

multisteer

BY MULTIFLEX

HYDRAULIC STEERING SYSTEM OUTBOARD : UP TO 115 HP (OH-115)

Instruction Manual,
Installation And
Maintenance Guide

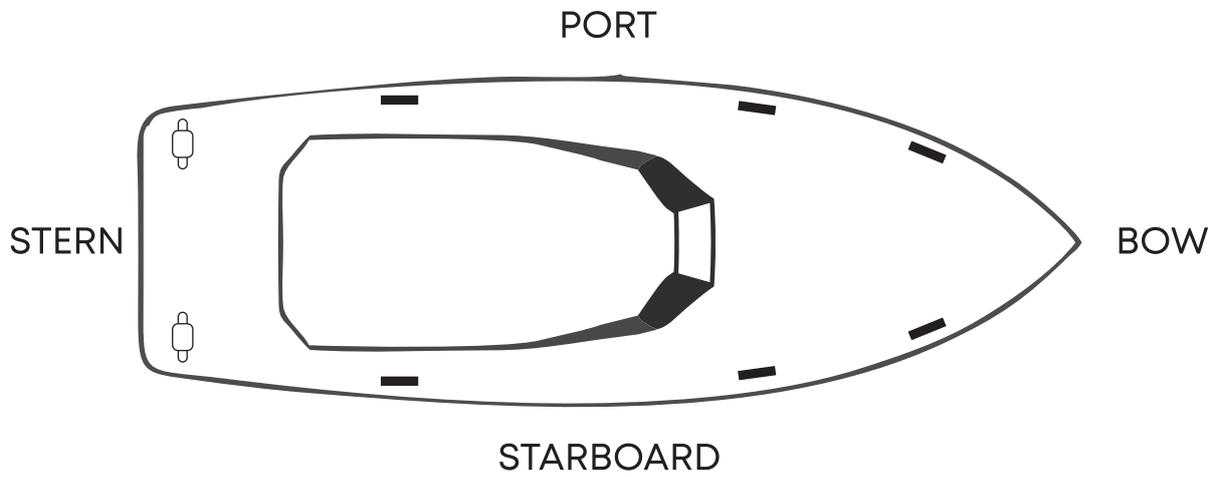


CE
ISO 10592

QUALITY SYSTEM CERTIFICATION
DNV-GL
IATF 16949

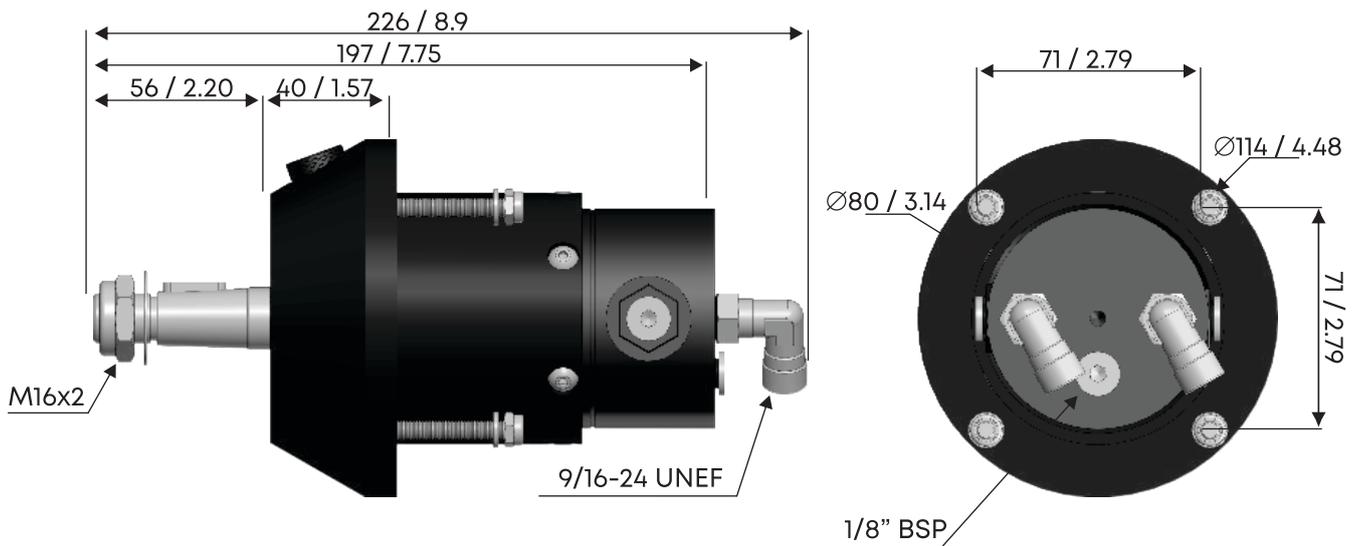
MEMBER
ABYC
Setting Standards for Safer Boating

E. NAUTICAL WORD REFERENCE



1.2 PRODUCT DIMENSIONS

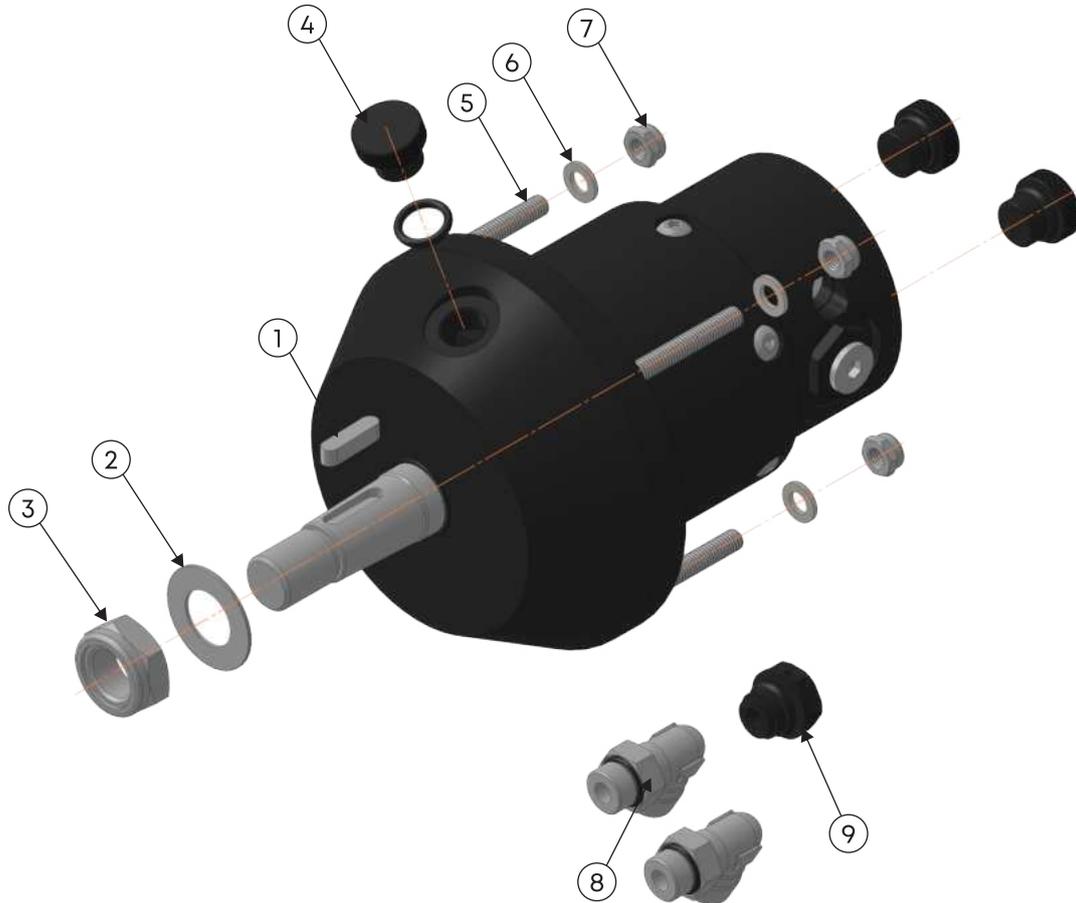
HYDRAULIC HELM PUMP : HP-16



All Dimensions are in mm / Inch

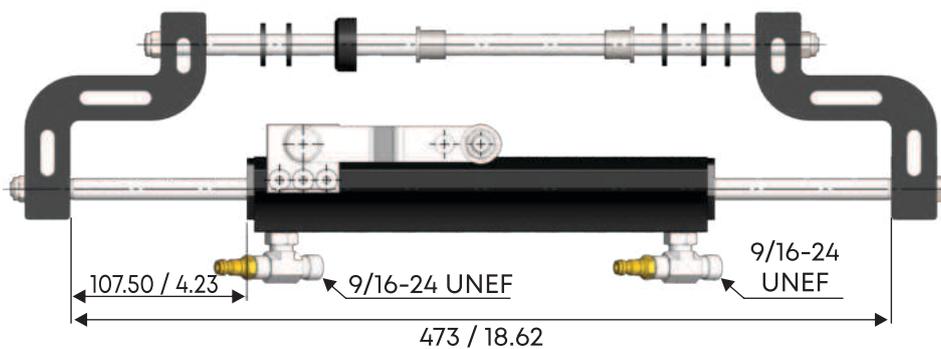
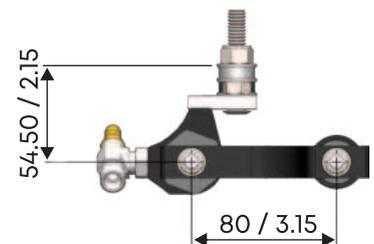
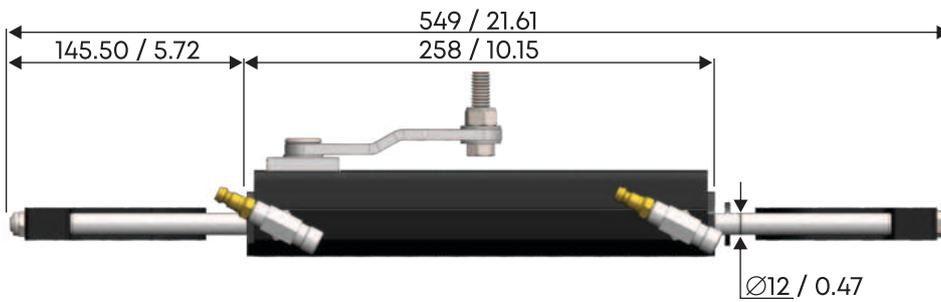
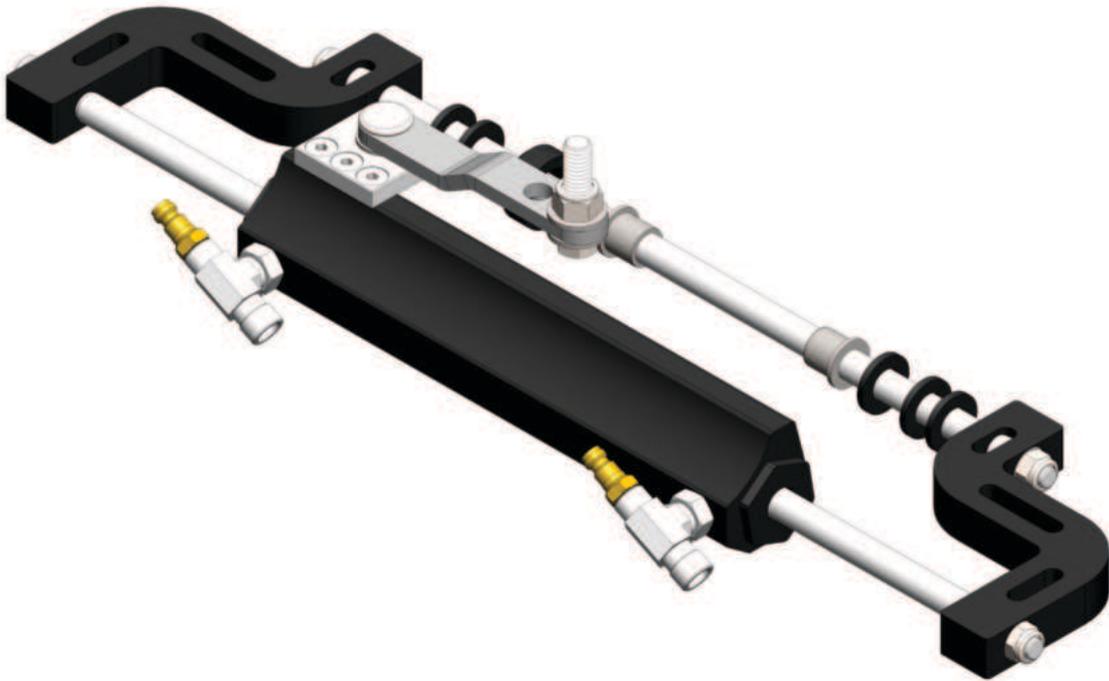
1.3 PRODUCT EXPLODED VIEW

HYDRAULIC HELM PUMP : HP-16



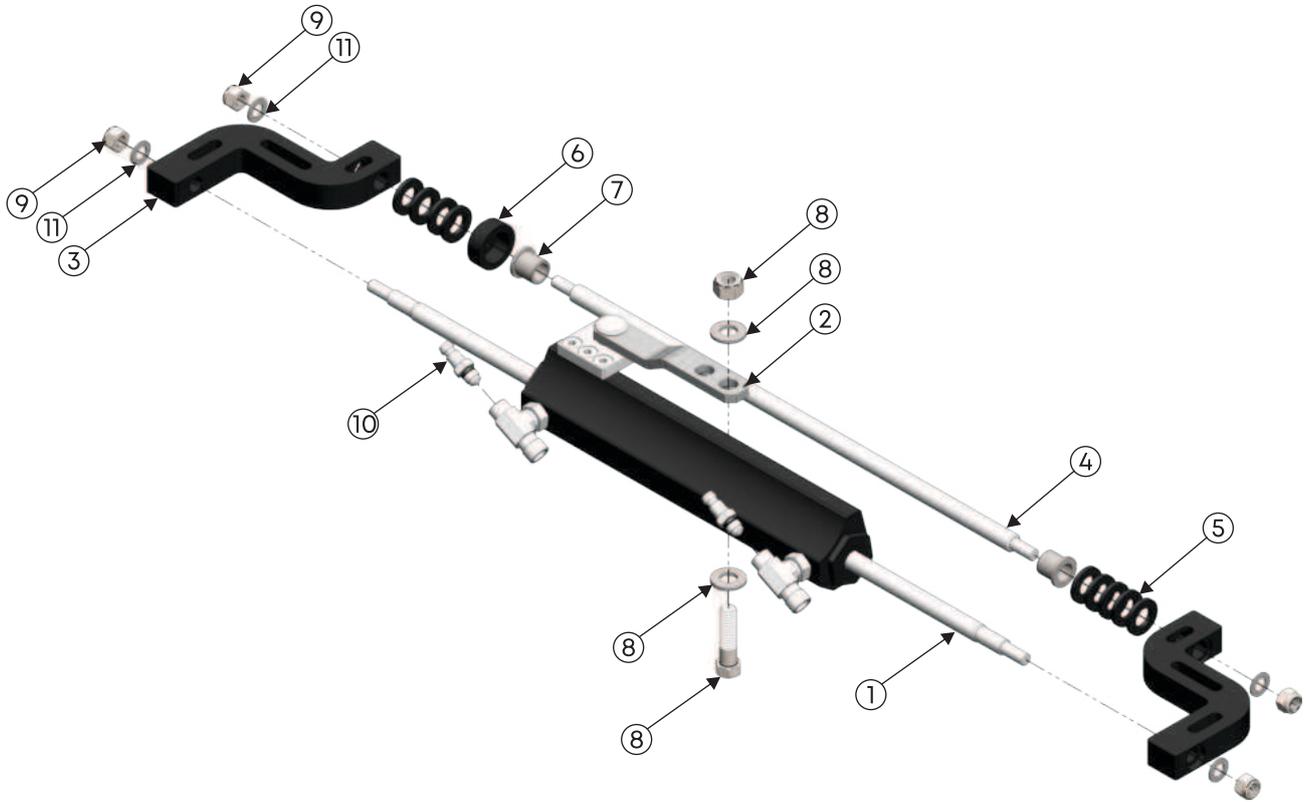
Item No.	Description	Qty.
1	Flat Key	01
2	Shaft Washer	01
3	Nyloc Nut	01
4	Dummy Plug- 1/4" BSP / Non Vented Plug	03
5	Stud - Flange	04
6	Stud Washer	04
7	Nyloc Nut	04
8	Elbow	02
9	Oil Fill Plug with Breather Hole / Vented Plug	01

HYDRAULIC CYLINDER : OC-115



All Dimensions are in mm / Inch

HYDRAULIC CYLINDER : OC-115



Item No.	Description	Qty.
1	Piston Rod	1
2	Tiller Plate	1
3	Support Bracket	2
4	Center Shaft	1
5	Spacer / Washer For OC-115	9
6	Mounting Spacer	1
7	Support Rod Bush	2
8	Hex Stud Assembly	1
9	Nyloc Nut For Piston Rod / Center Shaft	4
10	Air Bleed Plug	2
11	Piston Rod / Center Shaft Washer	4

1.4 TECHNICAL SPECIFICATIONS

HELM HP-16

Model No.	Volume cc	Volume ci	Port Threads (UNEF)	Relief/Design* Pressure in Bar	Recommended Steering Wheel Diameter	Weight in Kg
HP-16	16	0.9	9/16-24	50	350 mm	2.3

CYLINDER OC-115

Model No.	Volume cc	Volume ci	Port Threads (UNEF)	Force (Kgf)	Stroke (mm)	Air Bleeder Fittings	Weight (Kg)
OC-115	92.5	5.6	9/16-24	251	184	AB2	2.1

STEERING FLUID HO-150

Model No.	Viscosity at 40°	Viscosity Index	Pour Point	Flash Point
HO-150	15.5 cSt	>150	-40 Degrees	>188 Degrees

CAUTION :

We highly recommend the use of Multisteer Hydraulic Oil HO-150. Use of non-recommended fluid may result in hard Steering.

HYDRAULIC HOSES CT-5.0

Model No.	Description	End Connector
5.0	5 Meters (16.4 Feet)	HC-C1

2.2 PACKING LIST

HYDRAULIC STEERING SYSTEM (OH-115)

PACKAGING ITEMS

Model No.	Description	Part No.
HYDRAULIC STEERING KIT		1 OH-115
1	HELM PUMP	1 HP-16
A	WOODRUFF KEY / FLAT KEY	1 HP-WK4
B	SHAFT WASHER AND NUT	1 SK-HP1
C	VENTED PLUG	1 VP1
D	NON-VENTED PLUG	3 NP1
E	ELBOW ASSEMBLY	2 EB1
F	MOUNTING TEMPLATE	1 HP-16-MT
G	MOUNTING NUTS AND STUDS	4 HP-FN1 & HP-FS1
2	HYDRAULIC CYLINDER	1 OC-115
A	" T " ADAPTOR ASSEMBLY	2 TF1-AB2
B	RUBBER CAP	4 EB1-RC
C	HEX STUD ASSEMBLY FOR TILLER PLATE	1 OC-TP-SD-03
3	OIL BOTTLE	1 HO-150
4	HOSE KIT	2 CT-5.0
5	OIL COLLECTION BOTTLE	1 OC-B1
6	OIL COLLECTION TUBE	2 OC-T1
7	OIL FILLING KIT	1 OF-01
8	INSTALLATION MANUAL	1 OH-115-IM1
9	DECLARATION OF CONFORMITY : HELM	1 HP-DC-16
10	DECLARATION OF CONFORMITY : CYLINDER	1 OC-DC-115
11	SILICA GEL	2 OH-SG

NOTE: Please ensure all the above components are in the package in a proper condition. In case of any missing components or damage, please contact the Seller for warranty claim.

CAUTION :

The packaging waste must be disposed properly according to the existing laws.

SECTION 3 - PRODUCT INSTALLATION

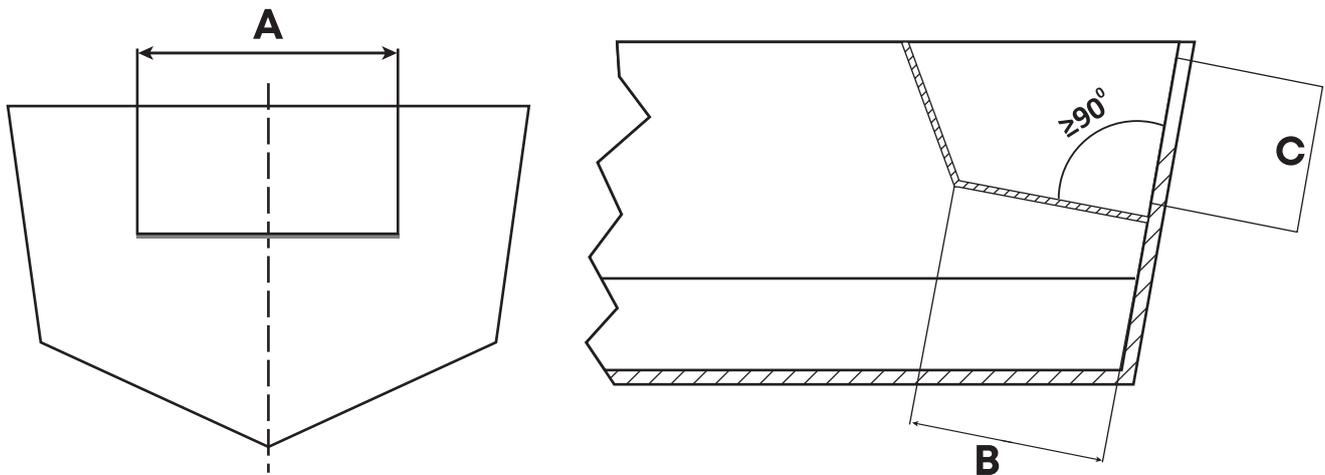
3.1 DIMENSIONAL REQUIREMENTS OF BOAT

The following diagram shows the minimum splash well dimensions for installation of Multisteer Hydraulic Cylinder. The said dimensions must be followed in order to prevent the Cylinder from getting damaged when the outboard engine is fully tilted upwards.

The diagram also shows the minimum transom dimensions needed for the Installation of Cylinder and the correct movement of the engine corresponding to Cylinder.

⚠ WARNING :

JACK PLATE ON THE TRANSOM : When you want to install jack plate, it will change all the application clearances mentioned above. You need to recheck the new clearance which must be completed with fully tilting of the engine in conjunction with the vertical movement of the jack plate in all the possible positions. By any chance, if you observe the Cylinder may come in contact with the splash well, transom and / or jack plate, immediately stop the installation! Please refer the Instruction Manual of the jack plate manufacturer to limit the upper or lower direction where the intrusion may occur.



No. of Engines	A	B	C	Min. Engine Center Distance
1	22" (559 mm)	6" (152 mm)	6" (152 mm)	N/A
2	44" (1118 mm)	6" (152 mm)	6" (152 mm)	26" (660 mm)

3.2 TOOLS REQUIRED DURING INSTALLATION

The following are the necessary tools required for the proper installation of the Multisteer Hydraulic Steering System OH-115

3" (77mm), 3 1/4" (82 mm) diameter Hole Saw or Key Hole Saw



7/16", 9/16", 1/2" Box or Open Type Wrench / Spanner



Torque Wrench



9, 12, 13, 14, 16, 17 mm Wrench / Spanner, Box or Open End type



3mm (1/8") Allen Key / Wrench



Marine Grease



Hand Drilling Machine

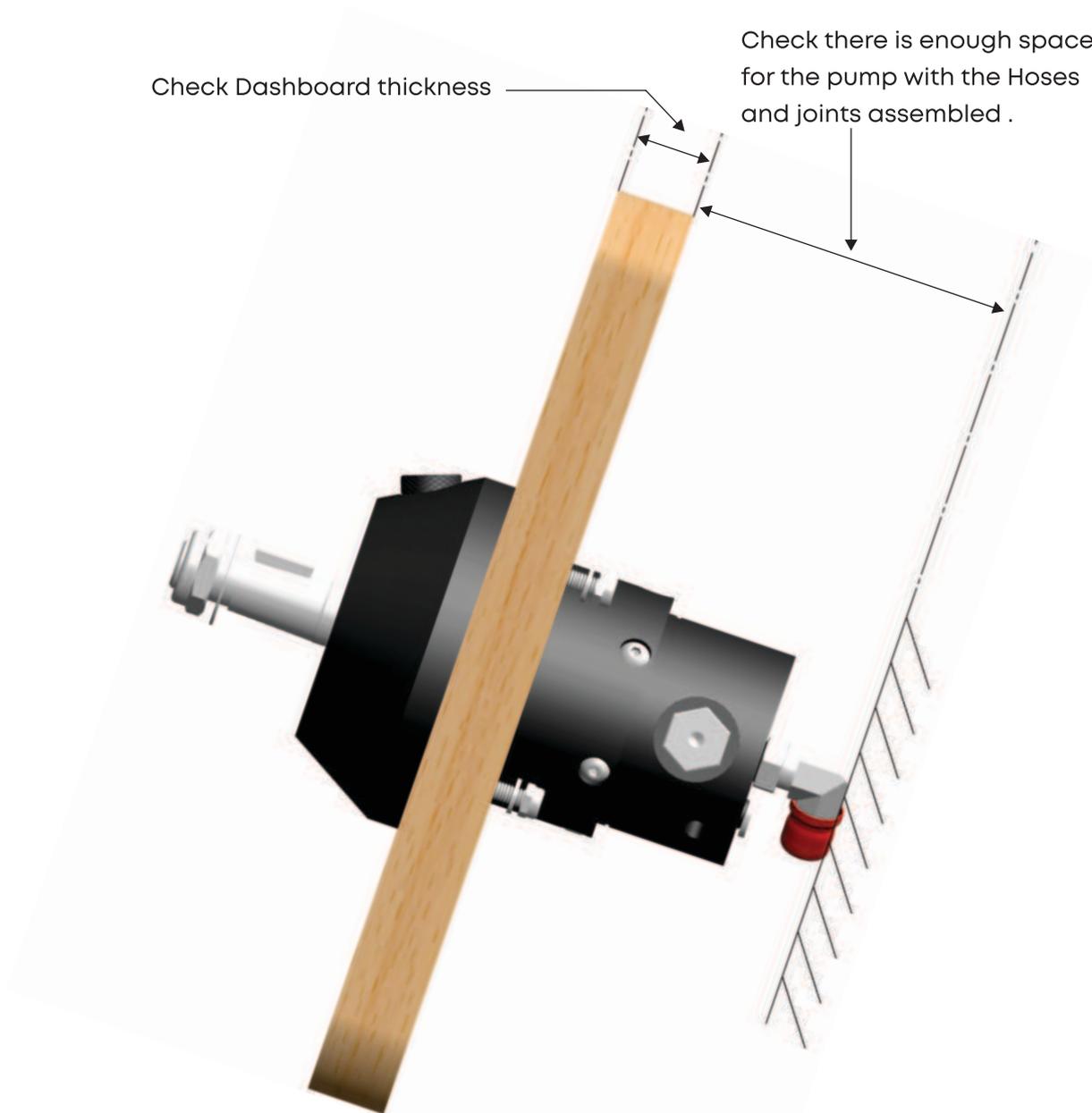


5/16" (8mm) and 1/4" (7mm) dia. Drill Bit



3.3 INSTALLING HELM PUMP (HP-16)

Step 1: Choose a suitable position to install the Steering Helm. Confirm if there is adequate space to move the Steering Wheel on the front side and sufficient space for the Helm with the Hoses and Fittings assembled on the back side of dashboard. (The Dashboard should be at an angle of 20 degrees to vertical plane as shown in below fig.)



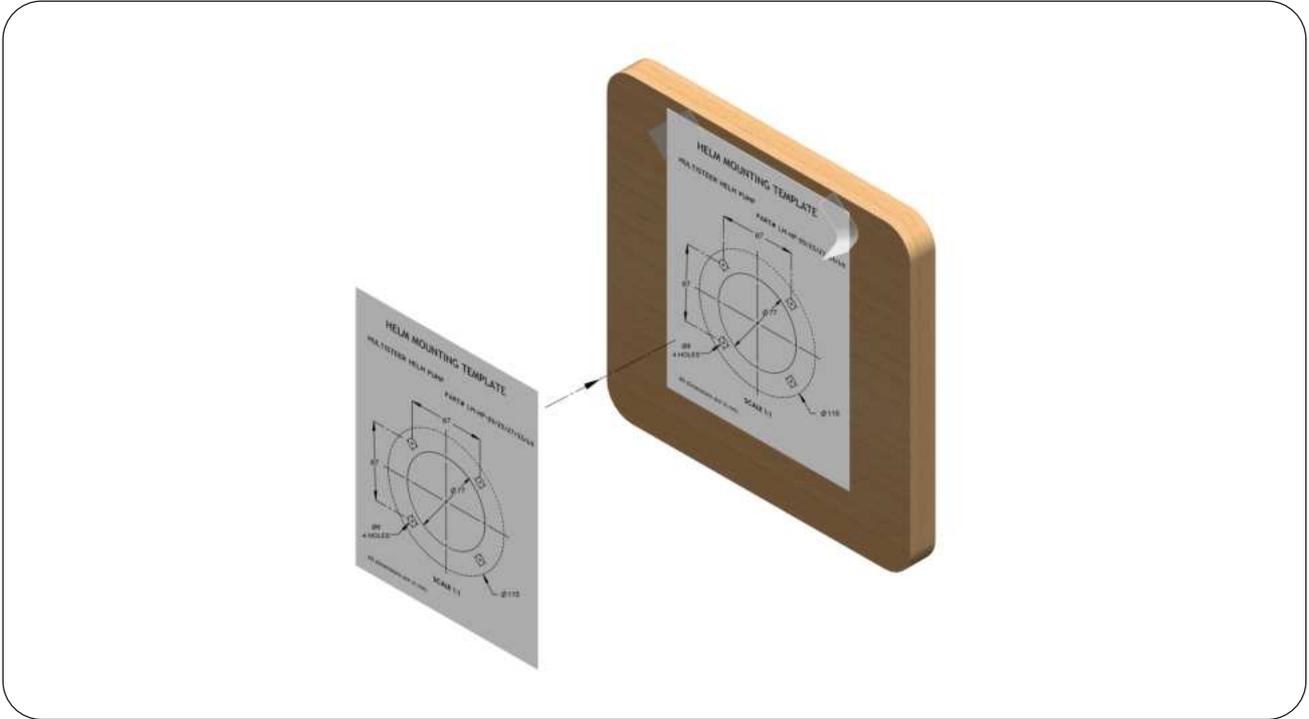
⚠ WARNING : **⚠ SKILLED LABOR REQUIRED :**

For proper fastening of the Helm, the thickness of the dashboard must be minimum 12.7 mm (0.5") and maximum 54mm (2.1") thick.

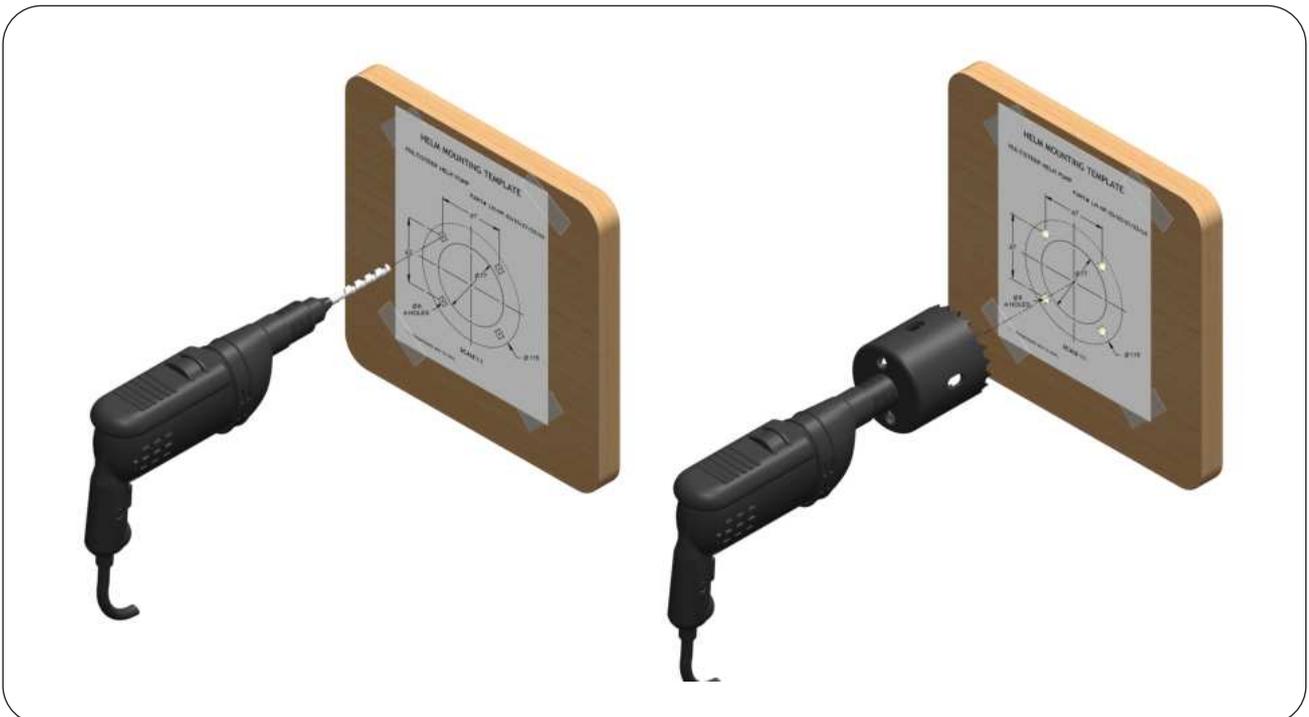
Thickness below or above these dimensions could lead to unsafe Steering.

After assembling the Helm, ensure that the 4 Nyloc Nuts (7) supplied are properly screwed on the Flange Studs(5).

STEP 2 : Paste the Helm Mounting Template supplied with Helm on the dashboard at a suitable position where the Helm is to be mounted with the help of tape.



STEP 3 : Make 4 holes for the Flange Studs with the help of a Hand Drill and a big one for the Center Hole with the help of hole saw.



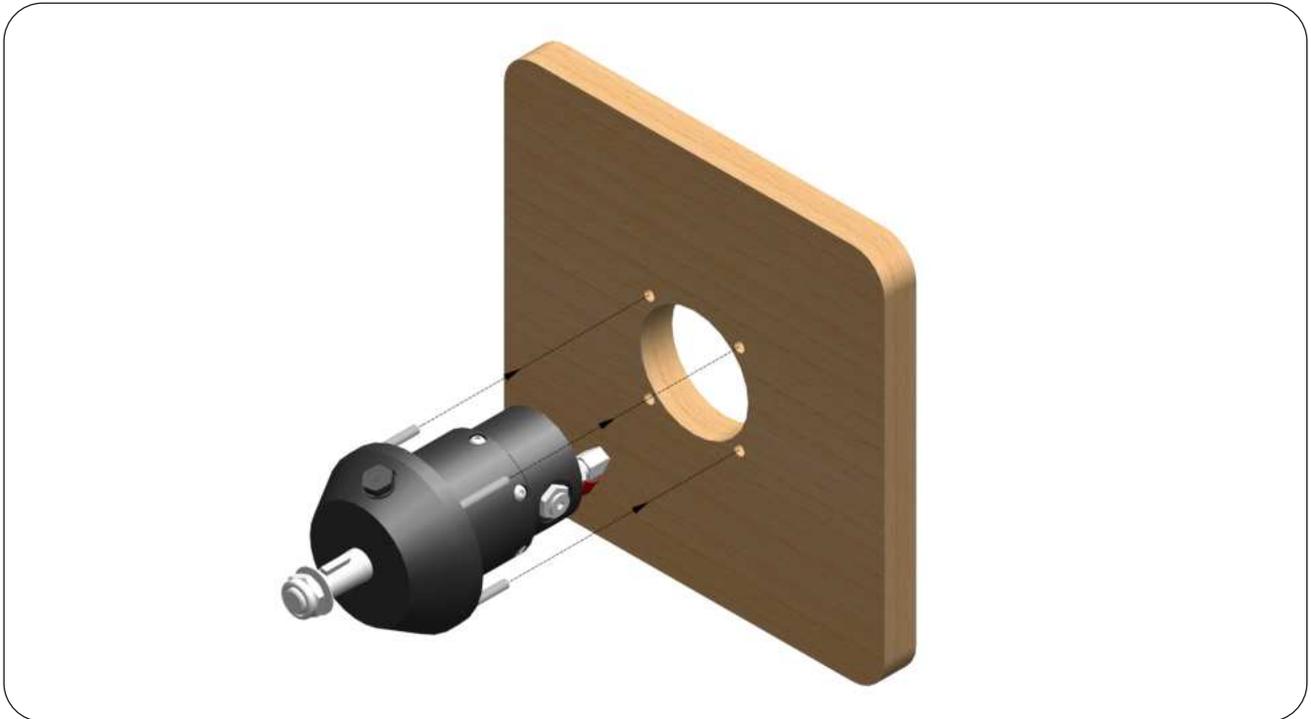
STEP 4 : Remove the Protective Plugs (4). Also Remove 4 Nyloc Nuts (7) and Washer (6) from the Flange Studs (5) of Helm with the help of 10 mm Wrench.



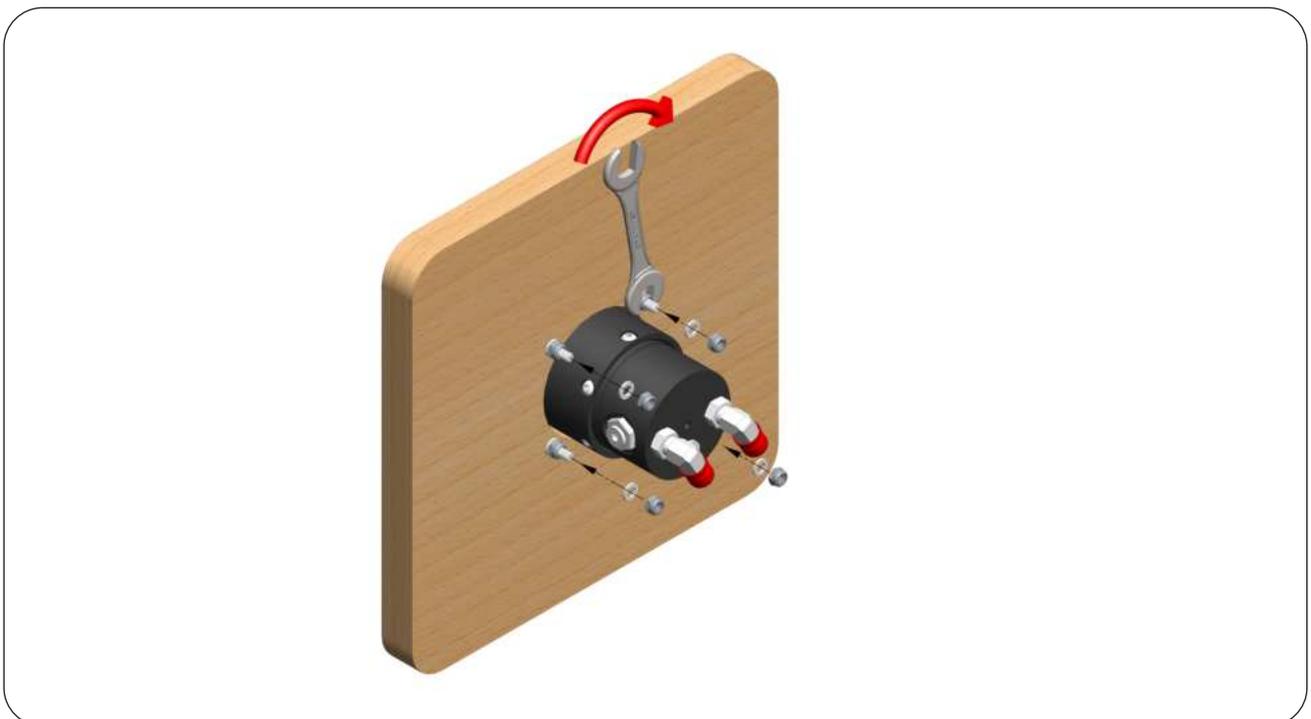
STEP 5 : Insert and tighten by hand the Elbow Fittings (8) until they are fully seated, then tighten with a wrench. Turning again from 1.5 to 2.5 turns, for their best orientation for the Hose connection. However do not exceed a maximum torque of 17.6 Nm (13 lb ft). Also insert the Vented Plug (9) into Oil Filling Port.



STEP 6 : Insert the Helm from the front of the dashboard with the Vented Plug (9) turned upwards matching the 4 Flange Studs (5) moving inside the 4 holes on the dashboard.



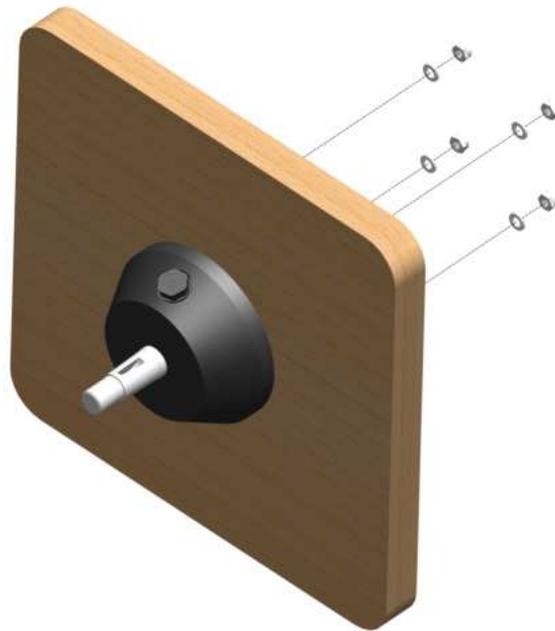
STEP 7 : Tighten the 4 Nyloc Nuts (7) & the 4 Washers (6) through the Flange Studs (5) of the Helm to the dashboard with the help of a 10mm Wrench with the torque of a 10 Nm (7.4 lb ft).



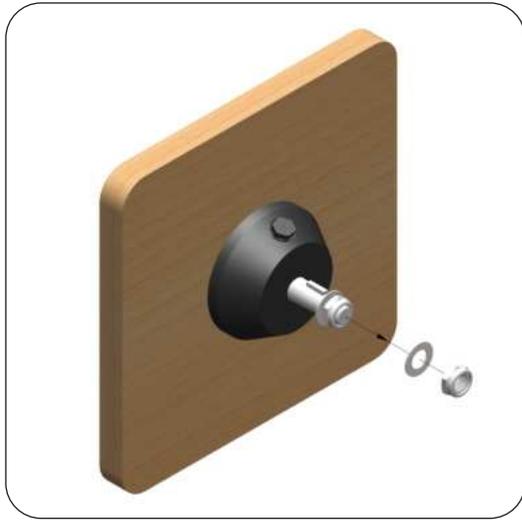
⚠ CAUTION :

If the Nyloc Nuts (7) are removed, they must be replaced immediately.

Is it important to install the Helm with the Vented Plug (9) positioned upwards (see picture) to allow complete filling and purging of the system (see section 3.7 "OIL FILLING AND PURGING PROCEDURE").



3.4 MOUNTING THE STEERING WHEEL



STEP 1: Remove the Nylock Nut (3) & Washer (2) from the Helm Shaft.



STEP 2: Apply grease lightly on the Tapered Shaft of the Helm. Slide the Steering Wheel supplied separately on the Helm Shaft.



STEP 3 : Fit the Steering Wheel on the Shaft by inserting the Specific Key (1) in its compartment. Insert the Washer (2) and use a 20mm hexagonal Wrench to tighten the Self-Locking Nut (3) with a 40 Nm (29.5 lb ft) torque.



STEP 4: Fix the Wheel cap in the Center of the Wheel where cap slot is provided.

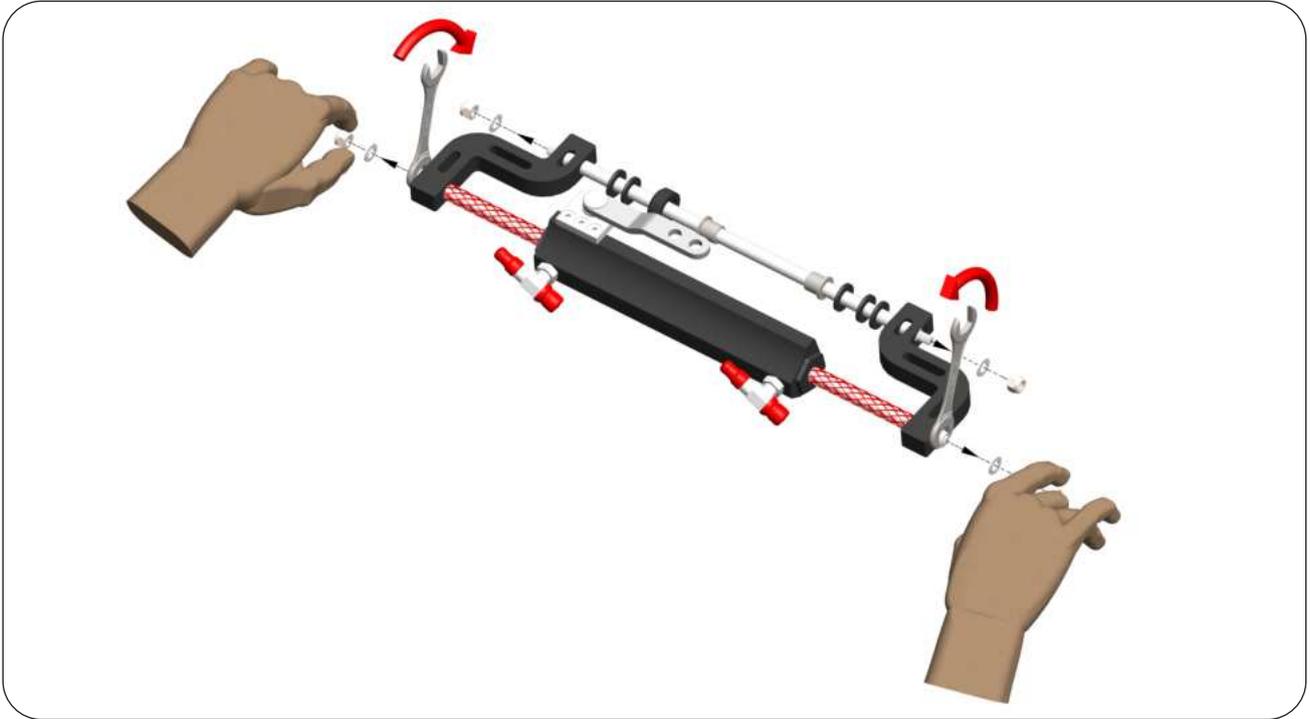
CAUTION :

Tighten the Steering Wheel Shaft Nut (3) before filling and purging the Steering System. Tighten Nut to 17 Nm (150 in.lb.). Do not exceed 22 Nm (200 in.lb.). If the Self-Locking Nut is removed, it must be replaced with new Self-Locking Nut and not used one.

3.5 INSTALLING FRONT MOUNT CYLINDER (OC-115)

SKILLED LABOR REQUIRED :

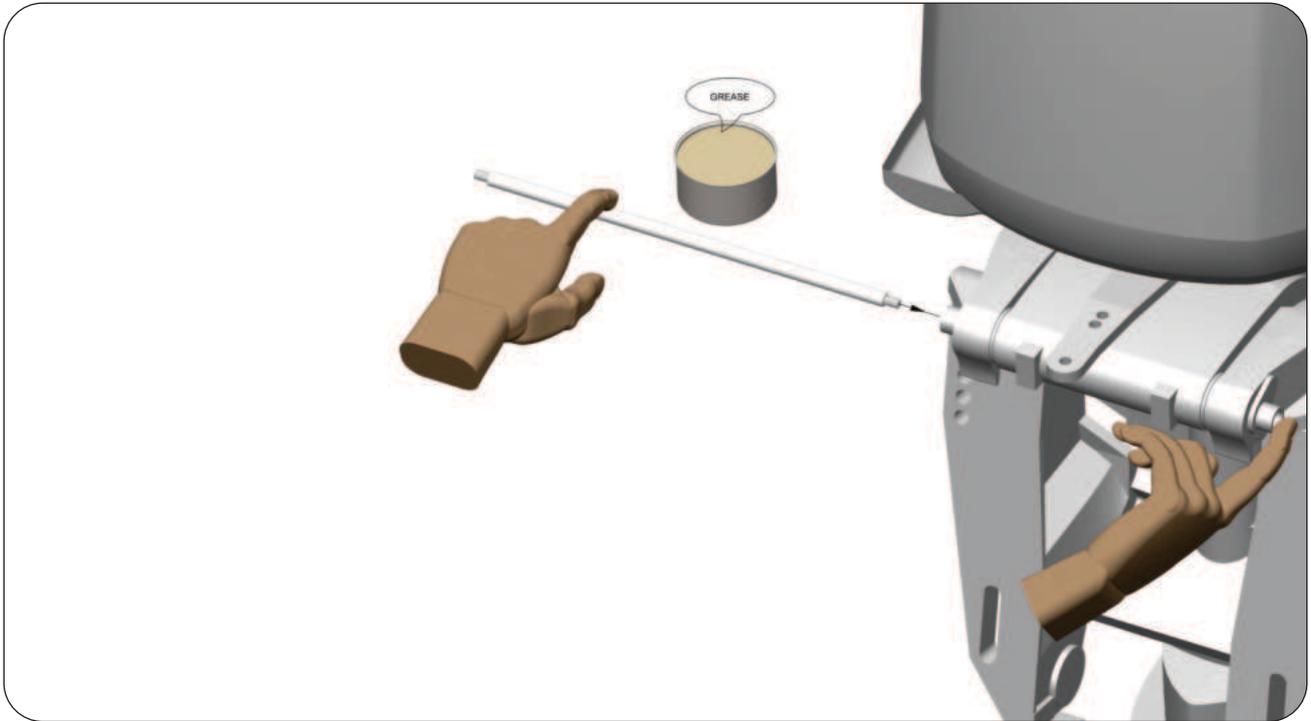
STEP 1: Remove the Nyloc Nut (9) and Washers (11) from the Center Shaft / Support Rod (4) and Piston Rod (1).



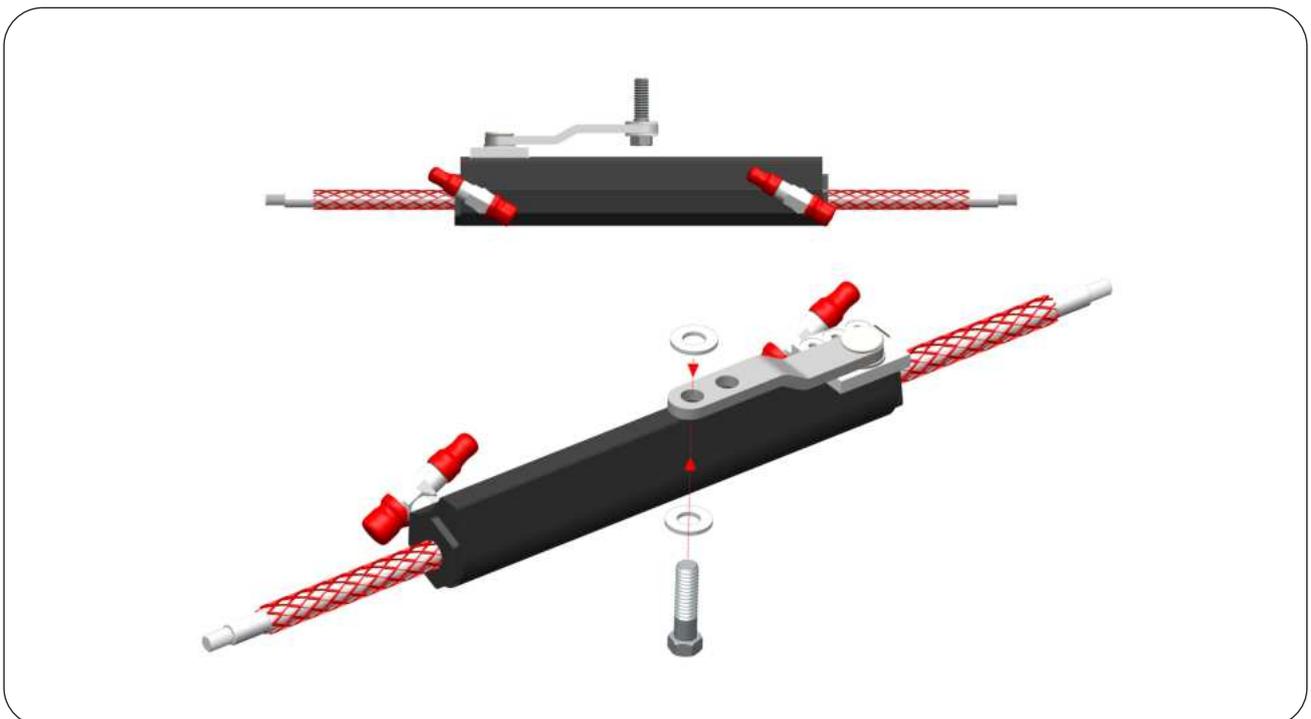
STEP 2 : Disassemble the Cylinder by removing Support Brackets (3), Bush (7), Spacers / Washer (5) & Mounting Spacer (6).



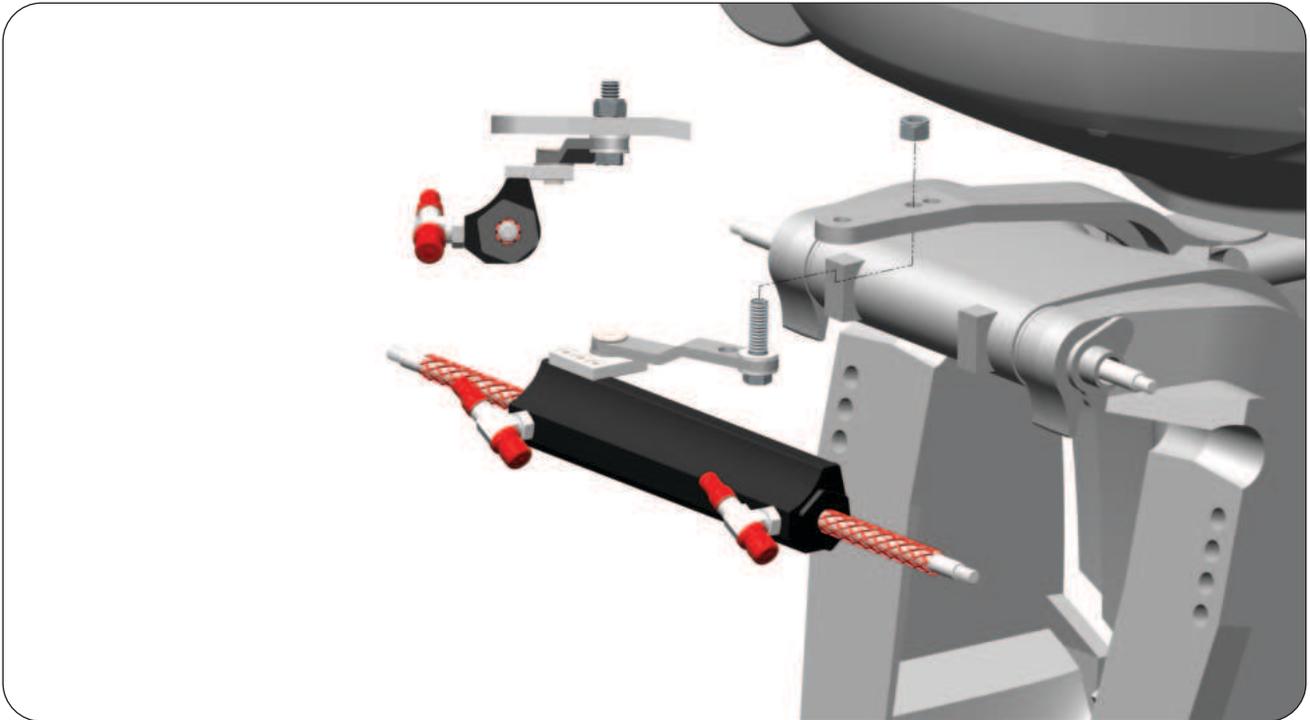
STEP 3: Apply Marine Grade Grease on the Center Shaft (4) and insert the Center Shaft into the Tilt Tube of Engine.



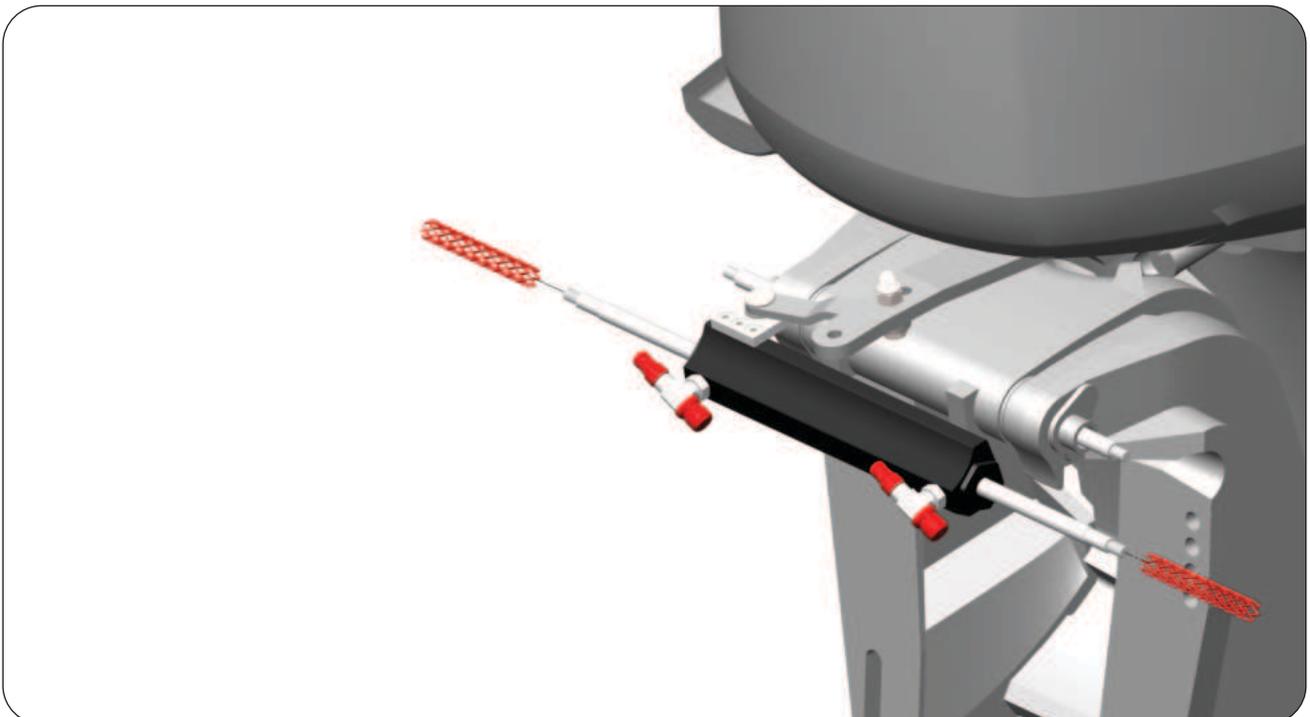
STEP 4: Assemble the Tiller Hex Stud Assembly (8) into the Tiller Plate (2) of Cylinder as shown.



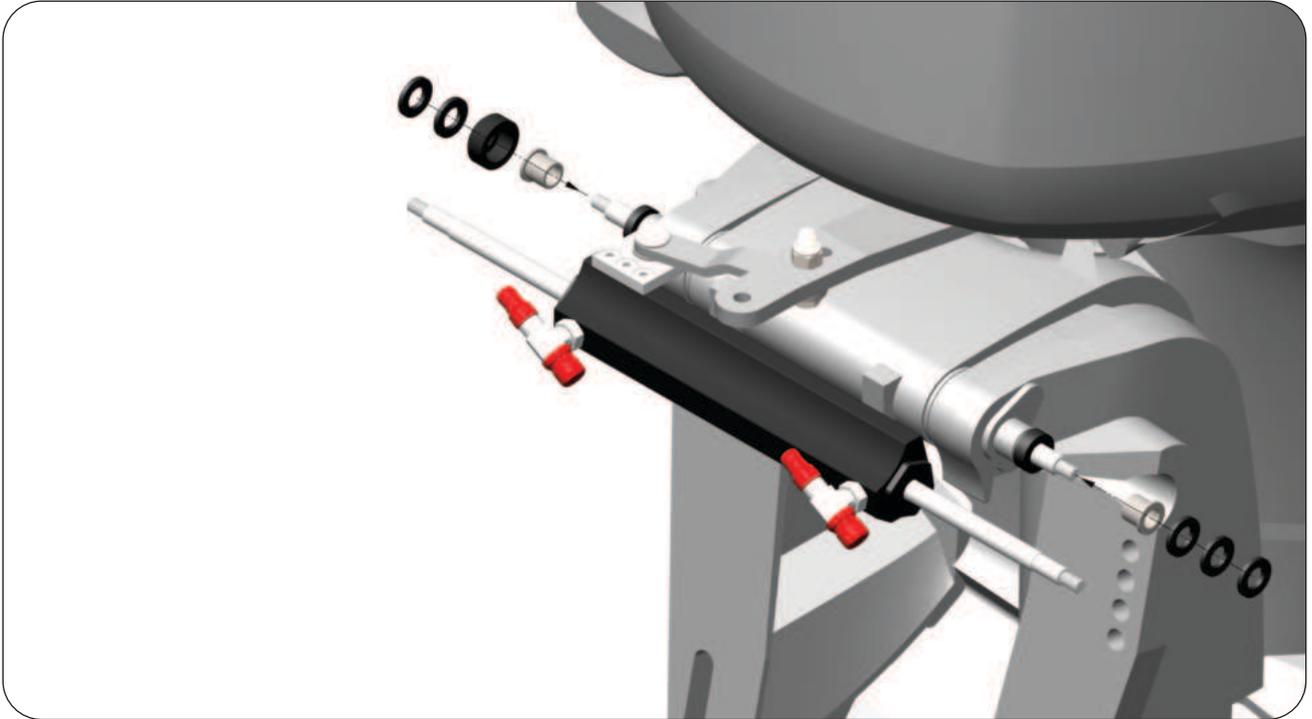
STEP 5: Position the Engine straight so that its Engine Arm is perpendicular to the Transom. Connect the Tiller Arm (2) of Cylinder to the Engine Arm by means of the Hex Stud (8). Tighten it by using a 14mm Wrench with a torque of 20 Nm (14.75 lb ft). Tighten the Nyloc Nut of Hex Stud by using a 14mm Wrench with a torque of 20 Nm (14.75 lb ft). After tightening the Nyloc Nut, check for the right torque 20 Nm (14.75 lb ft) of the Hex Stud (8).



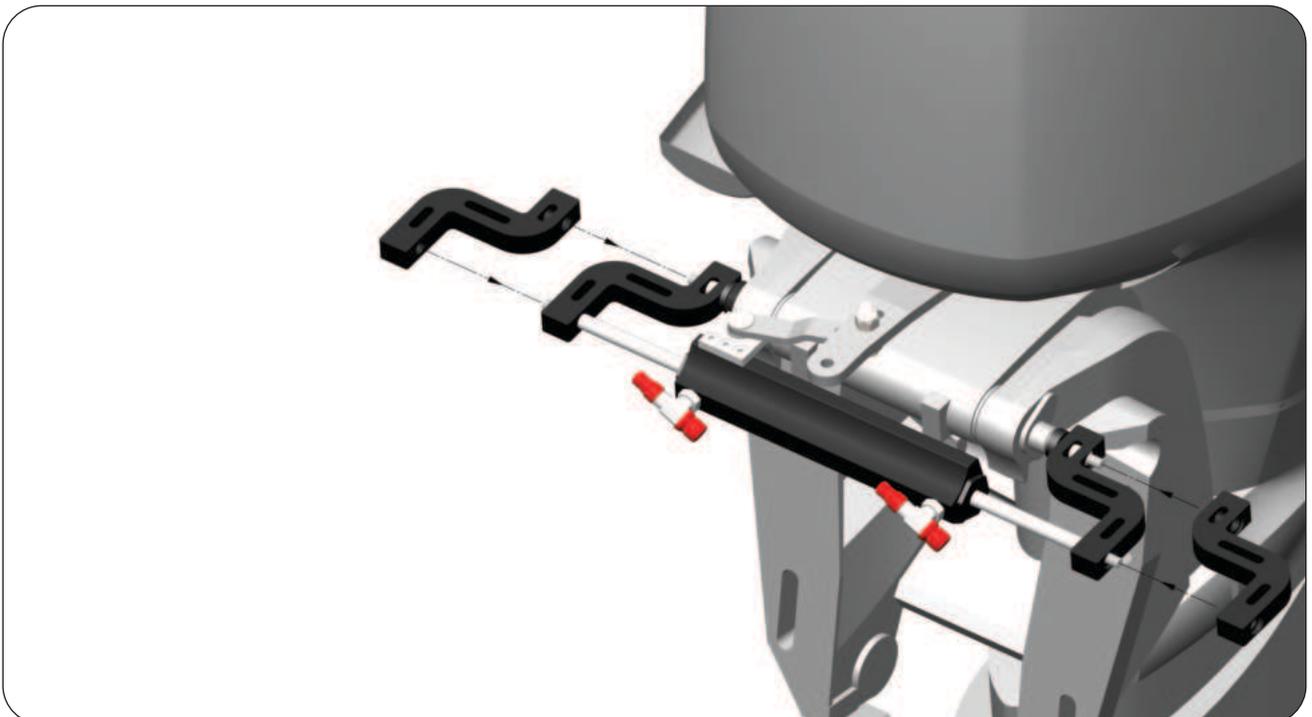
STEP 6: Remove the Piston Rod Protector before assembling the Support Bracket (3).



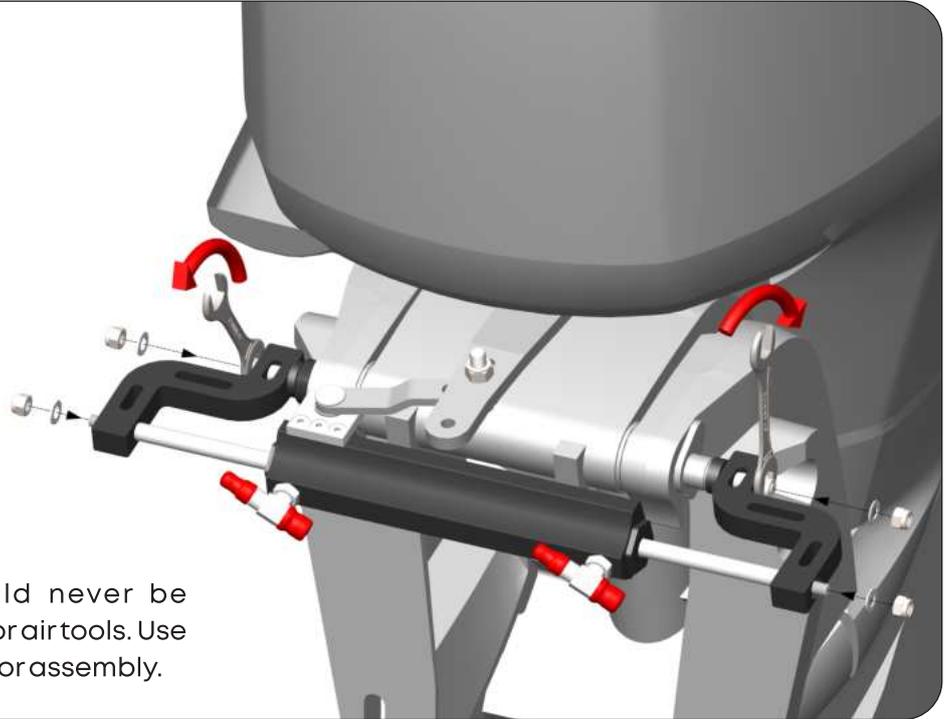
STEP 7: Insert the Bush (7), Mounting Spacer (6) and then Spacers / Washer (5) as shown. Choose the correct number of Washers for the Tilt Tube Rod. In this phase ensure that the cylinder body is centered on the Piston Rod (1) and that the Engine is perpendicular to the Transom.



STEP 8: Insert the right and left Support Brackets (3) by connecting both the Piston (1) & Support Rods (4) as shown in the picture.



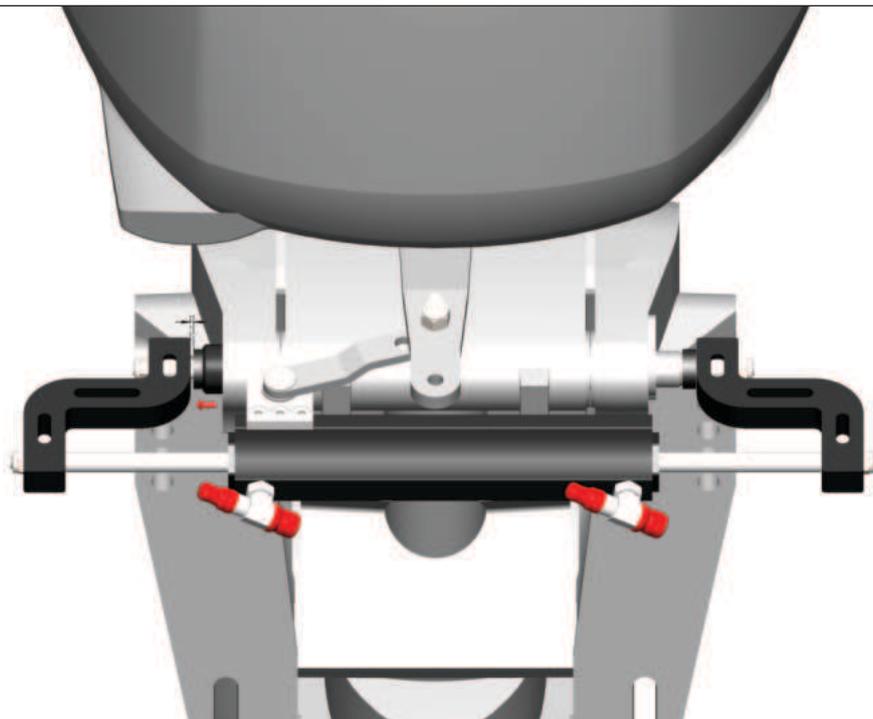
STEP 9 : Grease the Nyloc Nut threads with any Anti-Seize Grease. Insert the Washers (11) and Nyloc Nut (9) on the two ends of the Support Rod (4) and Piston Rod (1). Tighten them by using a 13 mm Wrench with a torque of 70 Nm (52lb ft).



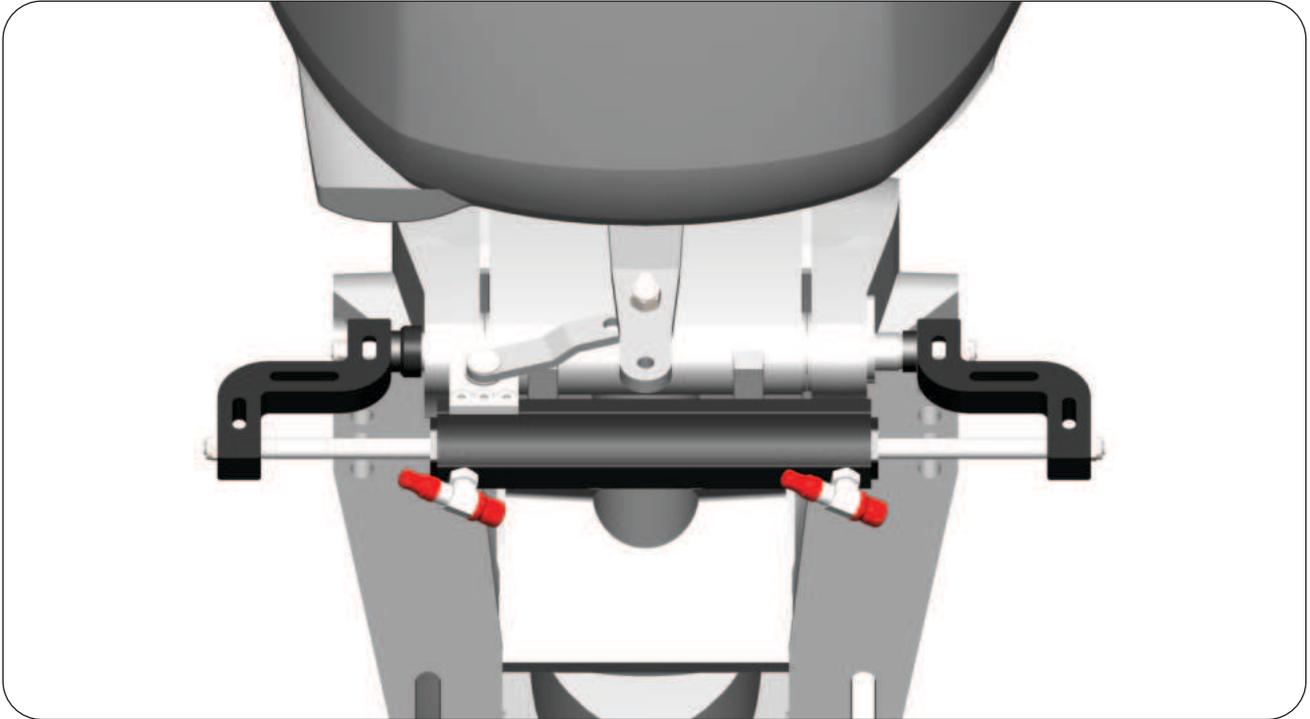
⚠ CAUTION :

The Nyloc Nuts should never be assembled with impact or air tools. Use only manual hand tools for assembly.

STEP 10 : Adjust the space on the Tilt Tube with the help of tightening the Mounting Spacers (6) until the clearance is eliminated.



STEP 11: Verify if the Cylinder installation is correct by manually moving the engine on the Starboard & Port Side. The displacement must be as symmetric as much as possible between Port and Starboard so that the Steering angle is the same on both sides.



3.6 HOSE CONNECTION (CT-5.0)

SKILLED LABOR REQUIRED :

Hydraulic Hose Kits and the way they are installed are very critical to the safe operation of The Steering System. Multisteer Recommends the use of Multisteer Hose Kits or exact equivalent ONLY. Use of any other Hoses may drastically reduce or affect the performance of the Steering System and Safety.

WARNING :

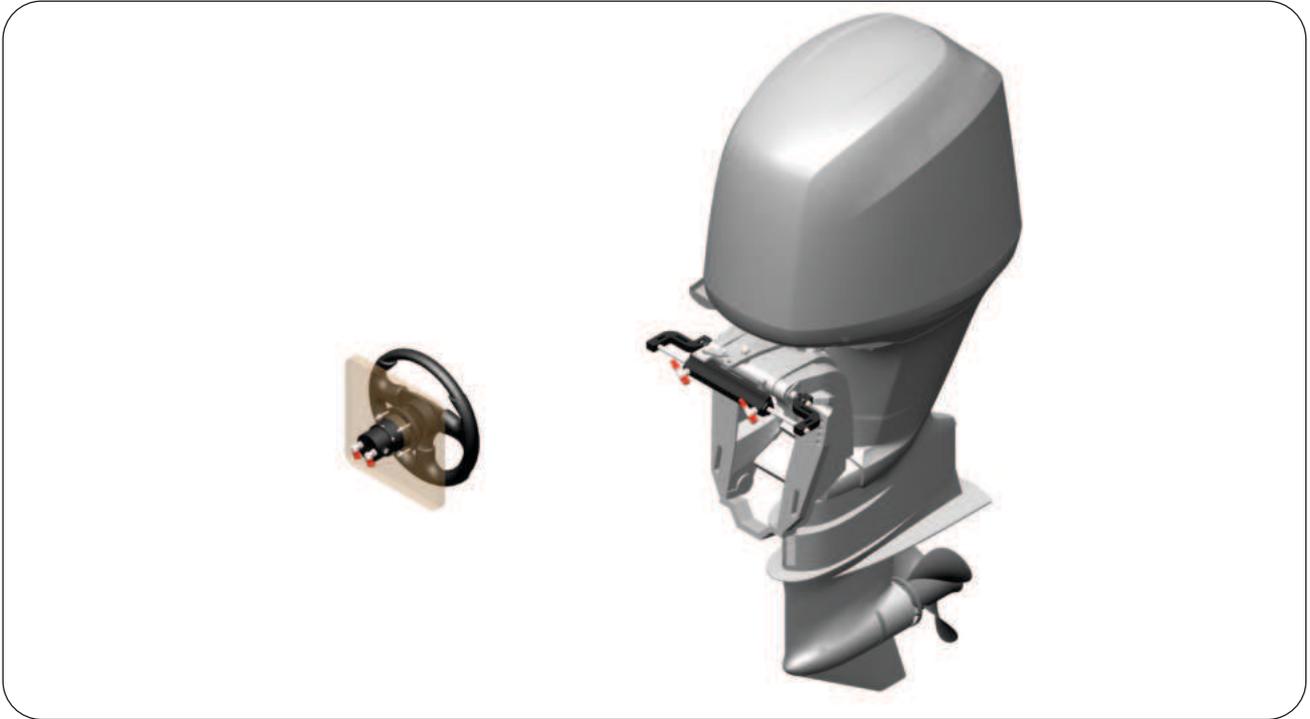
DO NOT cut the Multiflex Hoses. Cutting the Hoses will make it useless.

POINTS TO READ BEFORE CONNECTING HOSES:

1. DO NOT use any pipe / plumbing sealant on the Hose or fitting.
2. DO NOT remove protective covers at the end fittings until the Hoses have been properly routed and are ready to be connected to the Helm pump or Hydraulic Cylinder.
3. Before, during and after the connection of Hoses, they MUST be protected from chaffing, rubbing and contact or interference with assembly screws or sharp edges of any type.
4. DO NOT install Hoses in the area where they are exposed to high heat or highly corrosive areas.
5. Minimum Bend Radius for Hoses is 100 mm (4 Inches). DO NOT bend the Hoses more than 100 mm (4 Inches) of radius.
6. Ensure sufficient Hose lengths to allow Cylinder movement throughout the turning arc and UP / DOWN trim / tilt settings of engine / engines.

HOSE CONNECTION

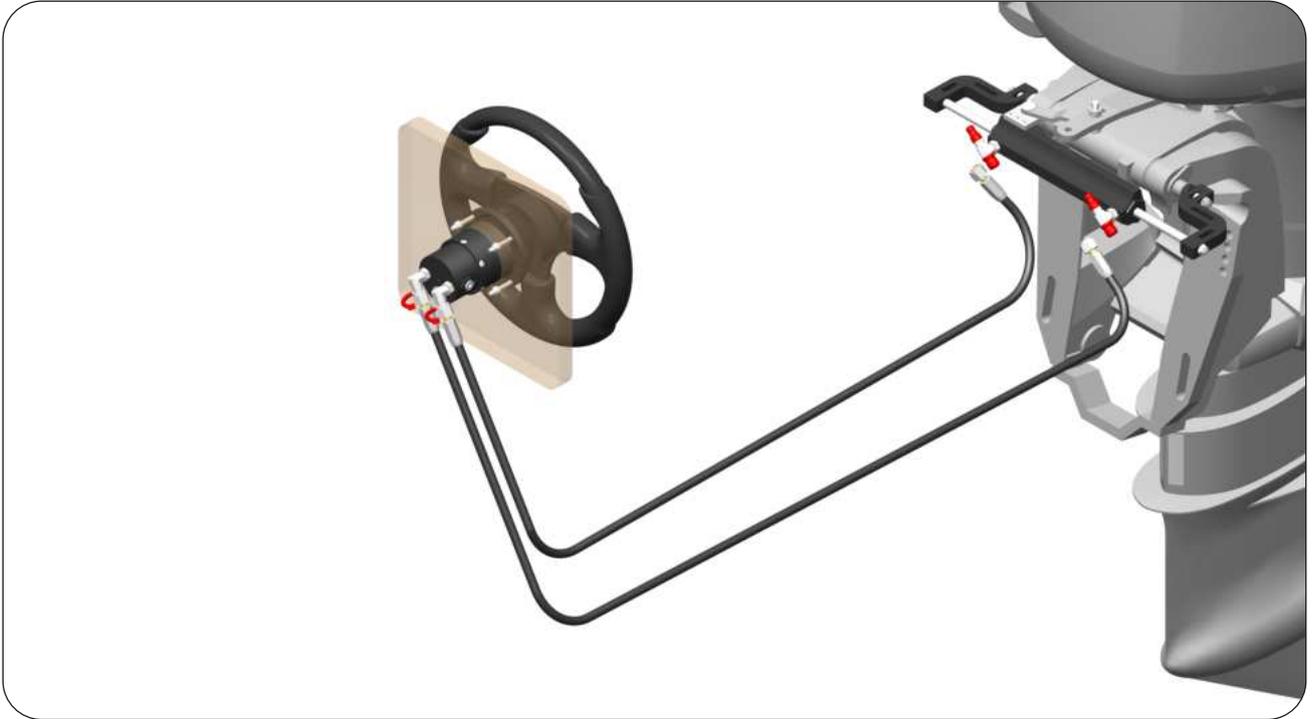
STEP 1: While installing Hoses, ensure that the Cylinder is in the center of the engine.



STEP 2: Remove the thread Protector Caps from both the Elbows of Helm.



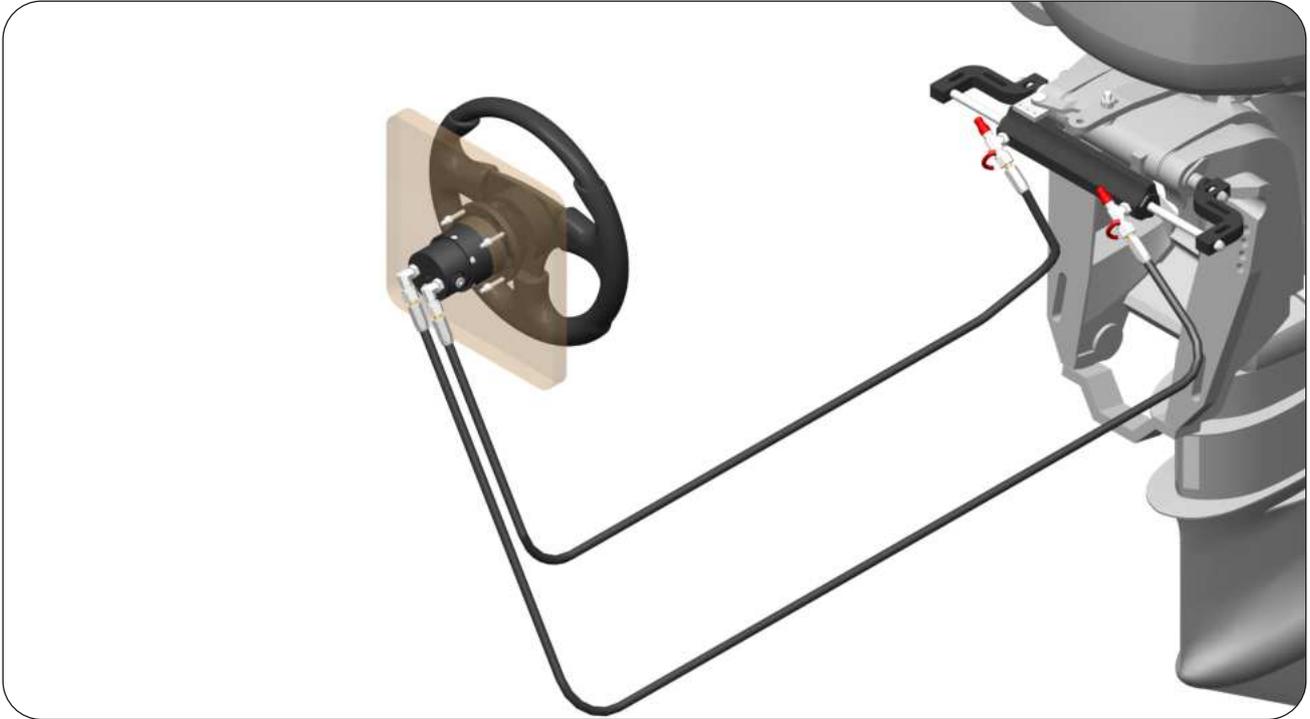
STEP 3: Insert the Hose Fittings into both the Elbows of Helm. Tighten the Hex Nut on the Hose Fitting by using 19 mm Wrench with a torque of 15 Nm (52 lb ft).



STEP 4: Remove the thread protector caps from both the T-Fitting of Cylinder.



STEP 5 : Insert the Hose Fitting from Starboard Side of Helm into the Port Side Hose Fitting of Cylinder & vice versa. Tighten the Hex Nut on the Hose Fitting by using 19 mm Wrench with a torque of 15 Nm (52 lb ft).



STEP 6 : Ensure that all the Hose Fittings should be tighten properly. Hoses should not be bent in excess. Minimum Hose bent radius is 100 mm (4 Inch). Ensure that there should be no interference during engine tilting as well as no interference with the transom.



3.7 OIL FILLING AND PURGING PROCEDURE

SKILLED LABOR REQUIRED :

STEP 7: For Oil Filling and Purging, it is necessary to use the Oil Filling Kit.



STEP 8: Replace the Oil Bottle fill cap with the Oil Filling Kit cap as shown in the picture.



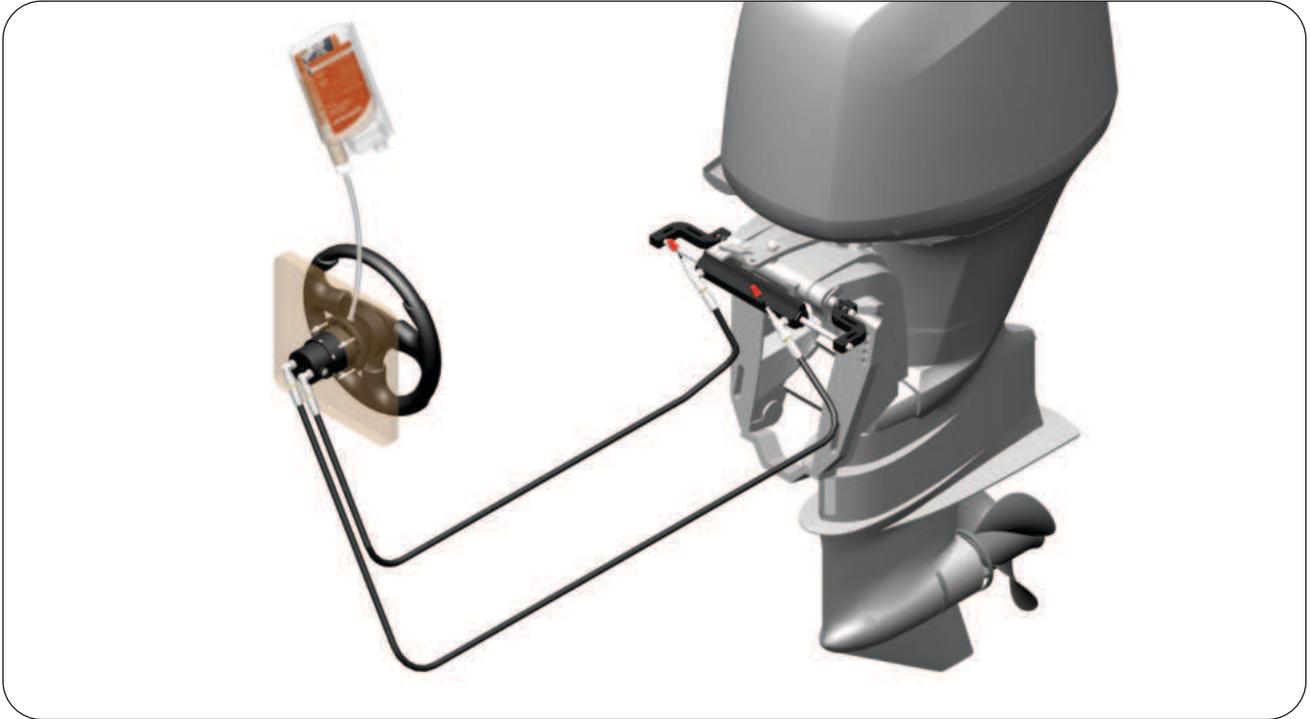
STEP 9: Remove the Oil Filling Plug of Helm.



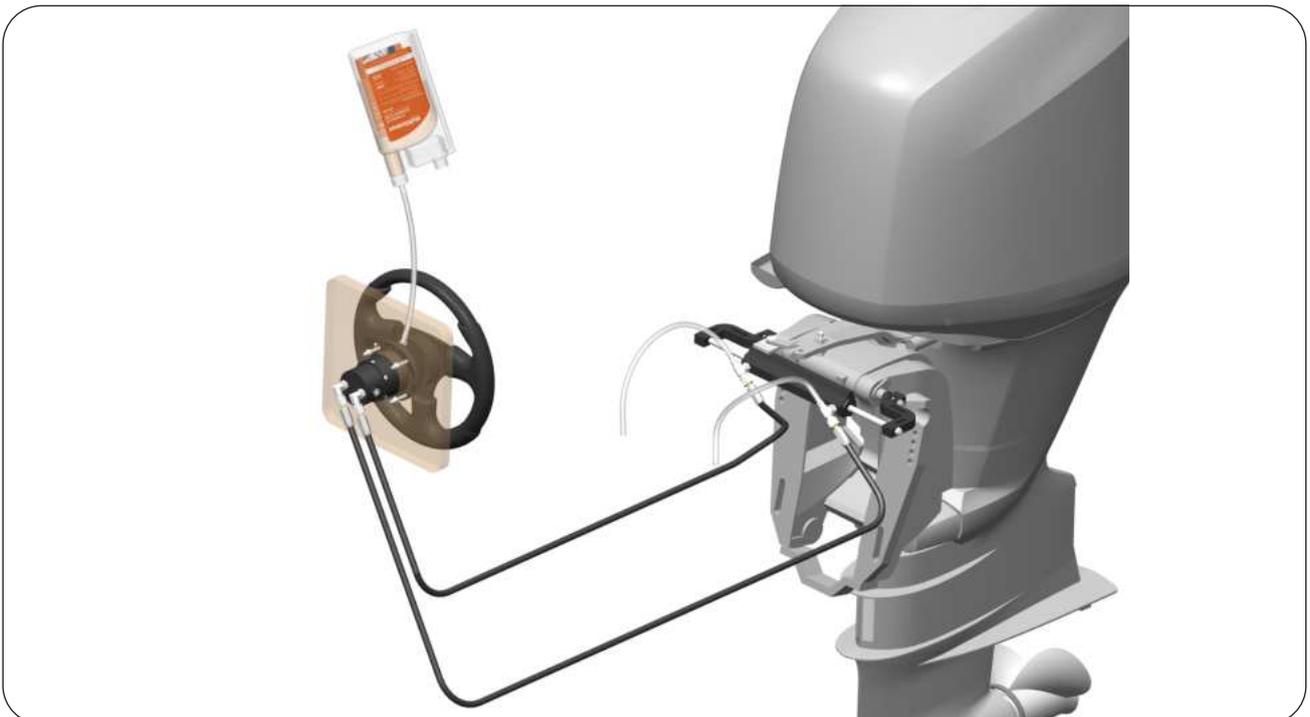
STEP 10 : Insert the threaded Port of pipe into the Oil Filling Port of Helm. Turn the bottle upside down and carefully remove the other side of cap to ease the Oil passage towards the Helm. Fill the Helm until no air bubbles are visible in the pipe.



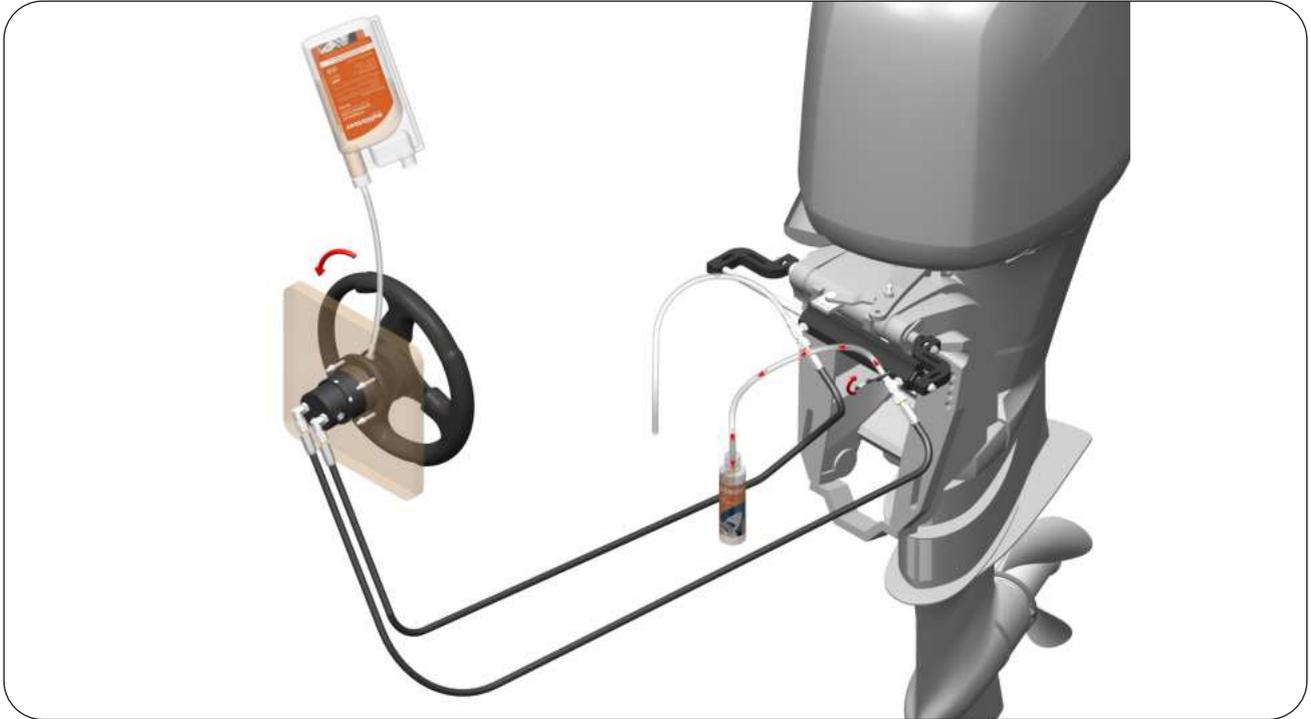
STEP 11: Remove the Protector Cap of both the air bleeders.



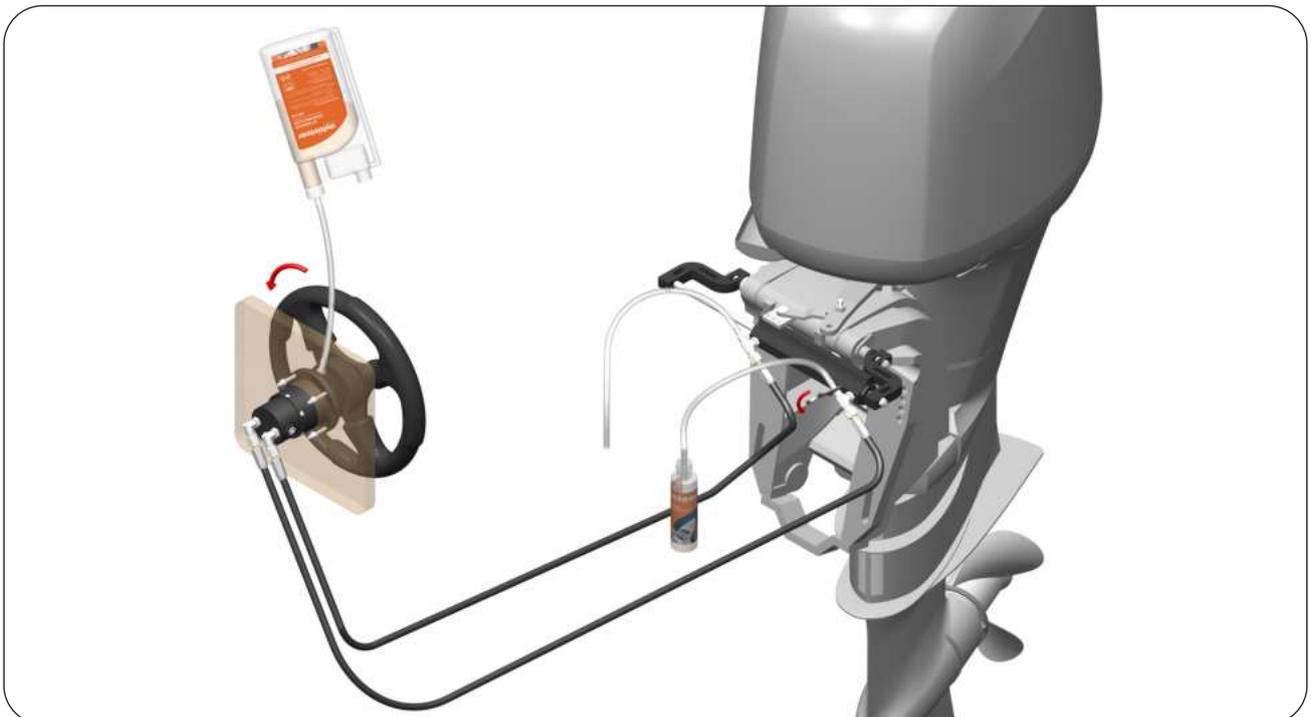
STEP 12: Insert the other pipe supplied with the Cylinder into the air bleeders for collecting the Oil, coming out from the air bleeders during purging process.



STEP 13 : Turn the Steering Wheel slowly towards Starboard Side, so that the Oil can come out of Hoses. Unscrew the Port Side air bleeder and allow the air & Oil (air bubbles) come out from air bleeder.



STEP 14 : Continue to turn the Steering Wheel towards Starboard Side. When the Oil comes out from air bleeder without air bubbles then carefully close the air bleeder. Do not overtighten the air bleeder. Continue to turn the Steering Wheel in the same direction to fill the Cylinder chamber. During this phase, the Cylinder body will move to the opposite direction up to the end stroke.



STEP 15 : Similarly turn the Steering Wheel slowly towards Port Side, so that the Oil can come out of Hoses. Unscrew the Starboard Side air bleeder and allow the air & Oil (air bubbles) come out from air bleeder.



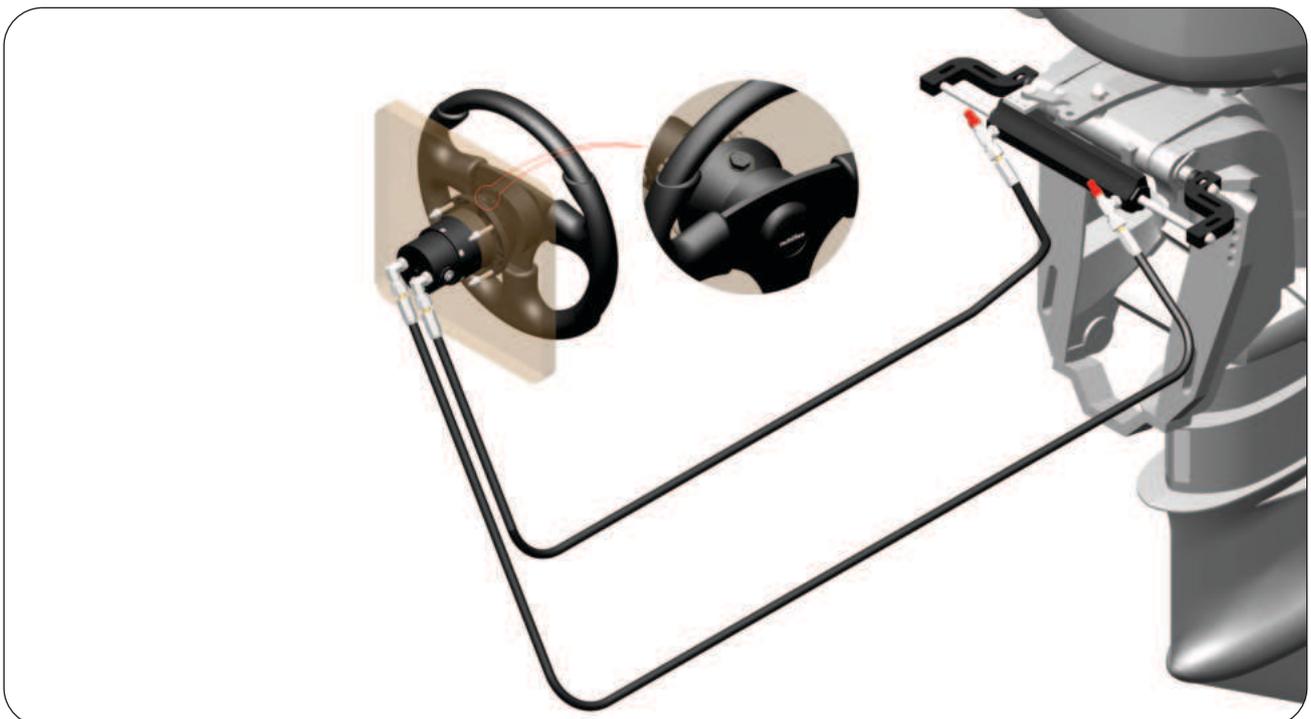
STEP 16 : Continue to turn the Steering Wheel towards Port Side. When the Oil comes out from air bleeder without air bubbles then carefully close the air bleeder. Do not overtighten the air bleeder. Continue to turn the Steering Wheel in the same direction to fill the Cylinder chamber. During this phase the Cylinder body will move to the opposite direction up to the end stroke.



STEP 17 : After completion of purging process, remove the Oil Bottle, Oil Filling Kit & Oil Collection Kit. Insert the Oil Filling Plug and Protective Caps.



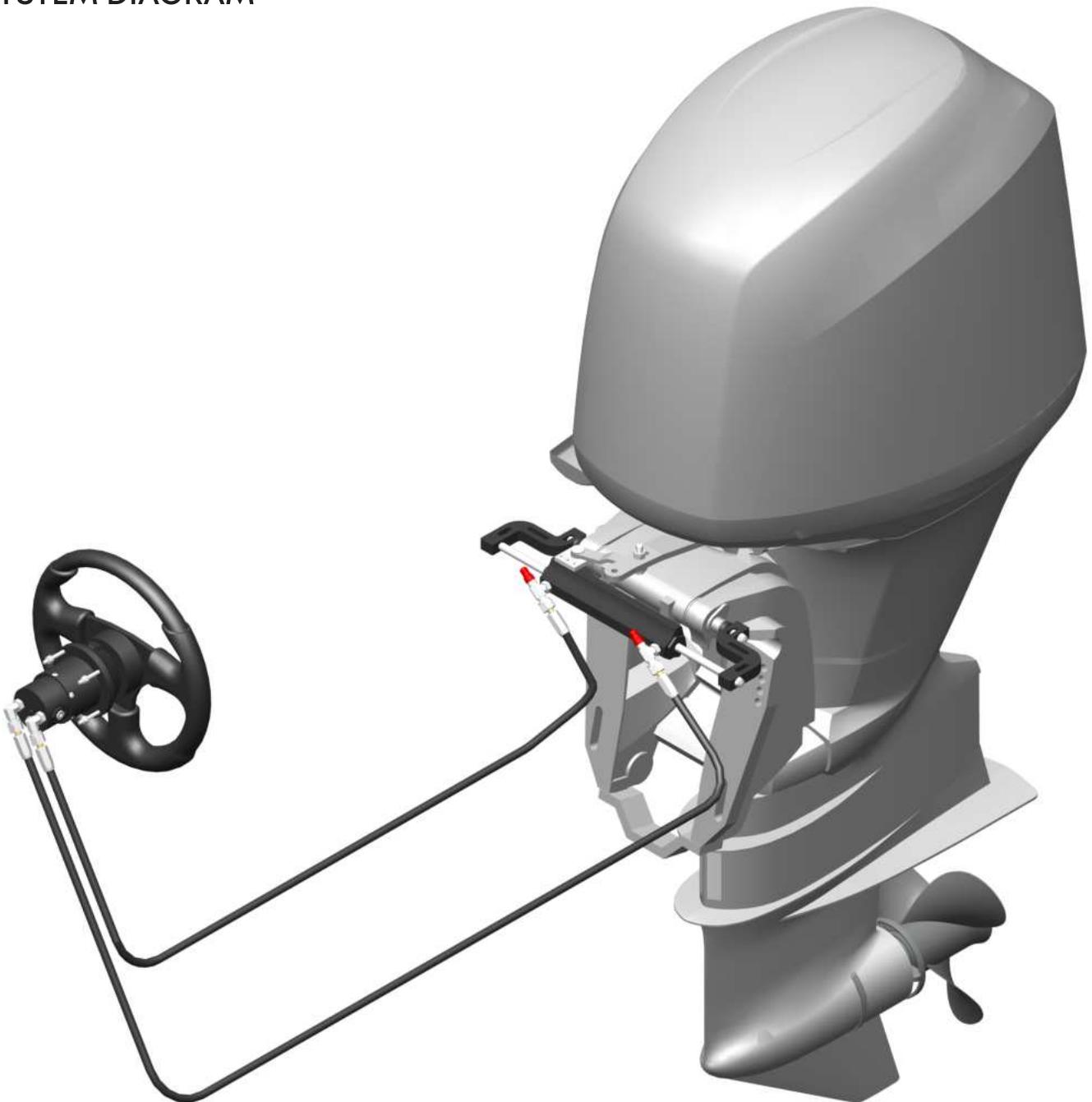
STEP 18 : After tightening the Oil Filling Plug, some amount of Oil will come out around the plug for some period of time when the Wheel is turned lock to lock. This Oil seepage will be over when the system is stabilized and no air is trapped inside the system.



3.8 TESTING STEERING SYSTEM FOR AIR :

- ▲ Place the Engine in the Center Position (mid-stroke position).
- ▲ Manually push Engine back and forth. While pushing the Engine, observe the displacement of Cylinder.
- ▲ If the Cylinder moves more than 2-3 mm (0.07-0.11 inch), this indicates that there is still air remaining in the system & further purging is required.
- ▲ Continue the purging procedure till the displacement of Cylinder is less than 2-3 mm (0.07-0.11 inch).

SYSTEM DIAGRAM



SECTION 4 – TROUBLESHOOTING

4.1 FAULTS, CAUSE & SOLUTION

Below are most common faults and their solutions

FAULT	CAUSE	SOLUTION
1. During filling, the Helm becomes Completely jammed.	a) Blockage in Steering System	Remove all Steering line. Blow air through lines. If air is obstructed through the line, then the Steering line 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 overtightened 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.

4.2 DISASSEMBLING

For any reason, if the system has to be removed, it is very important to dispose the waste properly considering the environment.

It is requested to return this product to a nearby registered dismantler or recycler while disposing this product.

⚠ CAUTION :

The Steering System CONTAINS POLLUTANT FLUIDS that must be disposed of according to local government regulations.

4.3 DISMANTLING STEERING WHEEL

SW-PL

Use a specific dismantling tool to remove the Steering Wheel from the Helm Shaft.

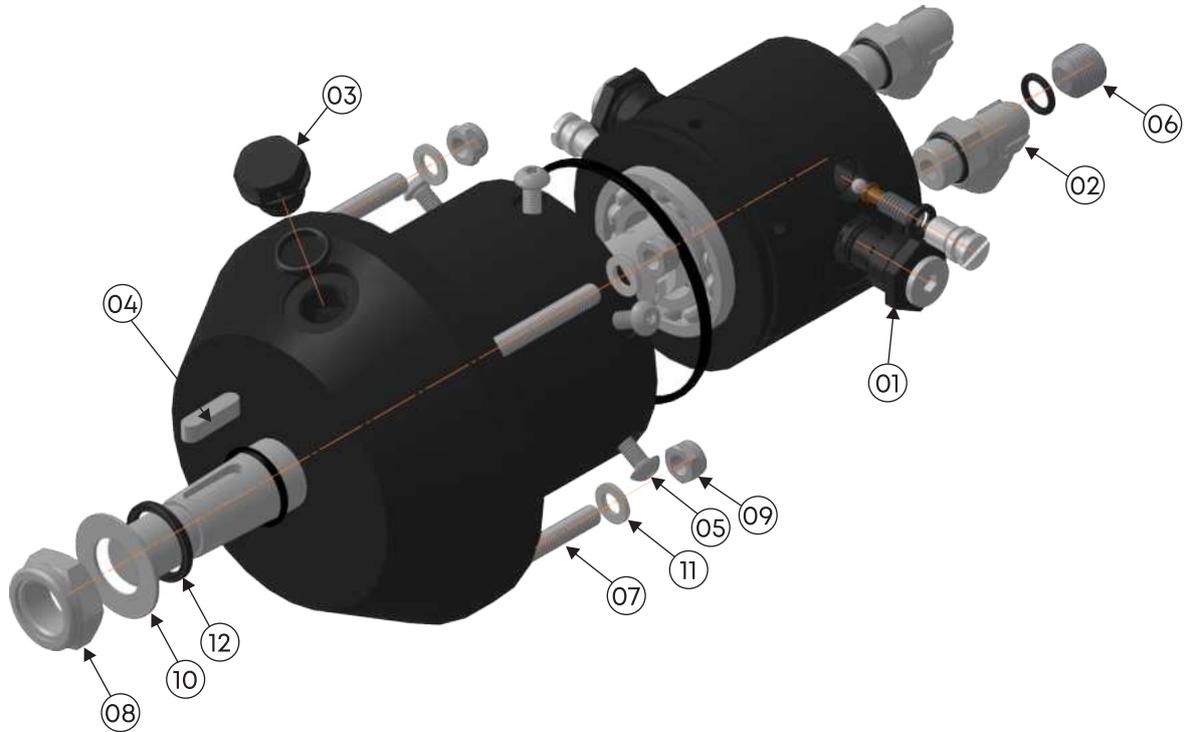


⚠ CAUTION :

Never use a hammer or other hammering tools that could cause irreparable damage to the pump or pump components.

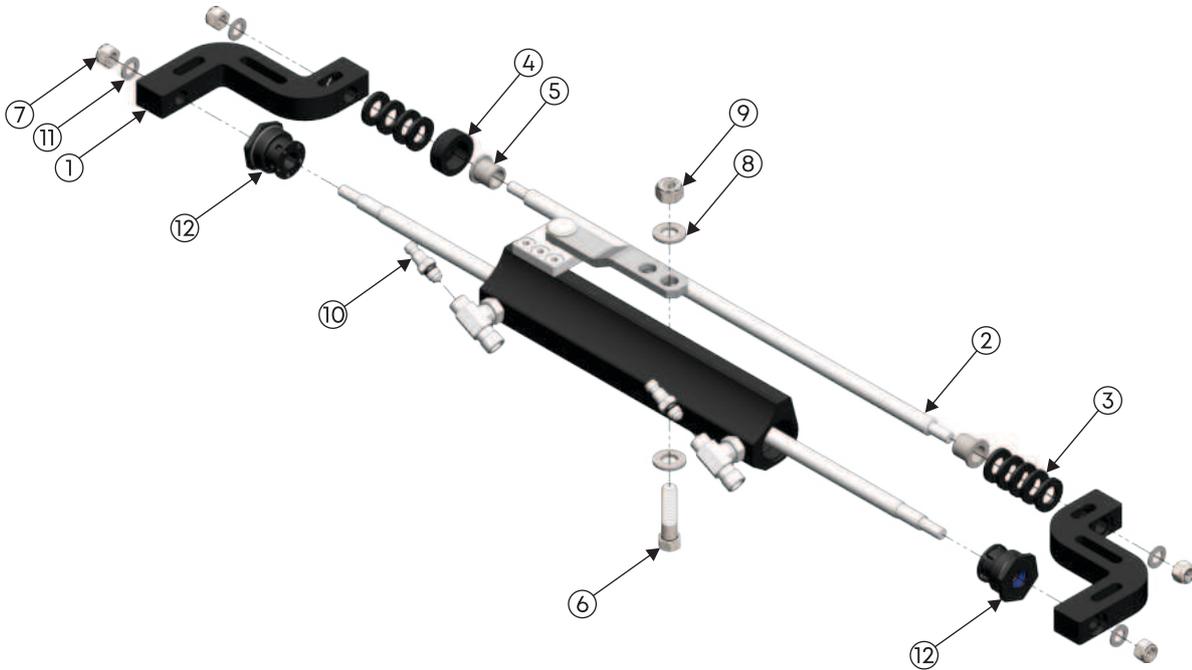
SECTION 5 – REPLACEABLE ITEMS AND SEALS

5.1 HELM HP-16



Item No.	Part No.	Description	Qty.
1	HP-EC1	End Cap Assembly	2
2	EB1	Elbow Assembly	2
3	VPI	Oil Fill Plug with Breather Hole / Vented Plug	1
4	HP-WK4	Flat Key	1
5	HP-CS1	Socket Button Head Cap Screw	6
6	HP-GS1	Socket Set Screw (Grub Screw / Dummy Plug)	1
7	HP-FS1	Flange Stud	4
8	HP-HN1	Nyloc Nut For Helm Shaft	1
9	HP-FN1	Nyloc Nut For Flange Stud	4
10	HP-HW1	Helm Shaft Washer	1
11	HP-SW1	Flange Stud Washer	4
12	SK-HP-16	Seal Kit	1

5.2 FRONT MOUNT CYLINDER OC-115



Item No.	Part No.	Description	Qty.
1	OC-SB2	Support Bracket	2
2	OC-SR1	Center Shaft	1
3	OC-SP1	Spacer / Washer For OC-115	9
4	OC-SK4	Mounting Spacer	1
5	OC-SB1	Support Rod Bush	2
6	OC-SD2	Engine Connector Hex Stud	1
7	PR-NT1	Nyloc Nut for Piston Rod	4
8	SD-WS1	Hex Stud Washer	2
9	SD-NT1	Nyloc Nut for Hex Stud	1
10	AB2	Air Bleed Plug	2
11	PR-WS1	Piston Rod Washer	4
12	SK-115	Seal Kit	1