SmartPilot X-10

Hydraulic Installation Guide for Verado systems

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SPX-10 Hydraulic Installation Guide for Verado systems

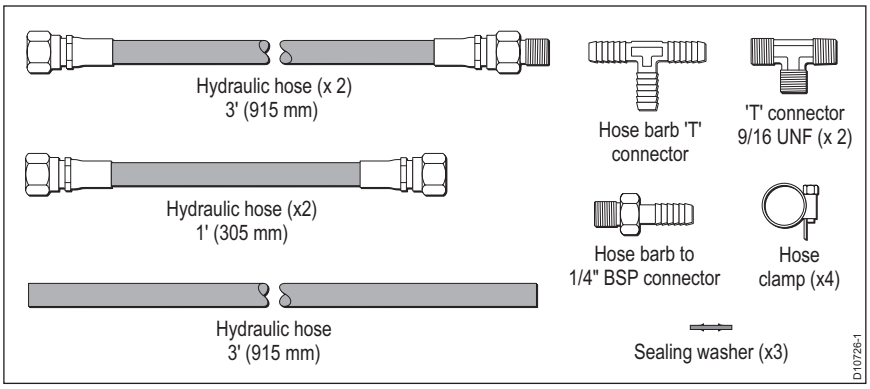
Overview

This guide describes how to install the components in the Verado Hydraulic Spares Kit, Part Number A18127, along with a Raymarine Type 1 hydraulic pump, to enable a Raymarine SmartPilot X-10 (SPX-10) system, to steer a boat with a single or twin Mercury Verado engine system.

Use this book in conjunction with the appropriate SPX system Installation and Commissioning Guides.

Parts

Supplied



Required

In addtion to the Verado Hydraulic Spares Kit, you need a Raymarine Type 1 Pump, Part Number M81120.

Tools required

- 3/4” spanner
- Power Steering Primer Module, Mercury part number 91-895040K01. Required only if you cannot start the engine (e.g. if the boat is out of the water).

Mounting the Type 1 Pump

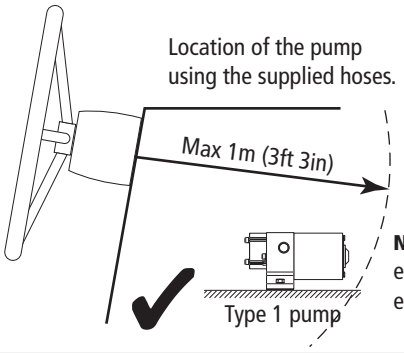
The Type 1 pump must be mounted:

- Within 3’ 3” (1 m) of the helm
- On a structural member, to avoid vibration that could damage the hydraulic pipes

Referring to the following illustration, mount the Type 1 pump and secure it using 1/4” (M6) stainless steel bolts, nuts and lock washers, or self tapping screws and lock washers.

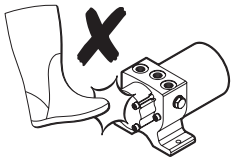
A drilling template is provided near the end of this book.

Location



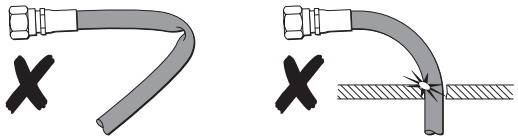
Note: Pump may be placed elsewhere if Mercury extension hoses are used.

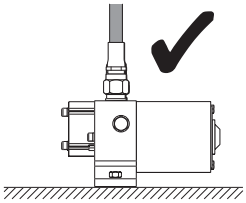
Provide protection from physical damage.

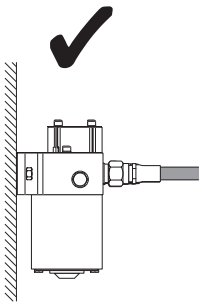


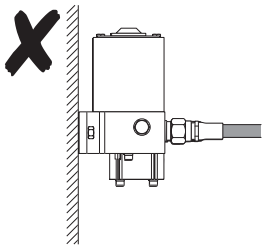
Install in a dry location.

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.

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Connecting the hydraulic lines

Before you start

Before you start installing the hydraulic lines, read this information, to gain an overall understanding of the system and prevent any problems due to incorrect hydraulic connections.

Summary of hydraulic connections

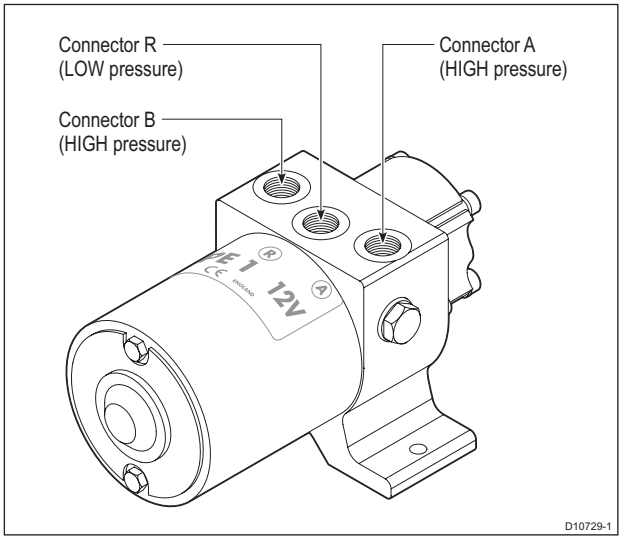
Circuit	Mercury Helm connector	Raymarine Type 1 Pump connector
High pressure (R)	**R**	**B**
High pressure (L)	**L**	**A**
Low pressure	**T**	**R**

Important

It is important to ensure that you correctly differentiate between the low pressure return hose connected to 'T' and the high pressure connections connected to R' and 'L', at the rear of the Mercury helm.

Do NOT disconnect or modify the high pressure hose from 'P' on the Mercury helm to the Mercury hydraulic pump (lower hose).

Do NOT connect the high pressure connector R, on the Mercury helm to the Raymarine Type 1 pump low pressure connector, also identified as R.



Procedure

Referring to the hydraulic circuit on the following page, modify the Mercury hydraulic system by installing the Raymarine hydraulic 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 low pressure 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.
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.

WARNING: Hydraulic fluid

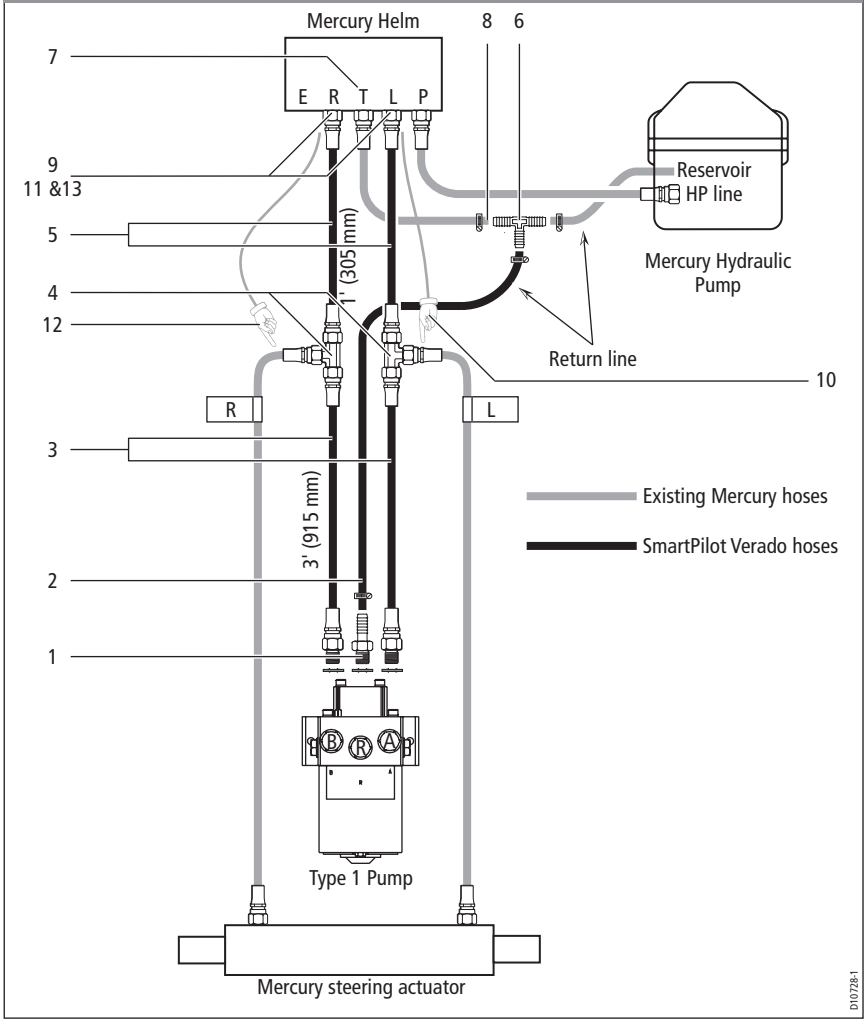
Do not allow hydraulic fluid to come into prolonged contact with your skin. Thoroughly wash any affected areas. Wear protective nitrile gloves when working with hydraulic fluid.

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. Locate and tag the 'L' and 'R' Mercury installed hoses at the back of the Verado helm.

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

Hydraulic circuit



Initiating the system

WARNING: Carry out initiation procedures before use

Do not use the steering system to steer the boat until the following initiation procedures have been completed.

Before the steering system is used to steer the boat, you must:

- Bleed the system.
- Check the system for leaks.
- Commission the system.

Bleeding the system

Connecting the pump and hoses will introduce air into the steering system, making it feel 'spongy' and 'lumpy' to operate. You therefore need to bleed the hydraulic system to restore it to full effectiveness.

In order to bleed the hydraulic system, the Mercury hydraulic pump needs to be running. This will happen automatically when the outboard engine starts.

If you need to run the pump without starting the engine, (e.g. if the boat is out of the water), use the Mercury 'Power Steering Primer Module' service tool, in accordance with the manufacturers instructions.

The following procedure assumes you are able to start the boat engine.To bleed the steering system:

1. Remove the reservoir cover, filler cap and filter.
2. Start the engine. If the fluid level in the reservoir level falls below 50%:
   i. Stop the engine and refill with Mercury hydraulic oil part No. 92-858002K01.
   ii. Restart the engine.
3. Slowly turn the helm to Starboard.If the fluid level in the reservoir level falls below 50%:
   i. Stop the engine and refill with Mercury hydraulic oil part No. 92-858002K01.
   ii. Restart the engine.
4. Slowly turn the helm to Port.If the fluid level in the reservoir level falls below 50%:
   i. Stop the engine and refill with Mercury hydraulic oil part No. 92-858002K01.
   ii. Restart the engine.
5. Repeat the lock to lock turn ten times, refilling the reservoir as necessary.
6. Replace the reservoir filter, filler cap and cover.

Checking for leaks

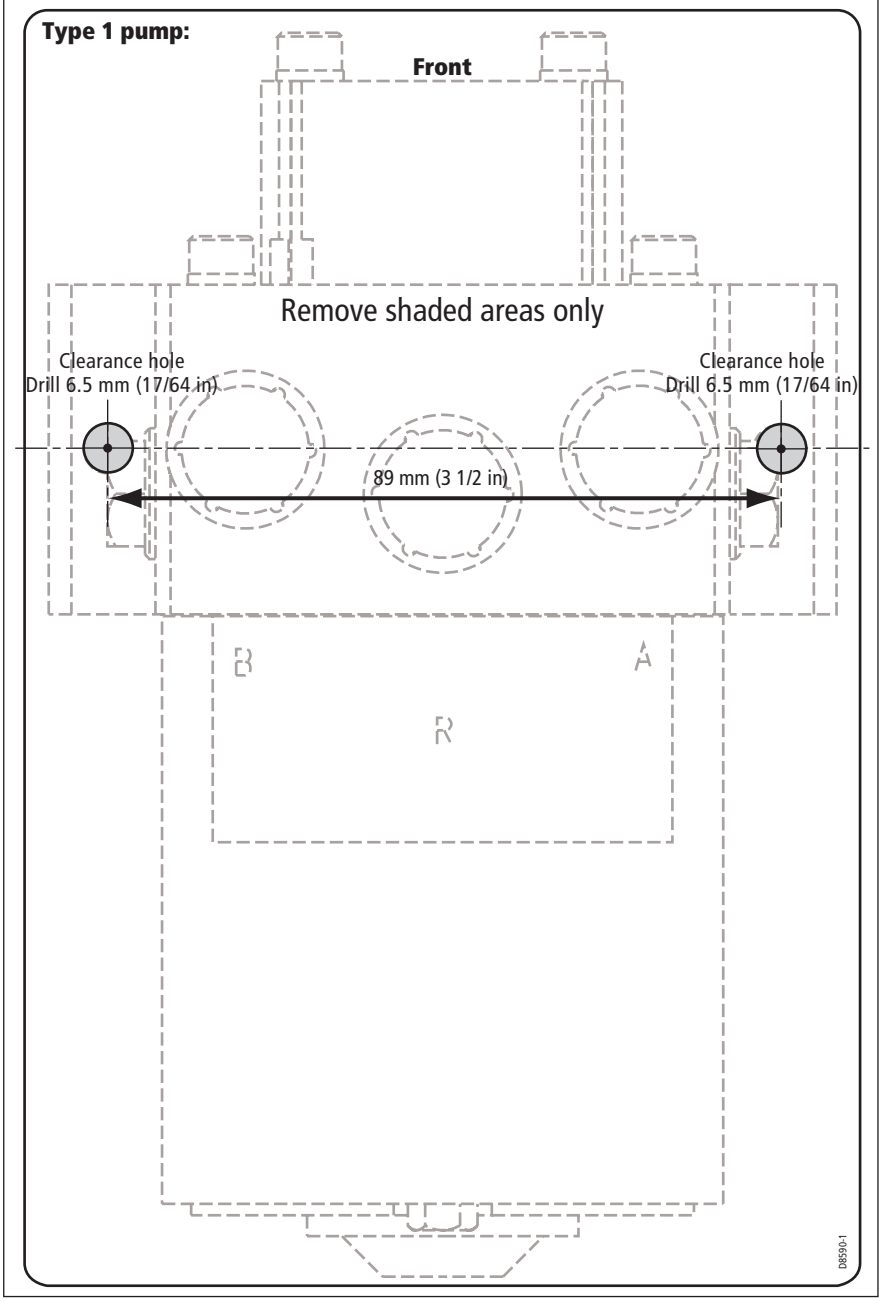
When the bleeding procedure has been successfully completed, ensure all hydraulic joints are secure then check the system for leaks as follows:

1. Turn the wheel hard to port.
2. With the port lines at maximum pressure, check the port lines for leaks, paying particular attention to the joints.
3. Turn the wheel hard to starboard.
4. With the starboard lines at maximum pressure, check the starboard lines for leaks, paying particular attention to the joints.

Commissioning

Carry out the commissioning procedure for the SPX-10 system, in accordance with the appropriate Commissioning Guide.

Pump drilling template



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