GARMIN.

GPSMAP® 500/700 Series and echoMAP™ 50/70 Series Installation Instructions

Important Safety Information

> ⚠ **WARNING**
>
> See the *Important Safety and Product Information* guide in the product box for product warnings and other important information.
>
> When connecting the power cable, do not remove the in-line fuse holder. To prevent the possibility of injury or product damage caused by fire or overheating, the appropriate fuse must be in place as indicated in the product specifications. In addition, connecting the power cable without the appropriate fuse in place will void the product warranty.

> ⚠ **CAUTION**
>
> Always wear safety goggles, ear protection, and a dust mask when drilling, cutting, or sanding.

> *NOTICE*
>
> When drilling or cutting, always check what is on the opposite side of the surface.

Registering Your Device

Help us better support you by completing our online registration today.

- Go to http://my.garmin.com.
- Keep the original sales receipt, or a photocopy, in a safe place.

Contacting Garmin Product Support

- Go to www.garmin.com/support and click **Contact Support** for in-country support information.
- In the USA, call (913) 397.8200 or (800) 800.1020.
- In the UK, call 0808 2380000.
- In Europe, call +44 (0) 870.8501241.

Tools Needed

- Drill and drill bits
- #2 Phillips screwdriver
- Jigsaw or rotary tool
- File and sandpaper
- Marine sealant (optional)

Mounting Considerations

> *NOTICE*
>
> This device should be mounted in a location that is not exposed to extreme temperatures or conditions. The temperature range for this device is listed in the product specifications. Extended exposure to temperatures exceeding the specified temperature range, in storage or operating conditions, may cause device failure. Extreme-temperature-induced damage and related consequences are not covered by the warranty.

Using the included hardware and template, you can mount the device using one of two methods. You can use the included bracket and hardware to bail mount the device, or you can use the included template and hardware to flush mount the device in the dashboard. If you want to mount the device using an alternative method where it appears flat with the front of the dashboard, you must purchase a flat-mount kit (sold separately, with professional installation recommended) from your Garmin® dealer.

When selecting a mounting location, observe these considerations.

NOTE: Not all mounting methods are available for all device models. See the specific mounting-type section for more details about your model.

- The location should provide optimal viewing as you operate your boat.
- The location should allow for easy access to all device interfaces, such as the keypad, touchscreen, and card reader, if applicable.
- The location must be strong enough to support the weight of the device and protect it from excessive vibration or shock.
- To avoid interference with a magnetic compass, the device should not be installed closer to a compass than the compass-safe distance value listed in the product specifications.
- The location must allow room for the routing and connection of all cables.

Bail Mounting a Five-Inch Device

> *NOTICE*
>
> If you are mounting the bracket on fiberglass with screws, it is recommended to use a countersink bit to drill a clearance counterbore through only the top gel-coat layer. This will help to avoid any cracking in the gel-coat layer when the screws are tightened.
>
> Stainless-steel screws may bind when screwed into fiberglass and overtightened. Garmin recommends applying an anti-seize lubricant to the screws before installing them.

You can use the included bracket to bail mount the device on a flat surface. The five-inch models have the option of installing a swivel at the base of the bail-mount bracket (Bail Mounting a Five-Inch Device with a Swivel Base).

1. Using the bail-mount bracket ① as a template, mark the pilot holes ②.
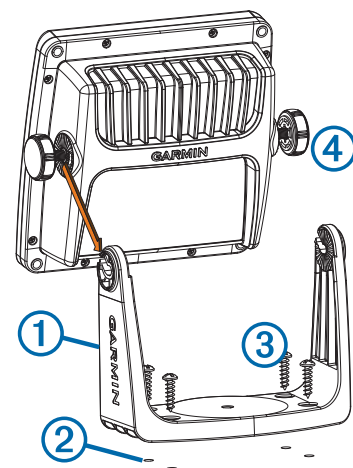
2. Using a $^1/_8$in. (3 mm) drill bit, drill the pilot holes.
3. Using the included screws ③, secure the bail-mount bracket to the mounting surface.
4. Install the bail-mount knobs ④ on the sides of the device.
5. Place the device in the bail-mount bracket and tighten the bail-mount knobs.

Bail Mounting a Five-Inch Device with a Swivel Base

NOTICE

Only pan-head machine bolts or self-tapping screws should be used to secure the swivel base. If you use screws with countersunk heads, you may damage the mounting bracket.

The five-inch devices have the option of adding a swivel to the bail mount. The swivel base allows for the routing of cables through the mounting surface (optional).

1   Using the swivel base as a template ①, mark three pilot holes ②.
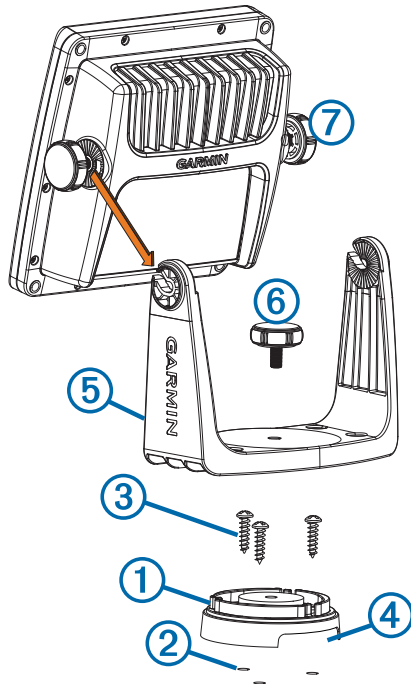
2   If you are routing the cables through the mounting surface, mark the location directly in the middle of the three pilot holes (optional).

3   Using a $1/8$ in. (3 mm) drill bit, drill the three pilot holes.

4   If you are routing the cables through the mounting surface, drill a 1 in. (25.4 mm) hole in the middle of the three pilot holes (optional).

5   If you are routing the cables through the mounting surface, route them through the hole you drilled in step 5, and extend enough slack so that the connectors will reach the device after it is mounted (optional).

6   If you are routing the cables through the mounting surface, route them through the holes ③ in the back of the swivel-mount bracket (optional).

7   Using the included screws ④, secure the swivel base to the mounting surface.

8   Place the bail-mount bracket ⑤ on the swivel base, and secure it using the swivel-mount knob ⑥.

9   Install the bail-mount knobs ⑦ on the sides of the device.

10 Place the device in the bail mount bracket and tighten the bail-mount knobs.

11 If you routed the cables through the mounting surface, apply marine sealant over the holes in the back of the swivel mount bracket (optional).

Bail Mounting a Seven-Inch Device

NOTICE

If you are mounting the bracket on fiberglass with screws, it is recommended to use a countersink bit to drill a clearance counterbore through only the top gel-coat layer. This will help to avoid any cracking in the gel-coat layer when the screws are tightened.

Stainless-steel screws may bind when screwed into fiberglass and overtightened. Garmin recommends applying an anti-seize lubricant to the screws before installing them.

You can use the included bracket to bail mount the device on a flat surface. The bail-mount bracket for the seven-inch devices allows for the routing of cables through the mounting surface (optional).

1   Select the mounting hardware appropriate for your mounting surface and for the bail-mount bracket.

2   Using the bail-mount bracket ① as a template, mark the pilot holes ②.
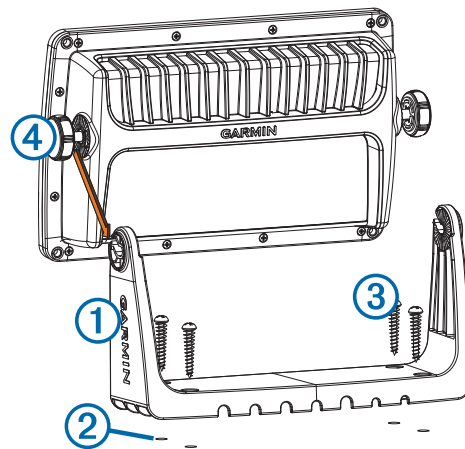
3   If you are routing the cables through the mounting surface, mark a location in the middle of the four pilot holes (optional).

4   Using a drill bit appropriate for the mounting hardware, drill the four pilot holes.

5   If you are routing the cables through the mounting surface, drill a 1¼ in. (32 mm) hole in the middle of the four pilot holes (optional).

6   If you are routing the cables through the mounting surface, route them through the hole you drilled in step 5, and extend enough slack so that the connectors will reach the device after it is mounted (optional).

7   If you are routing the cables through the mounting surface, route them through the holes in the back of the bail-mount bracket (optional).

8   Using the selected mounting hardware ③, secure the bail-mount bracket to the mounting surface.

9   Install the bail-mount knobs ④ on the sides of the device.

10 Place the device in the bail-mount bracket and tighten the bail-mount knobs.

11 If you routed the cables through the mounting surface, apply marine sealant over the holes in the back of the swivel mount bracket (optional).

Flush Mounting the Device

NOTICE

Be careful when cutting the hole to flush mount the device. There is only a small amount of clearance between the case

and the mounting holes, and cutting the hole too large could compromise the stability of the device after it is mounted.

The included template and hardware can be used to mount the device in your dashboard.

If you want to mount the device using an alternative method where it appears flat with the front of the dashboard, you must purchase a flat-mount kit (sold separately, with professional installation recommended) from your Garmin dealer.

1 Trim the template and make sure it fits in the location where you want to mount the device.
2 Remove the protective liner from the back of the template and adhere it to the location where you want to mount the device.
3 Using a $^3/_8$ in. (9.5 mm) drill bit, drill one or more of the holes inside the corners of the solid line on the template to prepare the mounting surface for cutting.
4 Using a jigsaw, cut the mounting surface along the inside of the solid line indicated on the template.
5 Place the device in the cutout to test the fit.
6 If necessary, use a file and sandpaper to refine the size of the cutout.
7 After the device fits correctly in the cutout, ensure the mounting holes on the device line up with the pilot holes on the template.
8 If the mounting holes on the device do not line up, mark the new pilot-hole locations.
9 Using a $^1/_8$ in. (3.2 mm) drill bit, drill the pilot holes.
10 Remove the template from the mounting surface.
11 If you will not have access to the back of the device after you mount it, connect all necessary cables to the device before placing it into the cutout.

   NOTE: To prevent corrosion of the metal contacts, cover unused connectors with the attached weather caps.
12 Install the rubber gasket ① on the back of the device.

   The pieces of the rubber gasket have adhesive on the back. Make sure you remove the protective liner before installing them on the device.
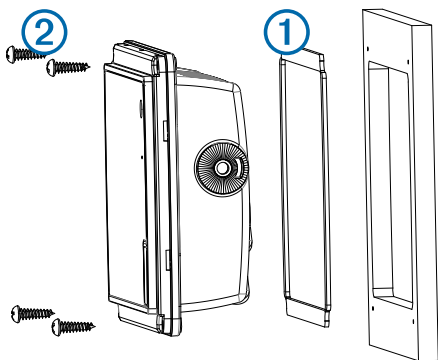

13 Place the device into the cutout.
14 Secure the device to the mounting surface using the included screws ②.
15 Install the decorative bezel by snapping it in place around the edges of the device.

About the Wiring Harness

- The wiring harness connects the device to power, NMEA® 0183 devices, and a lamp or a horn for visible or audible alerts.
- The wiring harness is packaged without the locking ring installed. You should route the cable before you install the locking ring.

- After connecting a locking ring to the wiring harness, you should make sure the ring is securely connected and the o-ring is in place so the connection remains secure.
- The device has two internal NMEA 0183 ports that are used to connect to NMEA 0183 compliant devices. When connecting to a device for both transmitting and receiving, you must make sure to use wires from the same internal NMEA 0183 port.
- If it is necessary to extend the power and ground wires, you must use 16 AWG (1.31 mm²) wire.
- If it is necessary to extend the NMEA 0183 or alarm wires, you must use 22 AWG (.33 mm²) wire.
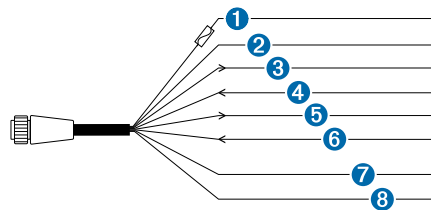
Item	Wire Color	Wire Function
①	Red	Power
②	Black	Ground (power and NMEA 0183)
③	Blue	NMEA 0183 internal port 1 Tx (out)
④	Brown	NMEA 0183 internal port 1 Rx (in)
⑤	Gray	NMEA 0183 internal port 2 Tx (out)
⑥	Violet	NMEA 0183 internal port 2 Rx (in)
⑦	Orange	Accessory on
⑧	Yellow	Alarm low

### Connecting the Wiring Harness to Power

⚠ **WARNING**

When connecting the power cable, do not remove the in-line fuse holder. To prevent the possibility of injury or product damage caused by fire or overheating, the appropriate fuse must be in place as indicated in the product specifications. In addition, connecting the power cable without the appropriate fuse in place will void the product warranty.

1 Route the wiring harness to the power source and to the device.
2 Connect the red wire to the positive (+) battery terminal, and connect the black wire to the negative (-) battery terminal.
3 Install the locking ring and o-ring on the end of the wiring harness.
4 Connect the wiring harness to the device by turning the locking ring clockwise.

NMEA 0183 Connection Considerations

- The installation instructions provided with your NMEA 0183 compatible device should contain the information you need to identify the transmitting (Tx) and receiving (Rx) A (+) and B (-) wires. Each port may have one or two transmitting wires, or one or two receiving wires.
- When connecting NMEA 0183 devices to ports containing two transmitting (Tx) wires or two receiving (Rx) wires each, it is not necessary for the NMEA 0183 device to connect to a common ground.
- When connecting a NMEA 0183 device to ports containing one transmitting (Tx) wire or one receiving (Rx) wire each, the NMEA 0183 device must be connected to a common ground.
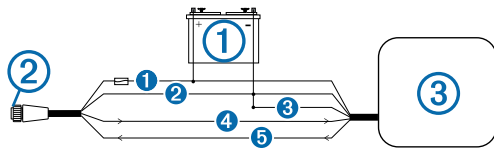
Item	Description
①	12 Vdc power source
②	Wiring harness
③	NMEA 0183 compliant device

Item	Garmin Wire Function	Garmin Wire Color	NMEA 0183 Device Wire Function
❶	Power	Red	Power
❷	Ground	Black	Data ground
❸	Tx/Rx		Tx/Rx/B (-)
❹	Tx	Blue	Rx/A (+)
❺	Rx	Brown	Tx/A (+)

Lamp or Horn Connections

The device can be used with a lamp, a horn, or both, to sound or flash an alert when the chartplotter displays a message. This is optional, and the alarm wire is not necessary for the device to function normally. When connecting the device to a lamp or horn, observe these considerations.

- The alarm circuit switches to a low-voltage state when the alarm sounds.
- The maximum current is 100 mA, and a relay is needed to limit the current from the chartplotter to 100 mA.
- To manually toggle visual and audible alerts, you can install single-pole, single-throw switches.
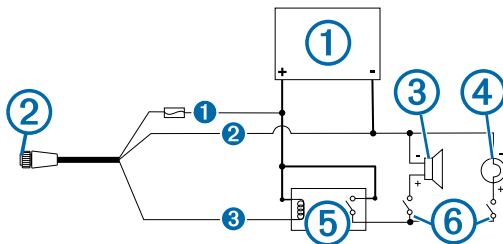
Item	Description
①	Power source
②	Power cable
③	Horn
④	Lamp
⑤	Relay (100 mA coil current)
⑥	Toggle switches to enable and disable lamp or horn alerts

Item	Wire Color	Wire Function
❶	Red	Power
❷	Black	Ground
❸	Yellow	Alarm

## NMEA 2000® Considerations

NOTICE

If you have an existing NMEA 2000 network on your boat, it should already be connected to power. Do not connect the NMEA 2000 power cable to an existing NMEA 2000 network, because only one power source should be connected to a NMEA 2000 network.

If you are installing a NMEA 2000 power cable, you must connect it to the boat ignition switch or through another in-line switch. NMEA 2000 devices will drain your battery if the NMEA 2000 power cable is connected to the battery directly.

NMEA 2000 compatible models can connect to a NMEA 2000 network on your boat to share data from NMEA 2000 compatible devices such as a VHF radio. The necessary NMEA 2000 cables and connectors are sold separately.

If you are unfamiliar with NMEA 2000, you should read the "NMEA 2000 Network Fundamentals" chapter of the *Technical Reference for NMEA 2000 Products*. To download this document, select Manuals on the product page for your device at www.garmin.com.

The port labeled NMEA 2000 on the back of the device is used to connect it to a standard NMEA 2000 network.
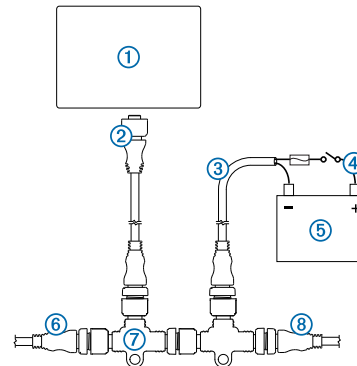
Item	Description
①	NMEA 2000 compatible Garmin device
②	NMEA 2000 drop cable
③	NMEA 2000 power cable
④	Ignition or in-line switch
⑤	12 Vdc power source
⑥	NMEA 2000 terminator or backbone cable
⑦	NMEA 2000 T-connector
⑧	NMEA 2000 terminator or backbone cable

Connecting the Device to a Transducer

Devices that can receive depth information from a Garmin transducer have a port labeled SONAR. Go to www.garmin.com or contact your local Garmin dealer to determine the appropriate type of transducer for your needs.

1 Follow the instructions provided with your transducer to install it on your boat correctly.
2 Route the transducer cable to the back of your device, away from sources of electrical interference.
3 Connect the transducer cable to the SONAR port on your device.

Connecting the Device to a Remote GPS Antenna

This device has an internal GPS receiver, but some installations, such as a flush-mount installation, may not allow a view of the sky needed to calculate your GPS position. In this situation, you can install a Garmin external GPS antenna and connect it to the device to provide GPS information.

Devices that can receive information from a Garmin external GPS antenna have a port labeled EXT GPS.

1 Follow the instruction provided with your Garmin external GPS antenna to install it on your boat correctly.
2 Route the antenna cable to the back of your device, away from sources of electrical interference.
3 Connect the antenna cable to the EXT GPS port on your device.

Connecting the Device to a Garmin Marine Radar

Only radar-compatible devices are capable of receiving information from a Garmin Marine Radar. Radar-compatible devices have a port labeled RADAR. Go to www.garmin.com or contact your local Garmin dealer to determine the appropriate type of radar for your needs.

1 Follow the instructions provided with your radar to correctly install it on your boat.
2 Route the Garmin Marine Network cable from the radar to the back of your device, away from sources of electrical interference.
3 Connect the Garmin Marine Network cable to the RADAR port on your device.

Additional Grounding Consideration

This consideration is applicable only to seven-inch devices.

This device should not need additional chassis grounding in most installation situations. If you experience interference, the grounding screw on the housing can be used to connect the device to the water ground of the boat to help avoid the interference.
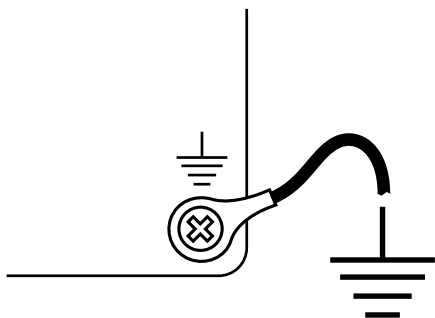
Updating the Device Software

Before you can update the software, you must obtain a software-update memory card or load the latest software onto a memory card.

1 Turn on the chartplotter.
2 After the home screen appears, insert the memory card into the card slot.
   NOTE: In order for the software update instructions to appear, the device must be fully booted before the card is inserted.
3 Follow the on-screen instructions.
4 Wait several minutes while the software update process completes.
   The device returns to normal operation after the software update process is complete.
5 Remove the memory card.
   NOTE: If the memory card is removed before the device restarts fully, the software update is not complete.

Specifications

Physical Specifications

Device	Specification	Measurement
Five-inch models	Dimensions (W×H×D)	$6^{7}/_{64} \times 5^{15}/_{16} \times 2^{13}/_{32}$ in. (155 × 151 × 61 mm)
	Display size (W×H)	$2^{29}/_{32}$ in. × 4 in. (74 × 101.6 mm)
	Weight	1.72 lbs (779 g)
Seven-inch models	Dimensions (W×H×D)	$9^{1}/_{16} \times 5^{5}/_{8} \times 2^{9}/_{32}$ in.(230 × 143 × 58 mm)
	Display size (W×H)	$6^{1}/_{64}$ in. × $3^{11}/_{32}$ in. (153 × 85 mm)
	Weight	2.31 lbs (1.048 kg)
All models	Temperature range	From 5° to 131°F (from -15° to 55°C)
	Material	Polycarbonate plastic

Electrical Specifications

Device	Specification	Measurement
All models	Input power	10–32 Vdc
	Fuse	3 A, fast-acting
	NMEA 2000 LEN	2
	NMEA 2000 Draw	100 mA max.
Five-inch models	Max. power usage at 10 Vdc	27 W
	Typical current draw at 12 Vdc	450 mA
	Max current draw at 12 Vdc	2.7 A
	Compass-safe distance	450 mm (17.72 in.)
Seven-inch models	Max. power usage at 10 Vdc	27 W
	Typical current draw at 12 Vdc	1.3 A
	Max current draw at 12 Vdc	2.3 A
	Compass-safe distance	600 mm (23.62 in.)

NMEA 2000 PGN Information

Type	PGN	Description
Transmit and receive	059392	ISO acknowledgment
	059904	ISO request
	060928	ISO address claim
	126208	NMEA: Command, request, and acknowledge group function
	126996	Product information
	127250	Vessel heading
	128259	Speed: Water referenced
	128267	Water depth
	129539	GNSS DOPs
	129799	Radio frequency, mode, and power
	130306	Wind data
	130312	Temperature
Transmit	126464	Transmit and receive PGN list group function
	127258	Magnetic Variance
	129025	Position: Rapid update
	129026	COG and SOG: Rapid update
	129029	GNSS position data
	129283	Cross track error
	129284	Navigation data
	129285	Navigation route and waypoint info
	129540	GNSS satellites in view
Receive	127245	Rudder
	127250	Vessel heading
	127488	Engine parameters: Rapid update
	127489	Engine parameters: Dynamic
	127493	Transmission parameters: Dynamic
	127498	Engine parameters: Static
	127505	Fluid level
	129038	AIS class A position report
	129039	AIS class B position report
	129040	AIS class B extended position report

Type	PGN	Description
	129794	AIS class A static and voyage related data
	129798	AIS SAR aircraft position report
	129802	AIS safety-related broadcast message
	129808	DSC call information
	130310	Environmental parameters
	130311	Environmental parameters (obsolete)
	130313	Humidity
	130314	Actual pressure
	130576	Small craft status

This data applies only to NMEA 2000-compatible products.

Type	Sentence	Description
	DSE	Expanded digital selective calling
	HDG	Heading, deviation, and variation
	HDM	Heading, magnetic
	MWD	Wind direction and speed
	MDA	Meteorological composite
	MWV	Wind speed and angle
	VDM	AIS VHF data-link message

You can purchase complete information about National Marine Electronics Association (NMEA) format and sentences from: NMEA, Seven Riggs Avenue, Severna Park, MD 21146 USA (www.nmea.org)

NMEA 0183 Information

Type	Sentence	Description
Transmit	GPAPB	APB: Heading or track controller (autopilot) sentence "B"
	GPBOD	BOD: Bearing (origin to destination)
	GPBWC	BWC: Bearing and distance to waypoint
	GPGGA	GGA: Global positioning system fix data
	GPGLL	GLL: Geographic position (latitude and longitude)
	GPGSA	GSA: GNSS DOP and active satellites
	GPGSV	GSV: GNSS satellites in view
	GPRMB	RMB: Recommended minimum navigation information
	GPRMC	RMC: Recommended minimum specific GNSS data
	GPRTE	RTE: Routes
	GPVTG	VTG: Course over ground and ground speed
	GPWPL	WPL: Waypoint location
	GPXTE	XTE: Cross track error
	PGRME	E: Estimated error
	PGRMM	M: Map datum
	PGRMZ	Z: Altitude
	SDDBT	DBT: Depth below transducer
	SDDPT	DPT: Depth
	SDMTW	MTW: Water temperature
	SDVHW	VHW: Water speed and heading
Receive	DPT	Depth
	DBT	Depth below transducer
	MTW	Water temperature
	VHW	Water speed and heading
	WPL	Waypoint location
	DSC	Digital selective calling information