

SmartPilot Verado

Installation and Commissioning Guide

Document Number: 87057-1
Date: October 2005

Trademarks and registered trademarks

Raymarine, SmartPilot, AST (Advanced Steering Technology), AutoAdapt, AutoLearn, AutoRelease, AutoSeastate, AutoTack, AutoTrim, FastTrim, GyroPlus, RayGyro, RayPilot, SeaTalk and WindTrim are trademarks of Raymarine Ltd.

NMEA® is a Registered Trademark of the National Marine Electronics Association

Verado® is a Registered Trademark of Mercury Marine

All other product names are trademarks or registered trademarks of their respective owners.

Copyright: ©Raymarine 2005

Important information

About the documentation provided

Welcome to Raymarine SmartPilot Verado. The autopilot system that will steer your boat to a heading automatically, accurately, reliably and comfortably.

SmartPilot documentation is arranged so that you can install, commission and quickly use your SmartPilot, keeping to hand only the information necessary.

- **SmartPilot Verado Installation and Commissioning Guide** - This book. Describes how to connect, commission and configure the system.
- **SmartPilot Controller Quick Start Guide** - Once commissioned, use your Smart Pilot right away with this handy guide to the main operations.
- **SmartPilot Controller Operating Guide** - Detailed operating information about your SmartPilot.

Note: *This handbook contains important information about the installation and commissioning of your new Raymarine product. To get the best from the product please read this handbook thoroughly.*

Safety notices

**WARNING: Product installation**

This equipment must be installed and operated in accordance with the instructions contained in this handbook. Failure to do so could result in poor product performance, personal injury and/or damage to your boat.

**CAUTION:**

There are no user serviceable parts in the SmartPilot controller, compass or pump. The only user serviceable parts in the course computer are fuses. Only authorized Raymarine service technicians should service all other parts.

**CAUTION:**

This system requires 12 V dc power. Before installing, check your boat's power supply voltage is 12 V dc.

**CAUTION:**

This system is not suitable for boats fitted with triple engines, or where the hydraulic steering cylinders are connected in parallel. If you are unsure whether this system can be fitted to your boat, please consult your local authorized Raymarine service representative.

As correct performance of the boat's steering is critical for safety, we **STRONGLY RECOMMEND** that an Authorized Raymarine Service Representative fits this product. You will only receive full warranty benefits if you can show that an Authorized Raymarine Service Representative has installed or commissioned this product.



DANGER
High voltage

WARNING: Electrical safety

Make sure the power supply is switched off before you make any electrical connections.

**WARNING: Calibration settings**

We supply this product with default calibration settings that do not match those required for a Mercury Verado installation. You must complete the commissioning section starting on *page 24*, before going to sea.

**WARNING: Navigation aid**

Although we have designed this product to be accurate and reliable, many factors can affect its performance. As a result, it should only be used as an aid to navigation and should

never replace common sense and navigational judgement. Always maintain a permanent watch so you can respond to situations as they develop.

Your SmartPilot will add a new dimension to your boating enjoyment. However, it is the skipper's responsibility to ensure the safety of the boat at all times by following these basic rules:

- Ensure that someone is present at the helm AT ALL TIMES, to take manual control in an emergency.
- Make sure that all members of crew know how to disengage the autopilot (see the SmartPilot Quick Start Guide)
- Regularly check for other boats and any obstacles to navigation – no matter how clear the sea may appear, a dangerous situation can develop rapidly.
- Maintain an accurate record of the boat's position by using either a navigation aid or visual bearings.
- Maintain a continuous plot of your boat's position on a current chart. Ensure that the locked autopilot heading will steer the boat clear of all obstacles. Make proper allowance for tidal set – the autopilot cannot.
- Even when your autopilot is locked onto the desired track using a navigation aid, always maintain a log and make regular positional plots. Navigation signals can produce significant errors under some circumstances and the autopilot will not be able to detect these errors.

EMC guidelines

All Raymarine equipment and accessories are designed to the best industry standards for use in the recreational marine environment. Their design and manufacture conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised.

Although every effort has been taken to ensure that they will perform under all conditions, it is important to understand what factors could affect the operation of the product.

The guidelines given here describe the conditions for optimum EMC performance, but it is recognized that it may not be possible to meet all of these conditions in all situations. To ensure the best possible conditions for EMC performance within the constraints imposed by any location, always ensure the maximum separation possible between different items of electrical equipment.

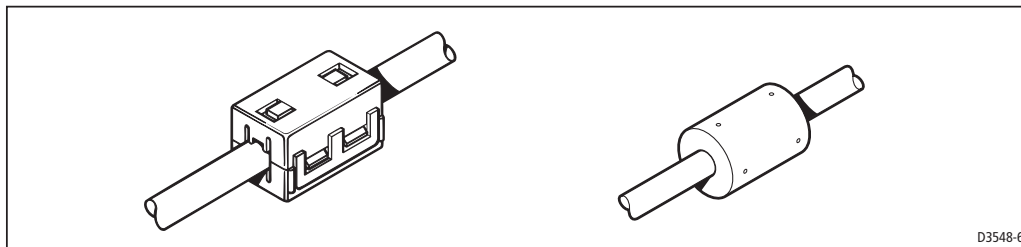
For optimum EMC performance, it is recommended that wherever possible:

- Raymarine equipment and cables connected to it are:
 - At least 3 ft (1 m) 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 7 ft (2 m) 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 equipment is supplied from a separate battery from that used for engine start. Voltage drops below 10 V, and starter motor transients, can cause the equipment to reset. This will not damage the equipment, but may cause the loss of some information and may change the operating mode.
- Raymarine specified cables are used. Cutting and rejoining these cables can compromise EMC performance and must be avoided unless doing so is detailed in the installation manual.
- If a suppression ferrite is attached to a cable, this ferrite should not be removed. If the ferrite needs to be removed during installation it must be reassembled in the same position.

EMC suppression ferrites

The following illustration shows typical cable suppression ferrites used with Raymarine equipment. Always use the ferrites supplied by Raymarine.



Connection to other equipment

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 to the Raymarine unit.

Waste Electrical and Electronic (WEEE) Directive

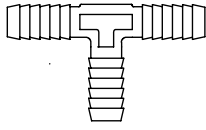


The WEEE Directive requires the recycling of waste electrical and electronic equipment. Whilst the WEEE Directive does not apply to some of Raymarine's products, we support its requirements as part of our environmental policy and we as you to be aware of how you should dispose of this product. The crossed out wheellie bin symbol found on our products signifies that it should not be disposed of in general waste or landfill. Please contact your local dealer, national distributor or Raymarine Technical Services for information on product disposal.

Handbook information

To the best of our knowledge, the information in this handbook was correct when it went to press. 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 the handbook.

What's in the box



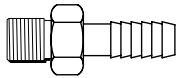
Hose barb 'T' connector



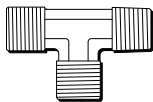
Hose clamp (x4)



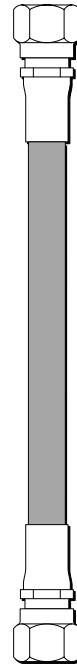
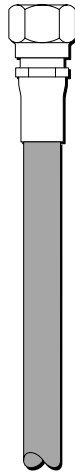
Sealing washer (x3)



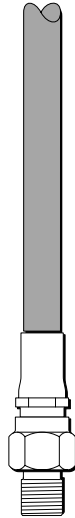
Hose barb to 1/4" BSP connector



'T' connector
9/16 UNF (x 2)



Hydraulic hose (x2) 1' (305 mm)



Hydraulic hose (x 2) 3' (915 mm)

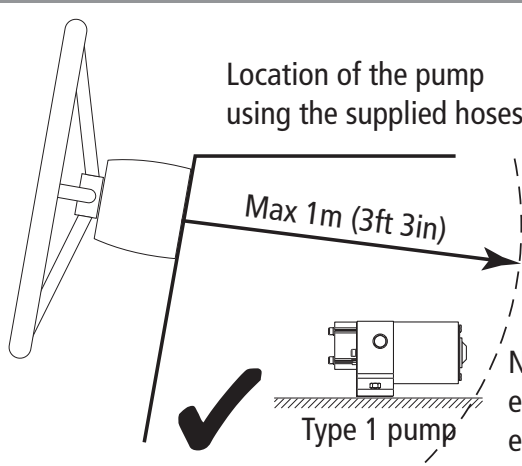


Hydraulic hose
3' (915 mm)

Mount the Type 1 pump

Mount the Type 1 pump within 3' 3" (1 m) of the helm, on a structural member to avoid vibration that could damage the hydraulic pipes. Secure the pump using 1/4" (M6) stainless steel bolts, nuts and lock washers, or self tapping screws and lock washers.

Location



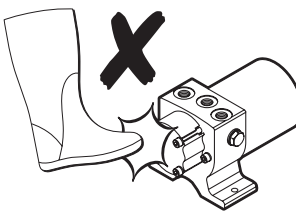
Location of the pump using the supplied hoses.

Max 1m (3ft 3in)


Type 1 pump

Note: Pump may be placed elsewhere if Mercury extension hoses are used.

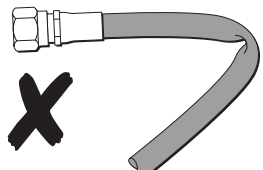
Provide protection from physical damage.

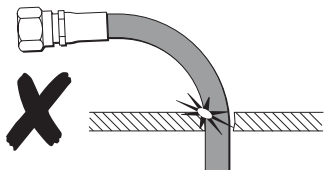


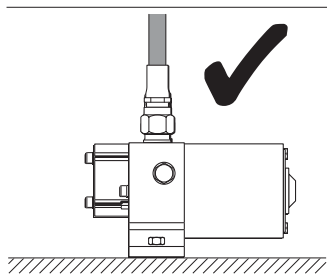
Install in a dry location.



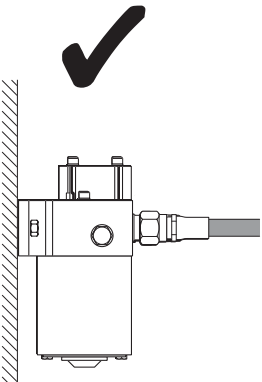
No sharp bends, kinks or chafing of tube.

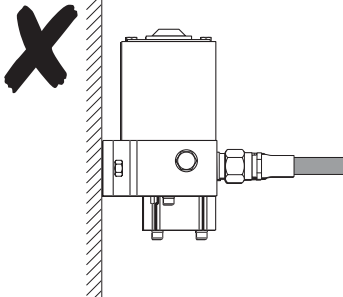






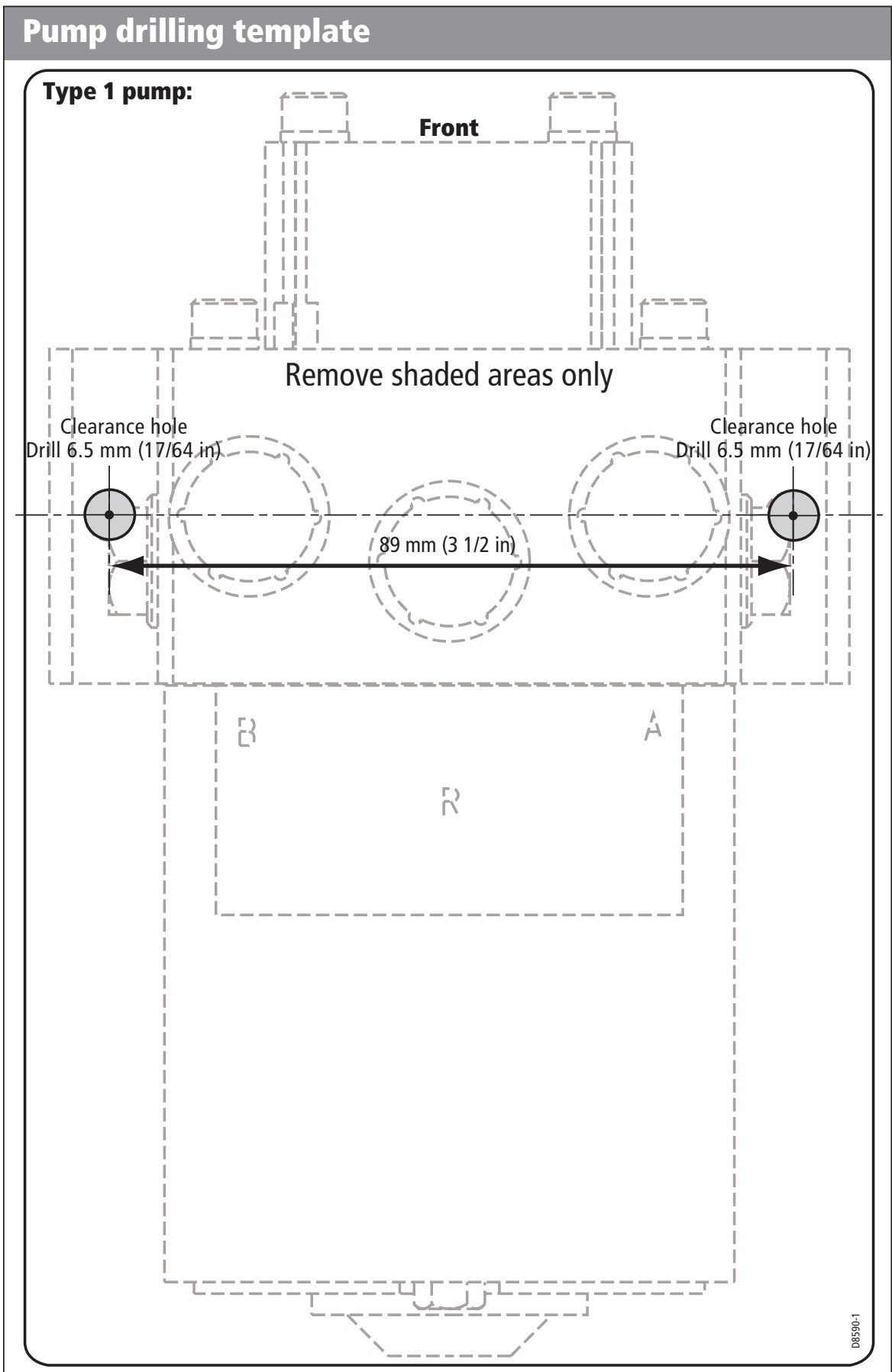
Mount pump either horizontally or with connector end up.





Do not mount pump with connector end down.

DS545-1



This page is intentionally blank

Connect the hydraulic lines

Referring to the hydraulic circuit on the following page, modify the Mercury hydraulic system and install the SmartPilot components as follows:

1. Install the barbed hose fitting (with sealing washer) to port 'R' on the Type 1 pump.
2. Fit the 3' (915 mm) return line hose over the barbed hose fitting and secure using the supplied hose clamp.
3. Attach the two 3' (915 mm) high pressure hoses (with sealing washers) to ports 'A' and 'B' on the Type 1 pump.
4. Attach the UNF Tee fittings (visually inspect the fittings to ensure that the face 'O' rings are in place).
5. Attach the 1' (315 mm) high pressure hoses to the Tee fittings
6. Attach the barbed Tee fitting to the hose from the Type 1 pump and secure using the supplied hose clamp.

Hydraulic connections at the back of the Verado helm are identified by the following letters:

E - Blank (not used)	L - Left (Port)
R - Right (Starboard)	P - High pressure supply
T - Low pressure return	

CAUTION: It is important to verify that you have correctly identified the low pressure return hose from 'T' **Do not disconnect or modify the high pressure hose from 'P' on the helm to the Mercury hydraulic pump (lower hose).**

WARNING: Do not allow hydraulic fluid to come into prolonged contact with your skin. Wear protective nitrile gloves when working with hydraulic fluid.

7. Locate the 'T' port Mercury return hose at the back of the Verado helm (leads to the reservoir on the hydraulic pump module). Identify a suitable location along its length to install the barbed Tee fitting.
8. Cut the return hose, install the barbed Tee fitting and secure using the supplied hose clamps.

Notes: (1) *Hoses cut or removed from the helm should be held upright until reconnected.*
 (2) *Do not allow hydraulic fluid to drain out of the hoses.*
 (3) *Check and top-up the hydraulic pump reservoir as necessary during installation.*

9. Locate and tag the 'L' and 'R' Mercury installed hoses at the back of the Verado helm.
10. Remove the Mercury 'L' hose and attach to the Tee fitting on the hose from 'A' on the Type 1 pump.

11. Connect the 1' (315 mm) high pressure hose from the Tee fitting to 'L' on the back of the Verado helm.
12. Remove the Mercury 'R' hose and attach to the Tee fitting on the hose from 'B' on the Type 1 pump.
13. Connect the 1' (315 mm) high pressure hose from the Tee fitting to 'R' on the back of the Verado helm.
14. Check all connections, fittings and clamps are tight.

