

GARMIN[®]

SMARTPUMP

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.

You are responsible for the safe and prudent operation of your vessel. The autopilot is a tool that enhances your capability to operate your boat. It does not relieve you of the responsibility of safely operating your boat. Avoid navigational hazards and never leave the helm unattended.

Always be prepared to promptly regain manual control of your boat.

CAUTION

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

NOTICE

To avoid damage to your boat, the autopilot system should be installed by a qualified marine installer. Specific knowledge of hydraulic steering componentry and marine electrical systems is required for proper installation.

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

This pump is only for use with Garmin[®] autopilot systems. Attempting to use this pump with any other system may damage the system, the pump, or the vessel.

The SmartPump steers your boat by interacting with the hydraulic steering system, based on commands from the autopilot system.

Registering Your Device

Help us better support you by completing our online registration today. Keep the original sales receipt, or a photocopy, in a safe place.

- 1 Go to my.garmin.com/registration.
- 2 Sign in to your Garmin account.

Tools Needed

- Safety glasses
- Drill and drill bits
- Wrenches
- Wire cutter/stripper
- Screwdrivers: Phillips and flat
- Cable ties
- Marine corrosion inhibitor spray
- Hydraulic hose with machine-crimped or field-replaceable fittings that have a minimum rating of 1000 psi
- Hydraulic T-connectors
- Thread sealant
- Hydraulic bleeding equipment
- Hydraulic fluid
- Mounting screws: the pump kit includes mounting screws, but if the included screws are not appropriate for the mounting surface, you must provide the correct types of screws

Mounting Considerations

- Before you start the pump installation, you must identify the type of hydraulic steering system in your boat and consult the hydraulic diagrams. Each boat is different, and you must consider the existing hydraulic layout before deciding where to mount the pump (*Hydraulic Considerations*, page 1).
- You should mount the pump horizontally, if possible.
- If you cannot mount the pump horizontally, you must mount it vertically with the pump head connectors facing up.
- You must mount the pump in a location to which you can extend the hydraulic steering lines of the boat.
- The pump has five hydraulic-connector fittings, although only three are used when installing the pump as recommended. The pump-valve illustration provided in these instructions may be helpful when determining the fitting layout that is best for your installation location (*Pump Valves and Fittings*, page 1).

Mounting the Pump

Before you mount the pump, if your boat has an unbalanced cylinder steering system, you must re-configure the pump to work properly with the unbalanced cylinder (*Configuring the Pump for an Unbalanced Cylinder*, page 4).

Before you can mount the pump, you must select a location (*Mounting Considerations*, page 1) and determine the correct mounting hardware (*Tools Needed*, page 1).

- 1 Hold the pump in the intended mounting location and mark the locations of the mounting holes on the mounting surface, using the pump as a template.
- 2 Using a drill bit appropriate for the mounting surface and selected mounting hardware, drill the four holes through the mounting surface.
- 3 Secure the pump to the mounting surface using the selected mounting hardware.

Hydraulic Considerations

NOTICE

When adding hydraulic line to the system, use only hose with machine-crimped or field-replaceable fittings that have a minimum rating of 1000 lbf/in² (6,895 kPa).

Do not use plumber's tape on any hydraulic fitting. Use an appropriate thread sealant rated for marine use on all pipe threads in the hydraulic system.

Do not attempt to use the autopilot to steer the boat until you bleed all air from each part of the hydraulic system.

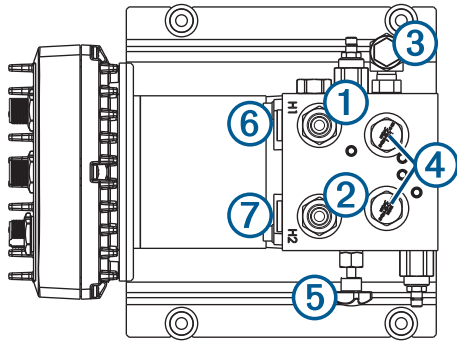
Consult the hydraulic-layout diagrams to help determine how to best install the pump in the hydraulic system of the boat (*Hydraulic Layouts*, page 2).

Installing T-fittings and shutoff valves so the pump can be removed for service without disabling the steering system is highly recommended. This type of installation uses three of the five ports on the manifold. Although it is not recommended, all five ports can be used instead of installing shutoff valves. See *Pump Valves and Fittings*, page 1 for more information on the fittings and alternate connection methods.

Pump Valves and Fittings

The pump can be connected to the hydraulic system using one of two methods. The recommended three-connector method uses only the H1 ① and H2 ② fittings, with a T-connector splitting the connection between the helm and cylinder. The return line fitting ③ connects to only the helm. The check valves ④ should not be reconfigured if the boat is equipped with a balanced cylinder. If the boat is equipped with an unbalanced cylinder, the check valves must be reconfigured (*Configuring the Pump for an Unbalanced Cylinder*, page 4). The bypass valve

⑤ is opened only for hydraulic bleeding, and must be fully tightened during normal operation.



If necessary, the C1 ⑥ and C2 ⑦ fittings can be used with the recommended three-connector installation instead of the H1 and H2 fittings.

Alternatively, the pump can be installed using all five connectors. This installation option uses the C1 and C2 fittings to connect the pump to the cylinder and the H1 and H2 fittings to connect the pump to the helm. This type of installation is not recommended, because the pump cannot be removed for service without disabling the steering system of the boat.

Hydraulic Layouts

NOTICE

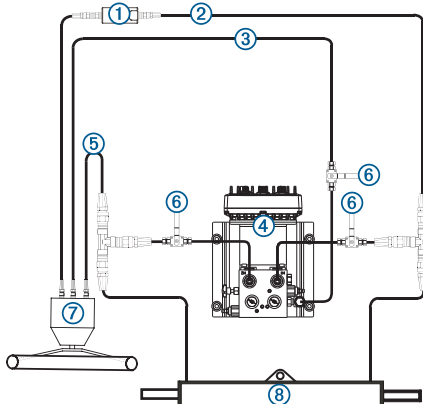
If the steering system in your boat does not match any of the hydraulic layouts in this manual and you are unsure how to install the pump, contact Garmin Product Support.

Before you start the pump installation, identify the type of hydraulic steering system in your boat. Each boat is different, and you must consider certain aspects of the existing hydraulic layout before deciding where to mount the pump.

Important Considerations

- The pump must be reconfigured if the boat is equipped with an unbalanced steering cylinder ([Configuring the Pump for an Unbalanced Cylinder](#), page 4).
- Garmin recommends using T-connectors to connect the hydraulic lines to the pump.
- To allow for easy pump disabling and removal, Garmin recommends installing shut-off valves in the hydraulic lines between the pump manifold and T-connectors.
- Teflon® tape must not be used on any hydraulic fitting.
- An appropriate thread sealant should be used on all pipe threads in the hydraulic system.

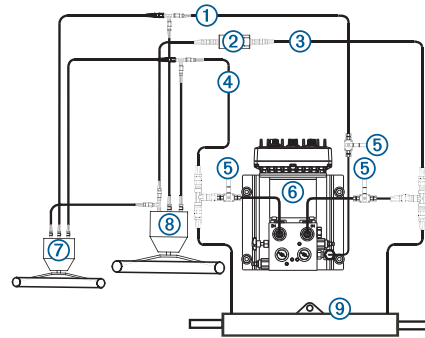
Single-Helm without Power Assist Layout



①	Shadow Drive™
②	Starboard line
③	Return line

④	Pump
⑤	Port line
⑥	Shut-off valves
⑦	Helm
⑧	Steering cylinder

Dual-Helm without Power Assist Layout



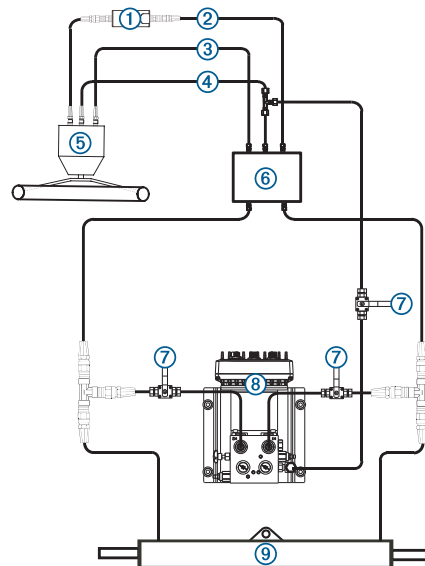
①	Return line
②	Shadow Drive
③	Starboard line
④	Port line
⑤	Shut-off valves
⑥	Pump
⑦	Upper helm
⑧	Lower helm
⑨	Steering cylinder

Single-Helm with Power Assist Layout

NOTICE

The pump must be installed between the cylinder and the power-assist module to function correctly.

NOTE: Removal of the power assist-module may be necessary to gain access to the fittings, hoses, and bleed-tee fitting.



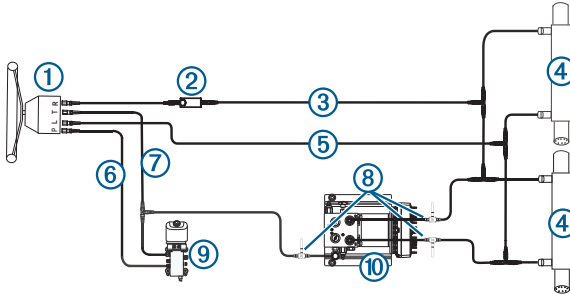
①	Shadow Drive
②	Starboard line
③	Port line
④	Return line
⑤	Helm
⑥	Power-assist module
⑦	Shut-off valves

⑧	Pump
⑨	Steering cylinder

Single-Helm with Uflex® MasterDrive™ Layout

⚠ CAUTION

When installing the pump in a system with a Uflex MasterDrive, do not cut the high-pressure line connecting the power unit to the helm to avoid injury or property damage.

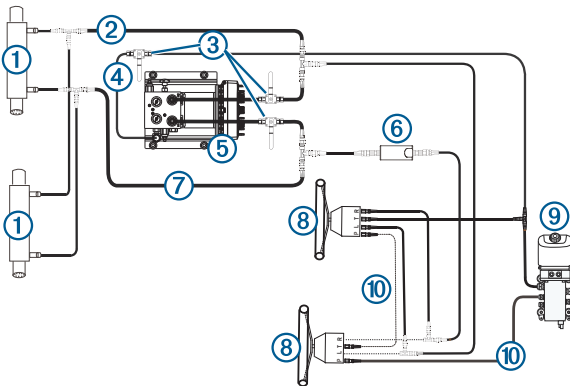


①	Helm
②	Shadow Drive
③	Starboard line
④	Steering cylinders
⑤	Port line
⑥	High pressure line - DO NOT CUT
⑦	Return line
⑧	Shutoff valves
⑨	Uflex MasterDrive power unit
⑩	Pump

Dual-Helm with Uflex MasterDrive Layout

⚠ CAUTION

When installing the pump in a system with a Uflex MasterDrive, do not cut the high-pressure line connecting the power unit to the helm to avoid injury or property damage.



①	Steering cylinders
②	Port line
③	Shutoff valves
④	Return line
⑤	Pump
⑥	Shadow Drive
⑦	Starboard line
⑧	Helms
⑨	Uflex MasterDrive power unit
⑩	High pressure line - DO NOT CUT

Connecting the Hydraulic Lines to the Pump

For assistance, see the layout diagrams (*Hydraulic Layouts, page 2*).

- 1 Disconnect the necessary lines from the hydraulic system.
- 2 Add a T-connector to the starboard and port lines of the system between the helm and the steering cylinder.
 - NOTE:** If the boat has a power-assist module, you must add the T-connectors between the power-assist module and the steering cylinder.
- 3 Complete an action:
 - If the boat does not have a return line connected to the helm, add enough hydraulic hose to connect the return fitting on the helm to the pump fitting labeled with a T.
 - If the boat has a return line connected to the helm, add a T-connector to the return line. If the return line is connected to a power-assist module, you must add the T-connector to the return line between the power-assist module and the helm.
- 4 Add hydraulic hose to the unused fitting on each T-connector, with enough hose to connect the T-connector to the pump fittings.
- 5 Connect the starboard line T-connector to a pump fitting labeled with a C1 or C2.
- 6 Connect the port line T-connector to the pump fitting labeled with a C1 or C2 that you did not use in the previous step.
- 7 Complete an action:
 - If the boat does not have a power-assist module, connect the return fitting on the helm to the pump fitting labeled with a T.
 - If the boat has a power-assist module, connect the return line T-connector to the pump fitting labeled with a T.
- 8 Install the Shadow Drive valve in the port or starboard hydraulic line between the helm and the T-connector that connects to the pump.

See the installation instructions provided in the autopilot corepack when installing the Shadow Drive valve.
- 9 Install a shut-off valve (not included) on each hydraulic line that connects directly to the pump.
- 10 Insert, tighten, and seal the included plugs in the unused pump fittings, if they are not already in place.

Connection Considerations

- You should mount the SmartPump and connect it to the hydraulic system before connecting the SmartPump to power and to the CCU.
- The ports on the SmartPump labeled POWER and CCU are the only ports used in a typical installation.
- The port on the SmartPump labeled FEEDBACK is used only when installing an optional rudder feedback sensor.

NOTE: Some SmartPump models use quarter-turn locking connectors on the cables and ports, and others use threaded connectors. If the connectors on the cable of the pump you purchased do not match your SmartPump model, you can remove the collar from the cable and replace it with a snap-together collar included or available from your Garmin dealer.

Completing the Installation

- 1 Follow the instructions included in the autopilot corepack to install the rest of the autopilot components.
- 2 Follow the instructions included in the autopilot corepack to bleed the air from the hydraulic system.
- 3 Apply a marine corrosion inhibitor spray to the SmartPump to ensure corrosion resistance.

Garmin recommends that you re-apply the marine corrosion inhibitor once each year to extend the life of the SmartPump.

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Configuration and Service

Configuring the Pump for an Unbalanced Cylinder

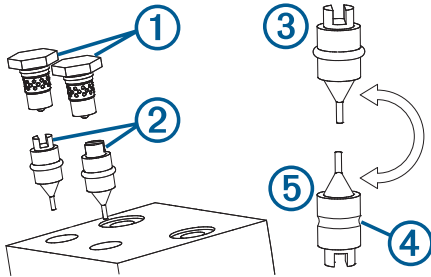
NOTICE

To avoid damage to the pump, keep all parts clean and free of dust and debris while configuring the pump for an unbalanced-cylinder steering system.

If you remove the check valves after bleeding the hydraulic system, you must bleed it again. Reconfiguring the check valves may introduce air into the hydraulic system.


If the boat has an unbalanced cylinder steering system, you must configure the pump to work properly with the steering system.

- 1 Remove the check valves ① from the pump manifold.



- 2 Pull the pistons ② out of the pump manifold.
The pump is configured from the factory with the pistons in the balanced configuration ③.
- 3 Remove the o-rings ④ from the pistons and discard them.
If you cannot easily pull the o-rings from the pistons, you may need to cut them.
- 4 Re-insert the pistons into the pump manifold in the unbalanced configuration ⑤.
- 5 Insert the check valves into the pump manifold, and tighten them.

Specifications

Specification	Measurement
Dimensions (H × W × D)	197 x 190 x 244 mm (7.75 × 7.48 × 9.61 in.)
Weight	7.5 kg (16.5 lb.)
Temperature range	From -15° to 55°C (from 5° to 131°F)
Material	<ul style="list-style-type: none"> • Electronics control unit (ECU): Fully gasketed aluminum alloy • Bracket: Carbon steel • Manifold: Aluminum alloy • Motor: Aluminum alloy
Power cable length	2.7 m (9 ft.)
Input voltage 	From 11.5 to 30 Vdc
Fuse	40 A, blade-type
Main power usage	<ul style="list-style-type: none"> • Standby: Less than 1 A • Engaged: From 5 to 10 A • Peak: 34 A

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