i60

WIND / CLOSE-HAULED WIND INSTRUMENTS

INSTALLATION & OPERATION INSTRUCTIONS

English (en-US)
Date: 10-2024
Document number: 81342 (Rev 6)

Raymarine®

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CONTENTS

CHAPTER 1: IMPORTANT INFORMATION

Safety warnings

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).

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 or damage to your vessel. It may also cause poor product performance or invalidate the product warranty.
- Raymarine highly recommends certified installation by a Raymarine approved installer. A certified installation qualifies for enhanced product warranty benefits. Register your warranty on the Raymarine website: www.raymarine.com/warranty

Warning: High voltage

This product contains high voltage. Adjustments require specialized service procedures and tools only available to qualified service technicians. There are no user serviceable parts or adjustments. The operator should never remove the cover or attempt to service the 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: Positive ground systems

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

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.

Caution: Service and maintenance

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

Caution: Transducer cable

- Do NOT use the transducer cable to lift or suspend the transducer; always support the transducer body directly during installation.
- Do NOT cut, shorten, or splice the transducer cable.
- Do NOT remove the connector.

If the cable is cut, it cannot be repaired. Cutting the cable will also void the warranty.

Caution: Sun covers

- If your product is supplied with a sun cover, to protect against the damaging effects of ultraviolet (UV) light, always fit the sun cover when the product is not in use.
- To avoid potential loss, sun covers must be removed when travelling at high speed, whether in water or when the vessel is being towed.

Caution: Product cleaning

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.

Caution: Condensation

Certain atmospheric conditions may cause a small amount of condensation to form on the unit's window. This will not damage the unit and will clear after the unit has been switched on for a short period.

Regulatory notices

Water ingress

Water ingress disclaimer

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

Disclaimer

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

Raymarine 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.

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EMC installation guidelines

Raymarine 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:

- Raymarine equipment and cables connected to it are:
  - At least 1 m (3.28 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 (6.56 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.
- Raymarine 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.

Suppression ferrites

- Raymarine 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 Raymarine 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.

Connections to other equipment

Requirement for ferrites on non-Raymarine cables:

If your Raymarine equipment is to be connected to other equipment using a cable not supplied by Raymarine, a suppression ferrite MUST always be attached to the cable near the Raymarine unit.

For more information, refer to your third-party cable manufacturer.

Declaration of conformity

Raymarine UK Ltd declares that this product is compliant with the essential requirements of EMC Directive 2014/30/EU.

The original Declaration of Conformity certificate may be viewed on the relevant product page at: https://bit.ly/rym-docs

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.

Warranty registration

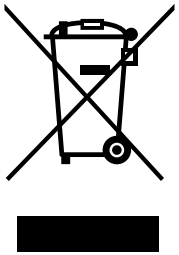
To register your Raymarine product ownership, please visit https://bit.ly/rym-warranty and register online.

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.

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: https://bit.ly/rym-recycling

Technical accuracy

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Publication copyright

CHAPTER 2: DOCUMENT INFORMATION

CHAPTER CONTENTS

2.1 Applicable products

This document is applicable to the following products:

Part number	Description
E70061	i60 Wind, includes: • i60 Wind SeaTalk NG instrument display.
E70062	i60 Close-Hauled Wind, includes: • i60 Close-Hauled Wind SeaTalk NG instrument display (repeater).
E70150	i60 Wind system pack, includes: • Wind Wind SeaTalk NG instrument display. • Short-Arm Masthead Wind vane transducer.
E70153	i50 & i60 Depth, Speed & Wind system pack, includes: • i50 Depth SeaTalk NG instrument display. • P319 Thru-hull Depth transducer. • i50 Speed SeaTalk NG instrument display. • P120 Thru-hull Speed and Temp transducer. • i60 Wind SeaTalk NG instrument display. • Short-Arm Masthead Wind vane transducer.

2.2 Product documentation

The following documentation is applicable to your product:

Applicable documents

Document	Description	Link
81342	i60 Installation and Operation Instructions (this document).	www.bit.ly/i60-docs
87130	i60 Mounting template.	www.bit.ly/i60-docs

Related documentation

Document	Description	Link
87221	Rotavecta Installation Instructions.	www.bit.ly/rotavecta-docs
87220	Short-Arm & Long-Arm Masthead Wind Vane Installation Instructions.	www.bit.ly/rym-wind-docs

Printed (hardcopy) product manuals

Raymarine provides a Print Shop service, enabling you to purchase a high-quality, professionally-printed manual for your Raymarine product, delivered directly to your door.

Printed manuals are ideal for keeping onboard your vessel, as a useful source of reference whenever you need assistance with your Raymarine product.

Printed manuals are provided by a third-party (**Lulu Press**).

To order a printed manual, use the Lulu Press website link provided below. The manual will then be printed and delivered to the address you specify. Once an order is placed, it typically takes Lulu Press approximately 5 to 10 working days to print and deliver a printed manual.

Supplier	Book purchase link
lulu	www.bit.ly/rym-i60-book

Note:

- Accepted methods of payment for printed manuals are credit cards and PayPal.
- Printed manuals can be shipped worldwide.
- Further manuals will be added to the Print Shop over the coming months for both new and legacy products.
- Raymarine user manuals are also available to download free-of-charge from the Raymarine website, in the popular PDF format. These PDF files can be viewed on a PC / laptop, tablet, smartphone, or on the latest generation of Raymarine multifunction displays.

2.3 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.

CHAPTER 3: PRODUCT AND SYSTEM OVERVIEW

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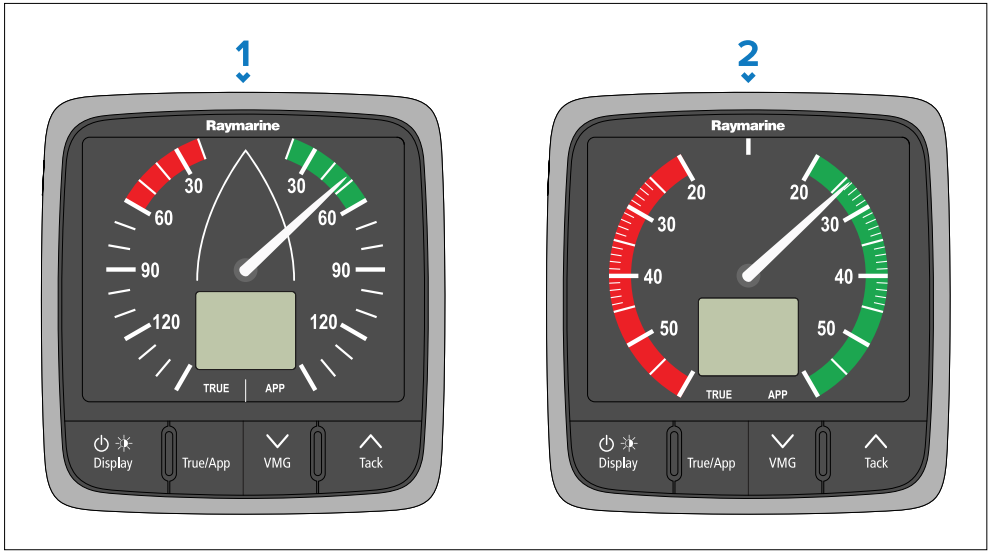
3.1 Product overview

The i60 range of SeaTalk NG instrument displays can be connected directly to the compatible wind transducers. The data can be transmitted on the SeaTalk NG network to other compatible displays.

The i60 instrument range consists of the following variants:



1. **i60 Wind** — The i60 Wind instrument provides a 360° wind direction scale and can be used as a stand alone unit or as part of a SeaTalk 1 / SeaTalk NG network.
2. **i60 Close-Hauled Wind** — The i60 Close-Hauled Wind instrument is a repeater display which provides an expanded indication from 20° to +60° about the bow and stern of the vessel. The i60 Close-Hauled Wind repeats wind data available on the SeaTalk 1 / SeaTalk NG network.

The i60 instrument display range offers the following key features:

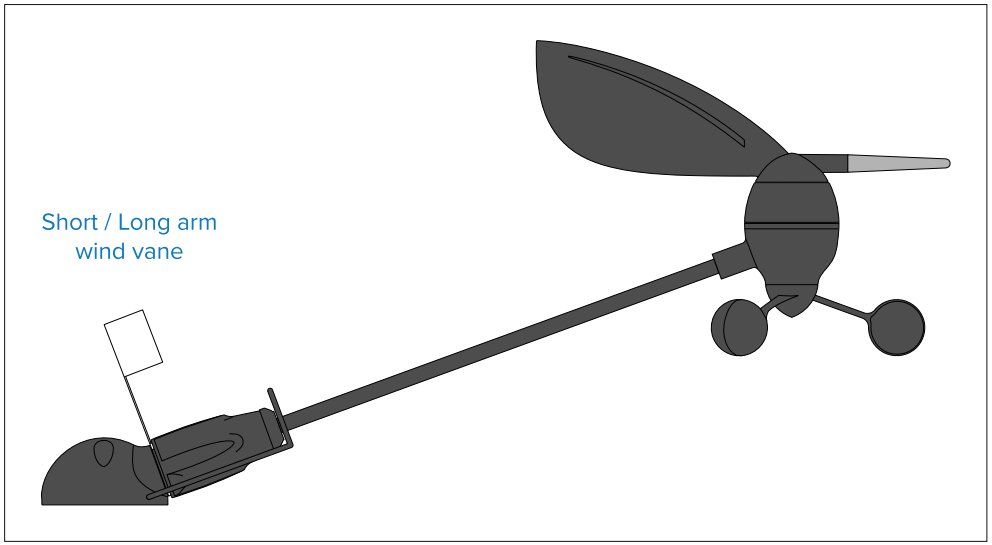
- Integrates with Raymarine autopilots and navigation equipment on the SeaTalk NG network.
- Analogue and digital display read outs.
- Surface mountable.
- Provides good visibility in all lighting conditions.
- Low power consumption.

3.2 Compatible transducers

Instrument Wind Vane transducer

The wind vane transducers listed below are compatible with the following instrument displays:

- i60 Wind
- i70 / i70s via the iTC-5 converter.

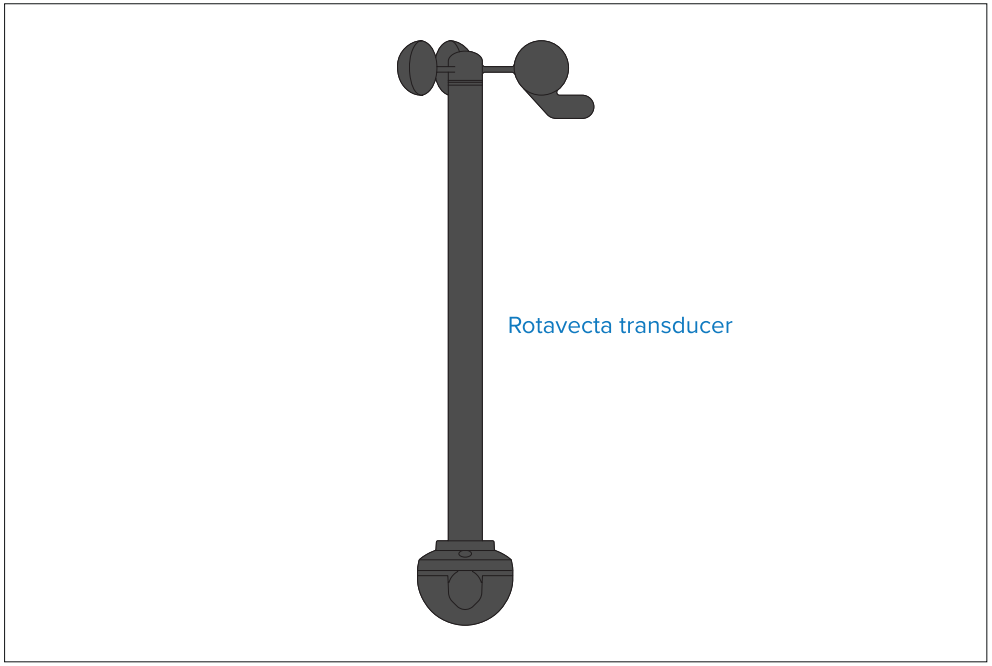


Part number	Transducer description
E22078	Short-Arm Masthead Wind vane transducer
E22079	Long-Arm Masthead Wind vane transducer

Instrument Rotavecta transducer

The wind transducers listed below are compatible with the following instrument displays:

- i40 Wind.
- i60 Wind.
- i70 / i70s via the iTC-5 converter.



Part number	Transducer description
Z195	Rotavecta transducer

3.3 System protocols and cable systems

Your product can be connected to various products and systems to share information and so improve the functionality of the overall system.

These connections may be made using a number of different protocols and cable systems. Fast and accurate data collection and transfer is achieved by using a combination of the following data protocols and cable systems:

- SeaTalk 1
- SeaTalk NG
- NMEA 2000

Note:

You may find that your system does not use all of the connection types or instrumentation described in this section.

3.4 SeaTalk 1

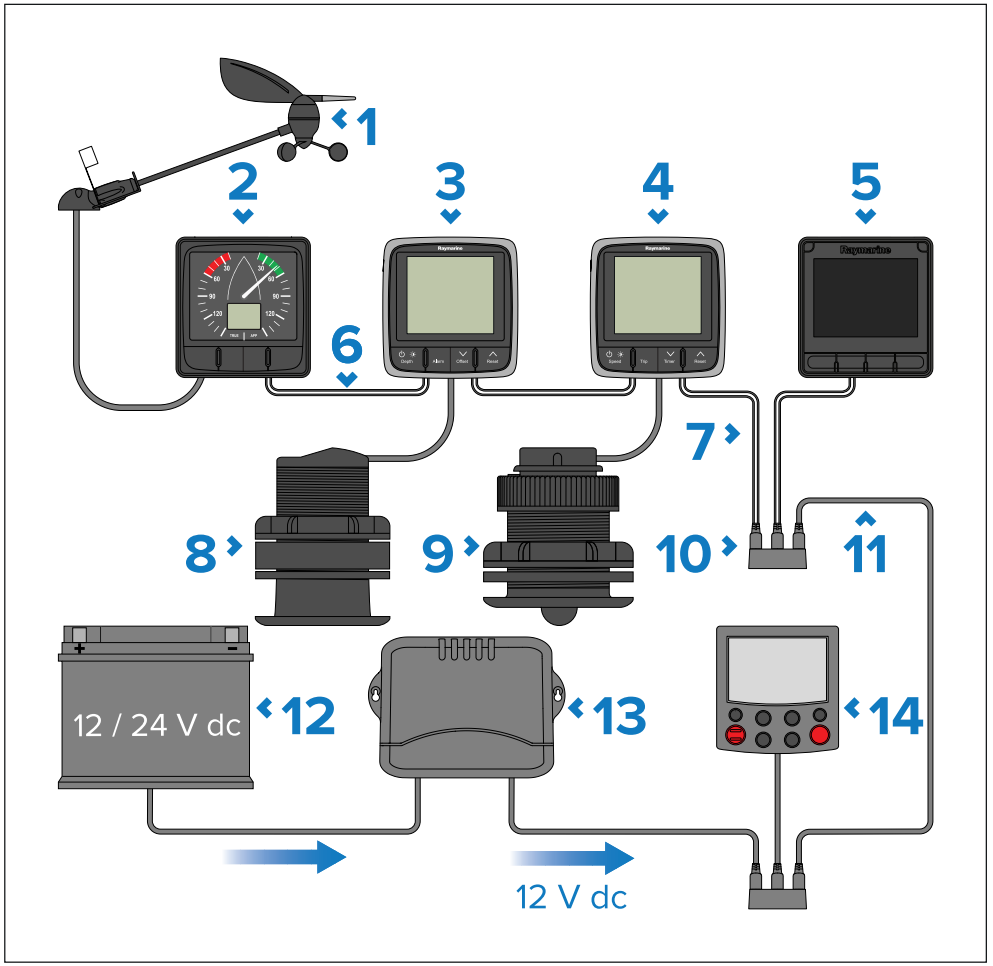
SeaTalk 1 is a cable system which enables compatible devices (typically, instruments) to connect to each other and share data.

SeaTalk 1 is used to connect compatible instruments and equipment. A single SeaTalk 1 cable carries both power and data signals, and enables the connection of mulitple devices without the need for a central processor or gateway.

Additional instruments and functions can be added to a SeaTalk 1 system, simply by plugging them into the network. SeaTalk 1 equipment can also communicate with other non-SeaTalk 1 equipment via the NMEA 0183 standard, provided a suitable interface / converter is used. SeaTalk 1 devices can also be connected to SeaTalk NG systems, via adapter cables and the SeaTalk 1 to SeaTalk NG converter (E22158).

SeaTalk 1 connection

Connections to an existing SeaTalk 1 system must be made using the separately available SeaTalk 1 (3-pin) to SeaTalk NG adapter cable (A06047).



	Description
1	Wind transducer (Short-Arm Masthead Wind vane transducer currently illustrated).
2	i60 Wind.
3	i50 Depth.
4	i50 Speed
5	i70s.
6	SeaTalk NG spur cable.
7	SeaTalk 1 (3-pin) to SeaTalk NG adapter cable.
8	Depth transducer (P319 currently illustrated).
9	Speed transducer (P317 currently illustrated).
10	SeaTalk 1 3-way junction box.
11	SeaTalk 1 extension cable.
12	12 / 24 V dc power supply.
13	SeaTalk 1 course computer (providing 12 V dc power to the SeaTalk 1 network.)
14	ST6002 (SeaTalk 1 pilot controller).

3.5 SeaTalk NG

SeaTalk NG (*Next Generation*) is an enhanced cable system for the connection of compatible marine instruments and equipment. It replaces the older SeaTalk 1 and SeaTalk 2 cable systems.

SeaTalk NG utilizes a single backbone which compatible equipment connects to using a spur. Data and power are carried within the backbone. Devices that have a low power draw can be powered from the network, although high current equipment will need to have a separate power connection.

SeaTalk NG is a proprietary extension to NMEA 2000 and the proven CAN bus technology. Compatible NMEA 2000, SeaTalk 1 and SeaTalk 2 devices can also be connected using the appropriate interfaces or adaptor cables as required.

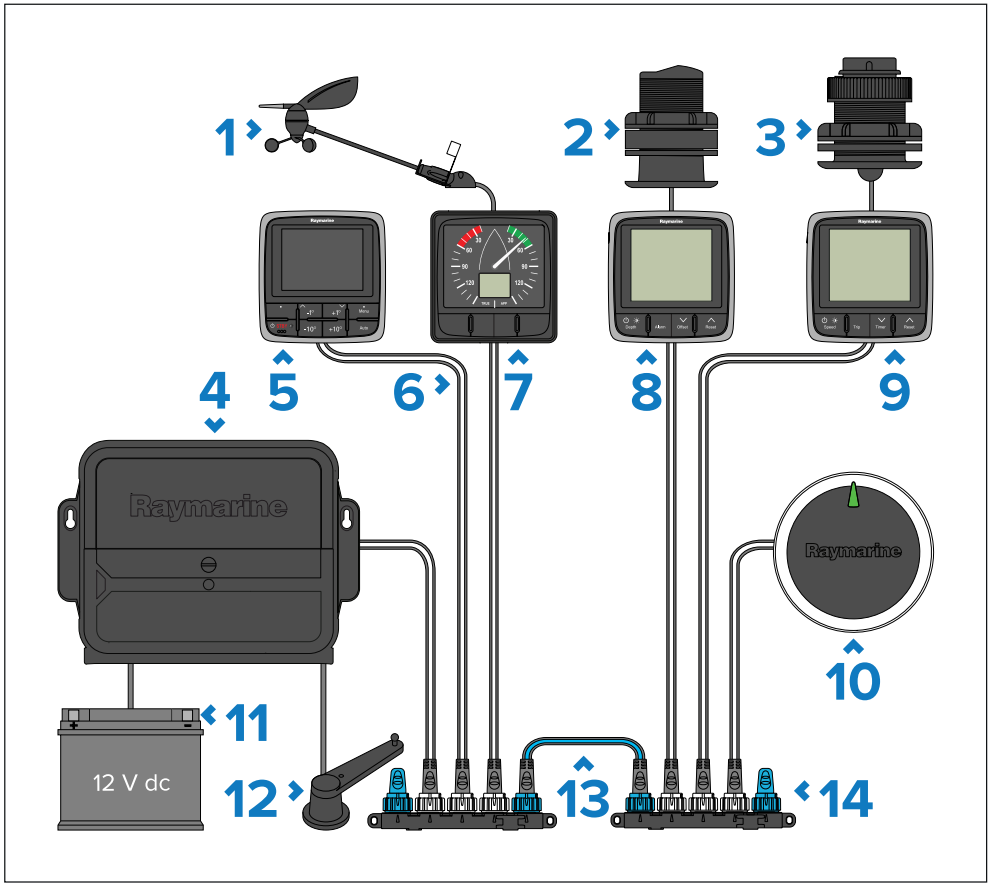
SeaTalk NG connection

Connections to an existing SeaTalk NG system must be made using the supplied SeaTalk NG spur cable.

Note:

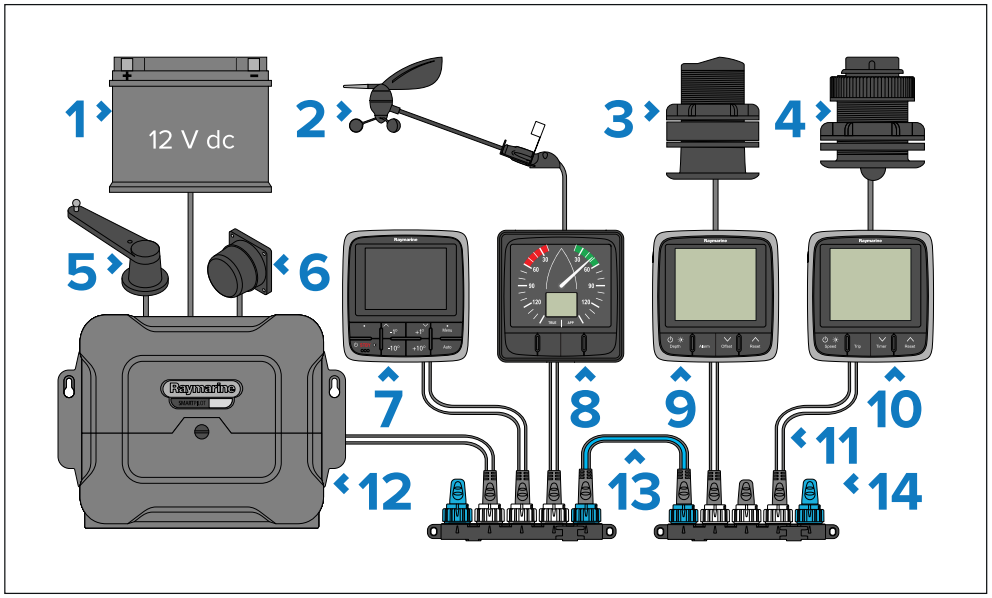
The ACU-100, ACU-150 and the SPX-5 cannot be used to power the SeaTalk NG backbone.

SeaTalk NG Evolution system



	Description
1	Wind transducer (Short-Arm Masthead Wind vane transducer currently illustrated).
2	Depth transducer (P319 currently illustrated).
3	Speed transducer (P371 currently illustrated).
4	ACU-200 / ACU-300 / ACU-400.
5	Pilot controller (p70 currently illustrated).
6	SeaTalk NG spur cable.
7	i60 Wind.
8	i50 Depth.
9	i50 Speed.
10	EV-1.
11	12 V dc power supply.
12	Rudder reference transducer.
13	SeaTalk NG backbone cable.
14	SeaTalk NG 5-way connector.

SeaTalk NG SPX system



	Description
1	12 V dc power supply.
2	Wind transducer (Short-Arm Masthead Wind vane transducer currently illustrated).
3	Depth transducer (P319 currently illustrated).
4	Speed transducer (P371 currently illustrated).

	Description
5	Rudder reference transducer.
6	Fluxgate compass.
7	Pilot controller (p70 currently illustrated).
8	i60 Wind.
9	i50 Depth.
10	i50 Speed.
11	SeaTalk NG spur cable.
12	SPX-Series (supplying 12 V dc to the SeaTalk NG network).
13	SeaTalk NG backbone cable.
14	SeaTalk NG 5-way connector.

3.6 NMEA 2000

The NMEA 2000 Data Interface Standard was developed by the NMEA® (*National Marine Electronics Association of America*). It is an international standard to enable equipment from many different manufacturers to be connected together and share information.

The NMEA 2000 standard was specifically intended to allow for a whole network of marine electronics from any manufacturer to communicate on a common bus via standardized message types and formats.

NMEA 2000 offers significant improvements over NMEA 0183, most notably in speed and connectivity. Up to 50 units can simultaneously transmit and receive on a single physical bus at any one time, with each node being physically addressable.

This disciplined multiple-talker, multiple-listener data network is therefore a significant improvement when compared to the NMEA 0183 single-talker, multiple-listener (simplex) serial communications protocol.

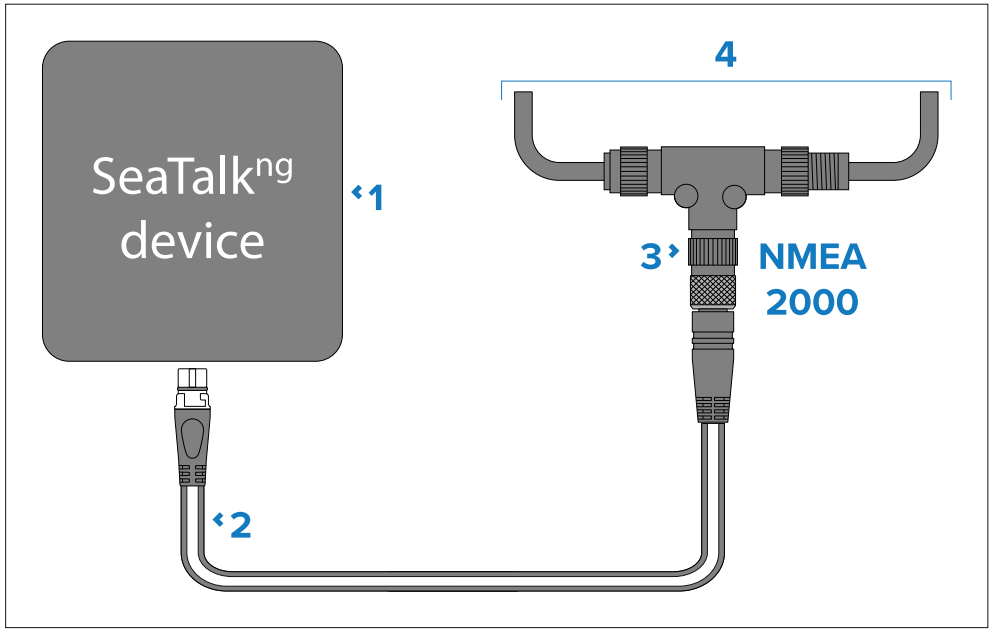
NMEA 2000 utilizes a single backbone which compatible equipment connects to using a spur. Data and power are carried within the backbone. Devices that have a low power draw can be powered from the network, although high current equipment will need to have a separate power connection.

DeviceNet

Electrically, NMEA 2000 is very similar to, and compatible with, the *Controller Area Network* ("CAN bus") technology known as "DeviceNet". Specifically, at the protocol higher-level, NMEA 2000 is based on *Society of Automotive Engineers* (SAE) J1939, with specific messages for the marine environment. Due to their electrical compatibility, NMEA 2000 devices and DeviceNet devices can co-exist on the same physical network, and can also use the same cables. Typically, the DeviceNet cables used in NMEA 2000 networks are known as "*Micro-C*", or sometimes just "*Micro*".

NMEA 2000 network connection

Your SeaTalk NG device can be connected to a DeviceNet / NMEA 2000 network.



1. SeaTalk NG device.
2. SeaTalk NG to DeviceNet (male) adapter cable (A06078, A06074, A06076, or A06046).
3. DeviceNet T-piece.
4. NMEA 2000 backbone.

CHAPTER 4: PARTS SUPPLIED

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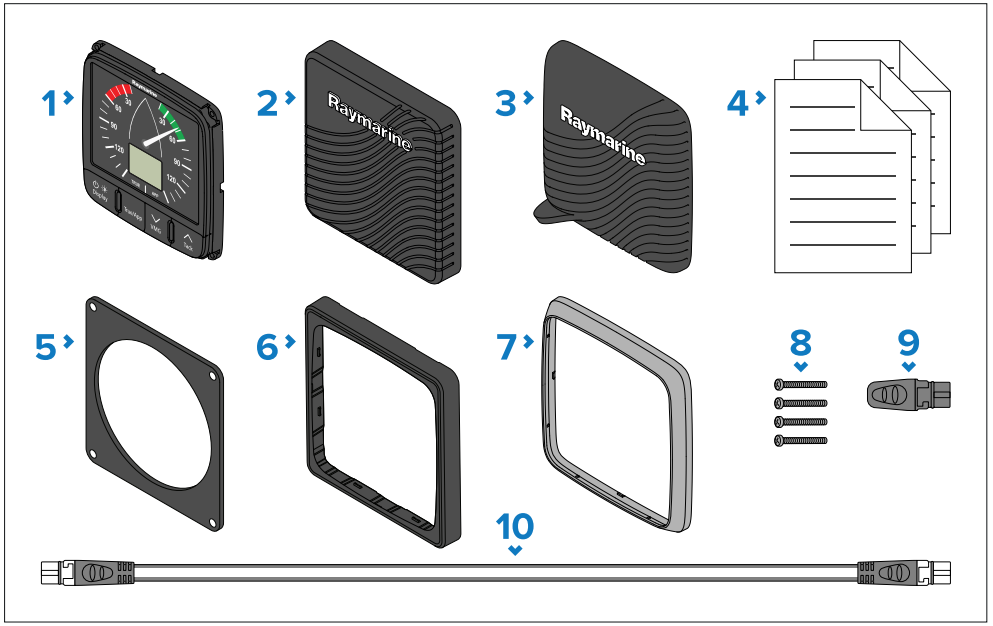
4.1 Parts supplied

The following parts are supplied in the box.



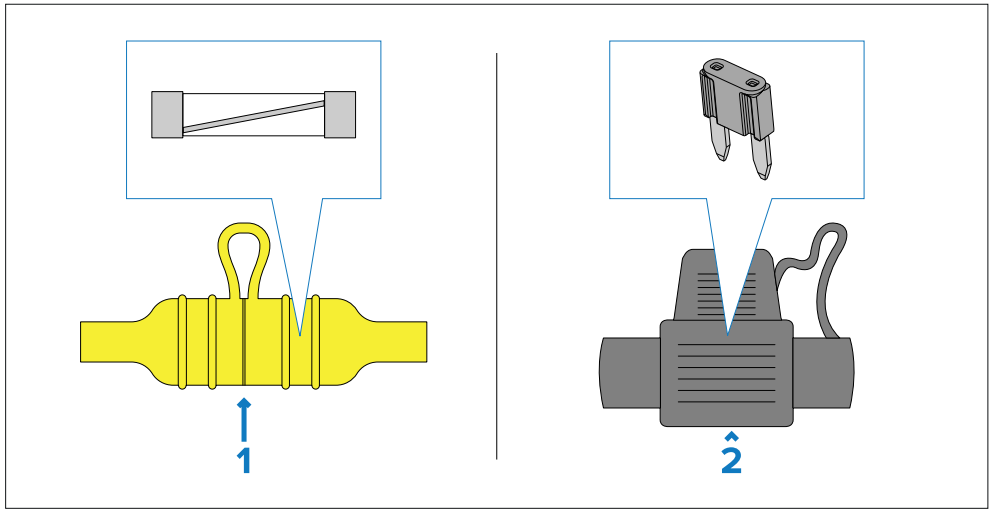
	Description
1	1x Instrument display.
2	1x Suncover (to match i70s, p70s, p70Rs and eS Series).
3	1x Suncover (to match a, c and e Series).
4	1x Documentation pack.
5	1x Gasket.
6	1x Front bezel (to match i70s, p70s, p70Rs and eS Series).
7	1x Front bezel (to match a, c and e Series).
8	4x Fixing screws.
9	1x SeaTalk NG blanking plug.
10	1x SeaTalk NG spur cable, 400 mm (15.7 in).

4.2 Inline fuse requirement

If your product is NOT supplied with an inline fuse (whether separately or fitted to the power cable), you MUST fit a suitably-rated inline fuse to your product's red power wire, housed in a waterproof fuse holder.

The illustration below shows the two main types of inline fuse with waterproof holder, for use in marine electronics installations. Fuses in a variety of ratings are widely available at chandleries and marine electrical retailers.

Select one of the following fuse types to protect your Raymarine product:



1. Waterproof fuse holder containing a "glass"-type inline fuse.
2. Waterproof fuse holder containing a "blade"-type inline fuse.

Fuse ratings:

- *Voltage rating* — must be equal to or greater than the voltage of your vessel's power supply.
- *Current rating* — refer to the *Inline fuse and thermal breaker rating* section in this document.

CHAPTER 5: PRODUCT DIMENSIONS

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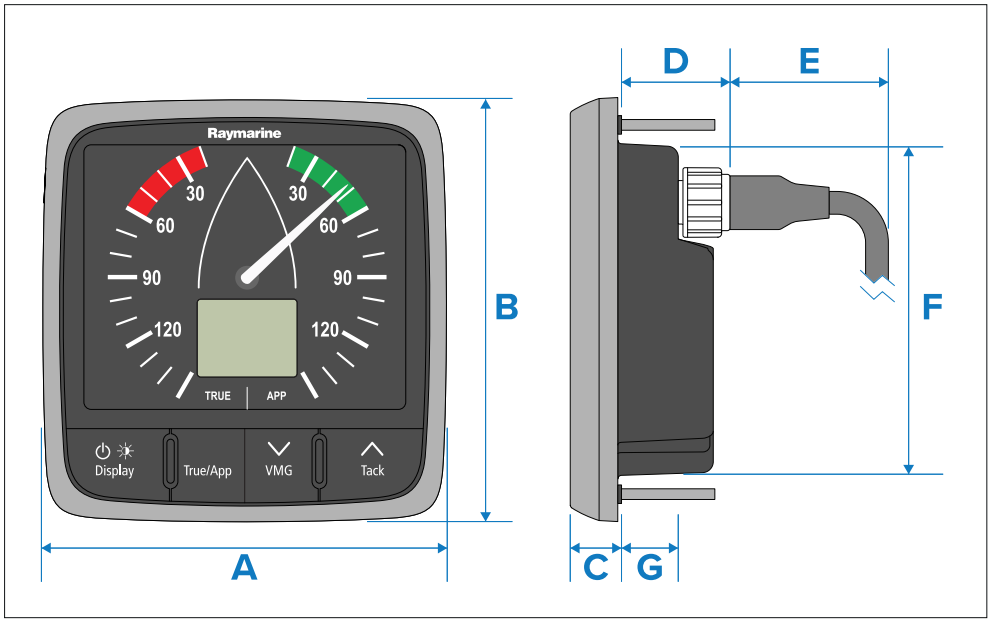
5.1 Product dimensions



	Description
A	110.00 mm (4.33 in).
B	115.00 mm (4.53 in).
C	14.00 mm (0.55 in).
D	30.00 mm (1.18 in).
E	35.00 mm (1.38 in).
F	90.00 mm (3.54 in).
G	17.00 mm (0.67 in).

CHAPTER 6: LOCATION REQUIREMENTS

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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.9 — 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

When selecting a location for your product it is important to consider a number of factors.

Factors for consideration:

- **Ventilation** — To ensure adequate airflow:
  - Ensure that product is mounted in a compartment of suitable size.
  - Ensure that ventilation holes are not obstructed. Allow adequate separation of all equipment.

  Any specific requirements for each system component are provided later in this chapter.
- **Mounting surface** — Ensure product is adequately supported on a secure surface. Do not mount units or cut holes in places which may damage the structure of the vessel.
- **Cabling** — Ensure the product is mounted in a location which allows proper routing, support and connection of cables:
  - Minimum bend radius of 100 mm (3.94 in) unless otherwise stated.
  - Use cable clips to prevent stress on connectors.
  - If your installation requires multiple ferrites to be added to a cable then additional cable clips should be used to ensure the extra weight of the cable is supported.
- **Water ingress** — The product is suitable for mounting both above and below decks. Although the unit is waterproof, it is good practice to locate it in a protected area away from prolonged and direct exposure to rain and salt spray.
- **Electrical interference** — Select a location that is far enough away from devices that may cause interference, such as motors, generators and radio transmitters / receivers.
- **Power supply** — Select a location that is as close as possible to the vessel's DC power source. This will help to keep cable runs to a minimum.

6.3 EMC installation guidelines

Raymarine 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:

- Raymarine equipment and cables connected to it are:
  - At least 1 m (3.28 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 (6.56 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.

- Raymarine 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.

6.4 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 must aim to maintain a distance of at least 1 m (3.3 ft) in all directions from any compasses.

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 on state.

6.5 Viewing angle considerations

As display contrast and color are affected by the viewing angle, It is recommended that you temporarily power up the display, prior to installation, to enable you to best judge which location provides the optimum viewing angle.

For viewing angles for your product refer to the *Technical specification*.

6.6 Wind transducer location requirements

When selecting a location for your wind transducer it is important to consider a number of factors.

The transducer's location must ensure that:

- It is installed facing forwards.
- It is installed on a horizontal surface. If a surface (e.g. a mast top) is otherwise suitable but not horizontal, make up a suitable wedge piece to provide the necessary horizontal surface.
- It is installed as high as possible and away from any equipment which may shield the transducer or otherwise disturb the air flow to the transducer.
- There is a viable route for the transducer's cable to be routed to the display / converter that it will be connected to.
- The vane and cups can spin freely.
- There is sufficient access for installation and servicing.

Wind vane transducer and Rotavecta mounting

Ensure that the Short-Arm / Long-Arm wind transducer or Rotavecta wind transducer is installed in accordance with the instructions supplied with the unit. For more information, refer to:

Short-Arm / Long-Arm **documentation link**
www.bit.ly/rym-wind-docs

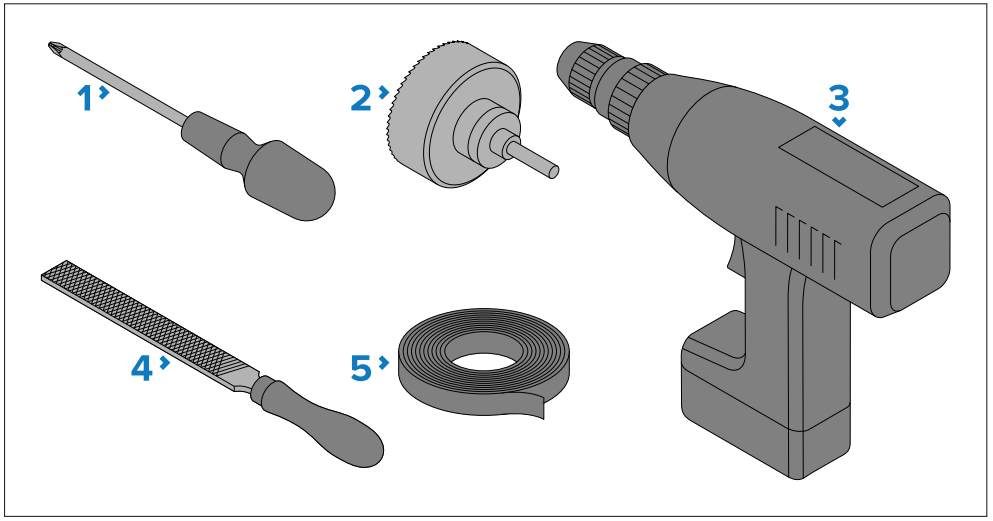
Rotavecta **documentation link**
www.bit.ly/rotavecta-docs

CHAPTER 7: MOUNTING

CHAPTER CONTENTS

7.1 Tools required

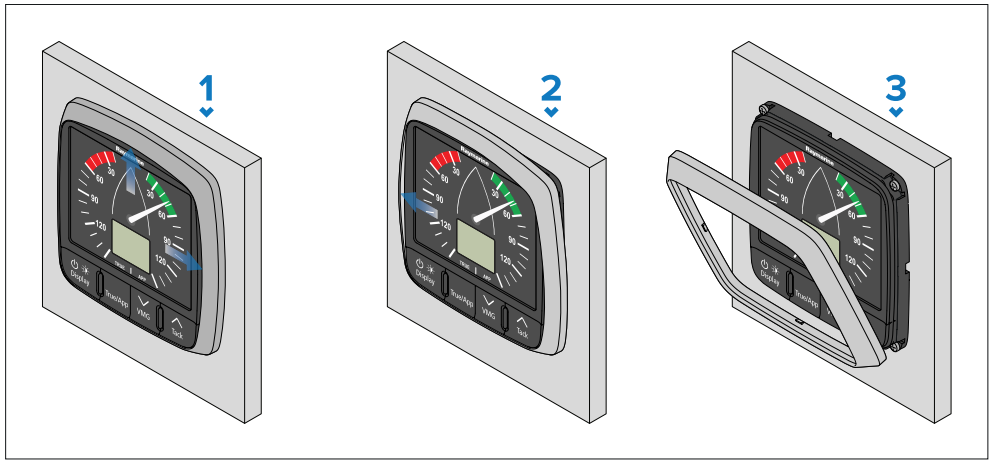
The following tools are required for installation.



	Description
1	Pozi-drive screwdriver.
2	File.
3	92.00 mm (3.62 in) hole cutter.
4	Adhesive tape.
5	Power drill.

7.2 Removing the front bezel

Follow the steps listed below to remove the front bezel.



Note:

Use care when removing the bezel. Do not use any tools to lever the bezel; doing so may cause damage.

In order to remove the front bezel:

1. Using your fingers pull the bezel away from the unit at the top and side. The bezel will start to come away from the unit at the top and side.
2. Pull the bezel away from the unit on the opposite side.
3. The bezel will now come free from the unit.

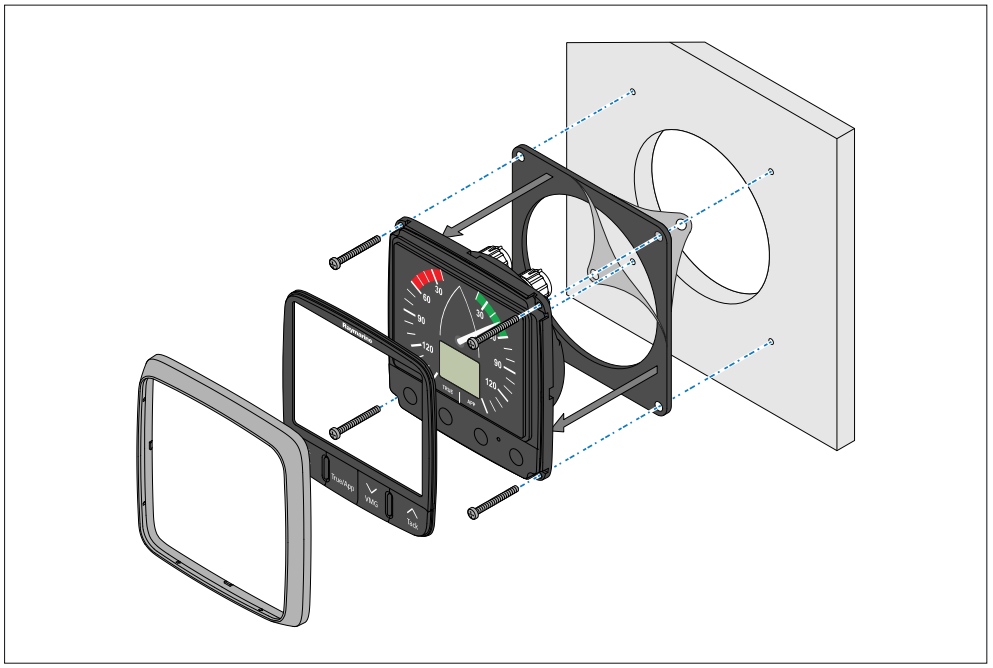
7.3 Mounting

Follow the instructions below to mount the display.

Before mounting the product, ensure that you have:

- Selected a suitable location, based on the location requirements found in this document. For more information, refer to: **p.26 — Location requirements**
- Identified the relevant cable connections and the route that the cables will take.

- Removed the bezel and button pad from the display.



1. Fix the supplied mounting template to the selected location, using self adhesive tape.
2. Drill the cut out hole using a 92 mm (3 5/8”) hole cutter.

   Alternatively, use small drill bit to make pilot holes in each corner of the cut out area and then use a jigsaw to cut along the inside edge of the cut out line.

3. Ensure that the display fits into the removed area.
4. File around any rough edges.
5. Drill the fixing holes as indicated on the mounting template.
6. Peel the backing off of the panel mounting gasket and place the adhesive side of the gasket onto the back of the display and press firmly onto the flange.
7. Connect the SeaTalk NG cable.
8. Position the display in place and secure using the fixings provided.
9. Refit the button pad and bezel.

Note:

- Drill bit, tap size and tightening torques are dependant upon the material type and thickness of the mounting surface.
- 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. If the mounting surface or binnacle is not entirely flat and stiff or has a rough surface finish, it may also be necessary to use a marine-grade sealant.

CHAPTER 8: CABLES AND CONNECTIONS — GENERAL INFORMATION

CHAPTER CONTENTS

8.1 General cabling guidance

Cable types and length

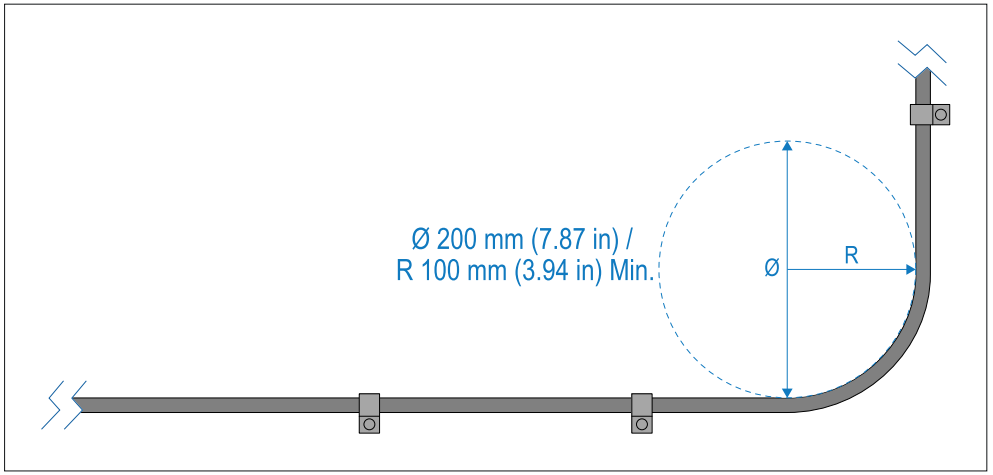
It is important to use cables of the appropriate type and length.

- Unless otherwise stated only use cables supplied by Raymarine.
- Where it is necessary to use non-Raymarine cables, ensure that they are of correct quality and gauge for their intended purpose. (e.g.: longer power cable runs may require larger wire gauges to minimize voltage drop along the run).

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 (Ø) 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.

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.

Cable shielding

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

Important:

Be aware that some **third-party** cables and adaptors (for example, certain Ethernet cables using RJ45 connectors) are not always shielded. To prevent breaks in cable shielding continuity and potential grounding issues, special attention is required to ensure that any cables, extension cables, adaptors, or other signal-coupling devices (such as multi-way connectors, junction boxes, terminal blocks etc.) used in cable runs **maintain all shield connections throughout the cable run**.

Suppression ferrites

- Raymarine 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 Raymarine 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.

Connecting cables

Follow the steps below to connect the cable(s) to your product.

1. Ensure that the vessel's power supply is switched off.
2. Ensure that the device being connected has been installed in accordance with the installation instructions supplied with that device.
3. Ensuring correct orientation, push cable connectors fully onto the corresponding connectors.
4. Engage any locking mechanism to ensure a secure connection (e.g.: turn locking collars clockwise until tight, or in the locked position).
5. Ensure any bare ended wire connections are suitably insulated to prevent shorting and corrosion due to water ingress.

Bare-ended wire connections

You must ensure that any bare-ended wires are adequately protected from short circuit and water ingress.

Bare-ended wire connections

It is recommended that bare-ended wire connections are made by soldering or using crimp connectors, and then protected by wrapping the connection in electrical insulation tape.

Unused bare-ended wires

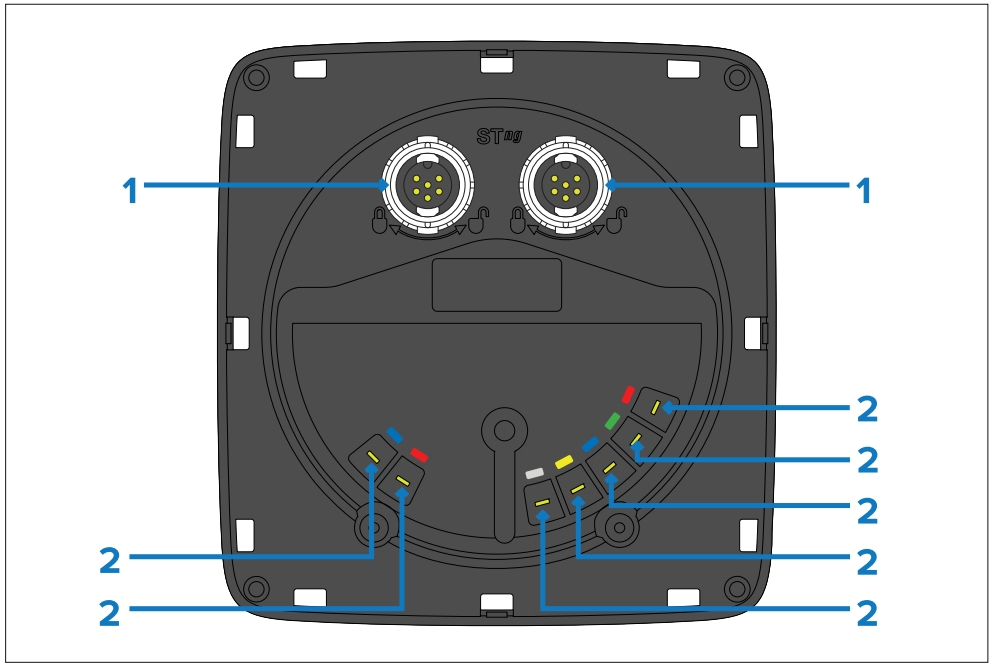
Any unused bare-ended wires should be folded back and wrapped in electrical insulation tape.

Warning: Positive ground systems

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

8.2 Connections overview

The instrument display includes the following connections:



SeaTalk NG connections:

	Description
1	SeaTalk NG connector.

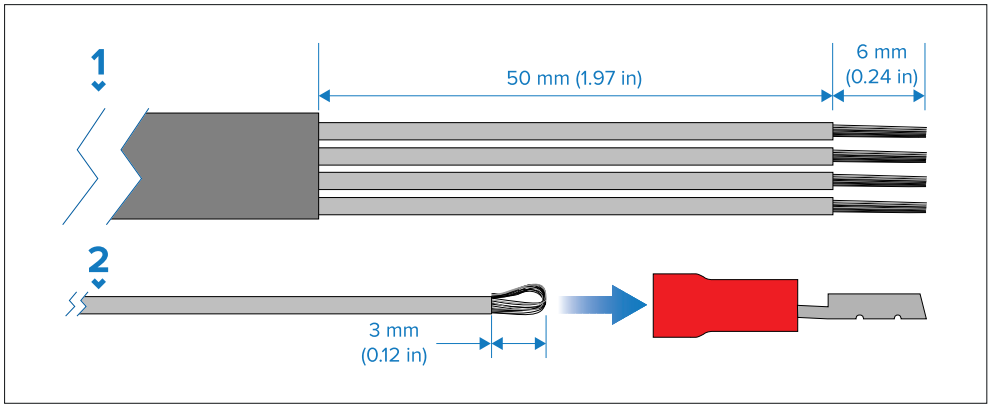
(i60 Wind only) Direct transducer connections:

	Description
2	For i60 Wind direct transducer connection information, refer to: **p.37 — Direct transducer connection**

Replacing spade terminals

Although the transducer cable is fitted with spade terminals for direct connection to a compatible display or converter, it may be necessary to remove these to allow the cable to be routed through bulkheads or masts etc. 5 x 1/8th spade terminals will be required (not supplied), to replace those removed.

When fitting the new spade terminals, prepare the cables as detailed below:



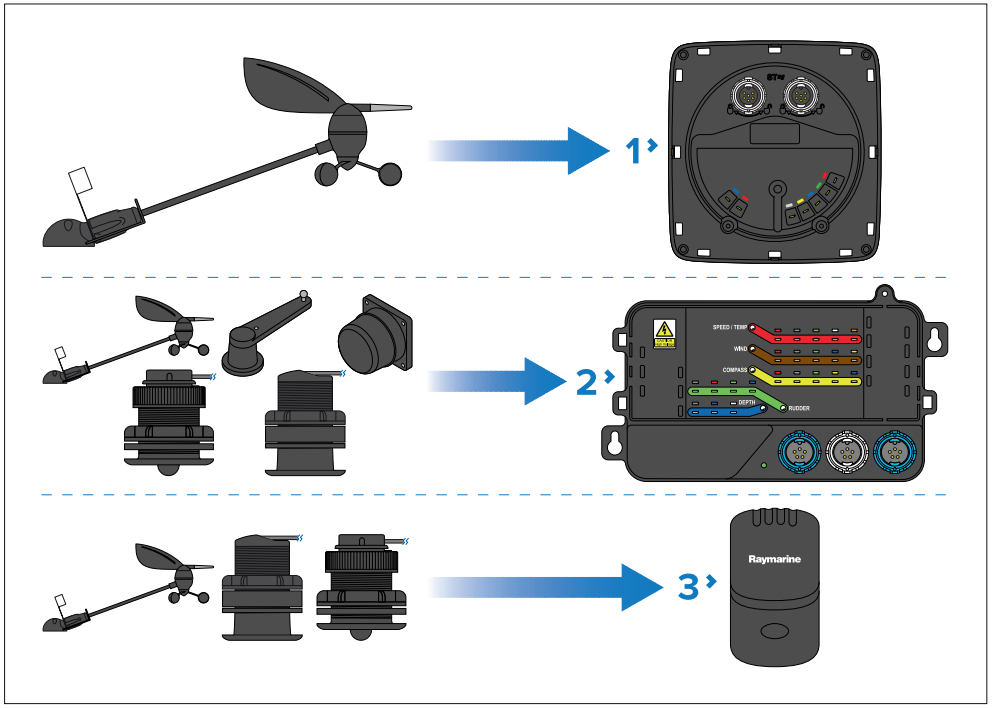
1. Prepare the cable as shown in 1 above.
2. Fold back the wire strands and insert into the new spade connector as shown in 2 above.
3. Ensure the wire strands do not extend beyond the rear of the spade connector insulation.
4. Crimp the connector to the wire.

CHAPTER 9: NETWORK CONNECTIONS

CHAPTER CONTENTS

9.1 Transducer connection options

Transducers may be connected to the instrument display using **one** of the following methods, which is dependent on your system configuration.



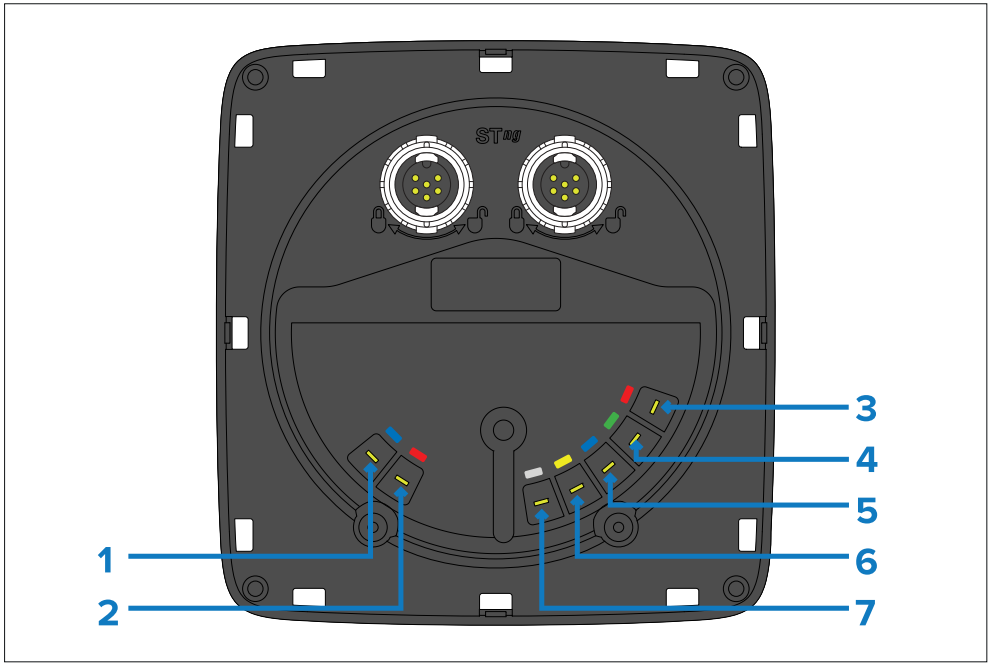
	Transducer connects to:	Description
1	**i60 (Wind only)**	Transducers may be connected **directly** to the rear of the i60 **Wind** display. For more information, refer to: **p.37 — Direct transducer connection**
2	**iTC-5**	Transducers may be connected to the display via an iTC-5 connected to the same SeaTalk NG network as the instrument display. For more information, refer to: **p.38 — iTC-5 transducer connections**
3	**ST70** transducer pod	Transducers may be connected to the instrument display via an ST70 transducer pod connected to the same SeaTalk NG network as the instrument display. For more information, refer to: **p.39 — Transducer pod connections**

Direct transducer connection

Analog transducer data can be transmitted to the i60 Wind using a direct transducer connection.

Note:

- A direct transducer connection only applies to the i60 Wind, the i60 Close-Hauled Wind does not support a direct transducer connection as it is a repeater display.
- The i60 Wind only requires a single Rotavecta connection or wind transducer connection, not both at the same time.



Rotavecta transducer connections:

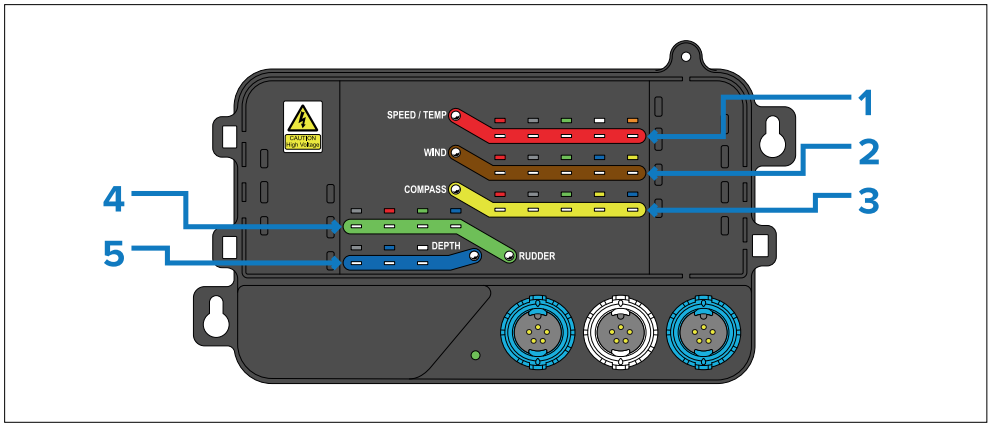
	Cable color	Signal name
1	Blue	Rotor + (Rotavecta)
2	Red	Rotor – (Rotavecta)

Wind transducer connections:

	Cable color	Signal name
3	Grey	Wind 0 V (Shield)
4	Yellow	Anemometer (signal)
5	Blue	Cosine wind direction
6	Green	Sine wind direction
7	Red	Wind V+

iTC-5 transducer connections

Analog transducer data can be transmitted to the display via an iTC-5.



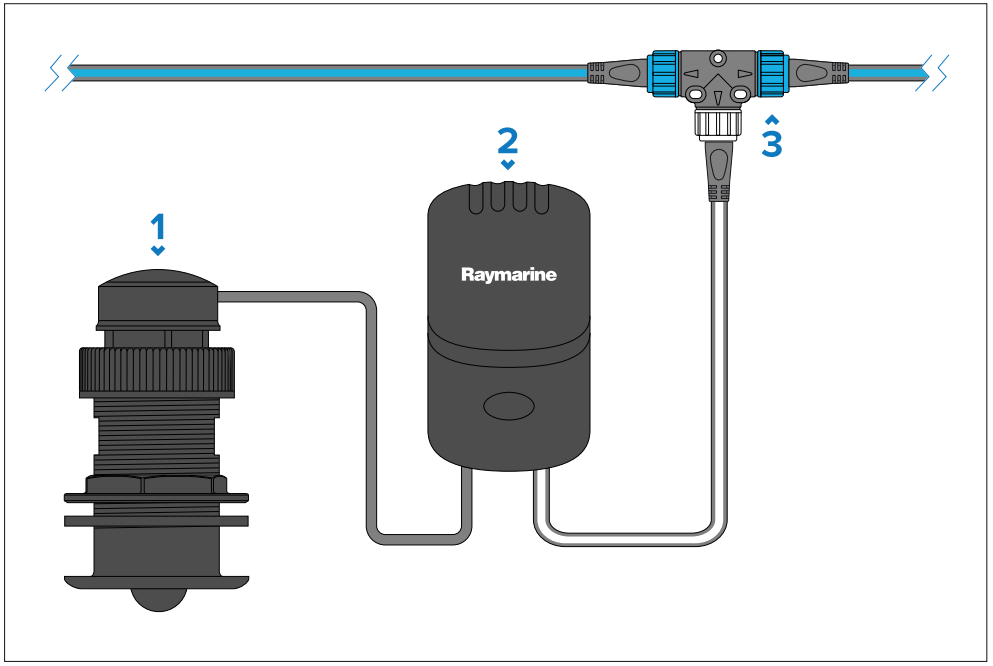
1. Speed & Temperature transducer connections
2. Wind transducer connections
3. Compass connections
4. Rudder reference transducer connections
5. Depth transducer connections

For details on connecting an iTC-5 to the SeaTalk NG backbone and connecting transducers to the iTC-5, refer to the documentation provided with the iTC-5:

iTC-5 **documentation link**
www.bit.ly/itc-5-docs

Transducer pod connections

Analog transducer data can be transmitted to the display using legacy transducer pods.



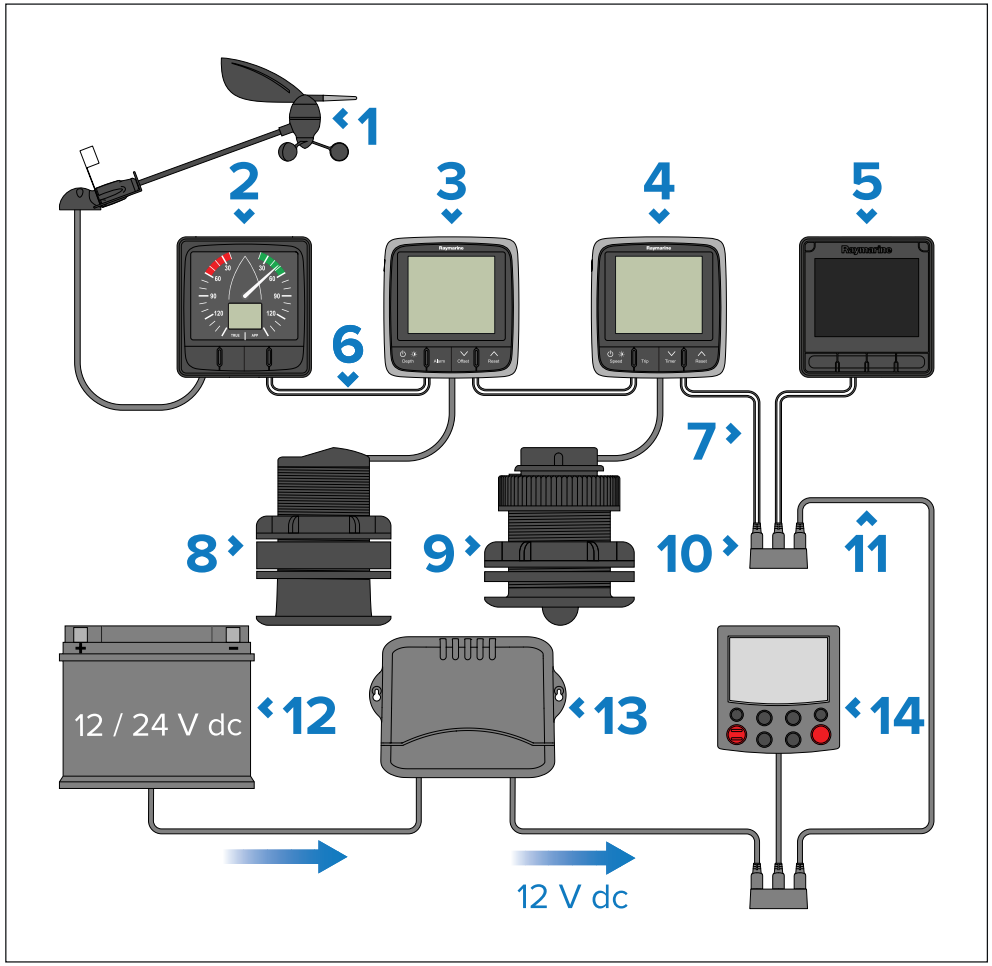
1. Analog transducer (e.g.: speed and temperature transducer)
2. Transducer pod (e.g.: Speed pod)
3. SeaTalk NG T-Piece connector (A06028)

Connect the transducer to the pod, the pod terminals are color-coded, ensure that each wire is connected to the corresponding terminal.

Connect the pod to the SeaTalk NG backbone using a SeaTalk NG to bare wire spur cable (e.g.: A06043) and a T-piece connector. Pods must be located no farther than 400 mm (15.75 in.) from the connection point on the backbone.

9.2 SeaTalk 1 connection

Connections to an existing SeaTalk 1 system must be made using the separately available SeaTalk 1 (3-pin) to SeaTalk NG adapter cable (A06047).



	Description
1	Wind transducer (Short-Arm Masthead Wind vane transducer currently illustrated).
2	i60 Wind.
3	i50 Depth.

	Description
4	i50 Speed
5	i70s.
6	SeaTalk NG spur cable.
7	SeaTalk 1 (3-pin) to SeaTalk NG adapter cable.
8	Depth transducer (P319 currently illustrated).
9	Speed transducer (P317 currently illustrated).
10	SeaTalk 1 3-way junction box.
11	SeaTalk 1 extension cable.
12	12 / 24 V dc power supply.
13	SeaTalk 1 course computer (providing 12 V dc power to the SeaTalk 1 network.)
14	ST6002 (SeaTalk 1 pilot controller).

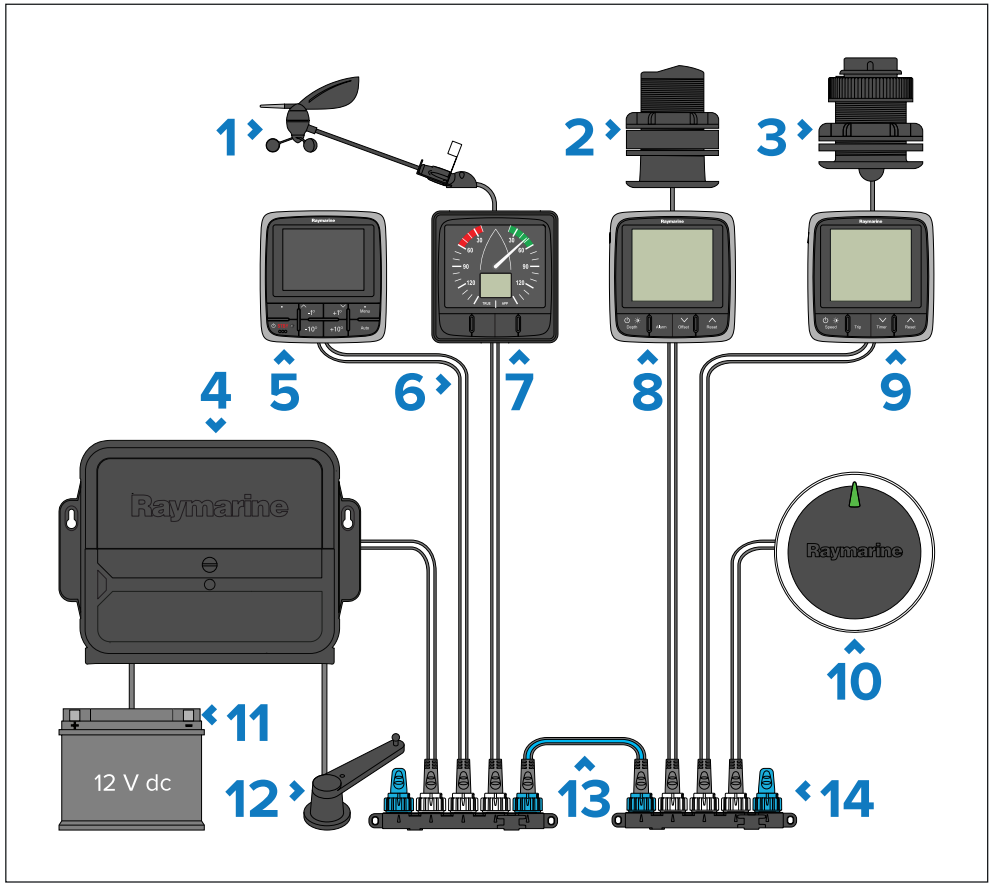
9.3 SeaTalk NG connection

Connections to an existing SeaTalk NG system must be made using the supplied SeaTalk NG spur cable.

Note:

The ACU-100, ACU-150 and the SPX-5 cannot be used to power the SeaTalk NG backbone.

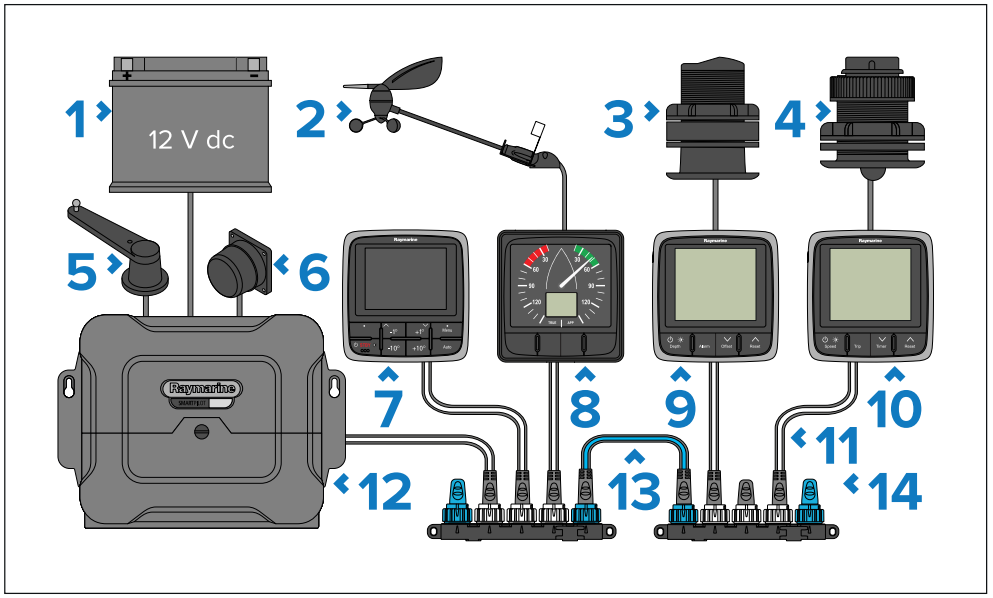
SeaTalk NG Evolution system



	Description
1	Wind transducer (Short-Arm Masthead Wind vane transducer currently illustrated).
2	Depth transducer (P319 currently illustrated).
3	Speed transducer (P371 currently illustrated).
4	ACU-200 / ACU-300 / ACU-400.
5	Pilot controller (p70 currently illustrated).
6	SeaTalk NG spur cable.
7	i60 Wind.

	Description
8	i50 Depth.
9	i50 Speed.
10	EV-1.
11	12 V dc power supply.
12	Rudder reference transducer.
13	SeaTalk NG backbone cable.
14	SeaTalk NG 5-way connector.

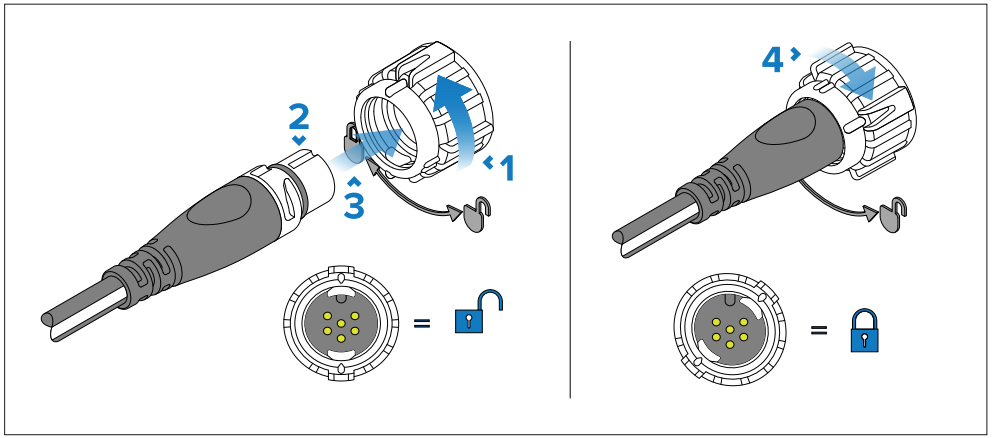
SeaTalk NG SPX system



	Description
1	12 V dc power supply.
2	Wind transducer (Short-Arm Masthead Wind vane transducer currently illustrated).
3	Depth transducer (P319 currently illustrated).
4	Speed transducer (P371 currently illustrated).

	Description
5	Rudder reference transducer.
6	Fluxgate compass.
7	Pilot controller (p70 currently illustrated).
8	i60 Wind.
9	i50 Depth.
10	i50 Speed.
11	SeaTalk NG spur cable.
12	SPX-Series (supplying 12 V dc to the SeaTalk NG network).
13	SeaTalk NG backbone cable.
14	SeaTalk NG 5-way connector.

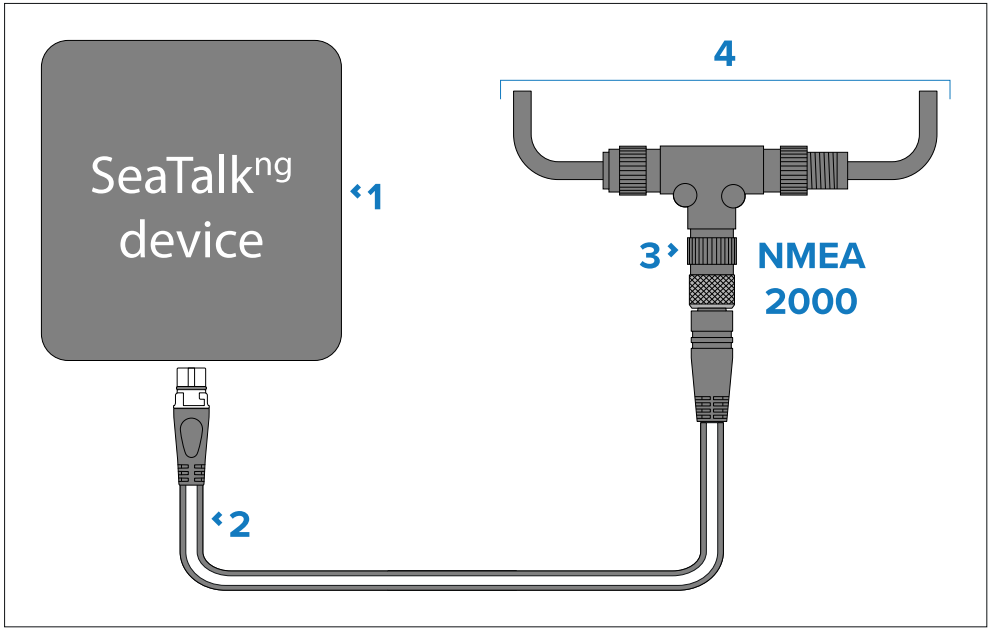
Connecting SeaTalk NG cables



1. Rotate your product's SeaTalk NG connector locking collar counter clockwise, so that the connector is in the unlocked position.
2. Ensure the cable's connector is correctly oriented (groove pointing up).
3. Fully insert the cable connector.
4. Rotate the locking collar clockwise (2 clicks) until it is in the locked position.

9.4 NMEA 2000 network connection

Your SeaTalk NG device can be connected to a DeviceNet / NMEA 2000 network.



1. SeaTalk NG device.
2. SeaTalk NG to DeviceNet (male) adapter cable (A06078, A06074, A06076, or A06046).
3. DeviceNet T-piece.
4. NMEA 2000 backbone.

CHAPTER 10: POWER CONNECTIONS (SEATALK NG CONNECTIONS)

CHAPTER CONTENTS

10.1 Power options

This product must have only **one** power source.

Important:

Before attempting to power your product from a SeaTalk NG backbone or SeaTalk 1 network, please note the following important requirements and considerations:

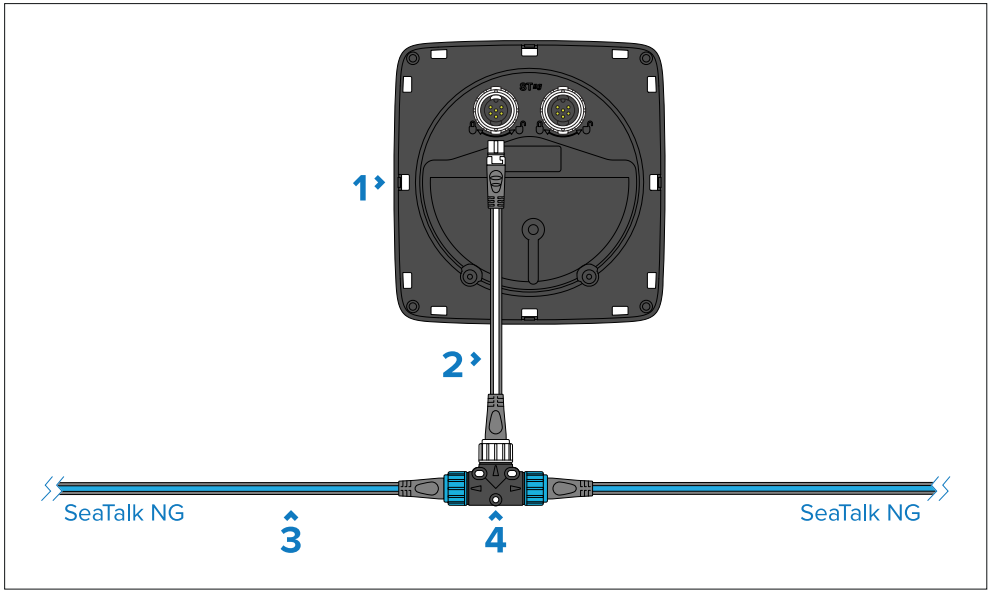
- You must connect only **one** power source.
- If your SeaTalk NG backbone is connected to any other system, ensure that in the combined system you connect only **one** data source for any given data type (for example GNSS (GPS)), unless specified otherwise.
- If any SeaTalk NG and SeaTalk 1 products are connected together, do NOT connect to an NMEA 2000 backbone. This product combination may compromise the integrity of your NMEA 2000 system.
- If you are connecting your product to a SeaTalk NG backbone via the SeaTalk 1 to SeaTalk NG converter (E22158), the converter must ONLY be powered by the SeaTalk NG bus.
- You can connect two separate SeaTalk 1 networks to a SeaTalk NG backbone using different adapter cables and bridging methods (e.g. via an ST70 instrument or a SeaTalk 1 to SeaTalk NG converter), but the SeaTalk 1 networks must NOT be connected together. For more information, refer to the SeaTalk NG Reference Manual (81300).

The following power options are available for your product. The required option is dependent on your system configuration:

1. **SeaTalk NG** power option:
   - Connection to a SeaTalk NG backbone, using the supplied SeaTalk NG spur cable. For more information, refer to: **p.43 — Power connections (**SeaTalk NG **connections)**
2. **SeaTalk 1** power option:
   - Connection to a SeaTalk 1 network, using the separately available SeaTalk 1 (3-pin) to SeaTalk NG adapter cable (A06047). For more information, refer to: **p.51 — Power connections (**SeaTalk 1 **connections)**
3. **Direct connection** power option:
   - Direct connection to a vessel's 12 V dc power supply, using the separately available SeaTalk NG power cable (A06049). For more information, refer to: **p.54 — Power connections (Direct connections)**

10.2 SeaTalk NG power connection

Your instrument display can be powered directly from a SeaTalk NG backbone, using the supplied SeaTalk NG spur cable.



	Description
1	Instrument display.
2	SeaTalk NG spur cable.
3	SeaTalk NG backbone cable.
4	SeaTalk NG T-piece (A06028).

10.3 SeaTalk NG power supply

Your product is supplied power via the SeaTalk NG backbone (or the NMEA 2000 backbone if applicable).

A SeaTalk NG backbone requires a single 12 V dc power supply. Power can be supplied to the SeaTalk NG backbone by one of the following methods:

- (1) Direct connection to a 12 V dc battery using an inline 5 amp fuse.
- Connection to a 12 V dc distribution panel using a 3 amp thermal breaker.
- (2) Connection to the SeaTalk NG connector of an ACU-Series Autopilot Control Unit (not ACU-100 or ACU-150), or an SPX-Series course computer (not SPX-5).
- For 24 V vessels, connection must be via a 5 amp, regulated, continuous 24 V dc to 12 V dc converter.

Note:

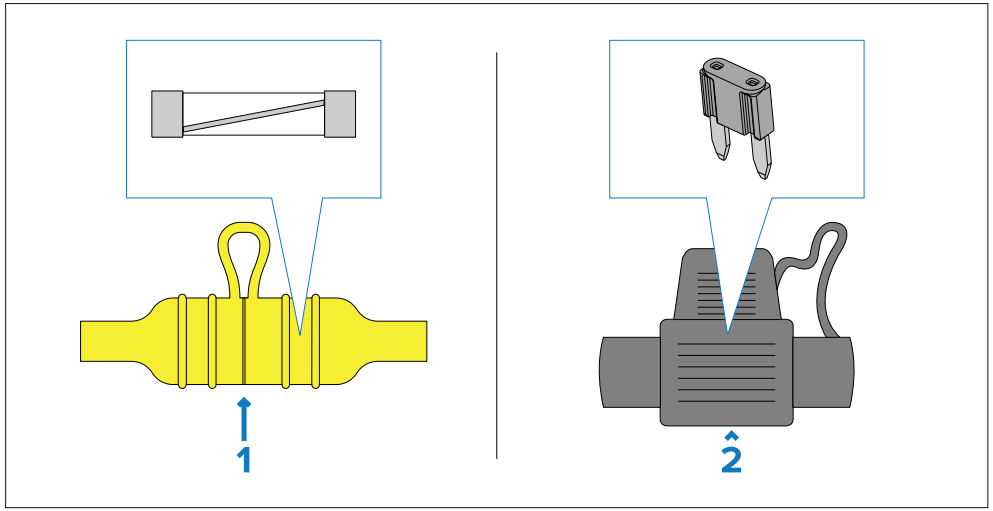
- (1) The battery used for starting the vessel's engine(s) should NOT be used to power the SeaTalk NG backbone, as this can cause sudden voltage drops when the engines are started.
- (2) The ACU-100, ACU-150 or SPX-5 cannot be used to power the SeaTalk NG backbone.
- The course computer SeaTalk NG connector includes a power switch that must be in the On position to provide power to the backbone.

10.4 Inline fuse requirement

If your product is NOT supplied with an inline fuse (whether separately or fitted to the power cable), you MUST fit a suitably-rated inline fuse to your product's red power wire, housed in a waterproof fuse holder.

The illustration below shows the two main types of inline fuse with waterproof holder, for use in marine electronics installations. Fuses in a variety of ratings are widely available at chandleries and marine electrical retailers.

Select one of the following fuse types to protect your Raymarine product:



1. Waterproof fuse holder containing a "glass"-type inline fuse.
2. Waterproof fuse holder containing a "blade"-type inline fuse.

Fuse ratings:

- *Voltage rating* — must be equal to or greater than the voltage of your vessel's power supply.
- *Current rating* — refer to the *Inline fuse and thermal breaker rating* section in this document.

10.5 Inline fuse and thermal breaker ratings

The SeaTalk NG network's power supply requires a suitably-rated inline fuse or thermal breaker to be fitted.

Inline fuse rating	Thermal breaker rating
5A	3A (refer to note below)

Note:

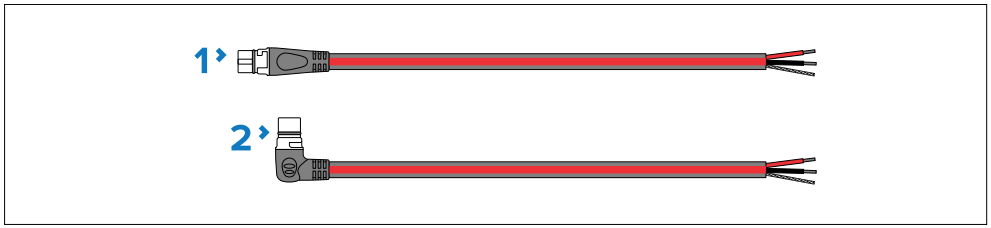
The suitable fuse rating for the thermal breaker is dependent on:

1. How many devices you have connected to your SeaTalk NG network, and;
2. How many devices are sharing the same thermal breaker that your SeaTalk NG network is connected to.

10.6 SeaTalk NG power cables

The following SeaTalk NG power cables can be used to connect the backbone to your chosen **12 V dc** power supply:

Direct connection cables



1. Standard (straight) SeaTalk NG power cable, 2 m (6.6 ft) (part number: **A06049**).
2. Elbow (right-angled) SeaTalk NG power cable, 2 m (6.6 ft) (part number: **A06070**).

Wiring

- **+ Red (positive) wire** — connects to the battery or distribution panel positive terminal. A waterproof fuse holder with 5 A inline fuse (not supplied) must be fitted to this red wire.
- **– Black (negative) wire** — connects to battery or distribution panel negative terminal.
- **Drain wire** — connects to the vessel's RF common ground point (if available), or the battery's negative (-) terminal.

Autopilot Control Unit connection cable

1. ACU-Series/SPX-Series autopilot to SeaTalk NG spur cable, 0.3 m (1.0 ft) (part number **R12112**). Connects the course computer to the SeaTalk NG backbone. This connection can also be used to provide 12 V dc power to the SeaTalk NG backbone.

10.7 SeaTalk NG product loading

The number of products that can be connected to a SeaTalk NG backbone depends on the current draw of each product and the physical length of the backbone cabling.

NMEA 2000 Load Equivalency Numbers (LEN) are used to express the amount of current that is drawn from SeaTalk NG products (**1 LEN = 50 mA**). The LEN for each product can be found in the product's *Technical Specification*.

Products which have a dedicated power supply connection that are connected to the SeaTalk NG backbone will still have an LEN rating. This is because the product's NMEA 2000/SeaTalk NG internal transceiver will still be powered by the SeaTalk NG backbone.

LENs are used to determine the power connection point for the SeaTalk NG backbone.

10.8 SeaTalk NG power connection point

The point along the backbone where the power connection should be made is based on the length of the backbone.

Note:

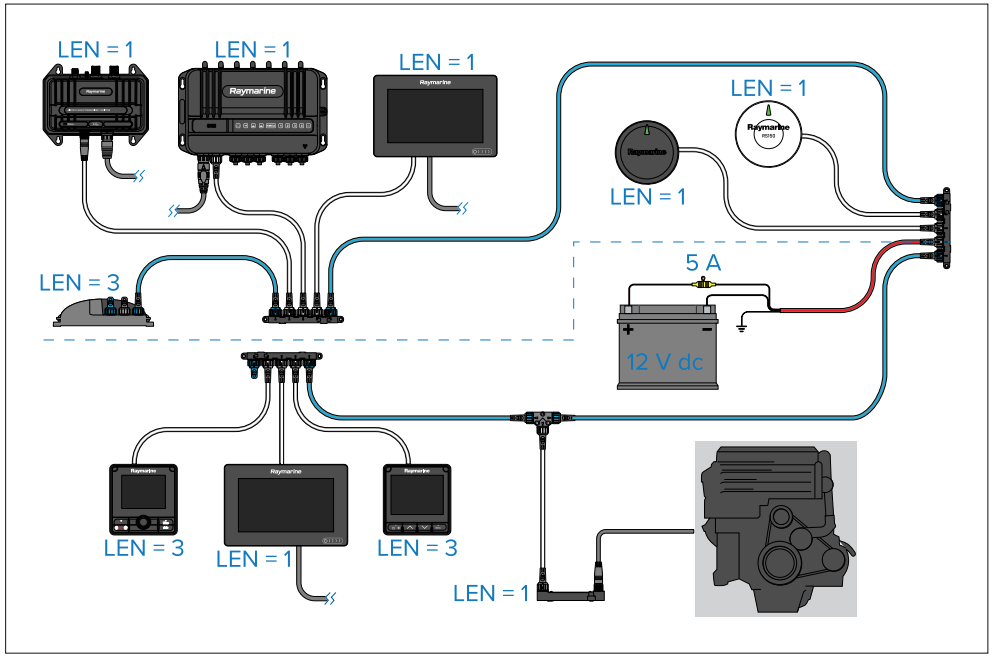
- A 12 V dc power supply must be connected to a *white* spur SeaTalk NG connection on the backbone.
- Do NOT connect the power connection to a *blue* SeaTalk NG backbone connector.
- **With the exception of** the iTC-5 and the backbone itself, do NOT connect the power supply directly to a product's *white* SeaTalk NG spur connector.

Small systems

If the backbone length is 60 m (197 ft) or less, the power connection may be made at any point in the backbone.

Large systems

If the backbone length is greater than 60 m (197 ft), the power connection should be made at a point that creates a balanced current draw from each side of the backbone. Load Equivalency Numbers (LEN) are used to determine the power connection point for the system.



In the example above, the system has an overall LEN of 16, so the optimum connection point would be to have a loading of 8 LEN either side of the connection point.

10.9 SeaTalk NG system loading

The maximum loading (LEN) for a SeaTalk NG system depends on the length of the backbone.

Unbalanced system loading:

- **Backbone Length**: 0 m (0 ft) to 20 m (66 ft) — **Maximum LEN**: 40
- **Backbone Length**: > 20 m (66 ft) to 40 m (131 ft) — **Maximum LEN**: 20
- **Backbone Length**: > 40 m (131 ft) to 60 m (197 ft) — **Maximum LEN**: 14

Balanced system loading:

- **Backbone Length**: 0 m (0 ft) to 60 m (197 ft) — **Maximum LEN**: 100
- **Backbone Length**: > 60 m (197 ft) to 80 m (262 ft) — **Maximum LEN**: 84
- **Backbone Length**: > 80 m (262 ft) to 100 m (328 ft) — **Maximum LEN**: 60
- **Backbone Length**: > 100 m (328 ft) to 120 m (394 ft) — **Maximum LEN**: 50

- **Backbone Length**: > 120 m (394 ft) to 160 m (525 ft) — **Maximum LEN**: 40
- **Backbone Length**: > 160 m (525 ft) to 200 m (656 ft) — **Maximum LEN**: 32

10.10 Power distribution — SeaTalk NG

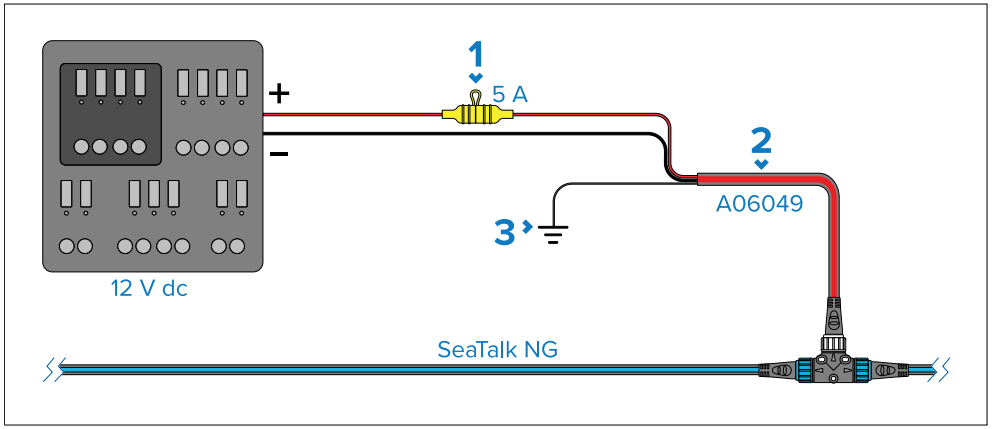
Recommendations and best practice.

- Only use approved SeaTalk NG power cables. Do NOT use a power cable designed for, or supplied with, a different product.
- See below for more information on implementation for some common power distribution scenarios.

Important:

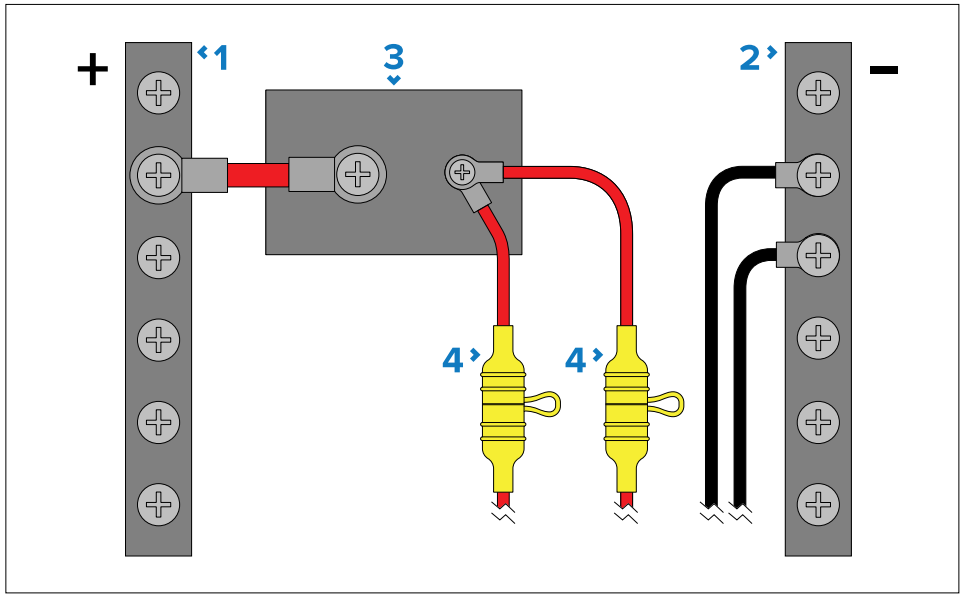
- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for 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 Raymarine dealer or a suitably qualified professional marine electrician.

Implementation — connection to distribution panel (recommended)



1. Waterproof fuse holder with 5 A inline fuse must be fitted (not supplied).
2. SeaTalk NG power cable.
3. RF Ground connection point for drain wire.

- Ideally, the SeaTalk NG power cable should be connected to a suitable breaker or switch on the vessel's distribution panel or factory-fitted power distribution point. It is recommended that a 5 A inline fuse is fitted to the red (positive) wire of the SeaTalk NG power cable.
- The distribution point should be fed from the vessel's primary power source by 8 AWG (8.36 mm^2) 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 one item of equipment shares a breaker, use individual in-line fuses for each power circuit to provide the necessary protection.



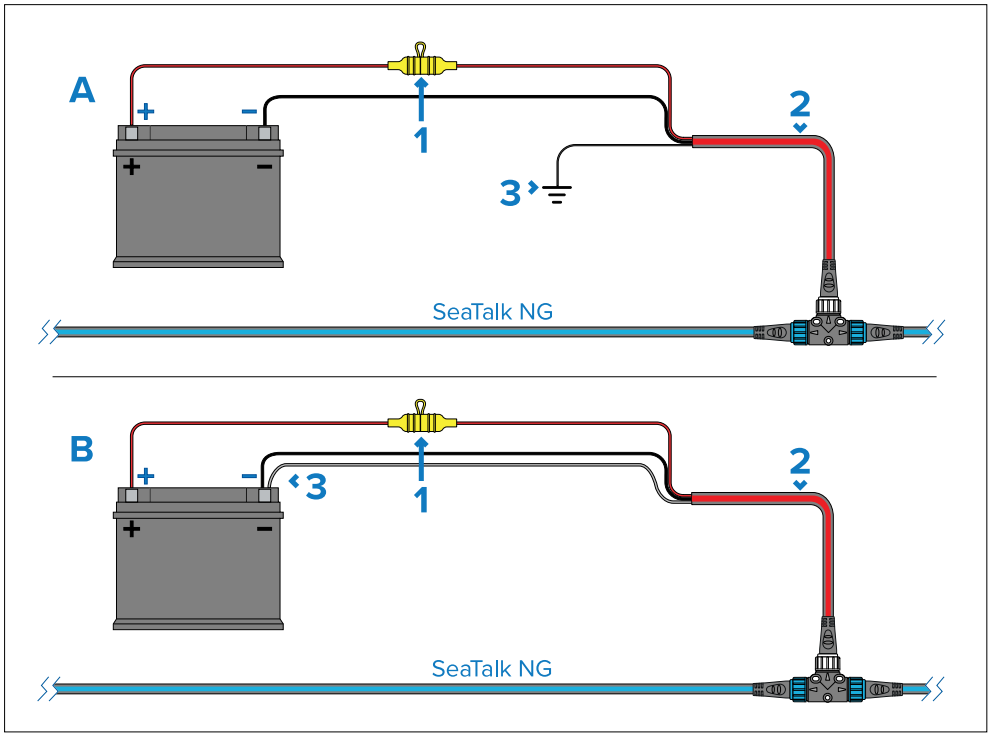
1. Positive (+) bar
2. Negative (-) bar
3. Circuit breaker
4. Waterproof fuse holder with 5 A inline fuse must be fitted (not supplied).

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 may be connected to the vessel's battery.
- You MUST fit a 5 A inline fuse between the red wire and the battery's positive terminal.
- If you need to extend the length of the power cable, ensure you use suitably rated cable and that sufficient power (12 V dc) is available at the SeaTalk NG backbone's power connection.



1. Waterproof fuse holder with 5 A inline fuse must be fitted (not supplied).
2. SeaTalk NG power cable.
3. Connection point for drain wire.

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 RF ground point.

Battery connection scenario B:

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

SeaTalk NG Power cable extension

If you need to extend the length of the SeaTalk NG power cable, ensure you use suitably-rated cable, and that sufficient power is available at the SeaTalk NG backbone's power connection point:

- For power cable extensions, a **minimum** wire gauge of 16 AWG (1.31 mm^2) is recommended. For cable runs longer than 15 m (49.2 ft), you may need to consider a thicker wire gauge (e.g. 14 AWG (2.08 mm^2), or 12 AWG (3.31 mm^2).
- 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.)

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.

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
- ISO 13297: Small craft — Electrical systems — Alternating and direct current installations
- ISO 10133: Small craft — Electrical systems — Extra-low-voltage d.c. installations
- ABYC E-11 AC & DC Electrical Systems on Boats
- ABYC A-31 Battery chargers and Inverters
- ABYC TE-4 Lightning Protection

Warning: 12 Volt dc only

This product must ONLY be connected to a 12 V dc power source.

Warning: Product grounding

Before applying power to this product, it MUST be correctly grounded, in accordance with the instructions provided.

Warning: Positive ground systems

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

10.11 Power connection via Autopilot Control Unit (ACU-Series)

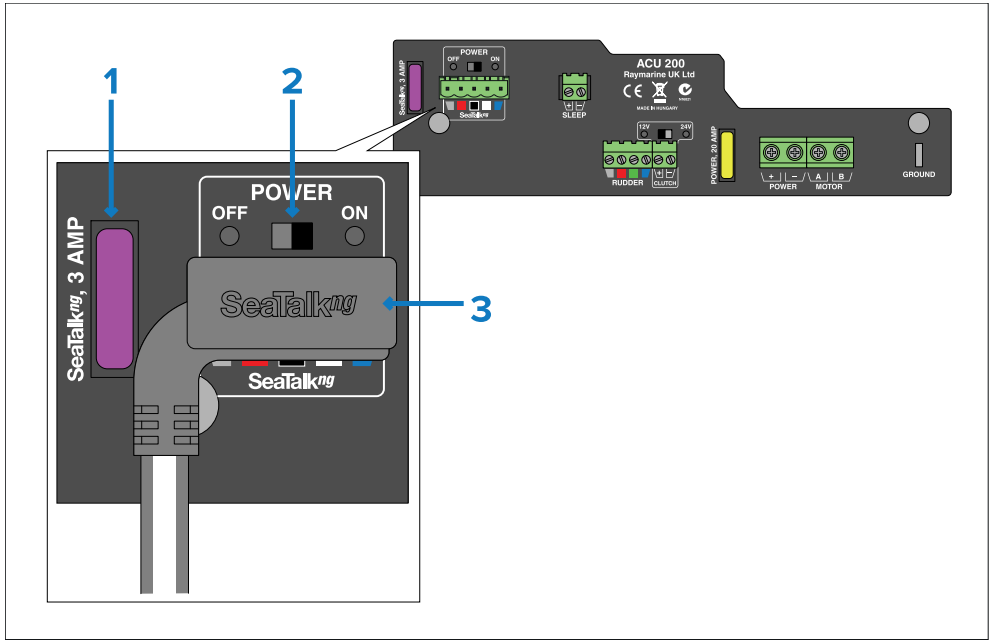
The SeaTalk NG backbone can be supplied 12 V dc power from a compatible Raymarine Autopilot Control Unit (ACU-Series).

Important:

The SeaTalk NG backbone must have a single power supply connection. If your SeaTalk NG backbone is supplied power directly from a battery or distribution panel, then you must ensure that the SeaTalk NG power switch on your ACU-Series is switched Off.

Note:

ACU-100, ACU-150 and SPX-5 autopilot control units cannot supply power to the SeaTalk NG backbone.



1. Fuse for SeaTalk NG power supply.
2. Power switch for SeaTalk NG power supply:
   a. Select the *[OFF]* position if your SeaTalk NG backbone is supplied power directly from a battery or distribution panel.
   b. Select the *[ON]* position if your SeaTalk NG backbone is supplied power by the ACU-Series.
3. ACU-Series/SPX-Series autopilot to SeaTalk NG spur cable (part number: R12112).

CHAPTER 11: POWER CONNECTIONS (SEATALK 1 CONNECTIONS)

CHAPTER CONTENTS

11.1 Power options

This product must have only **one** power source.

Important:

Before attempting to power your product from a SeaTalk NG backbone or SeaTalk 1 network, please note the following important requirements and considerations:

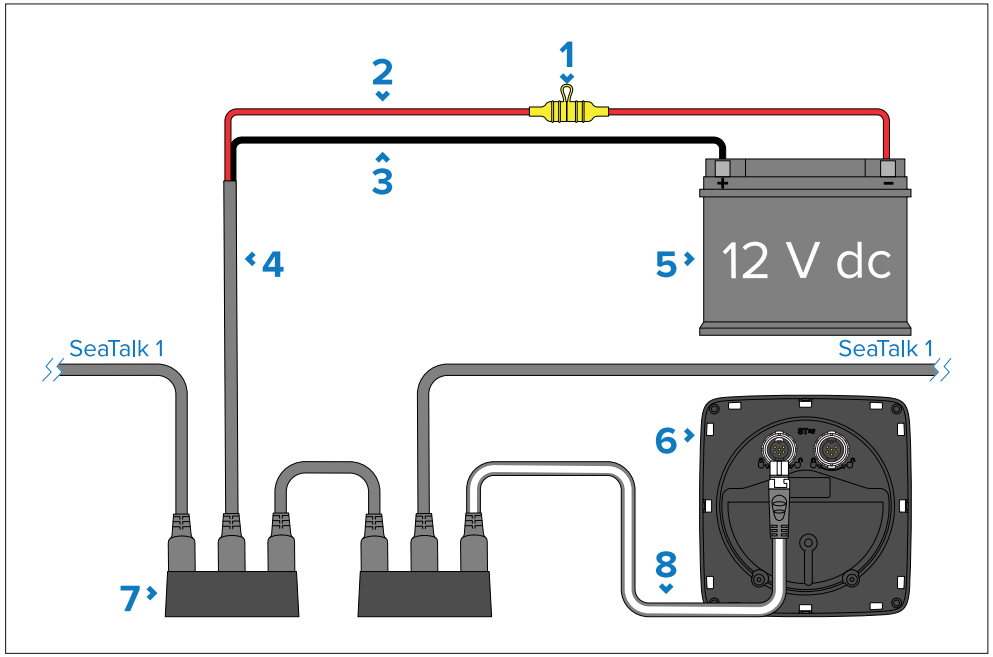
- You must connect only **one** power source.
- If your SeaTalk NG backbone is connected to any other system, ensure that in the combined system you connect only **one** data source for any given data type (for example GNSS (GPS)), unless specified otherwise.
- If any SeaTalk NG and SeaTalk 1 products are connected together, do NOT connect to an NMEA 2000 backbone. This product combination may compromise the integrity of your NMEA 2000 system.
- If you are connecting your product to a SeaTalk NG backbone via the SeaTalk 1 to SeaTalk NG converter (E22158), the converter must ONLY be powered by the SeaTalk NG bus.
- You can connect two separate SeaTalk 1 networks to a SeaTalk NG backbone using different adapter cables and bridging methods (e.g. via an ST70 instrument or a SeaTalk 1 to SeaTalk NG converter), but the SeaTalk 1 networks must NOT be connected together. For more information, refer to the SeaTalk NG Reference Manual (81300).

The following power options are available for your product. The required option is dependent on your system configuration:

1. **SeaTalk NG** power option:
   - Connection to a SeaTalk NG backbone, using the supplied SeaTalk NG spur cable. For more information, refer to: **p.43 — Power connections (**SeaTalk NG **connections)**
2. **SeaTalk 1** power option:
   - Connection to a SeaTalk 1 network, using the separately available SeaTalk 1 (3-pin) to SeaTalk NG adapter cable (A06047). For more information, refer to: **p.51 — Power connections (**SeaTalk 1 **connections)**
3. **Direct connection** power option:
   - Direct connection to a vessel's 12 V dc power supply, using the separately available SeaTalk NG power cable (A06049). For more information, refer to: **p.54 — Power connections (Direct connections)**

11.2 SeaTalk 1 power connection

Your instrument display can be powered directly from a SeaTalk 1 network, using the separately available SeaTalk 1 (3 pin) to SeaTalk NG adapter cable (A06047).



	Description
1	Waterproof fuse holder containing a suitably-rated inline fuse (**not supplied**), which must be fitted to the red positive wire — refer to the fuse ratings below.
2	Red wire (positive) — connects to the power supply's positive terminal.
3	Black wire (negative) — connects to the power supply's negative terminal.

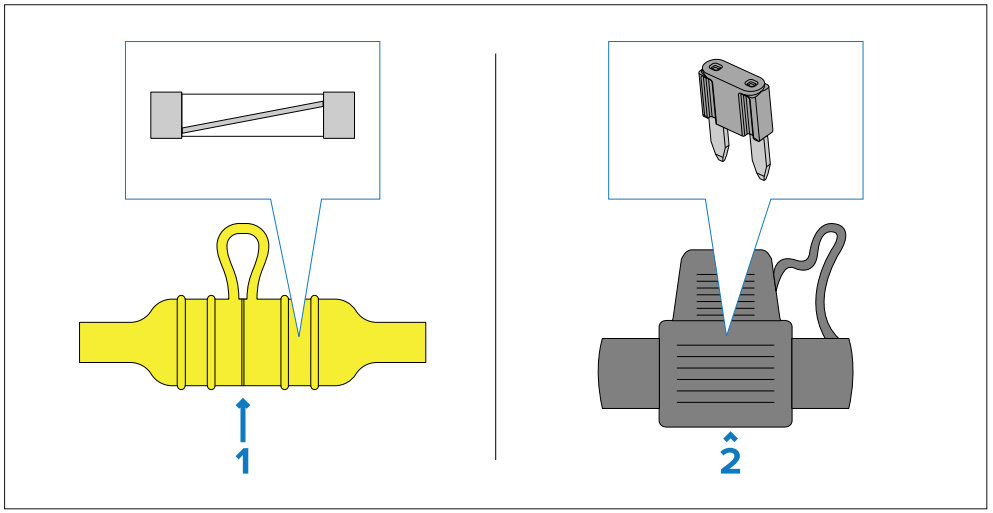
	Description
4	SeaTalk 1 power cable, 1 m (3.28 ft).
5	12 V dc power supply.
6	Instrument display.
7	SeaTalk 1 junction box (D224).
8	SeaTalk 1 (3 pin) to SeaTalk NG adapter cable (A06047).

11.3 Inline fuse requirement

If your product is NOT supplied with an inline fuse (whether separately or fitted to the power cable), you MUST fit a suitably-rated inline fuse to your product's red power wire, housed in a waterproof fuse holder.

The illustration below shows the two main types of inline fuse with waterproof holder, for use in marine electronics installations. Fuses in a variety of ratings are widely available at chandleries and marine electrical retailers.

Select one of the following fuse types to protect your Raymarine product:



1. Waterproof fuse holder containing a "glass"-type inline fuse.
2. Waterproof fuse holder containing a "blade"-type inline fuse.

Fuse ratings:

- *Voltage rating* — must be equal to or greater than the voltage of your vessel's power supply.
- *Current rating* — refer to the *Inline fuse and thermal breaker rating* section in this document.

11.4 Inline fuse and thermal breaker ratings

The SeaTalk 1 network's power supply requires a suitably-rated inline fuse or thermal breaker to be fitted.

Inline fuse rating	Thermal breaker rating
5A	5A (refer to note below)

Note:

The suitable fuse rating for the thermal breaker is dependent on:

1. How many devices you have connected to your SeaTalk 1 network, and;
2. How many devices are sharing the same thermal breaker that your SeaTalk 1 network is connected to.

Raymarine recommends that the power is connected to a SeaTalk 1 system in such a way that the current drawn on each side of the power connection point is equal.

CHAPTER 12: POWER CONNECTIONS (DIRECT CONNECTIONS)

CHAPTER CONTENTS

12.1 Power options

This product must have only **one** power source.

Important:

Before attempting to power your product from a SeaTalk NG backbone or SeaTalk 1 network, please note the following important requirements and considerations:

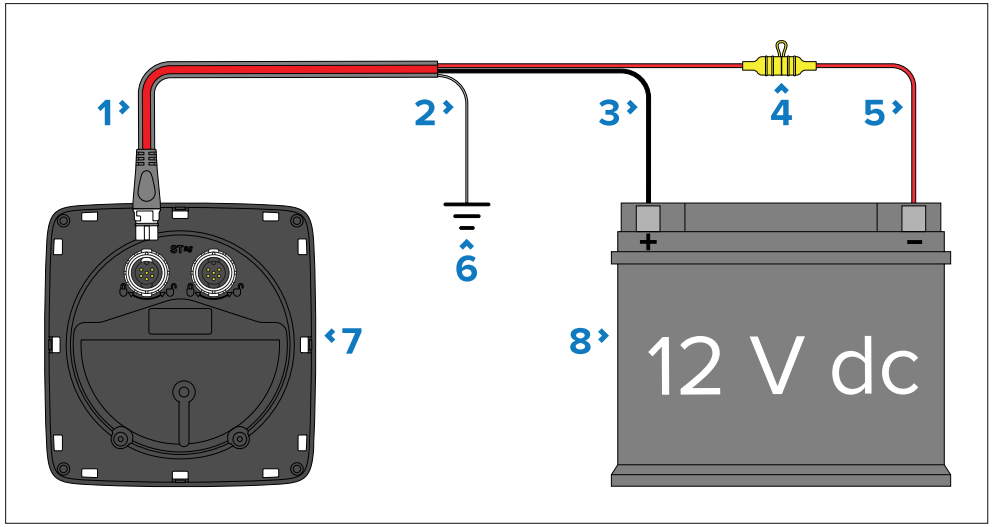
- You must connect only **one** power source.
- If your SeaTalk NG backbone is connected to any other system, ensure that in the combined system you connect only **one** data source for any given data type (for example GNSS (GPS)), unless specified otherwise.
- If any SeaTalk NG and SeaTalk 1 products are connected together, do NOT connect to an NMEA 2000 backbone. This product combination may compromise the integrity of your NMEA 2000 system.
- If you are connecting your product to a SeaTalk NG backbone via the SeaTalk 1 to SeaTalk NG converter (E22158), the converter must ONLY be powered by the SeaTalk NG bus.
- You can connect two separate SeaTalk 1 networks to a SeaTalk NG backbone using different adapter cables and bridging methods (e.g. via an ST70 instrument or a SeaTalk 1 to SeaTalk NG converter), but the SeaTalk 1 networks must NOT be connected together. For more information, refer to the SeaTalk NG Reference Manual (81300).

The following power options are available for your product. The required option is dependent on your system configuration:

1. **SeaTalk NG** power option:
   - Connection to a SeaTalk NG backbone, using the supplied SeaTalk NG spur cable. For more information, refer to: **p.43 — Power connections (**SeaTalk NG **connections)**
2. **SeaTalk 1** power option:
   - Connection to a SeaTalk 1 network, using the separately available SeaTalk 1 (3-pin) to SeaTalk NG adapter cable (A06047). For more information, refer to: **p.51 — Power connections (**SeaTalk 1 **connections)**
3. **Direct connection** power option:
   - Direct connection to a vessel's 12 V dc power supply, using the separately available SeaTalk NG power cable (A06049). For more information, refer to: **p.54 — Power connections (Direct connections)**

12.2 Direct power connection

Your instrument display can be powered directly from a 12 V dc power source, using the separately available SeaTalk NG power cable (A06049).



	Description
1	SeaTalk NG power cable (A06049), available separately.
2	Drain wire — connects to the vessel's RF common ground point (if available), or the battery's negative terminal.
3	Black (negative) wire — connects to the battery or distribution panel negative terminal.
4	Waterproof fuse holder containing a suitably-rated inline fuse (not supplied), which must be fitted to the red positive wire — refer to the fuse ratings below.
5	Red (positive) wire — connects to the battery or distribution panel positive terminal. A waterproof fuse holder containing a suitably-rated inline fuse must be fitted to the red positive wire.

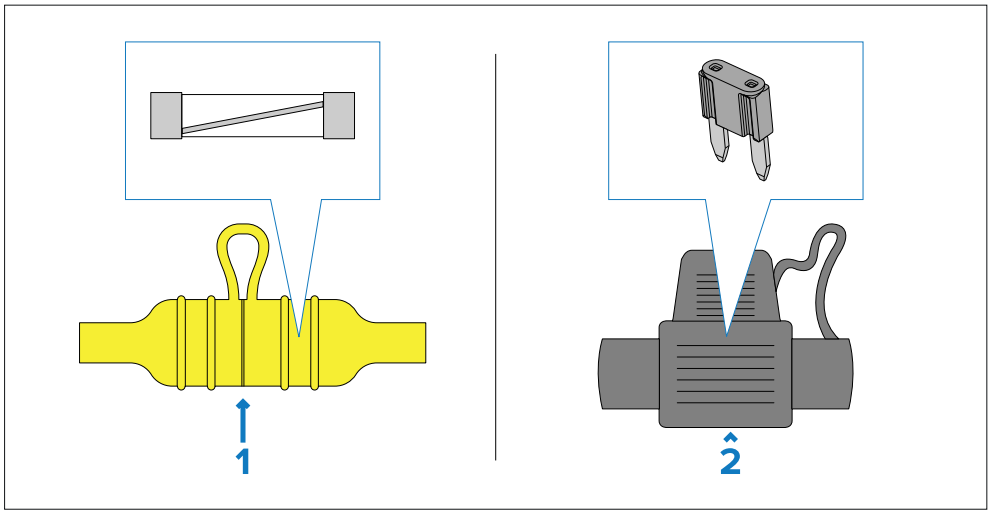
	Description
6	Vessel's RF common ground point.
7	i50-Series.
8	12 V dc power supply

12.3 Inline fuse requirement

If your product is NOT supplied with an inline fuse (whether separately or fitted to the power cable), you MUST fit a suitably-rated inline fuse to your product's red power wire, housed in a waterproof fuse holder.

The illustration below shows the two main types of inline fuse with waterproof holder, for use in marine electronics installations. Fuses in a variety of ratings are widely available at chandleries and marine electrical retailers.

Select one of the following fuse types to protect your Raymarine product:



1. Waterproof fuse holder containing a "glass"-type inline fuse.
2. Waterproof fuse holder containing a "blade"-type inline fuse.

Fuse ratings:

- *Voltage rating* — must be equal to or greater than the voltage of your vessel's power supply.
- *Current rating* — refer to the *Inline fuse and thermal breaker rating* section in this document.

12.4 Inline fuse and thermal breaker ratings

The following inline fuse and thermal breaker ratings apply to your product:

Inline fuse rating	Thermal breaker rating
5A	5A

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 Raymarine dealer.

12.5 Power distribution

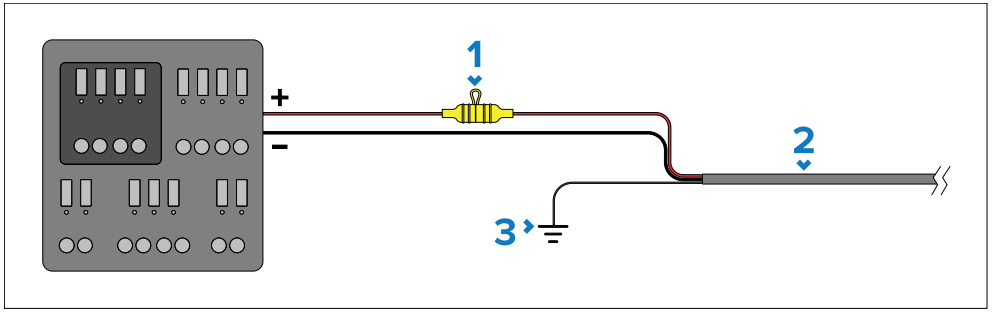
Recommendations and best practice for the power connection of products supplied with a drain wire as part of the supplied power cable.

- 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:

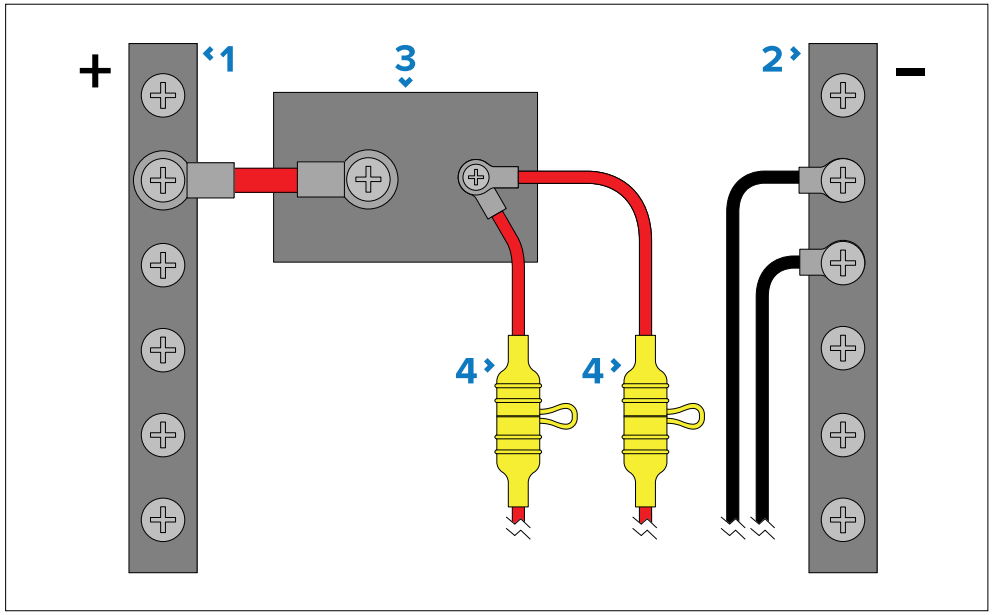
- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for 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)



	Description
1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: *Inline fuse and thermal breaker ratings*.
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 mm^2) 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.

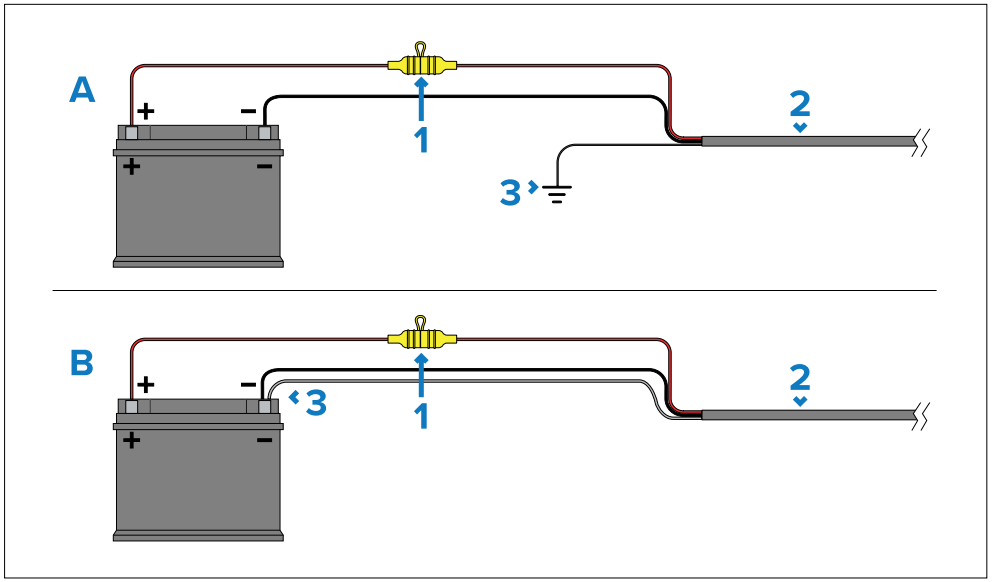


	Description
1	Positive (+) bar
2	Negative (-) bar
3	Circuit breaker
4	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: *Inline fuse and thermal breaker ratings*.

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.

	Description
1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: *Inline fuse and thermal breaker ratings*.
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
- ISO 13297: Small craft — Electrical systems — Alternating and direct current installations
- ISO 10133: Small craft — Electrical systems — Extra-low-voltage d.c. installations
- ABYC E-11 AC & DC Electrical Systems on Boats
- ABYC A-31 Battery chargers and Inverters
- ABYC TE-4 Lightning Protection

Warning: 12 Volt dc only

This product must ONLY be connected to a 12 V dc power source.

Warning: Product grounding

Before applying power to this product, it MUST be correctly grounded, in accordance with the instructions provided.

Warning: Positive ground systems

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

12.6 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)
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.

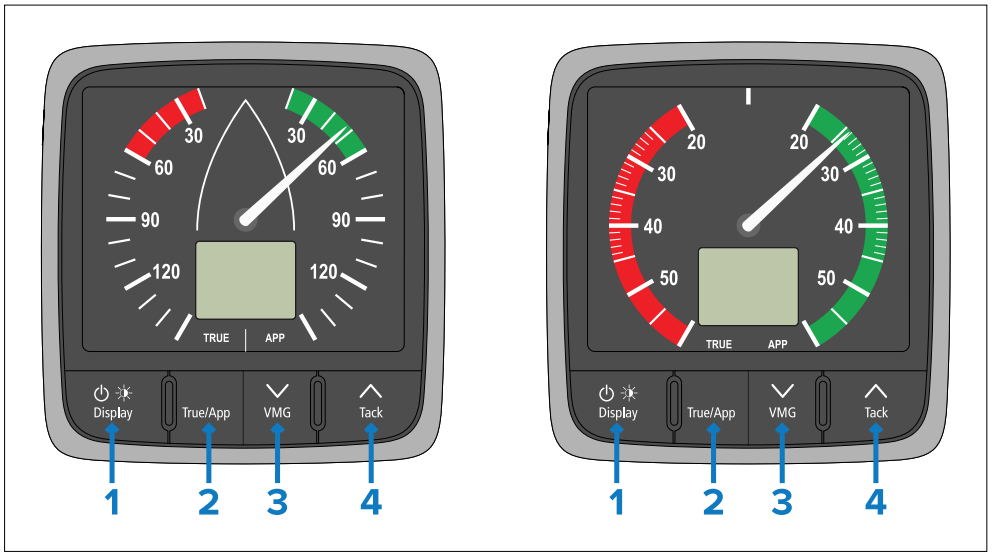
Important:

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).

CHAPTER 13: GETTING STARTED

CHAPTER CONTENTS

13.1 Controls



1	*[Display / Power]* — Select to access Depth information on the digital display, adjust backlight, adjust contrast and power the display On and Off.
2	*[True / App]* — Switch between true and apparent wind direction.
3	*[VMG / Down]* — Display Velocity Made Good. Use to move down through menu options or to decrease numeric values.
4	*[Tack / Up]* — Tack heading. Use to move up through menu options or to increase numeric values.

13.2 Switching on the display

The display will automatically switch on when power is applied to the SeaTalk NG backbone, unless the display has previously been switched off using the *[Power]* button. If the *[Power]* button has been used to switch off the display then it must be used to switch the display back on again.

With the display powered but switched off:

1. Press and hold the *[Power]* button until the screen turns on (approximately 2 seconds).

13.3 Switching off the display

The display can be switched off using the *[Power]* button.

1. Press and hold the *[Power]* button until the count down timer reaches zero and the screen turns off.

Note:

When switched off, the display may still draw a small amount of power from the battery, if this is a concern unplug the SeaTalk NG power supply or switch off at the breaker.

13.4 Calibration alert

If the *[CAL]* legend on the digital display flashes for the first 30 seconds after power up, refer to the following section to calibrate your unit:
p.63 — Calibration

13.5 Data master

Where a system contains more than one unit capable of displaying a data type, the unit physically connected to the transducer must be set as the data *master* and any other units set as a *repeater*.

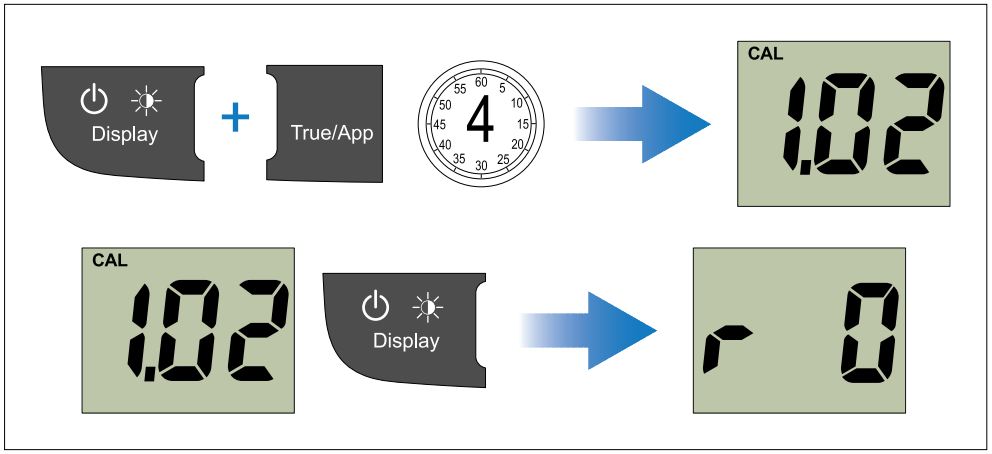
Checking the software version and instrument status

You can check the instrument display's software version and status by following the steps below.

Note:

The i60 Close-Hauled Wind instrument is a repeater display. You cannot check or change the instrument status of an i60 Close-Hauled Wind display.

During normal operation, from the software version page:



1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 4 seconds , until the *[Software Version]* page is displayed.
2. Press the *[Display]* button to show the *[Instrument Status]* page.

   The instrument status is displayed (*[r 0]* = master and *[r 1]* = repeater).

Note:

The *[Software Version]* and *[Instrument Status]* pages are temporary pages and will time-out automatically after 8 seconds of inactivity.

CHAPTER 14: CALIBRATION

CHAPTER CONTENTS

14.1 Calibration

Before first use the unit must be calibrated to ensure optimum performance.

The calibration settings are grouped into 3 categories: **User Calibration**, **Intermediate Calibration** and **Dealer Calibration**.

Access to the *[User Calibration]* menu can be locked from the *[Dealer Calibration]* menu.

14.2 User calibration

The i60-Series Close-Hauled Wind instrument display is a repeater display and as such does not require calibration, the steps below apply to the calibration of the i60 Wind instrument only.

[User Calibration] options include:

- *Wind Angle Offset* — Assigns an offset to the wind angle readings.
- *Units for Wind speed readings* — Assigns the unit of measure used for wind speed related readings.

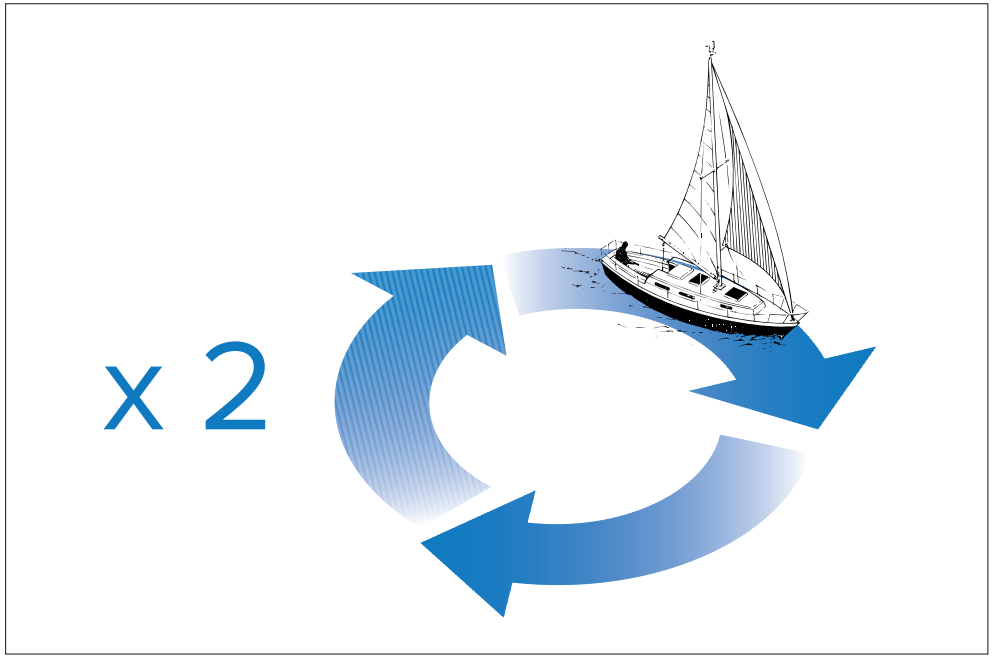
Automatic Linearization

The wind transducer can linearize itself automatically under certain conditions.

For *[Automatic Linearization]* to be performed *[CAL]* must be flashing on the digital display. *[CAL]* is displayed for approximately 30 seconds after power on under the following conditions:

- At first power on, after installation.
- At power on, after a factory reset.

To perform the automatic linearization the vessel will need to be underway, with sufficient space to turn in large circles unhindered. The wind speed must be sufficient to hold the vane to wind whilst the vessel is turning. The vessel must be turned slowly through at least 2 complete circles.

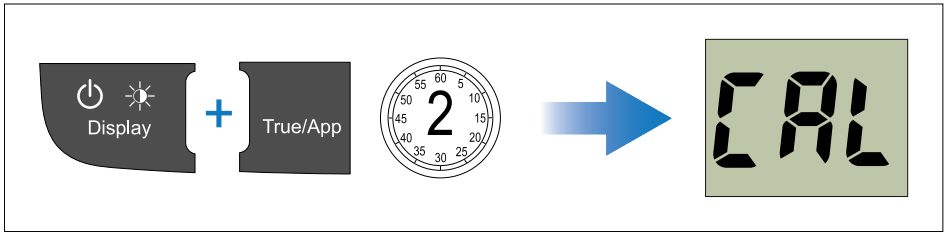


This procedure automatically linearizes the wind vane. A successful linearization is indicated by the digital display flashing and a buzzer sounding three beeps.

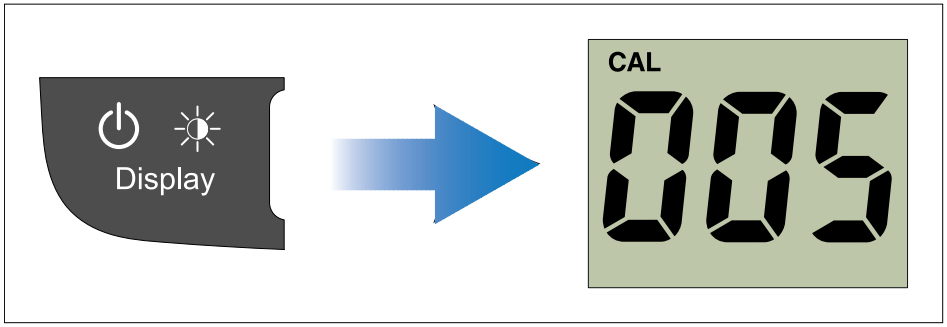
Aligning the wind transducer

During normal operation:

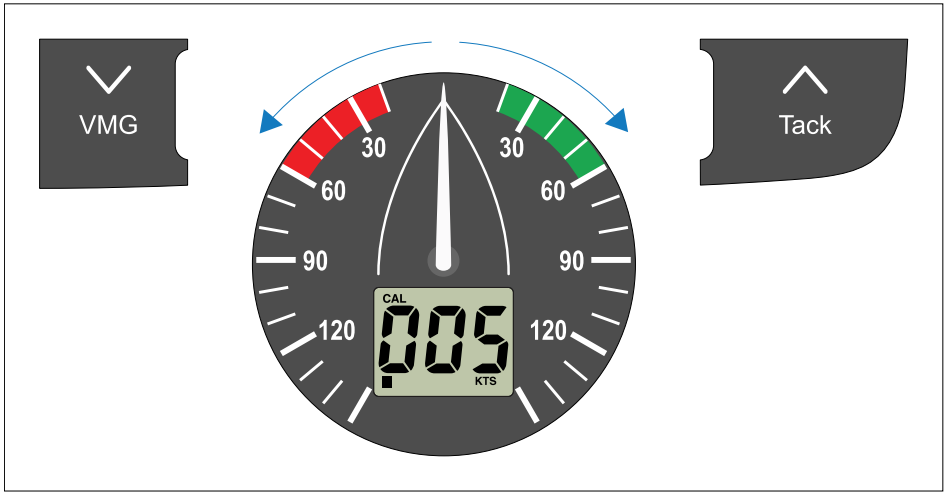
1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 2 seconds, until the *[User Calibration]* page is displayed.



2. Press the *[Display]* button until the *[Wind Angle Offset]* page is displayed (1 press from the *[User Calibration]* page).



3. Sail your vessel directly into the wind and adjust the analog pointer to zero, using the *[VMG]* and *[Tack]* buttons.



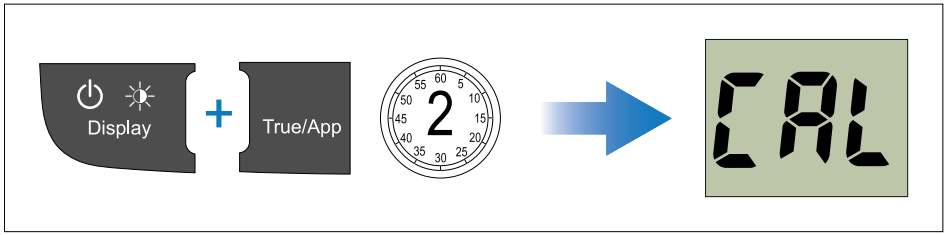
The *[VMG]* button will decrease the current value and the *[Tack]* button will increase the current value. As you do this, the wind angle offset shows the amount of correction you have applied.

4. To exit the *[User Calibration Menu]* at any time press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 2 seconds.

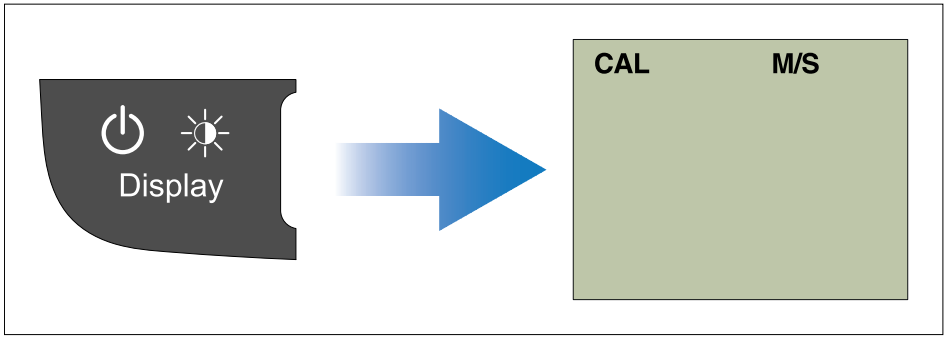
Selecting the unit of measure for wind speed readings

During normal operation:

1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 2 seconds, until the *[User Calibration]* page is displayed.



2. Press the *[Display]* button until the *[Wind Speed Units]* page is displayed (2 presses from the *[User Calibration]* page).



3. Use the *[VMG]* or *[Tack]* buttons to select the required unit of measure for wind speed readings.

   The available units of measure for wind speed are:

   - *KTS (default)* — Knots
   - *M/S* — Meters per second

4. To exit the *[User Calibration]* pages at any time press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 2 seconds.

14.3 Intermediate calibration

[Intermediate Calibration] allows you to:

- Check instrument software version.

- (1) Check the instrument status (either master or repeater).

Note:

(1) Not available on i60 Close-Hauled Wind.

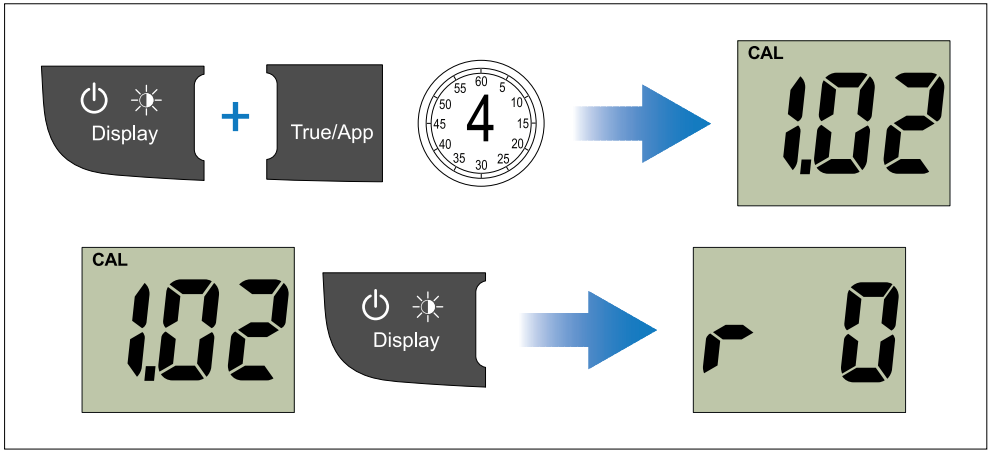
Checking the software version and instrument status

You can check the instrument display's software version and status by following the steps below.

Note:

The i60 Close-Hauled Wind instrument is a repeater display. You cannot check or change the instrument status of an i60 Close-Hauled Wind display.

During normal operation, from the software version page:



1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 4 seconds , until the *[Software Version]* page is displayed.
2. Press the *[Display]* button to show the *[Instrument Status]* page.
   The instrument status is displayed (*[r 0]* = master and *[r 1]* = repeater).

Note:

The *[Software Version]* and *[Instrument Status]* pages are temporary pages and will time-out automatically after 8 seconds of inactivity.

14.4 Dealer calibration

The *[Dealer Calibration]* procedures include:

- *[User Calibration]* menu access *[On]* and *[Off]*.
- Display Response for wind angle readings — Dictates the rate at which the instrument display responds to changes in wind angle data.
- Display Response for wind speed readings — Dictates the rate at which the instrument display responds to changes in wind speed data.
- Display Response for VMG readings — Dictates the rate at which the instrument display responds to changes in VMG data.
- (1) *[Boat Show Mode] On* and *Off (default)* (*[Boat Show Mode]* is only available on displays set as repeaters).
- Reset to factory defaults.

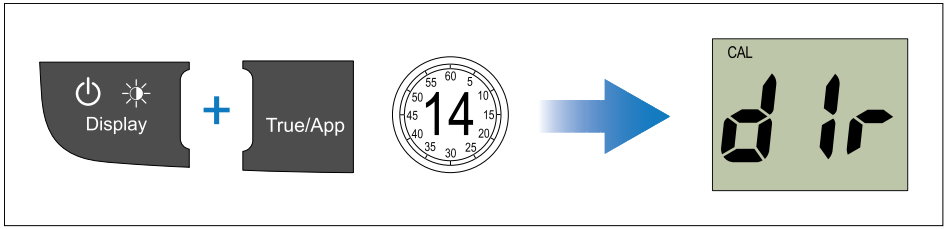
Note:

(1) Not available on the i60 Close-Hauled Wind instrument.

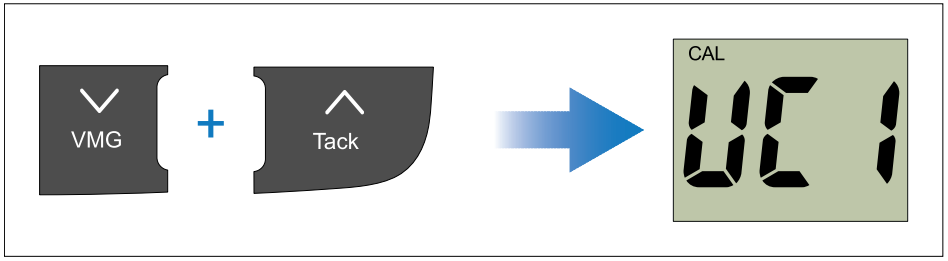
Setting access to the User Calibration Menu

During normal operation:

1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 14 seconds, until the *[Dealer Calibration]* page is displayed.



2. Press the *[VMG]* and *[Tack]* buttons at the same time to display the *[User Calibration Menu Access]* page.



3. Use the *[VMG]* or *[Tack]* buttons to switch access to the *[User Calibration Menu] On* and *Off*.
   - *UC1 (default)* — *[User Calibration]* menu enabled.
   - *UC0* — *[User Calibration]* menu disabled.

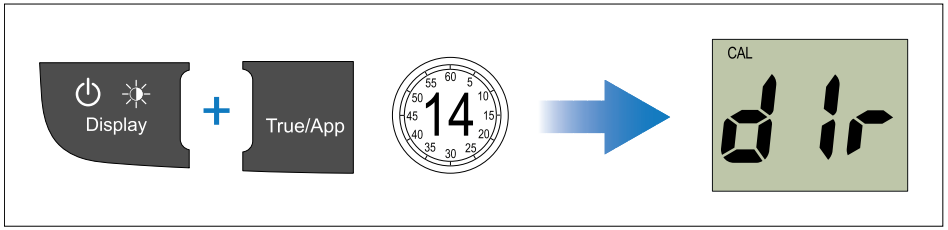
Note:

To exit the *[Dealer Calibration]* pages at any time, press and hold the *[Display]* and *[True/App]* buttons at the same time for approximately 2 seconds.

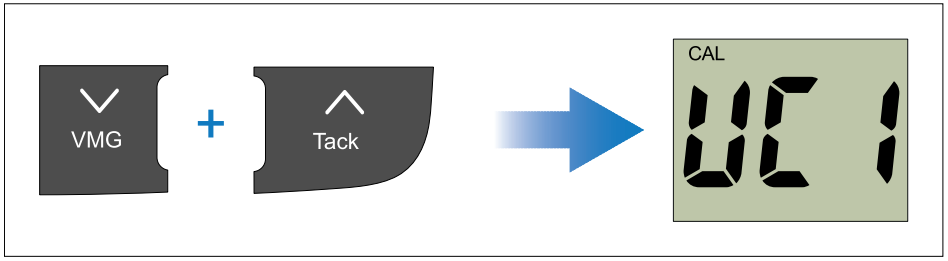
Setting the response delay for Wind Angle readings

During normal operation:

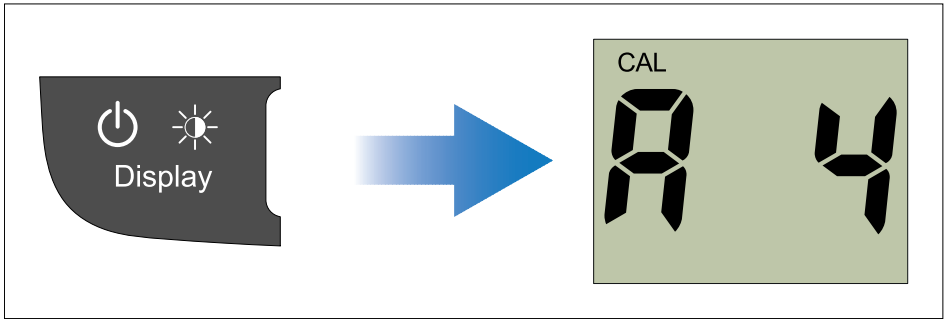
1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 14 seconds, until the *[Dealer Calibration]* page is displayed.



2. Press the *[VMG]* and *[Tack]* buttons at the same time to display the *[User Calibration Menu Access]* page.



3. Press the *[Display]* button until the *[Wind Angle Response]* page is displayed (1 press from the *[User Calibration Access Menu]* page).



4. Use the *[VMG]* and *[Tack]* buttons to set the required level for *[Wind Angle Response]*.

   The default level is 12. The levels available are 1 to 15 with level 1 being the slowest update rate and level 15 the quickest.

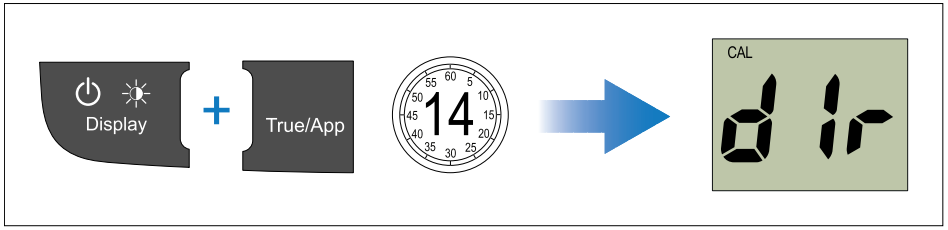
Note:

To exit the *[Dealer Calibration]* pages at any time, press and hold the *[Display]* and *[True/App]* buttons at the same time for approximately 2 seconds.

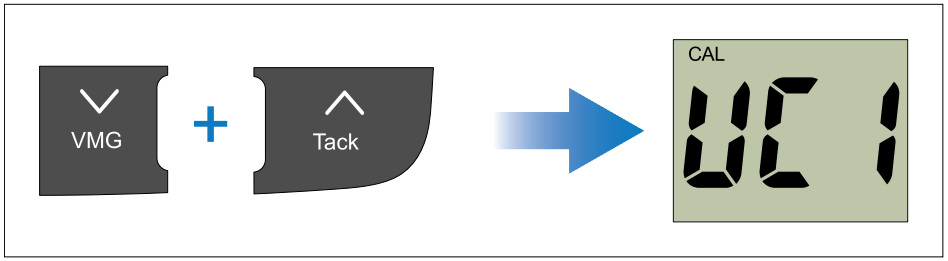
Setting the response delay for Wind Speed readings

During normal operation:

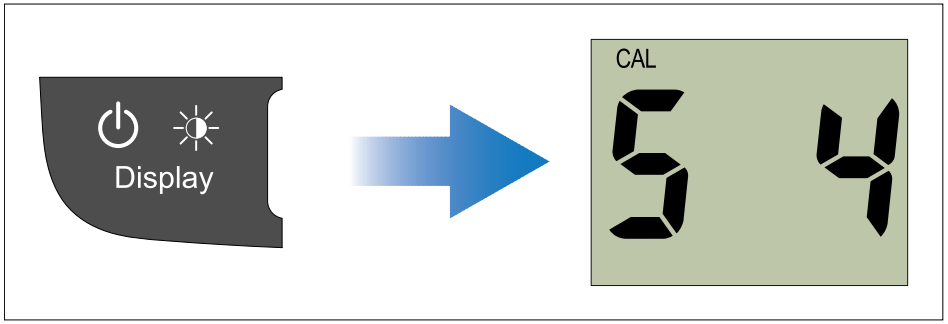
1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 14 seconds, until the *[Dealer Calibration]* page is displayed.



2. Press the *[VMG]* and *[Tack]* buttons at the same time to display the *[User Calibration Menu Access]* page.



3. Press the *[Display]* button until the *[Wind Speed Response]* page is displayed (2 presses from the *[User Calibration Access Menu]* page).



4. Use the *[VMG]* and *[Tack]* buttons to set the required level for *[Wind Speed Response]*.

   The default level is 12. The levels available are 1 to 15 with level 1 being the slowest update rate and level 15 the quickest.

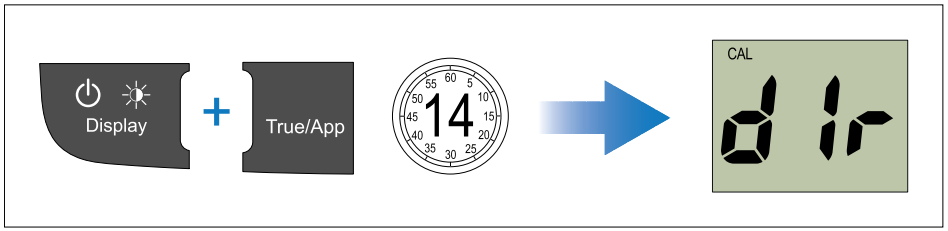
Note:

To exit the *[Dealer Calibration]* pages at any time, press and hold the *[Display]* and *[True/App]* buttons at the same time for approximately 2 seconds.

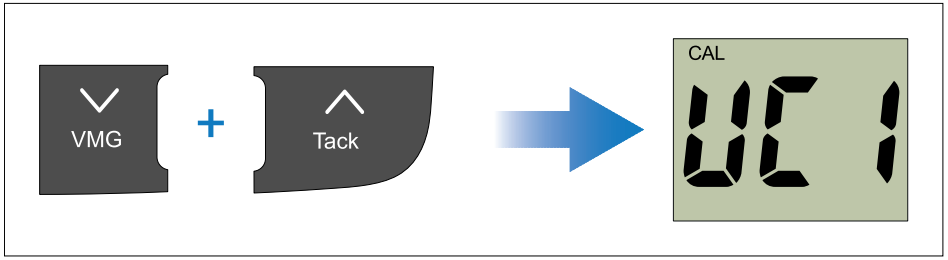
Setting the response delay for VMG readings

During normal operation:

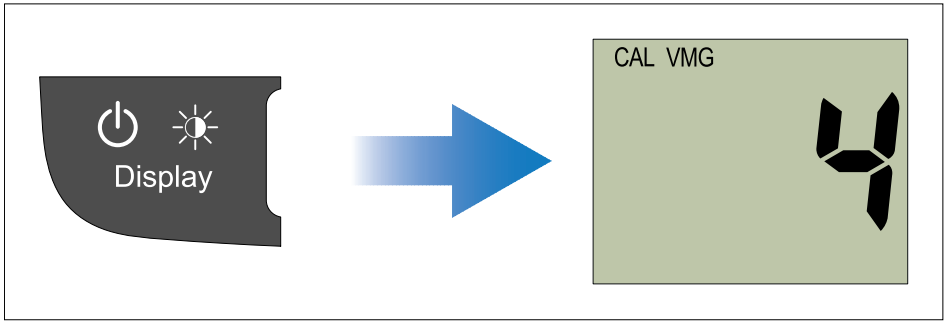
1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 14 seconds, until the *[Dealer Calibration]* page is displayed.



2. Press the *[VMG]* and *[Tack]* buttons at the same time to display the *[User Calibration Menu Access]* page.



3. Press the *[Display]* button until the *[VMG Response]* page is displayed (3 presses from *[User Calibration Menu Access]* page).



4. Use the *[VMG]* or *[Tack]* buttons to set the required level for *[VMG response]*.

   The default level is 12. The levels available are 1 to 15 with level 1 being the slowest update rate and level 15 the quickest.

Note:

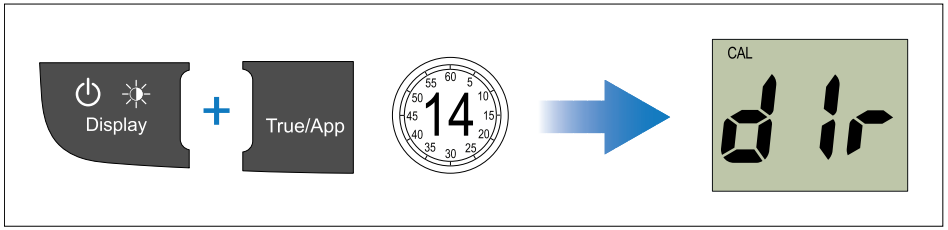
To exit the *[Dealer Calibration]* pages at any time, press and hold the *[Display]* and *[True/App]* buttons at the same time for approximately 2 seconds.

Setting the wind speed Calibration Factor

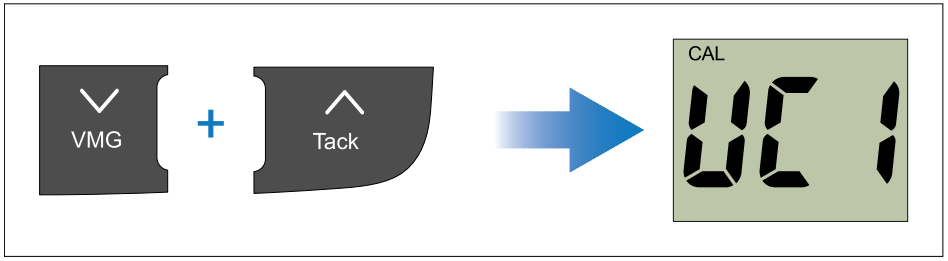
If you find that your wind speed readings deviate from a referenced wind speed source, then a *[Calibration Factor]* can be applied to reduce the deviation.

During normal operation:

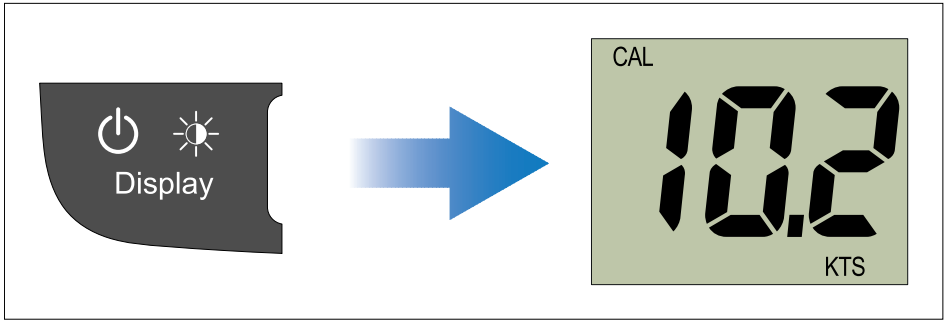
1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 14 seconds, until the *[Dealer Calibration]* page is displayed.



2. Press the *[VMG]* and *[Tack]* buttons at the same time to display the *[User Calibration Menu Access]* page.



3. Press the *[Display]* button until the *[Current Wind Speed]* page is displayed (4 presses from the *[User Calibration Menu Access]* page).



4. Use the *[VMG]* and *[Tack]* buttons to adjust the *[Calibration Factor]* to the desired value.

   When the [VMG] and [Tack] buttons are not being pressed the screen will revert back to [Current Wind Speed] page to enable you to see what change the [Calibration Factor] has on the display's wind speed reading.

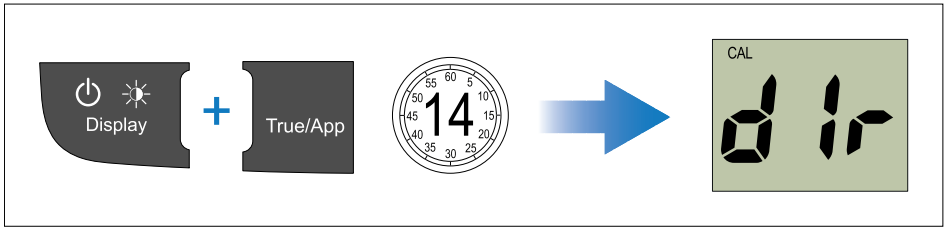
Note:

To exit the *[Dealer Calibration]* pages at any time press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 2 seconds.

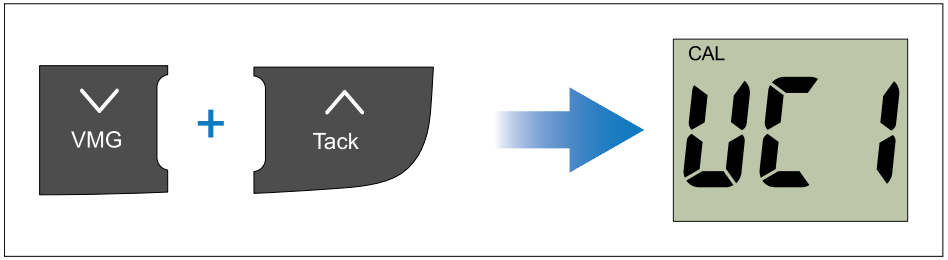
Enabling and disabling Boat Show Mode

During normal operation:

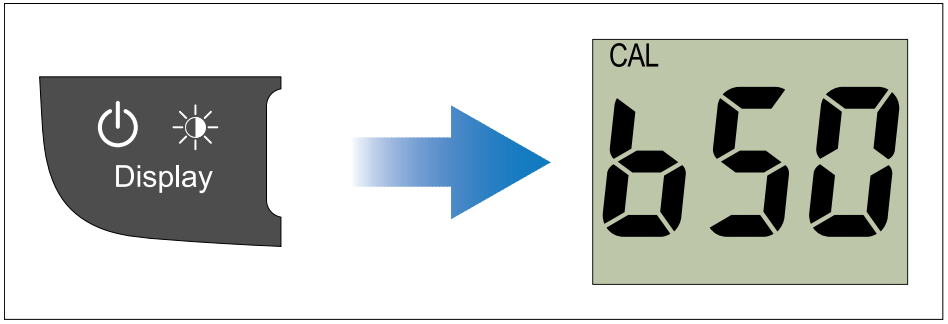
1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 14 seconds, until the *[Dealer Calibration]* page is displayed.



2. Press the *[VMG]* and *[Tack]* buttons at the same time to display the *[User Calibration Menu Access]* page.



3. Press the *[Display]* button until the *[Boat Show Mode]* page is displayed (5 presses from the *[User Calibration Menu Access]* page).



4. Use the *[VMG]* or *[Tack]* buttons to switch the *[Boat Show Mode] On* and *Off (default)*.

   Selecting *On* will put the display into *[Boat Show Mode]*.

Note:

[Boat Show Mode] is only suitable for demonstration purposes and should NOT be used whilst your vessel is in use.

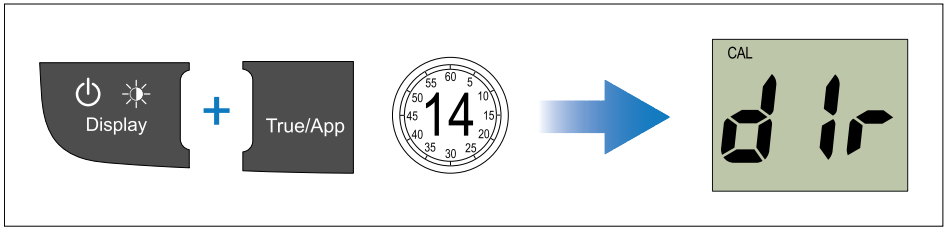
Note:

To exit the *[Dealer Calibration]* pages at any time press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 2 seconds.

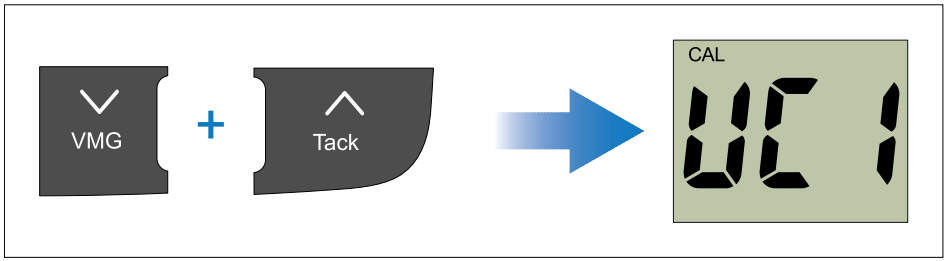
Resetting the display to factory defaults

During normal operation:

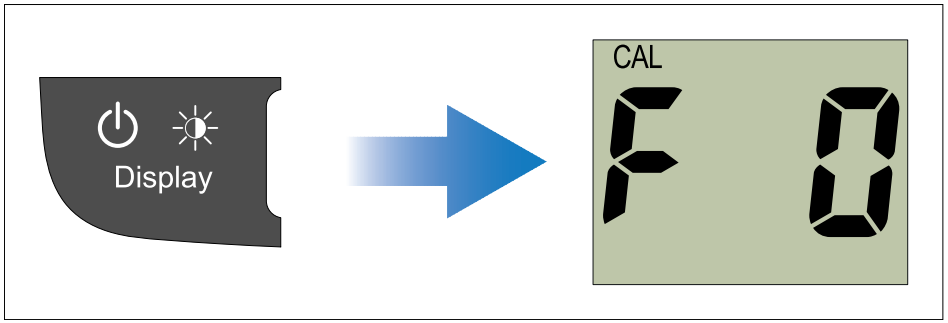
1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 14 seconds, until the *[Dealer Calibration]* page is displayed.



2. Press the *[VMG]* and *[Tack]* buttons at the same time to display the *[User Calibration Menu Access]* page.



3. Press the *[Display]* button until the *[Factory Reset]* page is displayed (5 presses from the *[User Calibration Menu Access]* page).



4. To reset the display to factory default settings:
   i. Use the *[VMG]* or *[Tack]* buttons to change the reset option to *F 1 (default)*.
   ii. Press the *[Display]* button to reset your display to factory default settings.

Note:

To exit the *[Dealer Calibration]* pages at any time press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 2 seconds.

CHAPTER 15: USING YOUR DISPLAY

CHAPTER CONTENTS

15.1 Pages

The pages available depend on the display variant and are shown in the table below:

i60 Wind	i60 Close-Hauled Wind
[Wind speed]	*[Wind speed]*
(1) *[Beaufort wind speed]*	(1) *[Maximum wind speed]*
(1) *[Maximum wind speed]*	*[VMG]*
(1) *[Maximum true wind speed alarm]*	*[Tack]*
(1) *[Low true wind speed alarm]*	
(1) *[High apparent wind angle alarm]*	
(1) *[Low apparent wind angle alarm]*	
[VMG]	
[Tack]	

Note:

(1) These pages are temporary pages and will time-out to the previous permanent page after 8 seconds of inactivity.

Changing pages

During normal operation:

1. Press either the *[Display]* button to cycle through the wind pages.
2. Press the *[VMG]* button to display VMG information.
3. Press the *[Tack]* button to display tack information.

15.2 i60 Wind operation

When connected to a relevant Rotavecta or wind vane transducer, the i60 provides:

- True and apparent wind direction and speed. Wind speed is displayed either in knots, meters per second or as Beaufort scale values.
- Velocity Made Good (VMG) information, when vessel speed information is available on the network.
- Tack angle, when heading information is available on the network.
- Maximum wind speed.
- High and low true wind speed alarms.
- High and low apparent wind angle alarms.

Note:

Alarms are only available on the i60 Wind instrument, when set as a master unit. No alarms are available on the i60 Close-Hauled Wind instrument.

Display information

The i60 instrument's display consists of an analogue pointer and digital display.

Analogue display

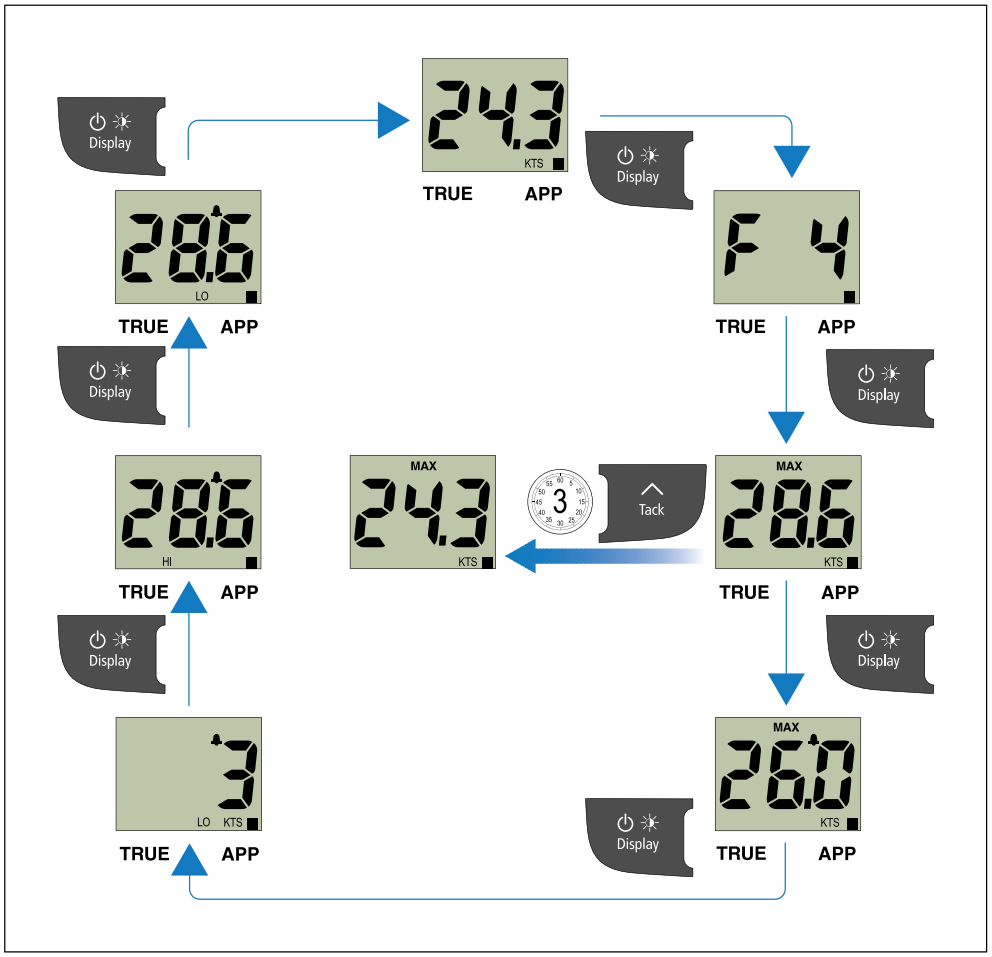
The analogue display pointer shows either true or apparent wind direction (depending on setting).

Digital display

The digital display LCD shows the following wind information:

- Beaufort wind speed.
- True / apparent wind speed.
- Velocity made good (VMG).
- Tack heading.
- Maximum wind speed.
- Wind alarm data.

Using the display button



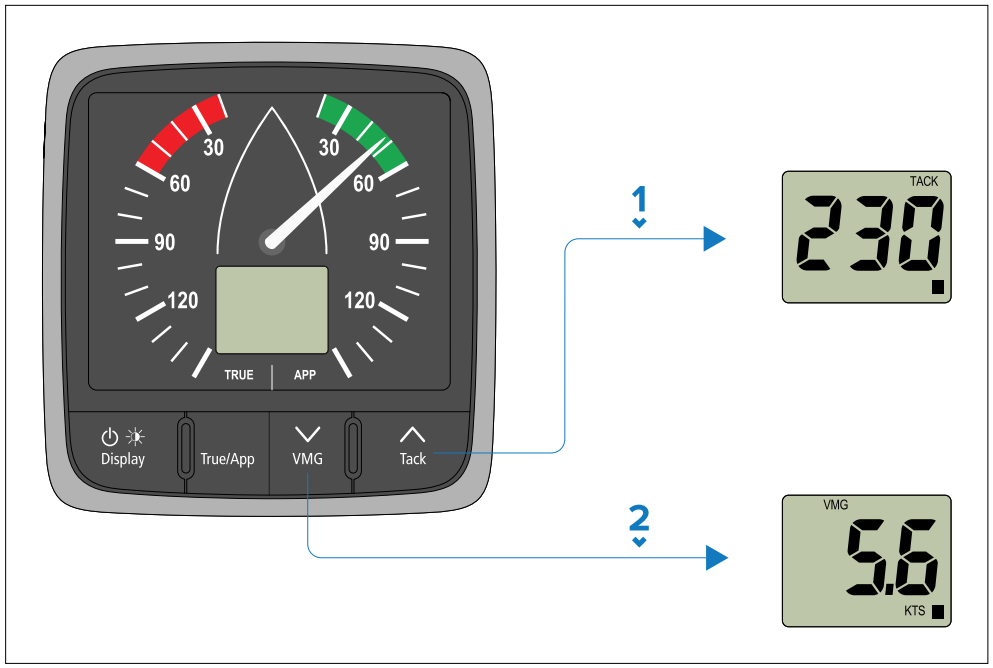
During normal operation:

1. Use the *[Display]* button to cycle through the available pages.
2. Press and hold the *[Tack]* button for 3 seconds to reset the maximum wind speed to the current wind speed values.

Note:

All pages except for the *[Current wind speed]* page are temporary and will time-out after 8 seconds.

Using Tack and VMG buttons



During normal operation:

1. Press the *[VMG]* button to show the *[VMG]* page on the digital display.

Note:

[VMG] information is only available when vessel speed information is available.

2. Press the *[Tack]* button to show the *[Tack]* page on the digital display.

Note:

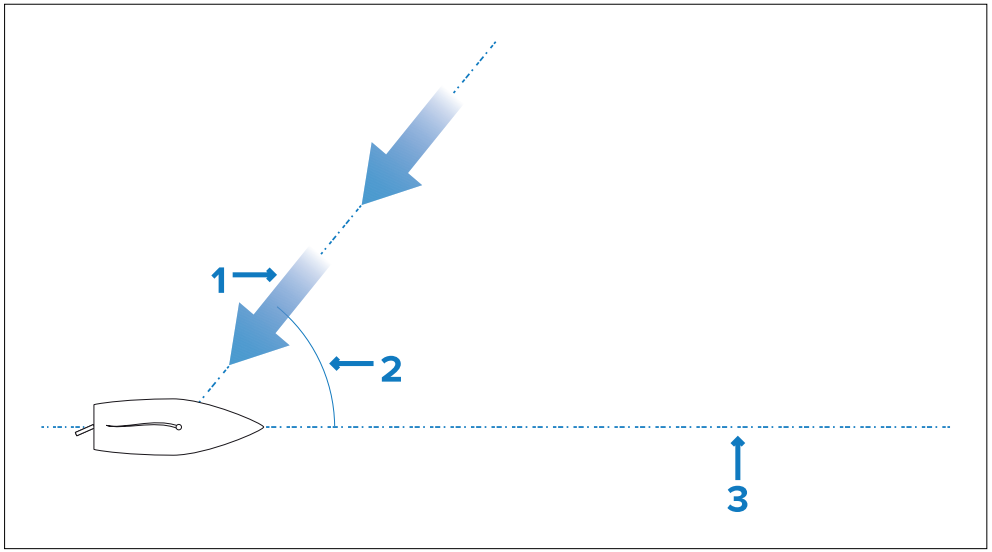
[Tack] information is only available when vessel heading and speed information is available.

True and Apparent wind

Wind angle, direction and speed are reported as either ‘True’ or ‘Apparent’ wind measurements.

- **True wind** — True wind measurements assume the vessel is motionless in the water. True wind readings are calculated using Apparent Wind and STW values.
- **Apparent wind** — Apparent wind is the wind felt on deck when the vessel is in motion which is affected by vessel angle and speed.

With the vessel tied along side, True and Apparent wind readings should be identical.



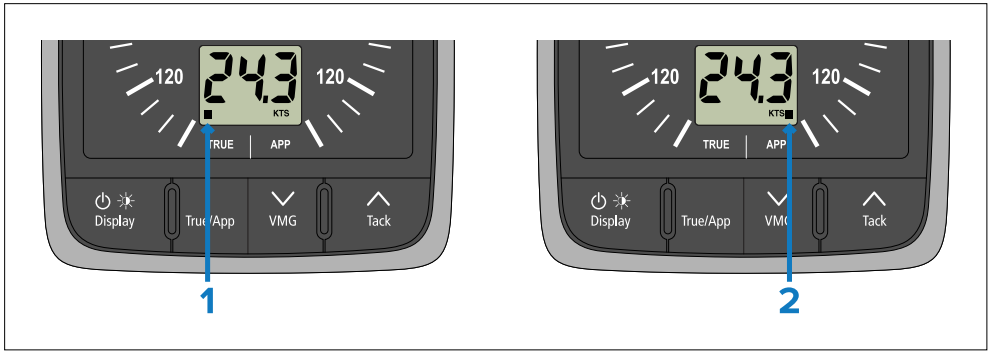
1. Wind direction (specified using compass points):
   - **True Wind Direction (TWD)** — The compass direction that wind would appear to be blowing across the vessel if it was not making any way.
   - **Apparent Wind Direction (AWD)** — The compass direction that wind would appear to be blowing across the vessel when it is making way.
2. Wind angle (specified in degrees):
   - **True Wind Angle (TWA)** — The angle between the TWD and the center line of the vessel.
   - **Apparent Wind Angle (AWA)** — The angle between the AWD and the center line of the vessel.
3. Wind speed (specified in the chosen speed units):
   - **True Wind Speed (TWS)** — The speed that the wind would appear to be blowing across the vessel if it was not making any way.
   - **Apparent Wind Speed (AWS)** — The speed that the wind would appear to be blowing across the vessel when it is making way.

Note:

True Wind readings require Speed Through Water (STW) data to be available.

Switching between true and apparent wind information

You can switch the unit between displaying True or Apparent wind information.



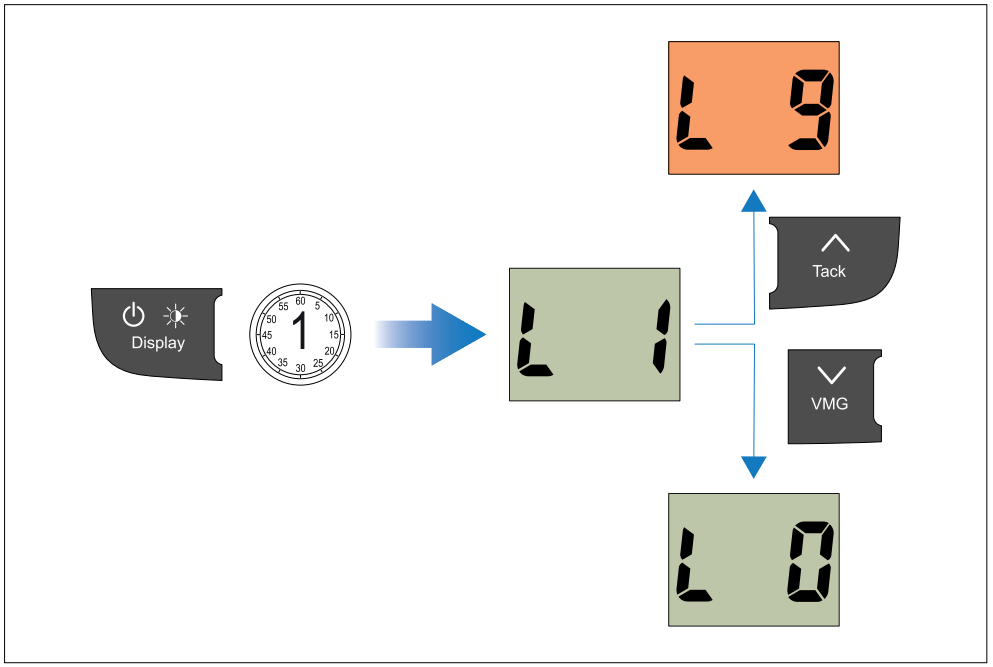
During normal operation:

1. Press the *[True / App]* button to switch between true or apparent wind information.
   - In *[True]* mode the indicator shown in 1 above will be displayed.
   - In *[Apparent]* mode the indicator shown in 2 above will be displayed.

15.3 Illumination

Adjusting the backlight level

The backlighting can be adjusted using the power button.



During normal operation:

1. Press and hold the *[Display]* button for approximately 1 second until the backlight page is displayed.

   [L] and the current illumination level is displayed.
2. Use the *[VMG]* button to decrease the illumination level.
3. Use the *[Tack]* button to increase the illumination level.

The illumination level can be adjusted from *0 (default)* (Off) to *9* (Max).

Note:

The backlight page will time-out after 8 seconds of inactivity.

Adjusting the contrast

The contrast level can be accessed using the *[Display]* button.

During normal operation:

1. Press and hold the *[Display]* button for approximately 4 seconds to display the *[Contrast]* page.

   C is displayed on-screen and the current contrast level.
2. Use the *[Display]* button to cycle through the available contrast levels.

The contrast level can be adjusted from level *0 (default)* to *3*.

Note:

The contrast page will time-out after 8 seconds of inactivity.

Group illumination

Group illumination is used to synchronizes and control the backlighting level of multiple units assigned to the same group.

The unit can participate in shared illumination via a SeaTalk 1 network or group illumination via a SeaTalk NG network.

When connected on a SeaTalk 1 network all compatible units will share their backlight level (when 1 unit's backlighting level is adjusted all other units backlight level will also change).

When connected on a SeaTalk NG network the unit can participate in group illumination and be assigned to a group of units which will share their backlighting levels. Available groups are as follows:

- *OFF (default)* — Group illumination is switched off
- *HL1* — Helm 1
- *HL2* — Helm 2
- *CPt* — Cockpit
- *FLY* — Flybridge
- *NST* — Mast
- *GP1* to *GP5* — User defined groups

When assigned to a group, when the backlighting of 1 unit is adjusted the backlighting level of all units assigned to the same group will also change.

Assigning the unit to a group

To assign the unit as part of a group so that it can participate in group illumination follow the steps below.

During normal operation:

1. Press and hold the *[Display]* and *[True / App]* buttons at the same time for approximately 6 seconds, until the *[Group Illumination]* page is displayed.

   GrP is displayed on-screen

Note:

The *[Group Illumination]* page is a temporary page and will time-out to the previous page after 8 seconds.

2. Press the *[Display]* button to display the current group illumination setting.
3. Press the *[VMG]* and *[Tack]* buttons at the same time to change the current setting.

   The current group setting will flash.
4. Use the *[Tack]* button to cycle upwards through the list of available groups.
5. Use the *[VMG]* button to cycle back down through the list.
6. Press the *[VMG]* and *[Tack]* buttons at the same time to assign the display to the selected group.

   The group setting will stop flashing.
7. Press and hold the *[Display]* and *[True / App]* buttons a the same time for approximately 2 seconds to return to normal operation.

CHAPTER 16: ALARMS

CHAPTER CONTENTS

16.1 Alarms

Alarms alert you to a situation or hazard requiring your attention.

You can set up alarms to alert you to certain conditions.

Alarms are raised by system functions, and also external equipment connected to your display.

When an alarm event occurs an audible and visual alarm is activated which indicates the alarm state.

Alarm thresholds can be configured from the relevant alarm page / menu.

Instrument alarms

Alarms available on the i60 Wind are listed below.

- High true wind speed.
- Low true wind speed.
- High apparent wind angle.
- Low apparent wind angle.

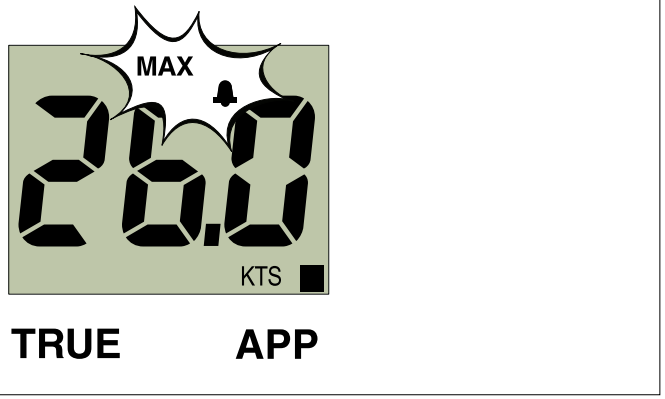
Note:

Alarms are not available on the i60 Close-Hauled Wind.

Alarm indications

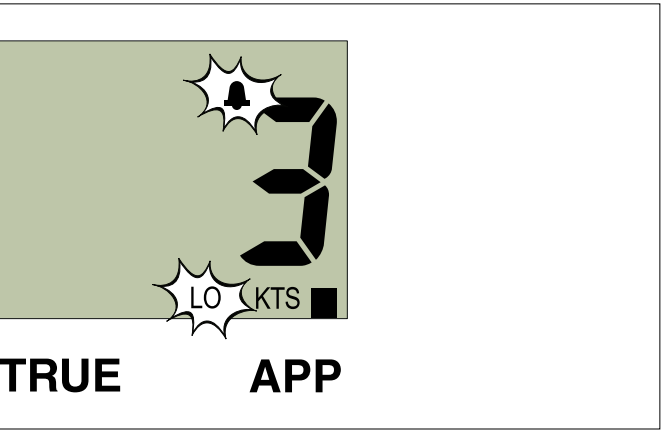
An alarm event is indicated by both audible and visual warnings.

High true wind speed alarm



The *[High true wind speed alarm]* sounds when the true wind speed is equal to or more than the *[High true wind speed threshold]*. The alarm sounds until silenced manually.

Low true wind speed alarm



The *[Low true wind speed alarm]* sounds when the true wind speed is equal to or less than the *[Low true wind speed threshold]*. The alarm sounds until silenced manually.

High apparent wind angle alarm

The *[High apparent wind angle alarm]* sounds when the apparent wind angle equal to or more than the *[High apparent wind angle threshold]*. The alarm sounds until silenced manually.

Low apparent wind angle alarm

The *[Low apparent wind angle alarm]* sounds when the apparent wind angle is equal to or less than the *[Low apparent wind angle threshold]*. The alarm sounds until silenced manually.

Silencing alarms

1. Press any button to silence an active alarm.

Enabling / Disabling alarms

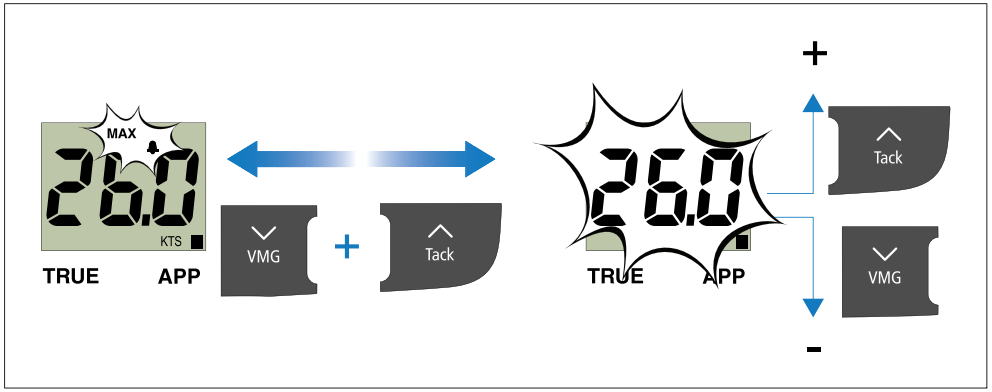
Alarms can be enabled or disabled at any time.

With the relevant alarm page displayed:

1. Press and hold the *[Tack]* button for 1 second to switch the alarm *on* or *off*.
   When the alarm is on the alarm threshold is displayed.

Setting alarm thresholds

You can adjust the threshold at which alarms are triggered by following the steps below.



With the relevant alarm page displayed:

1. Press the *[VMG]* and *[Tack]* buttons at the same time to enter adjust mode.
   The current threshold will start to flash.
2. Use the *[Tack]* button to increase the alarm threshold.
3. Use the *[VMG]* button to decrease the alarm threshold.
4. Press the *[VMG]* and *[Tack]* buttons at the same time to save the new alarm threshold and exit adjust mode.

Note:

The illustration above is an example depicting setting the Maximum true wind speed alarm threshold.

CHAPTER 17: MAINTAINING YOUR DISPLAY

CHAPTER CONTENTS

17.1 Service and maintenance

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

> **Caution: Condensation**
>
> Certain atmospheric conditions may cause a small amount of condensation to form on the unit's window. This will not damage the unit and will clear after the unit has been switched on for a short period.

17.2 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.

17.3 Cleaning the display case

The display is a sealed unit and does not require regular cleaning. If it is necessary to clean the display, follow this basic procedure:

1. Switch off the power to the display.
2. Wipe the case with a clean, lint-free cloth.
3. If necessary, use a mild detergent to remove grease marks.

17.4 Cleaning the display screen

A coating is applied to the display screen. This makes it water repellent, and prevents glare. To avoid damaging this coating, follow this procedure:

1. Switch off the power to the display.
2. Rinse the screen with fresh water to remove all dirt particles and salt deposits.
3. Allow the screen to dry naturally.
4. If any smears remain, very gently wipe the screen with a clean microfibre cleaning cloth.

> **Caution: Product cleaning**
>
> 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 18: TROUBLESHOOTING

CHAPTER CONTENTS

18.1 Troubleshooting

The troubleshooting section provides possible causes and the corrective action required for common problems that are associated with the installation and operation of your product.

Before packing and shipping, all Raymarine products are subjected to comprehensive testing and quality assurance programs. If you do experience problems with your product, this section will help you to diagnose and correct problems to restore normal operation.

If after referring to this section you are still having problems with your product, please refer to the *Technical support* section of this manual for useful links and Raymarine technical support contact details.

18.2 Instrument troubleshooting

Blank display:

Possible causes	Possible solutions
No power supply.	• Check the fuse / circuit breaker. • Check the power supply. • Check the security and condition of any cable connections made between units.

Information not being transferred between instruments:

Possible causes	Possible solutions
Cabling or connector fault.	• Check the security and condition of any cable connections made between functioning and non-functioning units.

A group of units are not working:

Possible causes	Possible solutions
Cabling or connector fault.	• Check the security and condition of any cable connections made between units. • Attempt to isolate any faulty units by disconnecting the units one by one.

18.3 Power up troubleshooting

Product does not turn on or keeps turning off:

Possible causes	Possible solutions
Blown fuse / tripped breaker:	1. Check condition of relevant fuses and breakers and connections, replace if necessary. (Refer to the *Technical Specification* 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:	1. Check that the power cable connector is correctly orientated and fully inserted into the display connector and locked in position. 2. Check the power supply cable and connectors for signs of damage or corrosion, and replace if necessary. 3. With the display turned on, try flexing the power cable near to the display connector to see if this causes the unit to restart or lose power. Replace if necessary. 4. Check the vessel's battery voltage and 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, and replace if necessary.
Incorrect power connection:	The power supply may be wired incorrectly, ensure the installation instructions have been followed.

Product will not start up (restart loop):

Possible causes	Possible solutions
Power supply and connection:	See possible solutions from the table above, entitled 'Product does not turn on or keeps turning off'.
Software corruption:	1. In the unlikely event that the product's software has become corrupted, try downloading and installing the latest software from the Raymarine website. 2. On display products, as a last resort, attempt to perform a 'Power on Reset'. Be aware that this will delete all settings / presets and user data (such as waypoints and tracks), and revert the unit back to factory defaults.

18.4 Miscellaneous troubleshooting

Miscellaneous problems and their possible causes and solutions are described here.

Display behaves erratically (frequent unexpected resets / system crashes, or other erratic behavior):

Possible causes	Possible solutions
Intermittent problem with power to the display.	• Check relevant fuses and breakers. • Check that the power supply cable is sound and that all connections are tight and free from corrosion. • Check that the power source is of the correct voltage and sufficient current.
Software mismatch on system (upgrade required).	Go to https://bit.ly/rym-software for the latest software downloads.
Corrupt data / other unknown issue.	Perform a factory reset. **Important:** This will result in the loss of any settings and data (such as waypoints) stored on the product. Save any important data to a memory card before resetting.

CHAPTER 19: TECHNICAL SUPPORT

CHAPTER CONTENTS

19.1 Raymarine technical support and servicing

Raymarine provides a comprehensive product support service, as well as warranty, service, and repairs. You can access these services through the Raymarine 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 diagnostic pages of the connected display.

Servicing and warranty

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

Don't forget to visit the Raymarine website to register your product for extended warranty benefits: https://www.raymarine.com/en-us/support/product-registration

United Kingdom (UK), EMEA, and Asia Pacific:

- E-Mail: emea.service@raymarine.com
- Tel: +44 (0)1329 246 932

United States (US):

- E-Mail: rm-usrepair@flir.com
- Tel: +1 (603) 324 7900

Web support

Please visit the "Support" area of the Raymarine website for:

- **Manuals and Documents** — http://www.raymarine.com/manuals
- **Technical support forum** — https://raymarine.custhelp.com/app/home
- **Software updates** — http://www.raymarine.com/software

Worldwide support

United Kingdom (UK), EMEA, and Asia Pacific:

- Help desk: https://raymarine.custhelp.com/app/home
- Tel: +44 (0)1329 246 777

United States (US):

- Help desk: https://raymarine.custhelp.com/app/home
- Tel: +1 (603) 324 7900 (Toll-free: +800 539 5539)

Australia and New Zealand (Raymarine subsidiary):

- E-Mail: aus.support@raymarine.com
- Tel: +61 2 8977 0300

France (Raymarine subsidiary):

- E-Mail: support.fr@raymarine.com
- Tel: +33 (0)1 46 49 72 30

Germany (Raymarine subsidiary):

- E-Mail: support.de@raymarine.com
- Tel: +49 40 237 808 0

Italy (Raymarine subsidiary):

- E-Mail: support.it@raymarine.com
- Tel: +39 02 9945 1001

Spain (Authorized Raymarine distributor):

- E-Mail: sat@azimut.es
- Tel: +34 96 2965 102

Netherlands (Raymarine subsidiary):

- E-Mail: support.nl@raymarine.com
- Tel: +31 (0)26 3614 905

Sweden (Raymarine subsidiary):

- E-Mail: support.se@raymarine.com
- Tel: +46 (0)317 633 670

Finland (Raymarine subsidiary):

- E-Mail: support.fi@raymarine.com
- Tel: +358 (0)207 619 937

Norway (Raymarine subsidiary):

- E-Mail: support.no@raymarine.com
- Tel: +47 692 64 600

Denmark (Raymarine subsidiary):

- E-Mail: support.dk@raymarine.com
- Tel: +45 437 164 64

Russia (Authorized Raymarine distributor):

- E-Mail: info@mikstmarine.ru
- Tel: +7 495 788 0508

19.2 Checking the software version

Follow the steps below to identify the software version of your unit.

During normal operation:

1. Press and hold the *[Display (Power)]* and *[True / App]* buttons simultaneously for 4 seconds.

The software version will be displayed on the screen.

CHAPTER 20: TECHNICAL SPECIFICATION

CHAPTER CONTENTS

20.1 Physical specification

Specification	
Length:	110.00 mm (4.33 in)
Height:	115.00 mm (4.53 in)
Depth:	44.00 mm (1.73 in)

20.2 Power specification

Specification	
Nominal supply voltage:	12 V dc
Operating voltage range:	10 V dc to 16 V dc
Power consumption:	• < 1 W typical (display only) • 2.4 W Maximum (transducer connected)
Current:	• 45 to 65 mA typical (display only) • 200 ma Maximum (transducer connected)
LEN (Load Equivalency Number):	4

20.3 Network specification

Specification	
Network connections:	• 2x SeaTalk NG connections (complaint with SeaTalk 1). • Transducer connections (i60 Close-Hauled Wind only).

20.4 Environmental specification

Specification	
Operating temperature range:	-20°C to +55°C (-4°F to +131°F)
Storage temperature range:	-30°C to +70°C (-22°F to +158°F)
Relative humidity:	93% Max
Waterproof rating:	IPx6

20.5 Display specification

Specification	
Viewing angle:	+70 / +70

20.6 Conformance specification

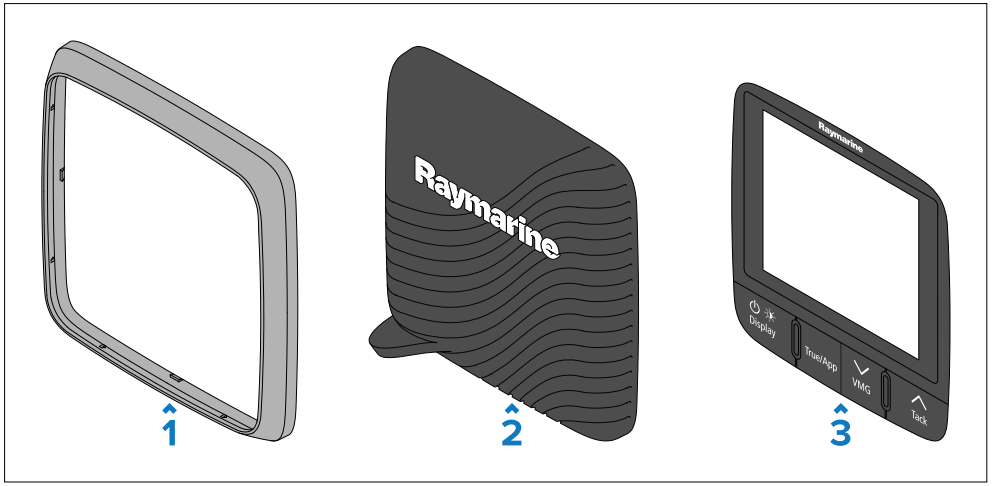
Specification	
Conformance:	Europe 2004/208/EC

CHAPTER 21: SPARES AND ACCESSORIES

CHAPTER CONTENTS

21.1 Spares

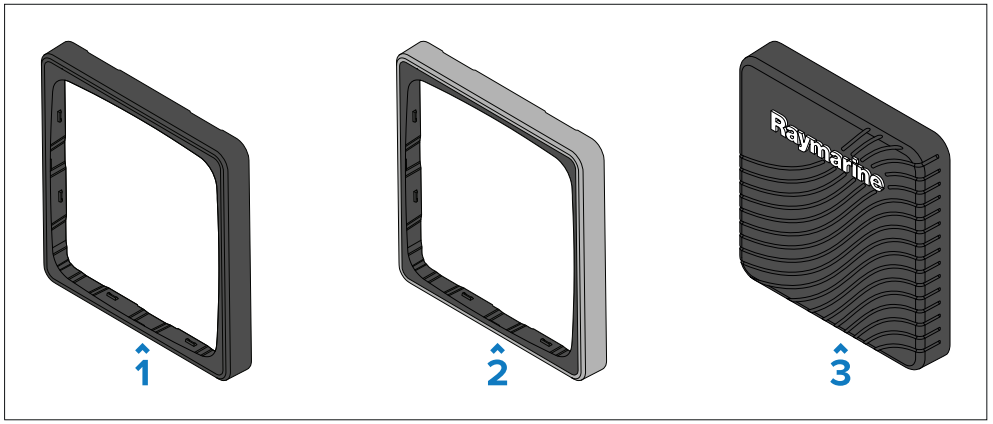
The following spares are available for your product:



	Part	Description
1	**R22168**	i50 / i60 / i70 front bezel.
2	**R22169**	i50 / i60 / i70 sun cover.
3	**R70133**	i60 keypad.

21.2 Accessories

The following accessories are available for your product:



	Part	Description
1	**A80355**	i50 / i60 / i70 front bezel black (eS style)
2	**A80356**	i50 / i60 / i70 front bezel gunmetal (eS style)
3	**A80357**	i50 / i60 / i70 suncover (for eS style bezel)

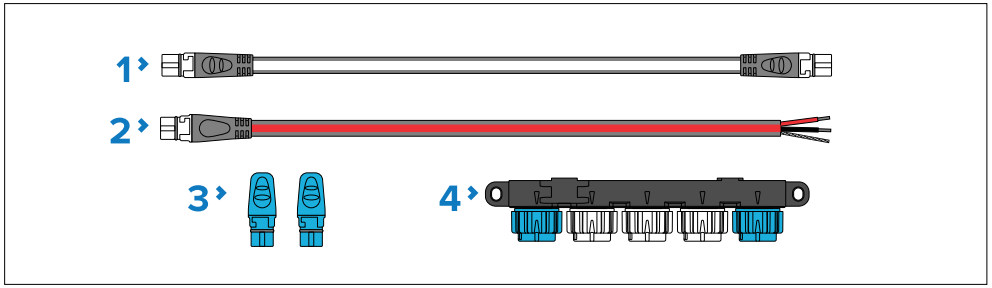
21.3 SeaTalk NG cables and accessories

SeaTalk NG cables and accessories for use with compatible products.

SeaTalk NG kits

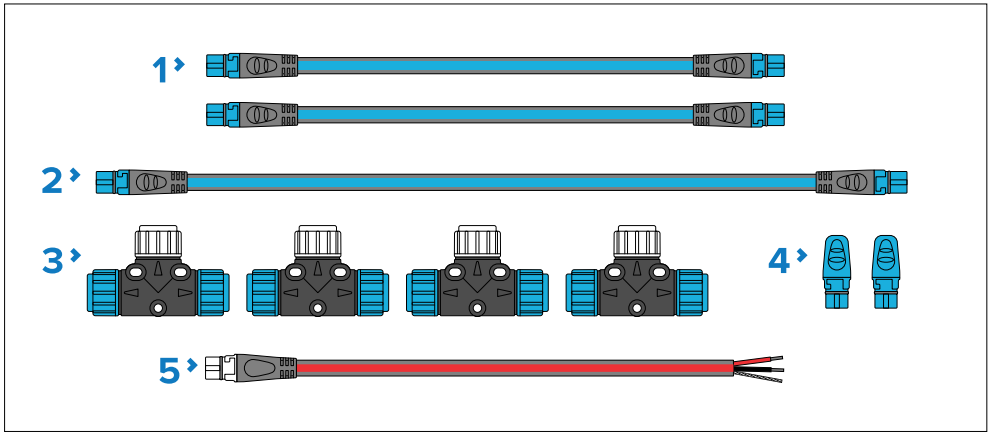
SeaTalk NG kits enable you to create a simple SeaTalk NG backbone.

Starter kit (part number: T70134) consists of:



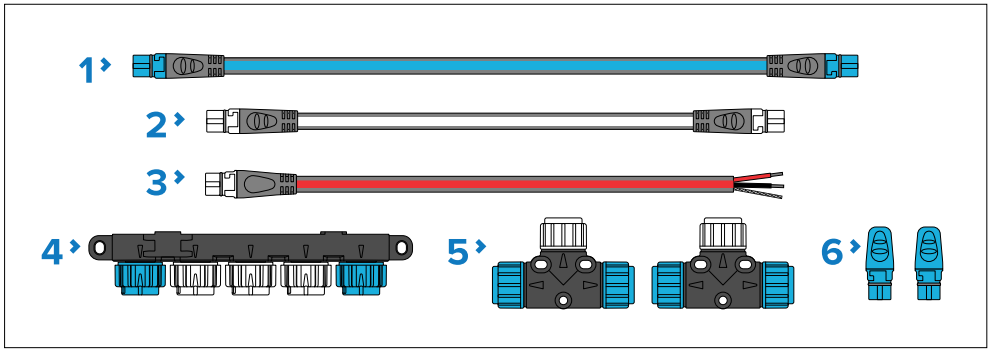
1. 1 x Spur cable 3 m (9.8 ft) (part number: **A06040**). Used to connect device to the SeaTalk NG backbone.
2. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalk NG backbone.
3. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalk NG backbone.
4. 1 x 5-Way connector (part number: **A06064**). Each connector block allows connection of up to 3 SeaTalk NG devices. Multiple connector blocks can be ‘daisy chained’ together.

Backbone kit (part number: A25062) consists of:



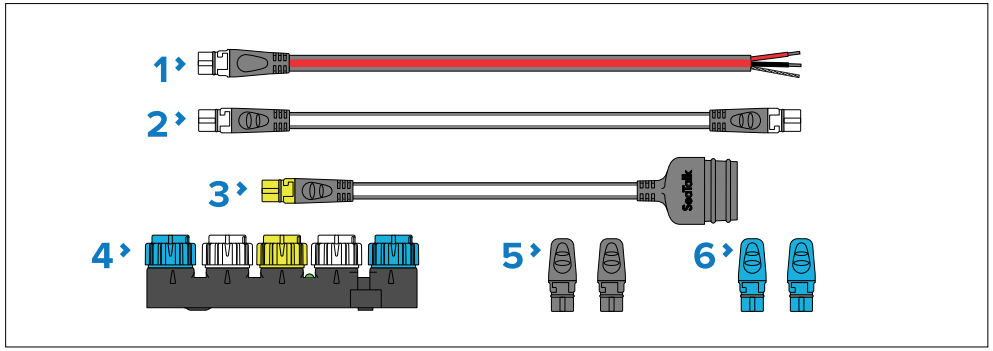
1. 2 x Backbone cables 5 m (16.4 ft) (part number: **A06036**). Used to create and extend the SeaTalk NG backbone.
2. 1 x Backbone cable 20 m (65.6 ft) (part number: **A06037**). Used to create and extend the SeaTalk NG backbone.
3. 4 x T-piece (part number: **A06028**). Each T-piece allows connection of one SeaTalk NG device. Multiple T-pieces can be 'daisy chained' together.
4. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalk NG backbone.
5. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalk NG backbone.

Evolution-Series autopilot cable kit (part number: R70160) consists of:



1. 1 x Backbone cable 5 m (16.4 ft) (part number: **A06036**). Used to create and extend the SeaTalk NG backbone.
2. 1 x Spur cable 1 m (3.3 ft) (part number: **A06040**). Used to connect device to the SeaTalk NG backbone.
3. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalk NG backbone.
4. 1 x 5-Way connector (part number: **A06064**). Each connector block allows connection of up to 3 SeaTalk NG devices. Multiple connector blocks can be 'daisy chained' together.
5. 2 x T-pieces (part number: **A06028**). Each T-piece allows connection of one SeaTalk NG device. Multiple T-pieces can be 'daisy chained' together.
6. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalk NG backbone.

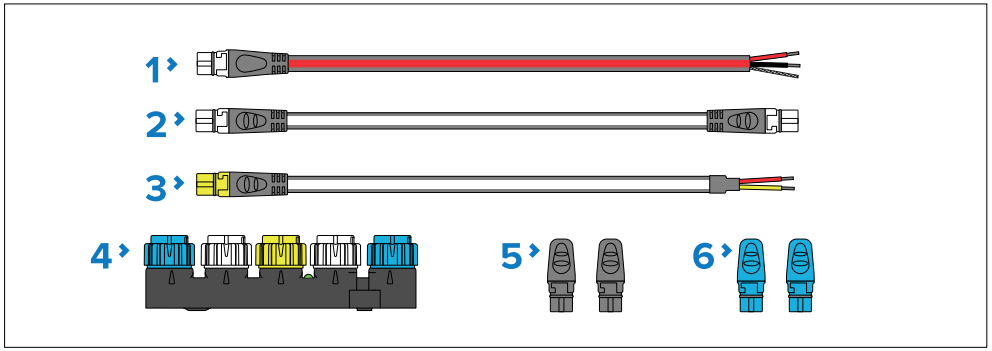
SeaTalk 1 to SeaTalk NG converter kit (part number: E22158) consists of:



1. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalk NG backbone.
2. 1 x Spur cable 1 m (3.3 ft) (part number: **A06039**). Used to connect a device to the SeaTalk NG backbone.
3. 1 x SeaTalk 1 (3 pin) to SeaTalk NG adapter cable 0.4 m (1.3 ft) (part number: **A22164**). Used to connect SeaTalk 1 devices to the SeaTalk NG backbone via the SeaTalk 1 to SeaTalk NG converter.
4. 1 x SeaTalk 1 to SeaTalk NG converter (part number: **E22158**). Each converter allows connection of one SeaTalk 1 device and up to 2 SeaTalk NG devices.
5. 2 x Spur blanking plugs (part number: **A06032**). Used to cover unused spur connections in 5-way blocks, T-piece connectors and SeaTalk 1 to SeaTalk NG converter.

6. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalk NG backbone.

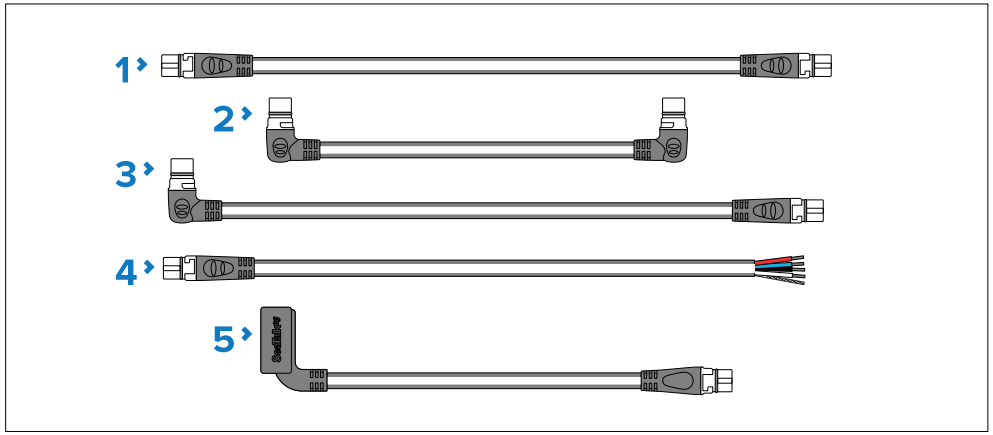
NMEA 0183 VHF 2-wire to SeaTalk NG converter kit (part number: E70196) consists of:



1. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalk NG backbone.
2. 1 x Spur cable 1 m (3.3 ft) (part number: **A06039**). Used to connect a device to the SeaTalk NG backbone.
3. 1 x NMEA 0183 VHF stripped-end (2-wire) to SeaTalk NG adapter cable 1 m (3.3 ft) (part number: **A06071**). Used to connect an NMEA 0183 VHF radio to the SeaTalk NG backbone via the NMEA 0183 to SeaTalk NG converter.
4. 1 x SeaTalk 1 to SeaTalk NG converter (part number: **E22158**). Each converter allows connection of one SeaTalk 1 device and up to 2 SeaTalk NG devices.
5. 2 x Spur blanking plugs (part number: **A06032**). Used to cover unused spur connections in 5-way blocks, T-piece connectors, and the SeaTalk 1 to SeaTalk NG converter.
6. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalk NG backbone.

SeaTalk NG spur cables

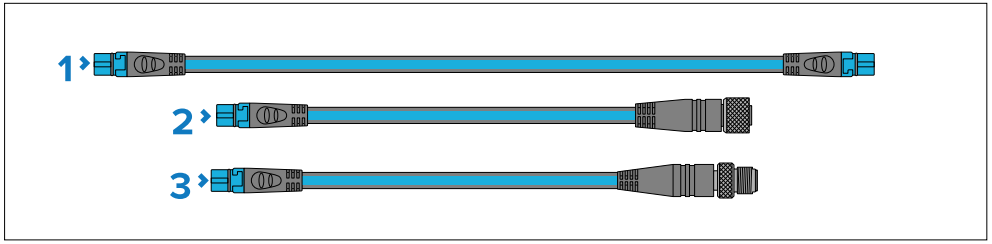
SeaTalk NG spur cables are required to connect devices to the SeaTalk NG backbone.



1. SeaTalk NG spur cables:
   - Spur cable 0.4 m (1.3 ft) (part number: **A06038**).
   - Spur cable 1 m (3.3 ft) (part number: **A06039**).
   - Spur cable 3 m (9.8 ft) (part number: **A06040**).
   - Spur cable 5 m (16.4 ft) (part number: **A06041**).
2. Elbow (right-angled) to elbow (right-angled) spur cable 0.4 m (1.3 ft) (part number: **A06042**). Used in confined spaces where a straight spur cable will not fit.
3. Elbow (right-angled) to straight spur cable 1 m (3.3 ft) (part number: **A06081**). Used in confined spaces where a straight spur cable will not fit.
4. SeaTalk NG to stripped-end spur cables (connects compatible products that do not have a SeaTalk NG connector, such as transducer pods):
   - SeaTalk NG to stripped-end spur cable 1 m (3.3 ft) (part number: **A06043**)
   - SeaTalk NG to stripped-end spur cable 3 m (9.8 ft) (part number: **A06044**)
5. ACU-Series / SPX-Series autopilot to SeaTalk NG spur cable 0.3 m (1.0 ft) (part number **R12112**). Connects the course computer to the SeaTalk NG backbone. This connection can also be used to provide 12 V dc power to the SeaTalk NG backbone.

SeaTalk NG backbone cables

SeaTalk NG backbone cables are used to create or extend a SeaTalk NG backbone.



1. Backbone cables:
   - Backbone cable 0.4 m (1.3 ft) (part number: **A06033**).
   - Backbone cable 1 m (3.3 ft) (part number: **A06034**).
   - Backbone cable 3 m (9.8 ft) (part number: **A06035**).
   - Backbone cable 5 m (16.4 ft) (part number: **A06036**).
   - Backbone cable 9 m (29.5 ft) (part number: **A06068**).
   - Backbone cable 20 m (65.6 ft) (part number: **A06037**).
2. SeaTalk NG to DeviceNet (female) Backbone cable 0.4 m (1.3 ft) (part number: **A80675**)
3. SeaTalk NG to DeviceNet (male) Backbone cable 0.4 m (1.3 ft) (part number: **A80674**)

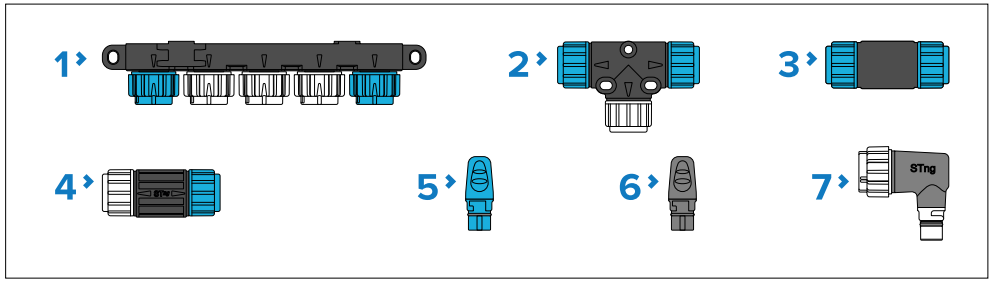
SeaTalk NG power cables

SeaTalk NG power cables are used to provide the SeaTalk NG backbone with a single 12 V dc power source. The power connection must include a 5 amp inline fuse (not supplied).

1. Power cable (straight) 2 m (6.6 ft) (part number: **A06049**).
2. Elbow (right-angled) power cable 2 m (6.6 ft) (part number: **A06070**).

SeaTalk NG connectors

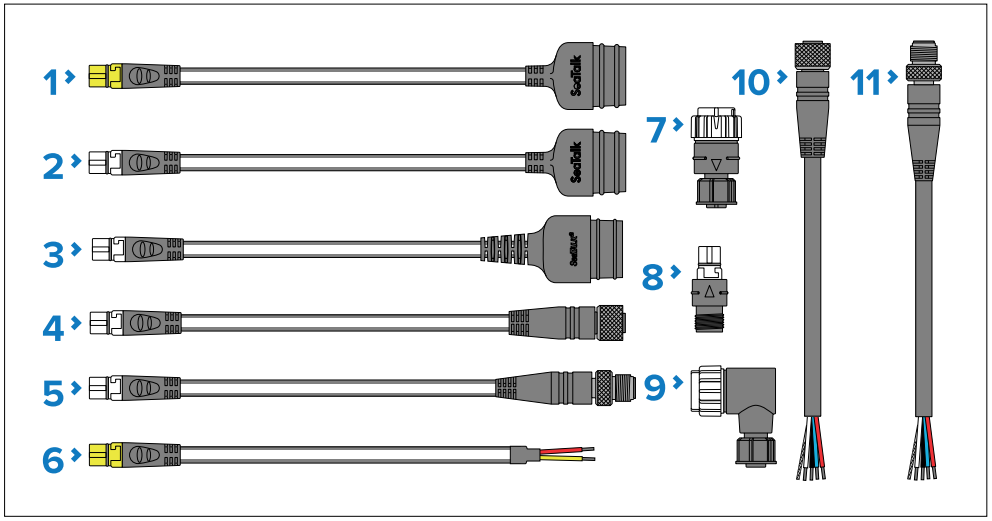
SeaTalk NG connectors are used to connect SeaTalk NG devices to the SeaTalk NG backbone and to create and extend the backbone.



1. 5-Way connector (part number: **A06064**). Each connector block allows connection of up to 3 SeaTalk NG devices. Multiple connector blocks can be ‘daisy chained’ together.
2. T-piece (part number: **A06028**). Each T-piece allows connection of one SeaTalk NG device. Multiple T-pieces can be ‘daisy chained’ together.
3. Backbone extender (part number: **A06030**). Used to connect 2 backbone cables together.
4. Inline terminator (part number: **A80001**). Used to connect a spur cable and SeaTalk NG device at the end of a backbone instead of a backbone terminator.
5. Backbone terminator (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalk NG backbone.
6. Spur blanking plug (part number: **A06032**). Used to cover unused spur connections in 5-Way blocks, T-piece connectors, or the SeaTalk 1 to SeaTalk NG converter.
7. Elbow (right-angled) spur connector (part number: **A06077**). Used in confined spaces where a straight spur cable will not fit.

SeaTalk NG adaptors and adaptor cables

SeaTalk NG adaptor cables are used to connect devices designed for different CAN Bus backbones (e.g.: SeaTalk 1 or DeviceNet) to the SeaTalk NG backbone.



1. SeaTalk 1 (3 pin) to SeaTalk NG converter cable 1 m (3.3 ft) (part number: **A22164 / A06073**). Can be used to connect a SeaTalk 1 device to a SeaTalk NG backbone via the SeaTalk 1 to SeaTalk NG converter, or to connect a SeaTalk NG product directly to a SeaTalk 1 network.
2. SeaTalk 1 (3 pin) to SeaTalk NG adaptor cable 0.4 m (1.3 ft) (part number: **A06047**). Can be used to connect a SeaTalk 1 device to a SeaTalk NG backbone via the SeaTalk 1 to SeaTalk NG converter, or to connect a SeaTalk NG product directly to a SeaTalk 1 network.
3. SeaTalk 2 (5 pin) to SeaTalk NG adaptor cable 0.4 m (1.3 ft) (part number: **A06048**). Used to connect SeaTalk 2 devices or networks to a SeaTalk NG backbone.
4. SeaTalk NG to DeviceNet (female) adaptor cables connect NMEA 2000 devices that use a DeviceNet connector to the SeaTalk NG backbone, or connects SeaTalk NG devices to an NMEA 2000 network. The following cables are available:
   - SeaTalk NG to DeviceNet (female) adaptor cable 0.4 m (1.3 ft) (part number: **A06045**).
   - SeaTalk NG to DeviceNet (female) adaptor cable 1 m (3.3 ft) (part number: **A06075**).
5. SeaTalk NG to DeviceNet (male) adaptor cables. Connect NMEA 2000 devices that use a DeviceNet connector to the SeaTalk NG backbone, or connect SeaTalk NG devices to an NMEA 2000 network. The following cables are available:
   - SeaTalk NG to DeviceNet (male) adaptor cable 0.1 m (0.33 ft) (part number: **A06078**).
   - SeaTalk NG to DeviceNet (male) adaptor cable 0.4 m (1.3 ft) (part number: **A06074**).
   - SeaTalk NG to DeviceNet (male) adaptor cable 1 m (3.3 ft) (part number: **A06076**).
   - SeaTalk NG to DeviceNet (male) adaptor cable 1.5 m (4.92 ft) (part number: **A06046**).
6. NMEA 0183 stripped-end (2-wire) to SeaTalk NG adapter cable 1 m (3.3 ft) (part number: **A06071**). Used to connect an NMEA 0183 VHF radio to the SeaTalk NG backbone via the NMEA 0183 to SeaTalk NG converter.
7. SeaTalk NG (male) to DeviceNet (female) adaptor (**A06082***).
8. SeaTalk NG (female) to DeviceNet (male) adaptor (**A06083***).
9. SeaTalk NG (male) to DeviceNet (female) elbow (right-angled) adaptor (**A06084***).
10. DeviceNet (female) to stripped-end adaptor cable (0.4 m (1.3 ft)) (part number: **E05026**).
11. DeviceNet (male) to stripped-end adaptor cable (0.4 m (1.3 ft)) (part number: **E05027**).

Important:

* Do NOT connect the A06082, A06083, or A06084 adaptors directly to a backbone. Only connect as part of a **spur** connection between backbone and device.

Appendix A NMEA 2000 PGNs

The i60 instrument range supports the following NMEA 2000 Parameter Group Numbers (PGNs).

PG name	PGN	Transmit	Receive
ISO Acknowledgement	59392	●	
ISO Request	59904		●
ISO Address claim	60928	●	●
ISO Commanded address	65240		●
NMEA Request group function	126208		●
NMEA Command group function	126208		●
NMEA Acknowledge group function	126208	●	
PGN list — Transmit PGN's group function	126464	●	
PGN list — Received PGN's group function	126464	●	
Product information	126996	●	●
Heading / Tack	127237		●
Vessel heading	127250		●
Magnetic variation	127258		●
Speed	128259		●
COG & SOG rapid update	129026		●
GNSS Position data	129029		●
Wind data	130306	●	●

Appendix B Software release history

The list below is a cumulative list of the new features introduced in subsequent releases of the i60 software, since the initial release (v1.05).

This list includes *new features* only. It does NOT include software maintenance items, such as bug fixes or performance improvements.

i60 v1.06:

(Software release date: *June 2013*)

- Maintenance release.

i60 v1.05:

(Software release date: *January 2013*)

- Initial public release.

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