

## 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 20cm (7.87in) 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 FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate this equipment.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## 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.

## Innovation, Science and Economic Development Canada (ISED)

This device complies with Industry Canada licence-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 CAN ICES-3(B)/NMB-3(B)

## Innovation, Sciences et Développement économique Canada (Français)

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet appareil numérique de la classe B est conforme à la norme CAN ICES-3(B)/NMB-3(B) du Canada.

## Declaration of Conformity

FLIR Belgium BVBA declares that the radio equipment types Element™ HV displays, part numbers E70532, E70534 and E70536 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.

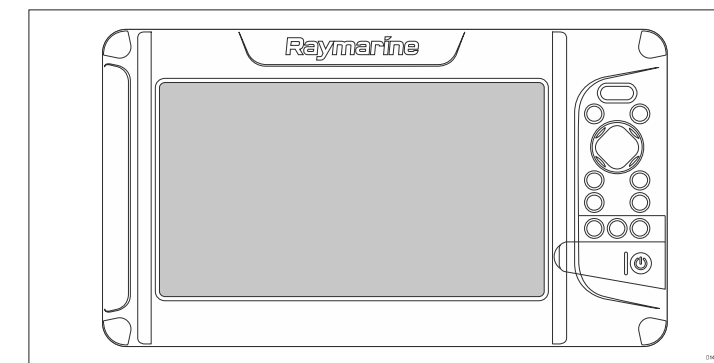


Equipment marked with the crossed-out wheeled bin symbol indicates that the equipment should not be disposed of in unsorted household waste. Local authorities in many regions have established collection schemes under which residents can dispose of waste electrical and electronic equipment at a recycling 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

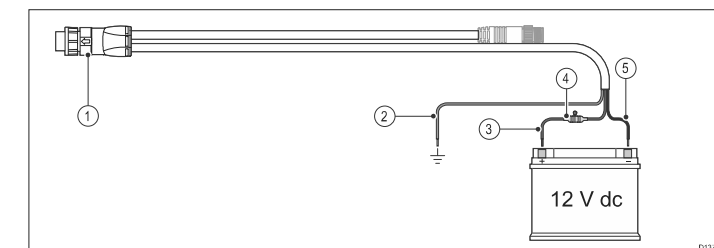
Compatible displays are listed below.



Part number	Description
E70532	Element 7 HV
E70534	Element 9 HV
E70536	Element 12 HV

## 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.



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

4. Waterproof use holder with 7 A fuse must be fitted (not supplied)
5. 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:

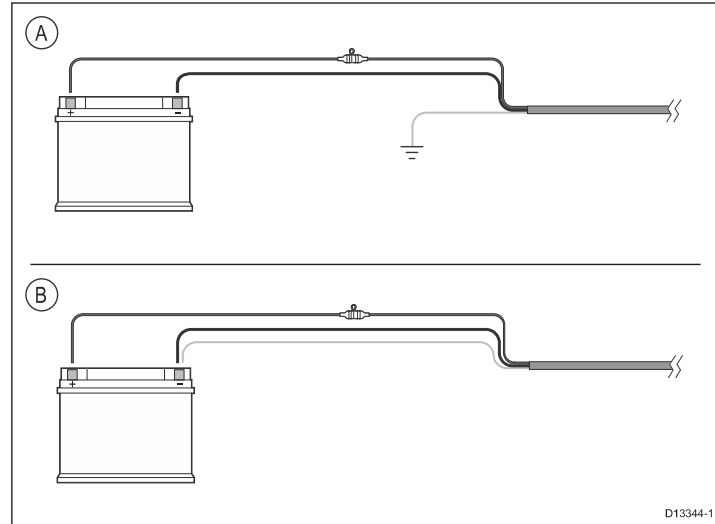
When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.

### Note:

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 — direct connection to battery

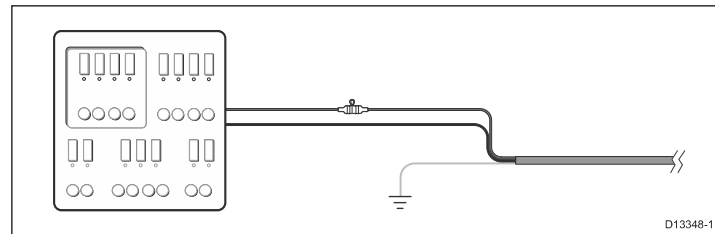
- The power cable supplied with your product may be connected directly to the vessel's battery, via a suitably rated fuse or breaker.
- The power cable supplied with your product may NOT include a separate drain wire. If this is the case, only the power cable's red and black wires need to be connected.
- If the supplied power cable is NOT fitted with an 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.



D13344-1

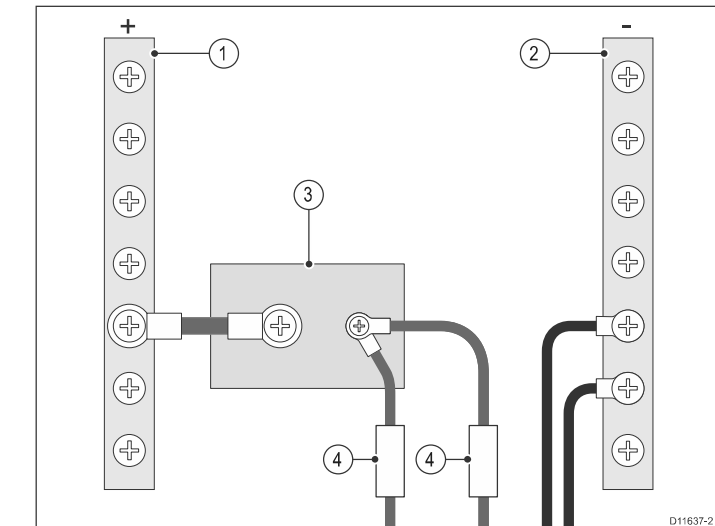
A	Battery connection scenario A: suitable for a vessel with a common RF ground point. In this scenario, if your product's power cable is supplied with a separate drain wire then it should be connected to the vessel's common ground point.
B	Battery connection scenario B: suitable for a vessel without 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.

**Implementation — connection to distribution panel**



D13348-1

- Alternatively, the supplied power cable may be 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.



D11637-2

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

3	Circuit breaker
4	Fuse

- In all cases, observe the recommended breaker / fuse ratings provided in the product's documentation.

**Important:**  
Be aware that the suitable fuse rating for the thermal breaker or fuse is dependent on the number of devices you are connecting.

**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 separate 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

**Technical specification**

**Element HV technical specification**

**Power**

	Element™ 7 HV	Element™ 9 HV	Element™ 12 HV
Nominal supply voltage:	12 V dc		
Operating voltage range:	8 V dc to 16 V dc (protected up to 32 V dc)		
Fuse requirements:	<ul style="list-style-type: none"> <li>• Inline fuse = 5 Amp, or</li> <li>• Thermal breaker = 3 Amp</li> </ul>		
LEN:	1		

**Environmental**

	Element™ 7 HV	Element™ 9 HV	Element™ 12 HV
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		

**LCD specification**

	Element™ 7 HV	Element™ 9 HV	Element™ 12 HV
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**

	Element™ 7 HV	Element™ 9 HV	Element™ 12 HV
Transducers:	<ul style="list-style-type: none"> <li>• HyperVision™ variant (15-pin connector) direct connection</li> <li>• Dragonfly® variant (10-pin Green connector) transducers via adaptor cable: A80558</li> <li>• CPT-S / CPT-DVS variant (9-pin connector) transducers via adaptor cable: A80559</li> <li>• Minnkota variant (4-pin connector) transducers via adaptor cable: A80560</li> <li>• Motorguide variant (9-pin connector) transducers via adaptor cable: A80606</li> </ul>		
NMEA 2000	1 x DeviceNet female connector built into power cable		
Wi-Fi	1 x 802.11/b/g/n		

**Storage**

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

**HyperVision™ technical specification**

The following specification only applies to HyperVision™ products.

<b>Frequencies</b>	<ul style="list-style-type: none"> <li>• 1.2 MHz CHIRP</li> <li>• 350 kHz CHIRP</li> <li>• 200 kHz CHIRP</li> </ul>
<b>Channels</b>	<ul style="list-style-type: none"> <li>• Conical CHIRP sonar</li> <li>• RealVision™ 3D (Hyper)</li> <li>• RealVision™ 3D (Standard)</li> <li>• SideVision™ (Hyper)</li> <li>• SideVision™ (Standard)</li> <li>• DownVision™ (Hyper)</li> <li>• DownVision™ (Standard)</li> </ul>
<b>200 kHz range</b>	• Conical CHIRP sonar = 0.6 M (2 ft) to 274 m (900 ft)
<b>350 kHz range</b>	<ul style="list-style-type: none"> <li>• RealVision™ 3D = 0.6 M (2 ft) to 91 m (300 ft)</li> <li>• SideVision™ = 0.6 M (2 ft) to 91 m (300 ft) each side</li> <li>• DownVision™ = 0.6 M (2 ft) to 183 m (600 ft)</li> </ul>
<b>1.2 MHz range</b>	<ul style="list-style-type: none"> <li>• RealVision™ 3D = 0.6 M (2 ft) to 38 m (125 ft)</li> <li>• SideVision™ = 0.6 M (2 ft) to 38 m (125 ft) each side</li> <li>• DownVision™ = 0.6 M (2 ft) to 38 m (125 ft)</li> </ul>