



JCU-3

INSTALLATION & OPERATION INSTRUCTIONS



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Software updates

Note:

Check the FLIR website for the latest software releases for your product.

www.flir.com/marine/support

Product handbooks

The latest versions of all English and translated handbooks are available to download in PDF format from www.flir.com/marine/support. Please check the website to ensure you have the latest handbooks.

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CHAPTER 1: IMPORTANT INFORMATION

Safety warnings



Warning: Product installation and operation

- This product must be installed and operated in accordance with the instructions provided. Failure to do so could result in personal injury, damage to your vessel and/or poor product performance.
- Certified installation by an approved installer is recommended. A certified installation qualifies for enhanced product warranty benefits. Contact your dealer for further details, and refer to the separate warranty document packed with your product.



Warning: Switch off power supply

Ensure the vessel's power supply is switched OFF before starting to install this product. Do NOT connect or disconnect equipment with the power switched on, unless instructed in this document.

Product warnings



Warning: Product grounding

Before applying power to this product, ensure it has been correctly grounded, in accordance with the instructions provided.



Warning: Positive ground systems

Do not connect this unit to a system which has positive grounding.



Warning: Potential ignition source

This product is NOT approved for use in hazardous/flammable atmospheres. Do NOT install in a hazardous/flammable atmosphere (such as in an engine room or near fuel tanks).

Caution: Power supply protection

When installing this product ensure the power source is adequately protected by means of a suitably-rated fuse or thermal circuit breaker.

Regulatory notices

Water ingress

Water ingress disclaimer

Although the waterproof rating capacity of this product meets the stated standard (refer to the product's *Technical Specification*), water intrusion and subsequent equipment failure may occur if the product is subjected to commercial high-pressure washing. FLIR will not warrant products subjected to high-pressure washing.

Disclaimer

FLIR does not warrant that this product is error-free or that it is compatible with products manufactured by any person or entity other than FLIR.

FLIR is not responsible for damages or injuries caused by your use or inability to use the product, by the interaction of the product with products manufactured by others, or by errors in information utilized by the product supplied by third parties.

EMC installation guidelines

FLIR equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations, to minimize electromagnetic interference between equipment and minimize the effect such interference could have on the performance of your system

Correct installation is required to ensure that EMC performance is not compromised.

Note:

In areas of extreme EMC interference, some slight interference may be noticed on the product. Where this occurs the product and the source of the interference should be separated by a greater distance.

For **optimum** EMC performance we recommend that wherever possible:

- FLIR equipment and cables connected to it are:
 - At least 1 m (3.3 ft) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 2 m (6.6 ft).
 - More than 2 m (6.6 ft) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- FLIR specified cables are used.
- Cables are not cut or extended, unless doing so is detailed in the installation manual.

Note:

Where constraints on the installation prevent any of the above recommendations, always ensure the maximum possible separation between different items of electrical equipment, to provide the best conditions for EMC performance throughout the installation

Declaration of conformity

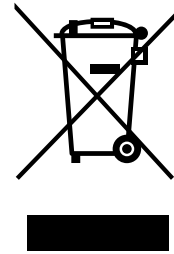
FLIR Belgium BVBA declares that the M100/M200 Series cameras, part numbers E70431, E70432, E70353, E70354 are in compliance with the Radio Equipment Directive 2014/30/EU.

The original Declaration of Conformity certificate may be viewed on the relevant product page at www.flir.com/support.

Product disposal

Dispose of this product in accordance with the WEEE Directive.

The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electrical and electronic equipment which contains materials, components and substances that may be hazardous and present a risk to human health and the environment when WEEE is not handled correctly.



Equipment marked with the crossed-out wheeled bin symbol indicates that the equipment should not be disposed of in unsorted household waste. Local authorities in many regions have established collection schemes under which residents can dispose of waste electrical and electronic equipment at a recycling center or other collection point. For more information about suitable collection points for waste electrical and electronic equipment in your region, refer to the Raymarine website: www.raymarine.eu/recycling.

Warranty registration

To register your FLIR product ownership, please visit www.flir.com and register online.

It is important that you register your product to receive full warranty benefits. Your unit package includes a bar code label indicating the serial number of the unit. You will need this serial number when registering your product online. You should retain the label for future reference.

IMO and SOLAS

The equipment described within this document is intended for use on leisure marine boats and workboats NOT covered by International Maritime Organization (IMO) and Safety of Life at Sea (SOLAS) Carriage Regulations.

Technical accuracy

To the best of our knowledge, the information in this document was correct at the time it was produced. However, FLIR cannot accept liability for any inaccuracies or omissions it may contain. In addition, our policy of continuous product improvement may change specifications without notice. As a result, FLIR cannot accept liability for any differences

between the product and this document. Please check the FLIR website (www.flir.com/marine/support) to ensure you have the most up-to-date version(s) of the documentation for your product.

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CHAPTER 2: DOCUMENT INFORMATION

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- 2.1 Document information — page 11
- 2.2 Document illustrations — page 11
- 2.3 Product documentation — page 11

2.1 Document information

This document contains important information related to the installation and operation of your FLIR product.

The document includes information to help you:

- plan your installation and ensure you have all the necessary equipment;
- install and connect your product as part of a wider system of connected marine electronics;
- use your product along with an appropriate FLIR thermal camera;
- troubleshoot problems and obtain technical support if required.

This and other FLIR product documents are available to download in PDF format from www.flir.com/marine/support.

2.2 Document illustrations

Your product and if applicable, its user interface may differ slightly from that shown in the illustrations in this document, depending on product variant and date of manufacture.

All images are provided for illustration purposes only.

2.3 Product documentation

The following documentation is applicable to your product:

| Description | Part number |
|---|-------------|
| JCU-3 Installation and operation instructions (this document) | 71002 |
| JCU-3 Mounting template | 87283 |

CHAPTER 3: PRODUCT AND SYSTEM OVERVIEW

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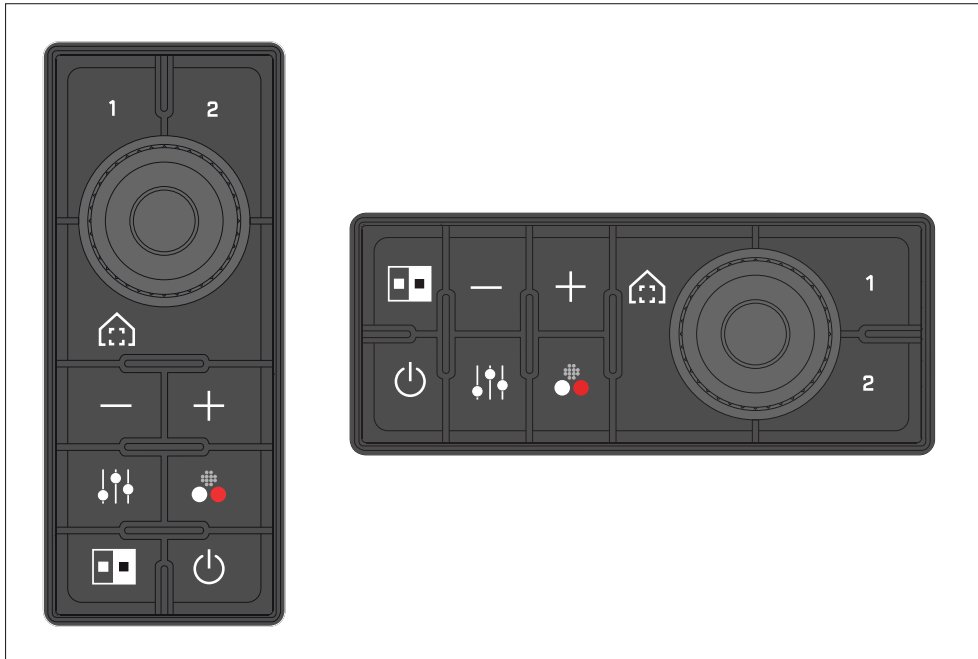
- 3.1 Product overview — page 13
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3.1 Product overview

The **JCU-3** is a remote keypad for FLIR thermal cameras. The keypad is a class 1 PoE (Power over Ethernet) device and can be powered either using a suitable network connection, that is providing PoE, or directly using the dedicated Alternate power connector.

The keypad interacts directly with supported thermal cameras, and does not require any other products (such as an MFD) to be present in the network.

The keypad can be mounted in landscape or portrait orientation.



3.2 Compatibility

The **JCU-3** keypad is compatible with the following FLIR thermal cameras:

- M100 Series
- M200 Series

| Part number | Description |
|---------------|---|
| A80510 | JCU-3 When ordering A80510 both portrait and landscape orientation keypad mats are supplied. |

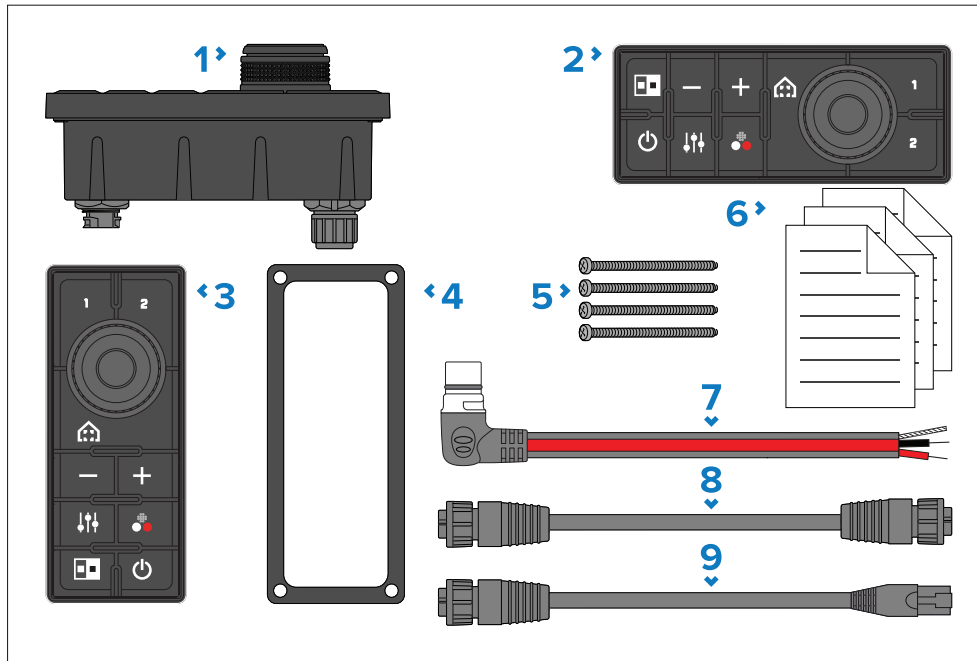
CHAPTER 4: PARTS SUPPLIED

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- 4.1 Parts supplied — page 15

4.1 Parts supplied

The parts supplied with the keypad are shown below.



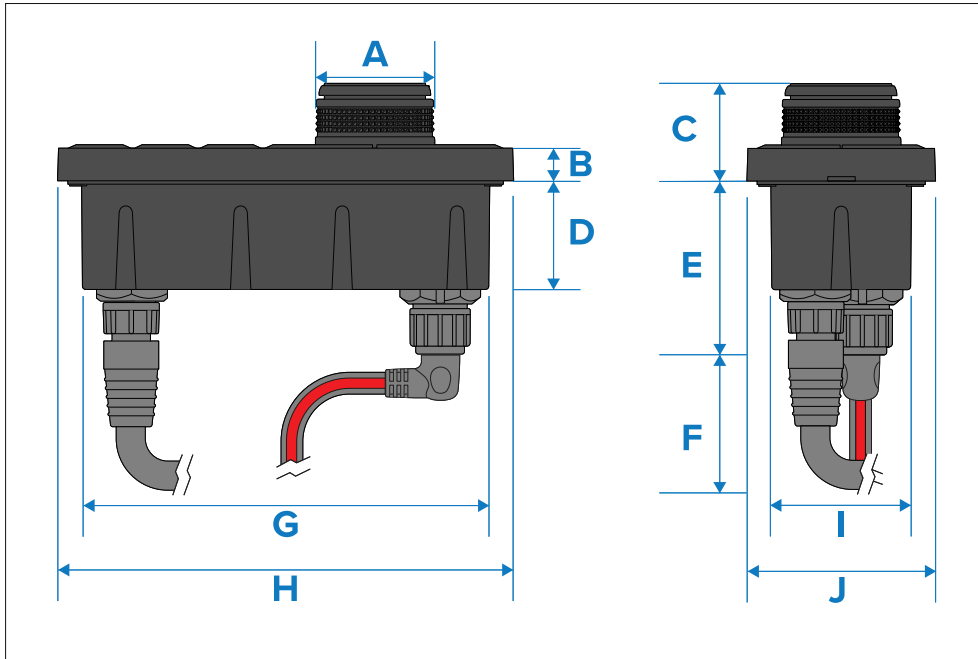
| Item | Description |
|------|---|
| 1 | JCU-3 keypad |
| 2 | Landscape keypad mat |
| 3 | Portrait keypad mat (supplied fitted to the unit) |
| 4 | Mounting gasket |
| 5 | 4 x mounting fixings |
| 6 | Documentation pack |
| 7 | Right angled power cable 2 m (6.6 ft.) |
| 8 | RayNet network cable 2 m (6.6 ft.) |
| 9 | RayNet-to-RJ45 adapter cable (100 mm) |

CHAPTER 5: PRODUCT DIMENSIONS

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5.1 Product dimensions



| Item | Dimension |
|------|---------------------|
| A | 34.8 mm (1.37 in.) |
| B | 10.5 mm (0.41 in.) |
| C | 28.4 mm (1.12 in.) |
| D | 31.7 mm (1.25 in.) |
| E | 50.7 mm (2.00 in.) |
| F | 80.0 mm (3.15 in.) |
| G | 119.0 mm (4.69 in.) |
| H | 133.0 mm (5.24 in.) |
| I | 41.0 mm (1.61 in.) |
| J | 55.0 mm (2.17 in.) |

CHAPTER 6: LOCATION REQUIREMENTS

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- 6.1 Warnings and cautions — page 19
- 6.2 General location requirements — page 19
- 6.3 Compass safe distance — page 19

6.1 Warnings and cautions

Important:

Before proceeding, ensure that you have read and understood the warnings and cautions provided in the following section of this document:
[p.7 — Important information](#)



Warning: Potential ignition source

This product is NOT approved for use in hazardous/flammable atmospheres. Do NOT install in a hazardous/flammable atmosphere (such as in an engine room or near fuel tanks).

6.2 General location requirements

Important considerations when choosing a suitable location for your product.

This product is suitable for mounting above or below decks.

The product should be mounted where it will be:

- Protected from physical damage and excessive vibration.
- Well ventilated and away from heat sources.
- Away from any potential ignition source such as an engine room, near fuel tanks or a gas locker.

When choosing a location for the product, consider the following points to ensure reliable and trouble-free operation:

- **Access** — there must be sufficient space to enable cable connections and to avoid tight cable bends.
- **Diagnostics** — the product must be mounted in a location where any diagnostics LED are easily visible.

Note:

Not all products include a diagnostics LED. For more information refer to:
[Chapter 12 System checks and troubleshooting](#)

- **Electrical interference** — the product should be mounted far enough away from any equipment that may cause interference such as engines,

motors, generators, radio transmitters / receivers and cables carrying high power.

- **Magnetic compass** — refer to the *Compass safe distance* section in this document for advice on maintaining a suitable distance between this product and any compasses on your vessel.
- **Power** — to keep cable runs to a minimum, the product must be located as close as possible to the vessel's dc power supply.
- **Mounting surface** — ensure the product is adequately supported on a secure surface. Refer to the weight information provided in the *Technical specification* for this product and ensure that the intended mounting surface is suitable for bearing the product weight. Do NOT mount units or cut holes in places which may damage the structure of the vessel.

6.3 Compass safe distance

To prevent potential interference with the vessel's magnetic compasses, ensure an adequate distance is maintained from the product.

When choosing a suitable location for the product you should aim to maintain the maximum possible distance from any compasses. Typically this distance should be at least 1 m (3.3 ft) in all directions. However for some smaller vessels it may not be possible to locate the product this far away from a compass. In this situation, when choosing the installation location for your product, ensure that the compass is not affected by the product when it is in a powered state.

CHAPTER 7: CABLES AND CONNECTIONS — GENERAL INFORMATION

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7.1 Cable types and length

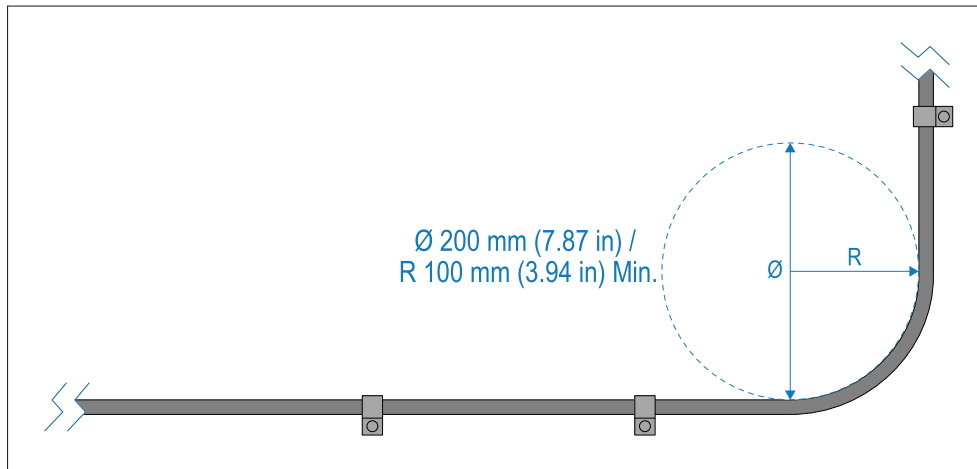
It is important to use cables of the appropriate type and length.

- Unless otherwise stated use only standard cables of the correct type, supplied by FLIR.
- Ensure that any non-FLIR cables are of the correct quality and gauge. For example, longer power cable runs may require larger wire gauges to minimize voltage drop along the run.

7.2 Cable routing

Cables must be routed correctly, to maximize performance and prolong cable life.

- Do NOT bend cables excessively. Wherever possible, ensure a minimum bend diameter (\emptyset) of 200 mm (7.87 in) / minimum bend radius (R) of 100 mm (3.94 in).



- Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible. Do NOT run cables through bilges or doorways, or close to moving or hot objects.
- Secure cables in place using cable clips or cable ties. Coil any excess cable and tie it out of the way.
- Where a cable passes through an exposed bulkhead or deckhead, use a suitable watertight feed-through.

- Do NOT run cables near to engines or fluorescent lights.
- Always route data cables as far away as possible from:
 - Other equipment and cables.
 - High current carrying AC and DC power lines.
 - Antennas.

7.3 Strain relief

Use adequate strain relief for cabling to ensure that connectors are protected from strain and will not pull out under extreme sea conditions.

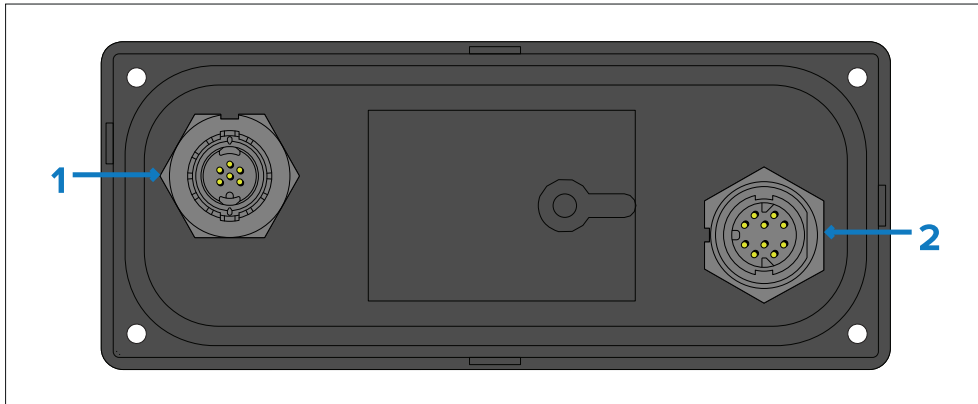
7.4 Cable shielding

Ensure that cable shielding is not damaged during installation and that all cables are properly shielded.

7.5 Suppression ferrites

- Cables may be pre-fitted or supplied with suppression ferrites. These are important for correct EMC performance. If ferrites are supplied separately to the cables (i.e. not pre-fitted), you must fit the supplied ferrites, using the supplied instructions.
- If a ferrite has to be removed for any purpose (e.g. installation or maintenance), it must be replaced in the original position before the product is used.
- Use only ferrites of the correct type, supplied by the manufacturer or its authorized dealers.
- Where an installation requires multiple ferrites to be added to a cable, additional cable clips should be used to prevent stress on the connectors due to the extra weight of the cable.
- If your camera installation requires long cable runs, you may need to fit additional ferrites to maintain acceptable EMC performance.

7.6 Connections overview



1. Alternate power connector
2. Network / PoE connector

The alternate power connector is required when connecting to a network which does not support Power over Ethernet PoE. The alternate power connector must be connected directly to a power supply.

Note:

Do not connect the alternate power connector to a SeaTalk^{ng} network.



Warning: Powering PoE devices

PoE devices can be powered via an ethernet connection (PoE) OR via a dedicated power cable.

NEVER connect a PoE device's dedicated power cable when it is being supplied PoE.

When the PoE device's dedicated power cable is not connected, any bare end wire connections must be separately covered with insulation.

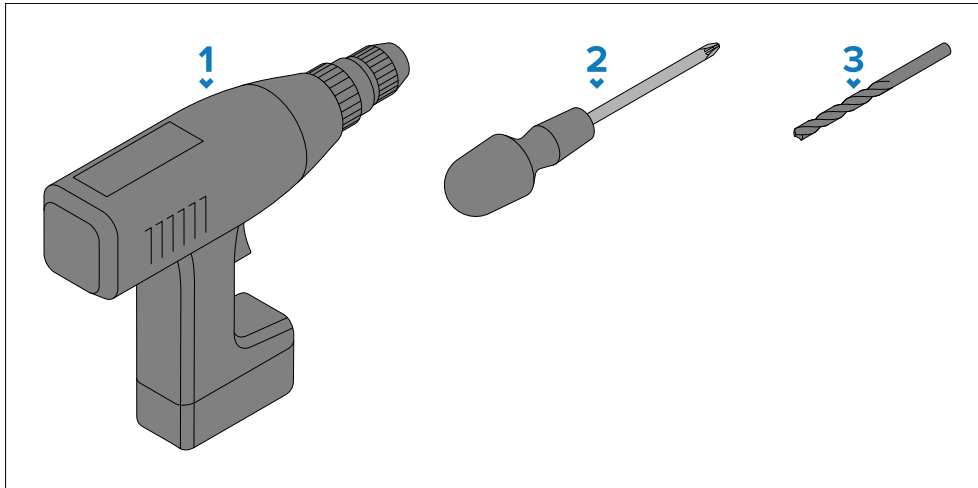
CHAPTER 8: MOUNTING

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8.1 Tools required

Product installation requires the following tools:



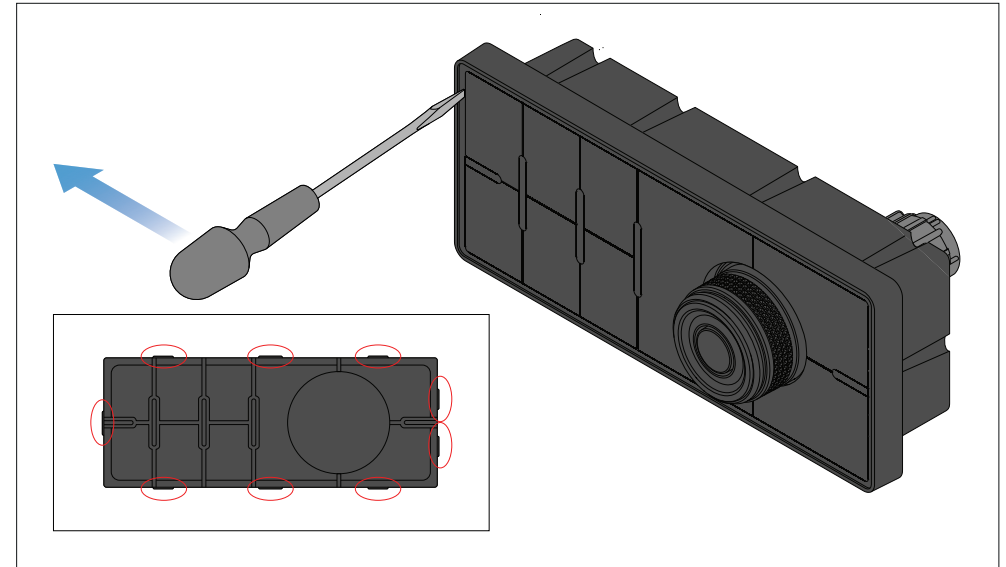
1. Power drill
2. Pozidrive screwdriver
3. Drill bit

Note:

The appropriate drill bit size is dependent on the thickness and material of the mounting surface.

8.2 Removing the keypad mat

To gain access to the mounting hole locations, the keypad mat must be removed.



Note:

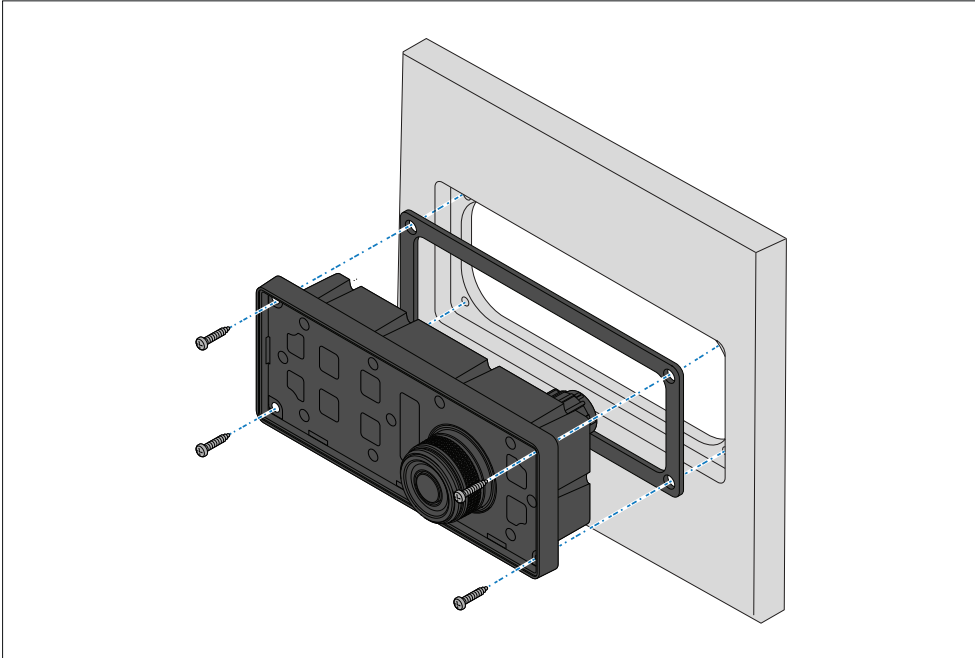
To help prevent scratching the product, cover the tip of your screwdriver blade with a small piece of insulation tape.

1. Using a thin, flat bladed screwdriver insert the tip of the screwdriver into the gap between the edge of the keypad mat and the keypad housing, at a location between locking tabs.
2. Gently lever the keypad mat away from the keypad to release the keypad mat.

Take care not to bend the keypad mat during removal.

8.3 Flush mounting the keypad

Flush mounting provides a sleek installation where the product and dash are flush, with only the buttons and Rotary controller protruding from the dash. Flush mounting requires the mounting surface to be rebated.



1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.
2. Before modifying the mounting surface, refer to the dimensions supplied in this document to ensure there is enough space for the unit and all cables.
3. Fix the supplied mounting template to the selected location, using masking or self adhesive tape.
4. Drill 4 holes as indicated on the mounting template to accept the fixings.
5. Using a suitable hole saw (the size and position is indicated on the template), make a hole in each corner of the cut-out area.
6. Using a suitable saw, cut along the inside edge of the cut-out line.
7. Using a Router, follow the Flush mount rebate line, to cut out a rebate to the specified rebate depth, as indicated on the template.

8. Ensure that the unit fits into the removed area and then remove rough edges.
9. Place the supplied gasket onto the rear of the keypad, ensuring the mounting holes are aligned.
10. Connect the relevant cables to the unit.
11. Place the keypad into the rebate and secure using the fixings provided.

Note:

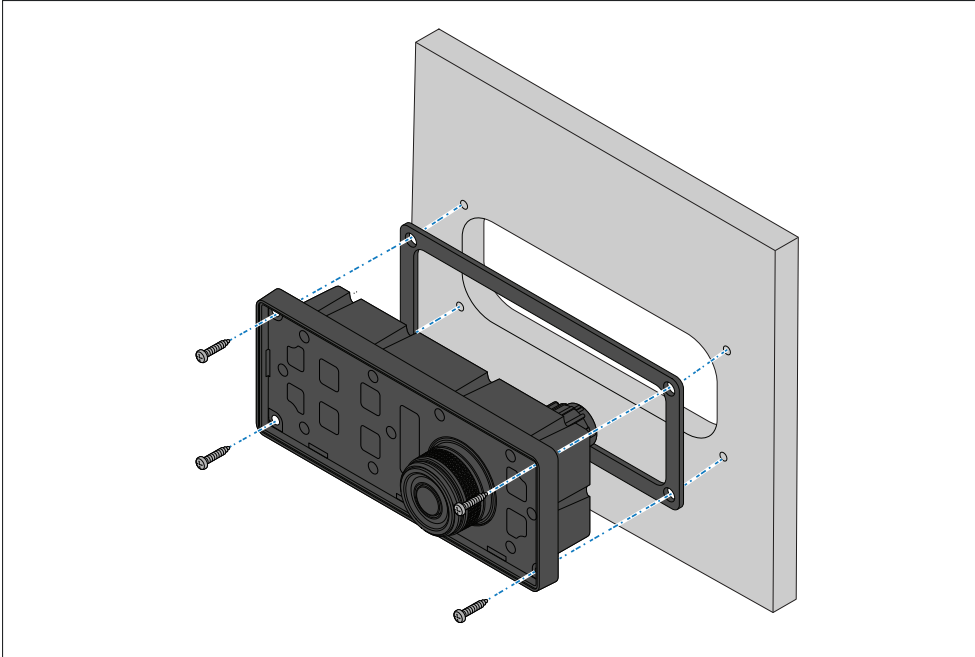
The appropriate tightening torque and drill bit size to use depends on the thickness of the mounting surface and the type of material it is made from.

Note:

The supplied gasket provides a seal between the unit and a suitably flat and stiff mounting surface or binnacle. The gasket should be used in all installations. It may also be necessary to use a marine-grade sealant if the mounting surface or binnacle is not entirely flat and stiff or has a rough surface finish.

8.4 Surface mounting the keypad

Surface mounting provides a uniform installation where the products protrude, usually by the thickness of the bezel, from the mounting surface.



1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.
2. Before modifying the mounting surface, refer to the dimensions supplied in this document to ensure there is enough space for the unit and all cables.
3. Fix the supplied mounting template to the selected location, using masking or self adhesive tape.
4. Drill 4 holes as indicated on the mounting template to accept the fixings.
5. Using a suitable hole saw, make a hole in each corner of the cut-out area.
6. Using a suitable saw, cut along the inside edge of the cut-out line.
7. Ensure that the unit fits into the removed area and then remove rough edges.
8. Place the supplied gasket onto the rear of the keypad, ensuring the mounting holes are aligned.
9. Connect the relevant cables to the unit.

10. Secure using the fixings provided.

Note:

The appropriate tightening torque and drill bit size to use depends on the thickness of the mounting surface and the type of material it is made from.

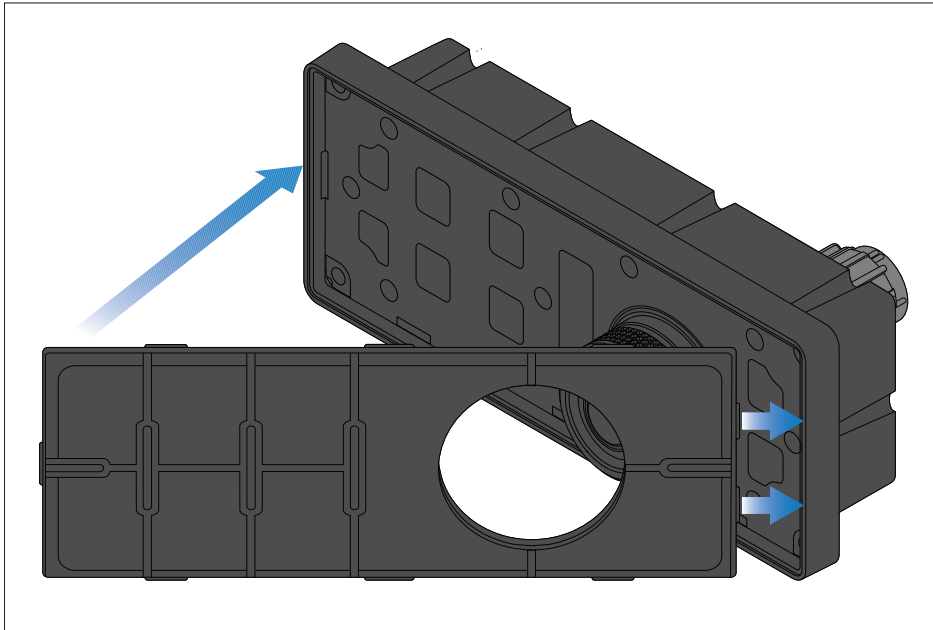
Note:

The supplied gasket provides a seal between the unit and a suitably flat and stiff mounting surface or binnacle. The gasket should be used in all installations. It may also be necessary to use a marine-grade sealant if the mounting surface or binnacle is not entirely flat and stiff or has a rough surface finish.

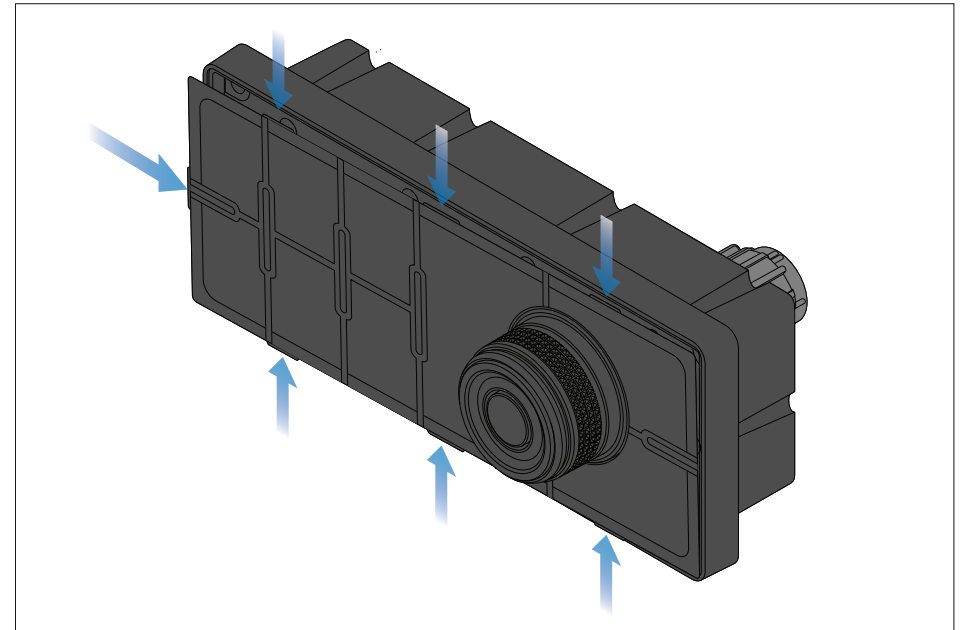
8.5 Fitting the keypad mat

Your keypad can be installed in portrait or landscape orientation. Keypad mats are available for each orientation.

- You should fit the keypad mat that matches your chosen mounting orientation.
 - You should only fit the keypad mat after the unit has been secured to the mounting surface.
1. Ensure the keypad mat is orientated correctly.
 2. Slide the keypad mat's shorter edge, with the 2 locking tabs, into the end of the keypad that has 2 notches to accept the tabs.



3. Close the opposite end of the keypad mat into the keypad, ensuring that the tab slides into the notch provided. Push all of the tabs on the longer sides into their notches (you should hear a click as each tab engages).



CHAPTER 9: NETWORK CONNECTIONS

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- [9.1 Keypad network connections](#) — page 29

9.1 Keypad network connections

Your keypad must be connected to the same network as your thermal camera, via a network switch. If the network connection to the keypad does not provide Power over Ethernet (PoE), then you must power the keypad using the Alternate power connector.

You can connect multiple keypads to the same network:

- A single keypad can control multiple thermal cameras.
- A single thermal camera can be controlled by multiple keypads.

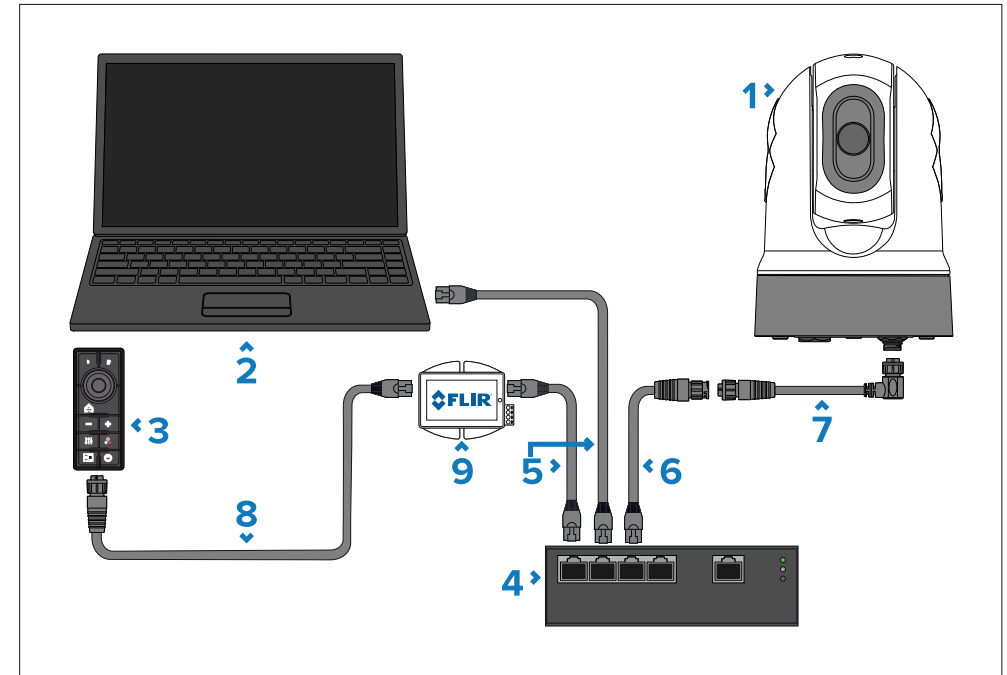
You can also connect your keypad directly to a Raymarine multifunction display (MFD).

Unless you are connecting your keypad directly to a Raymarine MFD, you will need to pair your keypad to your thermal camera as part of the installation.

To perform the pairing process, you will need to connect a PC, laptop, or other device running a web browser, to the same network as the keypad and thermal camera.

For more information about pairing your keypad to your thermal camera, refer to the following section: [p.39 — Pairing the keypad](#)

Single JCU-3 keypad with single camera and laptop web browser



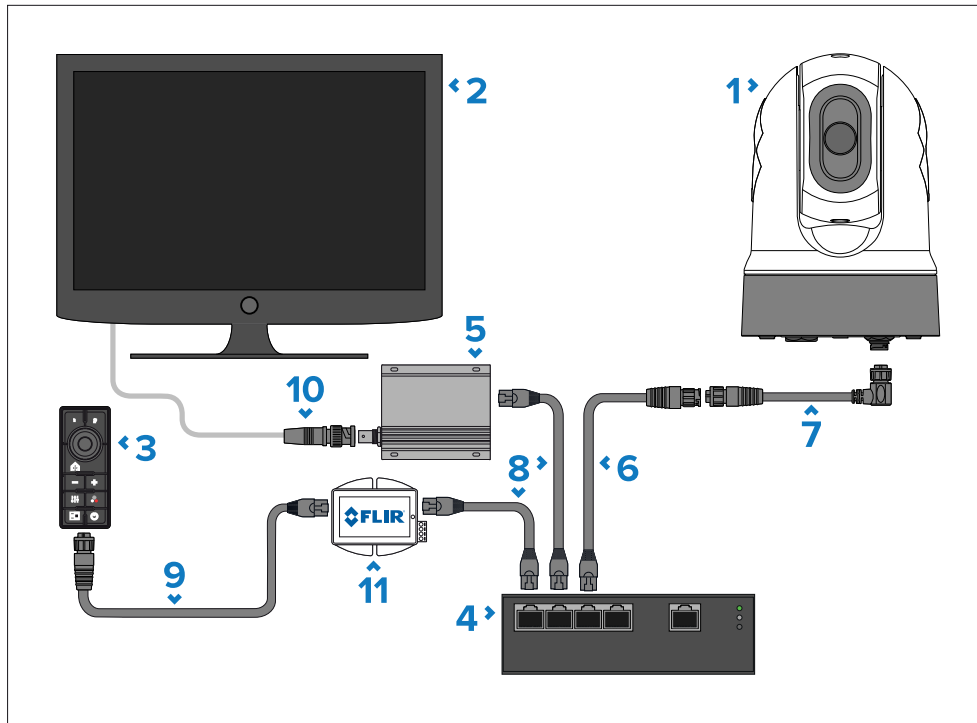
Note:

For relevant power connection information, refer to the instructions which accompany each device.

| Item | Description |
|------|---|
| 1 | M100 / M200-Series camera |
| 2 | Laptop (or other Ethernet-connected device running a web browser) |
| 3 | Joystick control unit (JCU-3) |
| 4 | Ethernet network switch |
| 5 | RJ45 to RJ45 Ethernet cable |
| 6 | RayNet (Ethernet) to RJ45 adapter cable 120 mm (4.72 in.) |

| Item | Description |
|------|---|
| 7 | Right-angled RayNet (Ethernet) to RayNet (Ethernet) cable 3 m (9.8 ft.) |
| 8 | RayNet (Ethernet) to RJ45 cable |
| 9 | PoE injector (provides power to JCU-3) |

Single JCU-3 keypad with single camera and analog video monitor



Note:
A PC, laptop – or other IP-capable device that can run a web browser – is required to pair the keypad to the camera. This is not shown in this illustration, and could be removed from the system after the pairing process is complete.

| Item | Description |
|------|--|
| 1 | M100 / M200-Series camera |
| 2 | Analog video monitor |
| 3 | Joystick control unit (JCU-3) |
| 4 | Ethernet network switch |
| 5 | IP video decoder |
| 6 | RayNet (Ethernet) to RJ45 adapter cable (100 mm) |
| 7 | Right-angled RayNet (Ethernet) to RayNet (Ethernet) cable (10 m) |
| 8 | RJ45 to RJ45 Ethernet cable |
| 9 | RayNet (Ethernet) to RJ45 cable |
| 10 | BNC to BNC video cable |
| 11 | PoE injector (provides power to JCU-3) |

Note:
For relevant power connection information, refer to the instructions which accompany each device.

CHAPTER 10: POWER CONNECTIONS

CHAPTER CONTENTS

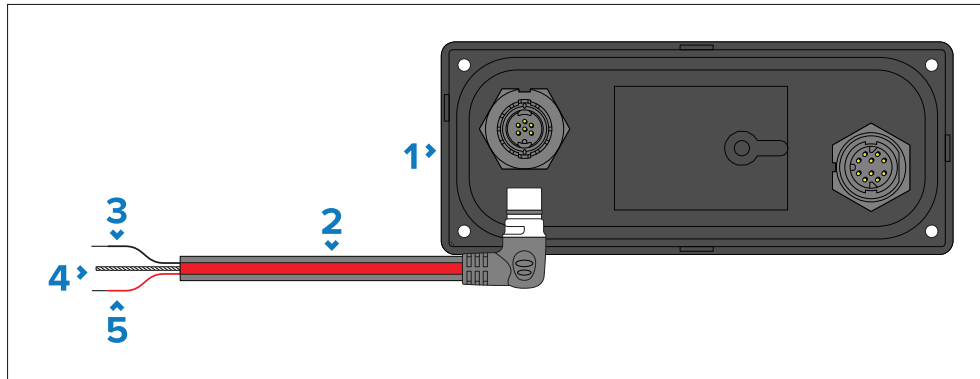
- 10.1 Positive ground systems — page 32
- 10.2 Alternate power connection — page 32
- 10.3 Inline fuse and thermal breaker ratings — page 32
- 10.4 Power distribution — page 32
- 10.5 Power cable extension (12 / 24 V systems) — page 34
- 10.6 Power cable drain wire connection — page 35

10.1 Positive ground systems

Do not connect this unit to a system which has positive grounding.

10.2 Alternate power connection

When the keypad is not supplied Power over Ethernet (PoE), the alternate power connection should be connected directly to a 12 V dc or 24 V dc power supply.



1. Keypad
2. Right angled power cable
3. Black negative wire
4. Drain wire
5. Red positive wire

10.3 Inline fuse and thermal breaker ratings

The following in-line fuse and thermal breaker ratings apply to your product:

| Inline fuse rating | Thermal breaker rating |
|--------------------|-------------------------------------|
| 1 A slow blow | 1 A (if only connecting one device) |

Note:

- The suitable fuse rating for the thermal breaker is dependent on the number of devices you are connecting. If in doubt consult an authorized FLIR dealer.
- Your product's power cable may have a fitted in-line fuse, if not then you can add an in-line fuse to the positive wire of your product's power connection.



Warning: Powering PoE devices

PoE devices can be powered via an ethernet connection (PoE) OR via a dedicated power cable.

NEVER connect a PoE device's dedicated power cable when it is being supplied PoE.

When the PoE device's dedicated power cable is not connected, any bare end wire connections must be separately covered with insulation.

10.4 Power distribution

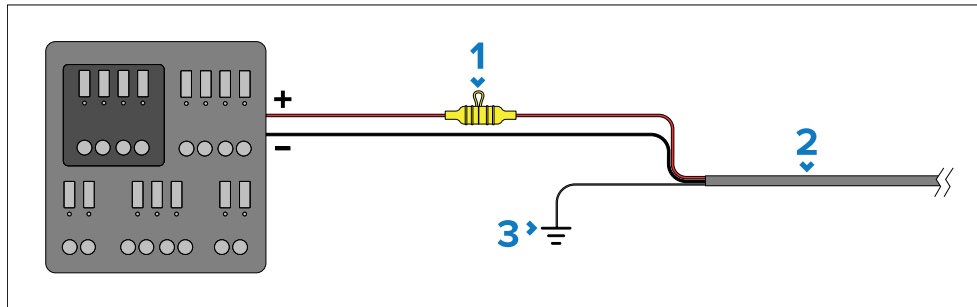
Recommendations and best practice for the power connection of products supplied with a drain wire as part of the supplied power cable.

- The product is supplied with a power cable, either as a separate item or a captive cable permanently attached to the product. Only use the power cable supplied with the product. Do NOT use a power cable designed for, or supplied with, a different product.
- Refer to the *Power connection* section for more information on how to identify the wires in your product's power cable, and where to connect them.
- See below for more information on implementation for some common power distribution scenarios:

Important:

- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for guidance only, to help protect your product. It covers common vessel power arrangements, but does NOT cover every scenario. If you are unsure how to provide the correct level of protection, please consult an authorized dealer or a suitably qualified professional marine electrician.

Implementation — connection to distribution panel (Recommended)

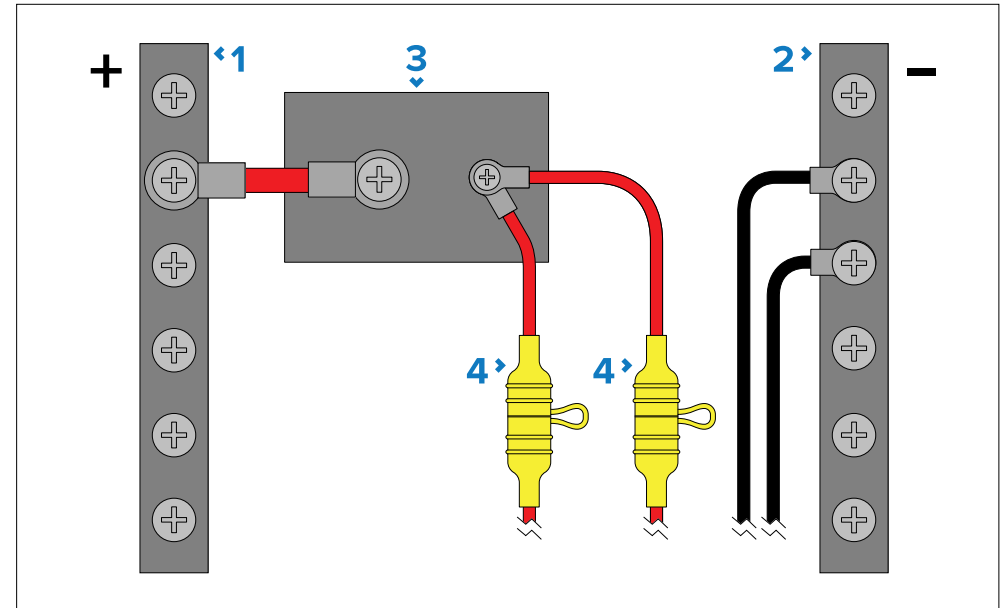


| Item | Description |
|------|---|
| 1 | Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>Inline fuse and thermal breaker ratings</i> . |
| 2 | Product power cable. |
| 3 | Drain wire connection point. |

- It is recommended that the supplied power cable is connected to a suitable breaker or switch on the vessel's distribution panel or factory-fitted power distribution point.
- The distribution point should be fed from the vessel's primary power source by 8 AWG (8.36 mm²) cable.
- Ideally, all equipment should be wired to individual suitably-rated thermal breakers or fuses, with appropriate circuit protection. Where this is not possible and more than 1 item of equipment shares a breaker, use

individual inline fuses for each power circuit to provide the necessary protection.

- The power cable supplied with your product includes a drain wire, which must be connected to the vessel's common RF ground.



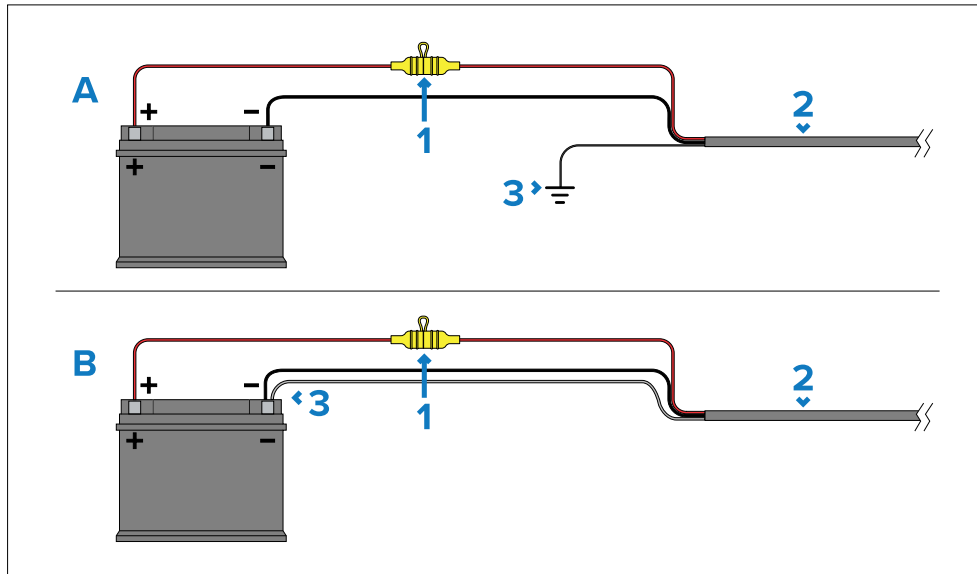
| Item | Description |
|------|---|
| 1 | Positive (+) bar |
| 2 | Negative (-) bar |
| 3 | Circuit breaker |
| 4 | Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>Inline fuse and thermal breaker ratings</i> . |

Important:

Observe the recommended fuse / breaker ratings provided in the product's documentation, however be aware that the suitable fuse / breaker rating is dependent on the number of devices being connected.

Implementation — direct connection to battery

- Where connection to a power distribution panel is not possible, the power cable supplied with your product may be connected directly to the vessel's battery, via a suitably rated fuse or breaker.
- If the power cable is NOT supplied with a fitted inline fuse, you MUST fit a suitably rated fuse or breaker between the red wire and the battery's positive terminal.
- Refer to the inline fuse ratings provided in the product's documentation.
- If you need to extend the length of the power cable supplied with your product, ensure you observe the dedicated *Power cable extensions* advice provided in the product's documentation.



| Item | Description |
|------|---|
| 1 | Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>Inline fuse and thermal breaker ratings</i> . |
| 2 | Product power cable. |
| 3 | Drain wire connection point. |

Battery connection scenario A:

Suitable for a vessel with a common RF ground point. In this scenario, the power cable's drain wire should be connected to the vessel's common ground point.

Battery connection scenario B:

Suitable for a vessel without a common grounding point. In this case, the power cable's drain wire should be connected directly to the battery's negative terminal.

Grounding

Ensure that you observe any additional grounding advice provided in the product's documentation.

More information

It is recommended that best practice is observed in all vessel electrical installations, as detailed in the following standards:

- BMEA Code of Practice for Electrical and Electronic Installations in Boats
- NMEA 0400 Installation Standard
- ABYC E-11 AC & DC Electrical Systems on Boats
- ABYC A-31 Battery chargers and Inverters
- ABYC TE-4 Lightning Protection

10.5 Power cable extension (12 / 24 V systems)

If you need to extend the length of the power cable supplied with your product, ensure you observe the following advice:

- The power cable for each unit in your system should be run as a separate, single length of 2-wire cable from the unit to the vessel's battery or distribution panel.
- Ensure that the extension cable is of a sufficient gauge for the supply voltage and the total load of the device and the length of the cable run. Refer to the following table for typical **minimum** power cable wire gauges:

| Cable length in meters (feet) | Wire gauge in AWG (mm ²) for 12 V supply | Wire gauge in AWG (mm ²) for 24 V supply |
|-------------------------------|--|--|
| <8 (<25) | 16 (1.31 mm ²) | 18 (0.82 mm ²) |
| 16 (50) | 14 (2.08 mm ²) | 18 (0.82 mm ²) |

| Cable length in meters (feet) | Wire gauge in AWG (mm ²) for 12 V supply | Wire gauge in AWG (mm ²) for 24 V supply |
|-------------------------------|--|--|
| 24 (75) | 14 (2.08 mm ²) | 16 (1.31 mm ²) |
| >32 (>100) | 14 (2.08 mm ²) | 16 (1.31 mm ²) |

Important:

Be aware that some products in your system (such as sonar modules) can create voltage peaks at certain times, which may impact the voltage available to other products during the peaks.

Important:

To ensure power cables (including any extension) are of a sufficient gauge, ensure that there is a continuous **minimum** voltage of **10.8 V dc** at the end of the cable where it enters the product's power connector, even with a fully flat battery at 11 V dc. (Do not assume that a flat battery is at 0 V dc. Due to the discharge profile and internal chemistry of batteries, the current drops much faster than the voltage. A "fully flat" battery still shows a positive voltage, even if it doesn't have enough current to power your device.)

10.6 Power cable drain wire connection

The power cable supplied with this product includes a dedicated drain wire for connection to a vessel's Radio Frequency (RF) ground point (if available), or the negative battery terminal.

It is important that an effective RF ground is connected to the system. A single common ground point should be used for all equipment. If several items require grounding, each item of equipment can be grounded by connecting the drain wire of the power cable first to a single local point (e.g. within a distribution panel), and then this point connected via an appropriately-rated conductor to the vessel's RF common ground point. An RF ground point is typically a circuit with a very low-impedance signal at RF, connected to the sea via an electrode immersed in the sea or bonded to the inner side of the hull in an area that is underwater.

On vessels without an RF ground system, the drain wires of all equipment should be connected directly to the vessel's negative battery terminal.

The dc power system should be either:

- Negative grounded ("bonded"), with the negative battery terminal connected to the vessel's RF ground.
- Floating, with neither battery terminal connected to the vessel's ground.

The preferred minimum requirement for the path to ground (bonded or non-bonded) is via a flat tinned copper braid, with a 30 A rating or greater. If this is not possible, an equivalent stranded wire conductor may be used, rated as follows:

- for runs of <1 m (3.3 ft), use 6 mm² (10 AWG) or greater.
- for runs of >1 m (3.3 ft), use 8 mm² (8 AWG) or greater.

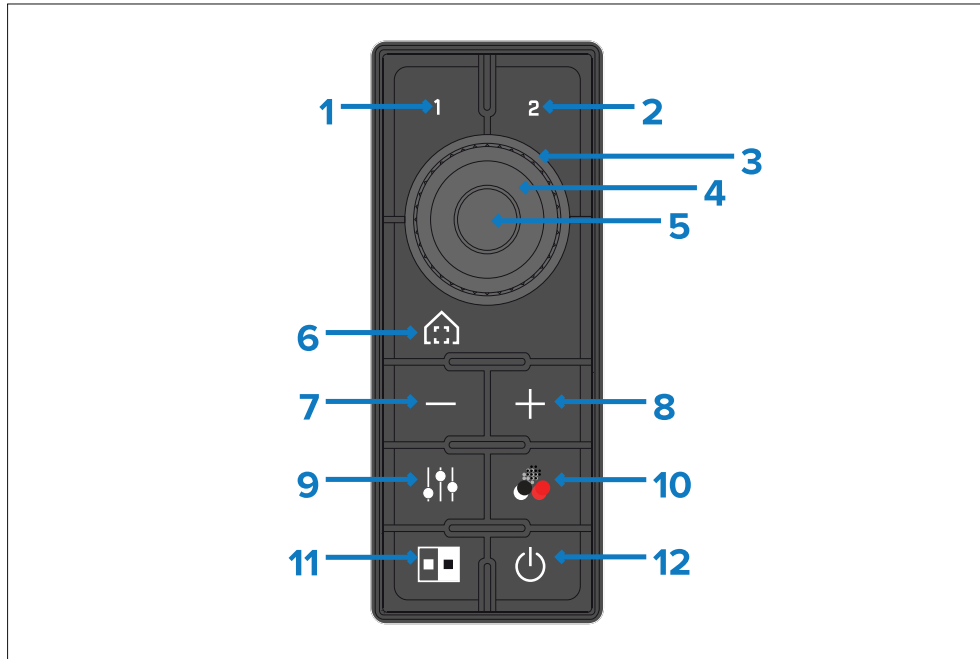
In any grounding system, always keep the length of connecting braid or wires as short as possible.

CHAPTER 11: OPERATION

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- 11.1 JCU-3 controls overview — page 37
- 11.2 Pairing the keypad — page 39
- 11.3 Resetting the keypad to factory defaults — page 40

11.1 JCU-3 controls overview



| Item | Description |
|------|--|
| 1 | [USER 1] <ul style="list-style-type: none"> User configurable button (configured via camera web page). |
| 2 | [USER 2] <ul style="list-style-type: none"> User configurable button (configured via camera web page). |

| Item | Description |
|---------|--|
| 3, 4, 5 | [UNI-CONTROLLER] – Use the uni-controller to control the camera: <ul style="list-style-type: none"> Press ring (4) up, down left right – Pan / Tilt camera (pan available on M200–Series only). Rotate outer ring (3) clockwise or counter-clockwise to pan the camera (pan available on M200–Series only). Central button (5): long-press to toggle OSD MENU On/Off; short-press to select (OK). Navigate setup menus: <ul style="list-style-type: none"> Move up, down – Scroll through menu options. Press down – Select highlighted menu option. |
| 6 | [HOME] <ul style="list-style-type: none"> Momentary press – Return camera to home position. Press and hold – Set current position as camera home. 4 x press – Reset the camera (realign home and stow positions). |
| 7 | [ZOOM-OUT] <ul style="list-style-type: none"> Press to zoom thermal camera out. |
| 8 | [ZOOM-IN] <ul style="list-style-type: none"> Press to zoom thermal camera in |
| 9 | [SCENE] <ul style="list-style-type: none"> Press to cycle through image scene presets (day; night; docking; high contrast) |
| 10 | [COLOR] <ul style="list-style-type: none"> Short-press to cycle through color palettes (WhiteHot; RedHot; Fusion; FireIce) Long-press to toggle polarity of selected color palette (for example: WhiteHot > BlackHot > WhiteHot) |

| Item | Description |
|------|---|
| 11 | <p><i>[NEXT PAYLOAD]</i></p> <ul style="list-style-type: none"> Short-press to switch to the next payload on the camera (applicable only to cameras with multiple payloads; for example: thermal and visible) |
| 12 | <p><i>[POWER]</i></p> <ul style="list-style-type: none"> Short-press to cycle through keypad backlight brightness settings. Long-press to put the camera into standby mode (parked and stowed); press any other button to wake the camera. Double-press to switch to the next available camera in the network. |

JCU-3 controls: notes

Note:

The listed button actions are the **default** actions for a JCU-3 keypad controlling an M100/M200 Series thermal camera.

Note:

You can change the default actions of certain buttons and controls for M100/M200 Series cameras (including the user programmable buttons) using the camera's web interface.

Setting the keypad orientation

If you choose to replace the fitted portrait-oriented keypad mat with the landscape-oriented keypad mat, you must also change the "Orientation" setting using the JCU-3 keypad web interface.

Note:

Changing the orientation setting requires a PC, laptop – or other IP-network compatible device that supports a web browser – to be connected to the same network as the keypad.

You complete the process using web pages served by the **JCU-3** keypad.

1. Make sure that your PC/laptop is configured to detect UPnP devices. For example, in Windows 7, 8, and 10, within the **Network and Sharing Center**, you'll need to select the option to **Turn on network discovery**.
2. The keypad is automatically added to the list of devices on your PC/laptop, and is named according to the keypad part number, and serial number (for example: **A80510 0123456**).

In Windows XP, the keypad is listed in Windows Explorer under "My Network Places"; in later versions of Windows, the keypad is listed in Windows Explorer under "Network".

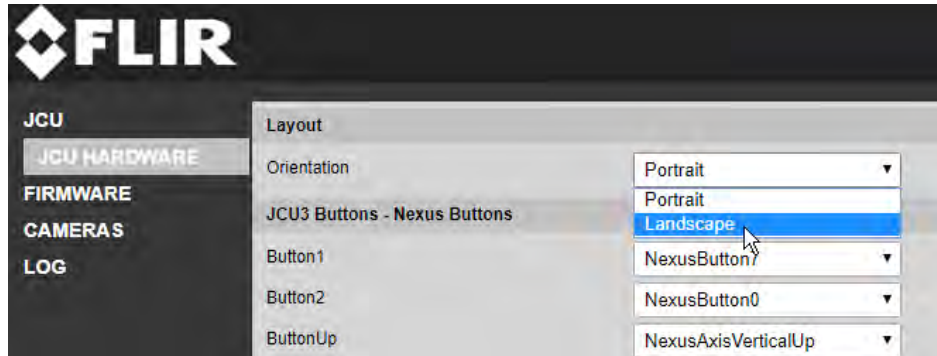
3. For Windows computers, double-click the keypad item to open the keypad's web page. You can also right-click the keypad item and select **Properties**, to show more information about the keypad, including its IP address.

The login screen with a picture of the JCU-3 is displayed.



4. Enter **user** for Username and **user** for Password, then click **Login**. The JCU configuration page is displayed.
5. Click **JCU HARDWARE**. The hardware configuration page is displayed.

- In the Layout section, click the **Orientation** list, and select **Landscape**.



- Click **Save Ini** to save the orientation setting. A dialog confirms that your changes have been saved.
- Click the **Logout** button at the top-right of the page, then close your web browser.

11.2 Pairing the keypad

Each JCU-3 keypad can be paired with multiple thermal cameras, and each thermal camera can be paired to multiple keypads.

Note:

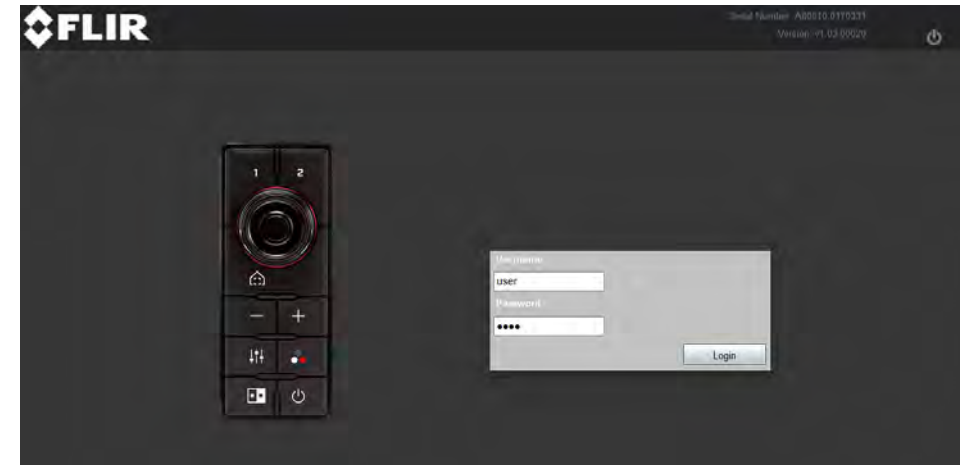
Pairing the keypad to a thermal camera requires a PC, laptop – or other IP-network compatible device that supports a web browser – to be connected to the same network as the camera and keypad.

You complete the pairing process using web pages served by the **JCU-3** keypad.

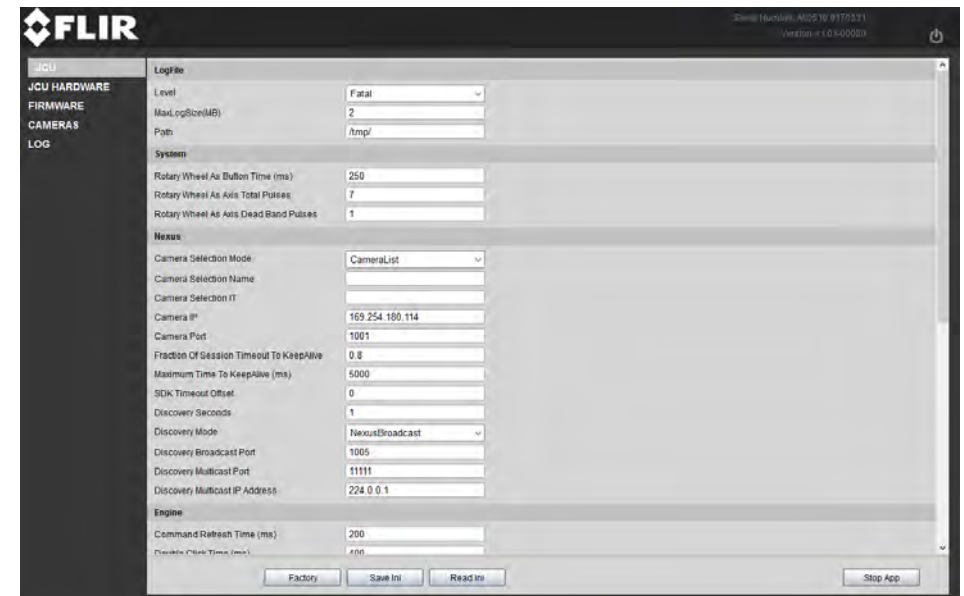
- Make sure that your PC/laptop is configured to detect UPnP devices. For example, in Windows 7, 8, and 10, within the *[Network and Sharing Center]*, you'll need to select the option to *[Turn on network discovery]*.
- The keypad is automatically added to the list of devices on your PC/laptop, and is named according to the keypad part number, and serial number (for example: **A80510 0123456**).
In Windows XP, the keypad is listed in Windows Explorer under “My Network Places”; in later versions of Windows, the keypad is listed in Windows Explorer under “Network”.

- For Windows computers, double-click the keypad item to open the keypad’s web page. You can also right-click the keypad item and select *[Properties]*, to show more information about the keypad, including its IP address.

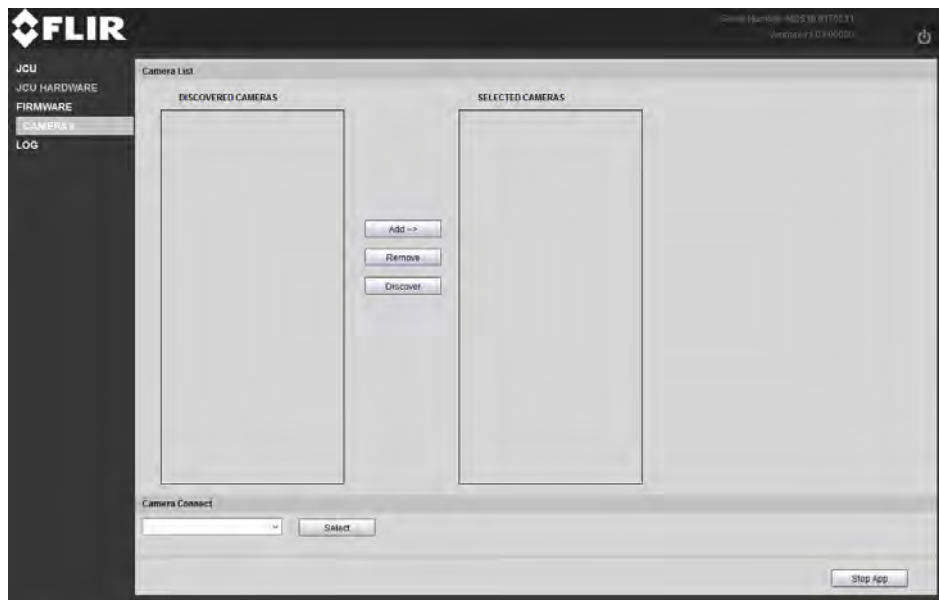
The login screen with a picture of the JCU-3 is displayed.



- Enter “user” for Username and “user” for Password, then click *[Login]*. The JCU configuration page is displayed.



- In the left-hand menu, click **CAMERAS**.
The camera pairing page is displayed.



- Click *[Discover]* to find all compatible cameras that are on the same network as the JCU-3.
The *[DISCOVERED CAMERAS]* list shows all compatible thermal cameras that were discovered.
- In the *[DISCOVERED CAMERAS]* list, select the camera you wish to pair with the JCU-3, and click *[Add->]*.

The keypad's LED backlight flashes twice to indicate that pairing was successful. For further information on the keypad's LED status, refer to the following section: [p.42 — Keypad status](#)

The chosen camera is now paired with the JCU-3 keypad, and moved to the *[SELECTED CAMERAS]* list. Repeat this step for any additional cameras that you want to pair with the JCU-3. When you leave the JCU-3 Configuration pages the JCU-3 keypad remembers the selected cameras, and will cycle through the camera list (if you paired the keypad to more than one camera) when you click the *[NEXT CAMERA]* button on the keypad.

- Optionally, before leaving the JCU-3 Configuration pages, you can manually connect to one of the cameras in the *[SELECTED CAMERAS]*

list, to confirm that you can control the camera with the JCU-3 keypad. In the *[camera connect]* list, highlight the camera you want to connect to and click *[Select]*

The JCU-3 keypad connects to the camera; you can now control the camera from the keypad. The top-right of the *[CAMERAS]* page (directly underneath the *[Logout]* button) shows *[Camera Connected:]*, and lists the name of the connected camera.

- When you have finished pairing cameras and testing connections, click the *[Logout]* button at the top-right of the page, then close your web browser.

11.3 Resetting the keypad to factory defaults

If your JCU-3 keypad is operating abnormally, or you have inadvertently saved unwanted changes from the JCU Configuration pages, you can reset the keypad to the factory defaults.

Note:

If you reset the JCU-3 keypad to the factory defaults, any previous camera pairing information will be lost.

- Complete steps 1 to 4 in the following section: [p.39 — Pairing the keypad](#)
- In the left-hand menu, click *[FIRMWARE]*.
The Firmware page is displayed.
- At the bottom of the *[FIRMWARE]* page, click the *[Factory]* button.
The keypad backlights turn off while the factory restore process is in progress; a message box – “Factory Defaults have been restored” – is displayed within a few seconds once the process has completed, and the keypad backlights turn on.
- Click *[OK]* to acknowledge the Factory Defaults restored message.
- Click the *[Logout]* button at the top-right of the page, then close your web browser.

CHAPTER 12: SYSTEM CHECKS AND TROUBLESHOOTING

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- 12.1 Keypad status — page 42
- 12.2 PoE troubleshooting — page 42
- 12.3 Power up troubleshooting — page 42

12.1 Keypad status

The keypad is backlit with LEDs. The LEDs are used to identify the status of the keypad.

Keypad powered off:

| UniController LED ring | Keypad backlight |
|------------------------|------------------|
| Off | Off |

Keypad is powered on but not paired to a camera:

| UniController LED ring | Keypad backlight |
|------------------------|------------------|
| Flashing | Off |

Keypad is powered on and paired to at least one camera; keypad has been used in the last 30 seconds:

| UniController LED ring | Keypad backlight |
|------------------------|------------------|
| On | On |

Keypad is powered on and paired to at least one camera; keypad has NOT been used in the last 30 seconds:

| UniController LED ring | Keypad backlight |
|------------------------|------------------|
| On | Off |

Keypad is powered on and has just successfully completed a pairing attempt:

| UniController LED ring | Keypad backlight |
|------------------------|---------------------|
| On | Double flash (fast) |

Keypad is powered on and has just failed to complete a pairing attempt:

| UniController LED ring | Keypad backlight |
|------------------------|---------------------|
| On | Triple flash (slow) |

You can adjust the keypad backlight brightness with the **POWER** button. A single short-press of the **POWER** button cycles through three brightness settings.

12.2 PoE troubleshooting

If you are experiencing connection issues with the remote keypad when powering the device via PoE, consider using the keypad's dedicated power connector to supply the power to the device.

Possible causes for connection issues are:

- Low or inconsistent voltage at the power supply to the PoE switch or PoE injector.
- Inadequate power or data cabling.
- If multiple devices are powered via PoE from the PoE switch or PoE injector, the power allocation for the PoE devices may be too high, either because there are too many device connected, or the total power consumption exceeds the supported allocation. Refer to the switch or PoE injector's documentation for more information on the PoE power allocation.

12.3 Power up troubleshooting

Problems at power up and their possible causes and solutions are described here.

Product does not turn on or keeps turning off:

| Possible causes | Possible solutions |
|--|---|
| Blown fuse / tripped breaker | <ol style="list-style-type: none"> 1. Check condition of relevant fuses and breakers and connections, replace if necessary (Refer to the <i>Technical Specification</i> section of your product's installation instructions for fuse ratings.) 2. If fuse keeps blowing check for cable damage, broken connector pins or incorrect wiring. |
| Poor / damaged / insecure power supply cable / connections | <ol style="list-style-type: none"> 1. Check that the power cable connector is fully inserted into the unit and locked in position. 2. Check the power supply cable and connectors for signs of damage or corrosion, replace if necessary. 3. With the unit turned on, try flexing the power cable near to the display connector to see if this causes the unit to re-boot/lose power, replace if necessary. 4. Check the vessel's battery voltage, the condition of the battery terminals and power supply cables, ensuring connections are secure, clean and free from corrosion, replace if necessary. 5. With the product under load, using a multi-meter, check for high voltage drop across all connectors/fuses etc, replace if necessary. |
| Incorrect power connection | The power supply may be wired incorrectly, ensure the installation instructions have been followed. |
| Power source insufficient | With the product under load, using a multi-meter, check the power supply voltage as close to the unit as possible to establish actual voltage when the current is flowing. (Refer to the <i>Technical Specification</i> section of your product's installation instructions for power supply requirements.) |

Product will not boot up (re-boot loop):

| Possible causes | Possible solutions |
|-----------------------------|--|
| Power supply and connection | See possible solutions from 'Products does not turn on or keeps turning off' above. |
| Software corruption | <ol style="list-style-type: none"> 1. In the unlikely event that the products software has become corrupted please try re-flashing the latest software from the FLIR website. 2. On display products, as a last resort, you can try to perform a 'Power on Reset', however this will delete all settings/presets and user data (such as waypoints and tracks) and revert the unit back to factory defaults. |

CHAPTER 13: MAINTENANCE

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- 13.1 Service and maintenance — page 45
- 13.2 Routine equipment checks — page 45
- 13.3 Product cleaning — page 45

13.1 Service and maintenance

This product contains no user serviceable components. Please refer all maintenance and repair to authorized FLIR dealers. Unauthorized repair may affect your warranty.

13.2 Routine equipment checks

It is recommended that you perform the following routine checks, on a regular basis, to ensure the correct and reliable operation of your equipment:

- Examine all cables for signs of damage or wear and tear.
- Check that all cables are securely connected.

13.3 Product cleaning

Best cleaning practices.

When cleaning products:

- Switch off power supply.
- Use a clean damp cloth to wipe clean.
- Do NOT use: abrasive, acidic, ammonia, solvent or other chemical based cleaning products.
- Do NOT use a jet wash.

CHAPTER 14: TECHNICAL SPECIFICATION

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- 14.1 Power specification — page 47
- 14.2 Environmental specification — page 47
- 14.3 Wired connections — page 47
- 14.4 Conformance specification — page 47

14.1 Power specification

| Specification | |
|---------------------------------|--|
| PoE class: | Class 1 |
| Nominal supply voltage: | <ul style="list-style-type: none">• PoE: 48 V dc• Alternate power: 12 V / 24 V dc |
| Operating voltage range: | <ul style="list-style-type: none">• PoE: 44 V to 57 V dc• Alternate power: 9 V to 32 V dc |
| Power consumption: | 4 W Max with full keypad illumination |

14.2 Environmental specification

| Specification | |
|-------------------------------|-------------------------------------|
| Operating temperature: | -25 °C to +55 °C (-13 °F to 131 °F) |
| Storage temperature: | -30 °C to +70 °C (-22 °F to 158 °F) |
| Relative humidity: | Maximum 93% |
| Waterproof rating: | IPx6 & IPx7 |

14.3 Wired connections

| Specification | |
|-------------------------|--|
| Network / PoE: | 1 x RayNet 10/100 Mb/s connector |
| Alternate power: | 1 x Power connector (SeaTalkng® style connector) |

14.4 Conformance specification

| Specification | |
|----------------------|---|
| Ethernet/PoE: | <ul style="list-style-type: none">• IEEE 802.3• IEEE 802.3af (PoE) |
| EMC: | <ul style="list-style-type: none">• EN60945 |

CHAPTER 15: TECHNICAL SUPPORT

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- 15.1 FLIR Maritime product support and servicing — page 49

15.1 FLIR Maritime product support and servicing

FLIR provides a comprehensive product support service, as well as warranty, service, and repairs. You can access these services through the FLIR website, telephone, and e-mail.

Product information

If you need to request service or support, please have the following information to hand:

- Product name.
- Product identity.
- Serial number.
- Software application version.
- System diagrams.

You can obtain this product information using the menus within your product.

Web portal support

| Service | Web portal |
|--------------------|--|
| Camera support | Support.FLIR.com |
| Return merchandise | customer.FLIR.com |

Servicing and warranty

FLIR offers dedicated service departments for warranty, service, and repairs.

Don't forget to visit the FLIR website to register your product for extended warranty benefits: <http://customer.flir.com/Warranty/EndUserRegistration>

| Region | Contact details |
|---|--|
| United Kingdom (UK), EMEA, and Asia Pacific | Telephone: +44 (0)1329 246 932 E-mail: emea.service@flir.com |
| United States (US) | Telephone: +1 (603) 324 7900 E-mail: rm-usrepair@flir.com |

Telephone and e-mail support

| Region | Contact details |
|---|--|
| United Kingdom (UK), EMEA, and Asia Pacific | Telephone: +44 (0)1329 246 777 E-mail: maritimecamerasupport@flir.com |
| United States (US) | Telephone: +1 (603) 324 7900 (Toll-free: +800 539 5539) E-mail: support@flir.com |
| Australia and New Zealand | Telephone: +61 2 8977 0300 E-mail: aus.support@flir.com (FLIR Maritime subsidiary) |

| Region | Contact details |
|-------------|---|
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CHAPTER 16: SPARES AND ACCESSORIES

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- 16.3 RayNet to RJ45, and RJ45 (SeaTalkhs) adapter cables — page 54

16.1 Keypad spares and accessories

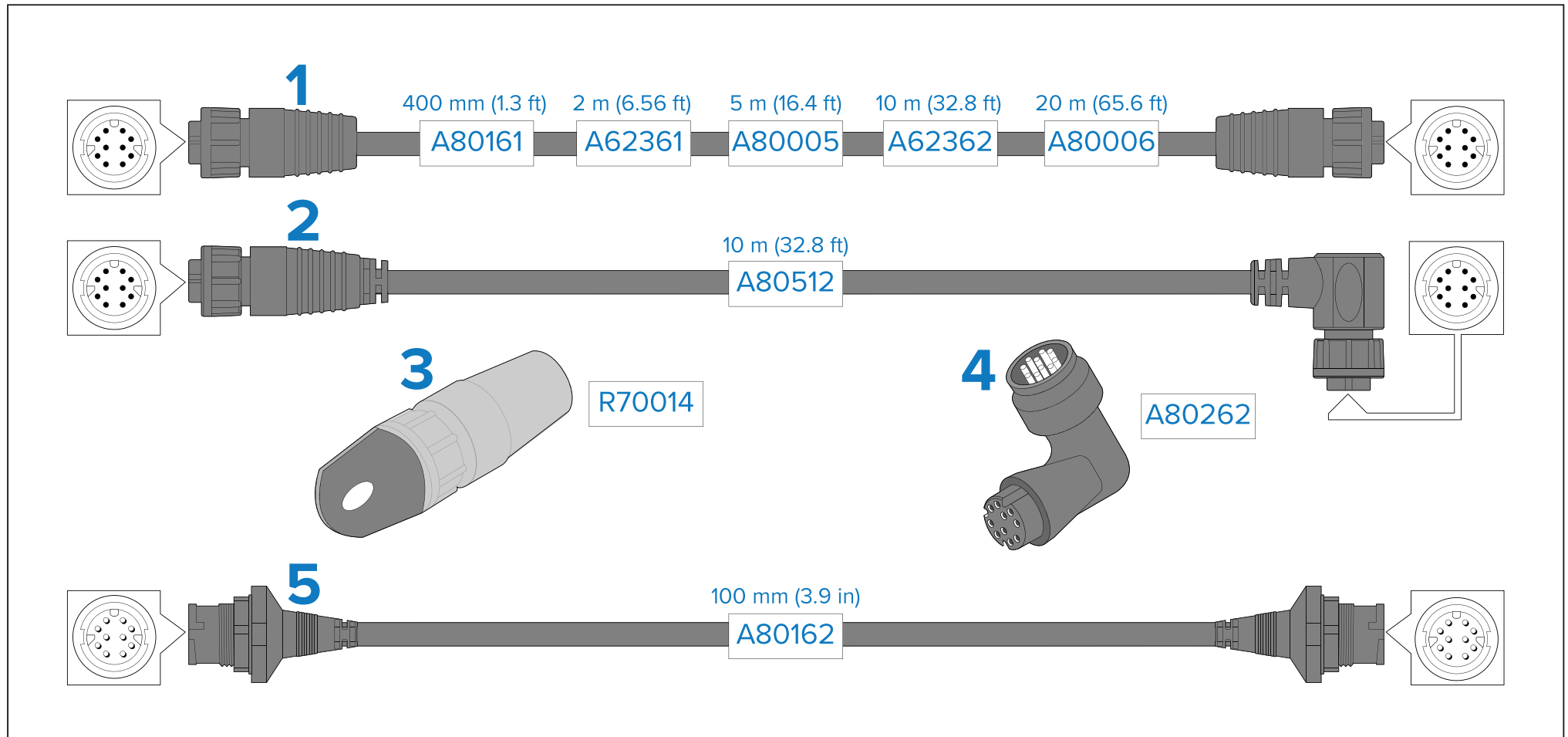
Spares:

| Item | Part number |
|----------------------------|-------------|
| Portrait keypad mat spare | R70557 |
| Landscape keypad mat spare | R70558 |

Accessories:

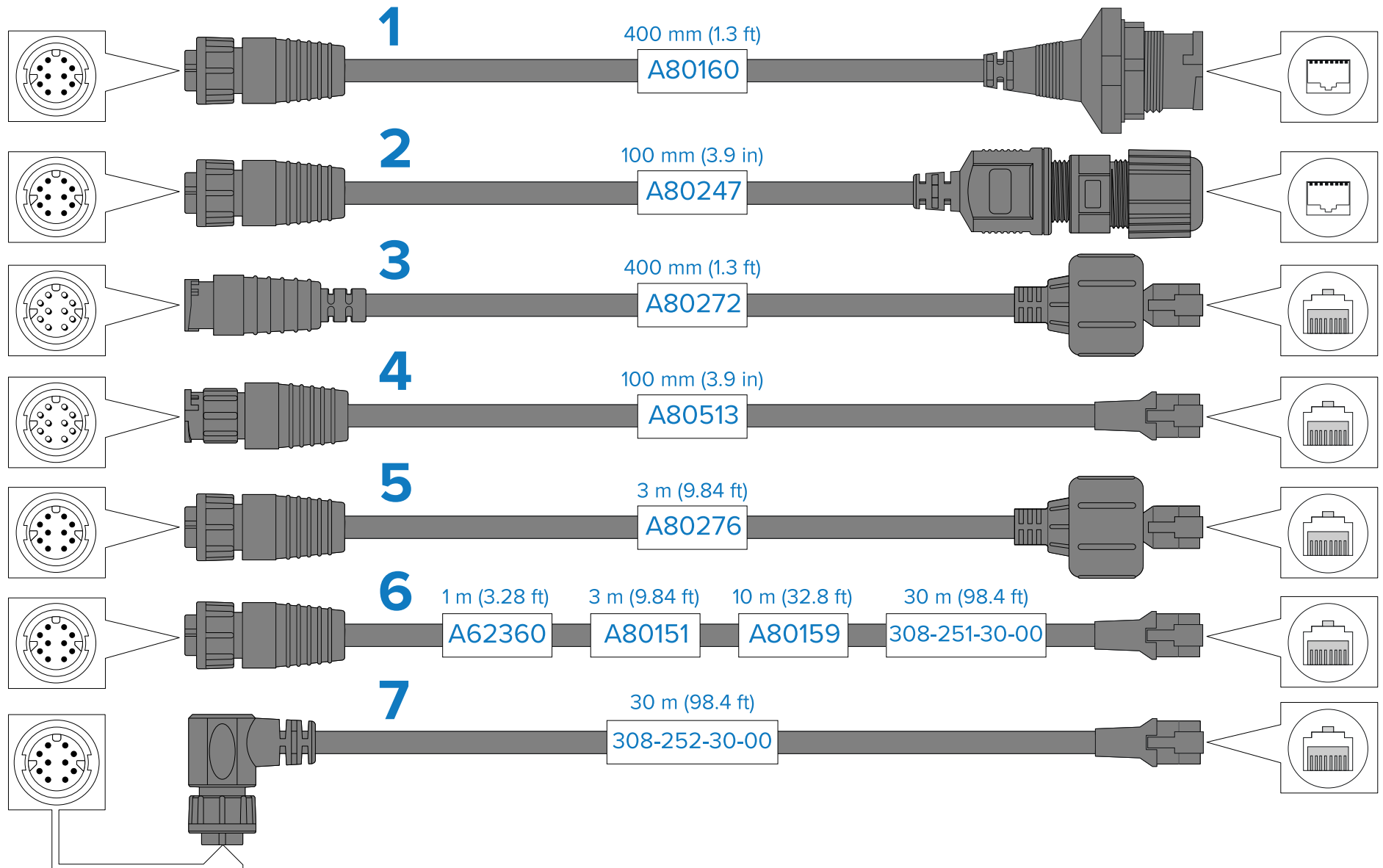
| Item | Part number |
|---------------------------------------|-------------|
| Right angled 2 m (6.6 ft) power cable | A06070 |
| Straight 2 m (6.6 ft) power cable | A06049 |

16.2 RayNet to RayNet cables and connectors



1. Standard RayNet connection cable with a RayNet (female) socket on both ends.
2. Right-angle RayNet connection cable with a straight RayNet (female) socket on one end, and a right-angle RayNet (female) socket on the other end. Suitable for connecting at 90° (right angle) to a device, for installations where space is limited.
3. RayNet cable puller (5 pack).
4. RayNet to RayNet right-angle coupler / adaptor. Suitable for connecting RayNet cables at 90° (right angle) to devices, for installations where space is limited.
5. Adapter cable with a RayNet (male) plug on both ends. Suitable for joining (female) RayNet cables together for longer cable runs.

16.3 RayNet to RJ45, and RJ45 (SeaTalkhs) adapter cables



1. Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) RJ45 (SeaTalkhs®) socket on the other end, accepting the following cables with an RJ45 (SeaTalkhs®) waterproof locking (male) plug:
 - A62245 (1.5 m).
 - A62246 (15 m).
2. Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) RJ45 (SeaTalkhs®) socket on the other end, along with a locking gland for a watertight fit.
3. Adapter cable with a RayNet (male) plug on one end, and an RJ45 (SeaTalkhs®) waterproof (male) plug on the other end.
4. Adapter cable with a RayNet (male) plug on one end, and an RJ45 (male) plug on the other end.
5. Adapter cable with a RayNet (female) socket on one end, and an RJ45 (SeaTalkhs®) waterproof (male) plug on the other end.
6. Adapter cable with a RayNet (female) socket on one end, and an RJ45 (male) plug on the other end.
7. Adapter cable with a right-angled RayNet (female) socket on one end, and an RJ45 (male) plug on the other end.

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