

Ray50 / Ray60 / Ray70

EN Mounting and Getting Started

ENGLISH

Date: 02-2015

Document number: 88033-2-EN

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Raymarine[®]
BY **FLIR**[®]

ENGLISH

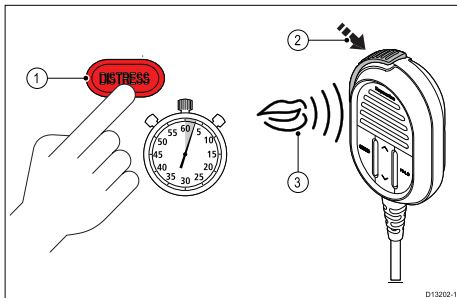
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Making a distress call

In an emergency you can use your unit to make an automatic DSC distress call.

With the spring loaded cover open:



1. Press and hold the **DISTRESS** button for 3 seconds.

Once the **DISTRESS** button is pressed a 3 second count down will begin, when the count down reaches zero the DSC distress call is transmitted.

The distress call is repeated automatically until it is acknowledged.

2. Press and hold the **PTT** button, then slowly and clearly speak the details of the distress in the following format:

MAYDAY, MAYDAY, MAYDAY

This is <state name of vessel 3 times>

MAYDAY <state name of vessel 1 time>

My position is <state latitude and longitude, or true bearing and distance from a known point.>

I am <state nature of distress e.g. sinking, on fire etc.>

I have <state number of persons on board and any other information — drifting, flares fired etc.>

**I REQUIRE IMMEDIATE ASSISTANCE
OVER**

3. Release the **PTT** button.

Making a Mayday call

In an emergency you can use your unit to make a Mayday call.

1. Press the **16 PLUS** button.
2. Press and hold the **PTT** button.
3. Slowly and clearly speak the details of the distress:

MAYDAY, MAYDAY, MAYDAY

This is <state name of vessel 3 times>

MAYDAY <state name of vessel 1 time>

My position is <state latitude and longitude, or true bearing and distance from a known point.>

I am <state nature of distress e.g. sinking, on fire etc.>

I have <state number of persons on board and any other information — drifting, flares fired etc.>

**I REQUIRE IMMEDIATE ASSISTANCE
OVER**

4. Release the **PTT** button.
5. If an acknowledgement is not received then repeat steps 2 to 4 above.

Important information



Warning: Read the expanded handbook

This document is a subset of the full documentation for your product. For the complete documentation and safety information, please refer to the expanded handbook, available on the Raymarine website (www.raymarine.com).



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: 12 Volt dc only

This product must only be connected to a 12 volt dc power source.



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.



Warning: Chassis grounding

Do NOT ground this product using the chassis ground terminal.

Grounding this product to a vessel's RF ground may cause galvanic corrosion.



Warning: Antenna isolation

To prevent galvanic corrosion your antenna must be isolated from any vessel metalwork using a suitable insulated e.g. plastic, mounting bracket.



Warning: Protect unused cables

Unused cables and wires should be protected from water ingress and from making contact with metal that may be grounded.

- If supplied, use protective boots to ensure that cables that are not connected are protected.
- NEVER leave bare ended wires uncovered/unprotected as this could cause a short circuit and can induce galvanic corrosion.



Warning: FCC Warning (Part 15.21)

Changes or modifications to this equipment not expressly approved in writing by Raymarine Incorporated could violate compliance with FCC rules and void the user's authority to operate the equipment.



Warning: Maximum Permissible Exposure

Failure to observe these guidelines may expose those within the maximum permissible exposure (MPE) radius to RF radiation absorption that exceeds the FCC MPE limit. It is the radio operator's responsibility to ensure that no one comes within this radius.

For optimal radio performance and minimal human exposure to radio frequency electromagnetic energy, make sure the antenna is:

- connected to the radio before transmitting
- located where it will be away from people
- located at least 1.5 meters (5 feet) from the radio's main unit

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: Perform regular radio checks

Perform regular radio checks when using your vessel, as recommended in radio training and certification schemes and radio equipment rules of use.

Caution: Ensure proper radio use

Under no circumstances should a DSC distress alert be sent from your radio for test purposes. Such action is a violation of rules of use for radio equipment, and can result in heavy fines.

Caution: Product cleaning

When cleaning products:

- If your product includes a display screen, do NOT wipe the 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.

Water ingress

Water ingress disclaimer

Although the waterproof rating capacity of this product meets the stated IPX standard (refer to the product's *Technical Specification*), water intrusion and subsequent equipment failure may occur if the product is subjected to commercial high-pressure washing. 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.

FCC

Compliance Statement (Part 15.19)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Interference Statement (Part 15.105 (b))

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio / TV technician for help.

Industry Canada

This device complies with Industry Canada License-exempt RSS standard(s).

Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

Industrie Canada (Français)

Cet appareil est conforme aux normes d'exemption de licence RSS d'Industry Canada.

Son fonctionnement est soumis aux deux conditions suivantes:

1. cet appareil ne doit pas causer d'interférence, et
2. cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Licensing

Prior to using this product please check your national requirements for both operators and equipment licensing.

Station Licence

FCC station license requirement

An FCC Ship Radio Station License and Call Sign are not required for most recreational vessels travelling in US waters. However, you must obtain a license if your vessel travels to foreign ports.

Ships that use MF/HF single side-band radio, satellite communications, or telegraphy must be licensed by the FCC. You can obtain a Station License by filing FCC Form 605, which is available from the FCC website listed above.

Industry Canada

Industry Canada license requirement

You do not need a license to operate this product within sovereign waters of Canada or the US. You will need a license to operate this radio outside of Canada or the US. To obtain Industry Canada licensing information, contact the nearest field or regional office, or write:

Industry Canada Radio Regulatory Branch
Attention: DOSP
300 Slater Street
Ottawa, Ontario
Canada, KIA OC8

European licensing requirements

Regulations in some areas require that an Operator's license is obtained before operating a VHF radio. It is your responsibility to determine whether a license is required in your area before operating this equipment.

Additional information – Ray50

The following additional information is required for completing a license application in Canada and the US.

Industry Canada certification number	4069B-RAY50D
FCC ID	PJ5-RAY50
FCC Type accepted	Parts 2, 15 and 80
Output power	1 watt (low) and 25 watt (high)
Modulation	FM
Frequency range	155.500 MHz to 163.275 MHz

Additional information – Ray60

The following additional information is required for completing a license application in Canada and the US.

Industry Canada certification number	4069B-RAY60D
FCC ID	PJ5-RAY60

FCC Type accepted	Parts 2, 15 and 80
Output power	1 watt (low) and 25 watt (high)
Modulation	FM
Frequency range	155.500 MHz to 163.275 MHz

Additional information – Ray70

The following additional information is required for completing a license application in Canada and the US.

Industry Canada certification number	4069B-RAY70D
FCC ID	PJ5–RAY70
FCC Type accepted	Parts 2, 15 and 80
Output power	1 watt (low) and 25 watt (high)
Modulation	FM
Frequency range	155.500 MHz to 163.275 MHz

Maritime Mobile Service Identity (MMSI)

This product is a class “D” Digital Selective Calling (DSC) device.

A 9 digit MMSI number is required to operate DSC equipment. In some areas, a radio operator license is required before an MMSI number can be issued.

Note: You can request an MMSI number from the same agency that issues radio or ship radio licenses in your area. Once obtained, you can program the MMSI number into your product by following the instruction supplied with the product.

Once obtained, you can program the MMSI number into your product using the instructions provided.

If regulations in your area do not permit you to program the MMSI number yourself, your Raymarine dealer can program the number for you.

Obtaining an MMSI number in the United States

You can request an MMSI number from the FCC when you apply for a Station License. If your vessel does not require a license, you may obtain an MMSI by contacting BoatUS www.boatus.com.

Obtaining an MMSI number in Canada

You can obtain an MMSI number from your nearest Industry Canada Office.

Obtaining an MMSI number in Europe and rest of world

An MMSI number should be requested from the same agency that issues radio operator licenses in your area.

Automatic Transmitter Identification System (ATIS)

Your product includes ATIS functionality for use on the inland waterways of contracting governments of the “Regional Arrangement on the Radiocommunication Service for Inland Waterways” — also known as “RAINWAT”.

ATIS adds data at the end of radio transmissions that identifies your station. ATIS operation can be turned on or off as needed via the radio's menu.

An ATIS ID can be obtained from the same agency that issues radio operator licenses in your area.

Your ATIS ID should be programmed into your product using the instructions provided.

Note: Contracting RAINWAT countries include: Austria, Belgium, Bulgaria, Croatia, the Czech Republic, France, Germany, Hungary, Luxembourg, Moldova, Montenegro, the Netherlands, Poland, Romania, Serbia, the Slovak Republic and Switzerland.

Note: When ATIS is enabled, certain programming steps have been implemented to protect the integrity of the RAINWAT agreement, including the blocking of DSC functions when ATIS is enabled.

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 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.

Antenna mounting and EME exposure

Ensure that the antenna is connected to the radio before transmission.

Raymarine declares a Maximum Permissible Exposure (MPE) radius of 1.5 metres (4.9 ft) (per OET Bulletin 65) for this system, assuming 25 watts output to an omnidirectional antenna of 3dBi gain or less.

For watercraft with suitable structures, the antenna base must be at least 3.5 metres (11.5 ft) above the main deck to meet the MPE for persons up to 2 metres (6.6 ft) tall. For watercraft without such structures, the antenna must be mounted so that its base is a minimum of 1.5 metres (4.9 ft) vertically from heads of all persons.

The antenna must be isolated from the vessel's metalwork using an insulated (e.g. plastic) mounting bracket.

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 R&TTE directive 1999/5/EC.

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

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

To register your Raymarine product ownership, please visit www.raymarine.com and register online.

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

IMO and SOLAS

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

Technical accuracy

To the best of our knowledge, the information in this document was correct at the time it was produced. However, 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. As a result, Raymarine cannot accept liability for any differences between the product and this document. Please check the Raymarine website (www.raymarine.com) to ensure you have the most up-to-date version(s) of the documentation for your product.

Applicable products

This document is applicable to the following products:

	Name	Part number	Features
	E70243	Ray50	• SeaTalk^{ng}® / NMEA 2000 • NMEA 0183 • Passive speaker connection
	E70245	Ray60	• SeaTalk^{ng}® / NMEA 2000 • NMEA 0183 • Passive speaker connection • Up to 2 stations
	E70251	Ray70	Same as Ray60 with additional: • Built-in AIS receiver • Built-in GNSS (GPS and GLONASS) receiver • Loud hailer connection

Location and mounting

General location requirements

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

Antenna mounting and EME exposure

Ensure that the antenna is connected to the radio before transmission.

Raymarine declares a Maximum Permissible Exposure (MPE) radius of 1.5 metres (4.9 ft) (per OET Bulletin 65) for this system, assuming 25 watts output to an omnidirectional antenna of 3dBi gain or less.

For watercraft with suitable structures, the antenna base must be at least 3.5 metres (11.5 ft) above the main deck to meet the MPE for persons up to 2 metres (6.6 ft) tall. For watercraft without such structures, the antenna must be mounted so that its base is a minimum of 1.5 metres (4.9 ft) vertically from heads of all persons.

The antenna must be isolated from the vessel's metalwork using an insulated (e.g. plastic) mounting bracket.

Compass safe distance

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

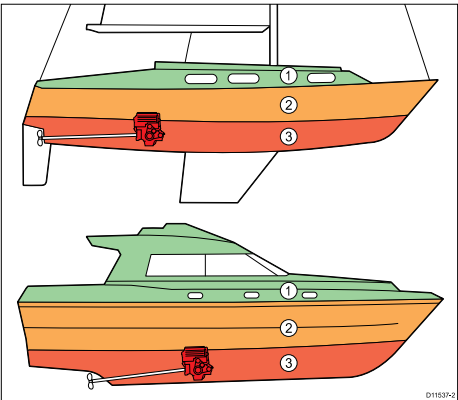
When choosing a suitable location for the product you should aim to maintain the maximum possible distance from any compasses. Typically this distance should be at least 1 m (3 ft) in all directions. However for some smaller vessels it may not be possible to locate the product this far away from a compass. In this situation, when choosing the installation location for your product, ensure that the compass is not affected by the product when it is in a powered state.

GPS location requirements

In addition to general guidelines concerning the location of marine electronics, there are a number of environmental factors to consider when installing equipment with an internal GPS antenna.

Mounting location

- **Above Decks mounting:**
Provides optimal GPS performance. (For equipment with appropriate waterproof rating.)
- **Below Decks mounting:**
GPS performance may be less effective and may require an external GPS antenna mounted above decks.



1		This location provides optimal GPS performance (above decks).
2		In this location, GPS performance may be less effective.
3		This location is NOT recommended for GPS antenna.

Vessel construction

The construction of your vessel can have an impact on GPS performance. For example, the proximity of heavy structure such as a structural bulkhead, or the interior of larger vessels may result in a reduced GPS signal. Before locating equipment with an internal GPS antenna below decks, seek professional assistance and consider use of an external GPS antenna mounted above decks.

Prevailing conditions

The weather and location of the vessel can affect the GPS performance. Typically calm clear conditions provide for a more accurate GPS fix. Vessels at extreme northerly or southerly latitudes may also receive a weaker GPS signal. GPS antenna mounted below decks will be more susceptible to performance issues related to the prevailing conditions.

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.

**Warning: Protect unused cables**

Unused cables and wires should be protected from water ingress and from making contact with metal that may be grounded.

- If supplied, use protective boots to ensure that cables that are not connected are protected.
- NEVER leave bare ended wires uncovered/unprotected as this could cause a short circuit and can induce galvanic corrosion.

Electrical interference

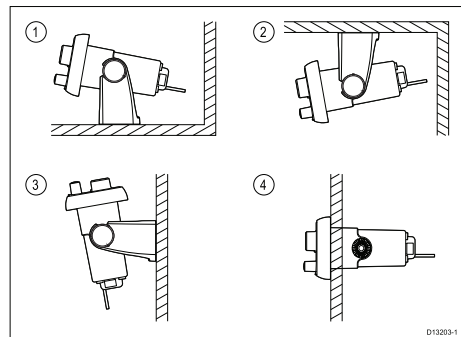
Select a location that is far enough away from devices that may cause interference, such as motors, generators and radio transmitters/receivers.

Power supply

Select a location that is as close as possible to the vessel's DC power supply. This will help to keep cable runs to a minimum.

Mounting options

The product can be mounted in the following configurations.



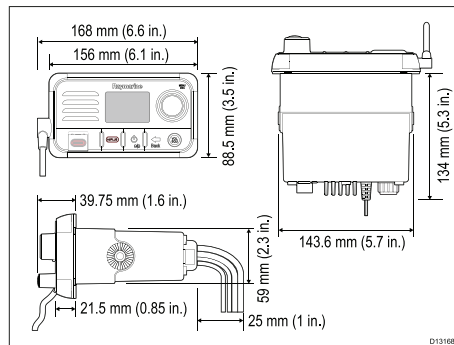
1. Table top mount
2. Overhead mount
3. Bulkhead mount
4. Panel mount

Product dimensions

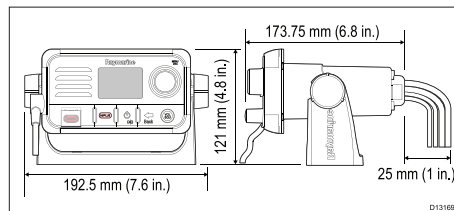
Ray50 product dimensions

The **Ray50** can be panel mounted or bracket mounted.

Ray50 dimensions (panel mount)



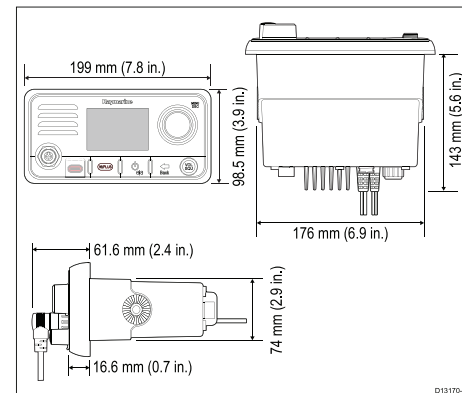
Ray50 dimensions (bracket mount)



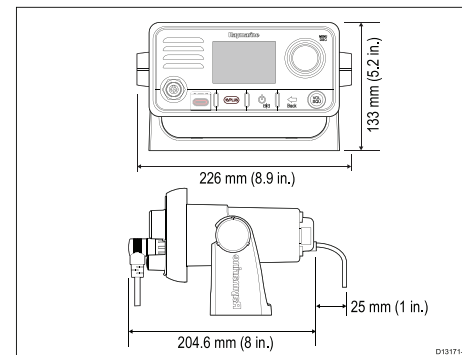
Ray60 and Ray70 product dimensions

The **Ray60** and **Ray70** can be panel or bracket mounted.

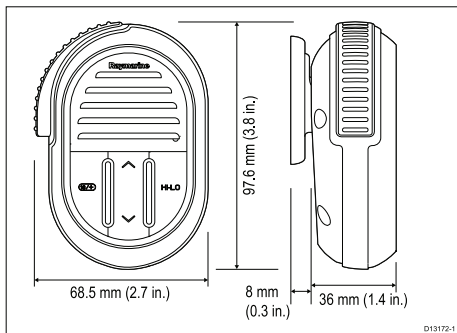
Ray60 and Ray70 dimensions (panel mount)



Ray60 and Ray70 dimensions (bracket mount)



Fistmic dimensions



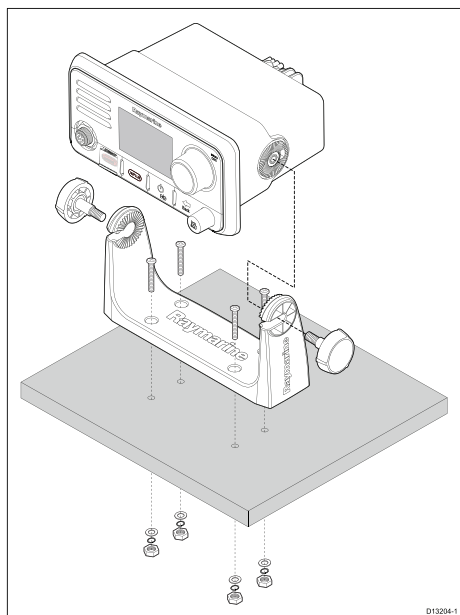
The Fistmic's fitted, coiled lead can be extended comfortably to approximately 1 meter (3.3 ft.)

Bracket mounting

Follow the steps below to mount the product on it's bracket.

Before mounting the unit ensure that you have:

- Selected a suitable location, ensuring there is nothing behind the mounting surface that may be damaged when drilling.
- Identified the cable connections and route that the cables will take.
- Attached the front bezel.



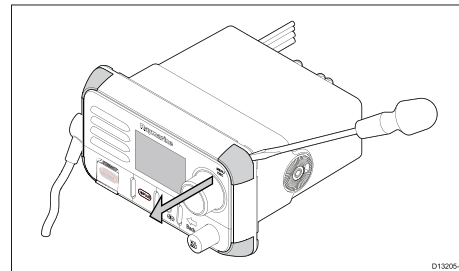
1. Mark the location of the bracket mounting holes on the mounting surface.
2. Drill holes for the mounting fixings using a drill with a suitable sized drill bit.
3. Use the fixings provided to attach the bracket securely to the mounting surface.
4. Attach the unit to the bracket and secure in place using the bracket mounting knobs.

Note: Drill bit, tap size and tightening torque is dependent on the thickness and type of material the unit is to be mounted on.

Ray50 Panel mounting

Removing the mounting hole covers — Ray50

Before the Ray50 can be panel mounted the mounting hole covers must be removed.

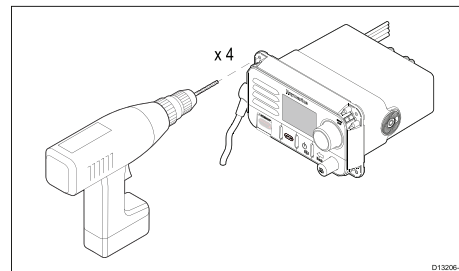


1. Using a flat blade screw driver, insert the tip of the screw driver in the slot between the back of the cover and the unit.
2. Carefully lever the cover forward away from the unit.
3. Repeat steps 2 and 3 for the remaining mounting hole covers.

Drilling out the mounting holes – Ray50

The mounting holes must be drilled out.

Guides for the mounting holes can be found on the corners of the unit, under the mounting hole covers.



1. Using a drill and a 4 mm (5/32) drill bit, drill out the 4 mounting holes.

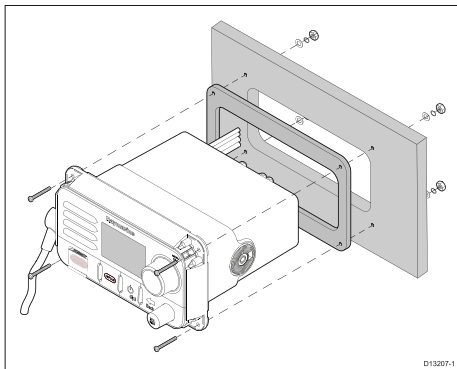
Holes should be drilled from the front of the unit, taking care not to damage the unit by applying too much force to the drill.

Panel mounting the Ray50

To panel mount the **Ray50** follow the steps below.

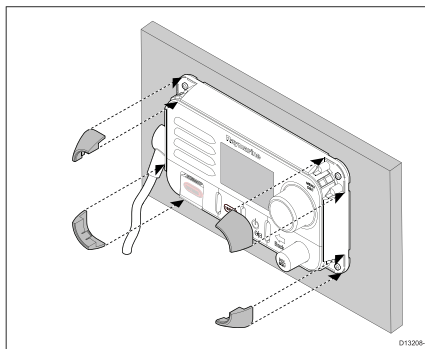
Before mounting the product, ensure that you have:

- Selected a suitable location, ensuring there is nothing behind the mounting surface that may be damaged when drilling / cutting.
- Identified the cable connections and route that the cables will take.
- Removed the mounting hole covers.
- Drilled out the mounting holes on the unit.



1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.
2. Fix the supplied mounting template to the selected location, using masking or self-adhesive tape.
3. Using a suitable hole saw (the size is indicated on the template), make a hole in each corner of the cut-out area.
4. Using a suitable saw, 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 rough edge until smooth.
6. Drill 4 holes as indicated on the template to accept the fixings.
7. Remove the backings from the supplied gasket.
8. Place the gasket in position on the back of the unit and press firmly onto the flange.
9. Connect the power, and other cables to the unit.
10. Slide the unit into place and secure using the fixings provided.
11. Attach the mounting hole covers.



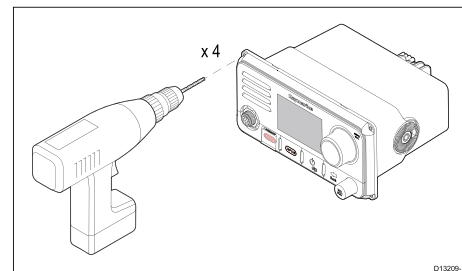
Note: The supplied gasket provides a seal between the unit and a suitably flat and stiff mounting surface or binnacle. The gasket should always be used. It may also be necessary to use a marine-grade sealant if the mounting surface or binnacle is not entirely flat and stiff or has a rough surface finish.

Ray60 / Ray70 Panel mounting

Drilling out the mounting holes – Ray60 / Ray70

Before panel mounting the product the mounting holes must be drilled out.

Guides for the mounting holes can be found in the corners of the unit, under the front bezel.



1. Using a drill and a 4 mm (5/32) drill bit, drill out the 4 mounting holes.

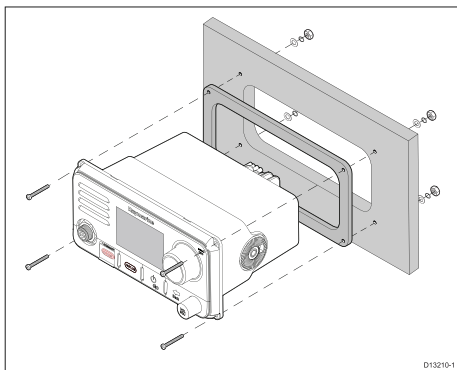
Holes should be drilled from the front of the unit, taking care not to damage the unit by applying too much force to the drill.

Panel mounting – Ray60 / Ray70

To panel mount the **Ray60 / Ray70** follow the steps below.

Before mounting the product, ensure that you have:

- Selected a suitable location, ensuring there is nothing behind the mounting surface that may be damaged when drilling / cutting.
- Identified the cable connections and route that the cables will take.
- Drilled out the mounting holes on the unit.
- Removed the front bezel.



1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.
2. Fix the supplied mounting template to the selected location, using masking or self-adhesive tape.
3. Using a suitable hole saw (the size is indicated on the template), make a hole in each corner of the cut-out area.
4. Using a suitable saw, 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 rough edge until smooth.
6. Drill 4 holes as indicated on the template to accept the fixings.
7. Remove the backings from the supplied gasket.
8. Place the gasket in position on the back of the unit and press firmly onto the flange.
9. Connect the power, and other cables to the unit.
10. Slide the unit into place and secure using the fixings provided.
11. Attach the front bezel.

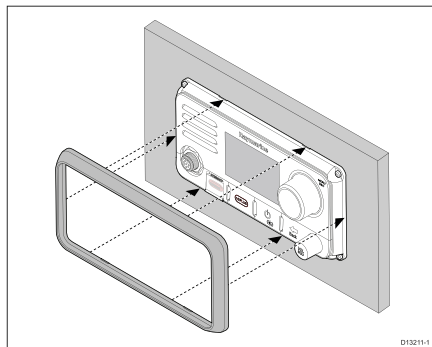
Note: The supplied gasket provides a seal between the unit and a suitably flat and stiff mounting surface or binnacle. The gasket should always be used. It may also be necessary to use a marine-grade sealant if the mounting surface or binnacle is not entirely flat and stiff or has a rough surface finish.

Attaching the front bezel – Ray60 / Ray70

After installation the front bezel can be attached following the steps below.

The following procedure assumes that the unit has already been mounted in position.

1. Orientate the bottom-right side of the bezel under the bottom-right side of the unit, ensuring that the clips along the bottom edge of the bezel latch into position.



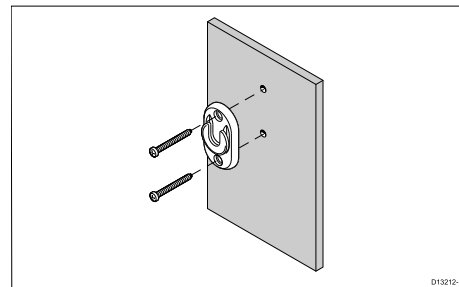
2. Ensure the bezel is correctly aligned with the unit, as shown.
3. Apply firm but even pressure to the bezel along the:
 - i. Outer edges - work from the sides upwards and then along the top edge, to ensure that it clips securely into position.
 - ii. Inner edges - ensure that the bezel sits flat.
4. Check that all control buttons are free to operate.

Fistmic / Handset mounting

The Fistmic and optional Handset can be mounted by following the steps below. Whilst only the Fistmic is pictured below the steps are identical when mounting the Handset using the mounting clip.

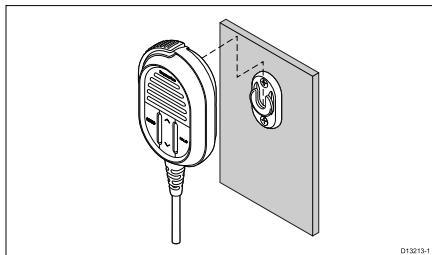
Before mounting the unit, ensure that you have:

- Selected a suitable location, ensuring there is nothing behind the mounting surface that may be damaged when drilling.
- Identified the cable connections and route that the cables will take.



1. Check the selected location for the mounting clip, a clear flat area is required, with sufficient space around it to place and remove the Fistmic / Handset.
2. Using a pencil, offer up the mounting clip to the desired location and mark the location of the screw holes on the mounting surface.
3. Drill the mounting holes using a suitable size drill bit.
4. Hold the clip in place and secure using the screws provided.
5. Hook the Fistmic / Handset over the clip and gently push down until it clicks into position.

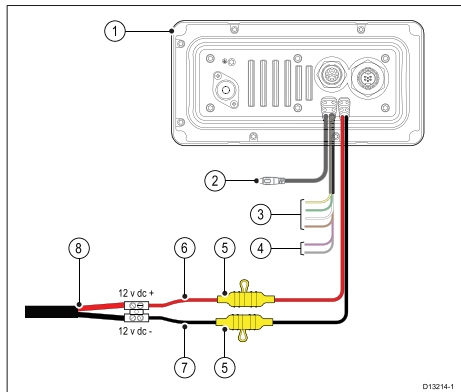
Note: The Fistmic can only be hooked and unhooked from the mounting clip when held vertical.



Note: Drill bit, tap size and tightening torque is dependent on the thickness and type of material the unit is to be mounted on.

Power connection

The power supply should be connected as shown below:



1. Base station

2. Passive speaker connection.
3. **NMEA 0183** wires
4. Loud hailer wires (**Ray70** only.)
5. In-line 10 A fuse
6. Red positive wire
7. Black negative wire.
8. Vessel's 12 V dc power supply



Warning: 12 Volt dc only

This product must only be connected to a **12 volt dc** power source.



Warning: Chassis grounding

Do **NOT** ground this product using the chassis ground terminal.

Grounding this product to a vessel's RF ground may cause galvanic corrosion.

Grounding

This product is grounded through the 0 V dc negative wire on the power cable and does not require a drain (shield) to be connected to the base station's ground terminal.



Warning: Positive ground systems

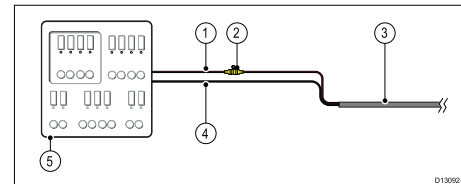
Do not connect this unit to a system which has positive grounding.

Breakers, fuses and circuit protection

The information below is provided as guidance to help protect your product. The example illustrations provided are for common vessel power arrangements, if you are unsure how to provide the correct level of protection then please consult a Raymarine authorized dealer for support.

Distribution panel connection

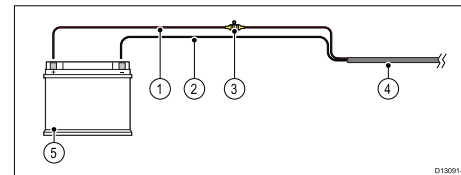
It is recommended that your product is wired through your vessel's distribution panel via a thermal breaker or fuse.



1. Vessel power supply positive (+)
2. In-line fuse. (If your products power cable does not have an in-line fuse then an one fuse should be fitted.)
3. Product power cable
4. Vessel power supply negative (-)
5. Vessel distribution panel

Battery connection

Your product may be wired directly to the battery using an in-line fuse.



1. Vessel power supply positive (+)
2. Vessel power supply negative (-)
3. In-line fuse (If your products power cable does not have a built in fuse then an in-line fuse should be fitted.)
4. Product power cable
5. Vessel battery

In-line fuse and thermal breaker ratings

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

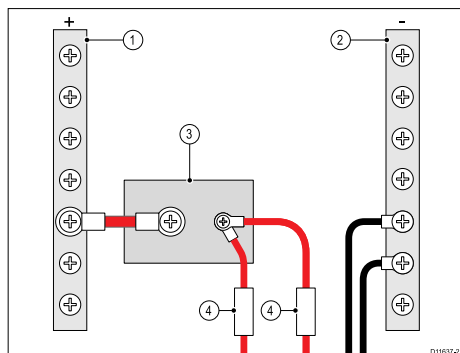
In-line fuse rating	Thermal breaker rating
10 A	7 A (if only connecting one device)

Note:

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

Sharing a breaker

Where more than 1 piece of equipment shares a breaker you must provide protection for the individual circuits. E.g. by connecting an in-line fuse for each power circuit.



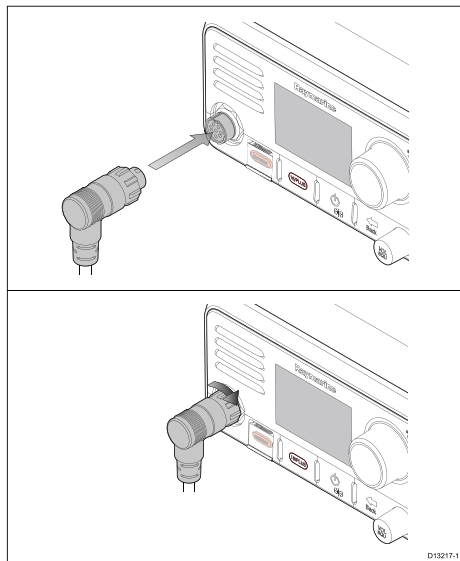
1	Positive (+) bar
2	Negative (-) bar

3	Circuit breaker
4	Fuse

Where possible, connect individual items of equipment to individual circuit breakers. Where this is not possible, use individual in-line fuses to provide the necessary protection.

Connecting the Fistmic – Ray60 / Ray70

The Fistmic can be connected directly to the connector on the front of the unit.



1. Ensure the Fistmic cable connector is correctly orientated.
2. Fully insert the connector into the connector on the front of the unit.
3. Rotate the locking collar clockwise until it clicks.

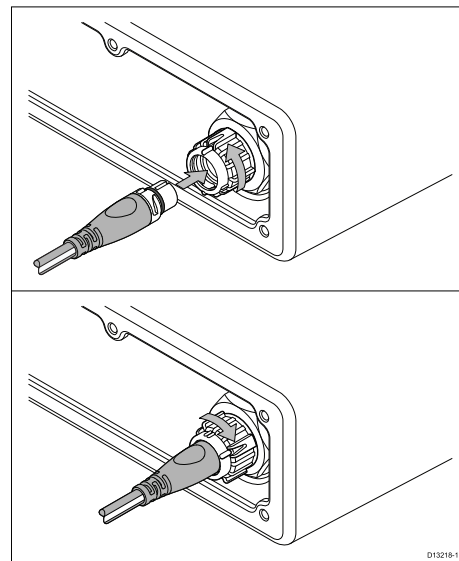
SeaTalk^{ng} connection

The product can interface with **Raymarine®** GPS or GNSS receivers and **Raymarine®** multifunction displays using the **SeaTalk^{ng}** connection.

A **Raymarine® SeaTalk^{ng}** GPS or GNSS receiver cannot be connected directly to the product, as GPS and GNSS receivers are powered via the **SeaTalk^{ng}** backbone.

Connecting SeaTalk^{ng}

Before connecting to **SeaTalk^{ng}**, refer to the **SeaTalk^{ng} Reference Manual**, to ensure that the maximum permitted Load Equivalence Number (LEN), for the **SeaTalk^{ng}** backbone is not exceeded once this product is connected.

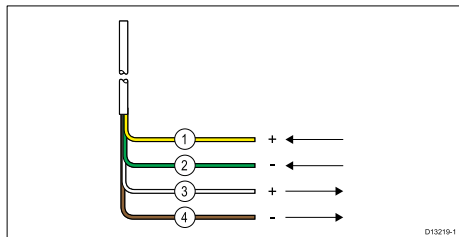


1. Rotate the **SeaTalk^{ng}** connector's locking collar anti clockwise, to the unlocked position.
2. Ensure the spur cable connector is correctly orientated.

3. Fully insert the spur cable connector into the **SeaTalk^{ng}** connector on the unit.
4. Rotate the locking collar clockwise 2 clicks, to the locked position.

NMEA 0183 connection

The **NMEA 0183** wires can be used to connect the unit to a 3rd party GPS/GNSS receiver or multifunction display.



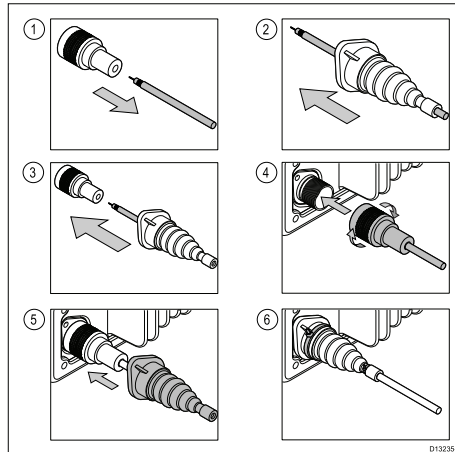
1. Yellow – Receive positive (+) wire.
2. Green – Receive negative (-) wire.
3. White – Transmit positive (+) wire.
4. Brown – Transmit negative (-) wire.

The NMEA wires should be connected to a compatible **NMEA 0183** device as shown in the table below:

NMEA 0183 wires		NMEA 0183 device
Yellow – Receive positive (+)	to	Transmit positive (+)
Green – Receive negative (-)	to	Transmit negative (-)
White – Transmit positive (+)	to	Receive positive (+)
Brown – Transmit negative (-)	to	Receive negative (-)

Connecting an antenna

The radio must be connected to a suitable antenna (not supplied). The antenna connection must be protected so it cannot come into contact with any bare metal (which may be grounded). A protective boot is supplied that can be used to ensure isolation of the antenna connection.



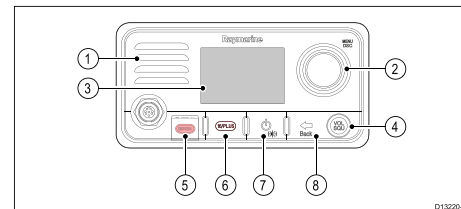
1. Disconnect your antenna cable from the connector.
2. Push the antenna cable through the supplied protective boot.
3. Re-connect the antenna cable to the connector.
4. Plug the antenna connector into the product's antenna connection and secure by tightening the locking collar.
5. Push the protective boot over the connection.
6. Secure the protective boot using the supplied cable ties.

If the antenna connector cannot be removed then another suitable means of protection must be used, such as electrical tape.

Controls and interface

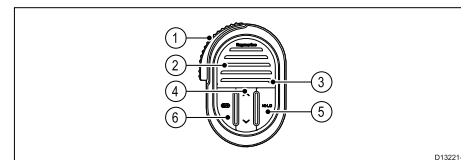
The controls and interface available are as follows:

Base station



1. **Built-in speaker**
2. **Rotary knob / OK push button** — Press knob in to access menu / DSC functions and to confirm selections. Turn rotary clockwise or anti-clockwise to move up and down through menu items or to change channel from the Homescreen.
3. **LCD**
4. **VOL/SQ** — Turn knob to adjust volume or squelch up and down. Press center button to switch between volume and squelch control.
5. **DISTRESS** — Push up the spring loaded cover and press this button to make a DSC distress call.
6. **16 / PLUS** — When powered on press to switch between priority channels.
7. **Power** — Press to power the unit on. Press and hold for 3 seconds to power the unit off. Momentary press to access the shortcut list.
8. **Back** — Move back through menu options.

Fistmic



1. **PTT (Push to Talk)** — Press and hold to send a voice message. Release to return to receive mode.

Note: The maximum transmit time is limited to 5 minutes to prevent un-intentional transmissions from occupying the VHF channel.

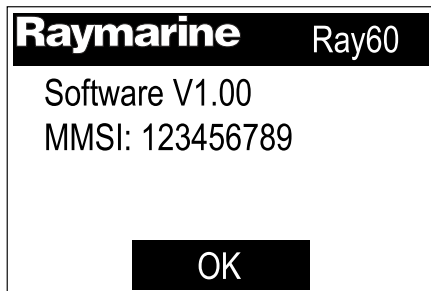
2. **Speaker**
3. **Microphone location**
4. **Channel Up and Down** — Changes the channel up or down.
5. **HI/LO** — Press to switch between High (25 W) and low (1 W) transmit power.
6. **16 / PLUS** — When powered on press to switch between priority channels.

Powering the unit on

With the radio connected to a power supply the power button is used to switch the radio on and off.

1. Press the **Power** button to power-up the radio.

The startup is displayed.



The startup screen will automatically time-out after 5 seconds.

2. Press the **OK** button, or wait for the startup screen to time-out.

The Homescreen is displayed.

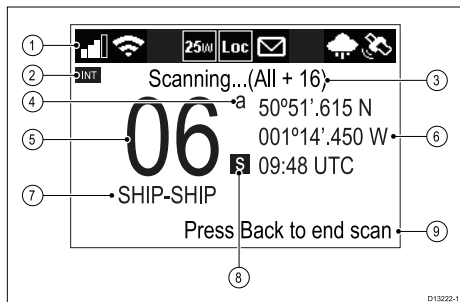
Powering the unit off

With the unit powered on:

1. Press and hold the **Power** button for approximately 3 seconds to power the unit off.

Homescreen overview

The information below describes the on-screen characters and symbols which the radio displays on the main screen and what they mean.



1. **Status bar** — The status bar displays symbols which indicate the current status of the unit. See [Status bar symbols](#) for details.
2. **Frequency band** — Indicates which channel frequency band is in use:
 - **USA** — United States of America
 - **INT** — International
 - **CAN** — Canada
 - **WX** — Weather

Note: Special licensing is required to receive USA and Canadian channel sets.

3. **Status text** — Indicates the current radio mode e.g.: ATIS Mode active, Weather Alert, Scan mode etc.
4. **Channel suffix**
 - **a** — Indicates that the current US or Canadian channel is simplex. This channel uses the transmit frequency of the International channel for transmitting and receiving. If a channel is simplex in all 3 frequency bands (e.g. channel 06, the channel does not require the **a** suffix.
 - **b** — Indicates that the channel is a receive only channel. Used for Canadian channels only.

Note: You cannot transmit on a receive only channel.

5. **Channel** — Indicates the current channel number
6. **Location / Time** or **Location / COG/SOG** — Depending on selection displays Location coordinates and current time or Location coordinates and current COG and SOG.
7. **Channel Name** — Indicates the name of the current channel.
8. **Channel type** — Indicates the type of channel:
 - **s** = Simplex — Simplex channels transmit and receive on the same frequency.
 - **d** = Duplex — Duplex channels use separate frequencies to transmit and receive.
9. **Optional text** — Provides extra user guidance

Status bar symbols

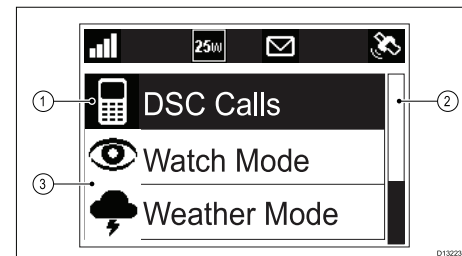
The status bar is used to display icons that indicate the radio's status.

Symbol	Name	Description
	Reception signal	Indicates the relative strength of the radio signal being received. Displays between 0 bars (no transmission being received) and 4 bars (strong reception signal).
	Transmit	Indicates the radio is currently transmitting (e.g. the PTT button is being pressed.)
	Receive	Indicates the radio is currently receiving a transmission
	Low power	Indicates the radio transmitters is in low power (1 watt) or high power (25 watt) mode
	High power	
	Local	Indicates the radio is in local reception mode, which decreases receiver sensitivity in high traffic areas to decrease unwanted reception

Symbol	Name	Description
	DSC	Indicates that a DSC call has been received
	Power supply voltage too low	Indicates the power supply to the radio is below the specified operating voltage
	Power supply voltage too high	Indicates the power supply to the radio is above the specified operating voltage
	Weather	Indicates that the weather alerts mode is activated.
	GPS Fix	Indicates if the radio has a GPS/GNSS fix.

Main menu overview

The main menu is accessed by Pressing the **OK** button from the **Homescreen**.



1. Currently selected menu item
2. Scroll bar
3. Menu items

The main menu includes the following items:

Symbol	Name	Sub-options
	* DSC Calls	• Individual call • Distress call • Position request • Group call • All ships call • Phonebook • Call logs • Test call • DSC set-up
	* Watch Mode	• Dual watch • Triple watch • 2nd priority channel

Symbol	Name	Sub-options
	* Weather Mode	Weather Homescreen
	* Scan Mode	- All channels - All channels + 16 - Saved channels - Saved channels + 16 - Edit saved channels
	** Hail/Fog/Intercom	- Hailer - Fog horn - Intercom
	** Hailer/Fog horn	- Hailer - Fog horn

Symbol	Name	Sub-options
	** Intercom	Intercom
	Set-up	- Display set-up - Language - Units - Power output - Sensitivity - Key beep - Channel set-up - Weather alerts - GPS set-up - DSC set-up - AIS - Network output - ATIS set-up - Maintenance

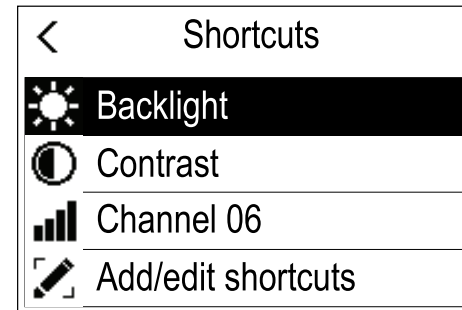
Note:

* Menu items not available when radio has ATIS enabled or if the radio has been pre-programmed in MARCOM-C mode.

** The menu name and sub-options depend on the peripheral devices connected to the radio.

Shortcut list

Pressing the **Power** button once while the radio is switched on will open the **Shortcuts list**. The Shortcuts list can be used to adjust the brightness, contrast and access frequently used functions.



Frequently used functions can be added by selecting **Add/edit shortcuts**.

Adjusting Brightness and Contrast

The LCD Brightness and Contrast can be adjusted using the Shortcuts list.

From any screen:

1. Press the **Power** button.
2. Select **Brightness** or **Contrast**.
3. Use the **Rotary knob** to adjust the Brightness or Contrast to the desired level.
4. Press the **Power** button again to return to the previous screen.

Unless your radio has been pre-programmed; the first time you power-up your radio you will be requested to select certain options. With the exception of your MMSI and ATIS ID, you will also be requested to enter these options after a factory reset.

1. Language selection

2. Turn on AIS reception — Ray70 only

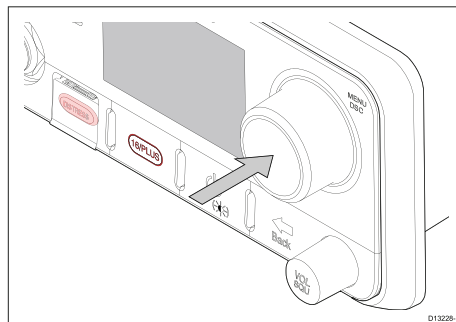
3. Select network type

4. Enter MMSI number

5. Enter ATIS ID

6. Frequency band selection

The radio's various options and settings are contained within the menu.



From the Homescreen,

1. Press the **Rotary knob's OK** push button.

The language the radio uses can be changed.

From the Main menu:

1. Select **Set-up**.
2. Select **Language**.

The languages available are:

- **English (default)** — English
- **Español** — Spanish
- **Français** — French
- **Deutsch** — German
- **Italiano** — Italian

3. Select the language that you want the radio to be set to.

The **Ray70's** AIS receiver can be switched on or off.
From the Main menu:

1. Select **Set-up**.
2. Select **AIS**.
3. Select **On**.

When connecting your radio to other devices it is important to ensure you select the network connection and type that you want data to be transmitted over.

From the Main menu:

1. Select **Set-up**.
2. Select **Network output**.

The following network types are available:

- **NMEA 2000 (default)** — uses the **SeaTalk^{ng}** connection to transmit data to other devices.
- **0183 High speed** — uses the **NMEA 0183** connection with 38400 baud rate
- **0183 Std speed** — uses the **NMEA 0183** connection with 4800 baud rate.

3. Select the network type relevant to the devices connected to your radio. If your radio is not connected to any other devices any option can be selected.

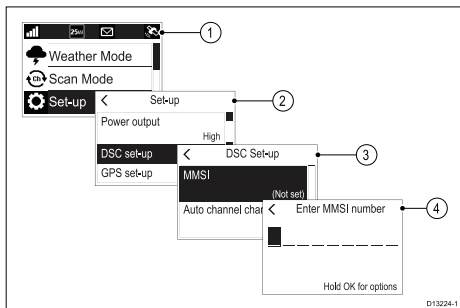
Selecting **0183 Std speed** will disable the internal AIS receiver on a **Ray70**.

The **Network Output** setting determines the baud rate of the **NMEA 0183** input:

19

Entering your MMSI number

To program your radio with your MMSI number follow the steps below.



From the Main menu:

1. Select **Set-up**.
2. Select **DSC set-up**.
3. Select **MMSI**.

(Not set) will be displayed if no MMSI number has been set.

4. Use the **Rotary knob** to cycle through the available numbers and press **OK** to confirm each number and move to the next digit.

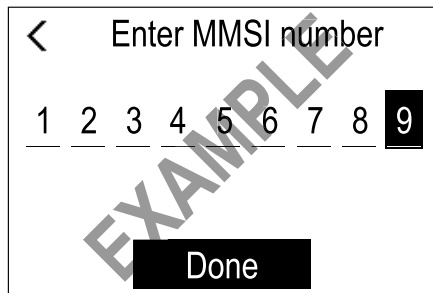
You should only enter the unique 9 digit MMSI number provided by your licensing authority.

MMSI numbers starting with a '0' are only used for groups and coast stations. If you enter a '0' as the first digit the radio will assume you are entering a coast station MMSI and automatically assign a '0' as the second digit; this is to ensure a group MMSI is not entered as the radio's unique MMSI.

5. Press the **Back** button at any time to edit digits you have already entered.
6. Press and hold the **OK** button to display options to **Move cursor** back and forward through the digits.

7. When the final digit is confirmed select **DONE**.

Example



8. The MMSI is displayed onscreen, check that it is correct, then:
 - i. Select **Yes – Save**, or
 - ii. if the number entered is not correct select **No – Retry**.

Caution: MMSI and ATIS ID entry

You can only enter the MMSI number and ATIS ID once!

If you store an incorrect MMSI number or ATIS ID in your product, it will have to be reset by an authorized **Raymarine®** dealer.

Enabling and disabling ATIS mode

ATIS is a European system used on some inland waterways. ATIS must be enabled and a unique ATIS ID entered in order to use ATIS mode.

From the Main menu.

1. Select **Set-up**.
2. Select **ATIS set-up**.

3. Select **ATIS**.
4. Select **On** to enable ATIS mode or **Off** to disable ATIS mode.

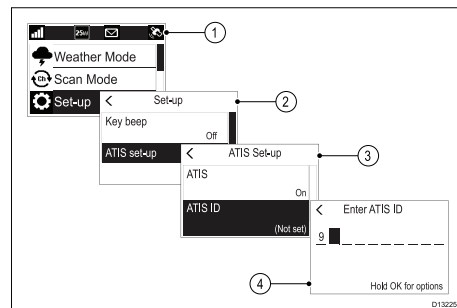
With ATIS mode enabled the radio's region will be fixed to the INT (international) frequency band and the following functions are disabled:

- DSC functions
- Watch Mode
- Scan Mode
- High/low power is restricted on certain channels

Once ATIS has been enabled an ATIS ID must be entered.

Entering your ATIS ID

When ATIS mode is enabled a unique ATIS ID must be entered.



From the Main menu.

1. Select **Set-up**.
2. Select **ATIS set-up**.
3. Select **ATIS ID**.

(Not set) will be displayed if no ATIS ID has been set.

The first digit is set to a '9' and cannot be changed, this is because all ATIS IDs start with a '9'.

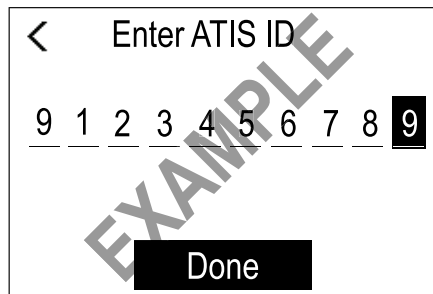
As most ATIS IDs consist of a '9' followed by your 9 digit MMSI number; if your radio already has an MMSI number the ATIS ID will be pre-filled in this format.

4. If the ATIS ID has been pre-filled, check it carefully against your issued ATIS ID.
5. To enter your ATIS ID manually, use the **Rotary knob** to cycle through the available numbers and press **OK** to confirm each number and move to the next digit.

You should only enter the unique 10 digit ATIS ID provided by your licensing authority.

6. Press the **Back** button at any time to edit digits you have already entered.
7. Press and hold the **OK** button to display options to **Move cursor** back and forward through the digits.
8. When the final digit is confirmed select **DONE**.

Example



9. The ATIS ID is displayed onscreen, check that it is correct, then:
 - i. Select **Yes – Save**, or
 - ii. if the number entered is not correct select **No – Retry**.

Caution: MMSI and ATIS ID entry

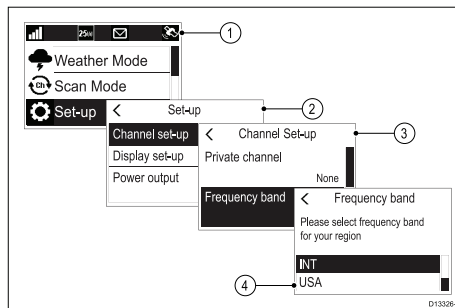
You can only enter the MMSI number and ATIS ID once!

If you store an incorrect MMSI number or ATIS ID in your product, it will have to be reset by an authorized **Raymarine®** dealer.

Changing the radio region

Prior to using the radio you must set the Frequency band to the region your radio will be used in.

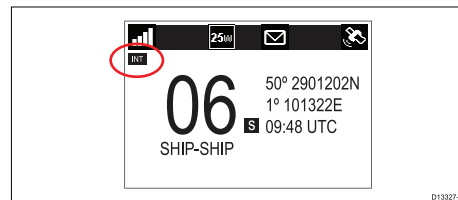
From the Main menu:



1. Select **Set-up**.
2. Select **Channel set-up**.
3. Select **Frequency band**.
4. Select the relevant region from the list.

The available options are:

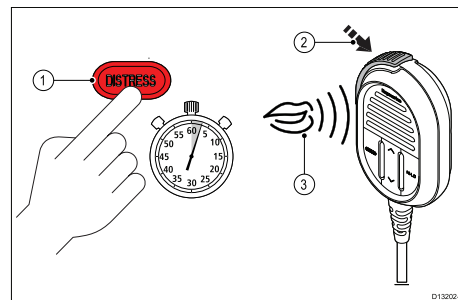
- **USA**
- **INT** = International
- **CAN** = Canada



Making a distress call

In an emergency you can use your unit to make an automatic DSC distress call.

With the spring loaded cover open:



1. Press and hold the **DISTRESS** button for 3 seconds.

Once the **DISTRESS** button is pressed a 3 second count down will begin, when the count down reaches zero the DSC distress call is transmitted.

The distress call is repeated automatically until it is acknowledged.

2. Press and hold the **PTT** button, then slowly and clearly speak the details of the distress in the following format:

MAYDAY, MAYDAY, MAYDAY

This is <state name of vessel 3 times>

MAYDAY <state name of vessel 1 time>

My position is <state latitude and longitude, or true bearing and distance from a known point.>

I am <state nature of distress e.g. sinking, on fire etc.>

I have <state number of persons on board and any other information — drifting, flares fired etc.>

**I REQUIRE IMMEDIATE ASSISTANCE
OVER**

3. Release the **PTT** button.

Making a Mayday call

In an emergency you can use your unit to make a Mayday call.

1. Press the **16 PLUS** button.
2. Press and hold the **PTT** button.
3. Slowly and clearly speak the details of the distress:
MAYDAY, MAYDAY, MAYDAY

This is <state name of vessel 3 times>

MAYDAY <state name of vessel 1 time>

My position is <state latitude and longitude, or true bearing and distance from a known point.>

I am <state nature of distress e.g. sinking, on fire etc.>

I have <state number of persons on board and any other information — drifting, flares fired etc.>

**I REQUIRE IMMEDIATE ASSISTANCE
OVER**

4. Release the **PTT** button.
5. If an acknowledgement is not received then repeat steps 2 to 4 above.

Cancelling a distress call before transmission

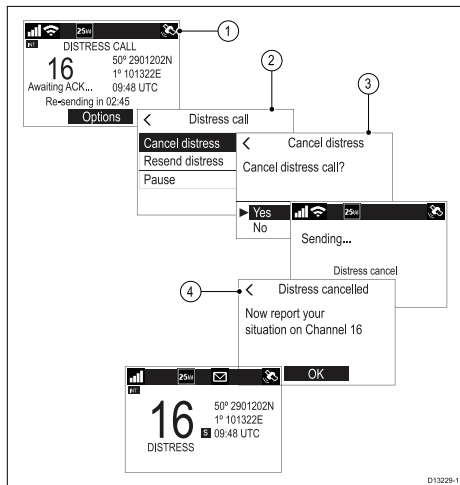
To cancel a distress call before it is transmitted follow the steps below:

1. Release the **DISTRESS** button before the count down timer completes.

When the button is released you will be returned to normal operation.

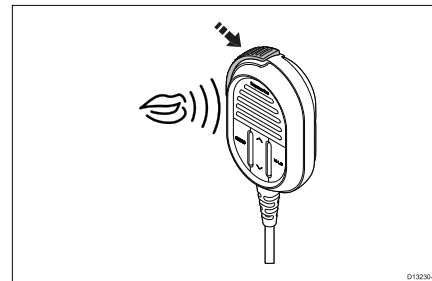
Cancelling a distress call after transmission

A distress call can be cancelled after it has been transmitted.



1. Select **Options**.
2. Select **Cancel distress**.
3. Select **Yes** to confirm cancellation.
4. Select **OK**.
5. Press and hold the **PTT** button and make a broadcast to all stations giving your vessel's name, call sign and MMSI number and cancel the false distress alert

Example: "All, Stations, All Stations, All Stations. This is <NAME>, <CALL SIGN>, <MMSI ID>, <POSITION>. Cancel my distress alert of <DATE>, <TIME>, <NAME>, <CALL SIGN>"



6. Repeat the broadcast described in step 5.

Receiving a distress call

It is expected that only a Coast Radio Station (CRS) will acknowledge DSC distress calls and will act as the coordinator for the rescue operation.

When a distress call is received an alarm is sounded at full volume and the LCD displays information relating to the distress.



If the **Auto channel change** function is enabled; 10 seconds after receipt of a distress call the radio will automatically re-tune to channel 16. Otherwise the user is prompted to change channel manually.

The details of the distress call are recorded in the distress log and the envelope icon will flash to let you know a message has been received. When connected to a **Raymarine®** multifunction display (**MFD**) the position data from the distress call can also be displayed in the Chart application.

When the received distress call is acknowledged by the CRS or by another station the radio will resume normal operation.

Acknowledging a distress call

Distress calls must only be acknowledged if the call continues without acknowledgement from a CRS, you are close enough to the distressed vessel to be of assistance and are prepared to relay the distress to a CRS by any means possible. Class D DSC radios are forbidden from automatically acknowledging distress calls. Acknowledgement must only be made by voice message on channel 16.

After receiving a distress call that has gone unanswered:

1. Switch to channel 16 to listen for the distress voice message.
2. Wait for the CRS to acknowledge the call.
3. If the distress call is not acknowledged by another station then acknowledge the call as follows:

MAYDAY

(MMSI of the vessel in distress)

Name of vessel in distress <repeated 3 times>

Call sign of the vessel in distress

This is <MMSI of your vessel>, <name of your vessel repeated 3 times> <call sign of your vessel>

RECEIVED MAYDAY

4. You **MUST** then notify the shore authorities by any means possible to relay the distress call.

Making a routine DSC call

From the **Individual Call** menu: **Menu** → **DSC Calls** → **Individual Call**.

1. Select **Phonebook** to make a routine call to a contact saved in your Phonebook, or
2. Select **Recent Calls** to make a routine call to a contact that you have called recently, or
3. Select **Enter MMSI** to manually enter the MMSI number of the station you want to contact.
4. Select a contact or enter an MMSI manually and press the **OK** button.
5. Select the Channel you want to transmit the call on.

If the MMSI is a CSR then the radio will automatically tune to the correct Channel. The radio will wait for an acknowledgement to be received.

6. If an acknowledgement is received, press the **OK** button.
7. Press and hold the **PTT** button and speak your message.
8. Release the **PTT** button when you have completed your message.



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