

FAULT TRACING GUIDELINE FOR MODEL 250V AND 275V

Capilano Systems will provide years of safe, reliable performance, with a minimum of service, if the units are selected and installed correctly. Our Model 250V and 275V systems are designed to:

- provide protection against over pressure situations.
- remove air simply and quickly at installation time.
- maintain the system free of air.
- provide safe guards against the effects of contaminants in the system.
- enable most problems to be serviced in the field quickly and without difficulty.

In addition, all components are thoroughly factory tested.

Most faults occur when the installation instructions are not followed and usually show up immediately upon filling the system. Provided below, are the most common faults encountered and their likely cause and solution. The term 'Rudder' also applies to stern drives.

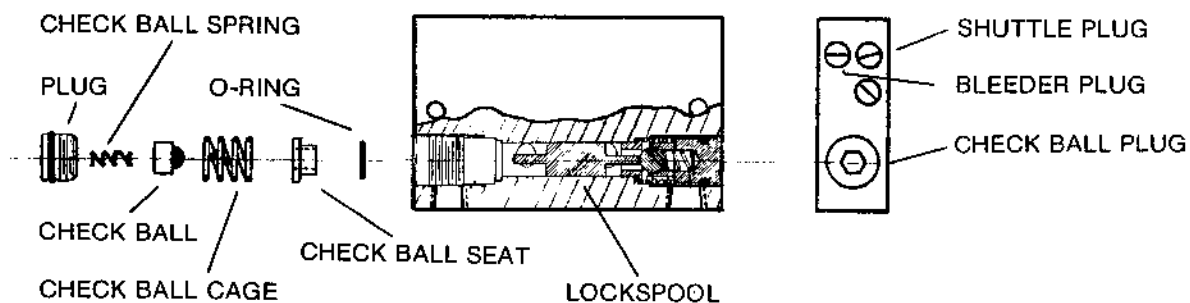
Sometimes when returning the wheel from a hard-over position, a slight resistance may be felt and a light clicking noise may be audible. This should not be mistaken as a fault as it is a completely normal situation caused by the releasing of the lockspool in the system.

- 1. FAULT - DURING FILLING, THE HELM BECOMES COMPLETELY JAMMED.**
 - CAUSE** - blockage in the line between the helms and the Uniflow Valve.
 - SOLUTION** - check that each fitting has a hole completely through it. Fittings with incomplete holes are not uncommon. Also make certain that copper tubing or return line hose has not been allowed to collapse during installation. If the copper tubing has collapsed, the collapsed section will have to be removed and re-fitted with a new piece, with the aid of copper tubing connectors.
 - CAUSE** - lines not installed correctly.
 - SOLUTION** - check runs of lines; refer to installation diagram. Make certain that all port lines are hooked up to the port connections on helms and Uniflow Valve, and all starboard lines are connected to the starboard connections on helms and Uniflow Valve. If the return line is of copper tubing, it could have been mistaken as either a port or starboard line.
- 2. FAULT - SYSTEM IS VERY DIFFICULT TO FILL. AIR KEEPS BURPING OUT TOP OF HELM EVEN AFTER SYSTEM APPEARS FULL.**
 - CAUSE** - return line is not installed correctly.
 - SOLUTION** - ensure return line from Uniflow Valve goes to the bottom of the lowest helm, then from the top of that helm to the bottom of the next lowest, etc. If you have a 'tee' in the return line, you are making a mistake.
 - CAUSE** - cylinder has been mounted upside down. This causes air to be trapped in the cylinder.
 - SOLUTION** - mount cylinder correctly, according to cylinder installation instructions. Ports should always be in upper most position.

- 3. FAULT - FLY-BRIDGE HELM SEEMS BUMPY AND OIL POURS OUT OF TOP OF HELM DURING OR SOON AFTER FILLING THE SYSTEM.**
- CAUSE - air in system.
- SOLUTION - review filling instructions. If fly-bridge helm is mounted on an angle, loosen the mounting bolts and swing the helm so the shaft is horizontal, (not always possible). While in the horizontal position, turn the wheel a few turns so entrapped air can escape from the pistons.
- 4. FAULT - STEERING IS STIFF AND HARD TO TURN, EVEN WHEN THE VESSEL IS NOT MOVING.**
- CAUSE - rudder post glands are too tight or rudder post is bent, causing mechanical binding. The same applies to tiller arm and linkages on out-drives.
- SOLUTION - to test, disconnect cylinder from the tiller arm and turn steering wheel. If it turns easily, correct above mentioned problems. Please note that excessively loose connections to tiller arm or tie bar can also cause mechanical binding.
- CAUSE - line size too small.
- SOLUTION - use correct size of copper tubing or hose on return line. The correct sizes of lines are given in the helm installation instructions. If maximum run of line in your vessel does not exceed 40 feet, 1/2" OD copper tubing is recommended. If runs exceed 40 feet, 5/8" OD copper tubing is recommended. Return line must be of equal or larger inside diameter. NOTE: For 275V helms, minimum tubing size is 5/8" OD copper tubing.
- CAUSE - restriction in hose, copper tubing or fittings.
- SOLUTION - find restriction and correct. NOTE: Collapsing of the copper tubing during bending is enough to cause restriction.
- CAUSE - air in oil.
- SOLUTION - see filling instructions supplied with helm units.
- CAUSE - rubber hose has been used in system.
- SOLUTION - replace with copper tubing.
- 5. FAULT - STEERING IS EASY TO TURN AT THE DOCK, BUT BECOMES HARD TO TURN WHEN VESSEL IS UNDERWAY.**
- CAUSE - helm and cylinder combination do not provide sufficient wheel turns.
- SOLUTION - increase wheel turns by turning adjusting knob on helm counter-clockwise.
- CAUSE - steering wheel is too small. (NB. 28" minimum on 275V).
- SOLUTION - fit larger wheel if possible. If the problem can not be rectified by the two above mentioned solutions, proceed with the next cause and solution or consult factory.
- CAUSE - cylinder is too small.
- SOLUTION - replace with a larger cylinder.
- CAUSE - rubber hose has been used in system.
- SOLUTION - replace with copper tubing.

- 6. FAULT** - **RUDDER MOVES ERRATICALLY WITH EXCESSIVE CHATTERING NOISE, COMING OUT OF A HARD TURN WHILE UNDERWAY.**
- CAUSE - air in system.
- SOLUTION - see filling instructions.
- CAUSE - cylinder too small. This is the most likely cause of the above mentioned fault.
- SOLUTION - replace with larger cylinder.
- CAUSE - insufficient counter-balance on rudder.
- SOLUTION - correct rudder.
- NOTE: A small amount of chattering should not be considered a problem.
- 7. FAULT** - **RUDDER DRIFTS TO PORT OR STARBOARD WHILE VESSEL IS UNDERWAY, EVEN WHEN WHEEL IS NOT BEING TURNED.**
- CAUSE - dirt in Uniflow check valves.
- SOLUTION - remove check valve plugs. (See Sketch A). These are the large black plugs with a hex key hole on the side of the Uniflow Valve mounted above the cylinder. Clean ball seats and balls and re-assemble. NOTE: Be prepared to lose a certain amount of oil during this procedure. Have a small can available. Refill system when check balls have been re-assembled.
- 8. FAULT** - **ONE HELM UNIT IN SYSTEM IS VERY BUMPY AND REQUIRES TOO MANY TURNS FROM HARD OVER TO HARD OVER.**
- CAUSE - dirt in inlet check of helm pump.
- SOLUTION - remove steering wheel. Remove helm from dash or console, and drain helm of fluid. Install spacers on helm shaft to take slack between helm shaft nut and front cover. (See Sketch B). Loosen the four front cover bolts and carefully remove shaft and rotor assembly. (See Sketch C). Bottom side of rotor will reveal 5 or 7 inlet balls. One of these will be found held open by some contamination. Clean and re-assemble. CAUTION: Use care when re-assembling helm unit, making certain that 'O' ring is not pinched, etc.
- 9. FAULT** - **TURNING ONE STEERING WHEEL CAUSES SECOND STEERING WHEEL TO ROTATE.**
- CAUSE - dirt is lodged in the helm outlet checks of the second steering helm.
- SOLUTION - clean both outlet checks of the second helm referencing Sketch B. These are located in the connection ports on the sides of the helm unit.
- 10. WORN SEALS** - seals will sometimes leak if system is not vented at upper most station. All helm units contain a helm shaft seal, which can be replaced by prying off the seal cover and replacing worn seal with a new 'O' ring. NOTE: On some older models, the seal cover is held in place with three screws. Most cylinders (brass/bronze type) contain a removable shaft seal as well. To replace:
1. disconnect cylinder from tiller arm.
 2. unscrew rod end clevis and jam nut.
 3. remove three seal cover screws and seal cover. Replace worn 'O' ring and re-assemble.

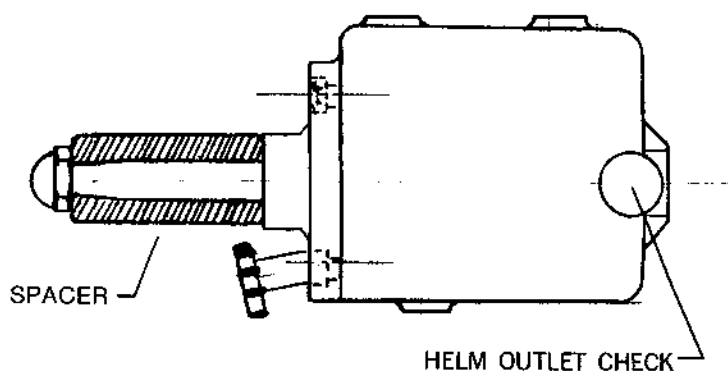
A — UNIFLOW VALVE LOCKSPOOL AND CHECKBALL ASSEMBLY



Note - Check ball seat and o-ring are retained with retaining ring and should not be removed unless ball seat or lockspool is defective.

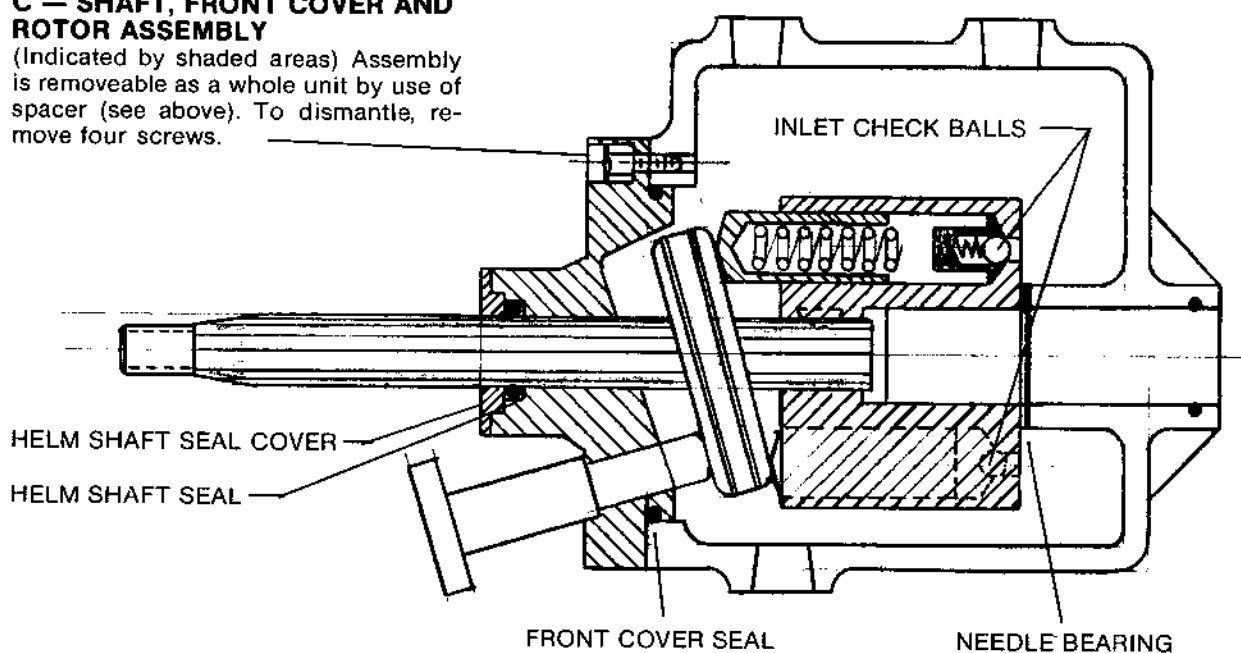
B — SPACER ON HELM SHAFT

Note — Any combination of washers, bushings etc. can be used. Make certain that spacer is held firmly in place by helm shaft nut, before dismantling unit.



C — SHAFT, FRONT COVER AND ROTOR ASSEMBLY

(Indicated by shaded areas) Assembly is removeable as a whole unit by use of spacer (see above). To dismantle, remove four screws.



1650 W. 2nd AVE., VANCOUVER, B.C., CANADA V6J 1H4 • (604) 736-2831 • TELEX 04-508802
CABLE: TELECAP