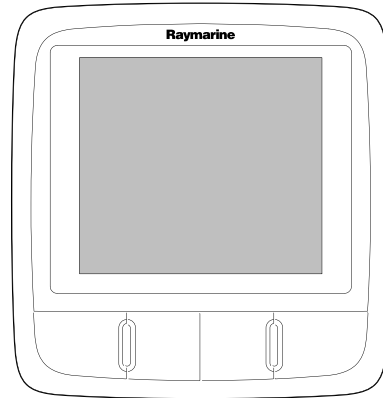


i60



**Installation and operation
instructions**

English

Raymarine®

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Contents

Chapter 1 Important information

- Safety notices
- Water ingress
- Disclaimer
- EMC installation guidelines
- Suppression ferrites
- Connections to other equipment
- Declaration of conformity
- Product disposal
- Warranty registration
- IMO and SOLAS
- Technical accuracy

Chapter 2 Handbook information

- 2.1 Handbook information

Chapter 3 Planning the installation

- 3.1 Installation checklist
- 3.2 System integration
- 3.3 Typical systems
- 3.4 System protocols
- 3.5 Parts supplied
- 3.6 Tools required

Chapter 4 Cables and connections

- 4.1 General cabling guidance
- 4.2 Connections overview

Chapter 5 Location and mounting

- 5.1 Selecting a display location
- 5.2 Mounting
- 5.3 Front bezel
- 5.4 Selecting a transducer location

Chapter 6 Getting started

- 6.1 Controls
- 6.2 Power
- 6.3 Data master
- 6.4 Illumination
- 6.5 Calibration

Chapter 7 Using your display

- 7.1 Pages
- 7.2 i60 Wind operation
- 7.3 Group illumination

Chapter 8 Using alarms

- 8.1 Alarms

Chapter 9 Maintaining your display

- 9.1 Service and maintenance
- 9.2 Condensation
- 9.3 Routine equipment checks
- 9.4 Cleaning
- 9.5 Cleaning the display case

- 9.6 Cleaning the display screen

Chapter 10 Troubleshooting

- 10.1 Troubleshooting
- 10.2 Instrument troubleshooting
- 10.3 Power up troubleshooting
- 10.4 Miscellaneous troubleshooting
- 10.5 Self-test

Chapter 11 Technical support

- 11.1 Raymarine customer support
- 11.2 Checking the software version

Chapter 12 Technical specification

- 12.1 Technical specification

Chapter 13 Spares and accessories

- 13.1 Wind transducers
- 13.2 Spares
- 13.3 SeaTalk^{ng} cables and accessories
- 13.4 Converters

Appendix A NMEA 2000 sentences

Chapter 1: Important information

Safety notices



Warning: Product installation and operation

This product must be installed and operated in accordance with the instructions provided. Failure to do so could result in personal injury, damage to your vessel and/or poor product performance.



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: 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: Positive ground systems

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



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.

Caution: Transducer cable

Do NOT cut, shorten, splice the transducer cable or remove the connector. If the cable is cut, it cannot be repaired. Cutting the cable will also void the warranty.

Caution: Power supply protection

When installing this product ensure the power source is adequately protected by means of a suitably-rated fuse or automatic 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: Cleaning

When cleaning this product:

- Do NOT wipe the display screen with a dry cloth, as this could scratch the screen coating.
- Do NOT use abrasive, or acid or ammonia based 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.

Water ingress

Water ingress disclaimer

Although the waterproof rating capacity of this product meets the IPX6 standard, water intrusion and subsequent equipment failure may occur if the product is subjected to commercial 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.

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.

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

- Raymarine equipment and cables connected to it are:
 - At least 1 m (3 ft) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 7 ft (2 m).
 - More than 2 m (7 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 fitted with suppression ferrites. These are important for correct EMC performance. 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 authorized dealers.

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.

Declaration of conformity

Raymarine UK Ltd. declares that this product is compliant with the essential requirements of EMC directive 2004/108/EC.

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. Whilst the WEEE Directive does not apply to some Raymarine products, we support its policy and ask you to be aware of how to dispose of this product.

Warranty registration

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

IMO and SOLAS

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

Technical accuracy

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

Chapter 2: Handbook information

Chapter contents

- [2.1 Handbook information](#)

2.1 Handbook information

This handbook contains important information regarding your Raymarine instrument display.

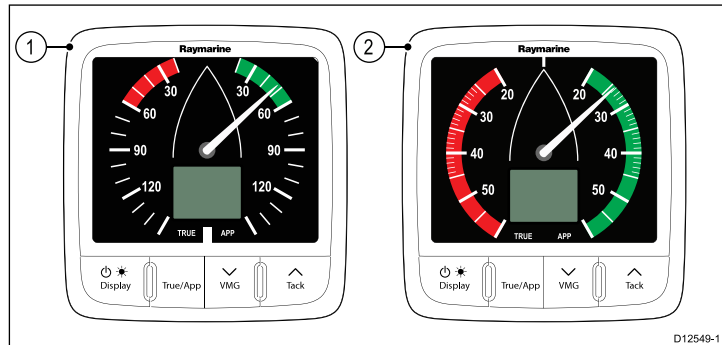
i60 Handbooks

Handbooks

Description	Part number
Mounting and getting started	88010
Installation and operation instructions	81342
Mounting template	87130

i60 instrument range

Raymarine's i60 instrument range consists of the following variants:



Item	Description	Part number
1	i60 Analogue wind instrument	E70061
2	i60 Analogue close hauled wind instrument	E70062

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 or SeaTalk^{ng} network.

i60 Close hauled wind

The i60 Close hauled wind instrument provides an expanded indication from 20° to +60° about the bow and stern of the vessel. The i60 Close hauled wind must be used as part of a SeaTalk or SeaTalk^{ng} network.

Chapter 3: Planning the installation

Chapter contents

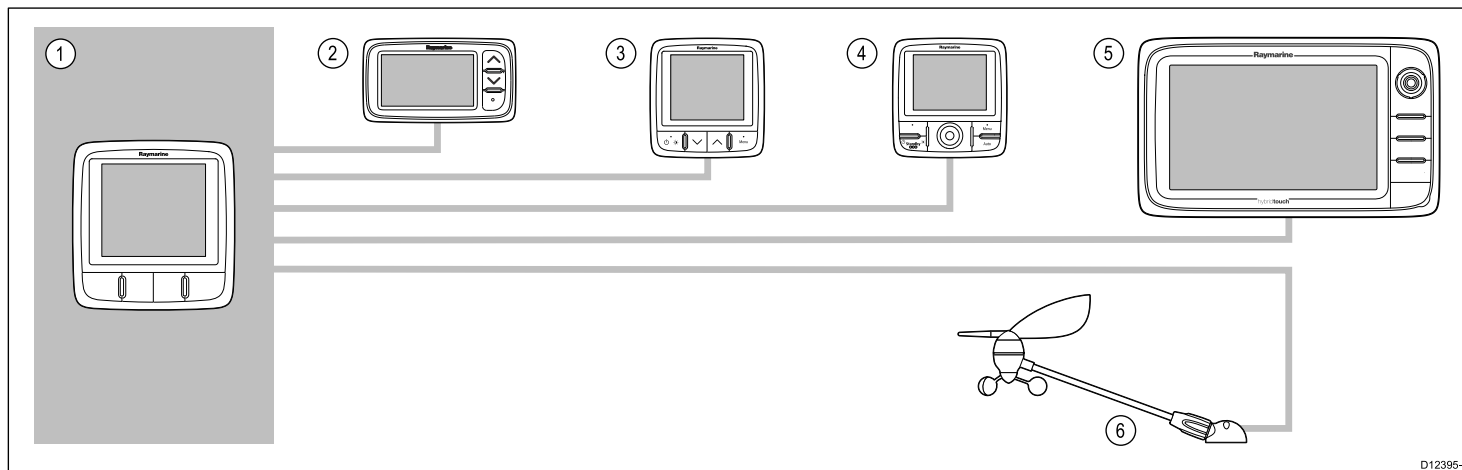
- [3.1 Installation checklist](#)
- [3.2 System integration](#)
- [3.3 Typical systems](#)
- [3.4 System protocols](#)
- [3.5 Parts supplied](#)
- [3.6 Tools required](#)

3.1 Installation checklist

Installation includes the following activities:

Installation Task	
1	Plan your system.
2	Obtain all required equipment and tools.
3	Site all equipment.
4	Route all cables.
5	Drill cable and mounting holes.
6	Make all connections into equipment.
7	Secure all equipment in place.
8	Power on and test the system.

3.2 System integration

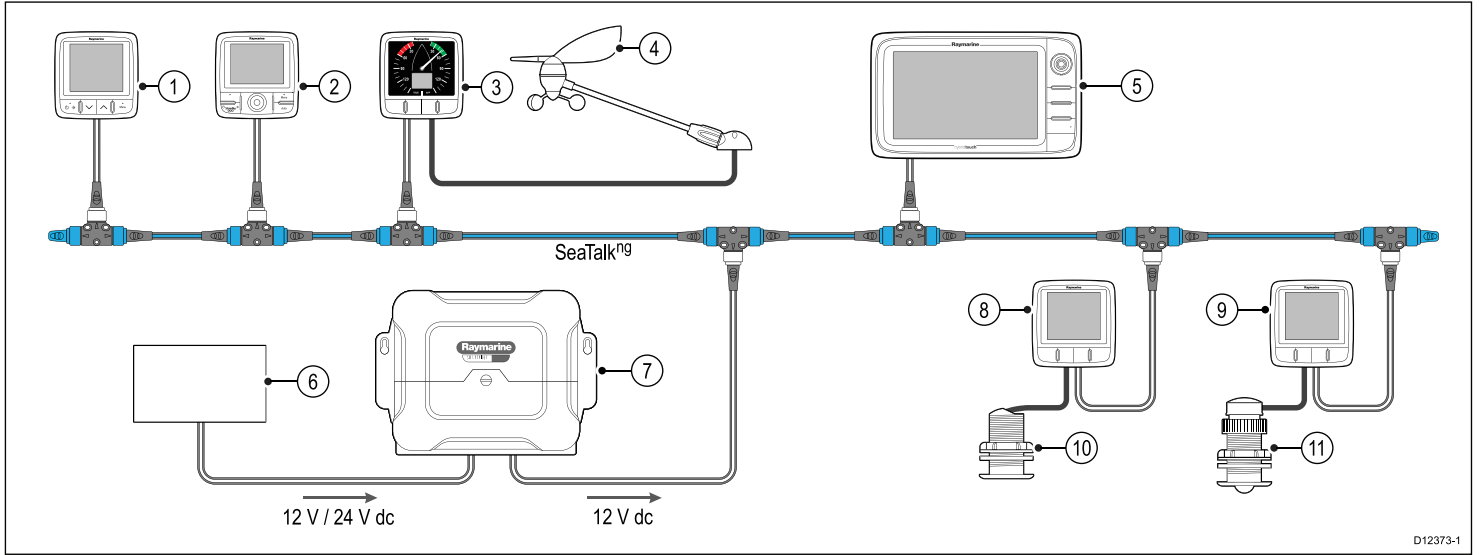


D12395-1

Item	Device type	Maximum Quantity	Suitable Devices	Connections
1	i60 Wind, Close hauled wind instrument.	As determined by the SeaTalkng bus bandwidth and power loading.	<ul style="list-style-type: none"> • i60 Wind • i60 Close hauled wind 	<ul style="list-style-type: none"> • SeaTalkng
2	SeaTalk instrument displays.	As determined by the SeaTalk bus bandwidth and power loading.	<ul style="list-style-type: none"> • i40 • ST40 • ST60+ 	<ul style="list-style-type: none"> • SeaTalkng via the optional SeaTalk1 to SeaTalkng converter
3	SeaTalkng Instrument displays.	As determined by the SeaTalkng bus bandwidth and power loading.	<ul style="list-style-type: none"> • i50 • i60 • i70 • ST70 • ST70+ 	<ul style="list-style-type: none"> • SeaTalkng
4	SeaTalkng pilot controller.	As determined by the SeaTalkng bus bandwidth and power loading.	<ul style="list-style-type: none"> • ST70 • ST70 + • p70 • p70R 	<ul style="list-style-type: none"> • SeaTalkng
5	SeaTalkng Multifunction displays.	6	<ul style="list-style-type: none"> • Raymarine multifunction displays. 	<ul style="list-style-type: none"> • SeaTalkng
6	Raymarine Wind transducers and rotavecta.	<ul style="list-style-type: none"> • 1 x wind vane transducer, or • 1 x rotavecta wind transducer. 	<ul style="list-style-type: none"> • Short arm wind vane transducer. • Long arm wind vane transducer. • Short arm masthead wind transducer. • Long arm masthead wind transducer. • Rotavecta wind transducer. 	Raymarine transducer connections.

3.3 Typical systems

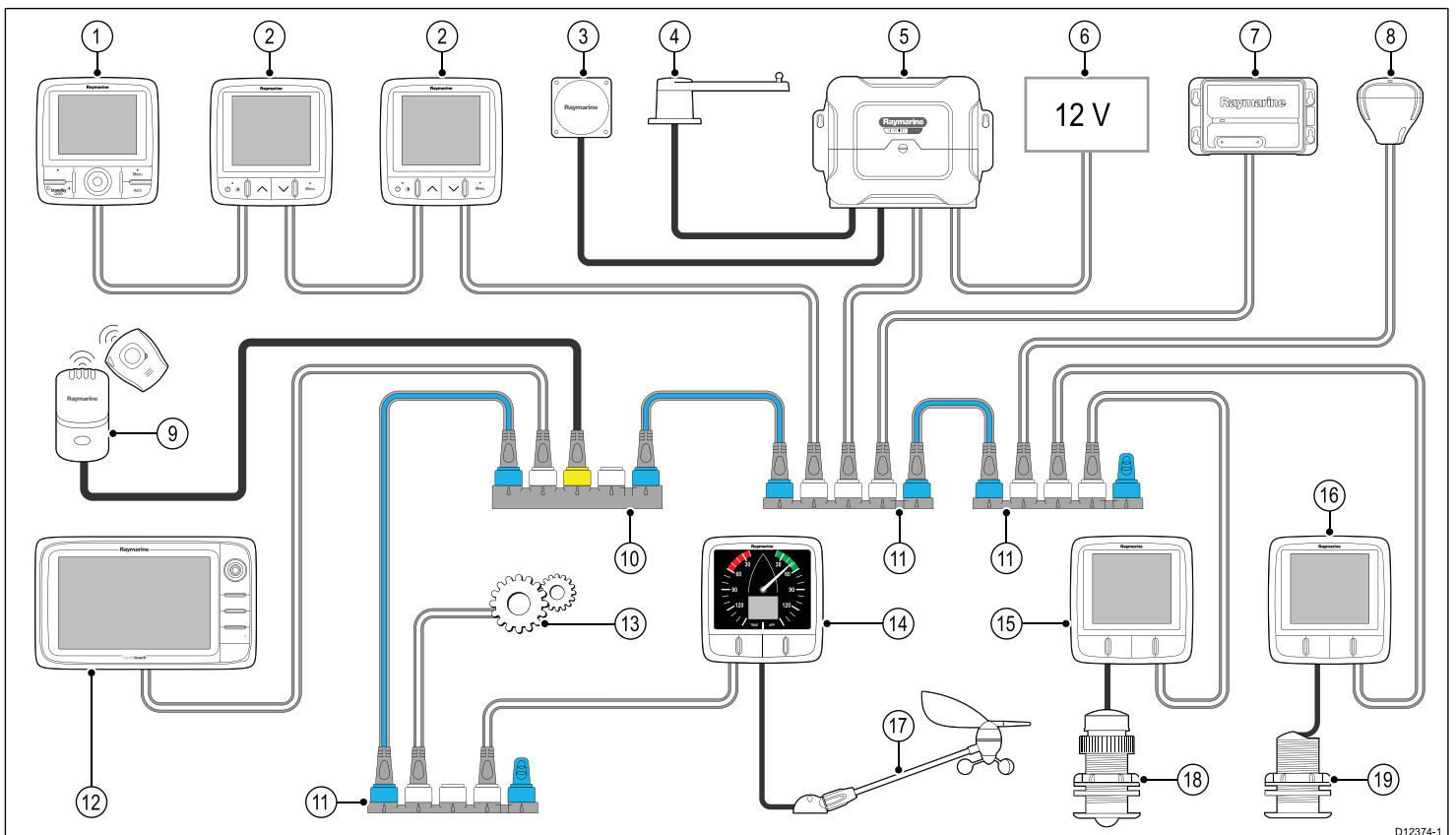
Basic SeaTalk^{ng} system example



D12373-1

1	SeaTalk ^{ng} instrument display
2	SeaTalk ^{ng} pilot controller
3	i60 Wind instrument
4	Raymarine wind vane transducer
5	Raymarine multifunction display
6	12 / 24 V dc power supply
7	Raymarine course computer (providing 12 V dc power supply to the SeaTalk ^{ng} network.)
8	i50 Speed instrument
9	i50 Depth instrument
10	Speed transducer
11	Depth transducer

Extended SeaTalk^{ng} system example



D12374-1

1	SeaTalk ^{ng} pilot controller
2	SeaTalk ^{ng} instrument displays
3	Fluxgate compass
4	Rudder reference
5	Raymarine course computer (providing 12 V dc power supply to SeaTalk ^{ng} network.)
6	12 / 24 V dc power supply
7	Raymarine AIS transceiver
8	Raymarine SeaTalk ^{ng} GPS
9	Man over board
10	SeaTalk to SeaTalk ^{ng} converter
11	SeaTalk ^{ng} 5 way blocks
12	Raymarine multifunction display
13	Engine data (via devicenet adaptor cable.)
14	i60 Wind instrument
15	i50 Depth instrument
16	i50 Speed instrument
17	Raymarine wind vane transducer
18	Depth transducer
19	Speed transducer

3.4 System protocols

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. Fast and accurate data collection and transfer is achieved by using a combination of the following data protocols:

- SeaTalk^{ng}
- NMEA 2000
- SeaTalk

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

Seataalk^{ng}

SeaTalk^{ng} (Next Generation) is an enhanced protocol for connection of compatible marine instruments and equipment. It replaces the older SeaTalk and SeaTalk² protocols.

SeaTalk^{ng} utilizes a single backbone to which compatible instruments connect using a spur. Data and power are carried within the backbone. Devices that have a low 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 and SeaTalk / SeaTalk² devices can also be connected using the appropriate interfaces or adaptor cables as required.

NMEA 2000

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. The 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.

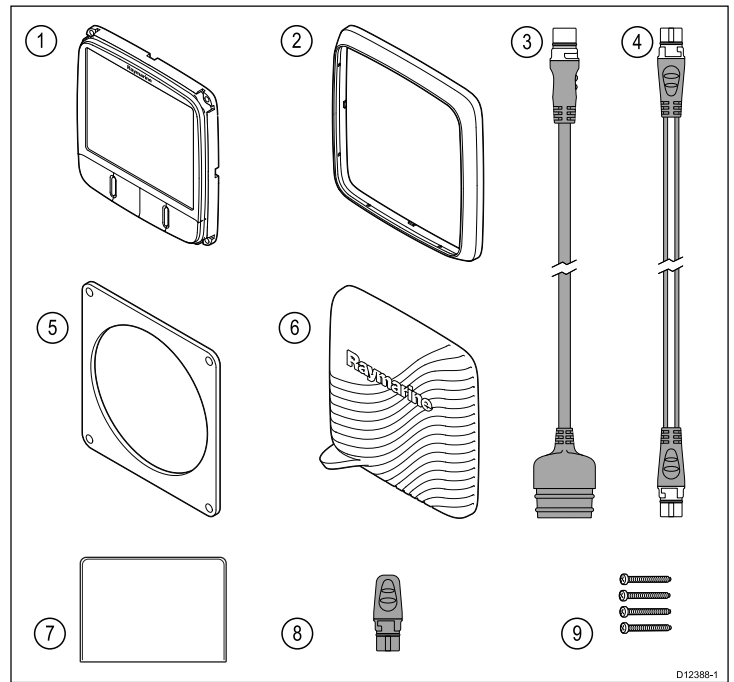
SeaTalk

SeaTalk is a protocol which enables compatible instruments to connect to each other and share data.

The SeaTalk cable system is used to connect compatible instruments and equipment. The cable carries power and data and enables connection without the need for a central processor.

Additional instruments and functions can be added to a SeaTalk system, simply by plugging them into the network. SeaTalk equipment can also communicate with other non-SeaTalk equipment via the NMEA 0183 standard, provided a suitable interface is used.

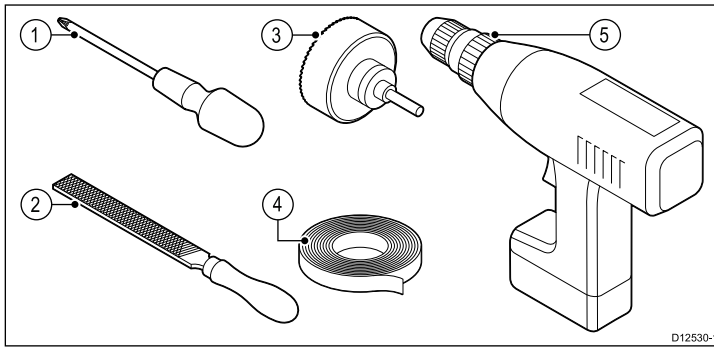
3.5 Parts supplied



1	i60 instrument
2	Front bezel
3	SeaTalk to SeaTalk ^{ng} adaptor cable
4	SeaTalk ^{ng} spur cable
5	Gasket
6	Sun cover
7	Documentation pack
8	SeaTalk ^{ng} blanking plug
9	4 x fixing screws

3.6 Tools required

Tools required for installation



1	Pozi-drive screwdriver
2	File
3	92 mm (3.62 in) hole cutter
4	Adhesive tape
5	Power drill

Chapter 4: Cables and connections

Chapter contents

- [4.1 General cabling guidance](#)
- [4.2 Connections overview](#)

4.1 General cabling guidance

Cable types and length

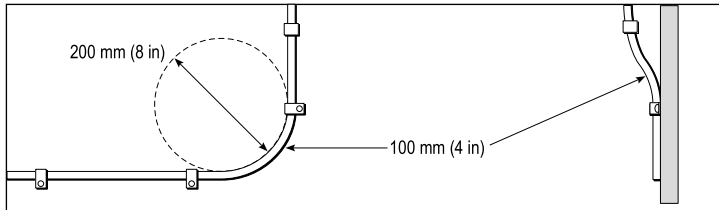
It is important to use cables of the appropriate type and length

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

Routing cables

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

- Do NOT bend cables excessively. Wherever possible, ensure a minimum bend diameter of 200 mm (8 in) / minimum bend radius of 100 mm (4 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 tie-wraps or lacing twine. Coil any extra 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,
- antennae.

Strain relief

Ensure adequate strain relief is provided. Protect connectors from strain and ensure they will not pull out under extreme sea conditions.

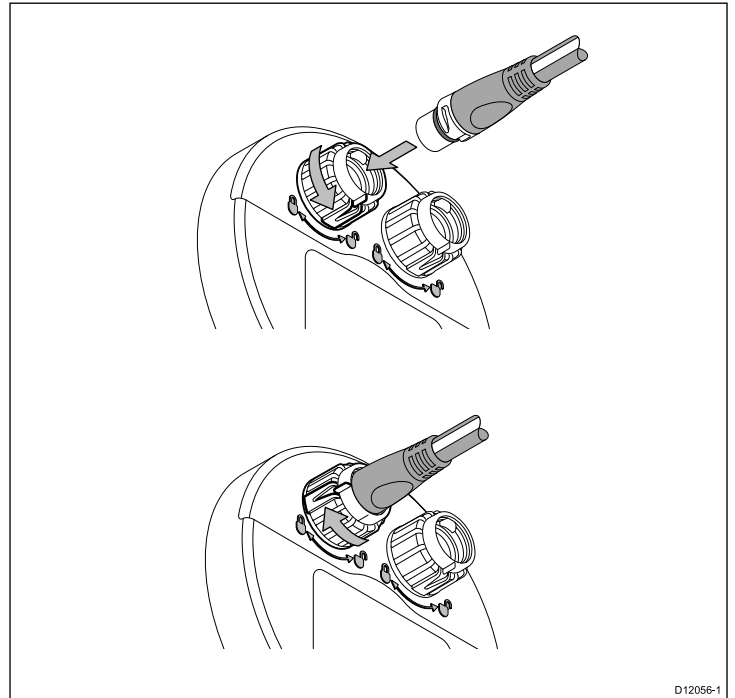
Cable shielding

Ensure that all data cables are properly shielded that the cable shielding is intact (e.g. hasn't been scraped off by being squeezed through a tight area).

4.2 Connections overview

Connections are made using the provided SeaTalk^{ng} and transducer cable connectors on the rear of the unit.

SeaTalk^{ng} connections

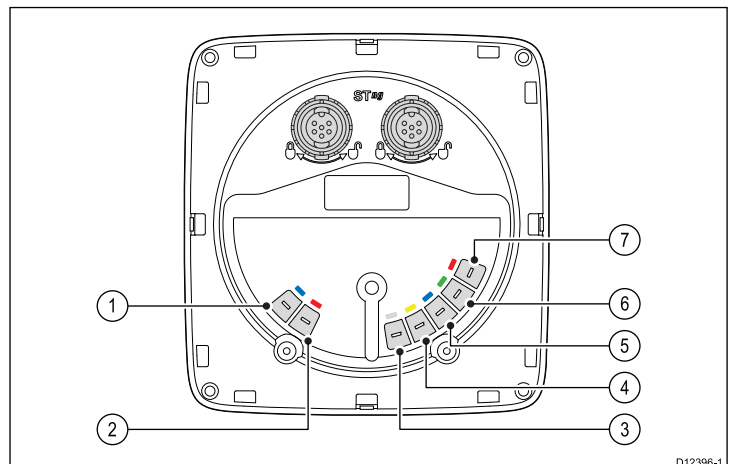


Connecting SeaTalk^{ng} cables

1. Rotate the locking collar on the back of the unit to the UNLOCKED position.
2. Ensure the spur cable end connector is correctly oriented.
3. Fully insert the cable connector.
4. Rotate locking collar clockwise (2 clicks) until it snaps into the LOCKED position.

Transducer connections

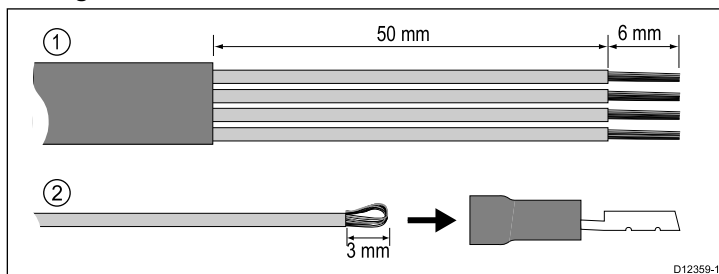
i60 transducer connections



1	Blue	Rotor + (Rotavecta)
2	Red	Rotor - (Rotavecta)
3	Grey	Wind 0 V (Shield)
4	Yellow	Anemometer (signal)
5	Blue	Cosine wind direction
6	Green	Sine wind direction
7	Red	Wind V+

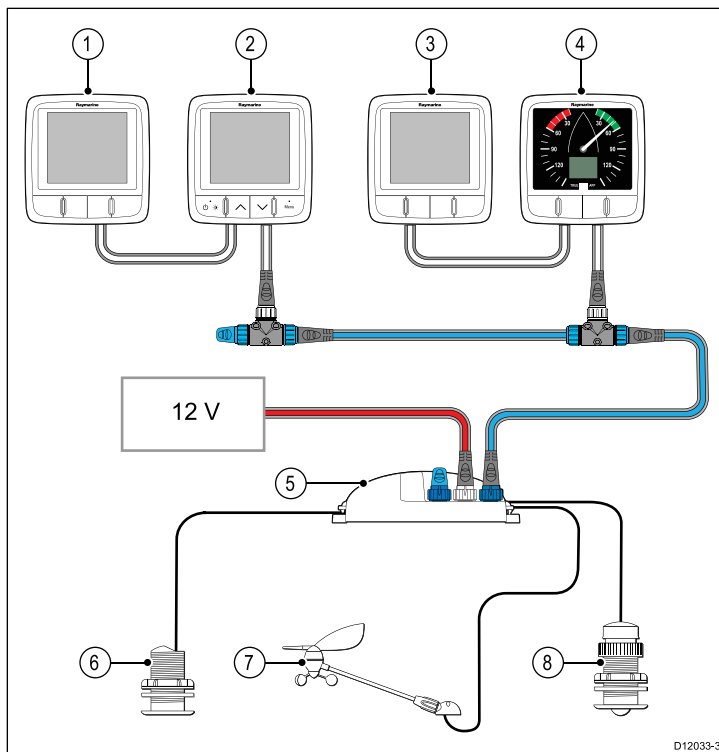
Note: Connectors 1 and 2 are rotavecta connections, connectors 3 to 7 are for wind transducers.

Making transducer connections



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.

iTC-5 connection



1	i50 Depth (Repeater)
2	i70 Instrument (Master)
3	i50 Speed (Repeater)
4	i60 Wind (Repeater)
5	iTC-5
6	Depth transducer
7	Wind vane transducer
8	Speed transducer

Note: Transducers connected to the iTC-5 must be calibrated using an i70 (master) unit. Transducers connected to the iTC-5 cannot be calibrated using an i50 / i60.

Making iTC-5 transducer connections

For instructions on connecting transducers to your iTC-5 refer to the iTC-5 handbook.

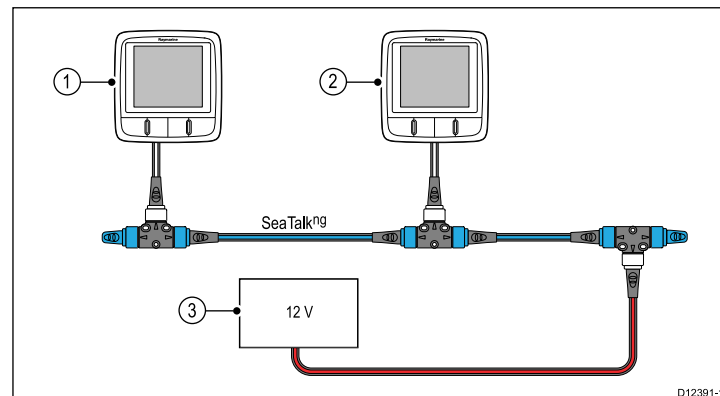
Power connection

A SeaTalk^{ng} system requires one 12 V dc supply, connected to the SeaTalk^{ng} backbone. This can be provided:

- By a battery via the distribution panel, or
- From a Raymarine course computer, via a SeaTalk or a SeaTalk^{ng} system.

Power connection example

SeaTalk^{ng} power connection



1	SeaTalk ^{ng} instrument.
2	SeaTalk ^{ng} instrument.
3	12 V dc vessel power supply.

Warning: Grounding not required
This product is fully insulated and does NOT require separate grounding.

Warning: Positive ground systems
Do not connect this unit to a system which has positive grounding.

SeaTalk power protection

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

SeaTalk power cables

Part number	Description
D229	SeaTalk power cable.

SeaTalk^{ng} power protection

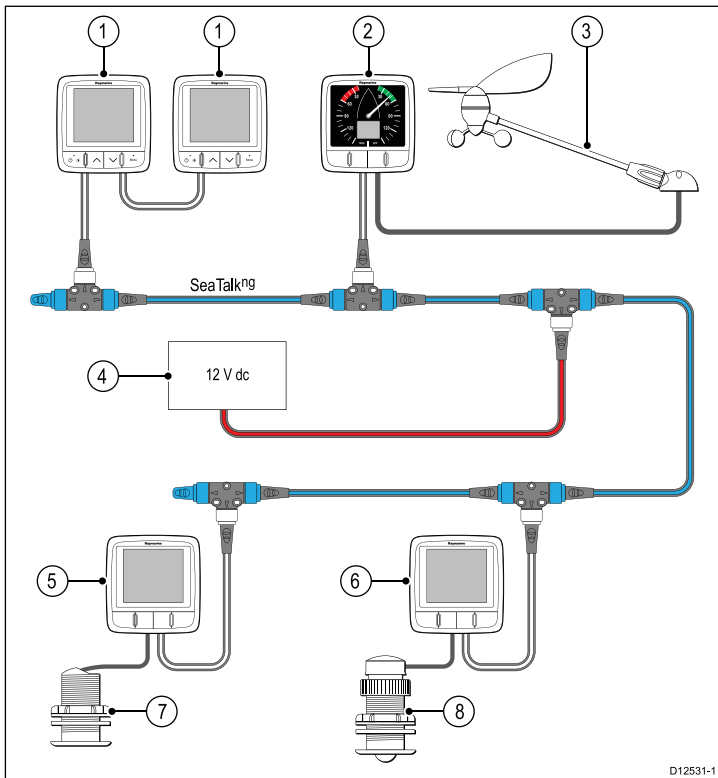
The power supply must be protected by a 5 A fuse or a circuit breaker providing equivalent protection.

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

SeaTalk^{ng} power cables

Part number	Description
A06049	SeaTalk ^{ng} power cable

SeaTalk^{ng} connection



D12531-1

1	i70 instrument displays (SeaTalk ^{ng})
2	i60 Wind instrument (SeaTalk ^{ng})
3	Raymarine wind vane transducer
4	12 V dc power supply
5	i50 Speed instrument (SeaTalk ^{ng})
6	i50 Depth instrument (SeaTalk ^{ng})
7	Speed transducer
8	Depth transducer

SeaTalk^{ng} cabling

SeaTalk^{ng} cables and connectors

Connection / Cable	Notes
Backbone cables (various lengths)	The main cable carrying data. Spurs from the backbone are used to connect SeaTalk ^{ng} devices.
T-piece connectors	Used to make junctions in the backbone to which devices can then be connected.
Terminators	Required at either end of the backbone.
Spur cables	Used to connect devices. Devices may be daisy chained or connected directly to the T-pieces
SeaTalk ^{ng} 5-way connector	Used to branch, split, or make additional connections in SeaTalk ^{ng} networks.

SeaTalk^{ng} power

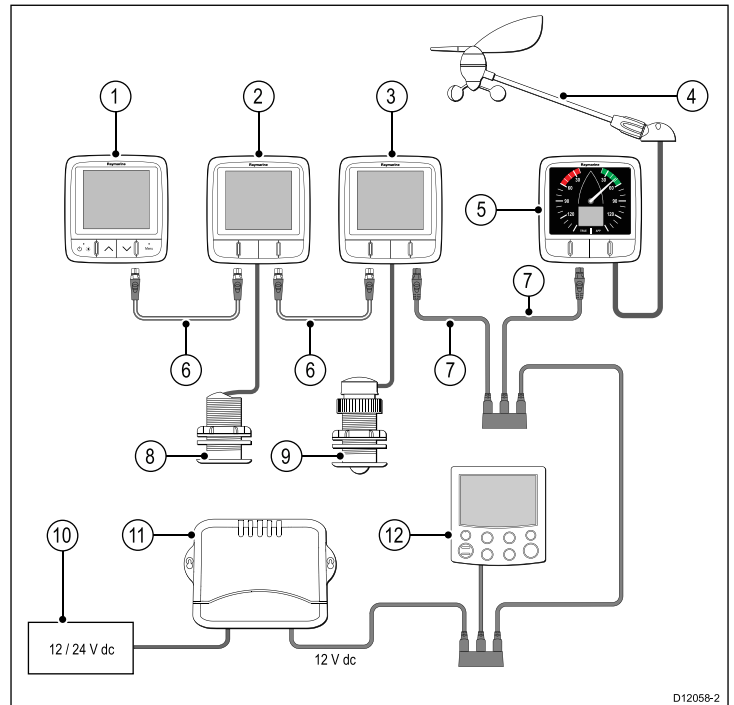
The SeaTalk^{ng} bus requires a 12 V power supply. This may be provided from:

- Raymarine SPX course computer, or
- Other separate regulated 12 V supply.

Note: SeaTalk^{ng} does NOT supply power to multifunction displays and other equipment with a dedicated power supply input.

SeaTalk connection

Basic SeaTalk system example



D12058-2

1	i70 Instrument display (SeaTalk ^{ng})
2	i50 Speed instrument (SeaTalk ^{ng})
3	i50 Depth instrument (SeaTalk ^{ng})
4	Raymarine wind vane transducer
5	i60 Wind instrument (SeaTalk ^{ng})
6	SeaTalk ^{ng} cables
7	SeaTalk to SeaTalk ^{ng} adaptor cables
8	Speed transducer
9	Depth transducer
10	12 / 24 V dc power supply
11	SeaTalk Course computer (providing 12 V dc power to SeaTalk network.)
12	ST6002 pilot controller (SeaTalk)

SeaTalk accessories

SeaTalk cables and accessories for use with compatible products.

Description	Part No	Notes
3-way SeaTalk junction box	D244	
1 m (3.28 ft) SeaTalk extension cable	D284	
3 m (9.8 ft) SeaTalk extension cable	D285	
5 m (16.4 ft) SeaTalk extension cable	D286	
9 m (29.5 ft) SeaTalk extension cable	D287	
12 m (39.4 ft) SeaTalk extension cable	E25051	
20 m (65.6 ft) SeaTalk extension cable	D288	

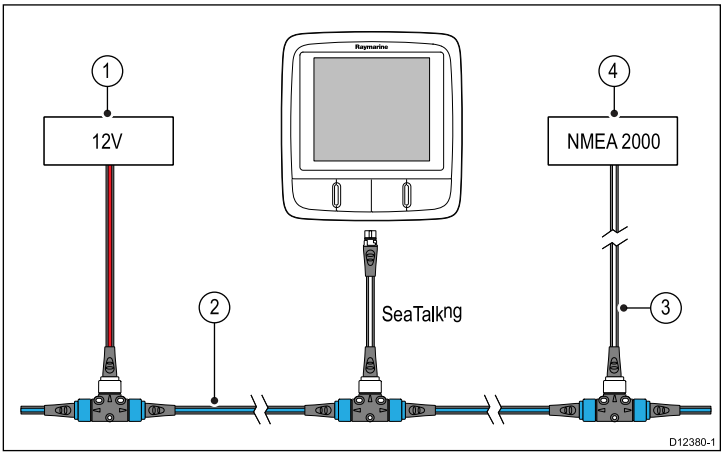
NMEA2000 connection

You can either:

- Use your SeaTalk^{ng} backbone and connect each NMEA2000 device on a spur, OR
- connect the instrument display on a spur into an existing NMEA2000 backbone.

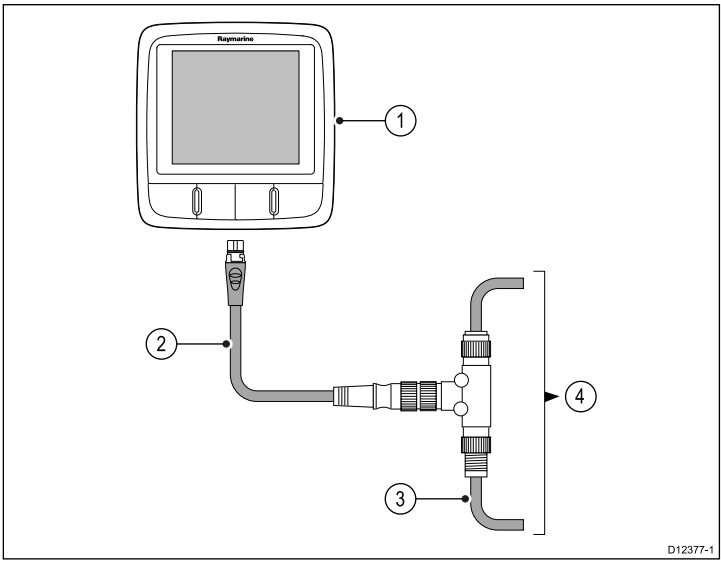
Important: You cannot have any 2 terminated backbones connected together, unless you have an isolation gateway between the two backbones.

Connecting NMEA2000 equipment to the SeaTalk^{ng} backbone



1. 12 V dc power supply into backbone.
2. SeaTalk^{ng} backbone.
3. SeaTalk^{ng} to DeviceNet adaptor cable.
4. NMEA2000 equipment.

Connecting the unit to an existing NMEA2000 (DeviceNet) backbone



1. SeaTalk^{ng} instrument display
2. SeaTalk^{ng} to DeviceNet adaptor cable.
3. DeviceNet backbone.
4. NMEA2000 equipment.

Chapter 5: Location and mounting

Chapter contents

- [5.1 Selecting a display location](#)
- [5.2 Mounting](#)
- [5.3 Front bezel](#)
- [5.4 Selecting a transducer location](#)

5.1 Selecting a display location



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).

General location requirements

When selecting a location for the unit it is important to consider a number of factors.

Ventilation requirements

To provide adequate airflow:

- Ensure that equipment is mounted in a compartment of suitable size.
- Ensure that ventilation holes are not obstructed.
- Ensure adequate separation of equipment.

Mounting surface requirements

Ensure units are adequately supported on a secure surface. Do NOT mount units or cut holes in places which may damage the structure of the vessel.

Cable routing requirements

Ensure the unit is mounted in a location which allows proper routing and connection of cables:

- Minimum cable bend radius of 100 mm (3.94 in) is required unless otherwise stated.
- Use cable supports to prevent stress on connectors.

Water ingress

This unit is suitable for mounting both above and below decks. It is waterproof to IPX6 standard. 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.

Magnetic compass

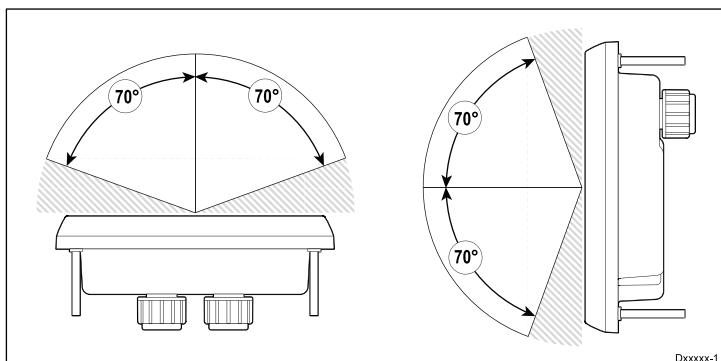
When choosing a suitable location you should aim to maintain the maximum possible distance between the unit and any compasses.

To prevent potential interference with the vessel's magnetic compasses, ensure that a minimum distance of 230 mm (9 in) between the unit and any installed compasses is maintained.

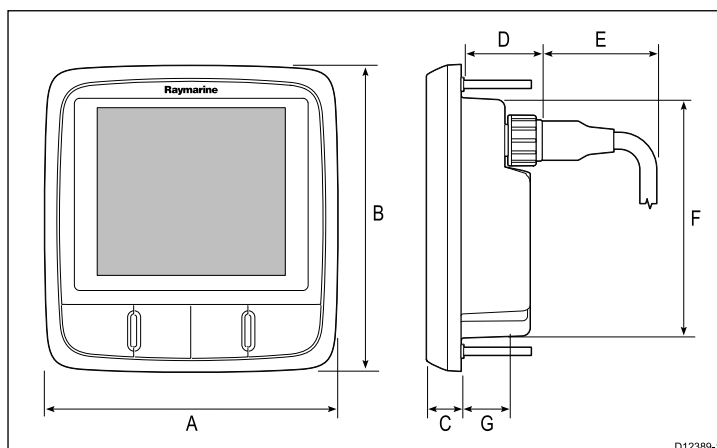
Viewing angle considerations

As display contrast, color and night mode performance are all affected by the viewing angle, Raymarine recommends you temporarily power up the display when planning the installation, to enable you to best judge which location gives the optimum viewing angle.

Viewing angle



Product dimensions



A	110 mm (4.22")
B	115 mm (4.52")
C	14 mm (0.55")
D	30 mm (1.18")
E	35 mm (1.38")
F	90 mm (3.54")
G	17 mm (0.67")

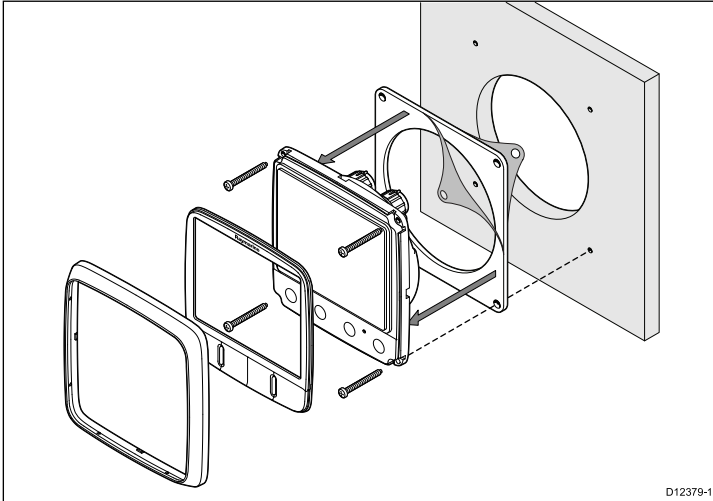
5.2 Mounting

Pre-mounting check

The product is designed to be surface mounted. Before mounting the unit, ensure you have:

- Selected a suitable location.
- Identified the cable connections and route that the cables will take.
- Detached the front bezel.
- Remove the keypad mat.

Mounting diagram



Mounting instructions

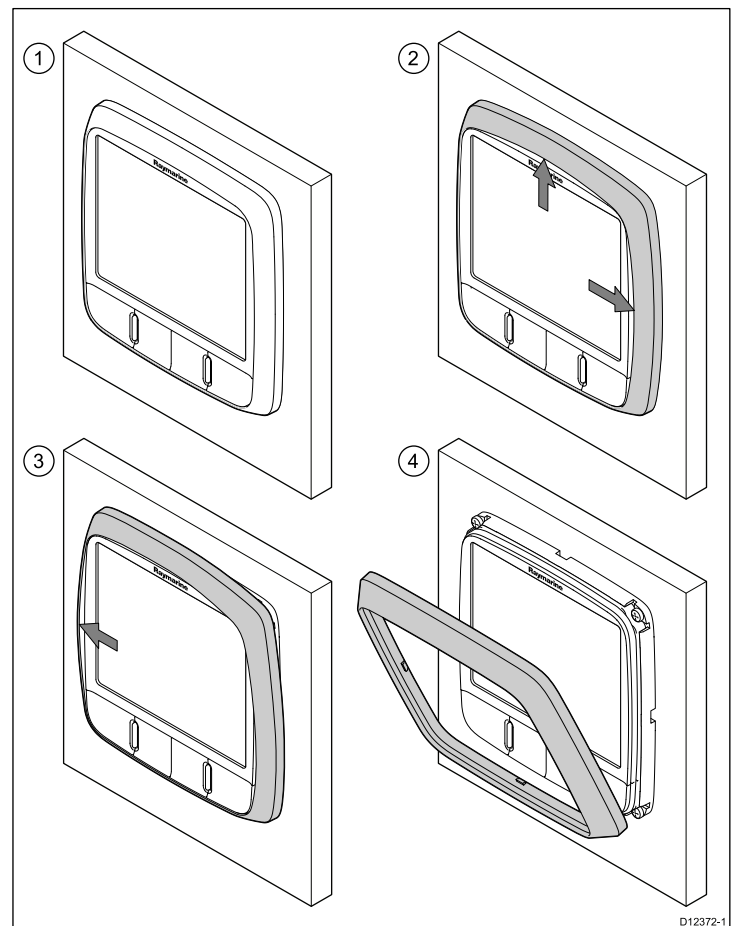
1. Check the selected location for the unit, a clear, flat area with suitable clearance behind the panel is required.
2. Fix the mounting template supplied with the product, to the selected location, using masking or self adhesive tape.
3. If possible use an appropriate size hole cutting saw and cut out the centre hole cut out area as indicated on the mounting template, or
4. Using a suitable hole cutting saw, make pilot holes in each corner of the cut out area and using a jigsaw cut along the inside edge of the cut out line.
5. Ensure that the unit fits into the removed area and then file around the cut edge until smooth.
6. Drill any required holes as indicated on the mounting template for the securing screws.
7. Connect the relevant cables to the unit.
8. Peel the backing off of the supplied gasket and place the adhesive side of the gasket onto the display unit and press firmly onto the flange.
9. Slide the unit into place and secure using the screws provided.
10. Refit keypad mat and front bezel.

Note: Drill, tap size and tightening torques are dependant upon the material type and thickness of the mounting surface.

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

5.3 Front bezel

Removing the front bezel



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

1. Using your fingers pull the bezel away from the unit at the top and side, as shown in 2. The bezel will start to come away from the unit at the top and side.
2. Now pull the bezel away from the unit on the opposite side, as shown in 3. The bezel will now come free from the unit, as shown in 4.

5.4 Selecting a transducer location

Wind vane transducer / rotavecta location requirements

The transducer's location must:

- Allow reasonable access for installation and servicing.
- Be as high as possible and away from any equipment which may shield the transducer or otherwise disturb the air flow.
- Provide a horizontal mounting surface. If a surface (e.g. mast top) is otherwise suitable but not horizontal, make up a suitable wedged packing piece to provide the necessary horizontal surface.
- There must also be a viable route for the transducer cable to be routed to the instrument display.

Wind vane transducer and rotavecta mounting

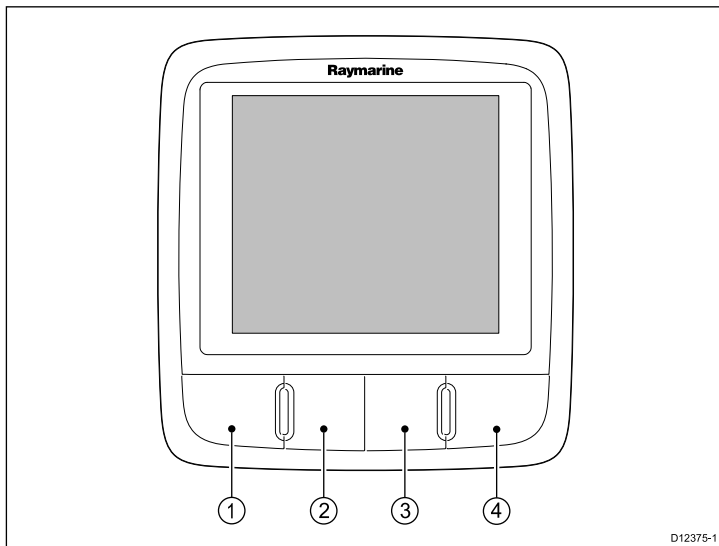
Ensure that the wind transducer or rotavecta is installed in accordance with the instructions supplied with the unit.

Chapter 6: Getting started

Chapter contents

- [6.1 Controls](#)
- [6.2 Power](#)
- [6.3 Data master](#)
- [6.4 Illumination](#)
- [6.5 Calibration](#)

6.1 Controls



1	Display (Power) — Power the instrument display on and off, adjust backlight and contrast levels.
2	True / App — Switch between true and apparent wind direction.
3	VMG — Display Velocity made good.
4	Tack — Tack heading.

6.2 Power

Powering on the unit

With power to the unit turned on but the unit switched off:

1. Press and hold the **Power** button until the unit powers on and data is displayed (approximately 2 seconds).

Note: When power to the unit is turned on the unit will switch on automatically.

Powering off the unit

1. Press and hold the **Power** button until the power count down timer is displayed and reaches zero (approximately 6 to 8 seconds).

Calibration alert

If the **CAL** legend on the digital display flashes for the first 30 seconds after power up, refer to the *Calibration* section to calibrate your unit.

6.3 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.

Setting a unit as data master

1. Refer to the *Intermediate calibration* section for details on how to set your unit as data master.

6.4 Illumination

Adjusting the backlight level

During normal operation:

1. Press and hold the **Power** button for approximately 1 second to display the backlight page.
2. Use the **VMG** or **Tack** buttons to adjust the backlight to the required level.

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

6.5 Calibration

Before first use calibration procedures must be carried out to ensure optimum performance of the instrument with the vessel.

The calibration procedures are:

- User calibration
- Intermediate calibration
- Group setup
- Dealer calibration

Note: Group setup is for group illumination and is not part of the calibration process.

User calibration

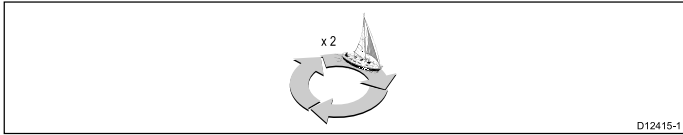
User calibration options include:

- Wind angle offset
- Wind speed units

Linearizing and aligning the wind transducer

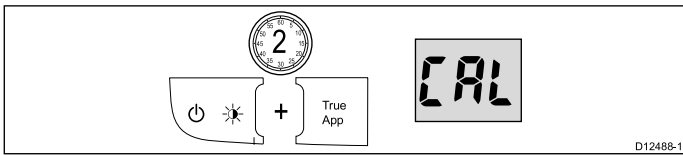
You will need to be underway, with sufficient space to turn in a large circle unhindered.

1. Slowly turn the vessel through 2 complete circles.

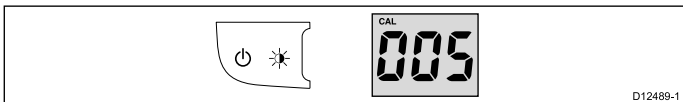


This procedure automatically linearizes the wind vane. A successful linearization is indicated by the digital display flashing and a buzzer sounding three beeps.

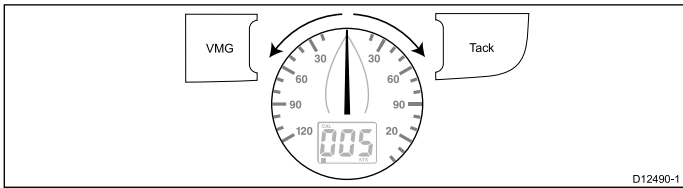
2. Press and hold the **Power** and **True / App** button simultaneously for approximately 2 seconds to enter the user calibration menu.



3. Press the **Power** button to display the wind angle offset page.



4. Sail your vessel directly into the wind and adjust the analog pointer to 0, using the **VMG** and **Tack** buttons.



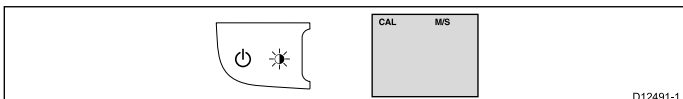
The VMG button will decrease the current value and the Tack button will increase the current value. As you do this, the wind angle offset shows the amount of correction you have applied.

5. To exit the user calibration pages at any time press and hold the **Power** and **True / App** buttons simultaneously for approximately 2 seconds.

Selecting wind speed units

From the user calibration pages:

1. Press the **Power** button to display the wind speed units page, or

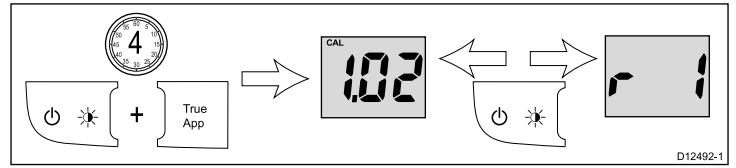


2. Use the **VMG** and **Tack** buttons to select the required wind units.
3. To exit the user calibration pages at any time press and hold the **Power** and **True / App** buttons simultaneously for approximately 2 seconds.

Intermediate calibration

Intermediate calibration allows you to:

i60 Wind	i60 Close hauled wind
Check instrument software version.	Check instrument software version.
Check the instrument status (either master or repeater).	



Checking the software version

During normal operation:

1. Press and hold the **Power** and **True / App** buttons simultaneously for approximately 4 seconds.

The current software version is displayed. The software version page will time-out automatically after 8 seconds of inactivity.

2. Press the **Power** button to display the instrument status.

Checking the instrument status

From the software version page:

1. Press the **Power** button.

The instrument status is displayed (r0 = master and r1 = repeater). The instrument status page will time-out automatically after 8 seconds of inactivity.

Dealer calibration

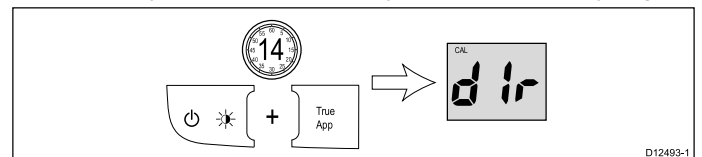
The dealer calibration procedures include:

- Setting User calibration options on or off.
- Setting required wind angle and speed response.
- Setting the velocity made good (VMG) response.
- Setting boat show mode on or off.
- Restore factory default

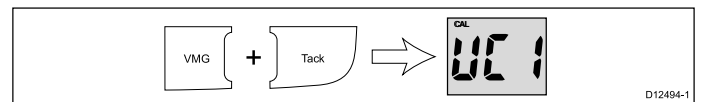
Setting dealer calibration options

During normal operation:

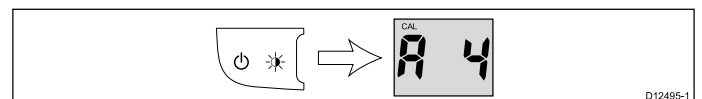
1. Press and hold the **Power** and **True / App** buttons for approximately 14 seconds to display the dealer cal entry page.



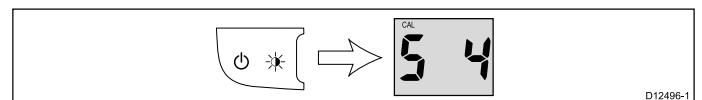
2. Press the **VMG** and **Tack** buttons simultaneously to display the user calibration access page.



3. Use the **VMG** or **Tack** buttons to turn user calibration on and off.
4. Press the **Power** button to display the wind angle response page.

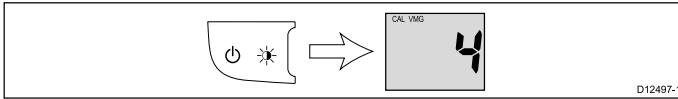


5. Use the **VMG** or **Tack** buttons to set the required wind angle response values.
6. Press the **Power** button to display the wind speed response page.



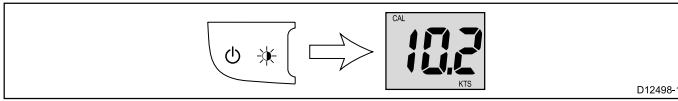
7. Use the **VMG** or **Tack** buttons to set the required wind speed response values.

8. Press the **Power** button to display the VMG response page.

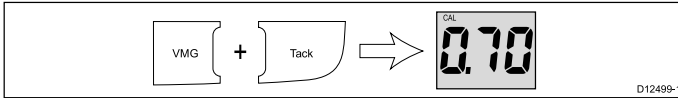


9. Use the **VMG** or **Tack** buttons to set the required VMG response values.

10. Press the **Power** button to display the wind speed page.

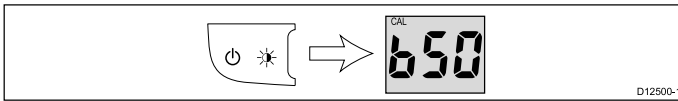


11. Press the **VMG** or **Tack** buttons to display the wind speed calibration page.



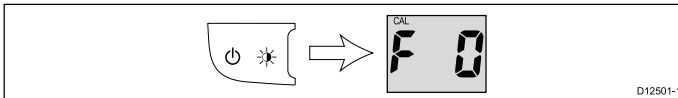
12. Use the **VMG** or **Tack** buttons to adjust the wind speed calibration value to 0.7.

13. Press the **Power** button to display the boat show mode page.



14. Use the **VMG** or **Tack** buttons to switch boat show mode on and off.

15. Press the **Power** button to display the factory reset page.



16. Use the **VMG** or **Tack** buttons to reset unit's settings to factory default values.

17. Use the **VMG** or **Tack** buttons to adjust the current values on each page.

18. To exit the dealer calibration pages at any time press and hold the **Power** and **True / App** buttons simultaneously for approximately 2 seconds.

Note: User calibration access, wind speed and boat show mode pages are not available on the i60 Close hauled wind.

Chapter 7: Using your display

Chapter contents

- [7.1 Pages](#)
- [7.2 i60 Wind operation](#)
- [7.3 Group illumination](#)

7.1 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
*Beaufort wind speed	*Maximum wind speed
*Maximum wind speed	VMG
*Maximum true wind speed alarm	Tack
*Low true wind speed alarm	
*High apparent wind angle alarm	
*Low apparent wind angle alarm	
VMG	
Tack	

Note: *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 **Power** button to cycle through the pages.
2. Press the **VMG** button to display VMG information.
3. Press the **Tack** button to display tack information.

7.2 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.

i60 display information

Analogue display

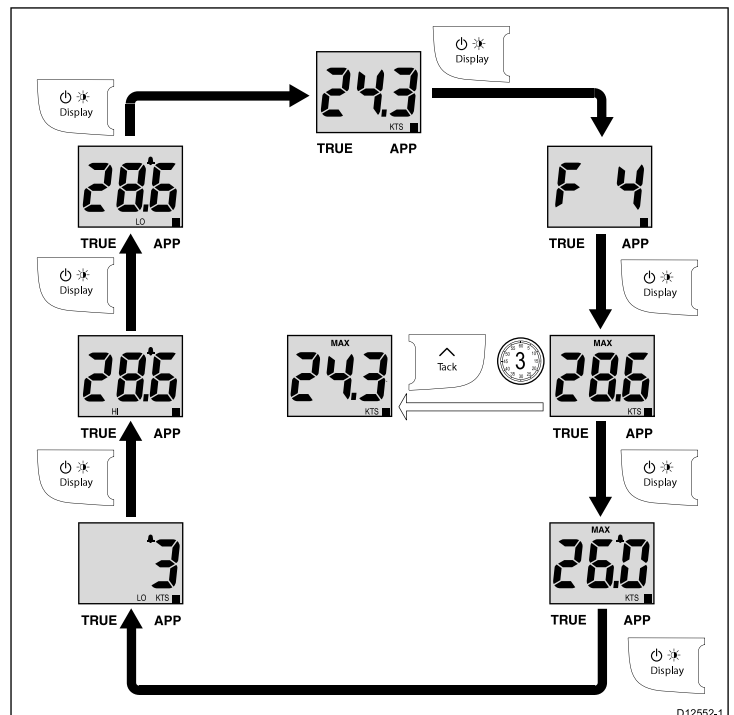
The analogue display pointer shows either true or apparent wind direction (Depending on setting).

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 (Power) button

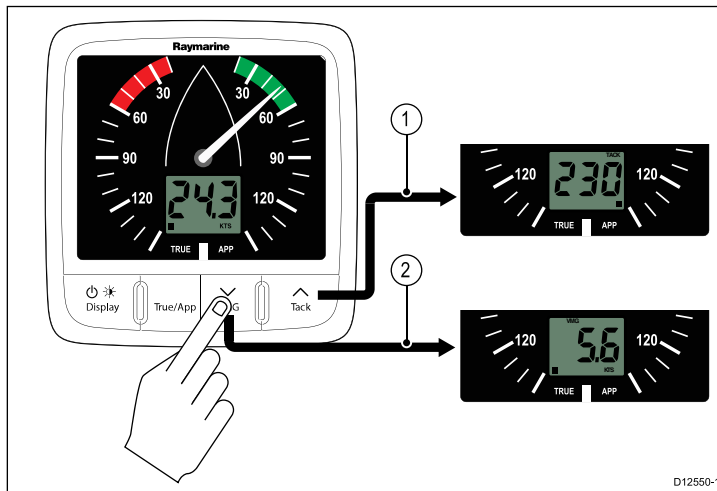


During normal operation:

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

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:

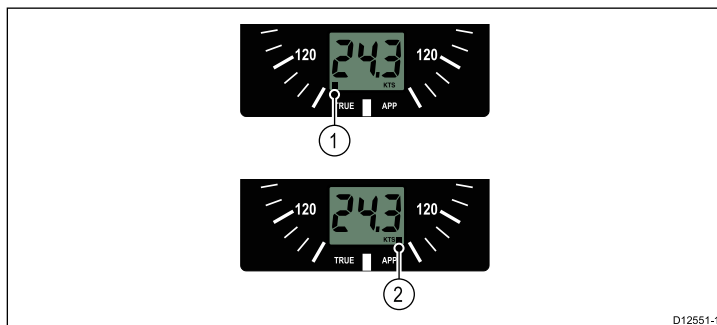
1. Press the **VMG** button to show the **VMG** page on the digital display.

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.

Switching between true and 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.

7.3 Group illumination

The unit can participate in shared illumination via a SeaTalk network or group illumination via a SeaTalk^{ng} network.

When connected on a SeaTalk 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:

- Helm 1
- Helm 2
- Cockpit
- Flybridge
- Mast
- grP1 to grP5

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

During normal operation:

1. Press and hold the **Display (Power)** and **True / app** buttons simultaneously for 6 seconds.

The **Group brightness entry** page is displayed.

Note: The **Group brightness entry** page is a temporary page and will time-out to the previous page after 8 seconds.

2. Press the **Display (Power)** button to display the **Group** page.
3. Use the **VMG** or **Tack** buttons to select the group the unit will be assigned to.

Chapter 8: Using alarms

Chapter contents

- [8.1 Alarms](#)

8.1 Alarms

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

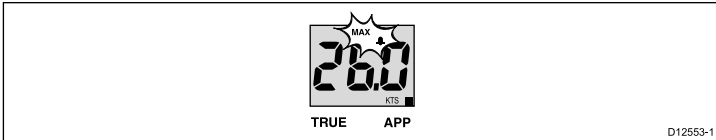
Alarms available on the i60 Wind are listed below.

- 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.

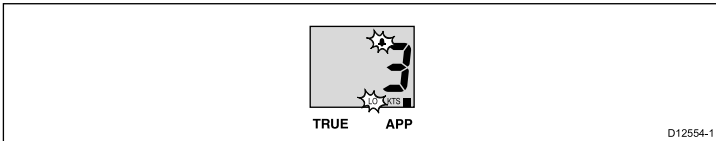
Alarm indications

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

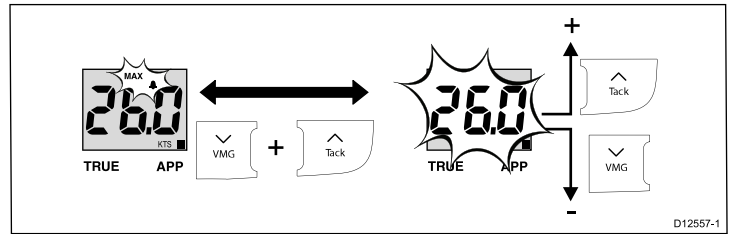
1. Press any button to silence an active alarm.

Enabling / Disabling alarms

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



With the relevant alarm page displayed:

1. Press the **VMG** and **Tack** buttons simultaneously 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 simultaneously 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 9: Maintaining your display

Chapter contents

- [9.1 Service and maintenance](#)
- [9.2 Condensation](#)
- [9.3 Routine equipment checks](#)
- [9.4 Cleaning](#)
- [9.5 Cleaning the display case](#)
- [9.6 Cleaning the display screen](#)

9.1 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.

9.3 Routine equipment checks

Raymarine strongly recommends that you complete a number of routine checks to ensure the correct and reliable operation of your equipment.

Complete the following checks on a regular basis:

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

9.5 Cleaning the display case

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

1. Switch off the power to the display.
2. Wipe the display with a clean, soft cloth (a microfibre cloth is ideal).
3. If necessary, use isopropyl alcohol (IPA) or a mild detergent to remove grease marks.

Note: Do NOT use IPA or any other solvent or detergent on the screen itself.

Note: In certain conditions, condensation may appear inside the display screen. This will not harm the unit, and can be cleared by powering on the display for a short time.

9.2 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.

9.4 Cleaning

Best cleaning practices.

When cleaning this product:

- Do NOT wipe the display screen with a dry cloth, as this could scratch the screen coating.
- Do NOT use abrasive, or acid or ammonia based products.
- Do NOT use a jet wash.

9.6 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 (available from an opticians).

Chapter 10: Troubleshooting

Chapter contents

- [10.1 Troubleshooting](#)
- [10.2 Instrument troubleshooting](#)
- [10.3 Power up troubleshooting](#)
- [10.4 Miscellaneous troubleshooting](#)
- [10.5 Self-test](#)

10.1 Troubleshooting

The troubleshooting information provides possible causes and corrective action required for common problems associated with marine electronics installations.

All Raymarine products are, prior to packing and shipping, subjected to comprehensive test and quality assurance programs. However, if you experience problems with the operation of your product this section will help you to diagnose and correct problems in order to restore normal operation.

If after referring to this section you are still having problems with your unit, please contact Raymarine Technical Support for further advice.

10.2 Instrument troubleshooting

Fault	Cause	Action
Blank display.	No power supply.	<ul style="list-style-type: none"> • Check fuse / circuit breaker. • Check power supply. • Check SeaTalk / SeaTalk^{ng} cabling and connector security.
SeaTalk / SeaTalk ^{ng} information not being transferred between instruments.	SeaTalk / SeaTalk ^{ng} cabling or connector fault.	<ul style="list-style-type: none"> • Check security of SeaTalk / SeaTalk^{ng} connections between units. • Check condition of SeaTalk / SeaTalk^{ng} cables. • Isolate faulty unit by disconnecting units one by one.
A group of SeaTalk / SeaTalk ^{ng} units not working.	SeaTalk / SeaTalk ^{ng} cabling or connector fault.	<ul style="list-style-type: none"> • Check the security of SeaTalk / SeaTalk^{ng} connectors between functioning and non-functioning units. • Check the condition of SeaTalk / SeaTalk^{ng} cable between functioning and non-functioning units.

10.3 Power up troubleshooting

Problem	Possible causes	Possible solutions
The system (or part of it) does not start up.	Power supply problem.	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.

10.4 Miscellaneous troubleshooting

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

Problem	Possible causes	Possible solutions
Display behaves erratically: <ul style="list-style-type: none">• Frequent unexpected resets.• System crashes or other erratic behavior.	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 raymarine and click on support 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.	

10.5 Self-test

The unit has a built in self-test to aid fault diagnosis. The resulting failures and / or fault codes should be used when contacting Raymarine customer support.

Starting self-test

During normal operation:

1. Press the **Display (Power)** and **Tack** button simultaneously for 4 seconds, until the unit beeps.
2. When the unit beeps immediately press the **VMG** and **Tack** button simultaneously.
Self-test stage 1 will commence.
3. At the end of each test press the **Display (Power)** and **True / App** button simultaneously to progress to the next stage.

Self-test stages

Self-test stage 1

When entering **Self-test stage 1**, the unit beeps and the display shows **St** followed by **t1**.

Self-test stage 1 will perform the following tests:

- SeaTalk / SeaTalk^{ng} self-test, which checks the receive and transmit circuits.
- EEPROM test (read and write).

If the tests are satisfactory, **P** is shown on the display.

If the tests are not satisfactory, the following failure codes may be generated:

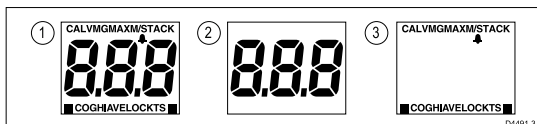
Fault code
F01
F02

Self-test stage 2

When entering **Self-test stage 2**, the unit beeps and the display shows **t 2**, for 1 second.

Self-test stage 2 will perform the following tests:

- Backlighting test, which cycles between on and off every second.
- Any button press sounds a beep.
- Display test, which tests the LCD segments in the following sequence, changing once per second:



D4491-2

While the test is progressing, press each of the display buttons and check that the buzzer sounds as each button is pressed.

The table below shows possible problems that may be encountered:

Failure
No illumination.
Button illumination failure.
Degraded dial illumination
No beep when button pressed.
LCD segment(s) missing completely.
Faint LCD segment(s).
Pointer not rotating or erratic movement

Self-test stage 3

When entering **Self-test stage 3**, the unit beeps and the display shows **t 3**, for 1 second.

Self-test stage 3 will perform pointer offset and corrections.

Pressing the **Display (Power)** button will rotate the pointer clockwise to align with the major graduations.

If the pointer is misaligned use the **VMG** (anti-clockwise) and **Tack** (clockwise) buttons to manually adjust the pointer offset until correct alignment is obtained.

Self-test stage 4

A known good transducer must be connected for **Self-test stage 4**, and the vessel must be underway at sufficient speed for the tests to be performed.

When entering **Self-test stage 4**, the unit beeps and the display shows **t 4**, for 1 second.

Self-test stage 4 will perform a transducer test

If the test is satisfactory then **P** is shown on the display.

If the test is not satisfactory then a fail code will be shown on the display:

Fault code	Failure
F5	Rotavecta
F3	Wind vane
F4	Annemometer

To exit self-test stage 4 and save pointer offset corrections, press the **Display (Power)** and **True / App** buttons simultaneously for 2 seconds.

To exit self-test stage 4 without saving pointer offset corrections, press the **Display (Power)** and **True / App** buttons simultaneously.

Chapter 11: Technical support

Chapter contents

- [11.1 Raymarine customer support](#)
- [11.2 Checking the software version](#)

11.1 Raymarine customer support

This contains Frequently Asked Questions, servicing information, e-mail access to the Raymarine Technical Support Department and details of worldwide Raymarine agents.

Product information

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

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

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

11.2 Checking the software version

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 12: Technical specification

Chapter contents

- [12.1 Technical specification](#)

12.1 Technical specification

Nominal supply voltage	12 V dc
Operating voltage range	10 V dc to 16 V dc
Power consumption	<ul style="list-style-type: none">• < 1 W Typical (Display only)• 2.4 W Maximum (Transducer connected)
Current	<ul style="list-style-type: none">• 45 to 65 mA Typical (Display only)• 200 mA Maximum (Transducer connected)
LEN (Refer to SeaTalk ^{ng} reference manual for further information.)	4
Environmental	Operating temperature: -20°C to +55°C Storage temperature: -30°C to +70°C Relative humidity: 93% Water proofing: IPX6
Connections	<ul style="list-style-type: none">• 2 x SeaTalk^{ng} connections (compliant with SeaTalk)• Transducer connections
Conformance	Europe 2004/108/EC

Chapter 13: Spares and accessories

Chapter contents

- [13.1 Wind transducers](#)
- [13.2 Spares](#)
- [13.3 SeaTalk^{ng} cables and accessories](#)
- [13.4 Converters](#)

13.1 Wind transducers

The following wind transducers are available for the i60 range:

Description	Part number	Notes
Wind vane transducer	E22078	
Rotavecta transducer	Z195	

Note: Other transducers are available please check with your local Raymarine dealer.

13.2 Spares

Description	Part number	Note
i50 / i60 / i70 front bezel	R22168	
i50 / i60 / i70 Sun cover	R22169	
i60 Keypad	R70133	

13.3 SeaTalk^{ng} cables and accessories

Description	Part No	Notes
Backbone Kit	A25062	Includes: <ul style="list-style-type: none"> • 2 x 5 m (16.4 ft) Backbone cable • 1 x 20 m (65.6 ft) Backbone cable • 4 x T-piece • 2 x Backbone terminator • 1 x Power cable
SeaTalk ^{ng} 0.4 m (1.3 ft) spur	A06038	
SeaTalk ^{ng} 1 m (3.3 ft) spur	A06039	
SeaTalk ^{ng} 3 m (9.8 ft) spur	A06040	
SeaTalk ^{ng} 5 m (16.4 ft) spur	A06041	
SeaTalk ^{ng} 0.4 m (1.3 ft) backbone	A06033	
SeaTalk ^{ng} 1 m (3.3 ft) backbone	A06034	
SeaTalk ^{ng} 3 m (9.8 ft) backbone	A06035	
SeaTalk ^{ng} 5 m (16.4 ft) backbone	A06036	
SeaTalk ^{ng} 9 m (29.5 ft) backbone	A06068	
SeaTalk ^{ng} 20 m (65.6 ft) backbone	A06037	
SeaTalk ^{ng} to bare ends 1 m (3.3 ft) spur	A06043	
SeaTalk ^{ng} to bare ends 3 m (9.8 ft) spur	A06044	
SeaTalk ^{ng} Power cable	A06049	
SeaTalk ^{ng} Terminator	A06031	
SeaTalk ^{ng} T-piece	A06028	Provides 1 x spur connection
SeaTalk ^{ng} 5-way connector	A06064	Provides 3 x spur connections
SeaTalk to SeaTalk ^{ng} converter	E22158	Allows the connection of SeaTalk devices to a SeaTalk ^{ng} system.
SeaTalk ^{ng} Inline terminator	A80001	Provides direct connection of a spur cable to the end of a backbone cable. No T-piece required.
SeaTalk ^{ng} Blanking plug	A06032	
SeaTalk (3 pin) to SeaTalk ^{ng} adaptor cable 0.4 m (1.3 ft)	A06047	
SeaTalk2 (5 pin) to SeaTalk ^{ng} adaptor cable 0.4 m (1.3 ft)	A06048	
DeviceNet adaptor cable (Female)	A06045	Allows the connection of NMEA 2000 devices to a SeaTalk ^{ng} system.

Description	Part No	Notes
DeviceNet adaptor cable (Male)	A06046	Allows the connection of NMEA 2000 devices to a SeaTalk ^{ng} system.
DeviceNet adaptor cable (Female) to bare ends.	E05026	Allows the connection of NMEA 2000 devices to a SeaTalk ^{ng} system.
DeviceNet adaptor cable (Male) to bare ends.	E52027	Allows the connection of NMEA 2000 devices to a SeaTalk ^{ng} system.

13.4 Converters

Part number	Description
E22158	SeaTalk to SeaTalk ^{ng} Converter

Appendix A NMEA 2000 sentences

PG name	PGN	i60 Wind Transmit	i60 Wind 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 groupfunction	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	•	•