



CONTENTS

	Page no.
INTRODUCTION	2
INSTALLATION INSTRUCTIONS	3
OPERATING INSTRUCTIONS	4
DIMENSIONAL SPECIFICATIONS	4
SYSTEM INSTALLATION	5
HYDRAULIC FLUID SPECIFICATION	8
FILLING AND PURGING	9
SYSTEM DIAGRAM	12
STEERING SYSTEM COMBINATIONS	13
TROUBLE SHOOTING	15
ACCESSORIES	16
CLEANING PROCEDURE	17
ROUTINE MAINTENANCE	18
REPLACEBLE ITEMS AND SEALS	19
WARRANTY	22
RETURN GOODS PROCEDURE	22



INTRODUCTION

Thank you for choosing Multiflex Hydraulic steering system.

MULTIFLEX offers you a wide range of hydraulic steering systems for Inboard and outboard motor boats applications. The Multiflex range products are manufactured at our plant **EXCEL CONTROLINKAGE Pvt. Ltd. India.**

Our hydraulic Steering systems for Outboard motors are perfectly adapted to the requirements of different applications. i.e. pleasure boating, workboats, professional or amateur fishing, competition and its accompaniment.

Before proceeding with the installation, read this installation manual carefully. If you cannot follow the instruction from this installation manual at the installation time, Multiflex shall not be responsible for any damages occur.

If you have any doubts, contact Multiflex.

Our systems carry a 1 year warranty and are C € approved.


TO THE USER: The Hydraulic steering system shall be installed by skilled technicians.



WARNING: *Hazardous or unsafe practices which could result in minor injury or product or property damage.*

Failure to adhere to a warning may lead to loss of steering control. Loss of steering control may results in unpredictable boat behavior, leading to ejection from boat causing property damage, personal injury or death.

INSTALLATION INSTRUCTIONS

 **WARNING:** *The safety information is provided below to inform that dangers may present before, after and during the installation.*

The safe operation of the steering system is dependent upon proper installation and maintenance, knowledge/expertise, right judgment of the operator. Every user/installer of the steering system should know the requirements before installing the steering system.

To avoid the risk of severe physical harm, always wear a Coast Guard approved personal floatation device (PFD) & Engine shut off cord.

NOTE: *DO NOT operate boat if any component is not in proper working condition.*

- a. Before installation Read carefully and understand this installation manual provided with steering system.
- b. Install all components as par this Installation Manual.
- c. DO NOT modify or substitute any component.
- d. There should be **NO** interference between the Steering Cylinder(s), Tie-bar and the Transom, Splash-well or Outboard engine or any combination of these parts by performing the following steps.
 - With Engine fully tilted DOWN, turn steering wheel from hard over to hard over and confirm that **NO** interference occurs.
 - Follow this step for Engines tilted up.
- e. Make sure that the Steering Cylinder can be fully extended /retracted in both directions & fully tilt and trim without stretching, rubbing the Hydraulic Hoses.
- f. Check fluid level in Helm pump. Also check Fittings for leakage.
- g. Follow the rules
 - i. Federal Laws/Regulations,
 - ii. State Laws/Regulations and
 - iii. Municipal Laws/Regulations

OPERATING INSTRUCTIONS

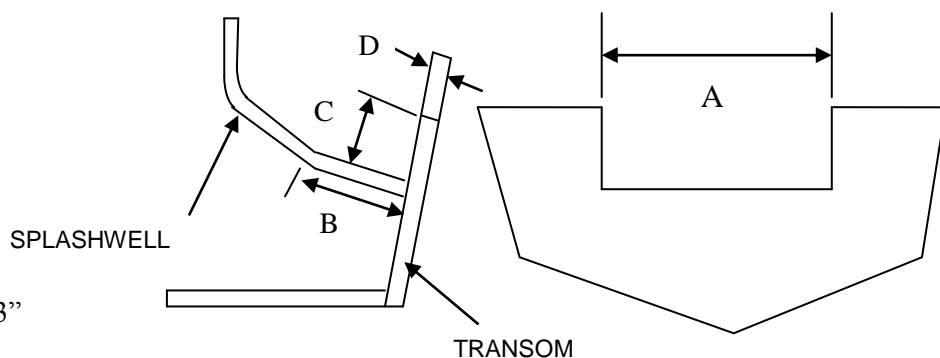
1. Perform the system pressure test by turning helm pump hard over and then forcing the helm another quarter to one half turn past the stop point.
2. Check the helm fittings for leakages and or deformation.
3. Check cylinder and cylinder bleeder fittings for leakages
4. Check hoses. If any leak observed will need to be rectified before operating the Boat.
5. Confirm that there is no interference between cylinder and the transom, splash-well or jack-plate.
6. Confirm that hydraulic hoses are not subjected to chafing or rubbing.
7. If installed on outboard cylinder on an outboard Engine, turn the steering wheel in both the directions while watching for interference with any other object, jack-plate and transom area.

DIMENSIONAL SPECIFICATIONS

Before installation, note that Splash-well of your boat has the following minimum dimensions.

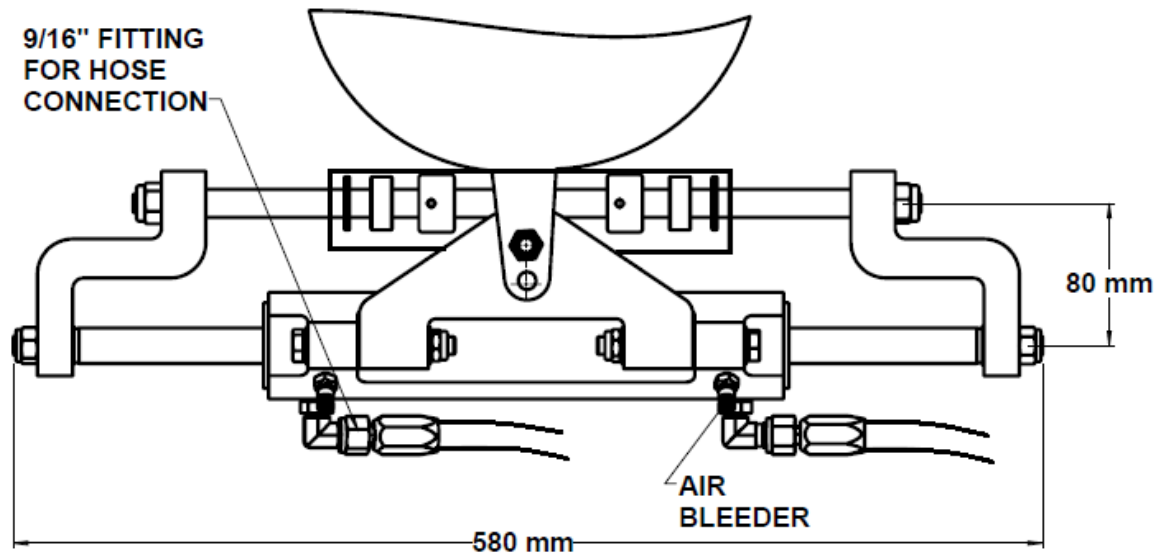
Dimension A would be increased proportional to tie bar length.

# OF ENGINES	A	B	C	MIN. ENGINE CENTER DISTANCE
1	22" (559mm)	6" (152mm)	5" (127mm)	N/A
2	44" (1118mm)	6" (152mm)	5" (127mm)	26" (660mm)



'D' not to exceed 3"

Front Mount Cylinder



Tools used for installation

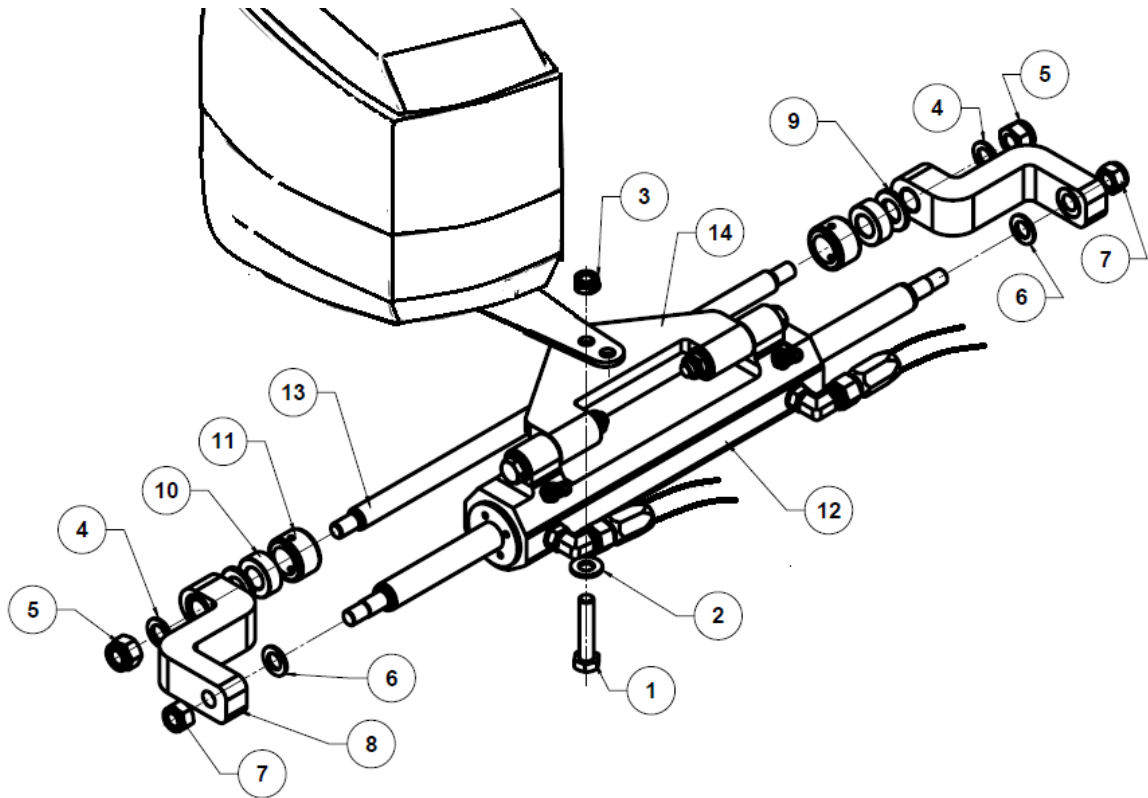
- 3" (77mm), 3 1/4" (82 mm) diameter Hole Saw or Key Hole Saw
- 7/16", 9/16", 1/2", End type Wrench/Spanner
- 5/16" (8mm) and 1/4" (7mm) dia. Drill Bit.
- 12mm , 9mm, 16mm, 14mm ,16mm ,13mm , 17mm Wrench/Spanner, Box or Open End type
- 3mm (1/8") Allen Key/Wrench.

SYSTEM INSTALLATION

As a general rule, the basic set up of steering system includes

- 1 Cylinder
- 1 Helm pump.
- Fittings & Hoses (to connect the Cylinder to the Helm pump).

FRONT MOUNT CYLINDER



NOTE: Before installation makes sure that all mounting hardware is included and the tiller arm and tilt tube bolt holes are clean & free from rust or obstructions.

- STEP 1:** Using an approved quality of marine grease, liberally lubricate the tilt tube and support rod and slide the support rod through the engine tilt tube.
- STEP 2:** Lightly grease the tiller bolt (1) & screw into appropriate hole in the tiller arm to assure a proper fit. Tighten the nylock nut (3) on to the tiller bolt. Hand tight will do. Do not over tight. Over tight will cause tough movement of cylinder.
- STEP 3:** Grease the end holes of the Bull Horn (8) and connect them to tilt tube rod with cylinder in mid stroke position
- STEP 4:** Place the washers (9) plastic spacer (10 and 11) on support rod and SS washer (6) on cylinder shaft.

STEP 5: Attach Bull horn (8) to the support rod and Cylinder shaft, using nuts, bolts and washers (4, 5 and 7) and tighten the nylock nuts until nylon inside the nut get punctured do not over tight the nylock nut.

STEP 6: Over tightening causes rod bend and eventually tough movement of barrel over the rod.

STEP 7: Make sure that the Engine can turn starting hard over to hard over without any interference.

***NOTE:** If the interference occurs between splash well and Hose or Fitting, the Fitting can be adjusted and interference must be removed completely.*

HELM PUMP INSTALLATION

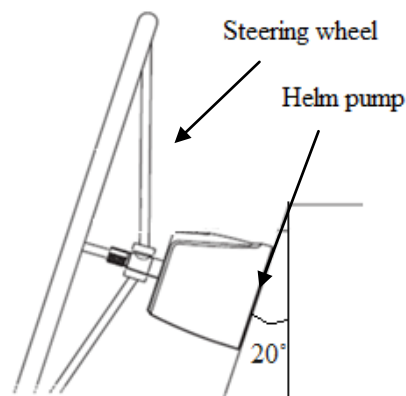
STEP 1: Select mounting plate for Helm pump installation, preferably steel plate.

STEP 2: Using the template provided with this manual mark & cut Holes for fixing the Pump on to dash board.

STEP 3: Mount Multiflex Helm pump onto dash board. Make sure that there is enough space for steering wheel, steering pump and its connection. (Fit the plate at an angle of 20 degree to vertical, front pane as shown in below fig.)


STEP 4: Fit the steering wheel on shaft along with position of key slot and tight the lock nut properly.

- HELM MOUNTING TEMPLATE IS PROVIDED WITH THIS INSTALLATION MANUAL.





HOSES CONNECTION

 Use only Multiflex Hoses provided with steering system.

STEP 1: Mark each end of Hoses. Hoses are crossed from the Helm Pump(s) to the steering Cylinder(s).

STEP 2: Throughout the hose installation, ensure that protective caps remain intact on to the end of Hoses.

STEP 3: Remove protective covers and connect Hoses

If damages, cracks, cut or Leaks at Fitting or in hose, occur then do not operate the system.

***NOTE:** Always try to route the hoses via shortest path to avoid any possible loss of Power.*

HYDRAULIC FLUID SPECIFICATIONS

Recommended oils for your steering system are:

- Multiflex Hydraulic Fluid, part no. LM-HO-150

***NOTE:** Never use brake fluid. Any non-approved fluid may cause irreparable damage and loss of steering.*

OIL REQUIRED

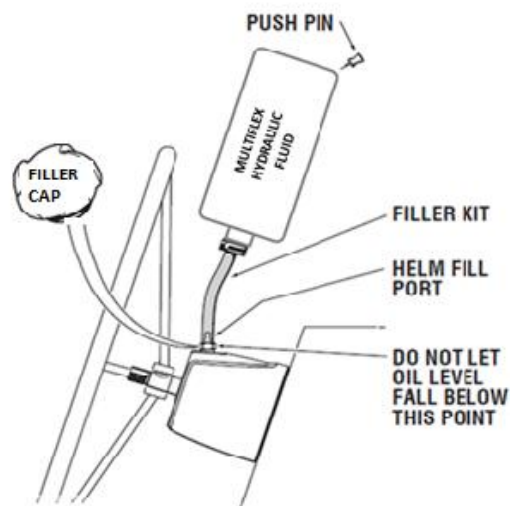
- 2 liters oil for single station and single Cylinder systems.
- 1 Bottle (1 liter) additional oil required for extra Cylinder with extra Helm Pump.

FILLING AND PURGING PROCESS

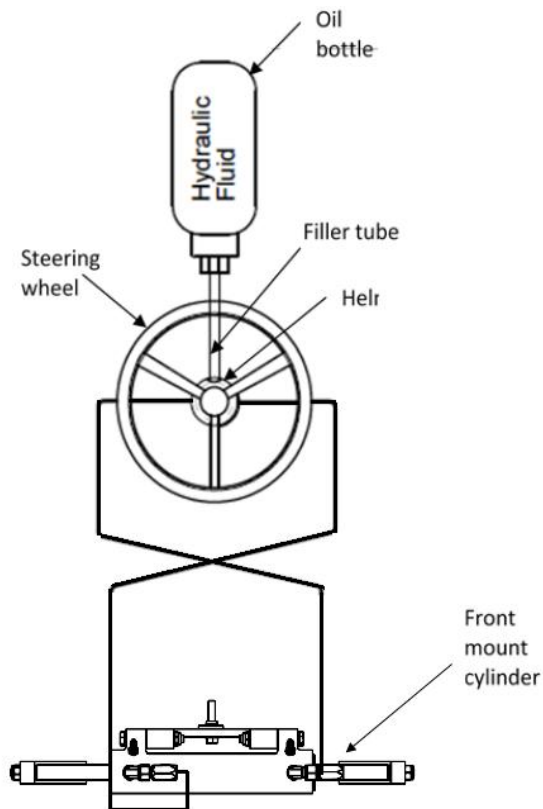
This procedure requires two people. One person may not be able to remove air completely from system which will result in spongy, unresponsive steering.

During the filling procedure, oil must be visible in filler tube.

DO NOT allow oil level to disappear into the Helm Pump, as this allows air to enter into the system.



STEP 1:-



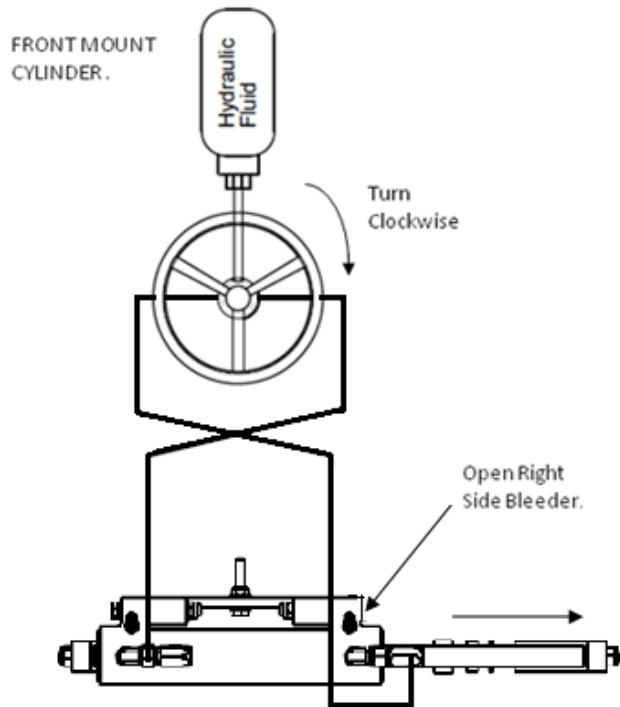
Connect the threaded end of filler tube to the oil Bottle and screw it to the Helm filler port. **Make Hole in the bottom of the Bottle.**

Fill the Helm Pump with hydraulic oil. So that it is visible in filler tube. **DO NOT** proceed to next step until Helm is full.

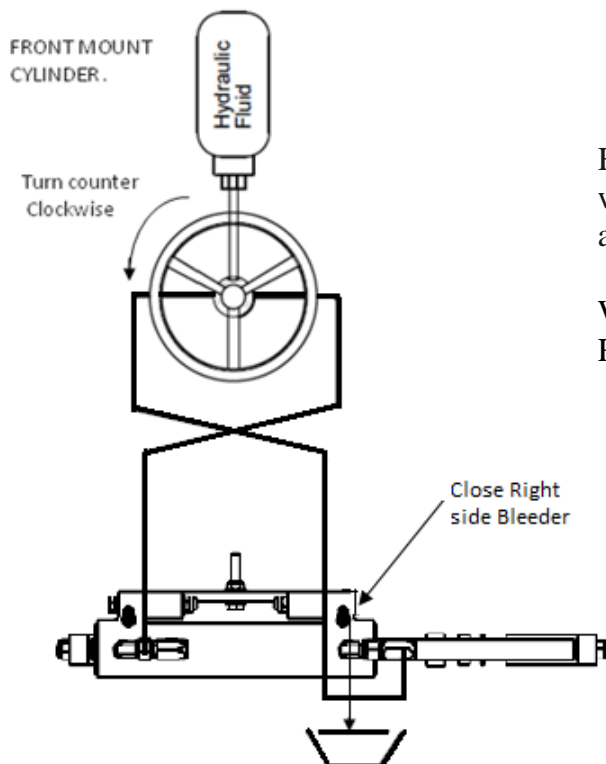
STEP 2:-

Turn the steering wheel clockwise until the Cylinder rod is fully extended on right side of the Cylinder.

Open the right side bleeder.



STEP 3:-



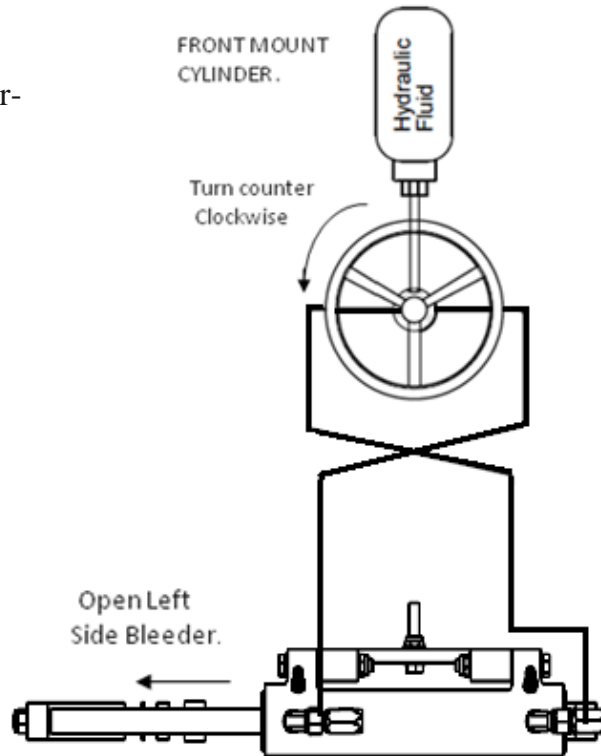
Holding the Cylinder body (front mount) turn the wheel counter- clockwise until a steady stream of air free oil comes out of the Bleeder.

While continuing to turn the wheels close the Right side Bleeder.

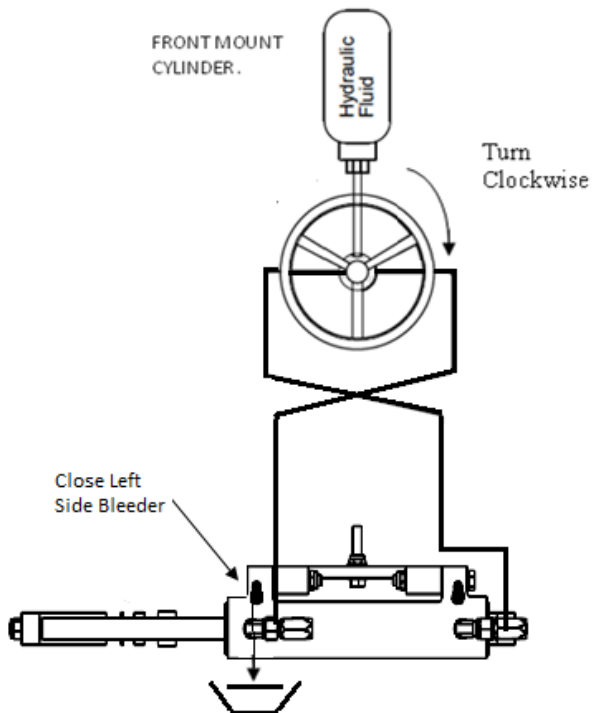
STEP 4:-

Continue turning the wheel counter-clockwise until the Cylinder rod is fully extended to left side.

Open the left Bleeder.

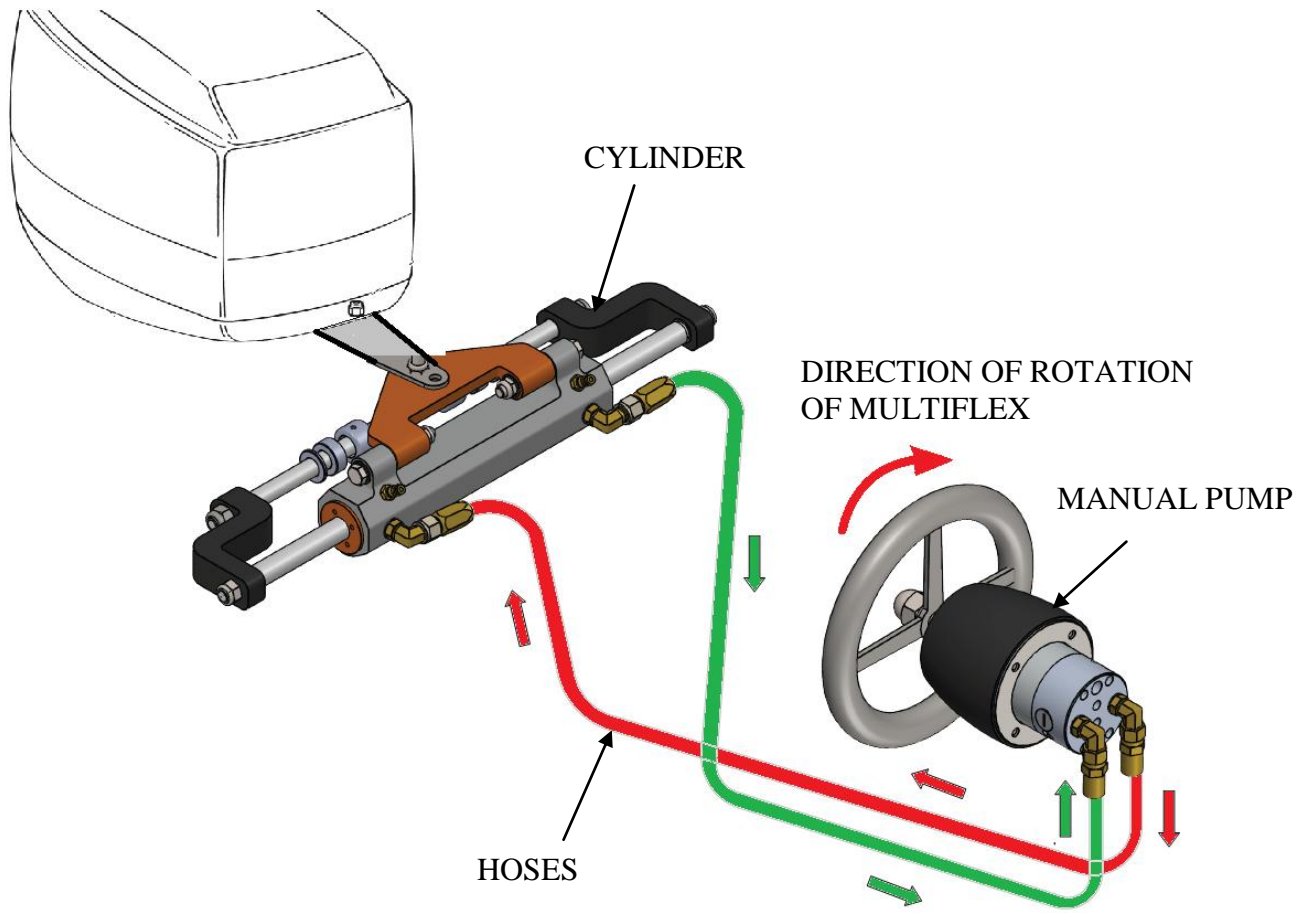


STEP 5:-



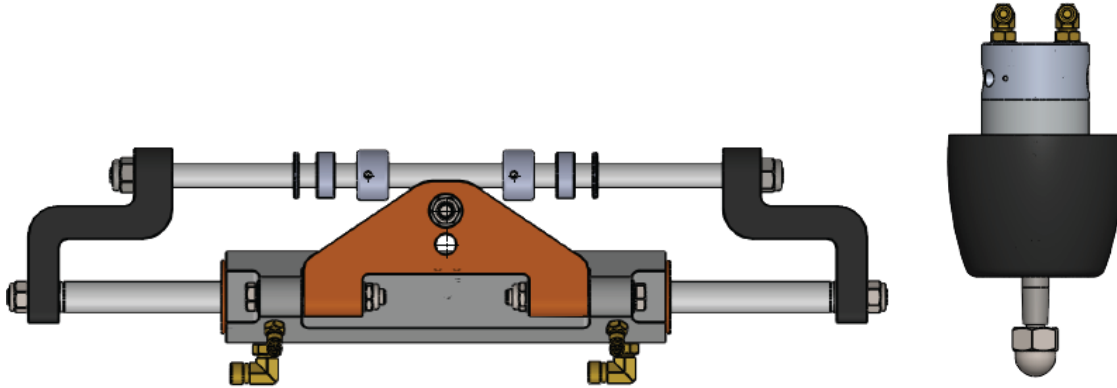
While turning the Steering Wheel close the left side Bleeder and let go-of the Cylinder body.

SYSTEM DIAGRAM



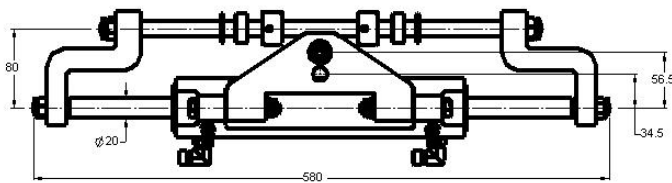
HYDRAULIC STEERING SYSTEM COMBINATIONS

POHS-350AF



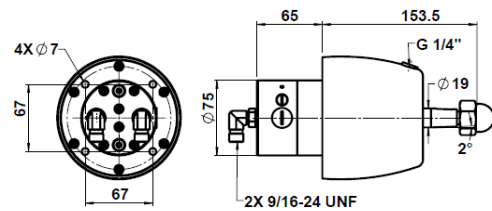
NO. OF TURNS = 6.1

UPTO 350 HP LM-OC-350AF



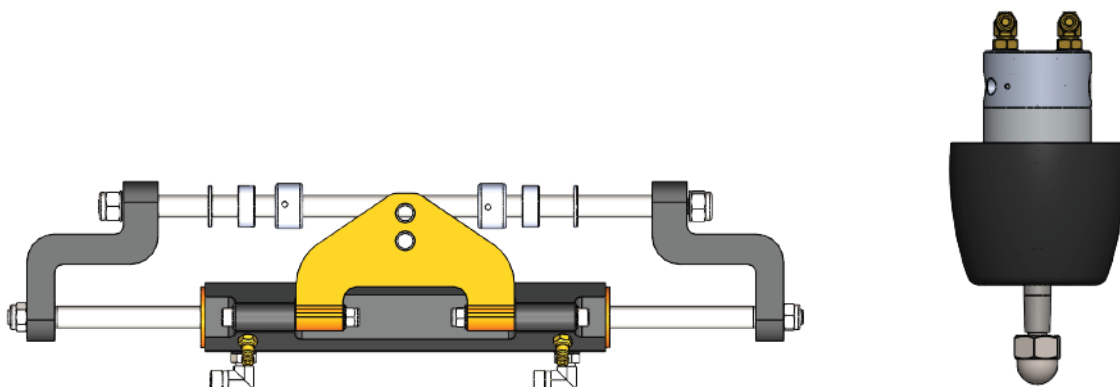
VOL.: 166 cc STROKE: 203 mm

LM-HP-27



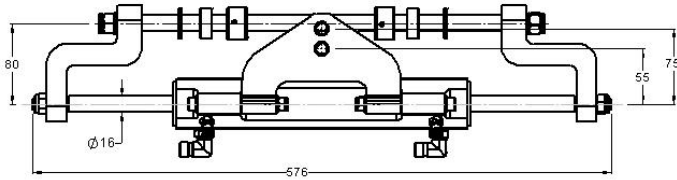
VOL.: 27 cc

POHS-150AF/POHS-250AF



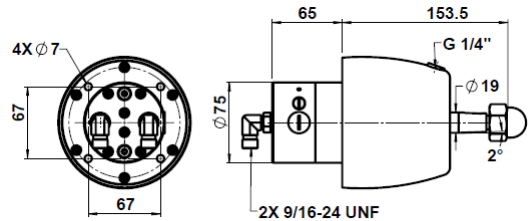
NO. OF TURNS = 6.1/5.3

UPTO 150/250 HP LM-OC-150AF/250AF



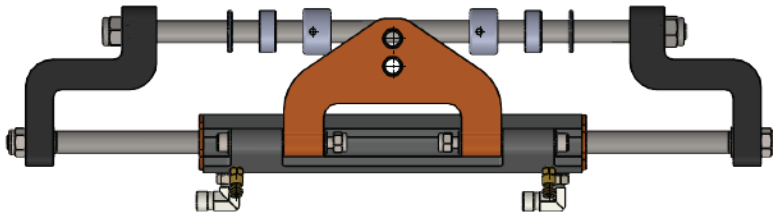
VOL.: 122 cc STROKE: 203 mm

LM-HP-20/23



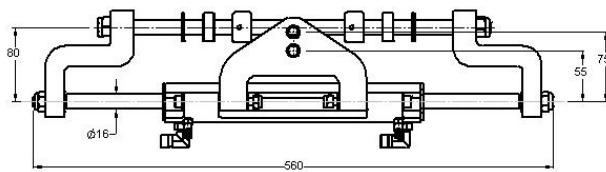
VOL.: 20cc / 23 cc

POHS-115AF



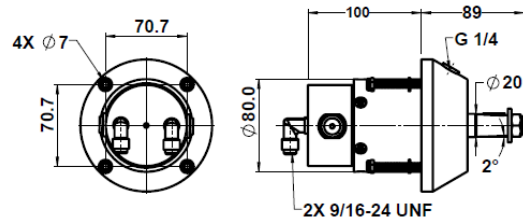
NO. OF TURNS = 5.25

UPTO 115 HP LM-OC-115AF



VOL.: 85cc STROKE: 185 mm

LM-HP-16



VOL.: 16 cc



TROUBLE SHOOTING

The system check must be completed after installation. Doing so will ensure the safe operation of your steering system.

Turn steering wheel hard over to hard over to confirm unrestricted movement of the Steering cylinder with hoses connected. Check the interference. Check all port Fittings if leaks are noticed, they **MUST** be rectified prior to operating boat.

FAULTS & SOLUTIONS

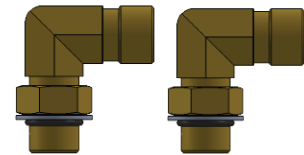
Below are most common fault and their solutions

FAULT	CAUSE	SOLUTION
1. During filling the Helm becomes Completely jammed	a) Blockage in steering system b) Mechanical interference with other components	Remove all steering lines. Blow air through lines. Any line not allowing good air flow should be replaced.
2. System is very difficult to fill, air keeps burping out top of helm even after system appears full.	a) Air in system b) Bleed Fitting leakage	Bleed the steering system again. Tighten Bleeder, replace if leaks continues.
3. Steering is stiff & hard to turn, even when boat is Not moving & engines are OFF	a) Adjusting nut on support rod is over tightened. b) Restriction in hoses c) Air in system	Nut should be hand tight. Check the right oil way. Bleed the steering system
4. Steering is easy to turn at the dock, but becomes hard to turn when system is underway.	a) Steering wheel is too small b) Incorrect engine setting.	Fit the proper size wheel Adjust the engine tab.

ACCESSORIES FOR OUTBOARD STEERING SYSTEMS

1. HYDRAULIC OIL (LM-HO-150)

TWO LITRES HYDRAULIC OIL



2. FITTINGS

1/2"-20 UNF -9/16"-20 UNEF

3. HOSE KIT (LM-CT-7.5/LM-RT-7.5)



5/16" ID , 1000 PSI PRESSURE 7.5 Meters

4. OIL FILLING KIT (LM-OF-O1)





CLEANING PROCEDURES

Hydraulic steering system exterior surfaces should be cleaned after every use of the boat. Even if you don't have the time or energy to clean the entire boat, you **MUST** clean the steering system as it should be considered a part of your safety gear.

1. When you are in a saltwater environment, the salt will crystallize as the water evaporates and coat all the parts of the steering cylinder along with the rest of the boat.
2. We have seen units in the shop that had no seals left; they were being sealed by the salt that had been carried under the wiper seal and then corroded the aluminum away in front of the seal.
3. You must wash this cylinder with soap and water as frequently as possible in salt water areas.
4. Even if you keep your boat on a trailer but store it near the coast, blowing saltwater will tend to build up salt on the aluminum parts of your system that will corrode over time.
5. Also many of the shafts on the steering cylinders may look like stainless steel, but they may not be. Non-stainless shafts **WILL** corrode and then they will leak! Use a magnet to find out if yours is stainless steel.
6. Just remember that even stainless will scratch over time from salt crystal deposits. I recommend after cleaning thoroughly with soap and water use a Corrosion Block product to finish cleaning your steering cylinder. (use it on the steering wheel and shaft also)
7. Get an air compressor with a small tip to blow out the lines
8. Get all the proper size wrenches that you will need.
9. At this point, if the oil is discolored or muddy looking, you should have your helm and cylinder serviced by a qualified shop.
10. While your unit is out being serviced, the rest of the system, hoses and reservoir, should be thoroughly flushed with mineral spirits and blown dry.
11. Get enough of the manufacturer's recommended new fluid to fill your entire system (you **MUST NOT** reuse the old oil that you remove)
12. Once all your lines and parts are cleaned, put the system back together, refill with fluid (read the owner's manual) and purge the system.

ROUTINE MAINTENANCE

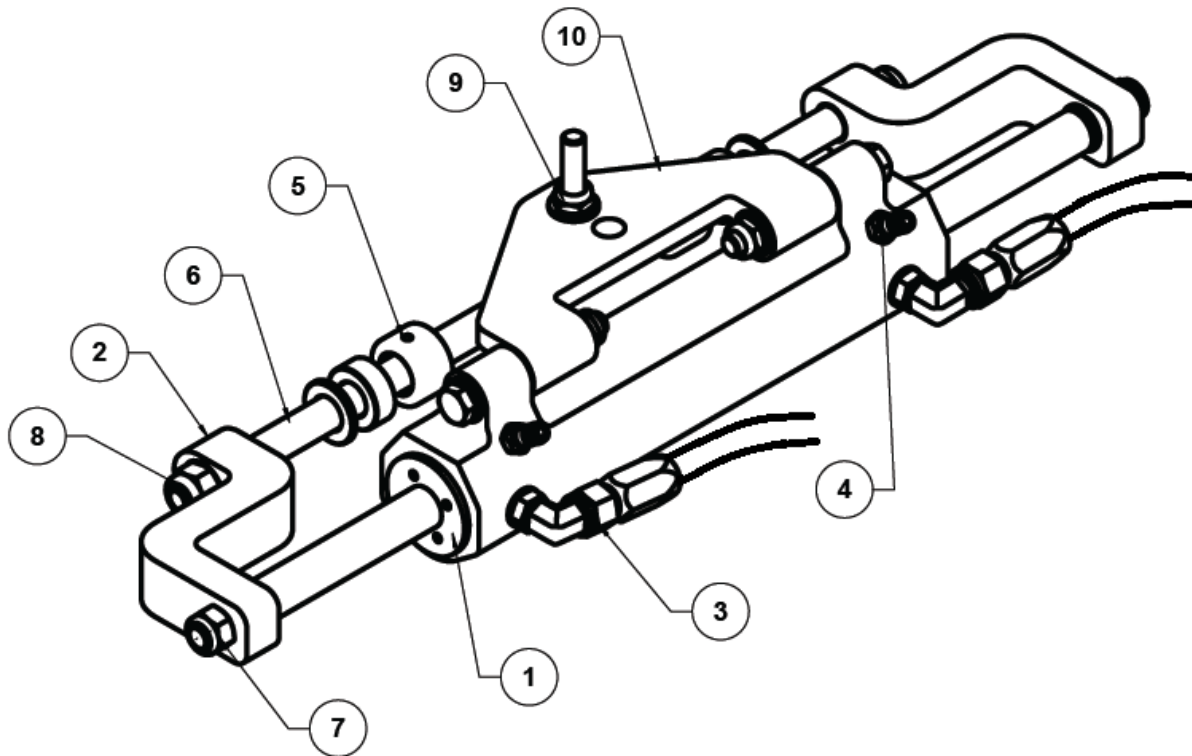
Multiflex Steering system if properly installed and maintained, gives you years of safe and reliable performance.

1. Check oil level in Helm Pump.
2. Verify steering response when turning the wheel.
3. Inspect steering Hoses & Fittings for damages, wear, leaks.
4. Check tightness of all Fasteners/Fittings to the system.
5. Check the signs of corrosion.
6. Remove support rod from engine steering/tilt tube. Clean engine steering/tilt tube and re-grease using approved quality of marine grease.
7. Remove steering wheel and re-grease wheel shaft using approved quality of marine grease
8. Inspect Hydraulic oil for cleanliness, flush if required.

REPLACEBLE ITEMS AND SEALS

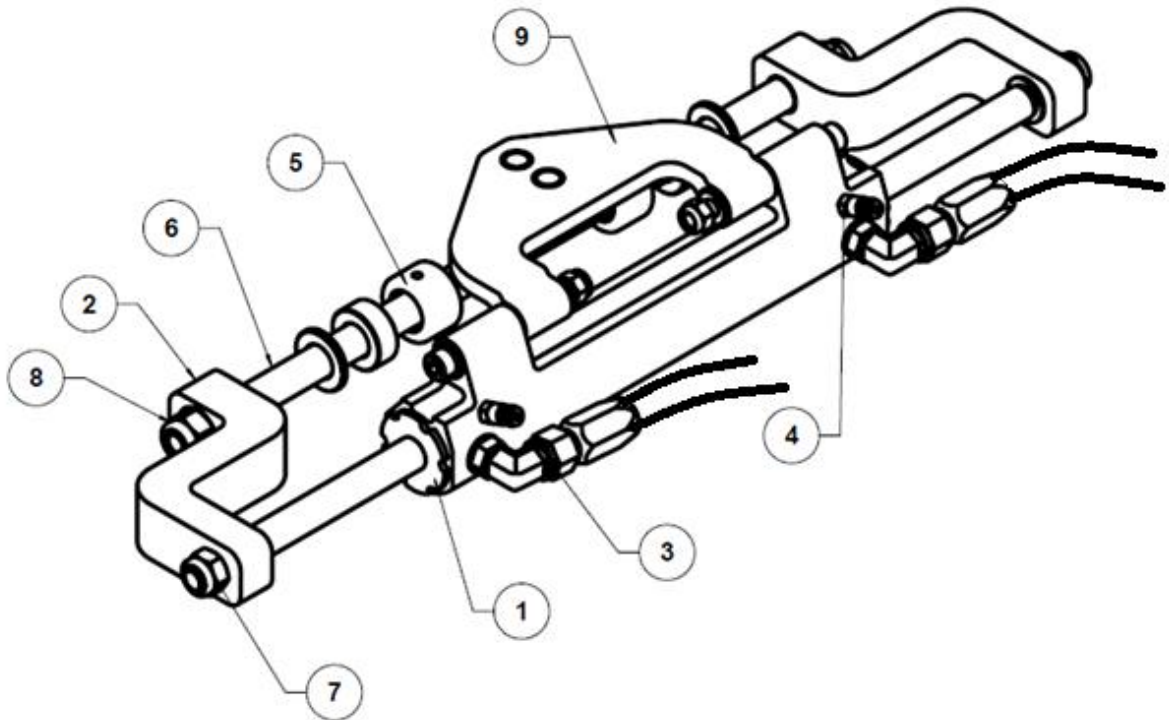
(PARTS # LM-OC-350AF, LM-OC-150AF/250AF, LM-OC-115AF)

LM-OC-350AF



ITEM NO.	PART	DESCRIPTION	QTY.
1	LM-SK-350AF	END CAP WITH SEALS	2
2	LM-OC-SB-01	SUPPORT BRACKET (BULL HORN)	2
3	LM-EB-01	HOSE ELBOW FITTINGS	2
4	LM-AB-01	BLEEDER FITTINGS	2
5	LM-OC-SP-1	SPACERS KIT	2
6	LM-SR-01	SUPPORT ROD (CENTRE SHAFT)	2
7	LM-PR-NT-01	PISTON ROD NYLOC NUT	2
8	LM-SR-NT-01	SUPPORT ROD NYLOC NUT	2
9	LM-OC-TP-SD-01	ENGINE CONNECTOR STUD	1
10	LM-OC-TP-01	TILLER PLATE (PIVOT MOUNT PLATE)	1

LM-OC-115AF



ITEM NO.	PART	DESCRIPTION	QTY.
1	LM-SK-115AF	END CAP WITH SEALS	2
2	LM-OC-SB-01	SUPPORT BRACKET (BULL HORN)	2
3	LM-EB-01	HOSE ELBOW FITTINGS	2
4	LM-AB-02	BLEEDER FITTINGS	2
5	LM-OC-SP-1	SPACERS KIT	2
6	LM-SR-02	SUPPORT ROD (CENTRE SHAFT)	2
7	LM-PR-NT-01	PISTON ROD NYLOC NUT	2
8	LM-SR-NT-01	SUPPORT ROD NYLOC NUT	2
9	LM-OC-TP-SD-01	ENGINE CONNECTOR STUD	1
10	LM-OC-TP-02	TILLER PLATE (PIVOT MOUNT PLATE)	1



WARRANTY STATEMENT

MULTIFLEX provides one year limited warranty from date of purchase for those systems used commercially or any income producing activity. Replacement of product is free to meeting the warranty. For details of Warranty view www.multiflex.in. Warranty is limited up to our product cost.

RETURN GOODS PROCEDURE

Prior to return the product to Multiflex under warranty. please obtain a return goods Authorization number (claim number)

Be sure the label goods with

1. The name & address of sender, and
2. Return goods Authorization number

Please return the goods to below given address.

ADDRESS

Excel controlinkage Pvt.Ltd..
W 68 (B) M.I.D.C Industrial Area,
Hingna Road Nagpur-16,
Maharashtra.