page 183). If **Yes** is not pressed within 5 seconds, normal Cooler operation continues and the **Running** screen appears.

NOTE

During shutdown confirmation, the system continues to operate normally until the **Yes** button is pressed.

4.7.7 Cooler Warnings (HT)

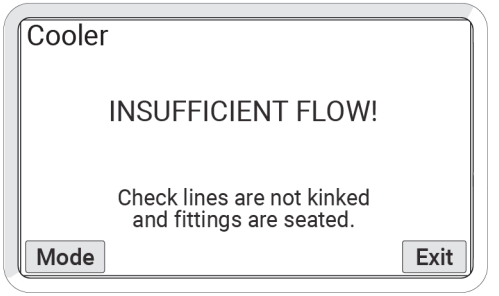


Figure 4-54 Warning screen

If a warning appears during initialization (see Figure 4-54 on page 184):

- Pump will turn off.
- User must ensure the hoses are straight, unobstructed, and contain no kinks or awkward bends.
- Press the Mode button to restart the Cooler.

If a warning appears while the Cooler is running (see Figure 4-54 on page 184):

- Pump will remain on.
- If hoses cannot be quickly adjusted to remove warning, remove device relying on Cooler from any hot surface.

4.7.8 High Internal Temperature Screen (HT)

CAUTION

HOT SURFACE. The handles of the crawler and crawler body may be hot to the touch. Use appropriate protective equipment when removing a crawler from a high temperature surface

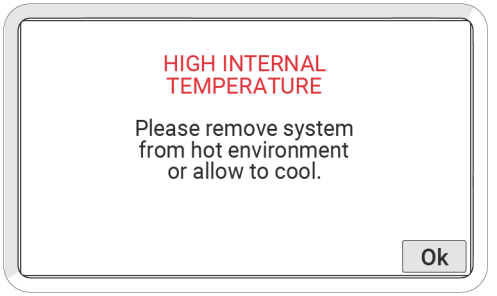


Figure 4-55 High internal temperature screen

When the system approaches its maximum operating temperature, the high internal temperature screen will display. When this alert screen is displayed, all motor and system function will cease.

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

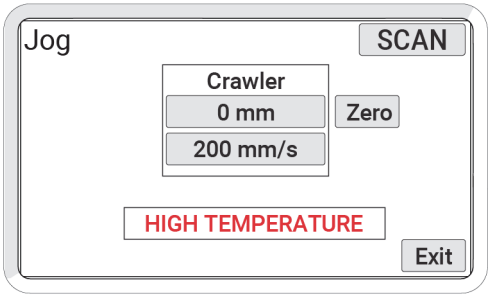


Figure 4-56 High internal temperature screen

Should the user choose to continue operating the crawler, the **HIGH TEMPERATURE** warning will continue to display until the temperature falls below the set temperature limit.

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 emergency off push-button is latched in the off position.

WARNING

MAGNETIC MATERIAL. The wheels of the scanner 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. Tools, magnets, and metal objects can cut, pinch, or entrap hands and fingers. HANDLE WITH CARE. People with pacemakers or ICDs must stay at least 25 cm (10 in.) away at all times.

WARNING

MAGNETIC MATERIAL. The installation/removal mat contains magnetic material. People with pacemakers or ICDs must stay at least 10 cm (4 in.) away. The magnetic base (see Figure 2-46 on page 79) of the raster arm cable tray contains magnetic material. People with pacemakers or ICDs must stay at least 10 cm (4 in.) away.

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 scanner, ensure that all connectors are free of water and moisture.

TIP

All components with wiring, cables, or electrical connections are splash proof but not submersible.

NOTE

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

The MapROVER system must be maintained according to the schedule in Table 6 on page 189.

Table 6 MapROVER maintenance table

Maintenance item	Frequency
Inspect safety apparatus This includes: • All components of tether system. Replace damaged components as necessary. • Lifting sling on scanner. If the lifting sling shows signs of damage (ex.: cuts, abrasion, etc) do NOT use.	Every use
Clean the drive wheels Debris will collect on the magnetic wheels. Remove this debris before every use. An effective cleaning method is to use adhesive backed tape (ex.: duct tape) to pull the debris off the wheels.	Every use
Inspect cables and connectors Inspect the umbilical cable, the control cable, and the power controller cable for damage. Have any damaged cables repaired by a qualified person or replace the cable assembly as necessary. Inspect all connectors for damage or moisture. Straighten bent pins. Dry connectors before using.	Every use
General cleaning Ensure that the scanner stays relatively clean by wiping off any excess dirt or other contaminants after every use.	Every use

5.3 Cooler Maintenance

The Cooler system must be maintained according to the schedule in Table 7 on page 190.

Table 7 Cooler maintenance table

Maintenance item	Frequency
Inspect the power supply and cable for damage. Replace the power supply as necessary.	Every Use
Inspect all connectors for damage or moisture. Straighten bent pins. Dry connectors before using.	Every Use
Clean the radiator with water from a garden hose or carefully with a pressure washer set on low.	As required for optimal cooling performance

5.3.1 Draining Coolant from the Cooler

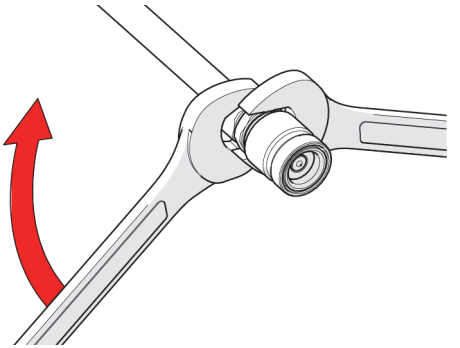


Figure 5-1 Remove quick connect fitting from hose

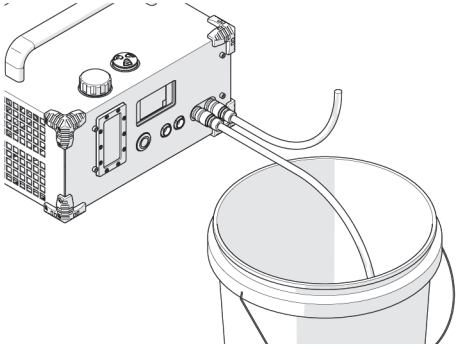


Figure 5-2 Draining the coolant

To drain coolant from the cooler (if required)

1. Create two hose assemblies with a quick connect fitting on one end and an open hose on the other.
   - To remove quick connect fittings:
     (1) Remove the nut from the fitting using 15 mm and 16 mm wrenches (see Figure 5-1 on page 190).
     (2) Remove hose from the barb section of the fitting manually by rotating and prying the hose off.
2. Connect one open-ended hose to the OUT port and place the open end into an appropriate container.
3. Connect the other open-ended hose to the IN port to allow the system to vent (see Figure 5-2 on page 191).
4. Press the **MODE** button to start the pump. Once the low coolant warning appears, press and hold the **MODE** button to override the low coolant warning and continue pumping the reservoir dry.

NOTE

Ensure coolant is handled in accordance with MSDS sheet instructions.

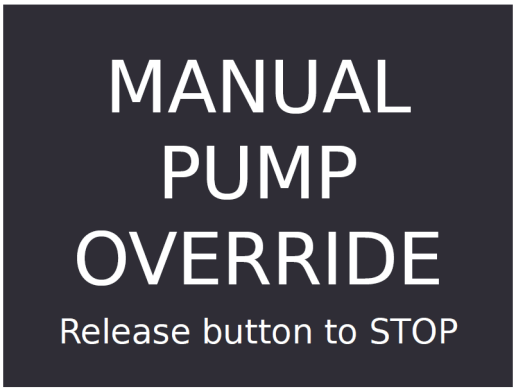


Figure 5-3 Manual pump override screen

5. Press and hold the **MODE** button to override the low coolant warning and pump fluid from the Cooler (see Figure 5-3 on page 192)

6. Troubleshooting

6.1 Startup Issues

Two messages are possible in the event of a startup issue: “Joystick off Center” or “Checking Network.”

6.1.1 Joystick off Center

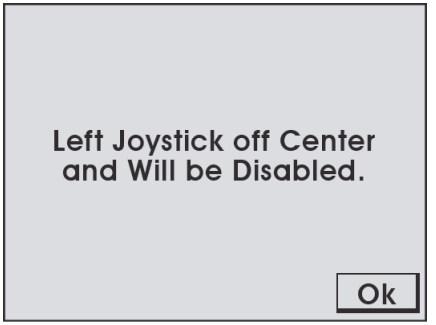


Figure 6-1 Joystick off Center screen

Upon system startup, 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. Press **Ok** to continue system startup. All system functions will work normally with the exception of movements that require joystick operation.

Ensure that the handheld controller's joysticks are free of interference and 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 179).

6.1.2 Checking Network

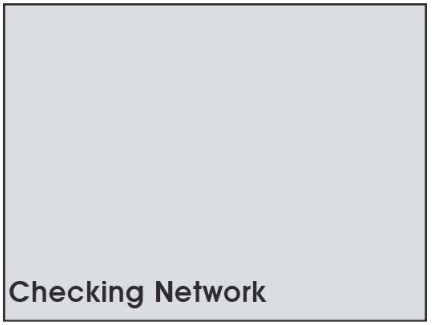


Figure 6-2 Checking Network screen

During startup, the system initializes the communications to all the devices on the network. If the network communication fails for any reason, the "Checking Network" message will appear and remain on screen (see Figure 6-2 on page 194).

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 195).

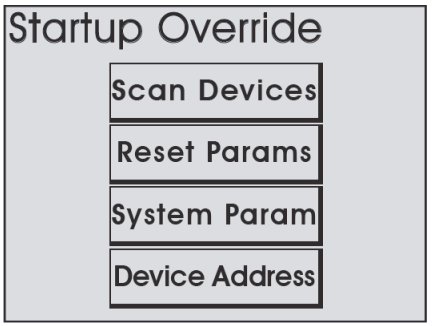


Figure 6-3 Startup Override screen

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 8 on page 196).

When the scanning is complete, power to the system must be cycled (see Figure 6-4 on page 196).

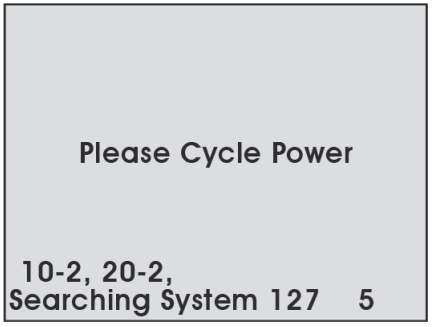


Figure 6-4 Cycle Power screen

Table 8 Common addresses

Common addresses	
600 mm Raster Module	30
MapROVER	40

When a device is connected to the system but is not detected, this most likely indicates an internal device problem.

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 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 you press 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 197).

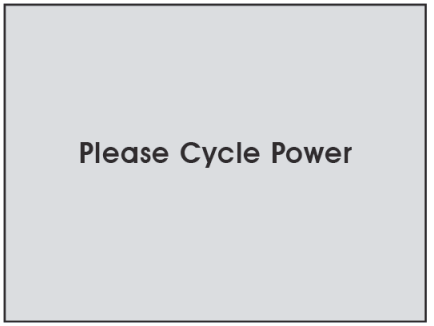


Figure 6-5 Cycle Power screen

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 Evident.

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

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 Evident

6.3 Additional Issues

Table 9 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 209).
	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, clean, and connector pins are not bent.
	MapROVER system not started.	Start the MapROVER system (see "System Startup" on page 140).
	Damaged components in controller, scanner, power controller, or cabling.	Contact manufacturer.
Handheld controller display is activated, yet scanner does not drive.	Handheld controller is not in correct mode for driving.	See "Operation" on page 139 for additional details.
	Damaged components in handheld controller, scanner, power controller, or cabling.	Contact manufacturer.

Table 9 Troubleshooting table *(continued)*

Problem	Possible cause	Solution
Scanner does not drive and is unreachable.	See possible causes for the first problem in this table.	See the possible solutions for the first problem in this table. If the scanner is still unresponsive, see “Retrieval of a Stranded Scanner” on page 199.

For technical assistance, see “Technical Support” on page 23.

6.4 Retrieval of a Stranded Scanner

DANGER

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

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

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

To retrieve the scanner manually

1. Press the emergency off push-button to turn off the scanner’s power.

NOTE

Under normal conditions, the scanner should begin descending slowly.

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

6.5 Cooler Warnings (HT)

6.5.1 Low Coolant

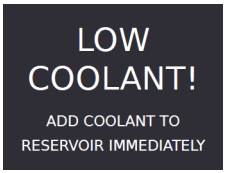


Figure 6-6 Low Coolant screen

The **Low Coolant** warning will display when additional coolant must be added to the system. The Cooler continues pumping fluid when this warning is displayed. Coolant may be added to the reservoir while the Cooler is still in operation (see Figure 6-6 on page 200).

6.5.2 Insufficient Flow

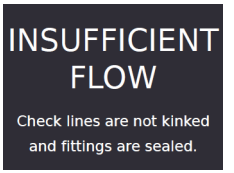


Figure 6-7 Insufficient Flow screen

If the **Insufficient Flow** warning appears during initialization (see Figure 6-7 on page 200):

- Pump will turn off.
- Ensure that the hoses are straight, unobstructed, and contain no kinks or awkward bends.

- Press the MODE button to restart the Cooler.

If the warning appears while cooler is running

- Pump will remain on.
- If hoses cannot be quickly adjusted to remove the warning, remove the device relying on Cooler from any hot surface.

6.5.3 Fan Failure

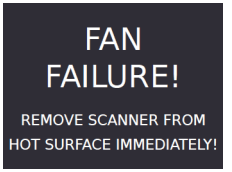


Figure 6-8 Fan Failure screen

If the **Fan Failure** warning appears during operation, immediately remove the device connected to the Cooler from any hot surface (see Figure 6-8 on page 201).

6.6 Cooler Troubleshooting (HT)

Table 10 Cooler troubleshooting

Problem	Possible Cause	Solution
Cooler is not cooling adequately	Kinked hose	Unkink hose
	Dirty radiator	Rinse radiator with water from a garden hose or carefully with a pressure washer set on low
Coolant is leaking out of the cooler	Ruptured radiator hose	Replace radiator hose
	Radiator hose fitting has loosened	Remove bottom cover, push hose back onto fitting barb, tighten fitting nut
Display shows 'Low Coolant', even though the reservoir is full	Failed level sensor	Send the unit in for repair

Table 10 Cooler troubleshooting *(continued)*

Problem	Possible Cause	Solution
Display shows 'Fan Failure'	Failed fan	Replace fan
	Disconnected fan connector	Remove the bottom cover and ensure fan connectors are securely connected

7. Service and Repair

For information about authorized repairs and maintenance, see “Maintenance” on page 187. For any other issues with your MapROVER scanner, first see “Troubleshooting” on page 193 and then see “Technical Support” on page 23.

IMPORTANT

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

8. Specifications

8.1 Crawler General Specifications

WARNING

LIFTING HAZARD. The MapROVER can be heavy. Single person lifting of the system could cause injury. Two person lifting is recommended.

Table 11 Crawler general specifications

Category	Parameter	Specification
Weight	Crawler weight[a]	7.3 kg (16 lb)
	Raster arm (600 mm) weight	3.36 kg (7.4 lb)
Voltage and power	Input Voltage	55 V to 45 V DC
	Input Power	320 W
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. Configuration excluding case, attachments, umbilical, manipulation handle, power controller, and handheld controller.

8.2 Crawler Dimensions

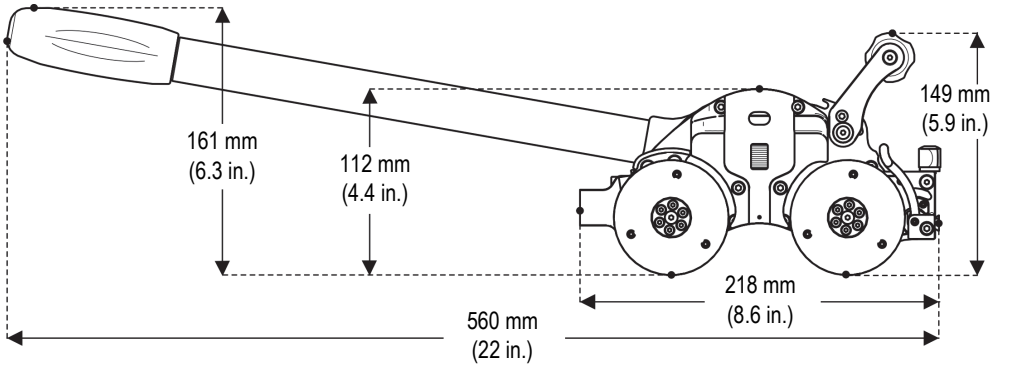


Figure 8-1 Crawler dimensions

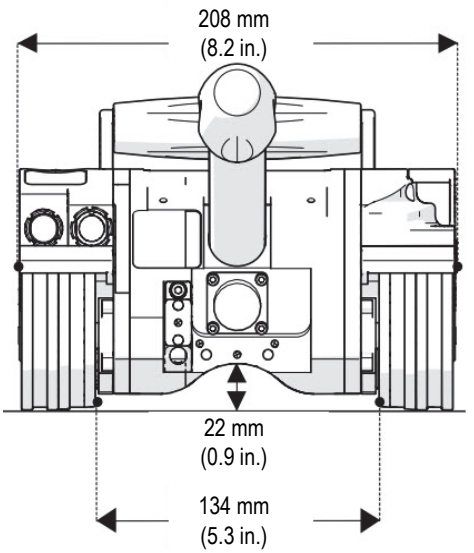


Figure 8-2 Crawler width dimensions

8.3 Scanner Operation Specifications

Table 12 Scanner operation specifications

Parameter	Specification
Scanner diameter range	• External, circumferential scans: 63.5 mm (2.5 in.) OD to flat • (HT) External, circumferential scans: 102 mm (4 in.) OD to flat • Internal, circumferential scans: 686 mm (27 in.) ID to flat • External, longitudinal scans: 762 mm (30 in.) OD to flat
Motor encoder	1354 counts/mm (34394 counts/in.)

Table 12 Scanner operation specifications *(continued)*

Parameter	Specification
Raster arm module	240.2 counts/mm (6100.9 counts/in.)
Environmental sealing	Dust tight, water tight (not submersible)
Required radial clearance[a]	101.32 mm (3.989 in.) on pipes under 200 mm (8 in.) OD and 110.26 mm (4.341 in.) on pipes over 200 mm (8 in.) OD

a. With backpack and manipulation handle removed, using slip joint probe holders only.

8.4 Performance Specifications

Table 13 Performance specifications

Parameter	Specification
Maximum vertical payload[a]	9 kg (20 lb)
Maximum travel speed	0.5–14.2 cm/s (0.2–5.6 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 crawler. Connections must be secured to prevent accidental disconnection. Power failure may cause the crawler 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 VAC–240 VAC, 50/60 Hz, 1.4 A

NOTE

The MapROVER power controller automatically adjusts to the supplied voltage.

8.6 Cooler Dimensions, Weight and Capacity (HT)

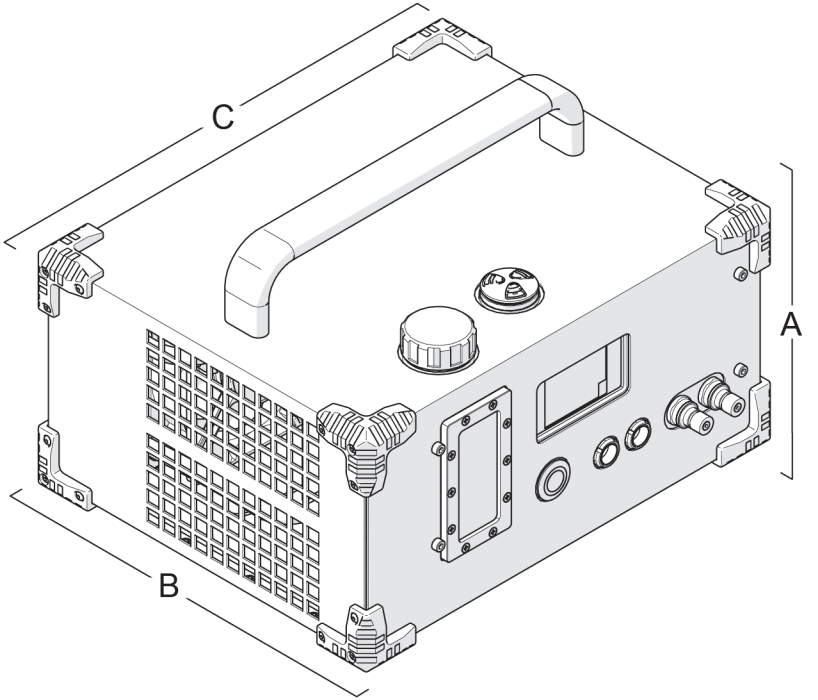


Figure 8-3 Cooler dimensions

Table 14 Cooler dimensions, weight, and capacities

A	20.8 cm (8.2 in.)
B	28.2 cm (11.1 in.)
C	32.8 cm (12.9 in.)
Cooler weight	8.3 kg (18.3 lb)
Coolant capacity, cooler	600 ml (20.3 oz)
Coolant capacity, hose	32 ml/m (0.33 oz/ft)

8.7 Cooler Specifications (HT)

CAUTION

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

- Input voltage: 25 VDC–45 VDC
- Input power: 23 W
- Dust tight, watertight (not submersible)
- Recommended coolant: 50/50 blend of ethylene glycol-based automotive antifreeze and water. Consult the MSDS for hazards associated with the use and handling of this coolant.

8.8 Encoder Interface Specifications

ID	Pinout
1	Enc B
2	Enc B′
3	Enc A
4	Enc A′
5	Aux Enc A′
6	Aux Enc A
7	Aux Enc B′
8	Aux Enc B
9	Enc +5 V
10	Enc Com
H	Shield

Figure 8-4 Pinout configuration

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

8.9 Operating Environment

The MapROVER is designed for operation in ambient temperatures between −20°C (−4°F) and 50°C (122°F).

9. Spare Parts

To order accessories or replacement parts for your MapROVER system, contact Evident.

NOTE

These drawings are for ordering spare parts. This is not a list of kit contents.

9.1 MapROVER Base Crawler

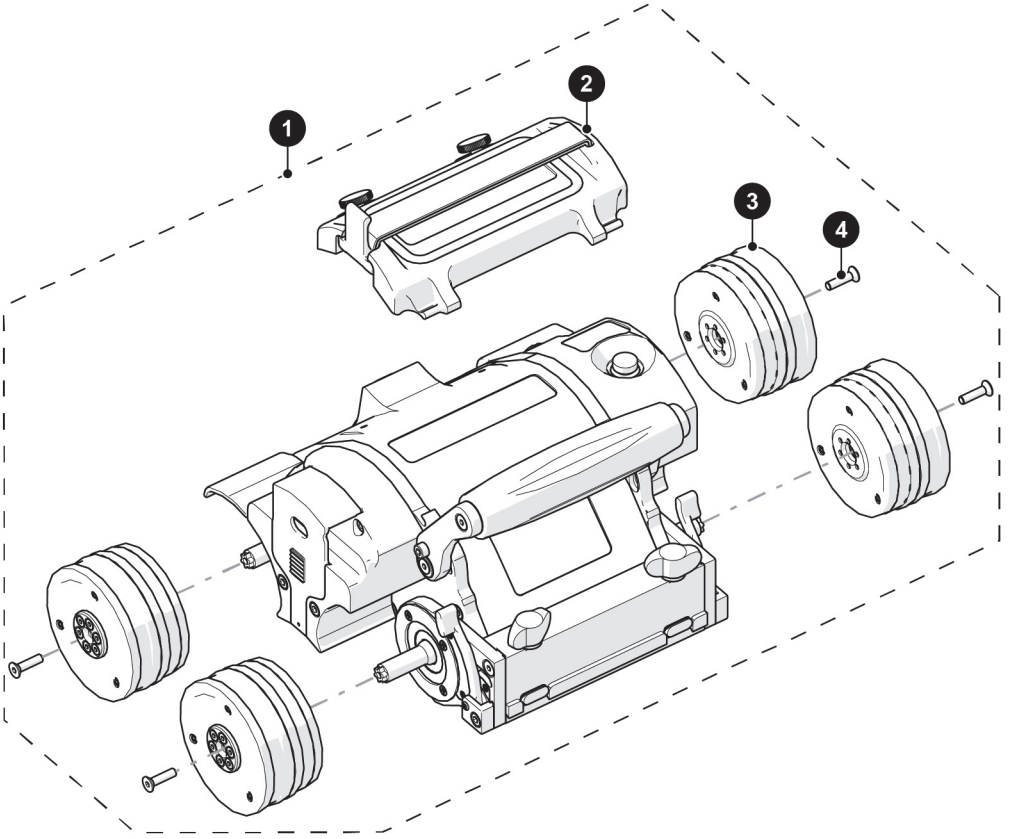


Figure 9-1 MapROVER base crawler

Table 15 MapROVER base crawler spare parts

ID	Part number	Description
1	Q8302620	MapROVER crawler only
2	Q8302633	MapROVER backpack

Table 15 MapROVER base crawler spare parts *(continued)*

ID	Part number	Description
3	Q8300548	MapROVER spare magnetic wheel
4	Q8300549	FHCS, M4x0.7 x 12 mm, SST

9.2 Kit Components

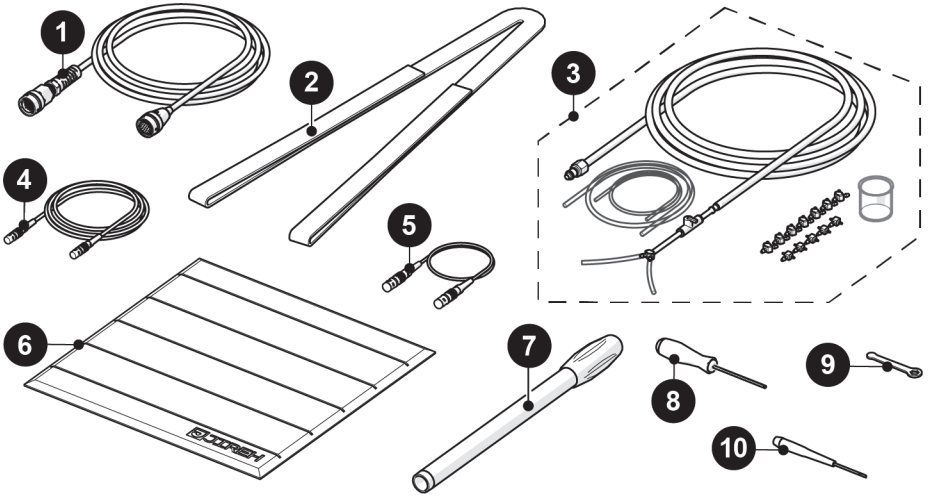


Figure 9-2 Kit components

Table 16 Kit components spare parts

ID	Part number	Description
1	Q8300550	MapROVER umbilical (7.5 m)
	Q8300551	MapROVER umbilical (30 m)
2	Q8300552	Sling

Table 16 Kit components spare parts *(continued)*

ID	Part number	Description
3	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
4	Q8300553	MapROVER auxiliary cable, 6 m (19.7 ft)
5	Q8300560	MapROVER encoder cable
6	Q8300558	MapROVER installation/removal mat
7	Q8302632	MapROVER manipulation handle
8	Q8300559	3 mm (0.188 in.) hex driver
9	Q8301359	10 mm (3/8 in.) wrench
10	Q8301362	3 mm (0.118 in.) flat driver

9.3 MapROVER HT Base Crawler

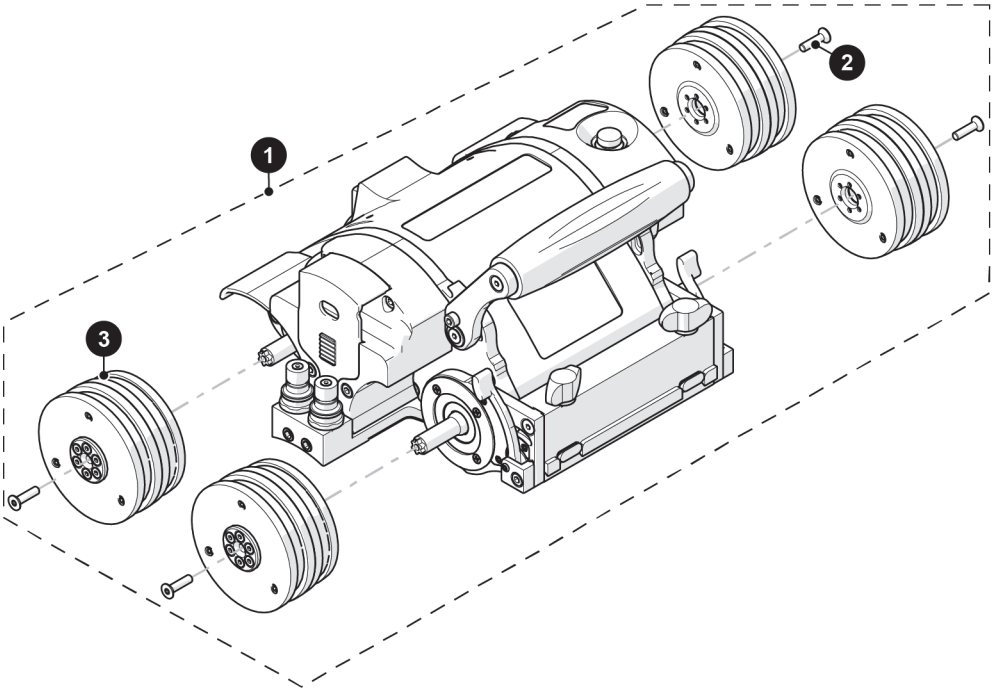


Figure 9-3 MapROVER HT crawler

Table 17 MapROVER base crawler spare parts

ID	Part number	Description
1	Q8302625	MapROVER HT crawler only
2	Q8302657	FHCS-TX, M4x0.7 x 12 mm, ST
3	Q8302638	MapROVER HT magnetic wheel

9.4 MapROVER HT Kit Components

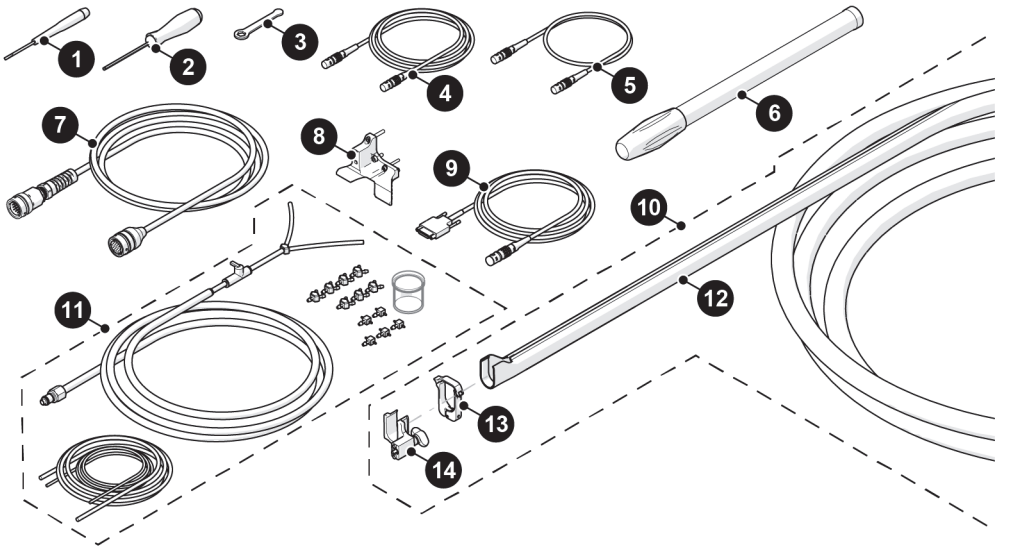


Figure 9-4 Kit components

Table 18 Kit components spare parts

ID	Part number	Description
1	Q8301362	Flat driver: 3 mm (0.118 in.)
2	Q8300559	Hex driver: 3 mm (0.118 in.)
3	Q8301359	3/8 in. wrench
4	Q8300553	MapROVER HT auxiliary cable 6 m (19.6 ft)
5	Q8302659	MapROVER HT auxiliary cable 1 m (3.3 ft)
6	Q8302632	MapROVER HT manipulation handle
7	Q8302662	MapROVER HT umbilical 7.5 m (25 ft)
8	Q8302631	MapROVER HT pry point

Table 18 Kit components spare parts *(continued)*

ID	Part number	Description
9	Q8302660	MapROVER HT encoder cable (MX)
	Q8302661	MapROVER HT encoder cable (SX/MX2/X3)
10	Q8302663	MapROVER HT cable management
11	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
12	Q8302617	HT cable management sleeve
13	Q8302619	MapROVER HT cable management clamp
14	Q8302618	MapROVER HT cable management threaded mount

9.5 Cooler (HT)

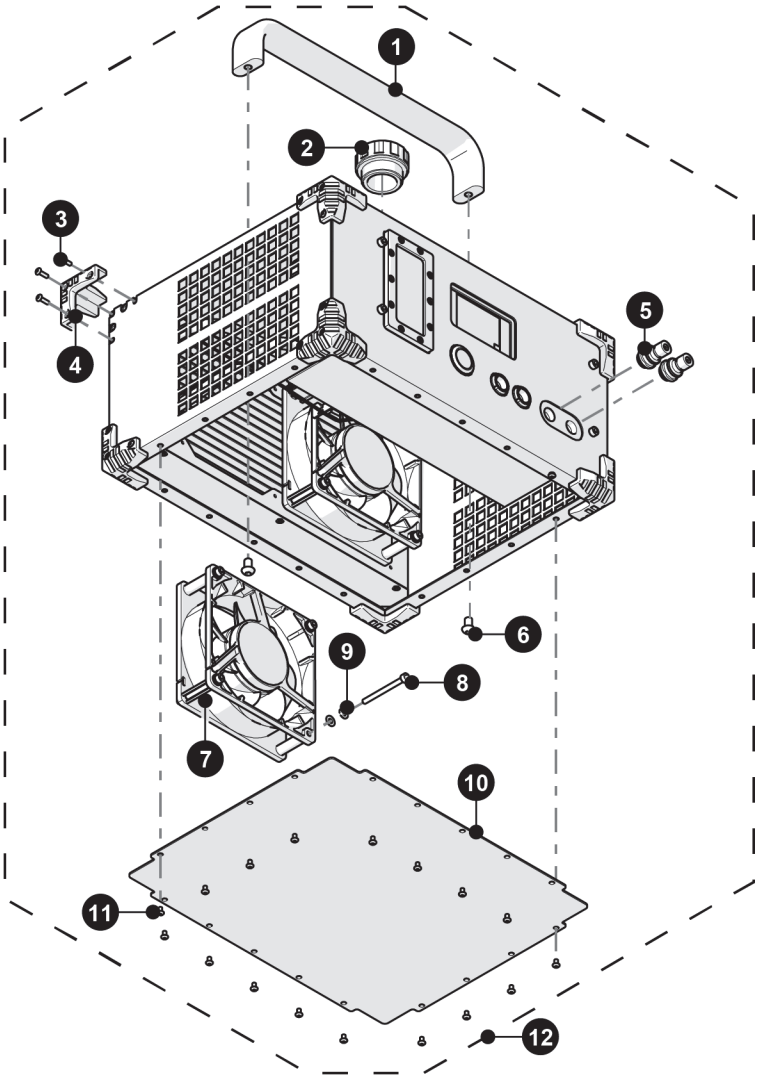


Figure 9-5 Cooler spare parts

Table 19 Cooler spare parts

ID	Part number	Description
1	Q8302645	Cooler handle
2	Q8302648	Cooler fill cap
3	Q8302655	BHCS, M3x0.5 x 10 mm, SST
4	Q8302644	Cooler bumper
5	Q8302647	Cooler quick connect fitting
6	Q8302664	BHCS, M6x1 x 10 mm, SST
7	Q8302658	Cooler fan, 24VDC 120x120x38
8	Q8302652	SHCS, M4x0.7 X 45 mm, SST
9	Q8302656	Washer, M4, DIN 125A, SST
10	Q8302634	Cooler bottom plate
11	Q8302653	BHCS, M3x0.5 x 5 mm, SST
12	Q8302626	Cooler complete assembly

9.6 Power Controller and Handheld Controller

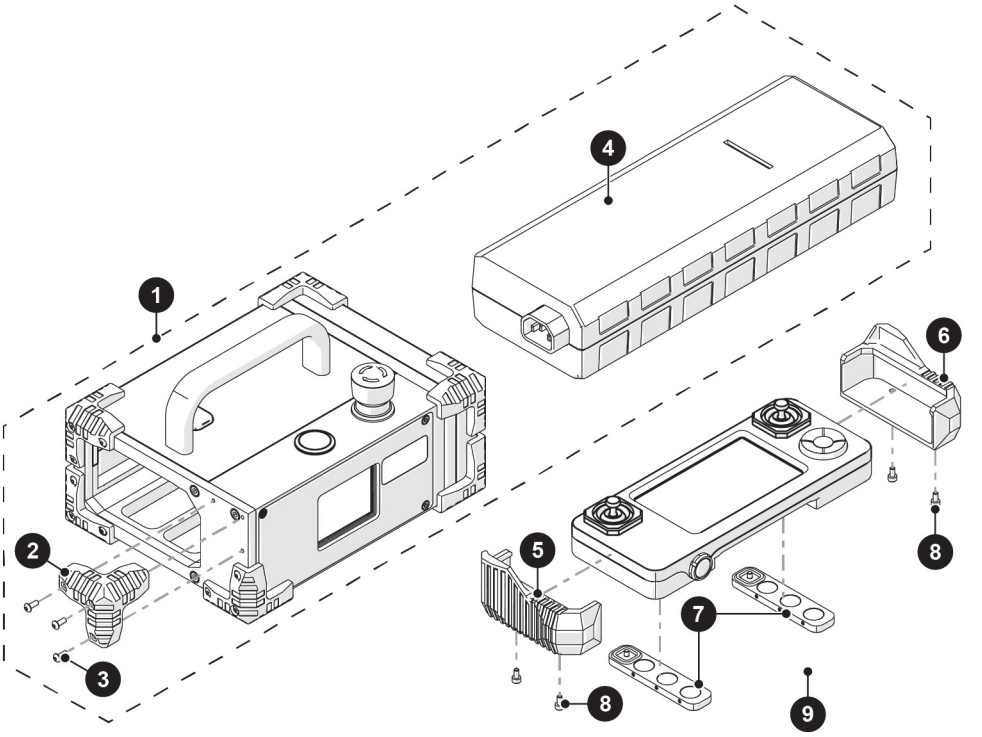


Figure 9-6 Power controller and handheld controller

Table 20 Power controller and handheld controller spare parts

ID	Part number	Description
1	Q8302621	SteerROVER and MapROVER battery compatible power controller
2	Q8302644	Power controller rubber bumper
3	Q8302654	BHCS, M3x0.5 x 8 mm, SST

Table 20 Power controller and handheld controller spare parts *(continued)*

ID	Part number	Description
4	Q8302627	SteerROVER and MapROVER power supply
5	Q8302628	Handheld controller bumper (left)
6	Q8302629	Handheld controller bumper (right)
7	Q8302630	Handheld controller magnet holder
8	Q8302651	SHCS, M3x0.5 x 6mm, SST
9	Q7750089	MapROVER and SteerROVER remote controller

9.7 Cable Management

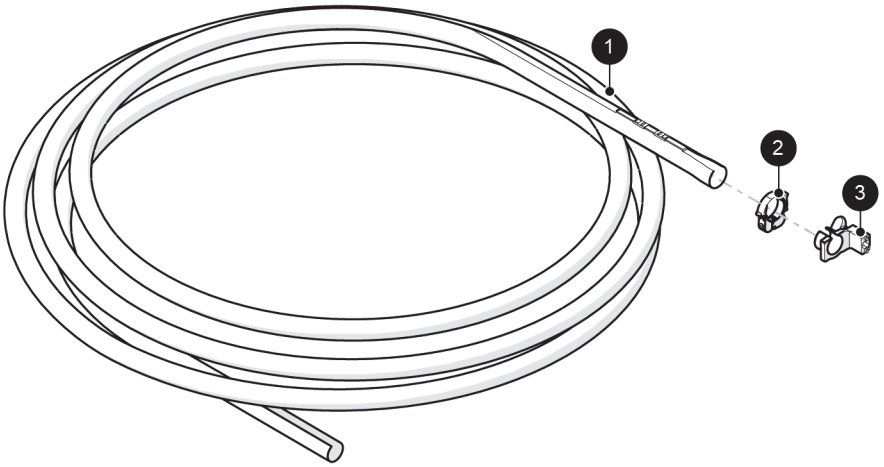


Figure 9-7 Cable management parts

Table 21 Cable management parts

ID	Part number	Description
1	Q7750093	Cable management sleeve (7 m)
	Q7750092	Cable management sleeve (30 m)
2	Q8300557	Cable management clamp
3	Q8300554	Cable management mount, threaded mount

9.8 Raster Arm Module (600 MM)

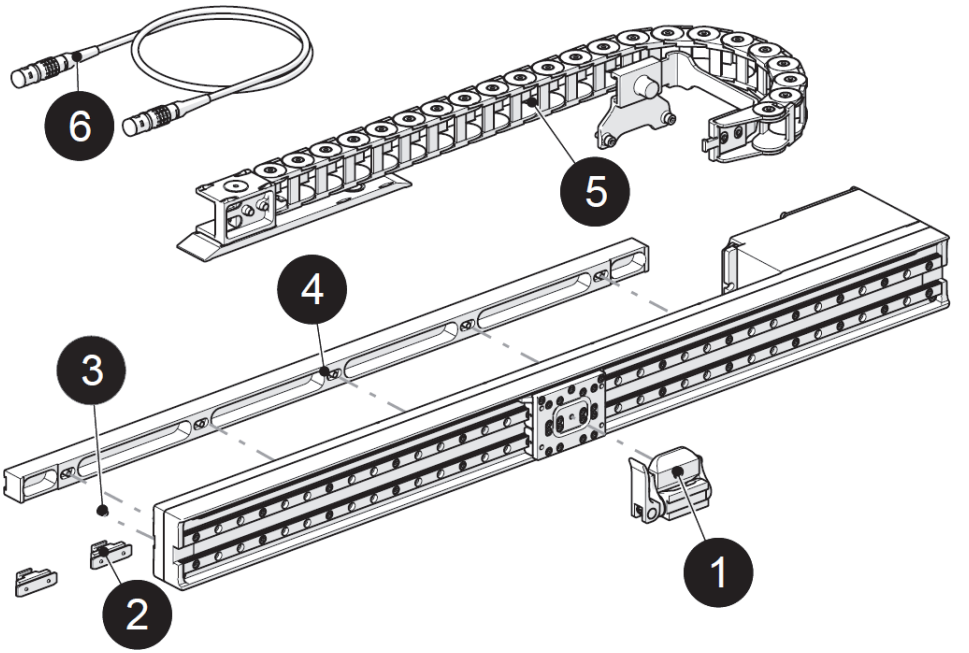


Figure 9-8 600 mm raster arm

Table 22 600 mm raster arm module spare parts

ID	Part number	Description
1	Q8300561	Pivot nose
2	Q8300562	Cable management clip
3	Q8300563	Screw M3 × 0.5 × 4 mm
4	Q8300564	Mounting rail
5	Q8300565	Cable tray, 600 mm
6	Q8300566	Raster arm cable

9.9 Raster Arm HT

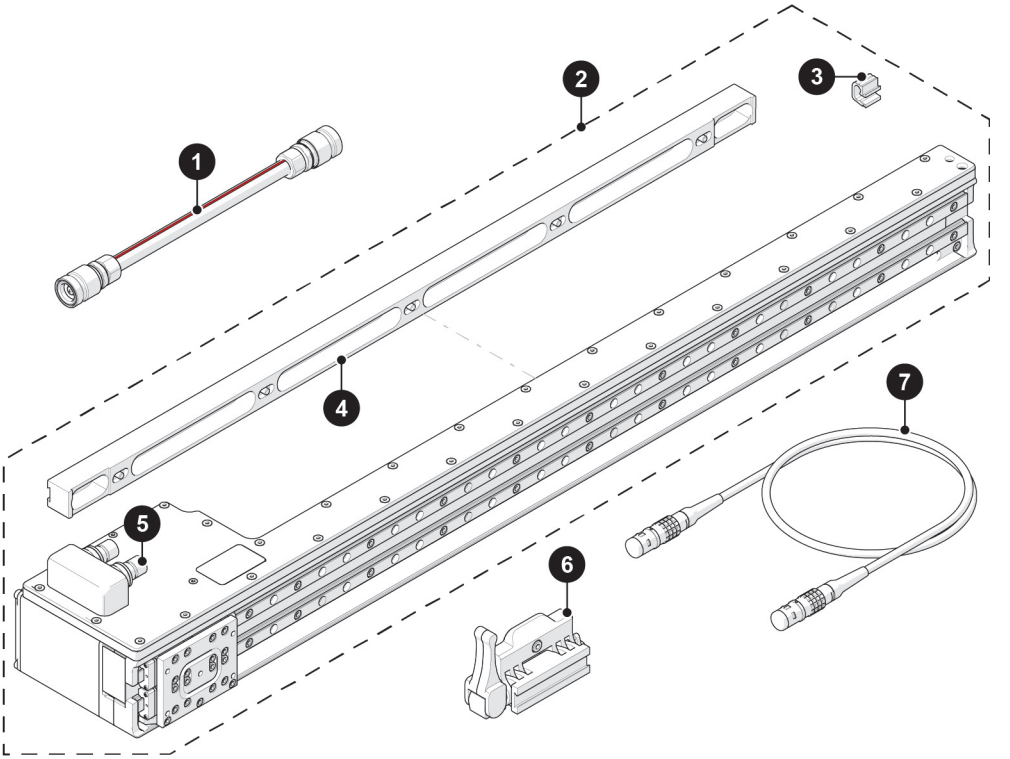


Figure 9-9 Raster arm HT parts

Table 23 Raster arm HT parts

ID	Part number	Description
1	Q8302673	Cooler red hose 30 cm
2	Q8302674	Raster arm HT base 300 mm
	Q8302675	Raster arm HT base 600 mm
3	Q8302676	Raster arm HT base cable management clip

Table 23 Raster arm HT parts *(continued)*

ID	Part number	Description
4	Q8302677	Raster arm HT mounting rail 300 mm
	Q8301365	Raster arm HT mounting rail 600 mm
5	Q8302647	Cooler quick connect fitting
6	Q8300561	Raster arm pivot nose female
7	Q8302679	MapROVER raster arm HT cable 300 mm
	Q8300566	MapROVER raster arm HT cable 600 mm

9.10 Hose Spare Parts (HT)

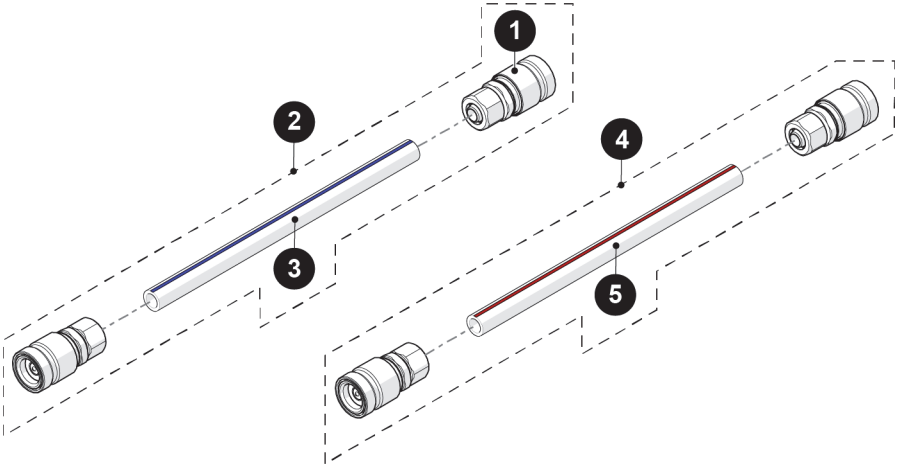


Figure 9-10 Hose spare parts

Table 24 Hose spare parts

ID	Part number	Description
1	Q8302635	Cooler hose fitting
2	Q8302636	Cooler hose blue
3	Q8302649	Cooler hose blue, 1/4 in. ID x 3/8 in. OD, 7.5 m (25 ft)
4	Q8302637	Cooler hose red
5	Q8302650	Cooler hose red, 1/4 in. ID x 3/8 in. OD, 7.5 m (25 ft)

9.11 Weld Probe Holder Frame Components (Optional)

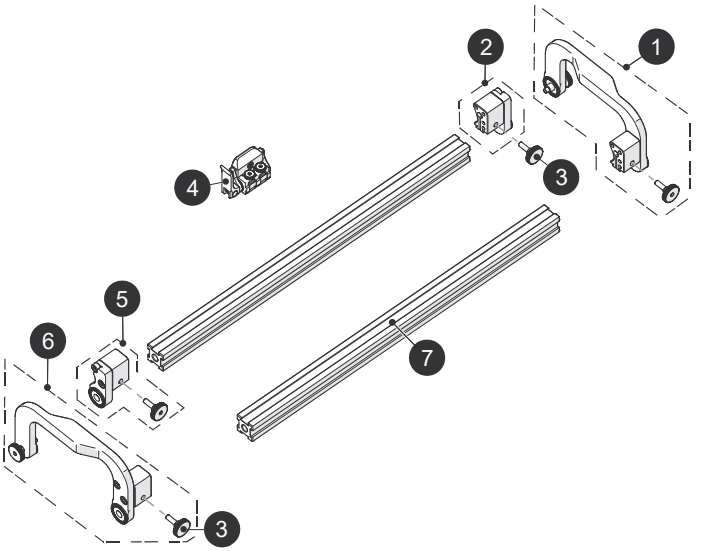


Figure 9-11 Weld probe holder frame

Table 25 Weld probe holder frame spare parts

ID	Part number	Description
1	Q8300573	Vertical probe holder side arm, left
2	Q8300858	Arm mount block, left
3	Q8300574	Knob
4	Q7750124	Male pivot to mount the 2-probe weld probe holder kit on the MapROVER raster arm. **IMPORTANT NOTE**: This pivot is not strong enough to hold the 4-probe weld probe holder kit.
5	Q8300859	Arm mount block, right
6	Q8300567	Vertical probe holder side arm, right
7	Q8300575	Frame bar (350 mm long)

9.12 Vertical Probe Holder Components for Weld Inspection (Optional)

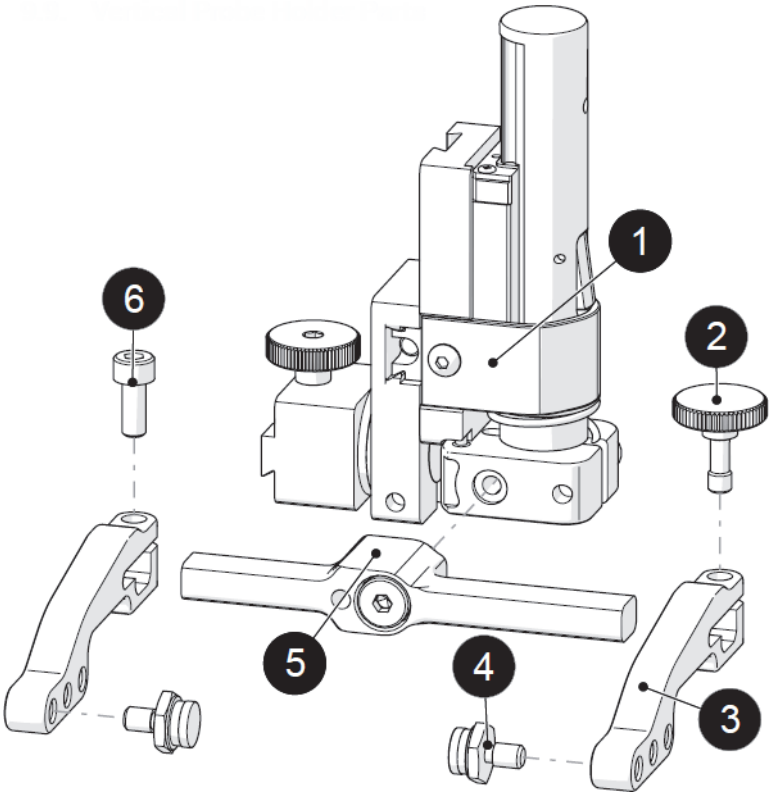


Figure 9-12 Vertical probe holder

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 optional MapROVER weld probe holder kit.

Table 26 Vertical probe holder spare parts

ID	Part number	Description
1	Q8300576	Vertical probe holder subassembly
2	Q7750010	Probe holder arm adjustment knob
3	Q8301669	Standard arm, drop (A)
	Q7750009	Short arm, flat (B)
	Q8300578	Long arm, flat (C)
4	U8775198	Pivot button (01), hole size 8 mm (0.315 in.) for Evident PA wedge
	U8775199	Pivot button (02), hole size 5 mm (0.197 in.) for Evident 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

9.13 Heavy Duty Vertical Probe Holder Components

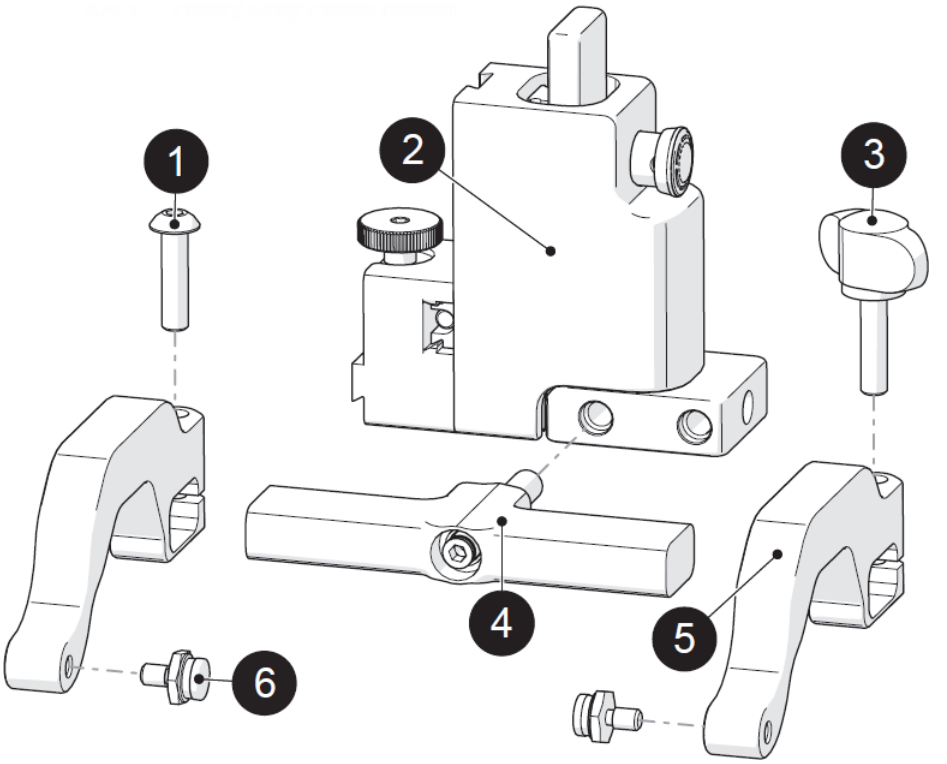


Figure 9-13 Heavy duty vertical probe holder

Table 27 Heavy duty vertical probe holder

ID	Part number	Description
1	Q8300592	Arm clamp screw, BHCS, metric SST
2	Q8300593	Heavy duty probe holder subassembly

Table 27 Heavy duty vertical probe holder *(continued)*

ID	Part number	Description
3	Q8300594	Probe holder arm adjustment knob
4	Q8300596	Standard yoke style (S) 8.28 cm (3.259 in.)
	Q8300580	Wide yoke style (W) 12.17 cm (4.791 in.)
5	Q8300595	Probe holder arm
6	U8775198	Pivot button style for Evident PA wedge

NOTE

The wide yoke version of the heavy duty vertical probe holder assembly (P/N: Q7750123) is used with the MapROVER scanner to hold the first generation HydroFORM full size cart (Evident reference MapROVER-SP-VPH-Hydro).

A fork kit (P/N: Q7750241) needs to be used to hold the new generation HydroFORM full size cart. This fork kit is included with the HydroFORM2-K-AUT kits. This fork kit is not included with the MapROVER (see Figure 9-14 on page 234).

An optional small carriage (P/N: Q7750240) is available to hold the new generation HydroFORM (see Figure 9-15 on page 234).

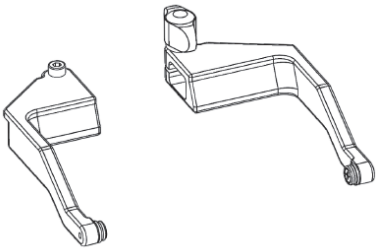


Figure 9-14 Fork kit Q7750241

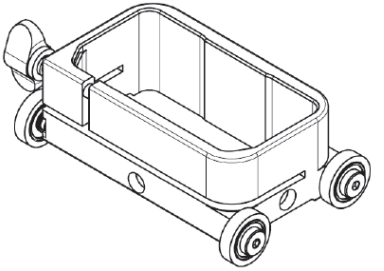


Figure 9-15 Small carriage Q7750240

9.14 Dual Conventional UT Probe Holder Components (Optional)

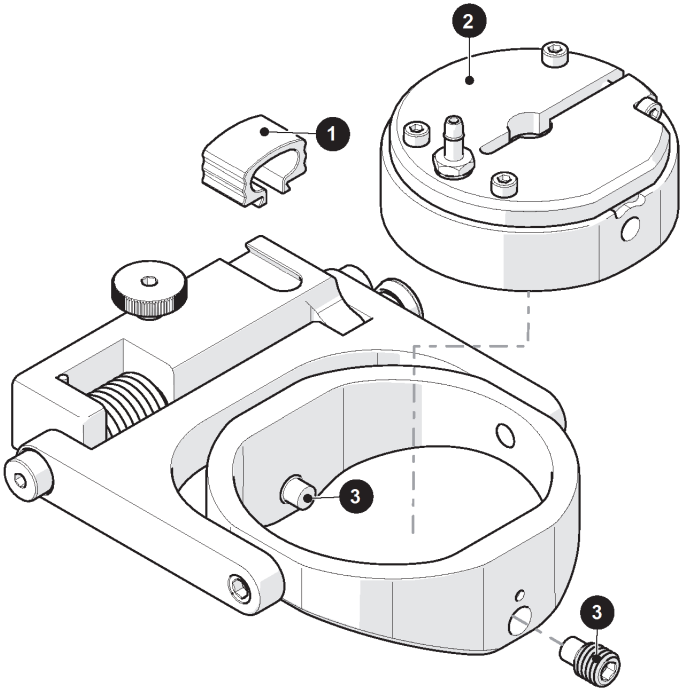


Figure 9-16 Dual conventional UT probe holder (P/N: Q7750070)

NOTE

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

Table 28 Dual conventional UT probe holder spare parts

ID	Part number	Description
1	Q8300601	Cable clip

Table 28 Dual conventional UT probe holder spare parts *(continued)*

ID	Part number	Description
2	Q8300598	Probe holder receptacle and wear plate
3	Q8300599	Screw, SHSS, M8 × 1.25 × 12 mm, dog point, SST

9.15 HT Corrosion Thickness Probe Holder Components (Optional)

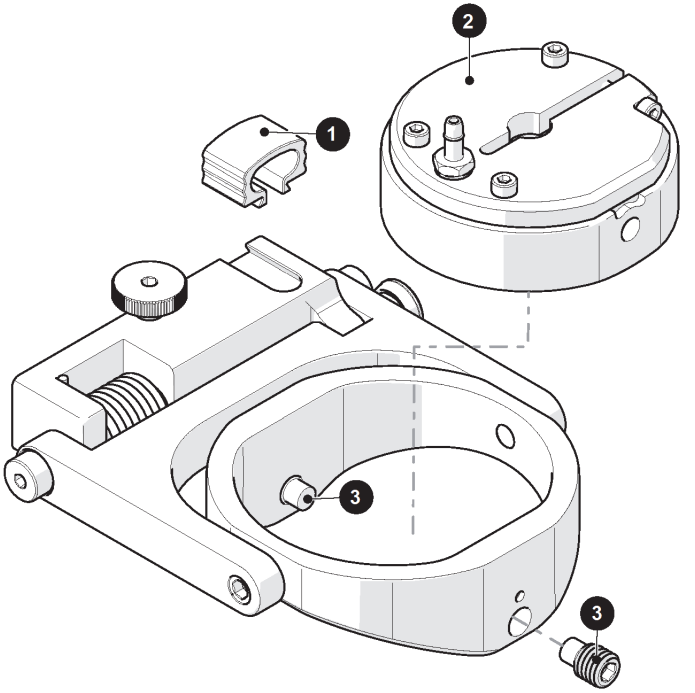


Figure 9-17 HT Dual conventional UT probe holder

Table 29 Dual conventional UT probe holder spare parts

ID	Part number	Description
1	Q8302668	MapROVER HT CTPH Cable clip
2	Q8302667	MapROVER HT Corrosion Thickness Probe Holder -Flat Wear Plate -19 mm (0.75 in) Diameter Receptacle
3	Q8302669	SHSS, M8 × 1.25 × 12 mm, dog point, SST

List of Figures

List of Tables