TO RETROFIT AN OCTOPUS REVERSING PUMP TO A VERADO POWER STEERING SYSTEM USING AN OCTOPUS CONNECTION KIT – OC17SUK34

1. Determine Steering and Engine configuration.

The steering/engine configuration is used to size the autopilot pump. The variables are: number of engines – number of steering cylinders.

Access to hydraulic components and a site for the autopilot pump are also considered. Bulkhead connections - dual helm stations/steering cylinders have additional fittings which can be utilized to plumb in the autopilot pump.

Ideally the autopilot pump should be located in the rear of the boat close to the hydraulic power pack and bulkhead fittings.

2. Pump Sizing & Setting Flow Rate.

Complete Table A.

TABLE A	
Number of helm stations	
Number of steering cylinders	
Number of engines	
Additional fittings available	

Single Verado power steering cylinder HO to HO volume is approx 10ci or 160cc. Dual volume is approx 20ci or 320cc.

Follow Table B for recommended Pump & Flow Settings.

TABLE B					
Number of Steering Cylinders	Number of Engines	Approx HO to HO Time secs	Approx Flow rate	Recommended Octopus Pump	Pump Ports
1	1	13-15	50%	Any 1.0 or 1.2 Litre/min	¼ NPT
1	2	13-15	50%	Any 1.0 or 1.2 Litre/min	¼ NPT
2	2	13-15	100%	Any 1.0 or 1.2 Litre/min	¼ NPT
2	3	13-15	100%	Consult Factory	
2	4	13-15	100%	Consult Factory	

3. Select Pump Installation Site.

If additional fittings on the steering lines are available, there are 2 options to consider.

- Option 1 – Installing in the vicinity of the fittings.
  Access to steering line fittings & power steering pumpset required.
- Option 2 – Installing in the vicinity of the helm(s).
  Access to hydraulic lines on rear of helm pump(s) required. See section 3.3 – 3.7 below.

If additional fittings on the steering lines are NOT available, there is only the option of installing in the vicinity of the helm(s). See section 3.3 - 3.7 below.

On dual helm/steering cylinder installations there will be additional fittings available to insert T fittings to plumb in the steering lines to the Octopus Pump.

The high pressure supply line from the hydraulic power pack connects to port **P** on helm 1.

The high pressure supply is continued on to helm 2 by a supply line connecting port **T** on helm 1 to port **P** on helm 2.

The low pressure return line connects to port **T** on helm 2 and runs back to the port on hydraulic power pack.

The high pressure steering lines from the steering cylinder(s) connect to ports **L** & **P** on both helms using a T fitting arrangement.

Verado
Power Steer Helm

4. Install Pumpset.

The Octopus Pump must be installed correctly to function well. The pump unit has either a universal or round style shut off valve attached to the front face; this valve facilitates pump service without loss of hand steering. When planning an installation, it is advisable to mount the pump in an area with reasonable access.

Pumpset with Universal Shut Off Manifold OC17141

Mount the pump close to the hose connections either at the rear of the helm pump or at the additional fittings when available.

Ideally the mounting surface should be horizontal in a clean dry area, vertical mounting is also possible. The best location is usually in the engine bay or behind the dashboard bulkhead. Be careful not to mount the pump on a flimsy panel as this may resonate and amplify any noise the pump generates.

The pumpset is approx 3-1/2 inch diameter (90mm) x 8 inches long (203mm). It has flexible rubber mounting feet that require approx 5 inches x 4 inches (127mm x 102mm) mounting surface. There are 4 x ¼ inch (6.3mm) diameter holes for attachment screws.

Pumpset with Round Shut Off Manifold OC1705

5. Hydraulic Connections.

Option 1 - Connecting to additional fittings and low pressure return line to power pack.

Tag one of the steering lines to identify for reconnection.
Disconnect 2 steering line hoses at fitting joints.
Connect 2 short ¼ hose assemblies to exposed fitting.
Connect 2 (stainless) T fittings to other end of short hose assembly.
Reconnect steering line hose fittings to (stainless) T fittings.
Connect 2 steering ports on Octopus Pump to (stainless) T fittings using long ¼ hose assemblies.
Connect return line on Octopus Pump to return line on Power Pack using long 3/8 hose assembly – barbed T fitting and hose clamps.

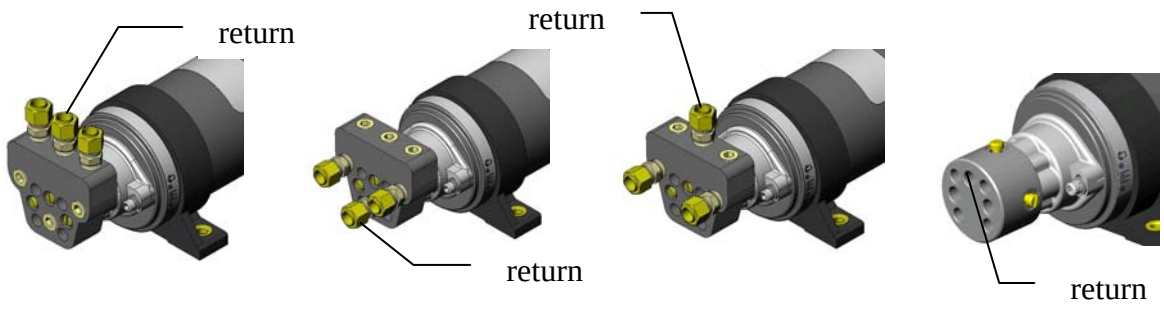
Option 2A - Connecting to single Helm Station and low pressure return line to Power Pack.

Tag one of the steering lines to identify for re-connection.

Disconnect 2 steering line hoses from ports **R** & **L** at rear of helm
Connect 2 short ¼ hose assemblies to exposed helm fittings.
Connect 2 (stainless) T fittings to other end of short hose assembly.
Reconnect steering line hoses to (stainless) T fittings (note Tag).
Connect 2 steering ports on Octopus Pump to (stainless) T fittings using long ¼ hose assemblies.
Disconnect 3/8 return line hose from port **T** at rear of helm.
Connect short 3/8 hose assembly to exposed helm fitting.
Connect (brass) T fitting to other end of short 3/8 hose assy.
Reconnect return line hose to (brass) T fitting.
Connect return line on Octopus Pump to ¼ leg of (brass) T fitting using long 1/4 hose assembly.

Option 2B - Connecting to dual Helm Station and low pressure return line to Power Pack.

Tag one of the steering lines to identify for re-connection.
Disconnect 2 steering line hoses from ports **R** & **L** at rear of helm 2. Or at convenient fitting joints in helm cross connections.
Connect 2 short ¼ hose assemblies to exposed fittings.
Connect 2 (stainless) T fittings to other end of short hose assembly.
Reconnect steering line hoses to (stainless) T fittings (note Tag).
Connect 2 steering ports on Octopus Pump to (stainless) T fittings using long ¼ hose assemblies.
Disconnect 3/8 return line hose from port **T** at rear of helm 2.
Connect short 3/8 hose assembly to exposed helm fitting.
Connect (brass) T fitting to other end of short 3/8 hose assy.
Reconnect return line hose to (brass) T fitting.
Connect return line on Octopus Pump to ¼ leg of (brass) T fitting using long 1/4 hose assembly.



Top Ports Front Ports Random Ports Front Only

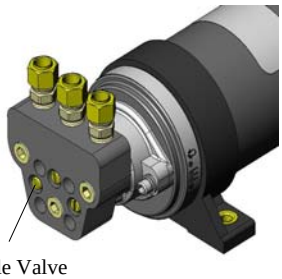
Universal & Round Shut Off Manifold Porting Options – All Ports ¼ NPT

6. Filling and Purging the System.

Fill the Verado steering system following the manufacturer's instructions.

Purge and run the Octopus Pump as follows.

Ensure that the 3 brass needle screws on the front of the universal manifold (radial on the round manifold) are fully closed.
From fully closed – open the 3 brass needle screws 2 full turns each.
Turn off electrical power to the hydraulic power pack.
Turn the helm steering wheel (direction not important) until hard over. At hard over apply pressure to the steering wheel forcing the rudder against the rudder stop.
While holding the rudder against the rudder stop via the helm steering wheel (pressurizing one steering line), energize the Octopus Pump by applying system voltage on the 2 motor wires, occasionally reversing the polarity.
Repeat steps 6.2.4 & 6.2.5 until the pump runs smoothly, driving the rudder in both directions.



Needle Valve

7. Adjusting Pump Flow.

The Octopus pump is shipped set at its maximum rated flow.

Time the HO to HO speed when running the Octopus pump.

See Table B for approx recommended speed and flow rate setting.

Follow autopilot manufactures recommendation for final speed.

If required, adjust the Octopus pump flow as follows.
Note the position of the marker located on the side of the pump body to the +/- scale.
Crack the 2 allen screws that hold the pump body to the motor. Undo 2 full turns.
Rotate the pump body downward to a lower setting on the scale.
Tighten the 2 Allen screws.

It may be necessary to try several settings to get the best autopilot performance.

For additional information see Service Procedure SP002 – Flow Adjustment Procedure.