

HYDRAULIC SYSTEMS – POWER STEERING

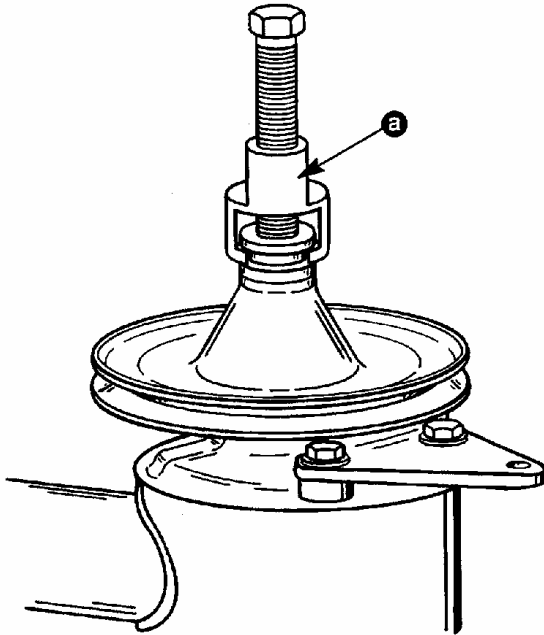
5B

Table of Contents

Power Steering Pump.....	3
Power Steering Pump Pulley Removal	3
Removal Tool for Older (Steel) Pump Pulley	3
Removal Tool for Newer (Composite or Steel) Pump Pulley	4
Power Steering Pump Pulley Installation Tool	4
Power Steering Control Valve Installation	5
Earlier Model Control Valve	5
Later Model (DHB) Control Valve.....	6
Power Steering System - 2004	7
DHB Power Steering System Operation.....	9
Pump Description.....	9
Later Model (DHB) Power Steering System	10
Neutral.....	10
NEUTRAL MODE DESCRIPTION	11
Right Turn	12
RIGHT TURN MODE DESCRIPTION	13
Left Turn.....	14
LEFT TURN MODE DESCRIPTION	15
Power Steering System Testing	16

Power Steering Pump

Power Steering Pump Pulley Removal



a) Pulley Removal Tool

Removal Tool for Older (Steel) Pump Pulley

KENT-MOORE SPECIAL TOOLS	
Can be ordered from: Kent-Moore Tools, Inc. 29784 Little Mack Roseville, MI 48066 Phone: 313-774-9500	
Power Steering Pump Pulley Remover	Kent-Moore Part No. J-25034

Notes:

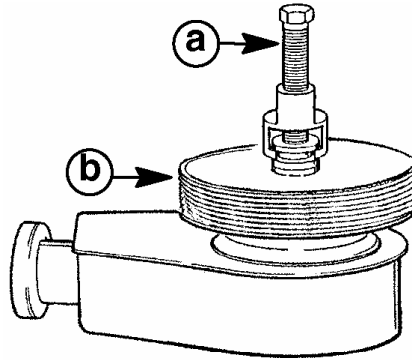
Notes:

Removal Tool for Newer (Composite or Steel) Pump Pulley

SNAP-ON SPECIAL TOOLS

Pulley Remover

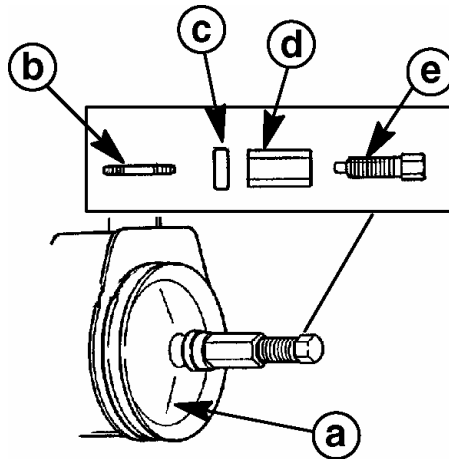
P/N CJ124A



- a) Typical Puller
- b) Serpentine Pulley

Power Steering Pump Pulley Installation Tool

P/N 91-93656A1



- a) Power Steering Pump Pulley
- b) Stud
- c) Bearing
- d) Nut
- e) Tool Shaft

NOTE: *Current power steering pulley installation tool should fit either type of pulley.*

Power Steering Control Valve Installation

Notes:

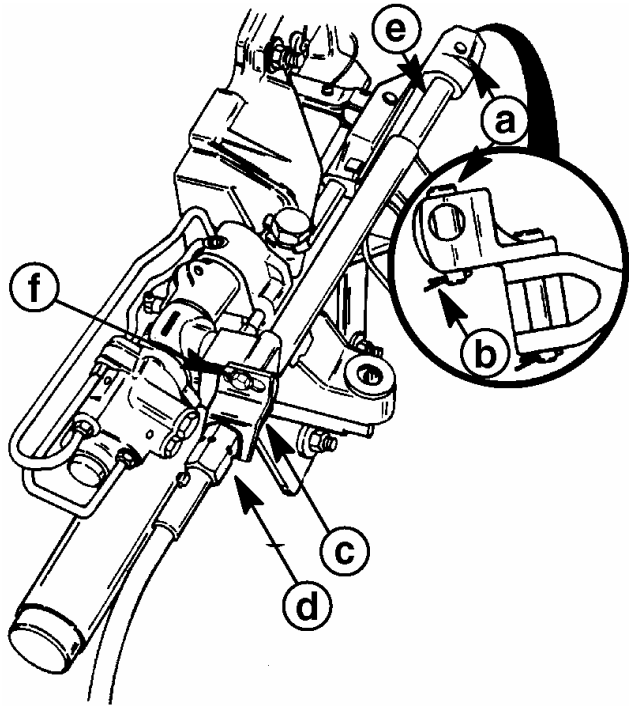
WARNING

Steering cable outer casing MUST BE free to move back-and-forth for steering to function properly. DO NOT fasten any wires, cables or other items to steering cable, as this may prevent it from moving.

1. Apply a liberal amount of Special Lubricant 101 to end of steering cable and install cable end in clevis. Secure with pin and cotter pin.
2. **Later model control valve:** Using a suitable wrench, hold the flat surfaces on the cable guide tube in the vertical position.
3. **Both models:** Torque coupler nut to 35 lb. ft. (48 N·m).
4. **Earlier model control valve:** Install and tighten locking plate on coupler nut. Secure with self locking bolt and washer.

NOTE: Later model control valves do not have a locking plate on the coupler nut.

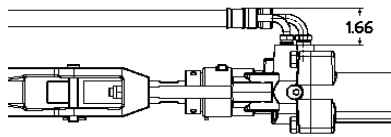
Earlier Model Control Valve



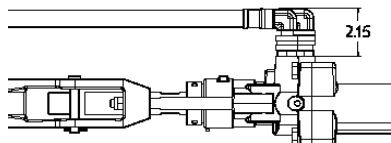
- a) Clevis Pin
- b) Cotter Pin
- c) Locking Plate (If No Self Locking Coupler Nut)
- d) Coupler Nut
- e) Steering Cable
- f) Bolt and Washer

Power Steering System - 2004

Older Design

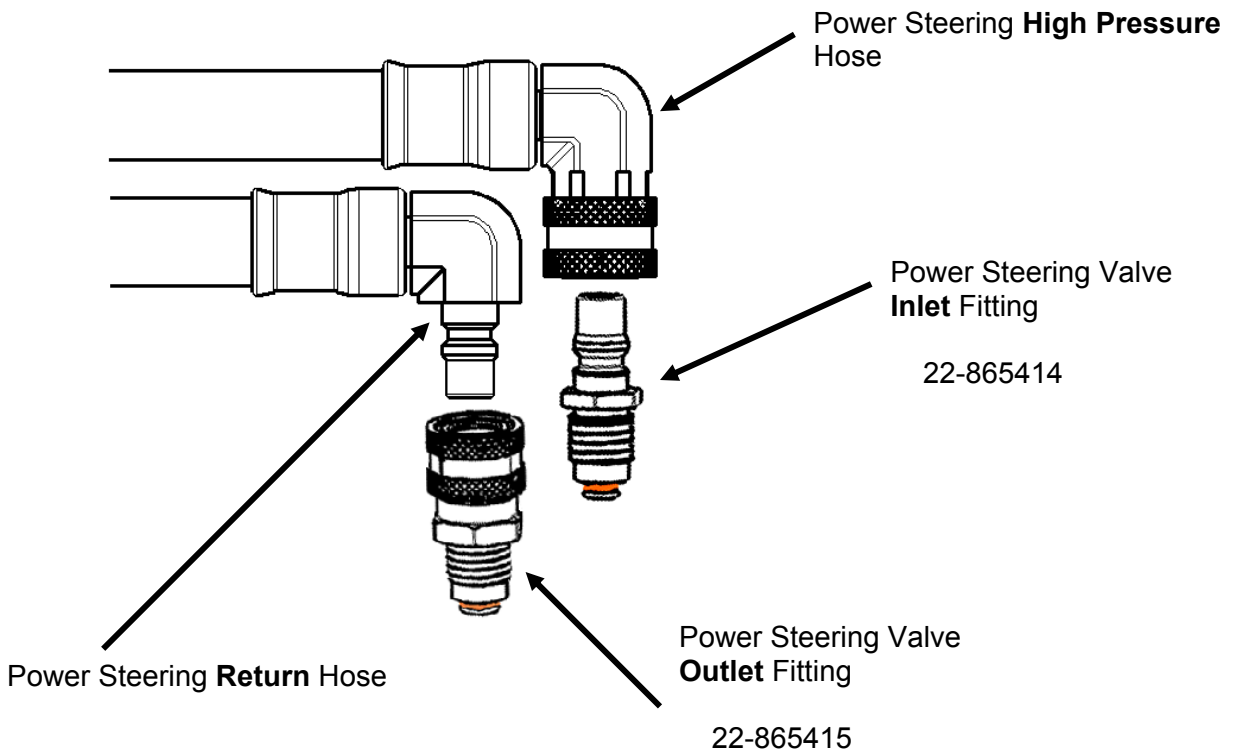


Newer Design



Quick Connect Fittings

Power Steering hoses receive quick connect fittings. Cross threading eliminated. Reduced installation time. Male/female connections to insure correct connections.



DHB Power Steering System Operation

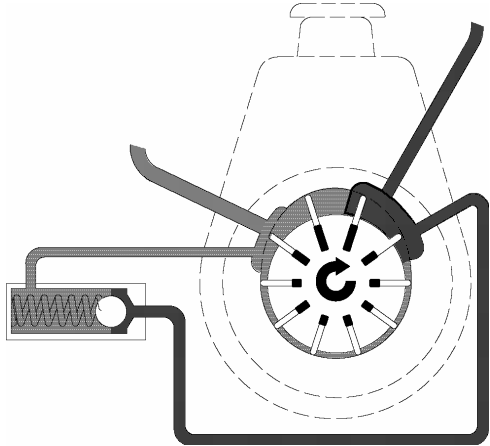
Notes:

The Power Steering system utilizes an engine-driven vane-type hydraulic pump that supplies fluid flow and pressure by means of hoses to a control valve that, in turn, controls fluid flow and pressure to-and-from a booster cylinder. Three modes make up the basic function of the Power Steering system; 1) neutral, 2) left turn mode, and 3) right turn mode. The control valve, which is activated by the steering cable, controls the steering system mode.

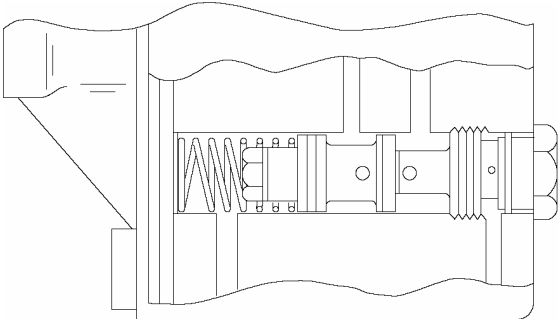
Pump Description

Pump pulley rotation drives the pump shaft and rotor assembly. Rotor movement extends the pump vanes until contact is made with the outer cam ring surface. The vanes form adjustable chambers that move fluid through the pump.

The rotor is offset in relation to the cam ring surface and forms areas of increasing and decreasing volume in the pump. An increasing volume is created on the inlet side of the pump for fluid out of the reservoir to fill. The vanes create chambers that trap fluid and move it to the outlet, where the decreasing volume forces it out. At the outlet, there is a decreasing volume formed between the rotor and the cam ring surface, forcing the vanes to retract, and forcing the fluid out of the pump (outlet).



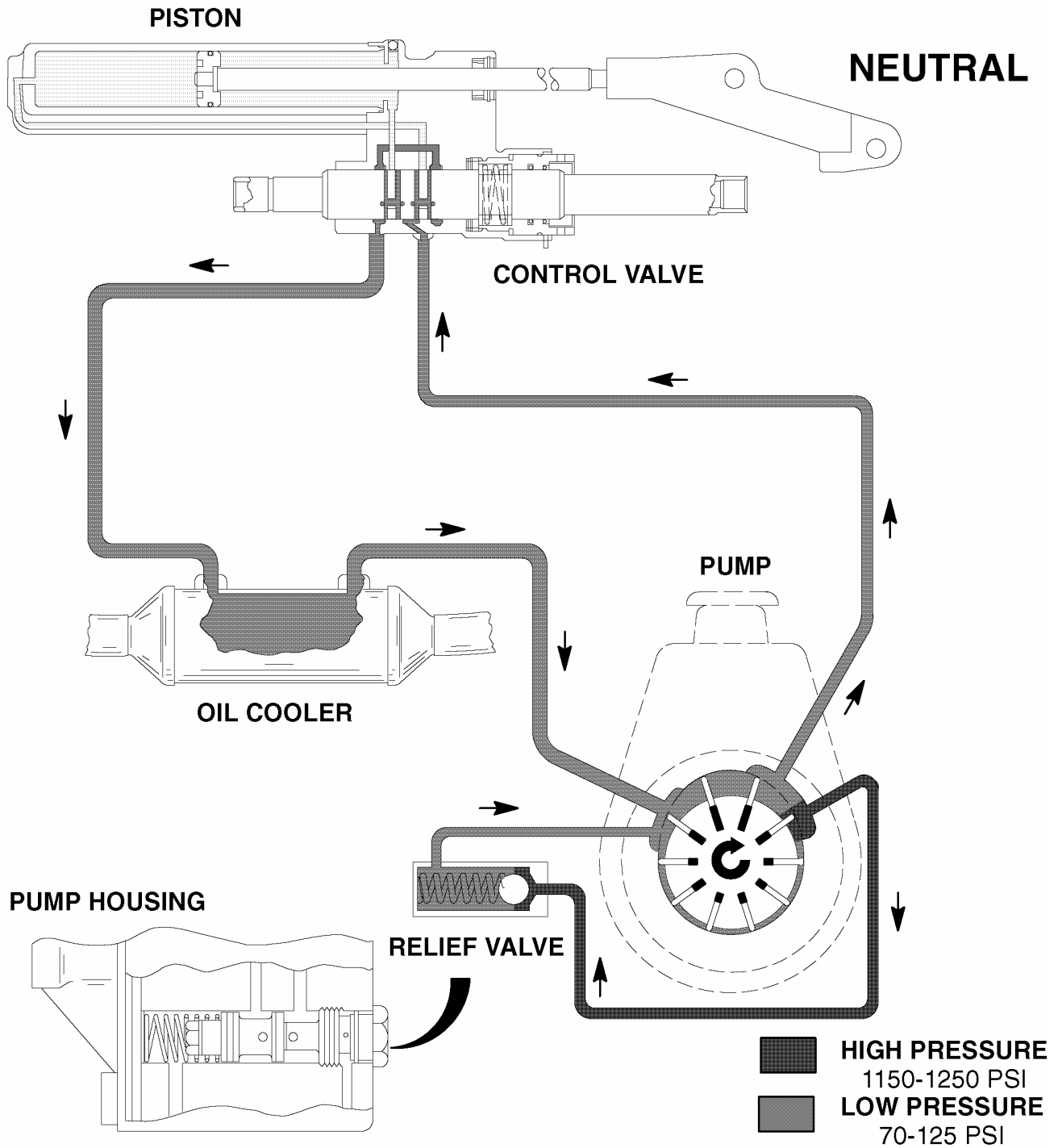
A pressure regulating valve is located inside the pump assembly. As pump outlet pressure rises fluid pressure forces the regulating valve back against the regulating spring. As the pressure increases, the spring is collapsed. When sufficient pressure is achieved, the valve uncovers the fluid return passage, allowing fluid under pressure to enter the reservoir.



Later Model (DHB) Power Steering System

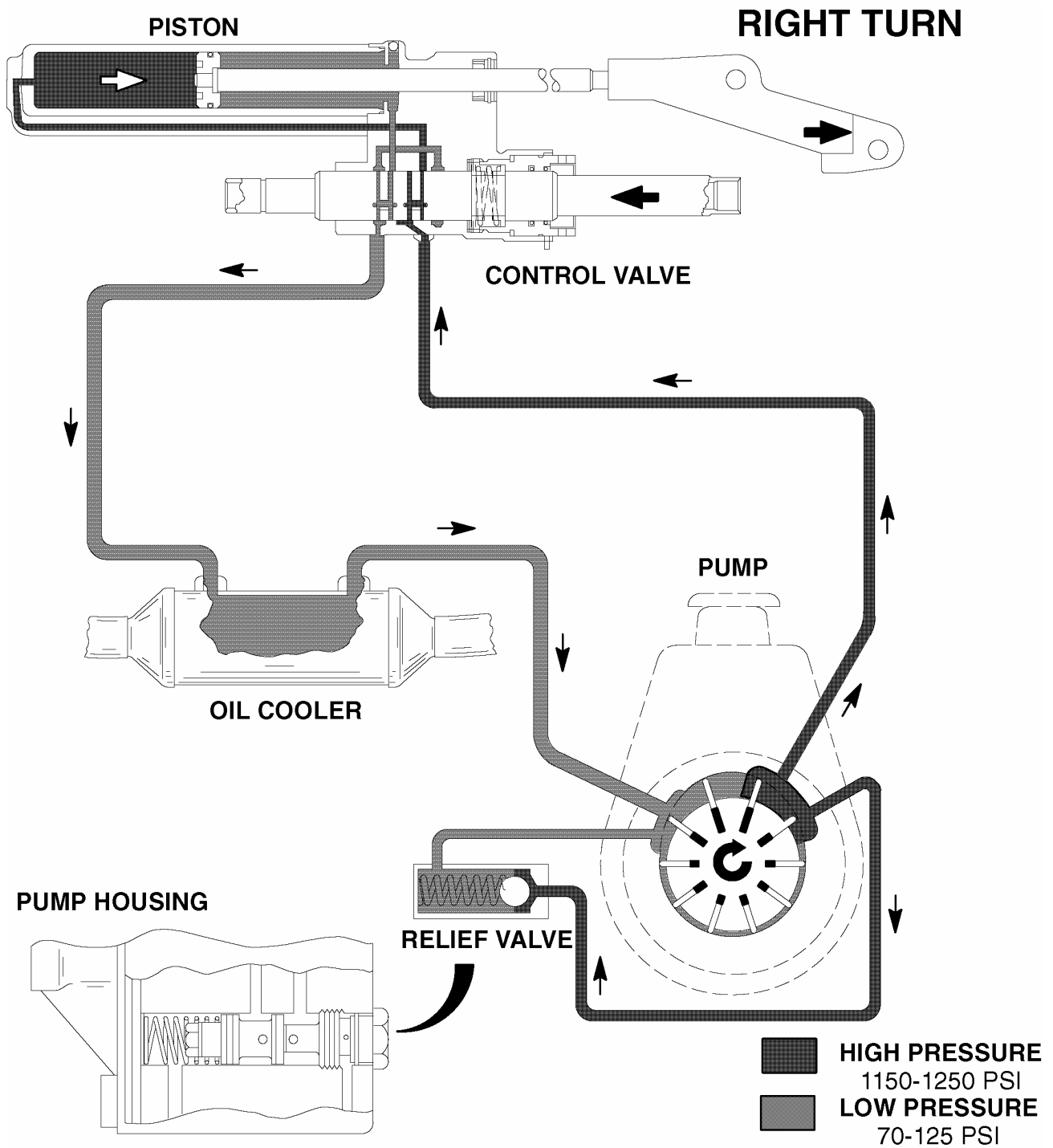
Neutral

(VIEWING FROM INSIDE OF BOAT LOOKING AT TRANSOM)



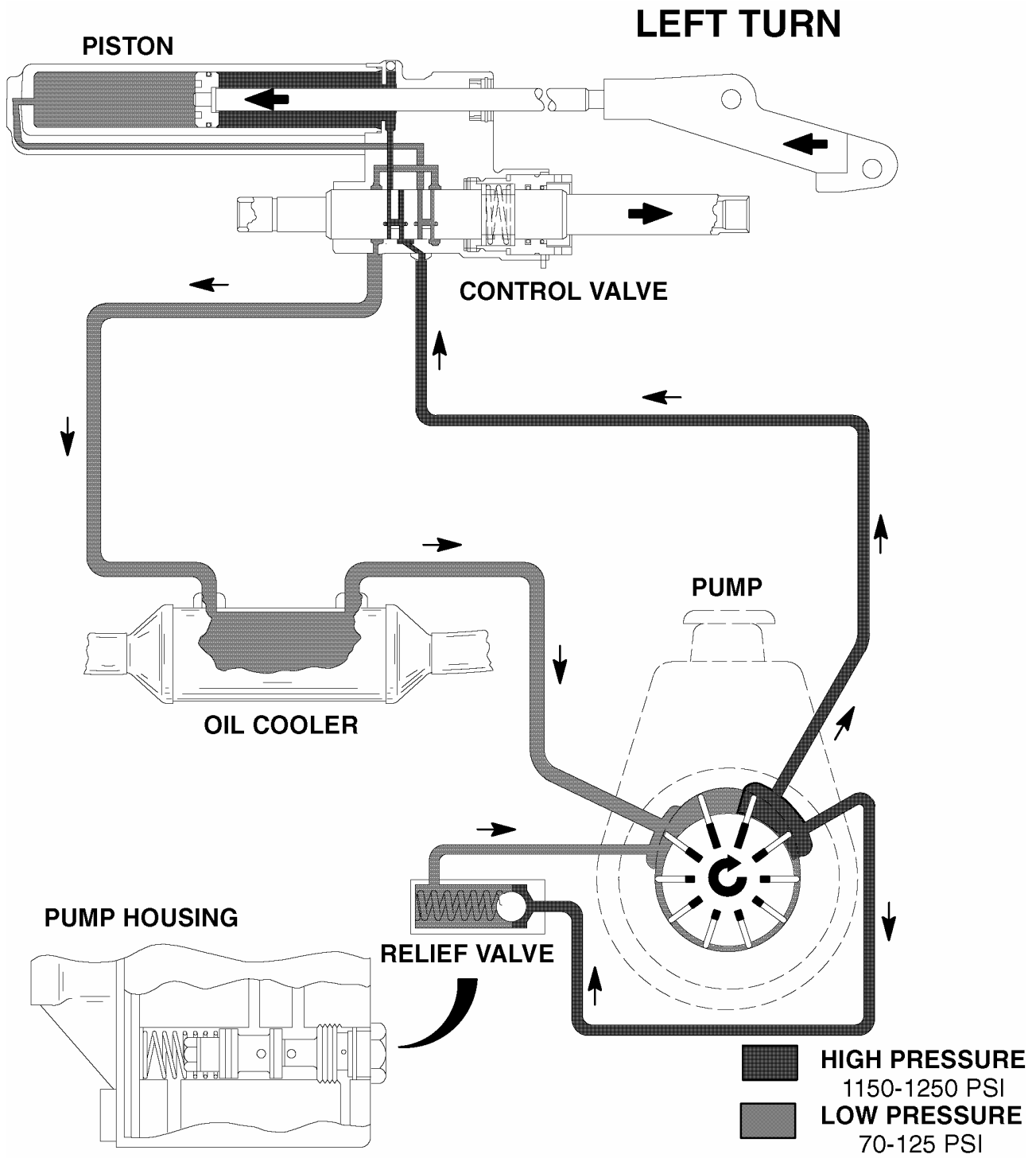
Right Turn

(VIEWING FROM INSIDE OF BOAT LOOKING AT TRANSOM)

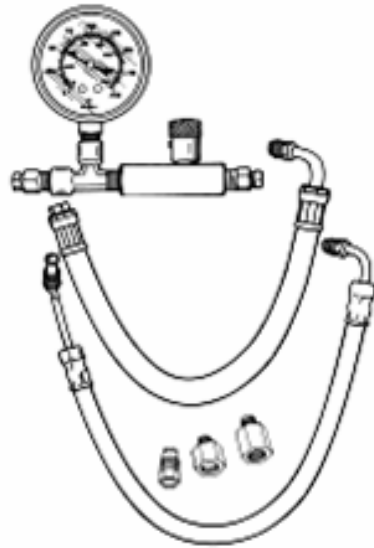


Left Turn

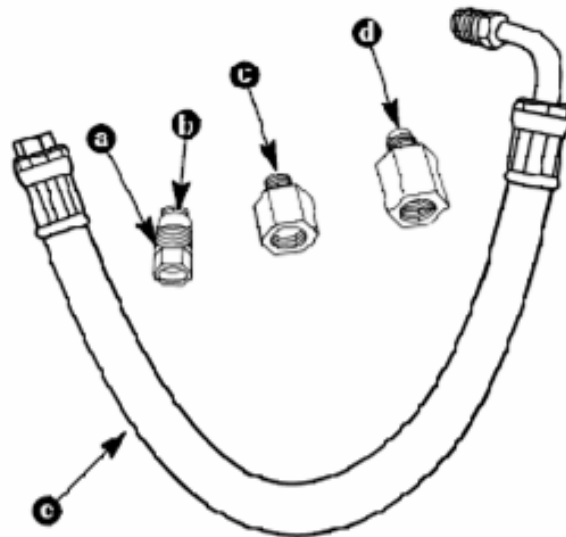
(VIEWING FROM INSIDE OF BOAT LOOKING AT TRANSOM)



Power Steering System Testing



Power Steering Test Gauge Kit – 91-38053A05



74108

**Adapter Kit for use with Later Model Power Steering Control Valves
(allows older kit to fit newer quick-connect fittings at the valve) – 91-806908A02**

- a – Adapter fitting
- b – O-ring
- c – Adapter fitting
- d – Adapter fitting
- e – Adapter hose

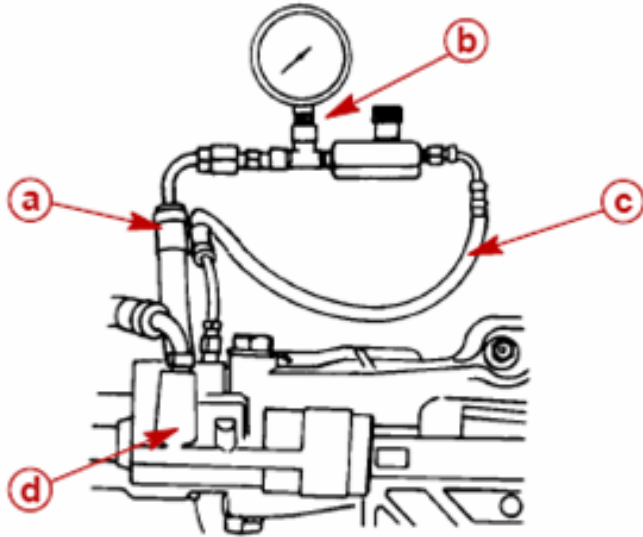
Power Steering System Pressure Test

[Note:

This test for pressure is only for the Saginaw Banjo and Ham can style pumps. The New Saginaw pump used on the 8.1 / 496 has higher pressure specs, which will be sent out after testing is completed. The next pump coming out will be a DHB power steering pump. These specs will also be sent out.]

Test Procedure:

CAUTION: Do not operate engine without cooling water being supplied to water pickup inlet, or overheating damage to engine may result.



Power Steering Pressure Gauge Installation

- a - Pump Pressure Hose
- b - Test Gauge Assembly
- c - Gauge to Control Valve Hose
- d - Control Valve

Assemble and install test gauge assembly between control valve and pump pressure hose. Tighten all fittings securely, but **DO NOT OVERTIGHTEN**.

Open valve on gauge completely.

Start engine and run at 1000-1500 RPM until engine reaches normal operating temperature.

With engine at idle speed, test gauge reading should be between 483 and 862 kPa (70 and 125 psi). If not, proceed as follows.

- **If lower than 483 kPa (70 psi)**, proceed to “Pump Pressure Test.”
- **If higher than 862 kPa (125 psi)**, check for hose restrictions in the system.

Push in and then pull steering cable **momentarily**. Gauge reading should show an instant increase in pressure when block is pushed in both directions.

Push steering cable in until booster cylinder piston rod is fully retracted. With piston rod in this position, **momentarily** push steering cable in until maximum pressure reading is obtained.

- **If pressure is above 6897 kPa (1000 psi)**, system pressure is good.
- **If pressure is below 6897 kPa (1000 psi)**, conduct “Pump Pressure Test.”

Pump Pressure Test:

CAUTION: In performing the following test, do not lug pump at maximum pressure for more than 5 seconds or damage to power steering pump may occur.

Start engine and run at 1000-1500 RPM until engine reaches normal operating temperature (**with cooling water being supplied to water pickup inlet**).

Close test gauge valve just long enough to obtain maximum pressure reading.

Close and open valve 3 times. Record highest pressure reading attained each time.

- If pressure readings are between 7932 and 8621 kPa (1150 and 1250 psi) and are within a range of 345 kPa (50 psi)**, the pump is within specifications. If the pump tests OK, but system pressure was low (as tested under “Power Steering System Pressure Test”), proceed to “Booster Cylinder Test” (see service manual).
- If pressure readings are between 7932-8621 kPa (1150 and 1250 psi), but are not within a 345 kPa (50 psi) range**, the Power Steering pump flow control valve is sticking or pump hydraulic system is dirty.
- If pressure readings are constant, but below 6897 kPa (1000 psi)**, replace Power Steering pump.