EVIDENT

RECON
Camera System
User's Manual

10-039815-01EN—Rev. 2
February 2024

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.

EVIDENT CANADA, INC.

3415, rue Pierre-Ardouin,
Quebec (Quebec), 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.

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

Printed in Canada

Table of Contents

Important Information

Intended Use

The RECON camera system's primary purpose is to provide a visual driving reference and capture video of inspections. It is intended for use with the parent products and their limits listed in "Parent Product" on page 20.

WARNING

Do not use the RECON camera system 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 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.

Instrument Compatibility

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

The RECON camera system does not contain any user-serviceable parts. Opening the instrument might void the warranty.

CAUTION

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

Safety Symbols


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


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

Safety Signal Words

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

DANGER

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

WARNING

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

CAUTION

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

Note Signal Words

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

IMPORTANT

The IMPORTANT signal word calls attention to a note that provides 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, which 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 provides hints on how to effectively use the capabilities of the product.

Warnings

WARNING

General Warnings

- Carefully read the instructions contained in this instruction manual prior to turning on the instrument.
- Keep this instruction manual in a safe place for further reference.
- Follow the installation and operation procedures.
- It is imperative to respect the safety warnings on the instrument and in this instruction manual.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment could be impaired.
- Do not install substitute parts or perform any unauthorized modification to the instrument.
- Service instructions, when applicable, are for trained service personnel. To avoid the risk of electric shock, do not perform any work on the instrument unless qualified to do so. For any problem or question regarding this instrument, contact 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.

Equipment Disposal

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

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 indicates compliance with the above directives.

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.

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 RECON has been determined to be 15 years.

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

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

电气电子产品有害物质限制使用标识

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

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

产品中有害物质的名称及含量

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

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:

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 RECON 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.

WARNING

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: RECON
Model: RECON

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.

Regulatory Information

The RECON may display a regulatory screen that lists the specific regulation with which it complies.

To view the REGULATORY screen

1. In the measurement screen, press **[SETUP]**, and then select **SP MENU**.
2. In the **SP MENU**, select **REGULATORY** to display the **REGULATORY** screen (see Figure i-1 on page 13).

Figure i-1 The REGULATORY screen

3. Use the up and down arrow keys to scroll through the different **REGULATORY** screens.

4. Press **[MEAS]** to return to the measurement screen.

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 at: https://www.evidentscientific.com/service-and-support/service-centers/.

1. General Information

The RECON is a camera system used on SteerROVER scanner.

1.1 Operating Environment

The RECON system is for use in dry industrial environments having ambient temperatures shown below. It is NOT intended for use in explosive environments.

Table 1 Operating environment

Parameter	Specification
Minimum ambient Temperature	−20° C (−4° F)
Maximum ambient temperature	50° C (122° F)

1.2 Dimensions and Weight

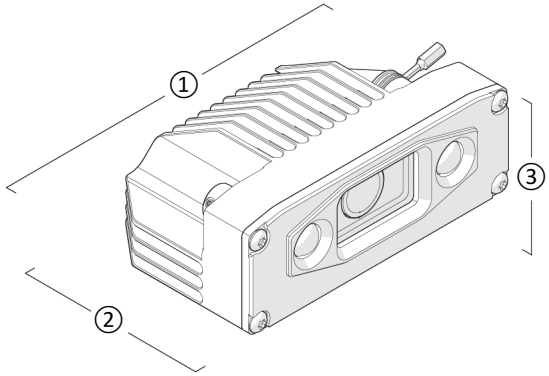


Figure 1-1 Camera dimensions

Table 2 Camera dimensions and weight

1	Width	9.4 cm	3.7 in.
2	Depth	5.8 cm	2.3 in.
3	Height	3.7 cm	1.5 in.
	Weight	0.173 kg	0.382 lb

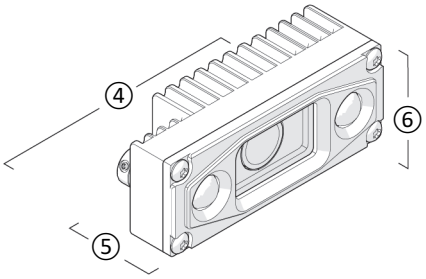


Figure 1-2 Satellite camera dimensions

Table 3 Satellite camera dimensions and weight

4	Width	7.2 cm	2.8 in.
5	Depth	2.8 cm	1.1 in.
6	Height	3.3 cm	1.3 in.
	Weight	0.078 kg	0.174 lb

1.3 Power Requirements

Table 4 Power requirements

Input Voltage	25–45 VDC
Input Power, RECON camera	16 W
Input Power, RECON satellite camera	14 W

1.4 Environmental Sealing

Dust-tight, watertight (not submersible)

1.5 Performance Specifications

Max. video resolution Full HD (1080p 30 fps)

1.6 Parent Product

The RECON camera system is intended to be used with the SteerROVER scanner, a steerable, motorized scanning platform. The scanner is capable of longitudinal and circumferential travel on pipes and tubes.

Refer to the *SteerROVER User's Manual* for the scanner's operating instructions and specifications.

2. System Components

2.1 Component Identification

The RECON camera system contains the following components:

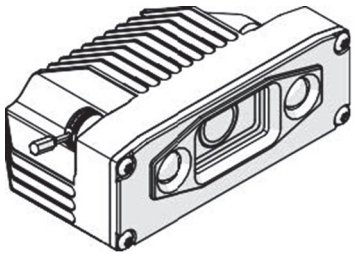


Figure 2-1 Camera

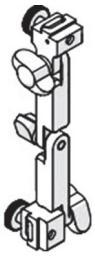


Figure 2-2 Camera bracket

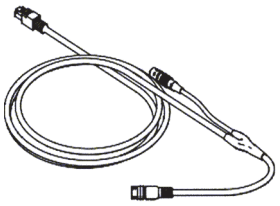


Figure 2-3 Camera cable

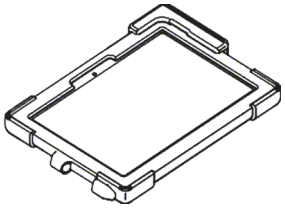


Figure 2-4 Tablet

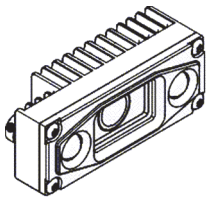


Figure 2-5 Satellite camera

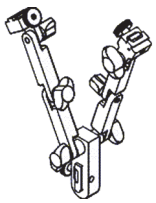


Figure 2-6 Dual camera bracket

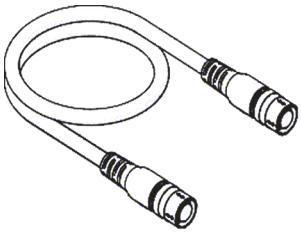


Figure 2-7 Satellite camera cable

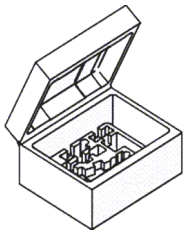


Figure 2-8 Case

2.2 Base System Components

2.2.1 Camera

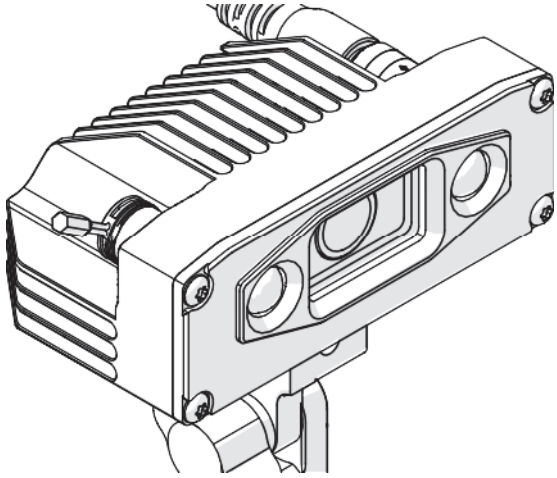


Figure 2-9 Camera

The camera mounts to the SteerROVER scanner via the adjustable camera bracket. The camera includes LED lights for low-light illumination.

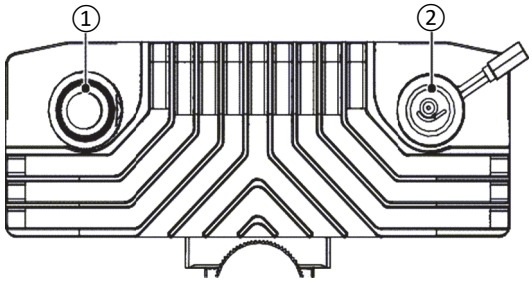


Figure 2-10 Rear of camera

Two sockets are found on the rear of the camera housing.

The main socket (1) is a connection for the camera cable. The satellite socket (2) accommodates a cable that plugs into the satellite camera. The satellite socket includes a cap to protect the socket when not in use.

2.2.2 Camera Bracket

The camera bracket attaches the unit to the SteerROVER scanner and provides viewing angle adjustment for the camera.

2.2.3 Camera Cable

The camera cable connects the camera to the tablet as well as to the SteerROVER scanner, which provides power to the camera.

2.2.4 Tablet

RECON Studio application displays the video images.

2.2.5 Satellite Camera

The satellite camera offers a second camera angle on the SteerROVER scanner.

2.2.6 Dual Camera Bracket

The dual camera bracket is used when you are using both the camera and satellite camera.

2.2.7 Satellite Camera Bracket

The satellite camera cable connects the satellite camera to the main camera for the purpose of power and transmission of video signals.

2.2.8 RECON Case

The product includes a fitted case for all the components of this system.

3. Preparation for Use

Prepare the SteerROVER scanner for use as instructed in the *SteerROVER User's Manual*.

3.1 Single Camera Configuration

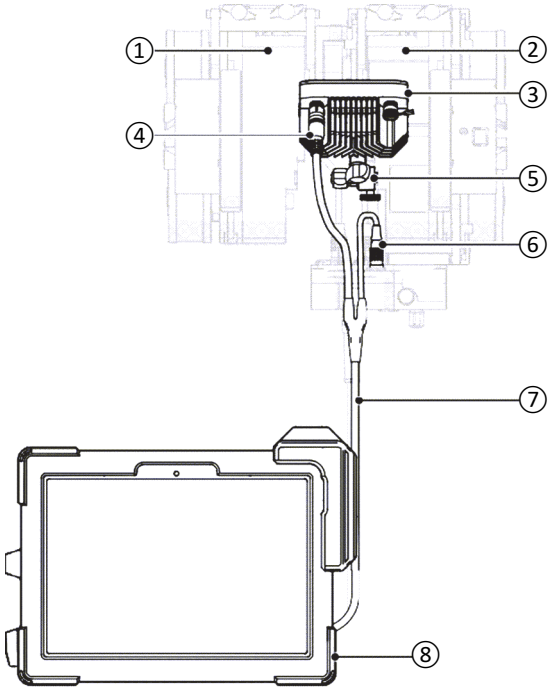


Figure 3-1 Single camera configuration

Table 5 Single camera configuration

ID	Description
1	Left drive module
2	Right drive module
3	Camera
4	Camera connector
5	Camera bracket
6	Power connector
7	Camera cable
8	Tablet

3.2 Two Camera Configuration

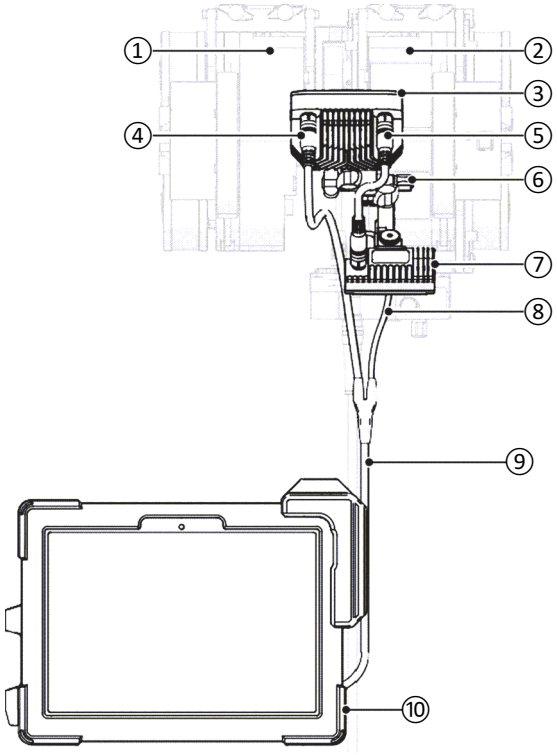


Figure 3-2 Two camera configuration

Table 6 Two camera configuration

ID	Description
1	Left drive module
2	Right drive module
3	Camera
4	Camera connector
5	Satellite camera cable
6	Dual camera bracket
7	Satellite camera
8	Power connector
9	Camera cable
10	Tablet

3.3 Attaching the Camera

To attach the camera

1. Loosen the camera mount thumb screw on the camera bracket.

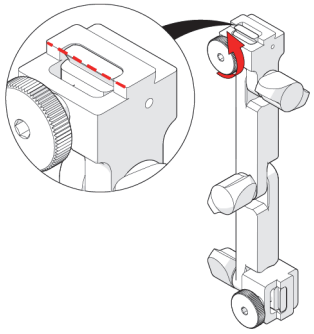
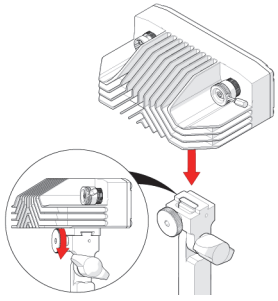


Figure 3-3 Loosen camera mount thumb screw

2. Attach the camera to the bracket and tighten the thumb screw.



o

Figure 3-4 Attach camera and tighten thumb screw

3. Loosen the scanner mounting thumb screw.

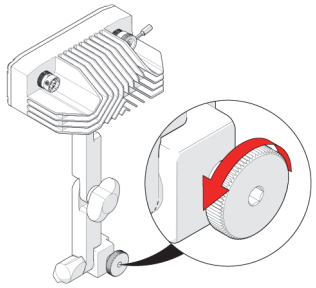


Figure 3-5 Loosen thumb screw

4. Attach bracket to the scanner's dovetail accessory mount.

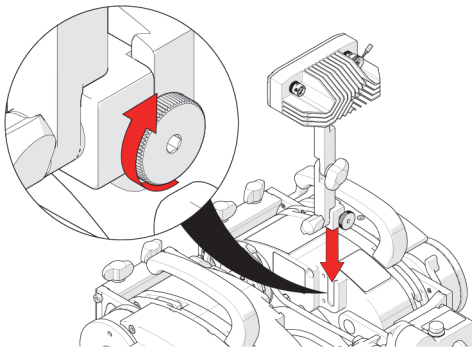


Figure 3-6 Attach camera and tighten thumb screw

5. Tighten thumb screw.

3.4 Adjusting the Camera Angle

To adjust the camera angle

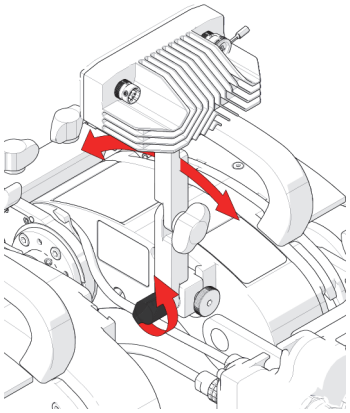


Figure 3-7 Adjust bracket angle

1. Loosen the wing knob at the bottom of the bracket to adjust the camera bracket angle.
2. Adjust camera angle as required and tighten wing knob.

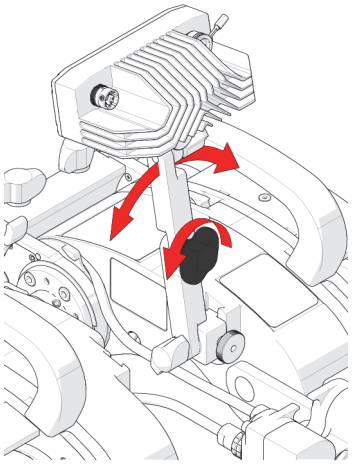


Figure 3-8 Adjust horizontal angle

3. Loosen the middle wing knob to adjust the camera's horizontal angle.
4. Tighten the wing knob when required angle is achieved.

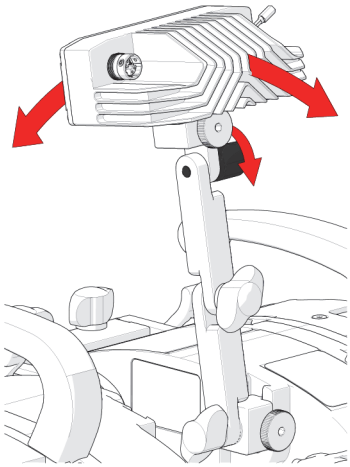


Figure 3-9 Adjust camera angle

5. Loosen the top wing knob to adjust the camera angle.
6. Tighten the wing knob when required angle is achieved.

3.5 Connecting the Camera Cable

WARNING

DO NOT DISCONNECT UNDER LOAD. Shut off power before connecting or disconnecting the RECON camera system. Permanent damage to electronics could occur.

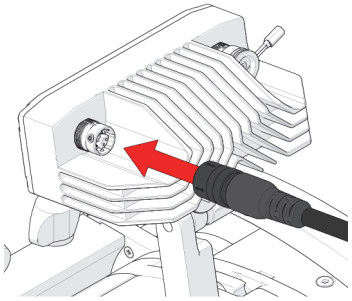


Figure 3-10 Connect cable to the camera

1. Connect the camera cable to the left side receptacle.
2. Ensure the SteerROVER system power is off.

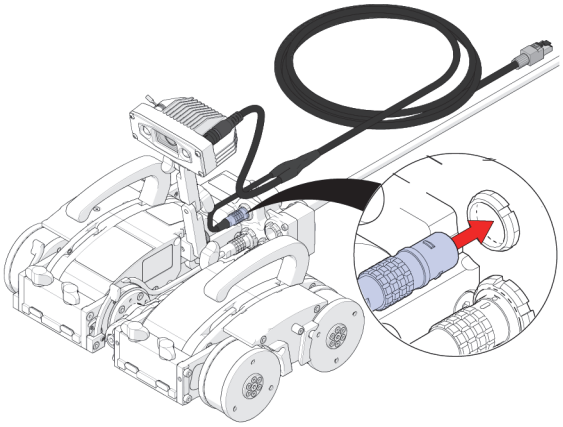


Figure 3-11 Connect camera power to umbilical

3. Connect the camera cable's power to the scanner's auxiliary connector located on the umbilical.

4. Route the camera cable into the scanner's cable management (refer to the *SteerROVER User's Manual* for details).

3.6 Connecting the Tablet

To connect the tablet

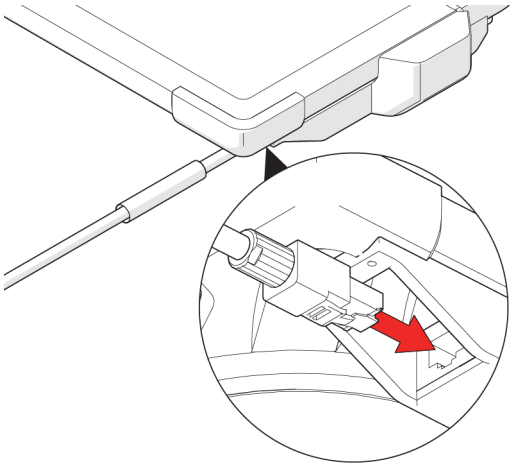


Figure 3-12 Connect the Ethernet connector to the tablet

- Plug the Ethernet connector of the camera cable into the tablet.

3.7 Attaching the Satellite Camera

To attach the satellite camera

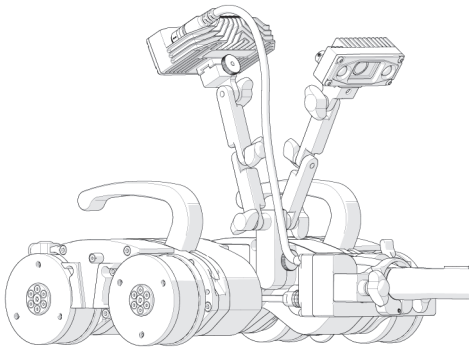


Figure 3-13 Satellite camera attached to dual bracket

1. Attach the satellite camera to the dual camera bracket (see "Attaching the Camera" on page 31).
2. Adjust the angle of the satellite camera as required (see "Attaching the Camera" on page 31).

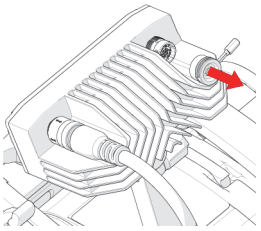


Figure 3-14 Remove satellite socket cap

3. Remove the satellite socket cap from the camera.

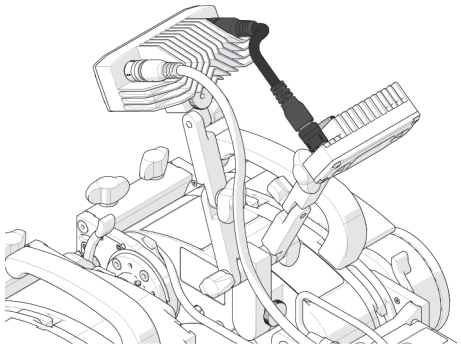


Figure 3-15 Connect satellite camera cable to both cameras

4. Ensure the SteerROVER system power is off.
5. Connect the satellite camera cable to both the camera and satellite camera.

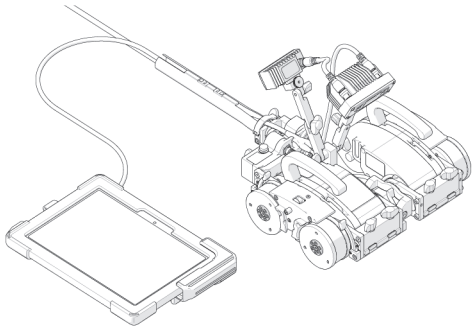


Figure 3-16 Connect tablet to the camera cable

6. Connect the tablet to the camera cable (see “Connecting the Tablet” on page 38).

3.8 Charging the Tablet

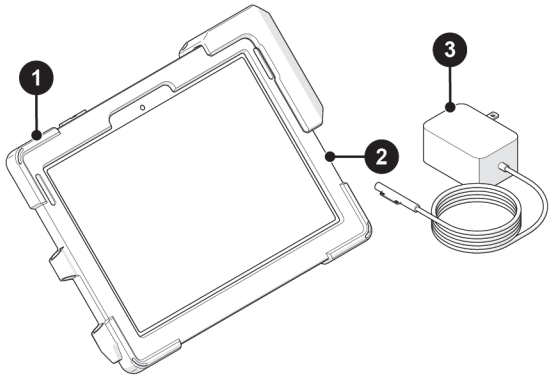


Figure 3-17 RECON tablet and charger

Table 7 RECON tablet and charger

ID	Description
1	Power Button
2	Charge port
3	Charger

To charge the tablet

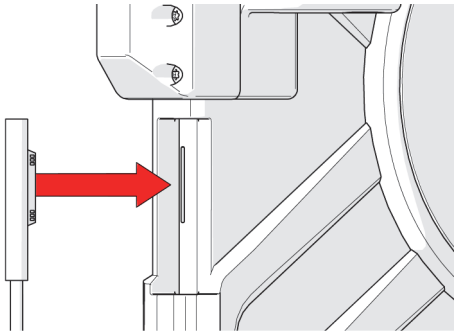


Figure 3-18 Connect charger to the tablet's charge port

- Connect the charger to the tablet's charge port. When charging properly, a LED light on the charger cable will illuminate.

4. Operation

Refer to *SteerROVER User's Manual* for preparation and operation instructions for the SteerROVER scanner. Powering up the SteerROVER system with the camera connected will activate the camera and the tablet screens as described in this chapter.

4.1 System Activation

During the initiation process, the camera's LED lights will blink to indicate power and signal has reached the camera.

The SteerROVER scanner must be activated for the camera to power on.

4.2 RECON Studio Application

The RECON camera system is controlled using the RECON Studio application installed on the tablet. This section describes the app's user interface and how to use it to set up and operate the system.

4.2.1 Record Screen Interface

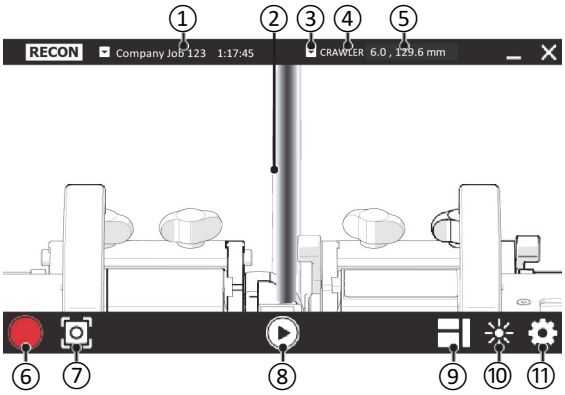


Figure 4-1 RECON Studio interface

Table 8 Record screen

ID	Icon	Name	Description
1		Session information	To begin recording video, a session must be created. When the system is first powered on, **No Session Active** will be displayed. The session entry dialogue also appears if the video record button is pressed when **No Session Active** is displayed. Once a session is created, video and images can be saved using the video record and snapshot buttons.
2		Viewer	View screen for camera and playback screen.

Table 8 Record screen (Continued)

ID	Icon	Name	Description
3		Encoder options	Pull down for encoder options.
4		CRAWLER	Tap the CRAWLER button to access additional options.
5		Encoder position display	The encoder position of the scanner and any attached accessory will display here. NOTE: When setting the encoder position to zero on the handheld controller, ensure that the encoder position is also reset by the user within the RECON Studio application. The encoder data on the handheld controller is independent of the RECON.
6		Video record	Press to begin recording video signals.
7		Snapshots	Press at any time to capture a still photograph.
8		Playback	Press to access the video and still image file management.
9		Camera selection	Only available when a satellite camera is connected. The camera selection enables you to choose between a variety of camera display options.
10		LED light brightness	Control the brightness of the LED lights on camera (does not adjust video exposure).
11		Settings	Access all settings related to the camera (see “Settings” on page 46 for additional details).

4.2.2 Settings

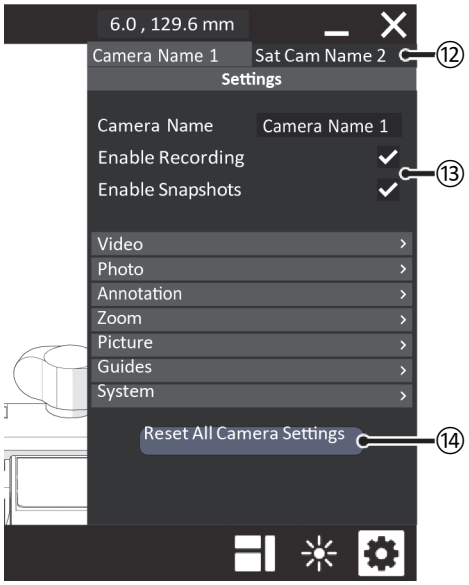


Figure 4-2 RECON Studio settings

Table 9 RECON Studio settings

ID	Name	Description
12	Camera selection tab	Tabs located at the top of the settings window enable you to chose which camera settings to adjust.
13	Camera selection tab	Select which abilities are available.

Table 9 RECON Studio settings (Continued)

ID	Name	Description
14	Restore	To restore all default settings, press **Reset all Camera Settings**.

5. Maintenance and Service Information

5.1 Maintenance Schedule

The camera must be maintained according to the schedule in Table 10 on page 49.

Table 10 Maintenance items

Task	Frequency
Inspect cables and connectors Inspect the cables for damage. Have any damaged cable 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 camera stays relatively clean by wiping off any excess dirt or other contaminants after every use.	Every use

5.2 Cleaning

General cleaning of components is important to keep your system working well. All components that have no wiring or cables are 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.

Inspect cables/connectors daily and as required, depending on occurrence of damaging events.

NOTE

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

NOTE

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

5.3 Troubleshooting

Table 11 Maintenance items

Problem	Possible cause	Solution
Camera does not activate (no flashing lights on power up).	Cables are not properly connected.	Unplug all cables, and plug back in, ensuring cables are properly connected.
		Return to manufacturer for repair. Do not activate camera, do not attempt to repair.
	Restart Studio application.	Within the Studio application, enter the settings and choose the system tab. Press **Restart Now**.

Table 11 Maintenance items (Continued)

Problem	Possible cause	Solution
Camera lights flashing, no connection to RECON Studio application.	Ethernet cable not connected to tablet.	Ensure Ethernet cable is properly connected to tablet.
	Ensure enough time has elapsed for camera firmware to start up	Wait 45 seconds to ensure camera startup has completed processing.
	Studio application needs to be restarted.	Close and re-open the Studio application on the tablet.
	Camera requires power-cycling	Camera requires power- cycling. Turn camera off and on and wait 45 seconds.

5.4 Service and Repair

WARNING

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

For issues with your RECON, first see “Troubleshooting” on page 50 and then see “Technical Support” on page 14.

5.4.1 Technical Support

For technical support, contact Evident (see “Technical Support” on page 14).

5.5 Spare Parts

To order accessories or replacement parts for the RECON camera system, contact Evident (see “Technical Support” on page 14).

NOTE

The following drawings are for ordering spare parts. They are not lists of kit contents.

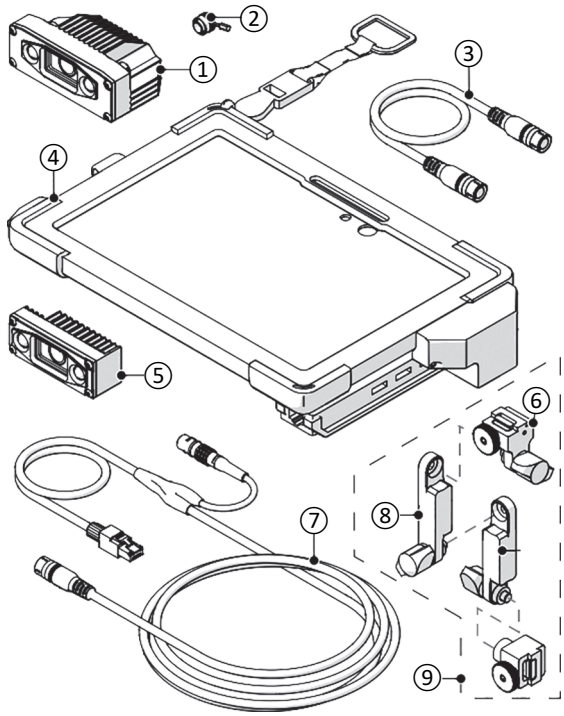


Figure 5-1 Spare parts 1 of 2

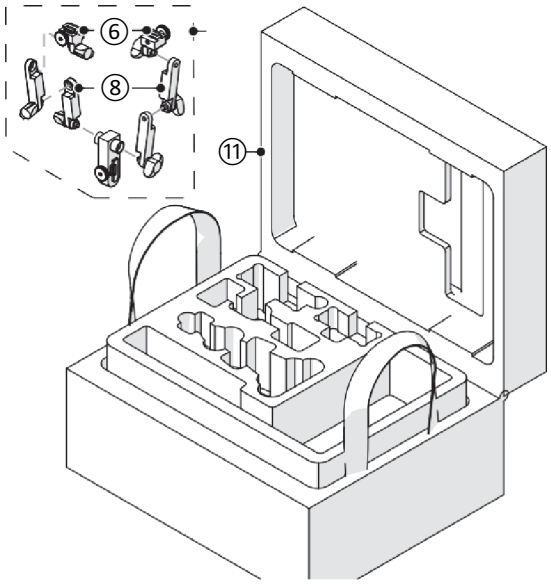


Figure 5-2 Spare parts 2 of 2

Table 12 RECON spare parts

BOM ID	Part Number	Description
1	Q8302622	RECON camera
2	Q8302646	RECON camera socket plug
3	Q8302665	RECON satellite camera cable 1 foot
4	Q8302639	RECON Surface Go tablet
5	Q8302623	RECON satellite camera
6	Q8302642	RECON camera bracket mount

Table 12 RECON spare parts (Continued)

BOM ID	Part Number	Description
7	Q8302666	RECON camera cable 30 m
8	Q8302643	RECON camera bracket, arm
9	Q8302640	RECON camera bracket
10	Q8302641	RECON dual camera bracket
11	Q8302624	RECON case

List of Figures

List of Tables