



Element HV Supplementary Information

**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.
- Raymarine recommends certified installation by a Raymarine approved installer. A certified installation qualifies for enhanced product warranty benefits. Contact your Raymarine dealer for further details, and refer to the separate warranty document packed with your product.

**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: Product grounding**

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

**Warning: Positive ground systems**

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

Disclaimers

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.

This product uses digital chart data, and electronic information from Global Navigation Satellite Systems (GNSS) which may contain errors. Raymarine does not warrant the accuracy of such information and you are advised that errors in such information may cause the product to malfunction. 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 chart data or information utilized by the product and supplied by third parties.

This product supports electronic charts provided by third party suppliers which may be embedded or stored on memory card. Use of such charts is subject to the supplier's End-User Licence Agreement.

RF exposure

This equipment complies with FCC / IC RF exposure limits for general population / uncontrolled exposure. The wireless LAN / Bluetooth antenna is mounted behind the front facia of the display. This equipment should be installed and operated with a minimum distance of 20 cm (7.87 in) between the device and the body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

Compliance Statement (Part 15.19)

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

- This device may not cause harmful interference.
- 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:

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

Innovation, Science and Economic Development Canada (ISED)

This device complies with License-exempt RSS standard(s). Operation is subject to the following two conditions:

- This device may not cause interference; and
- 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.

Innovation, Sciences et Développement économique Canada (Français)

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

Son fonctionnement est soumis aux deux conditions suivantes:

- cet appareil ne doit pas causer d'interférence, et
- 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.

Declaration of Conformity

FLIR Belgium BVBA declares that the radio equipment types Element™ S displays, part numbers E70531, E70533 and E70535 are in compliance with the Radio Equipment Directive 2014/53/EU.

The original Declaration of Conformity certificate may be viewed on the relevant product page at [www.raymarine.com/manuals](http://www.raymarine.com/manuals).

Product disposal

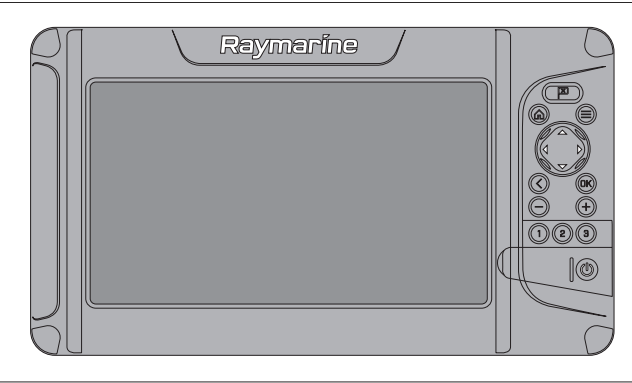
Dispose of this product in accordance with the WEEE Directive.

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

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

Compatible displays (S variants)

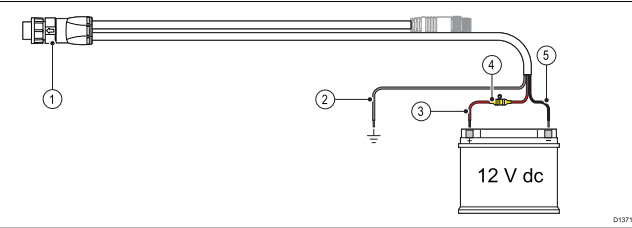
Compatible displays are listed below.



| Part number     | Description   |
|-----------------|---------------|
| E70531 / E70606 | Element™ 7 S  |
| E70533 / E70608 | Element™ 9 S  |
| E70535 / E70610 | Element™ 12 S |

Power connection

The power cable must be connected to a 12 V dc power supply, this can be achieved by connecting directly to a battery, or via the distribution panel. For 24 V vessels a suitable voltage converter is required. The product is protected against reverse polarity.



- Power/NMEA 2000 cable connects to the rear of the display.
- Ground wire connects to RF ground point, if no ground point is available connect to the battery negative (-) terminal.

- Positive (Red) wire connects to battery positive (+) terminal.
- Waterproof fuse holder with 7 A fuse must be fitted (not supplied)
- Negative wire connects to battery negative (-) terminal.

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 |
|---------------------|------------------------|
| 5 A                 | 3 A                    |

**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 an in-line fuse fitted, if not then you must add an in-line fuse / breaker to the positive wire of your product's power connection.

Power distribution

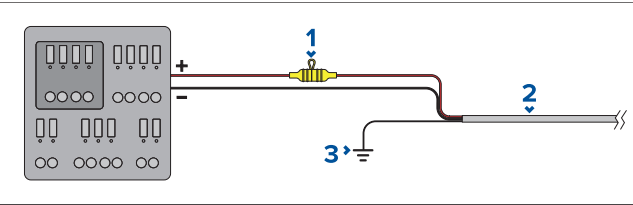
Recommendations and best practice.

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

**Important:**

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

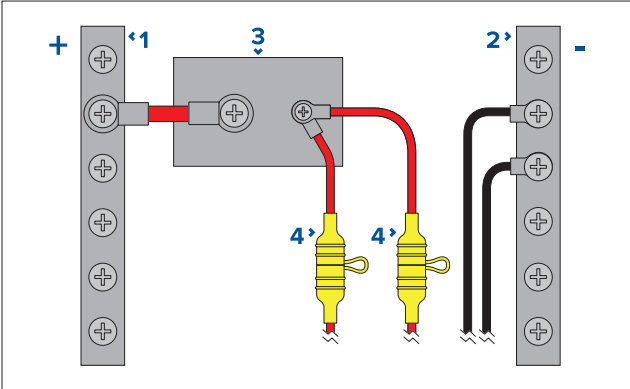
Implementation — connection to distribution panel (Recommended)



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

- It is recommended that the supplied power cable is connected to a suitable breaker or switch on the vessel's distribution panel or factory-fitted power distribution point.

- The distribution point should be fed from the vessel's primary power source by 8 AWG (8.36 mm<sup>2</sup>) cable.
- Ideally, all equipment should be wired to individual suitably-rated thermal breakers or fuses, with appropriate circuit protection. Where this is not possible and more than 1 item of equipment shares a breaker, use individual in-line fuses for each power circuit to provide the necessary protection.



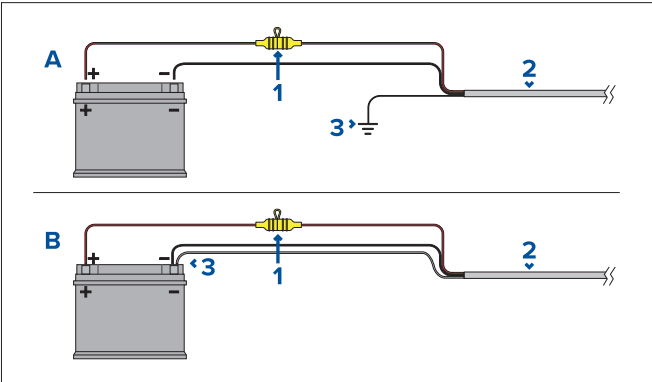
|   |                                                                                                                                                                      |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|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

#### Important:

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

#### Implementation — direct connection to battery

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



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

#### Battery connection scenario A:

Suitable for a vessel with a common RF ground point. In this scenario, if your product's power cable is supplied with a separate drain wire then it should be connected to the vessel's common ground point.

#### Battery connection scenario B:

Suitable for a vessel without a common grounding point. In this case, if your product's power cable is supplied with a separate drain wire then it should be connected directly to the battery's negative terminal.

#### Power cable extension

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

- The power cable for each unit in your system should be run as a separate, single length of 2-wire cable from the unit to the vessel's battery or distribution panel.
- For power cable extensions, a **minimum** wire gauge of 16 AWG (1.31 mm<sup>2</sup>) is recommended. For cable runs longer than 15 meters, you may need to consider a thicker wire gauge (e.g. 14 AWG (2.08 mm<sup>2</sup>), or 12 AWG (3.31 mm<sup>2</sup>)).
- An important requirement for all lengths of power cable (including any extension) is to ensure that there is a continuous **minimum** voltage at the product's power connector of 10.8 V dc, with a fully flat battery at 11 V dc.

#### Important:

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

#### Grounding

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

#### More information

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

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

## Grounding — Dedicated drain wire

The power cable supplied with this product includes a dedicated shield (drain) wire for connection to a vessel's RF ground point.

It is important that an effective RF ground is connected to the system. A single ground point should be used for all equipment. The unit can be grounded by connecting the shield (drain) wire of the power cable to the vessel's RF ground point. On vessels without an RF ground system the shield (drain) wire should be connected directly to the negative battery terminal.

The dc power system should be either:

- Negative grounded, with the negative battery terminal connected to the vessel's ground.
- Floating, with neither battery terminal connected to the vessel's ground

## Technical specification

### Element technical specification

#### Power

|                          | Element™ 7                                             | Element™ 9 | Element™ 12 |
|--------------------------|--------------------------------------------------------|------------|-------------|
| Nominal supply voltage:  | 12 V dc                                                |            |             |
| Operating voltage range: | 8 V dc to 16 V dc (protected up to 32 V dc)            |            |             |
| Fuse requirements:       | • Inline fuse = 5 Amp, or<br>• Thermal breaker = 3 Amp |            |             |

#### Environmental

|                              | Element™ 7                       | Element™ 9 | Element™ 12 |
|------------------------------|----------------------------------|------------|-------------|
| Operating temperature range: | -25°C (-13°F) to + 55°C (+131°F) |            |             |
| Storage temperature range:   | -30°C (-22°F) to + 70°C (+158°F) |            |             |
| Humidity:                    | up to 93% @ 40°C                 |            |             |
| Water ingress protection:    | IPx6 and IPx7                    |            |             |

#### LCD specification

|                         | Element™ 7                         | Element™ 9        | Element™ 12              |
|-------------------------|------------------------------------|-------------------|--------------------------|
| Size (diagonal)         | 7.0"                               | 9.0"              | 12.1"                    |
| Type                    | TN (Twisted Nematic)               |                   | IPS (In-Plane Switching) |
| Color depth             | 24 bit                             |                   |                          |
| Resolution              | WVGA 800 x 480                     |                   | WXGA 1280 x 800          |
| Ratio                   | 5:3                                |                   | 8:5                      |
| Illumination            | 1500 nits / 1500 cd/m <sup>2</sup> |                   |                          |
| Viewing angle (T/B/L/R) | 50 / 60 / 70 / 70                  | 50 / 70 / 70 / 70 | 89 / 89 / 89 / 89        |

#### Data connections

|                                         |                                                       |
|-----------------------------------------|-------------------------------------------------------|
| NMEA 2000                               | 1 x DeviceNet female connector built into power cable |
| NMEA 2000 LEN (Load Equivalency Number) | 1                                                     |
| Wi-Fi                                   | 1 x 802.11 b/g/n                                      |

#### Sonar transducer connections — HV variants only

| Element™ 7 HV                                                                                                                                                                                                                                                                                                                                                                                                   | Element™ 9 HV | Element™ 12 HV |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|
| HyperVision™ variant transducers (15-pin connector), by direct connection<br>Dragonfly® variant transducers (10-pin Green connector), via adaptor cable: A80558<br>CPT-S / CPT-DVS variant transducers (9-pin connector), via adaptor cable: A80559<br>Minnkota variant transducers (4-pin connector), via adaptor cable: A80560<br>Motorguide variant transducers (9-pin connector), via adaptor cable: A80606 |               |                |
| <b>Note:</b> Minnkota and MotorGuide transducers will run at 200 kHz only.                                                                                                                                                                                                                                                                                                                                      |               |                |

#### Sonar transducer connections — S variants only

| Element™ 7 S                                                                                                                                                                                                                       | Element™ 9 S | Element™ 12 S |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|
| CPT-S variant transducers (9-pin connector), via adaptor cable: A80559<br>Minnkota variant transducers (4-pin connector), via adaptor cable: A80560<br>Motorguide variant transducers (9-pin connector), via adaptor cable: A80606 |              |               |
| <b>Note:</b> Minnkota and MotorGuide transducers will run at 200 kHz only.                                                                                                                                                         |              |               |

#### Storage

|                    | Element™ 7                       | Element™ 9 | Element™ 12 |
|--------------------|----------------------------------|------------|-------------|
| Internal           | 8 GB Solid State (4.5 GB usable) |            |             |
| External (MicroSD) | 1 x MicroSDXC card reader        |            |             |

#### CHIRP sonar specification

|               |                                                              |
|---------------|--------------------------------------------------------------|
| Channels      | 1 x CHIRP sonar                                              |
| Beam coverage | Conical beam                                                 |
| Depth range   | 0.6 m (2 ft) to 274 m (900 ft) depending on water conditions |
| Power         | 90 W                                                         |

## L'exposition des radiofréquences

Le document FCCC/IC conformément aux limites d'exposition des radiofréquences

Dans la population générale/échappant à leur contrôle.Réseau local sans fil / Installations LanYa montre tout à l'heure sur.

Le présent équipements doivent être plus l'installation et l'exploitation

20 centimètres (distance entre 7,87 pouces) et du matériel.ce Émetteur ou ne peuvent pas coexister Câble ou avec tout autre, donnant suite aux capteurs Produits transmettre multi - sma