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BY MULTIFLEX

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

User Manual, Installation And Maintenance Guide

QUALITY SYSTEM CERTIFICATION
DNV·GL
IATF 16949

MEMBER
ABYC®
Setting Standards for Safer Boating

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Dear Customer

It gives us immense pleasure to welcome you to the **multisteer** family.

We appreciate your decision to use **multisteer** products. With over two decades of experience, **multisteer** is one of the leading manufacturers of Steering and Control Products for the boating industry.

multisteer products can be sourced in 80 countries through a wide distribution network.

Our range of products includes -

- Hydraulic Steering System
- Mechanical Steering System
- Engine Control Cables & Levers
- PWC Cables
- Steering Wheels
- Boat Trailer Rollers
- Mooring Compensators

multisteer Steering Products are tested and conform to:

Recreational Craft and Personal Watercraft Directive 2013/53/EU.

Extensive research, innovation and technology allows us not only to ensure reliability and quality of products but also helps us to increase our product offerings to our customers, including customization of products and services.

Our true endeavor is to present you with the best quality products and excellent services, thus building a strong foundation to our relationship with you.

Warm regards,

Team Multisteer

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A. ABOUT THE MANUAL

- The User Manual contains all the essential information for the users regarding the purchased Multisteer product. This document is to be given along with the product.
- ALL RIGHTS ARE RESERVED. Distributing Rights, Part Numbers, Pictures, Text or any content of Multisteer products incorporated in this User Manual property of Multisteer.
- Use this product only for its intended use as described in this User Manual.
- This User Manual itself is an important part of the purchased Multisteer product.
- The User Manual includes - Description of the Products, Safety Warnings and Step wise Procedures for Handling, Assembling, Installation, Maintenance, Disassembling and Replacement of the Products.
- The user must be aware of the content of this User Manual. No activities regarding the product (like its Assembling, Disassembling, Maintenance, Transport etc.) should be carried out without carefully reading this User Manual.
- Immense care has been taken in collecting and checking the information contained in this User Manual to make it as accurate and understandable as possible.

Nothing in this User Manual should be understood as a warranty or a guarantee for the products. Nothing contained in this Manual can be interpreted as an amendment or confirmation of the terms of any purchase contract.

Multisteer reserves all the rights to alter the User Manual format if another format is more suitable for the particular product.

Multisteer takes no responsibility for any possible mistakes due to printing errors in this Manual.

NOTE : It is very important to read this User Manual carefully before carrying out any activities involving the product, its handling and unloading.

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B. DOCUMENT REVISIONS

REV.	DATE	REVISION DESCRIPTION
1	July 2020	First Edition OH-115-IM1

C. SAFETY SYMBOLS

The following Symbols / Terms define the various HAZARD identifications in this User Manual to ensure User Safety and to assure correct Installation and Operation of the Product.

DANGER :

The “DANGER” symbol indicates an immediate hazardous situation which, if not avoided, will result in death or serious injury.

WARNING :

The “WARNING” symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION :

The “CAUTION” symbol indicates attention to unsafe practices which, if not avoided, could result in minor or moderate injury or component damage.

NOTICE :

The “NOTICE” symbol indicates important information for the correct installation and for maintenance that does not cause personal injury or component damage.

SKILLED LABOUR REQUIRED :

The adjacent symbol indicates that all the activities should be carried out by a skilled labour only.

D. SAFETY WARNINGS

It's very important to read this section carefully to avoid any personal harm or injury and also to prevent machinery damage.

Multisteer shall not be responsible for any damage because of the user's negligence.

NOTE : It is advised to read the other manuals as well which are provided with the Steering System Components.

DANGER

- DO NOT PUT YOUR HANDS BETWEEN MOVING PARTS.
- Do not disable the safety devices.
- Do not use this equipment for a purpose different from the one it has been designed for, which is specified in the Installation and Maintenance Manual.
- Do not let unskilled staff perform the Installation.

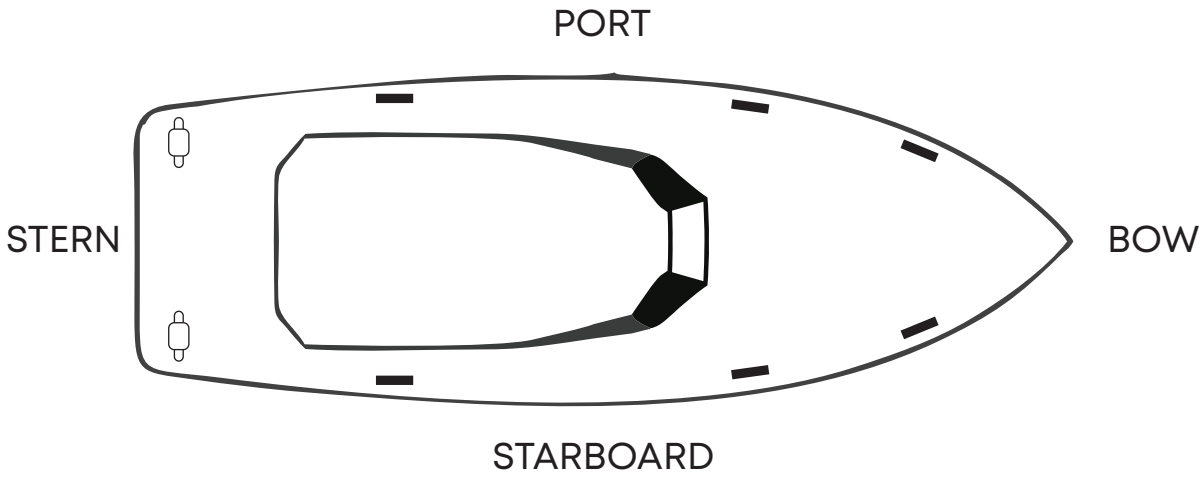
⚠ WARNING : DO NOT operate boat if any component is not in proper working condition.

SAFETY RULES :

DURING INSTALLATION :

- DO NOT modify or substitute any component without written approval from Multiflex.
- Conform with all system ratings / regulations.
- Hydraulic Cylinder must be compatible with the rated power of engine/engines
- Hydraulic Cylinder must be compatible with the engine/engines installed.
- 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 above step for Engines tilted up.
- Make sure that the Steering Cylinder can be fully extended /retracted in both directions and fully tilt and trim without stretching, rubbing the Hydraulic Hoses.
- Check fluid level in Helm Pump. Also check all fittings for leakage.
- Confirm that extruded nylon tubing has NOT been substituted for Multisteer Steering Hose.
- Never use a wire coil type trim switch with a Hydraulic Steering System . This may lead to winding up the wire tight around the Steering Wheel shaft which will avert further Steering.

E. NATUCIAL WORDS REFERENCE



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F. WARRANTY

Multisteer undertakes that the product is warranted against manufacturing defect for a period of one year from the date of purchase by the end user .

ALL Multisteer manufactured products have warranty against Manufacturing, Material and Workmanship defects. This warranty is not valid when the products are used for Commercial, Rental or Income making activity or installed and used on commercial boats.

Multisteer shall replace the defective product free of cost subject to product being returned to us or our dealer within the warranty period on Freight Pre-Paid basis. The customer should submit the documentary proof of defect in the system such as pictures, video and description describing & clearly showing the defect in the product or during operation of product along with the serial number of the product.

On receipt of the defective product, Multisteer will undertake to examine the cause of the defect and if found defective the product shall be repaired or replaced as per Multisteer's discretion.

Multisteer's decision in this regard shall be binding and final.

The warranty under the above shall only be limited to repair and replace the defective product as per opinion of Multisteer and shall not cover under any circumstances labor costs of removal, reinstallation and replacement of the product.

All obligations under this warranty shall be null and void in case the product has been:

- Improperly installed or installed other than as recommended.
- Improper application of products.
- Damaged due to non- recommended operation such as racing / misused / failed due to accident.
- Modified, altered or repaired by any entity other than MULTIFLEX.
- Has been used on a boat where the engine horsepower exceeds the rating specified by the boat manufacturer.
- Has been used with products of other Brands which may not be compatible to our products.

NOTICE :

In no event Multiflex will be liable for any incidental or consequential damages for breach of any express or implied warranty relating to the products. we shall not be responsible for any liability claims for direct or indirect damage.

WARNING :

Do not use Hydraulic Steering System OH-115 on vessels that exceed a maximum horsepower rating of outboard engines that use wing nut type transom mount clamping screws. Warranty will be void if combined with any other product (including Multiflex Steering Components). Steering failure may occur causing property damage and / or personal injury or death.

NOTE : Incase the damaged product cannot be returned, a documentary proof should be provided in forms of images and videos along with the serial number of the product.

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SECTION 1 - PRODUCT DESCRIPTION

1.1 FUNCTION OF A HYDRAULIC STEERING SYSTEM OH-115

The Multisteer Hydraulic System OH-115 conform to Recreational Craft and Personal Watercraft Directive 2013/53/EU in accordance with EN ISO 10592:1995 / A1:2000.

The Steering System is designed to operate in an ambient temperature ranging between -20°C (4°F) and +60°C (+140°F).

All the components of system are explicitly manufactured considering marine environment.

It offers great durability and safety even in extreme environments.

The Multisteer Hydraulic Steering System consists of :

1. **A Manual Axial Helm Pump :**

   This is an axial piston driven pump which draws and pushes the flow of Steering Fluid when the Wheel mounted on the Helm shaft is rotated. Its volume determines the number of turns required hard over to hard over to guide the engine. A lock valve prevents untimely engine movement when the Helm is not operated and a pressure relief valve protects the system against unusual pressure increase.

2. **A Front Mount Single Balanced Cylinder :**

   The Cylinder provides linear movement to the engine or rudder depending on application, Steering the boat to starboard or port.

3. **A Pair of Thermoplastic Hydraulic Hoses to connect Helm with Cylinder :**

   The Hose Tube is designed to transfer Steering Fluid from Helm pump to Cylinder and vice versa. Hoses are flexible so as to be routed through complex or small bending radii and are tested at higher pressure than maximum working pressure to prevent Oil leakage.

4. **A Bottle of High Viscosity Index Hydraulic Steering Fluid :**

   Hydraulic Steering Fluid is required, where the Helm pump while being turned pushes the fluid, such that it travels through the tubing and displaces the Cylinder.

For selecting the Helm pump, one must consider the volume of the Cylinder. The number of Steering Wheel turns from left to right (lock to lock) is determined by the ratio between the volume of the Cylinder to the volume of pump in one rotation.

For Example : Here, the pump has a flow rate of 16 cc [1.0 ci] and the Cylinder has a volume of 92.5 cc [5.6 ci], then the following formula applies: 92.5/16 = 5.8. Therefore, the Steering Wheel will rotate about 5.8 times before the Cylinder is completely shifted from left to right or vice versa. Steering Wheel turns less than 5 are not recommended since it requires heavy driving load. Also, it is not recommended to have more than 9 turns as it makes the system very slow in responding to the Steering Wheel. The maximum operating pressure is equal to 5.0 MPa (50 bars) (725 psi).

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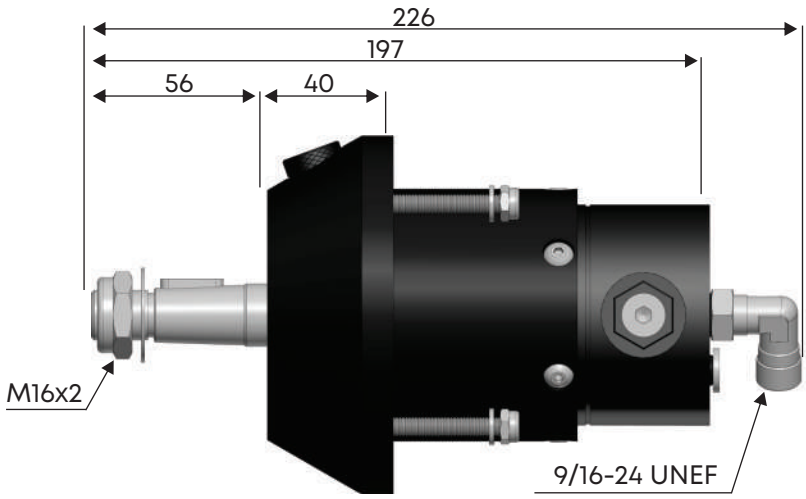
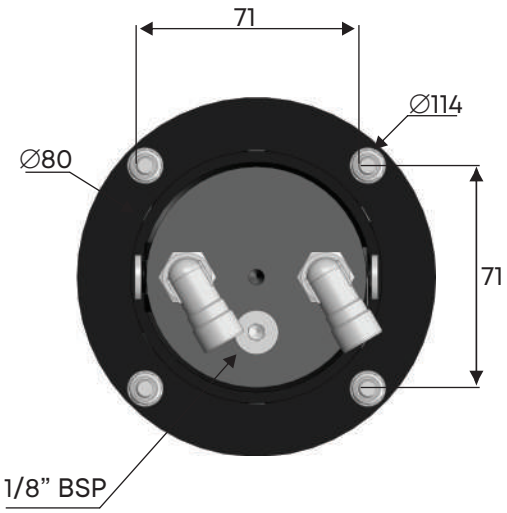
1.2 PRODUCT DIMENSIONS

HYDRAULIC HELM PUMP : HP-16





All Dimensions are in mm

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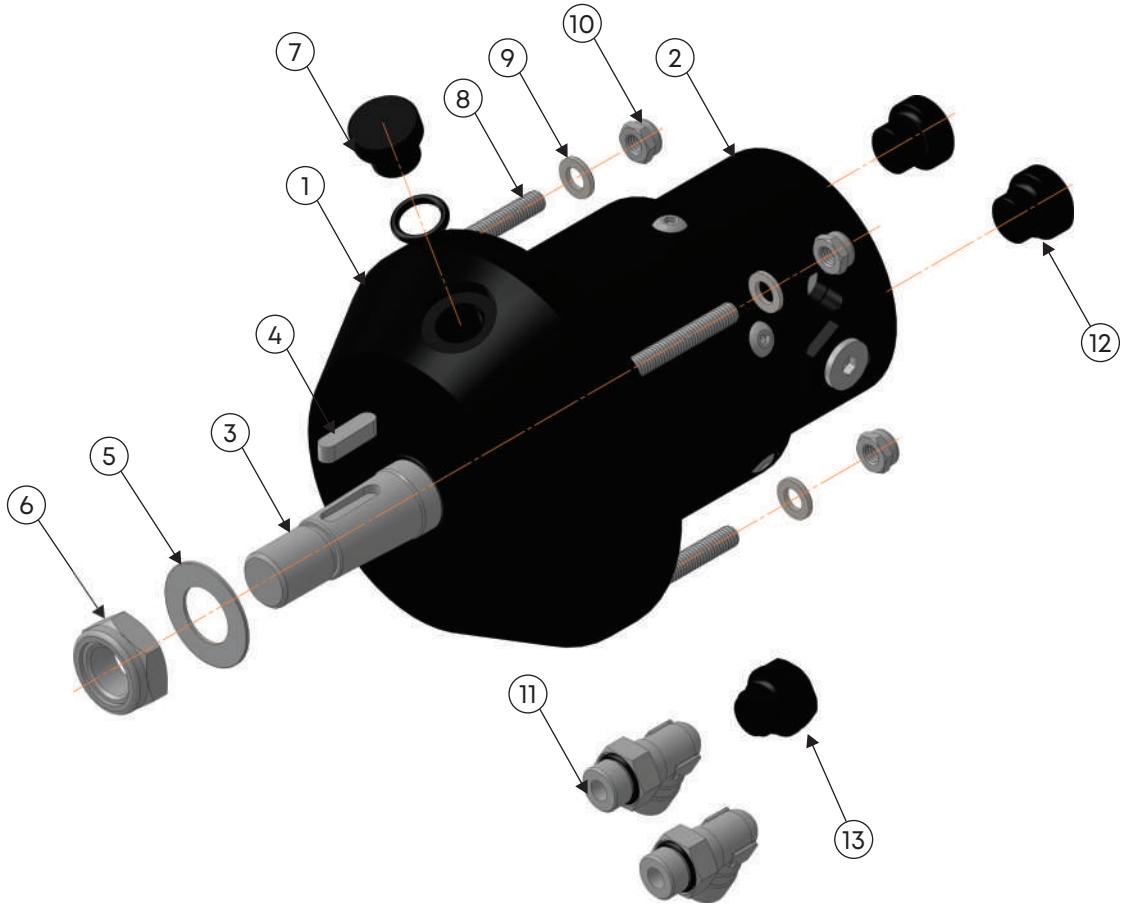
1.3 PRODUCT EXPLODED VIEW

HYDRAULIC HELM PUMP : HP-16



Item No.	Description	Qty.
1	Housing	01
2	Lock Valve Body	01
3	Shaft	01
4	Flat Key	01
5	Shaft Washer	01
6	Nyloc Nut	01
7	Dummy Plug- 1/4” Bsp	01
8	Stud - Flange	04
9	Stud Washer	04
10	Nyloc Nut	04
11	Elbow	02
12	Dummy Plug - 1/2” UNF	02
13	Oil Fill Plug with Breather Hole	01

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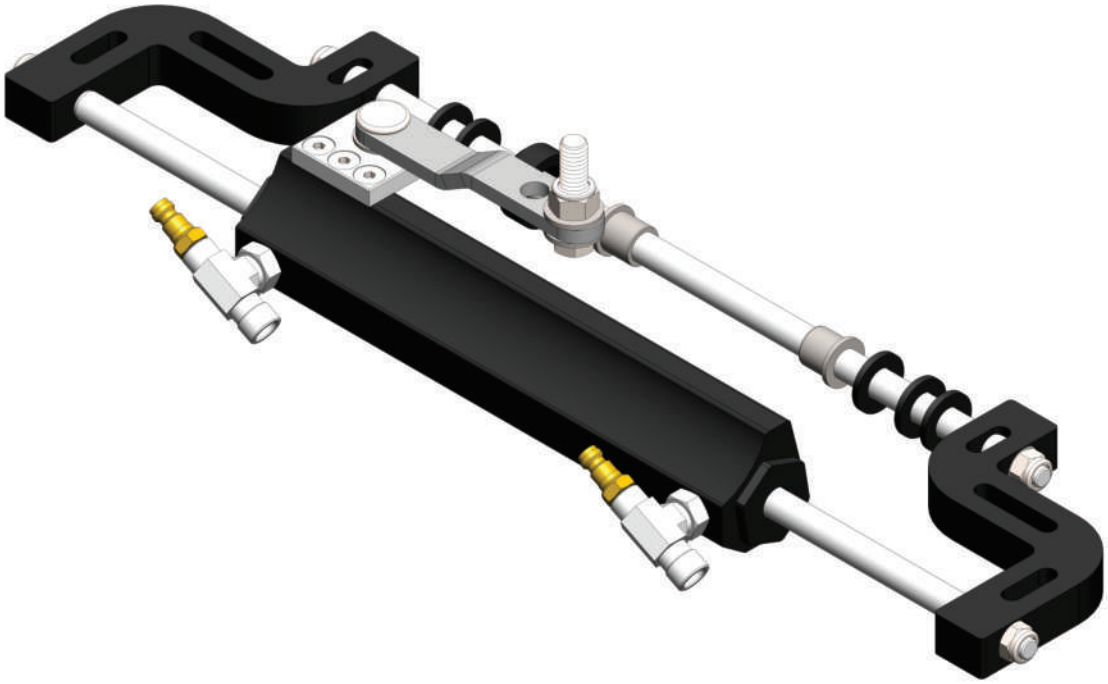
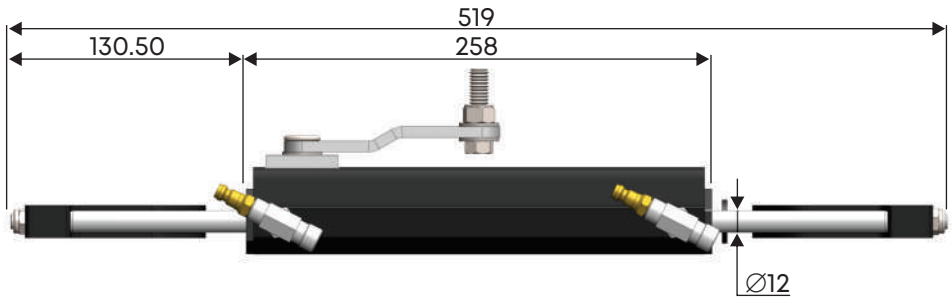
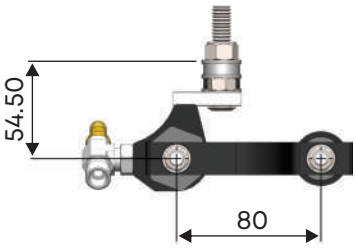
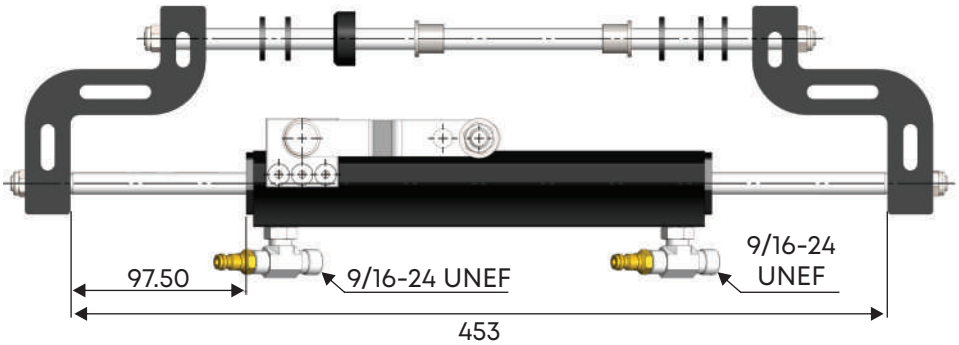
HYDRAULIC CYLINDER : OC-115









All Dimensions are in mm

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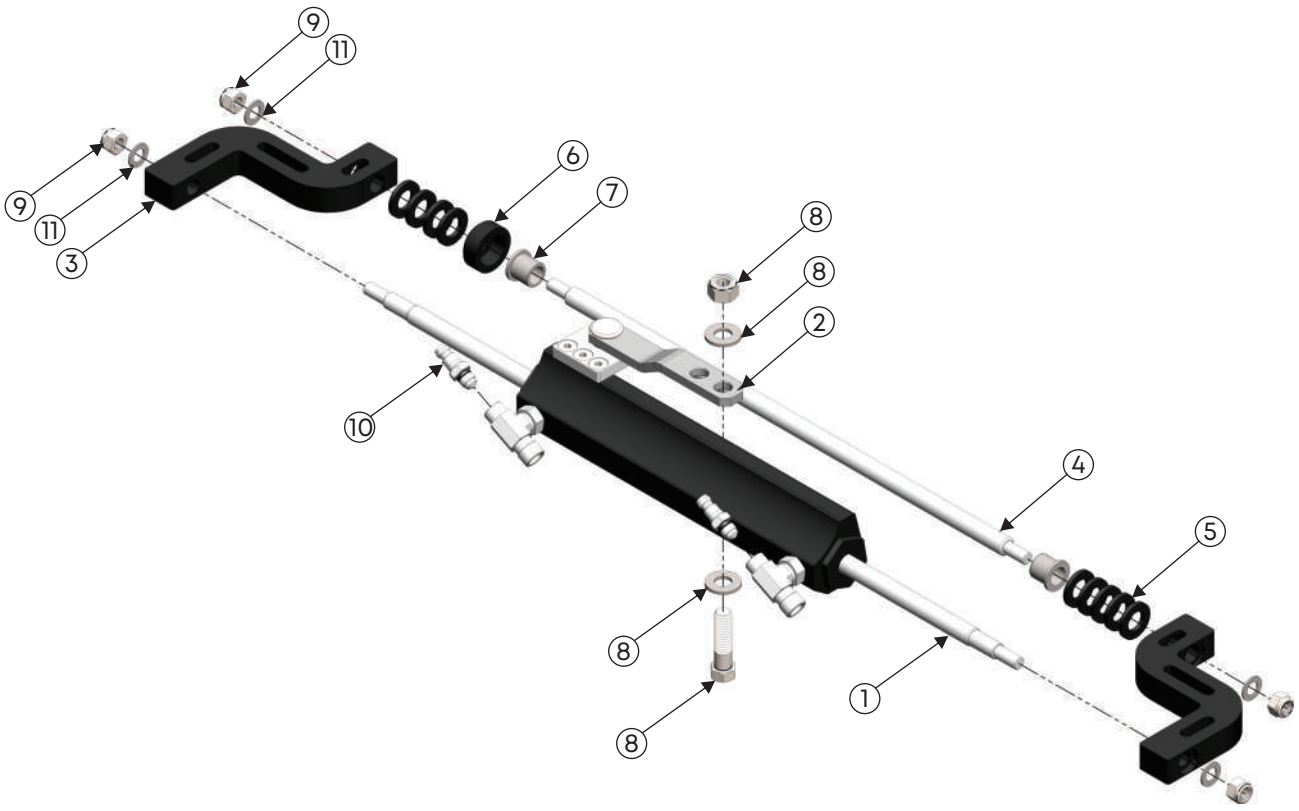
HYDRAULIC CYLINDER : OC-115



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	4
10	Air Bleed Plug	2
11	Piston Rod Washer	4

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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	280 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	HC-C1

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SECTION 2 - PACKAGING CONTENT

2.1 GUIDELINE FOR PRODUCT HANDLING

Multisteer Hydraulic Steering Kit OH-115 :

The net & gross weight of Multisteer Hydraulic Steering Kit OH-115 is 6.6 kg (14.5 pounds) & 8.5 kg (18.7 pounds). Thus, the Helm can be handled manually.

Multisteer Hydraulic Helm HP-16 :

The net & gross weight of Multisteer Hydraulic Helm HP-16 is 2.3 kg (5.0 pounds) & 2.6 kg (5.7 pounds). Thus, the Helm can be handled manually.

Multisteer Hydraulic Cylinder OC-115 :

The net & gross weight of Multisteer Hydraulic Cylinder OC-115 is 2.0 kg (4.4 pounds) & 2.3 kg (5.0 pounds). Thus, the Cylinder can be handled manually.

⚠ CAUTION :

The staff handling the load must operate using all required PPE (individual protection devices) as required by the applicable standard on accident prevention at the workplace.

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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	1	HP-WK4
B	SHAFT WASHER AND NUT	1	SK-HP1
C	DUMMY PLUG	1	HP-DP1
D	ELBOW ASSEMBLY	2	EB1
E	MOUNTING TEMPLATE	1	HP-16-MT
F	MOUNTING NUTS AND STUDS	4	HP-FN1 & HP-FS1
2	**HYDRAULIC CYLINDER**	**1**	**OC-115**
A	ELBOW ASSEMBLY	2	EB1
B	RUBBER CAP	4	EB1-RC
C	HEX STUD ASSEMBLY FOR TILLER PLATE	1	OC-SD2
3	OIL BOTTLE	2	HO-150
4	HOSE KIT	2	CT-5.0
5	OIL FILLING KIT	1	OF1
6	INSTALLATION MANUAL	1	OH-115-IM1
7	DECLARATION OF CONFORMITY : HELM	1	HP-DC-16
8	DECLARATION OF CONFORMITY : CYLINDER	1	OC-DC-115
9	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 forwarder for warranty claim.

⚠ CAUTION :

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

SECTION 3 - PRODUCT INSTALLATION

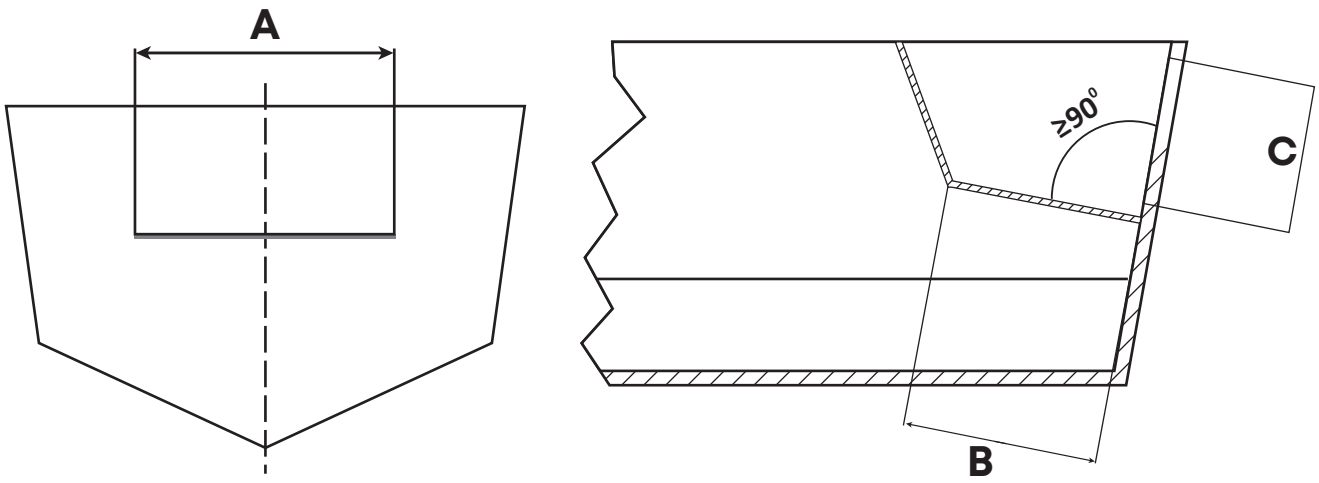
3.1 DIMENSIONAL REQUIREMENTS OF BOAT

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 ¼" (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

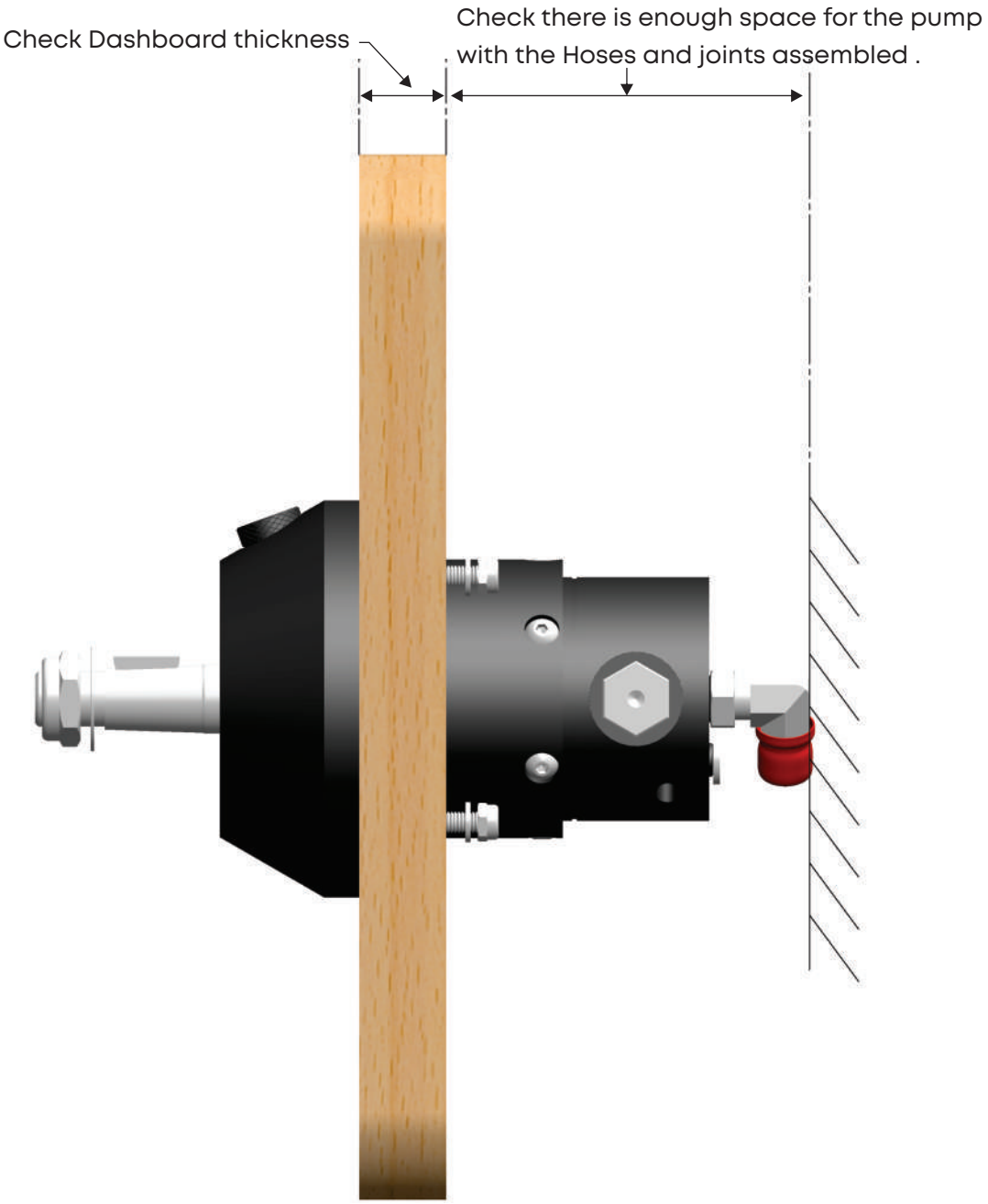
Marine Grease

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.



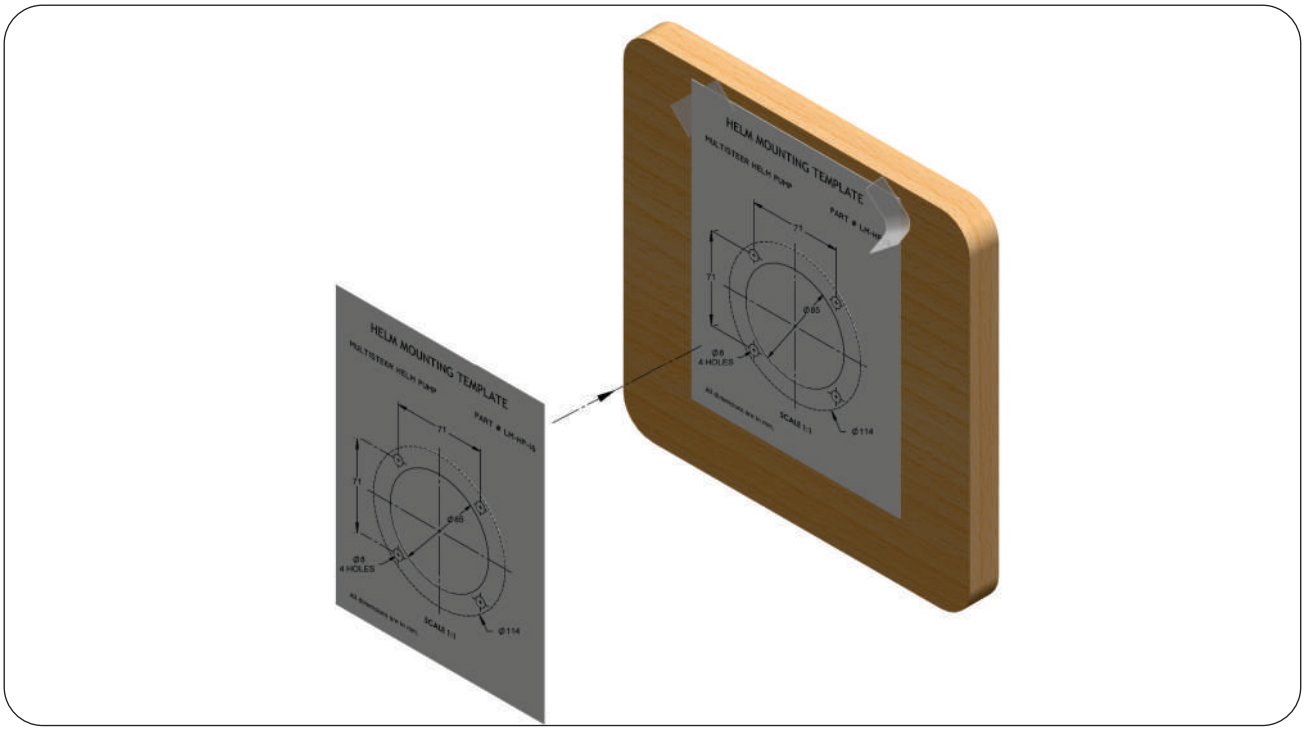
⚠ WARNING : **⚠ SKILLED LABOR REQUIRED :**

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.

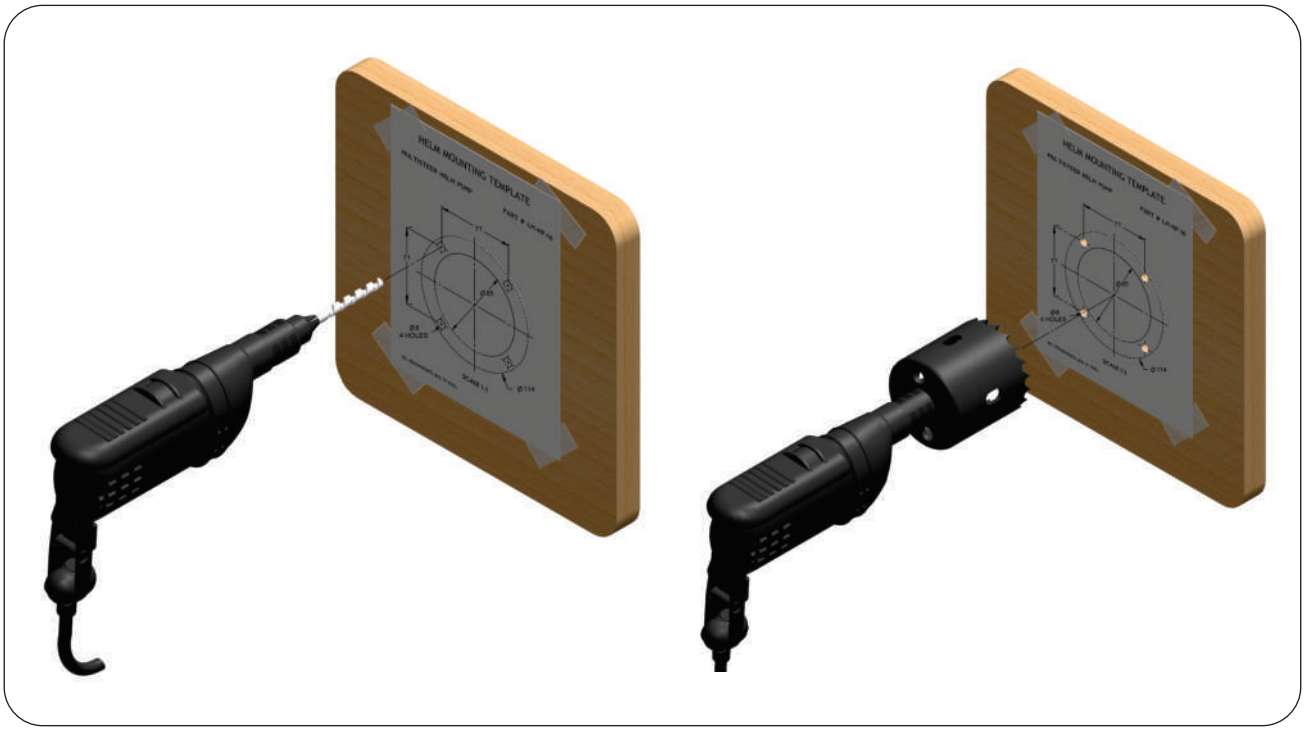
Thickness below or above these dimensions could lead to unsafe steering.

After assembling the Helm, ensure that the 4 Nyloc Nuts (10) supplied are properly screwed on the Flange Studs (8).

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.

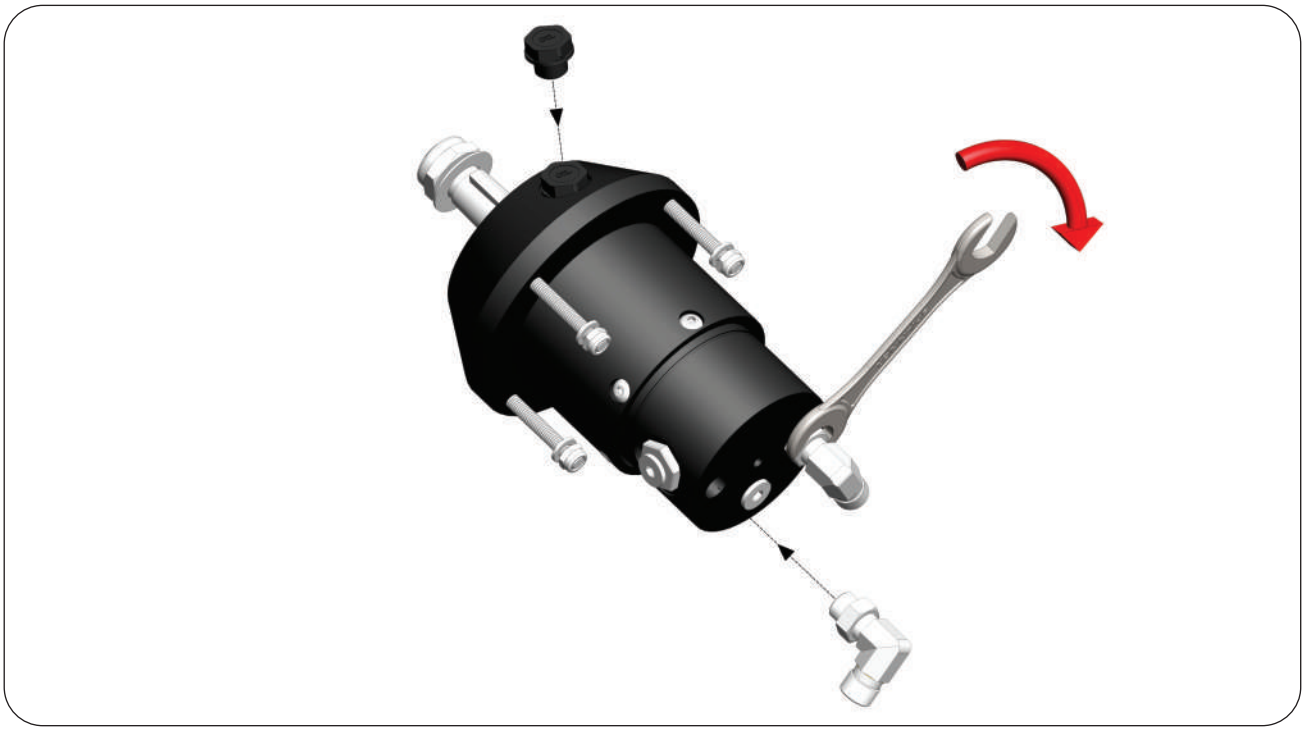


STEP 3 : Make 4 holes for the flange studs with the help of Hand Drill and a big one for the center hole with the help of hole saw.



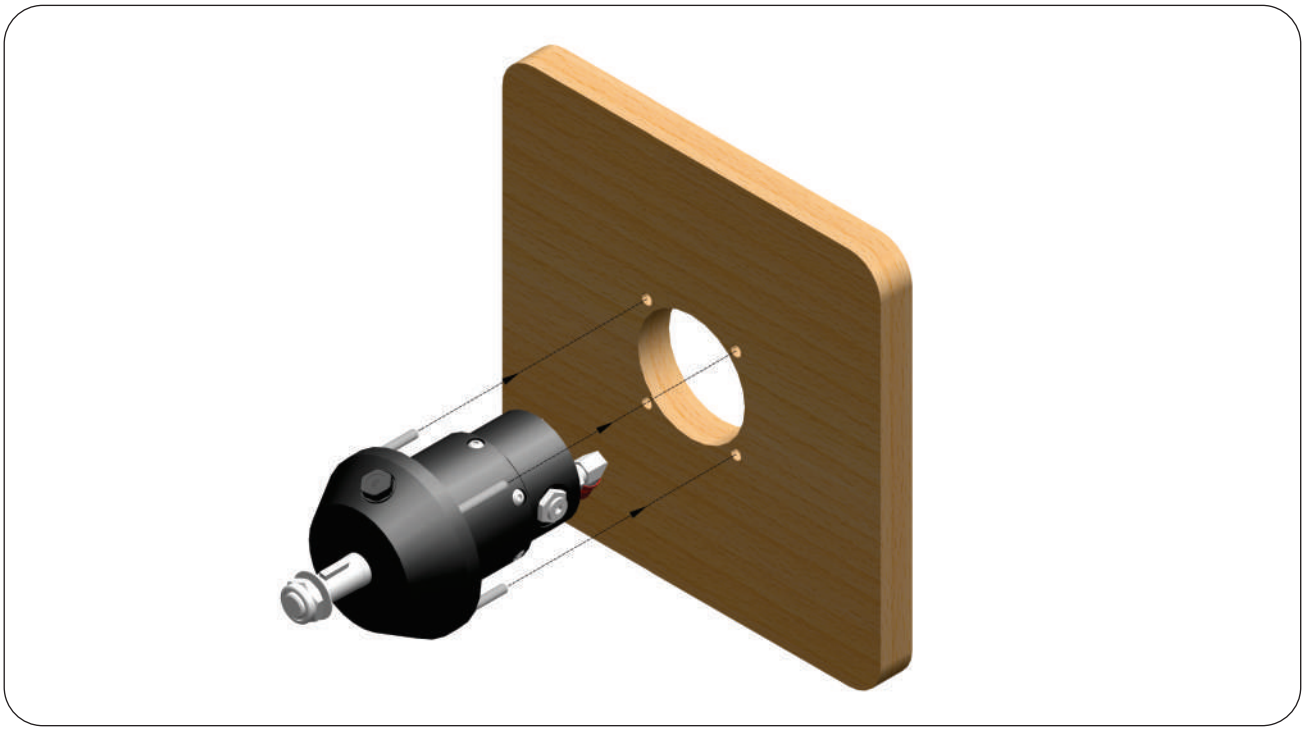
STEP 4 : Remove the protective plugs (7 & 12)

STEP 5 : Insert and tighten by hand the elbow fittings (11) until they are fully seated, then tighten with a wrench. Screwing again from 1.5 to 2.5 turns, up to their best positioning for Hoses connection. However do not exceed a maximum torque of 17.6 Nm (13 lb ft). Also insert the Oil Filling Plug with Breather Hole (13) into Oil Filling Port

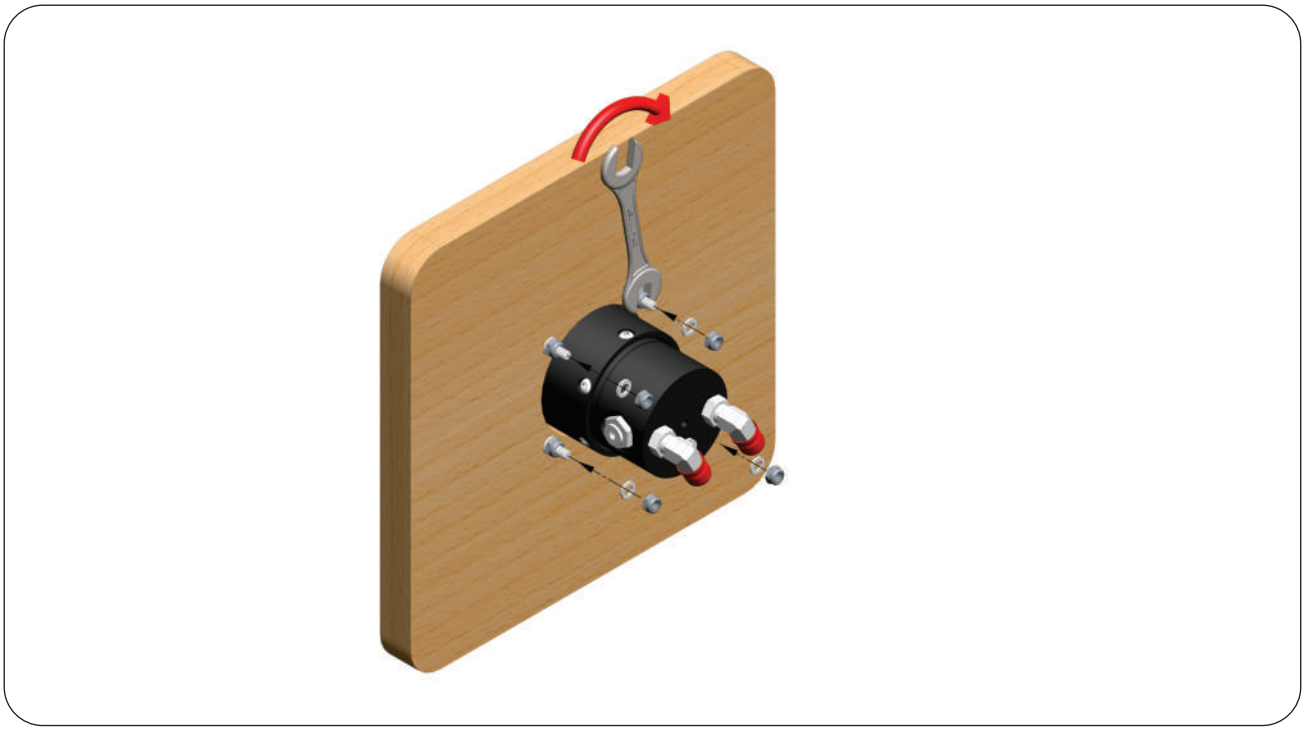


STEP 6 : Remove the 4 Nyloc Nuts (10) and Washer (9) from the Flange Studs (8) of Helm with the help of 10 mm Wrench.

STEP 7 : Insert the Helm from the front of the dashboard with the Oil Filling Plug (7) turned upwards matching the 4 Flange Studs (8) moving inside the 4 holes on the dashboard.



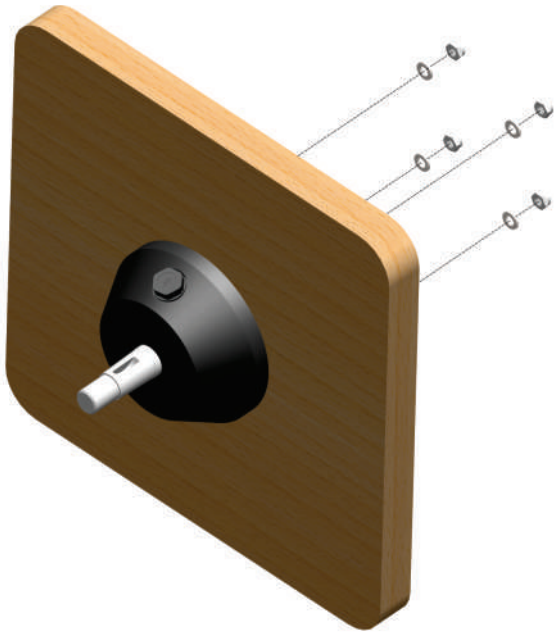
STEP 8 : Tighten the 4 Nyloc Nuts (10) & the 4 washers (9) through the Flange Studs (8) of the Helm to the dashboard with the help of a 10mm Wrench with the torque of a 10 Nm (7.4 lb ft).



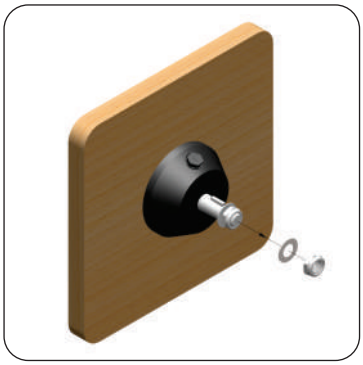
⚠ CAUTION :

If the Nyloc Nuts (10) are removed, they must be replaced immediately.

Is it important to install the Helm with the Oil Filling Plug Hole (13) positioned upwards (see picture) to allow complete filling and purging of the system (see section 3.7 “OIL FILLING AND PURGING PROCEDURE”).

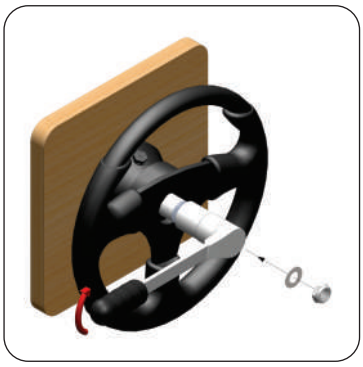


3.4 MOUNTING THE STEERING WHEEL



STEP 1 : Remove the nylock nut (6) & washer (5) 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 (4) in its compartment. Insert the Washer (5) and use a 20mm hexagonal Wrench to tighten the self-locking nut (6) 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.

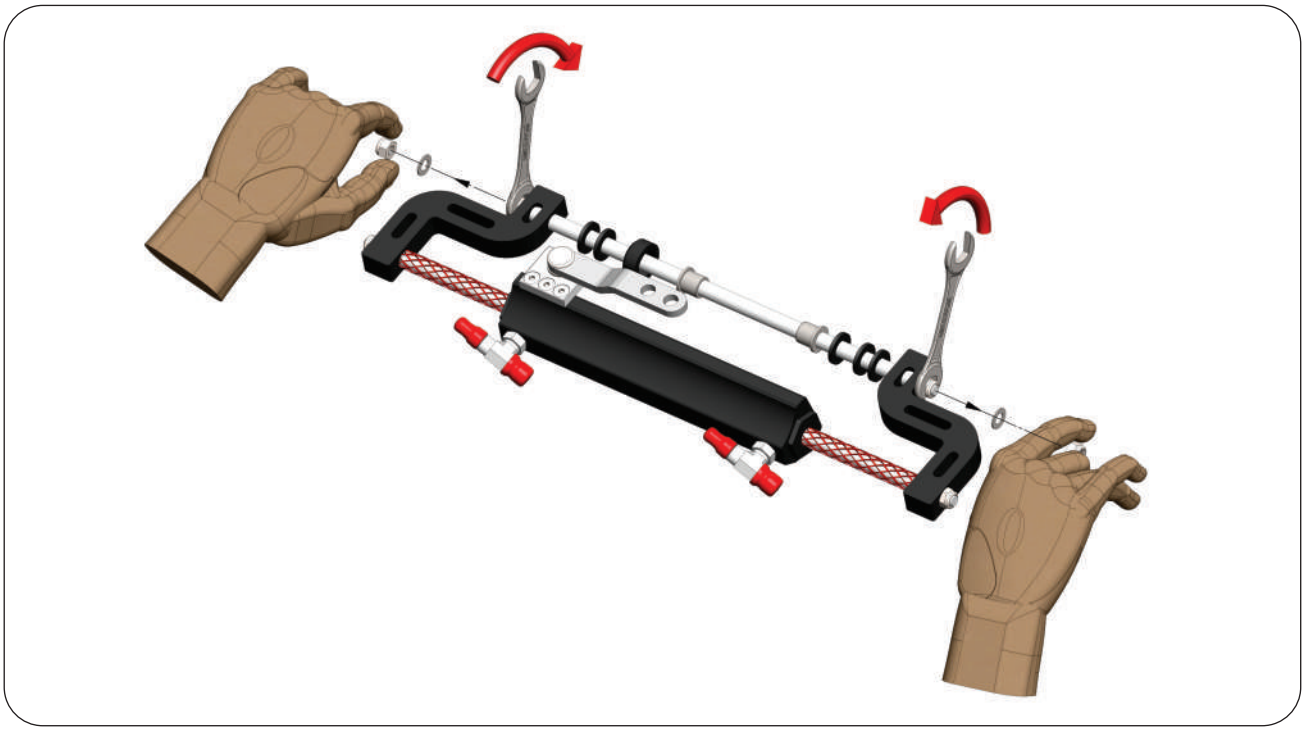
⚠ CAUTION :

Tighten the Steering Wheel Shaft nut (6) before filling and purging the Steering System. Tighten nut to 150 in. lbs. /17 Nm. Do not exceed 200 in.lb. (22 Nm). If the self-locking nut is removed, it must be replaced with new self-locking nut and not used one.

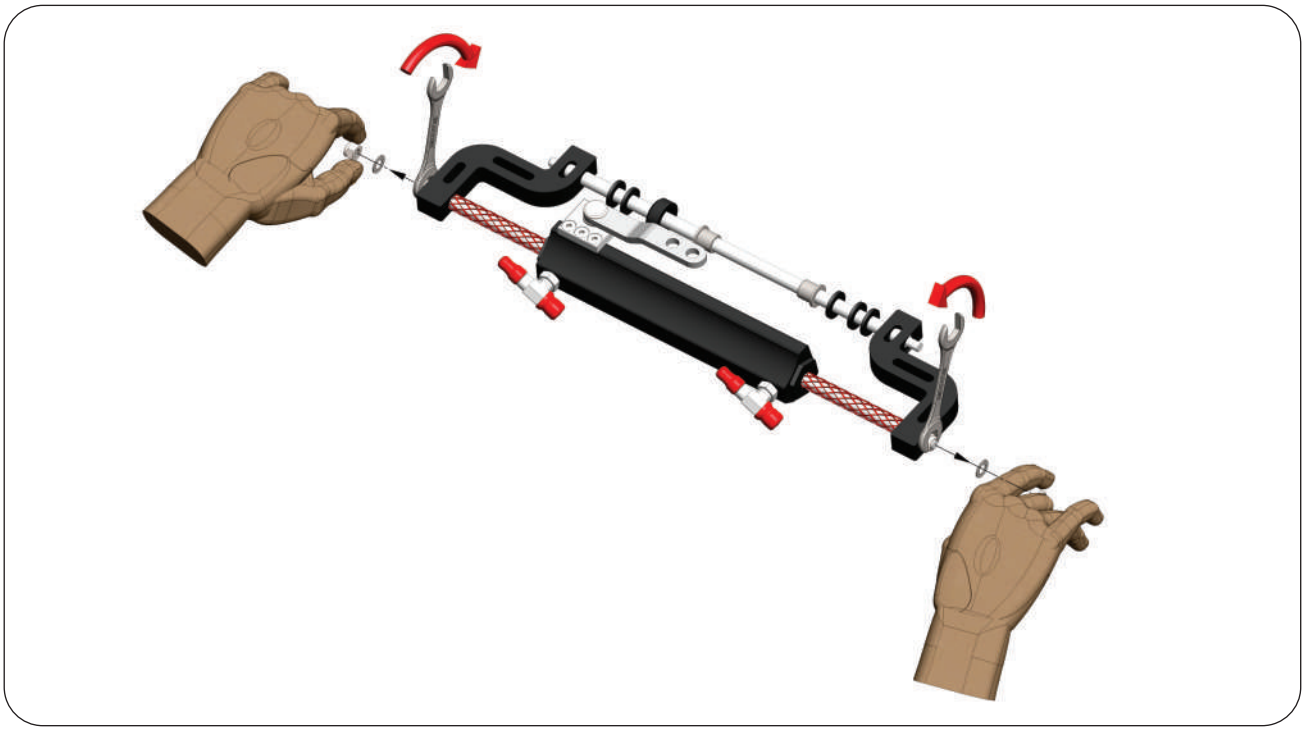
3.5 INSTALLING FRONT MOUNT CYLINDER (OC-115)

⚠ SKILLED LABOR REQUIRED :

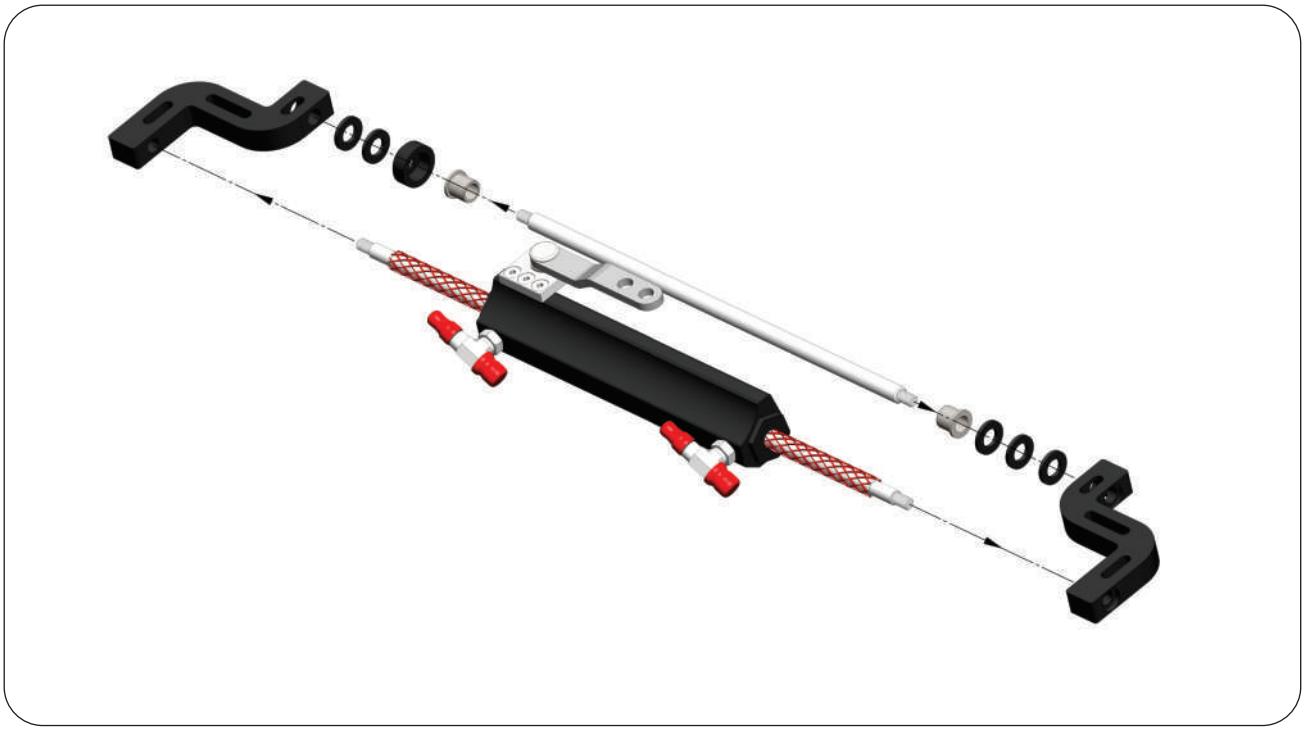
STEP 1 : Remove the Nyloc Nut (9) and Washers (11) from the Center Shaft / Support Rod (4).



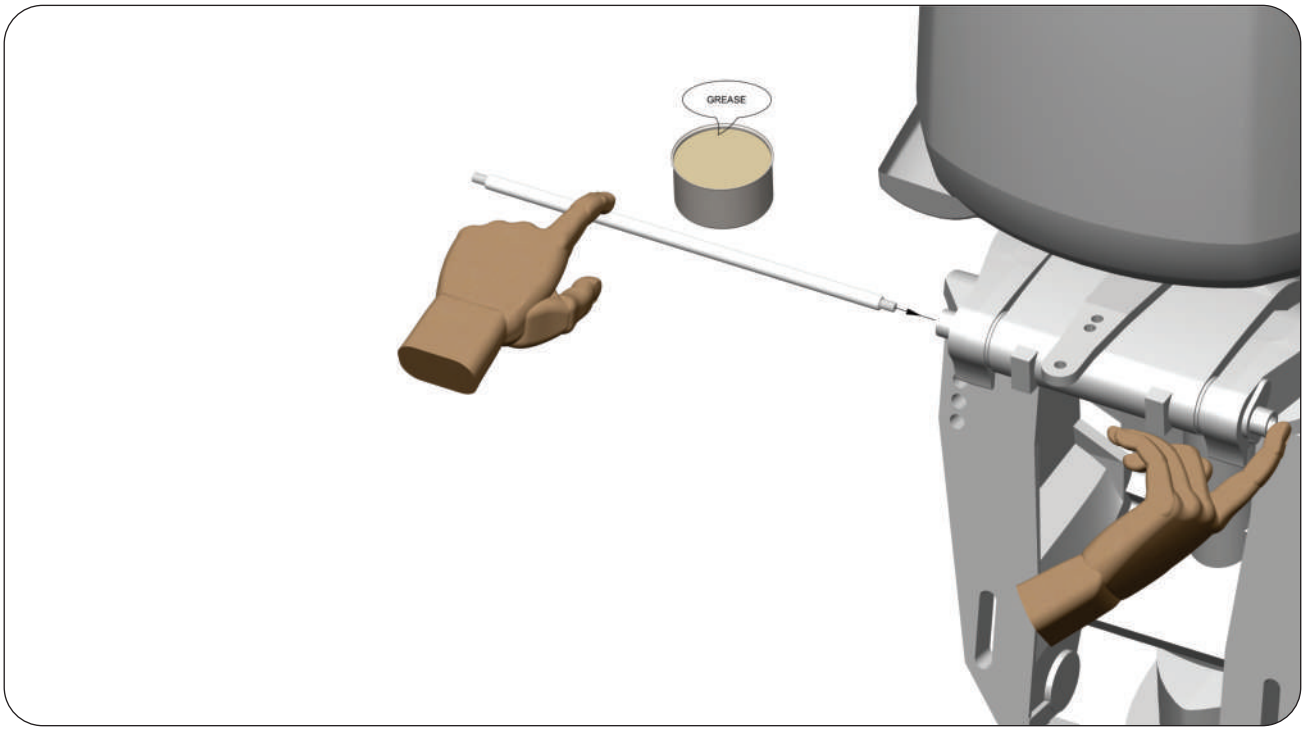
Remove the Nyloc Nut (9) and Washers (11) from the piston rod (1).



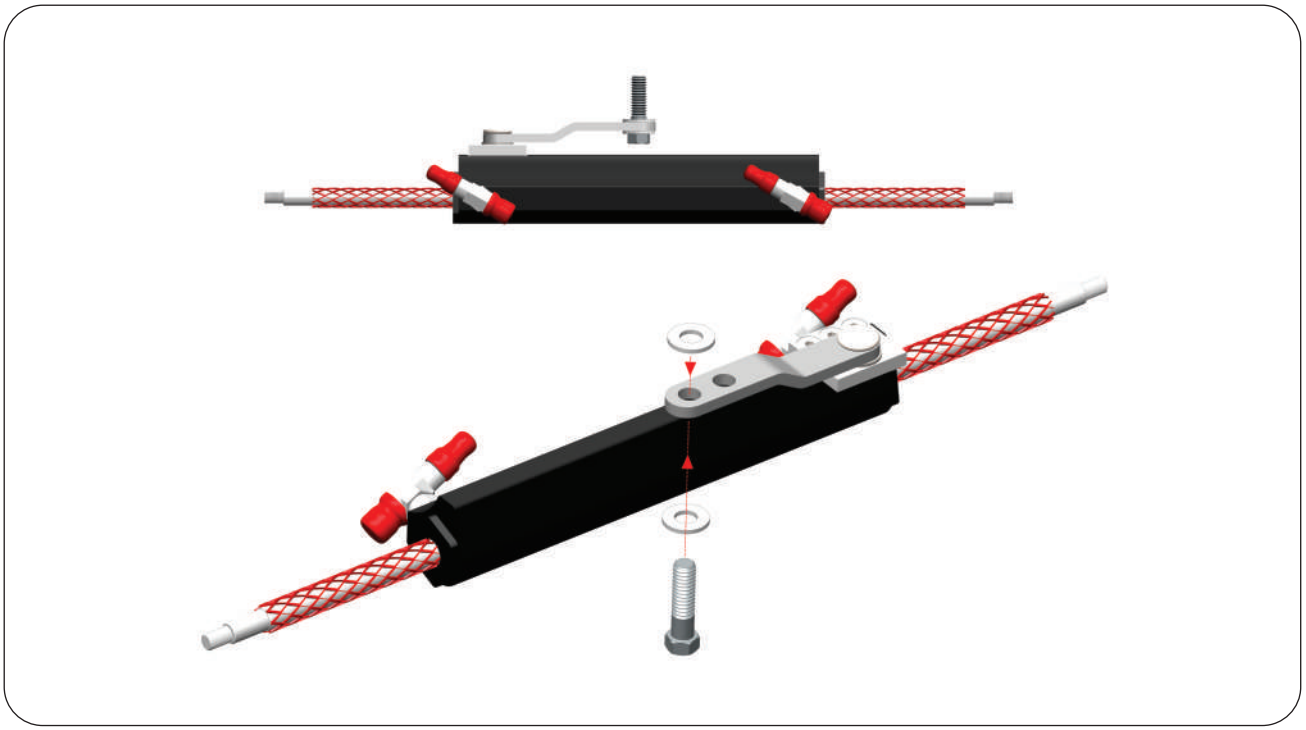
STEP 2 : Disassemble the Cylinder by removing Support Brackets (3), Bush (7), Spacers / Washer (5) & Mounting Spacer (6).



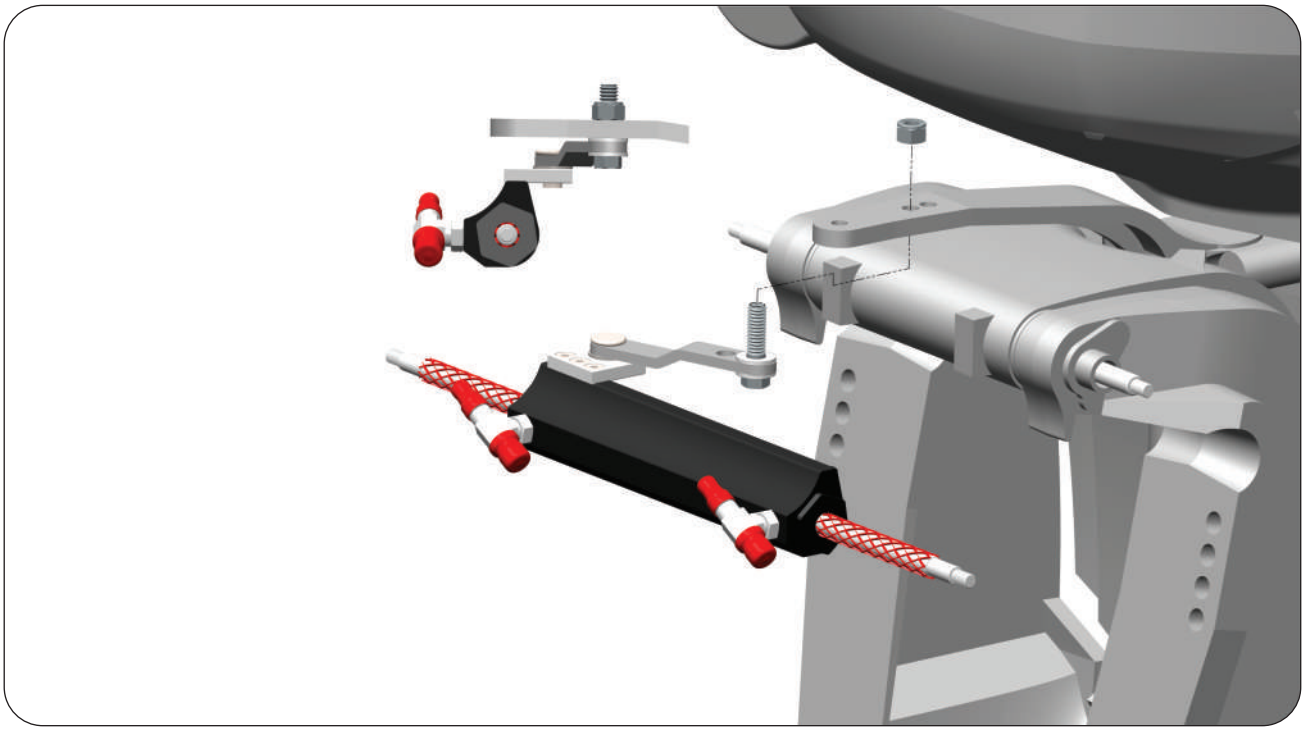
STEP 3 : Apply Marine Grade Grease on the Center Shaft (4) and insert the Center Shaft into the Tilt Tube of Engine.



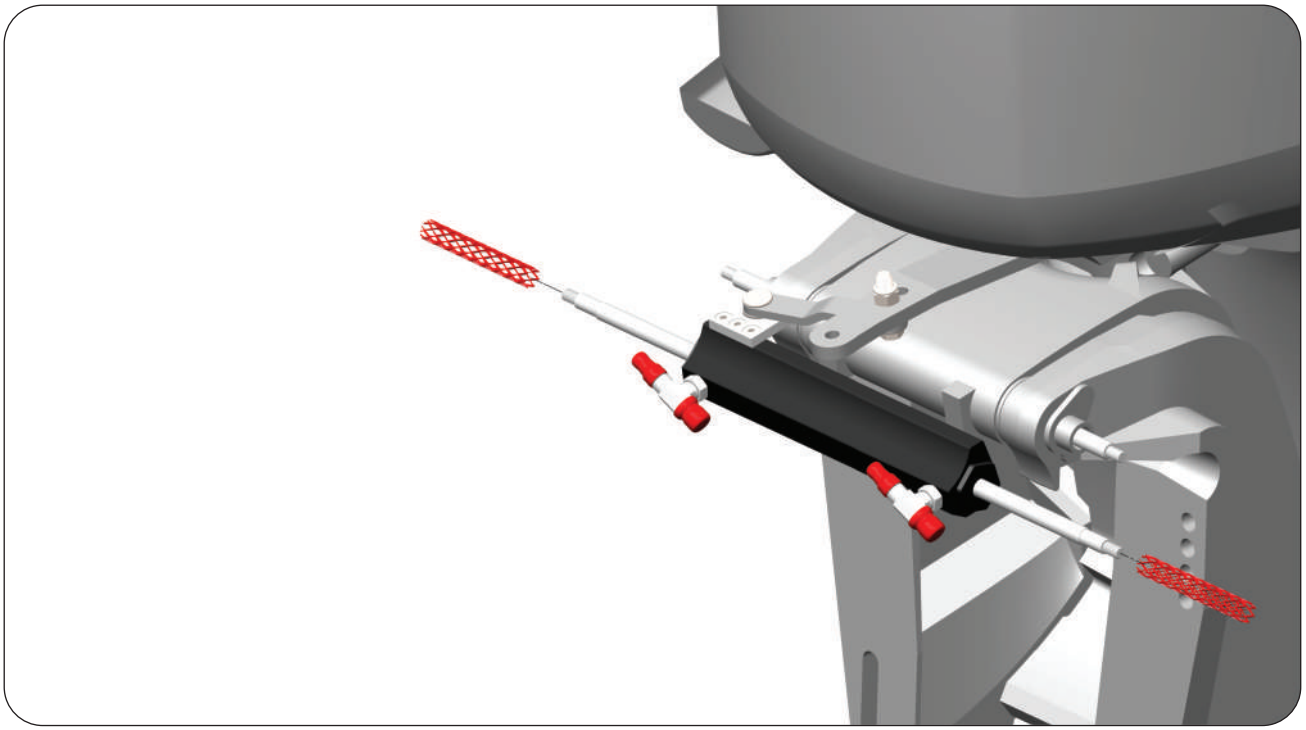
STEP 4 : Assemble the Tiller Hex Stud Assembly (8) into the Tiller Plate (2) of Cylinder as shown.



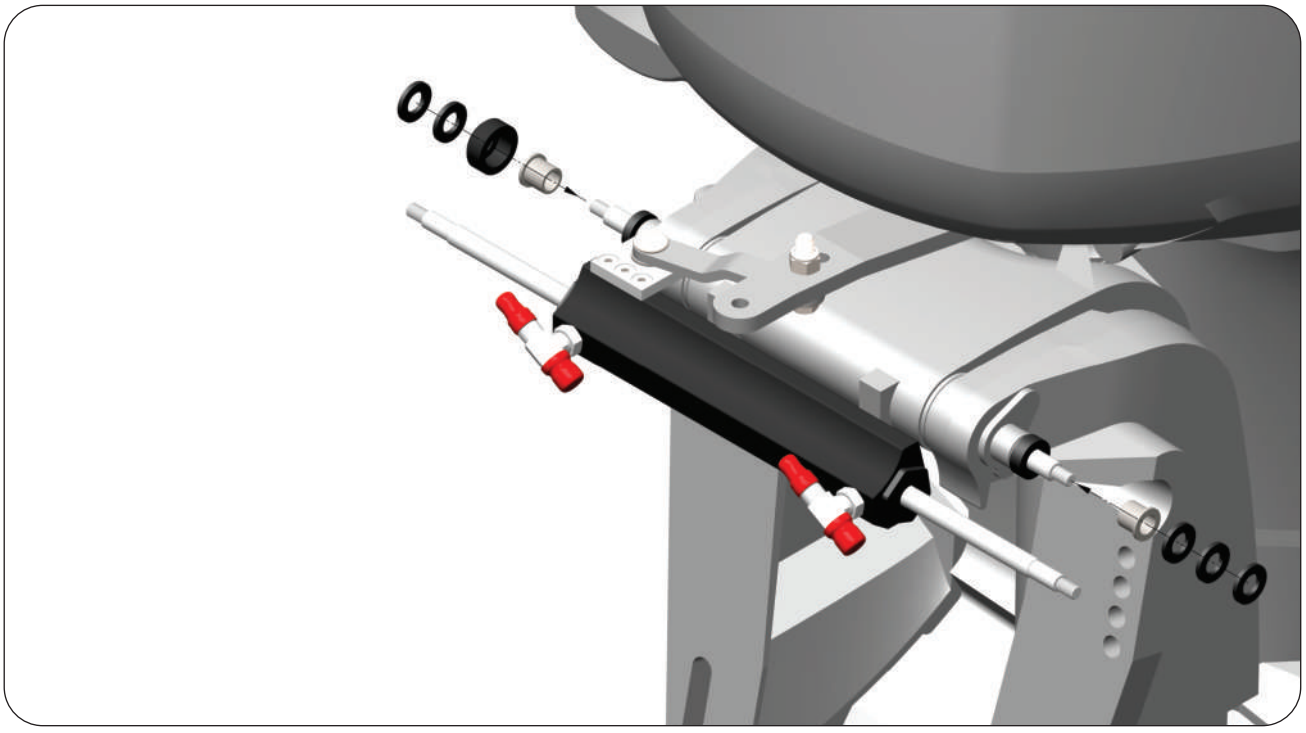
STEP 5 : Position the Engine straight so that its Engine Arm is perpendicular to the Transom. Connect the Tiller Arm (2) of Cylinder to the Engine Arm by means of the Hex Stud (8). Tighten it by using a 14mm Wrench with a torque of 20 Nm (29.5 lb ft). Tighten the Nyloc Nut of Hex Stud by using a 14mm Wrench with a torque of 20 Nm (18.5lb ft). After tightening the Nyloc Nut, check for the right torque 20 Nm (29.5lb ft) of the Hex Stud (8).



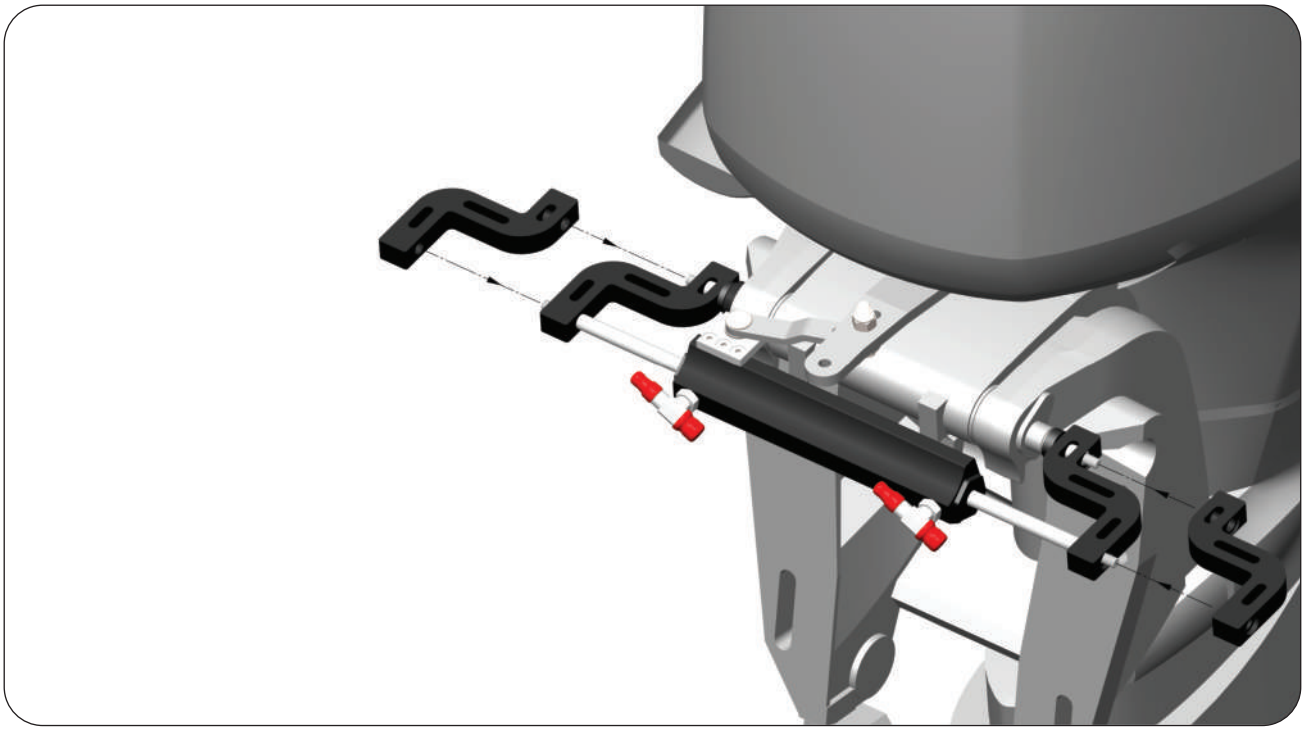
STEP 6 : Remove the Piston Rod Protector before assembling the Support Bracket (3).



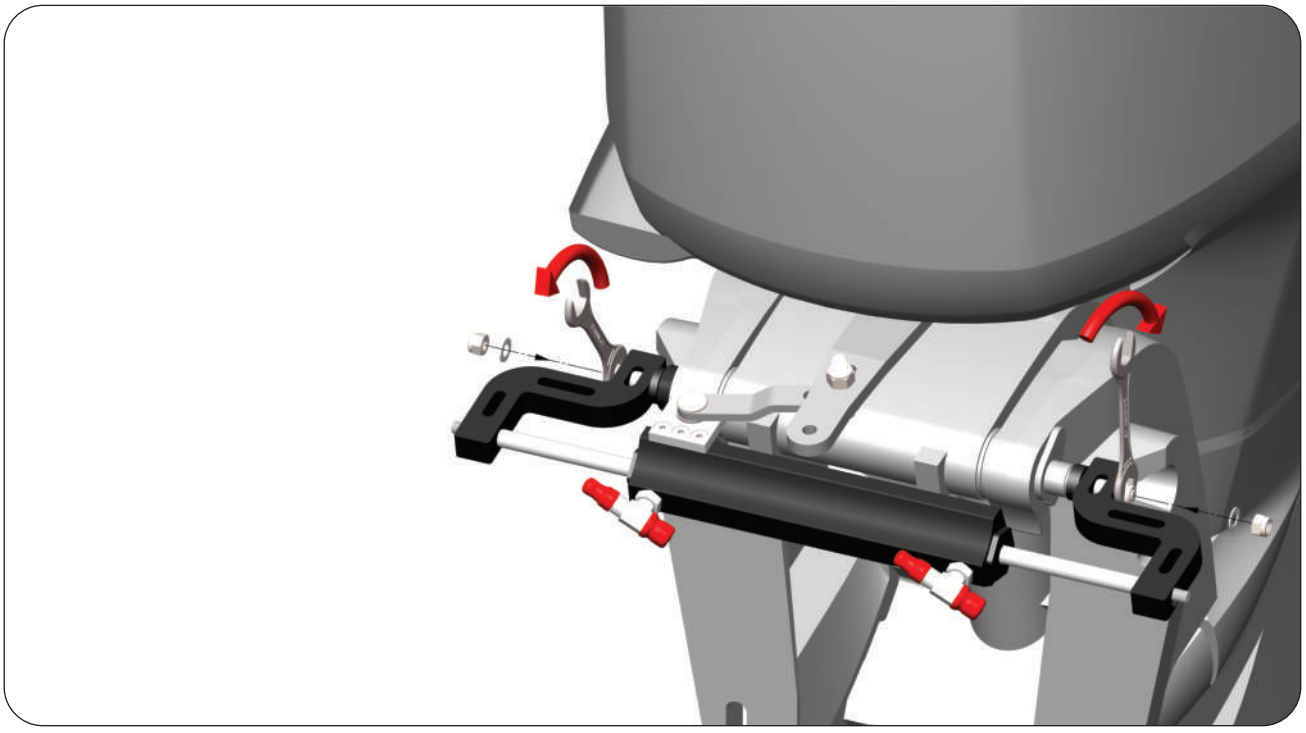
STEP 7 : Insert the Bush (7), Mounting Spacer (6) and then Spacers / Washer (5) as show. With reference to the"application guide" chooses the correct number of washers for the tilt tube rod. In this phase ensure that the cylinder body is centered on the Piston Rod (1) and that the Engine is perpendicular to the Transom.



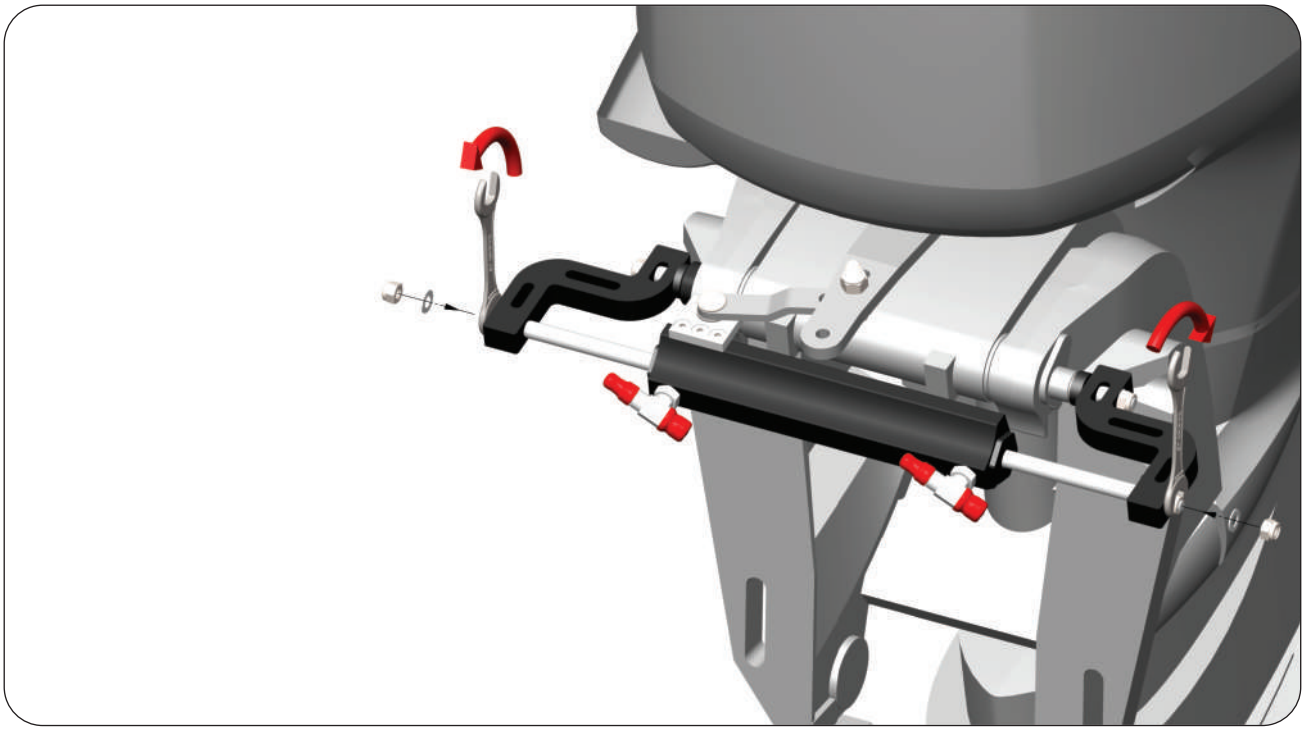
STEP 8 : Insert the right and left Support Brackets (3) by connecting the both the Piston (1) & Support Rods (4) as shown in the picture.



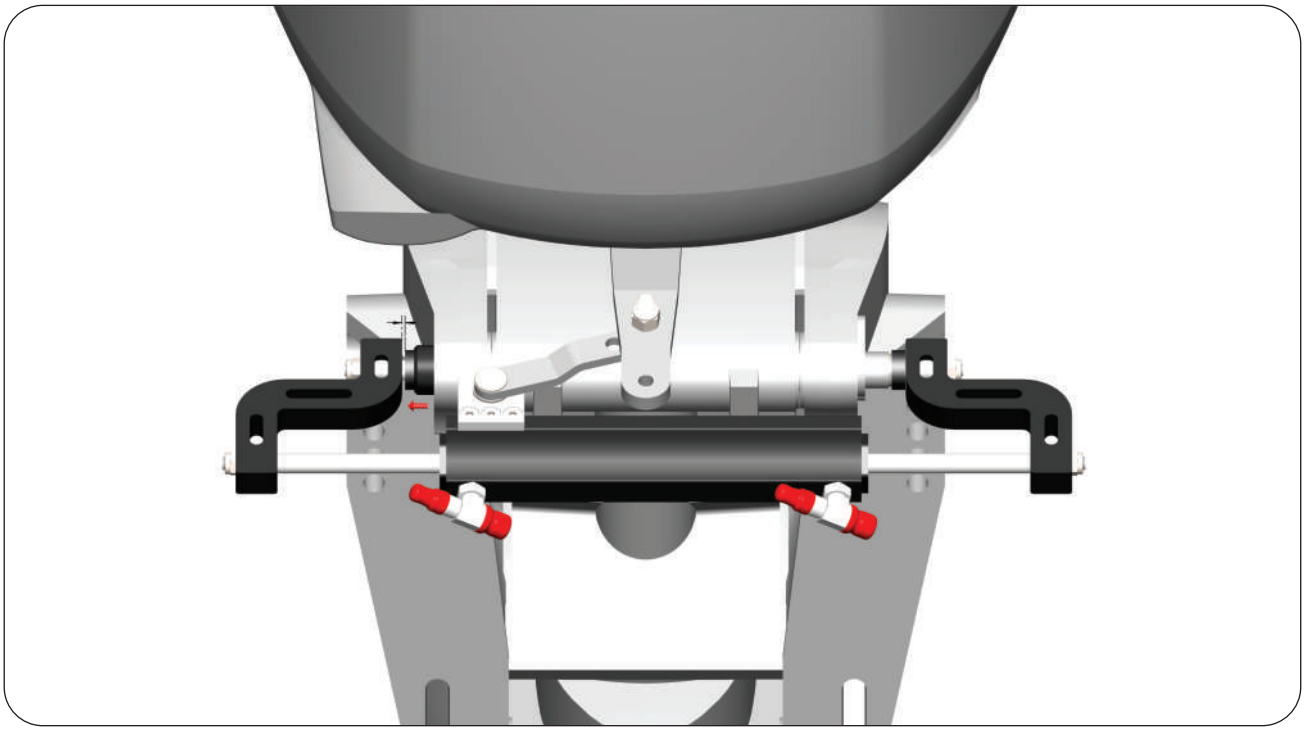
STEP 9 : Insert the Washers (11) and Nyloc Nut (9) on the two ends of the Support Rod (4). Grease the Nyloc Nut threads with any Anti-Seize Grease. Tighten them by using a 13 mm Wrench with a torque of 70 Nm (52lb ft).



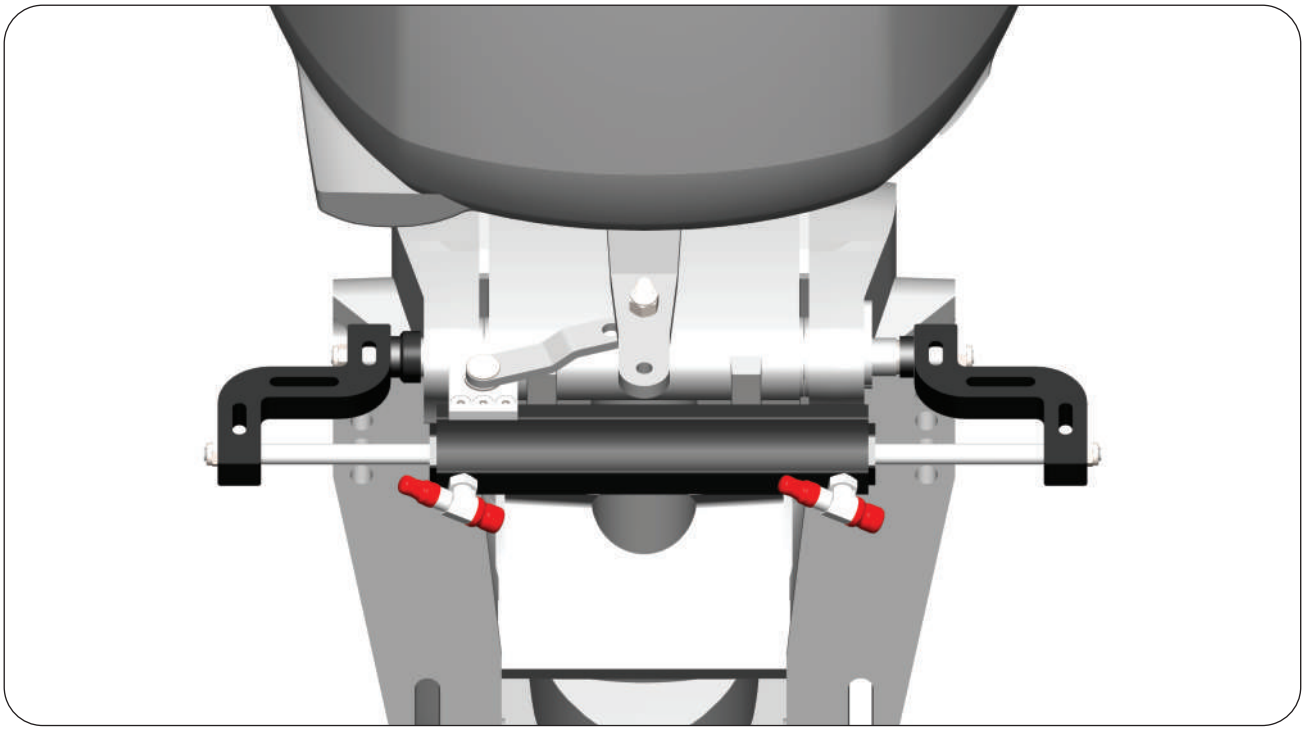
STEP 10 : Insert the Washers (11) and Nyloc Nut (9) on the two ends of the Piston Rod (1). Grease the Nyloc Nut threads with any Anti-Seize Grease. Tighten them by using a 13 mm Wrench with a torque of 70 Nm (52 lb ft).



STEP 11 : Adjust the space on the Tilt Tube with the help of tightening the Mounting Spacers (6) until the clearance is eliminated.



STEP 12 : 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 HOSES CONNECTION (CT-5.0)

⚠ SKILLED LABOR REQUIRED :

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

⚠ WARNING :

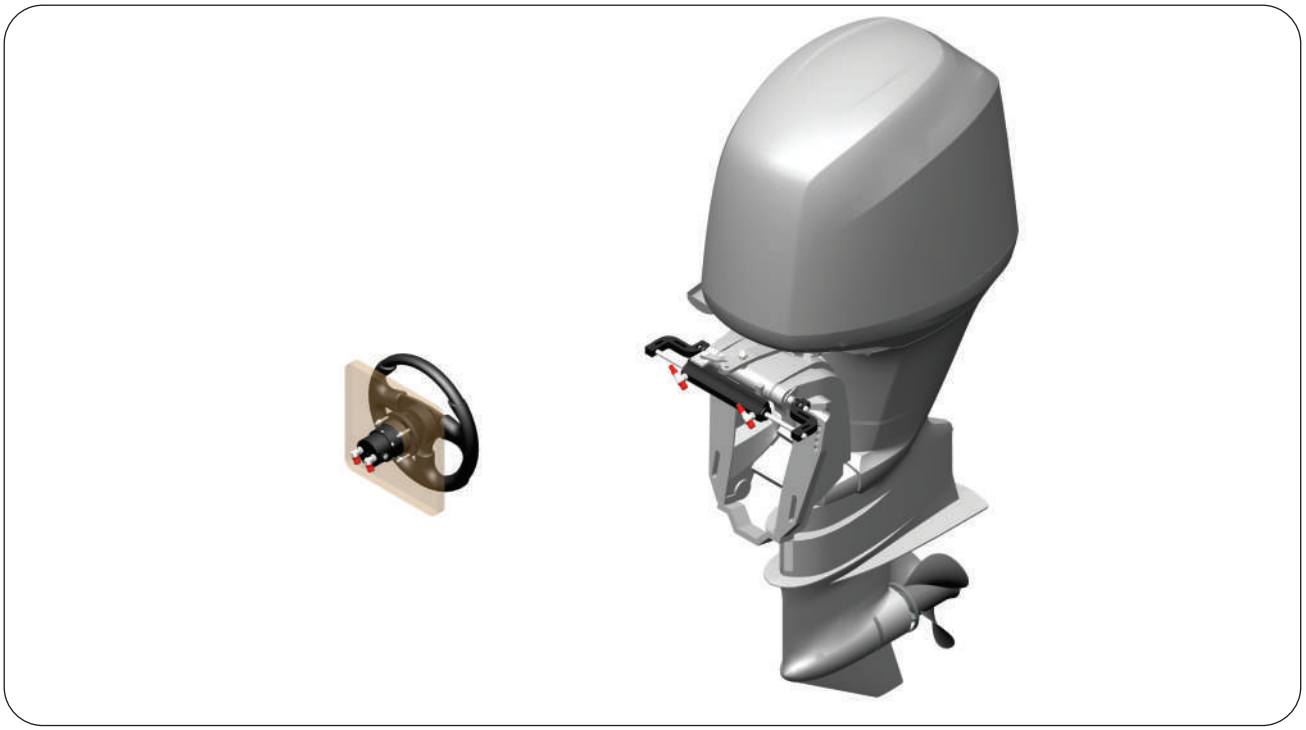
DO NOT cut the Multiflex Hoses. Cutting the Hoses will make it useless.

POINTS TO READ BEFORE CONNECTING HOSES:

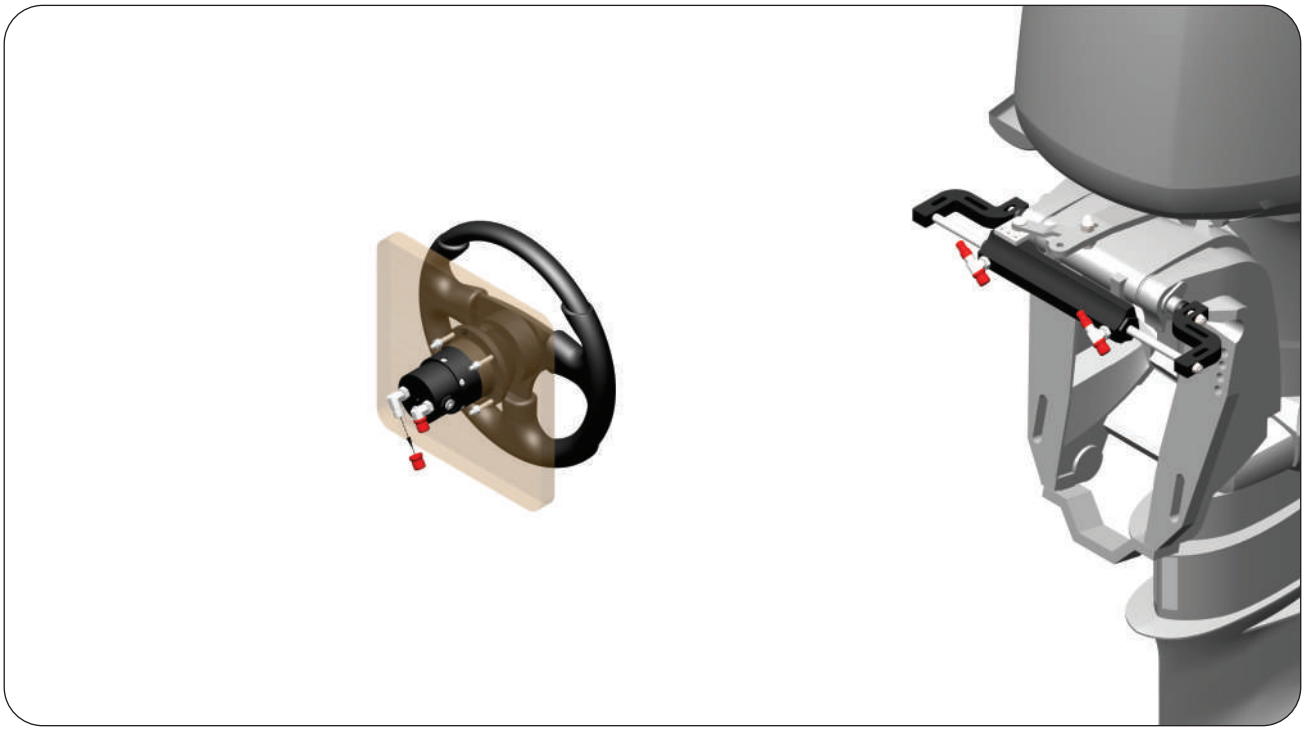
1. DO NOT use any pipe / plumbing sealant on the Hose for fitting.
2. DO NOT remove protective covers at the end fittings until the Hoses have been properly routed and are ready to be connected to the Helm pump or Hydraulic Cylinder.
3. Before, during and after the connection of Hoses, they MUST be protected 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 90 mm. DO NOT bend the Hoses more than 90 mm of radius.
6. Ensure sufficient Hose lengths to allow Cylinder movement throughout the turning arc and UP/DOWN trim / tilt settings of engine / engines.

HOSES CONNECTION

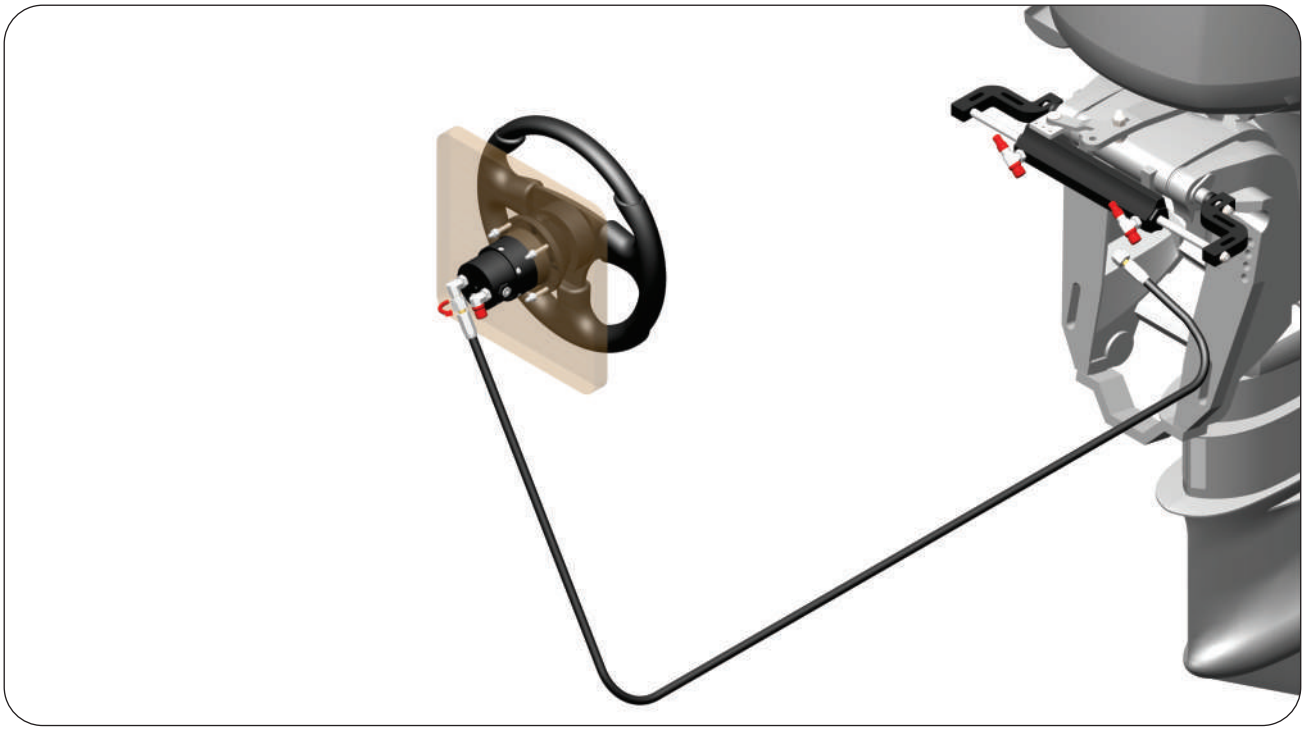
STEP 1 : While installing Hoses, ensure that the Cylinder should be in the center position.



STEP 2 : Remove the thread protector cap of Helm from starboard side.



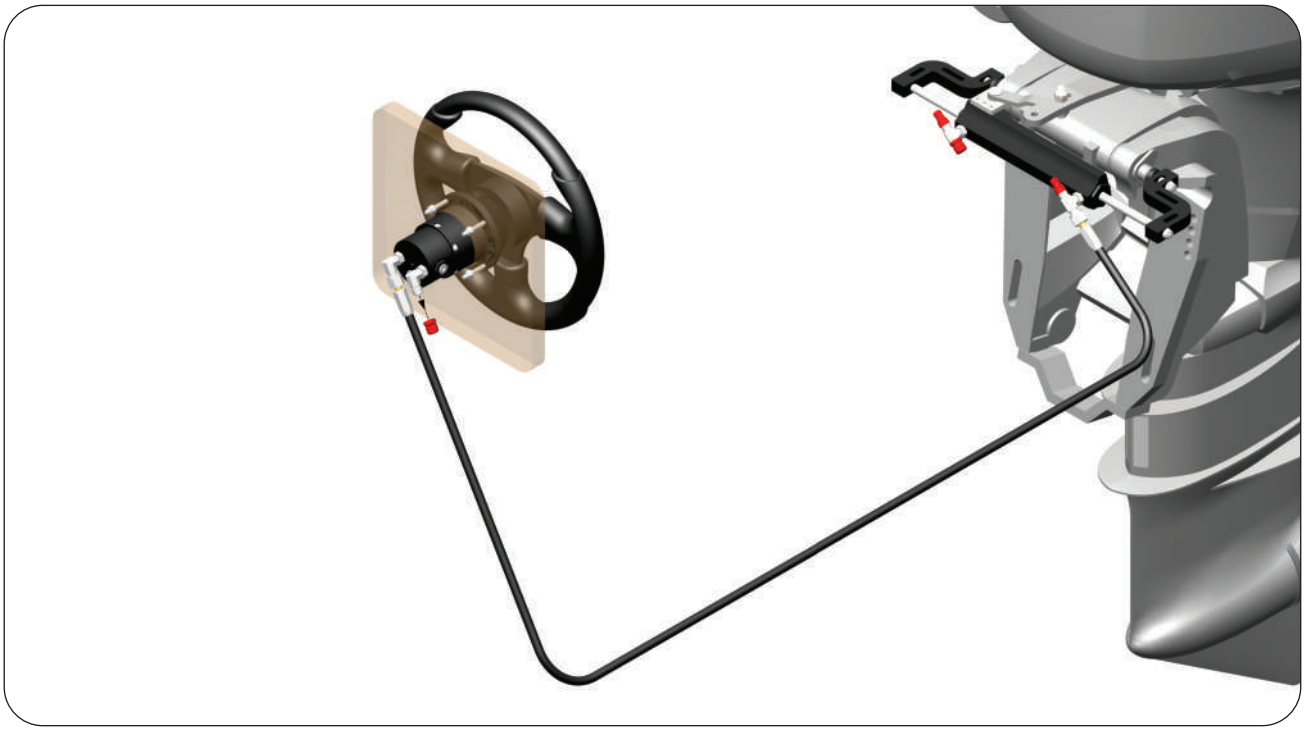
STEP 3 : Insert the Hose Fitting into the starboard side Elbow of Helm. Tighten the Hex Nut on the Hose Fitting by using 19 mm Wrench with a torque of 70 Nm (52 lb ft).



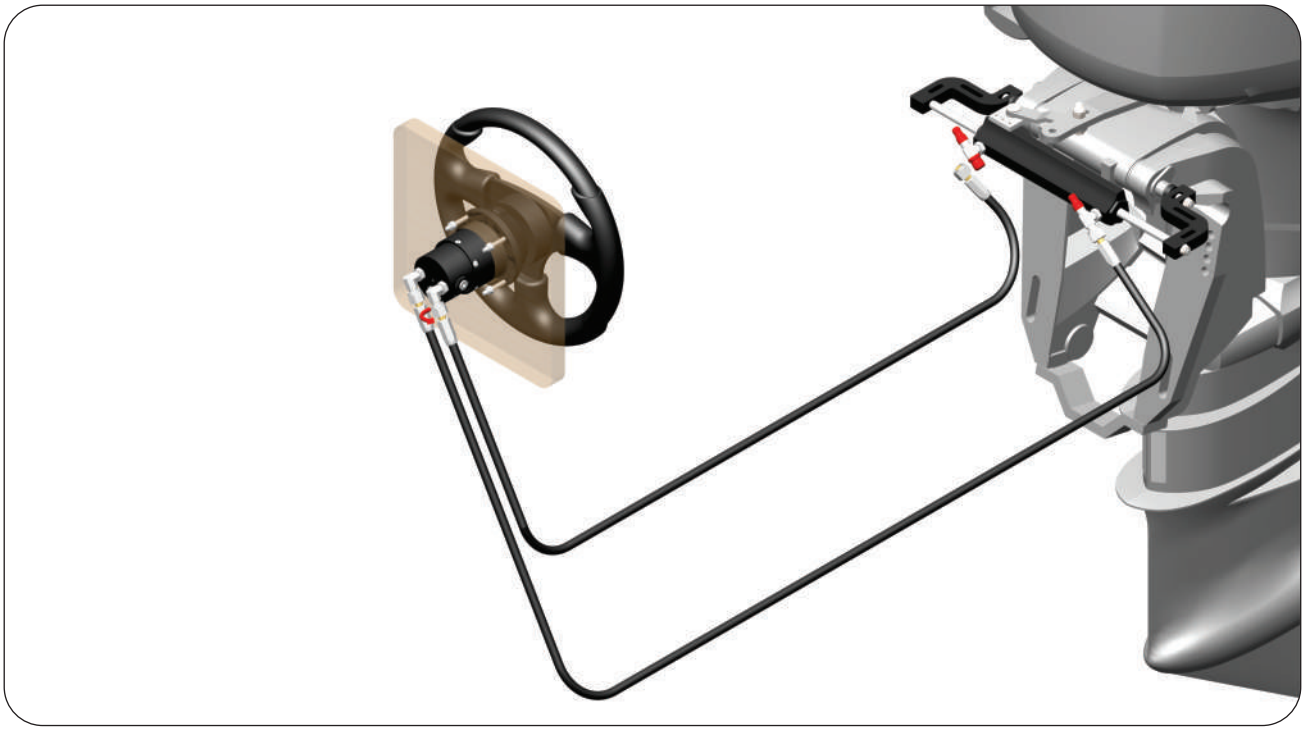
STEP 4 : Remove the thread protector cap of Cylinder from port side.

STEP 5 : Insert the Hose Fitting into the port side Fitting of Cylinder. Tighten the Hex Nut on the Hose Fitting by using 19 mm Wrench with a torque of 70 Nm (52 lb ft).

STEP 6 : Now remove the thread protector cap of Helm from port side.

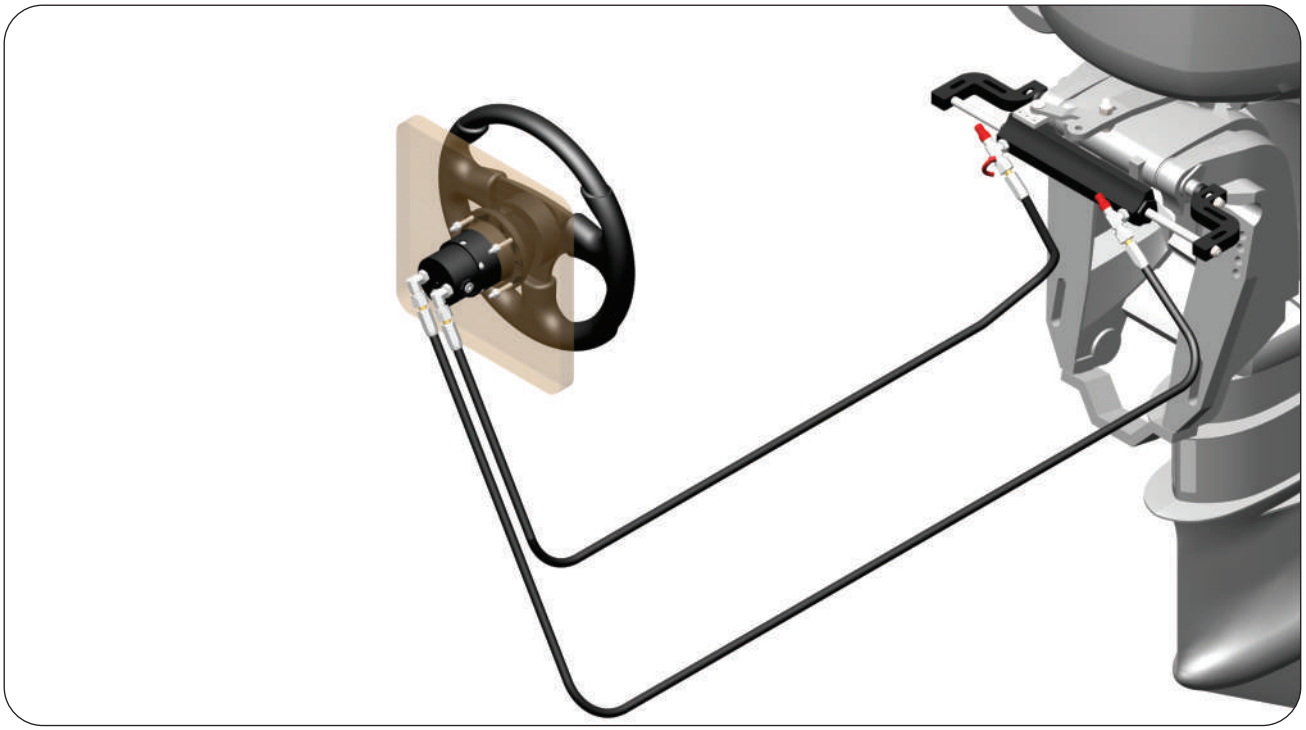


STEP 7 : Insert the Hose Fitting into the port side Elbow of Helm. Tighten the Hex Nut on the Hose Fitting by using 19 mm Wrench with a torque of 70 Nm (52 lb ft).

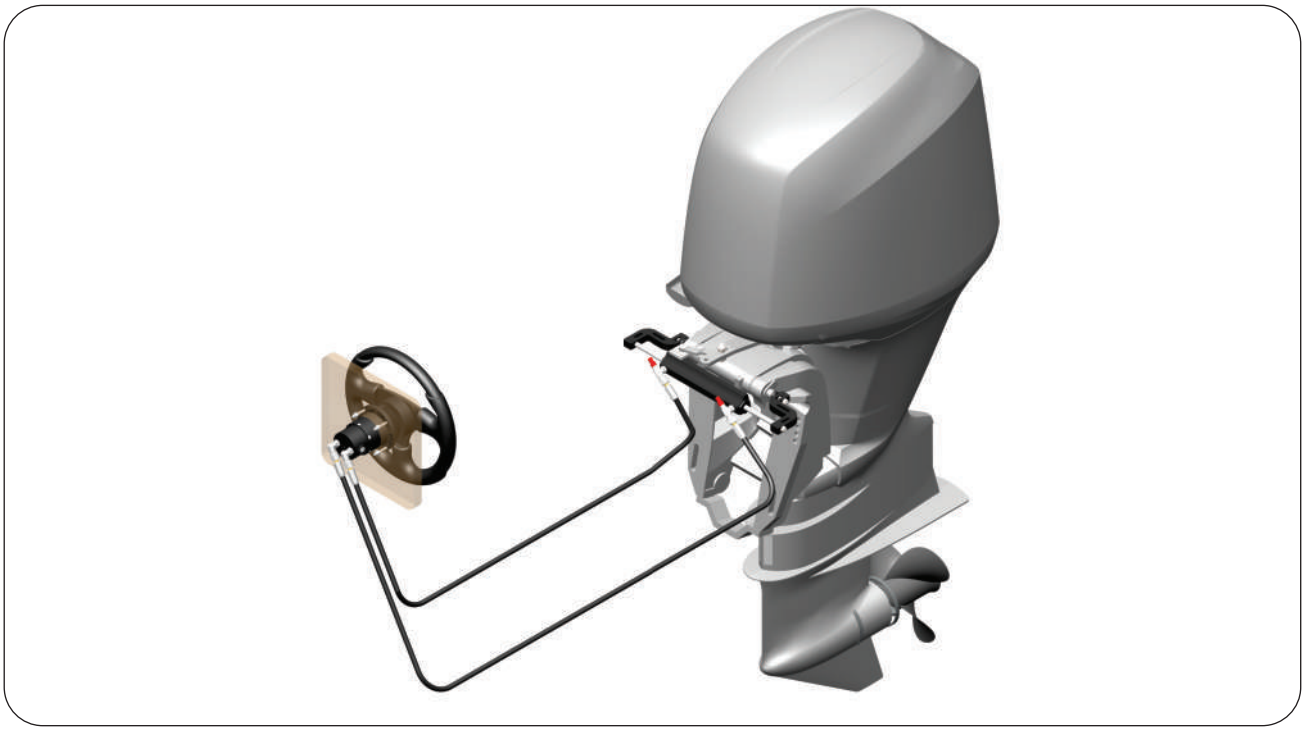


STEP 8 : Remove the thread protector cap of Cylinder from starboard side.

STEP 9 : Insert the Hose Fitting into the starboard side Elbow of Cylinder. Tighten the Hex Nut on the Hose Fitting by using 19 mm wrench with a torque of 70 Nm (52 lb ft).



STEP 10 : Ensure that all the Hose Fittings should be tighten properly. Hoses should not be bend in excess. Minimum Hose bend radius is 250 mm. Ensure that there should be no interference during engine tilting as well as no interference with the transom.

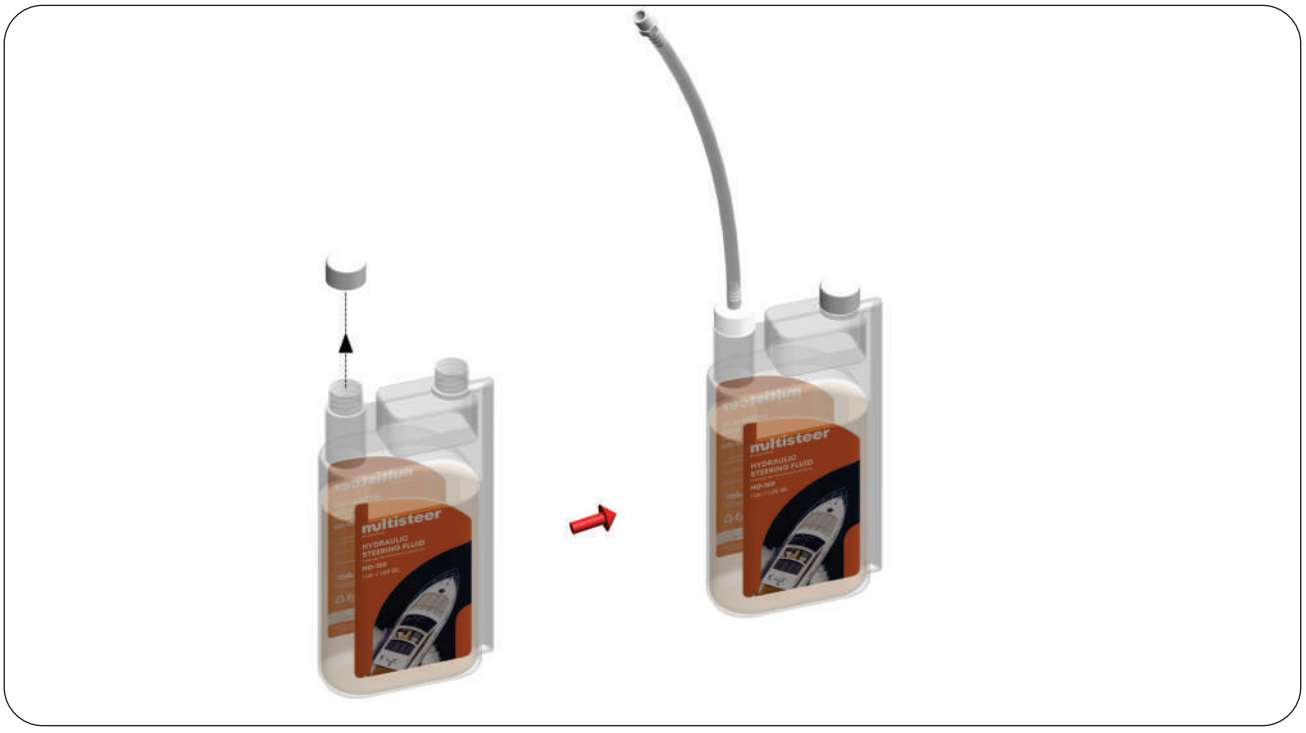


3.7 OIL FILLING AND PURGING PROCEDURE

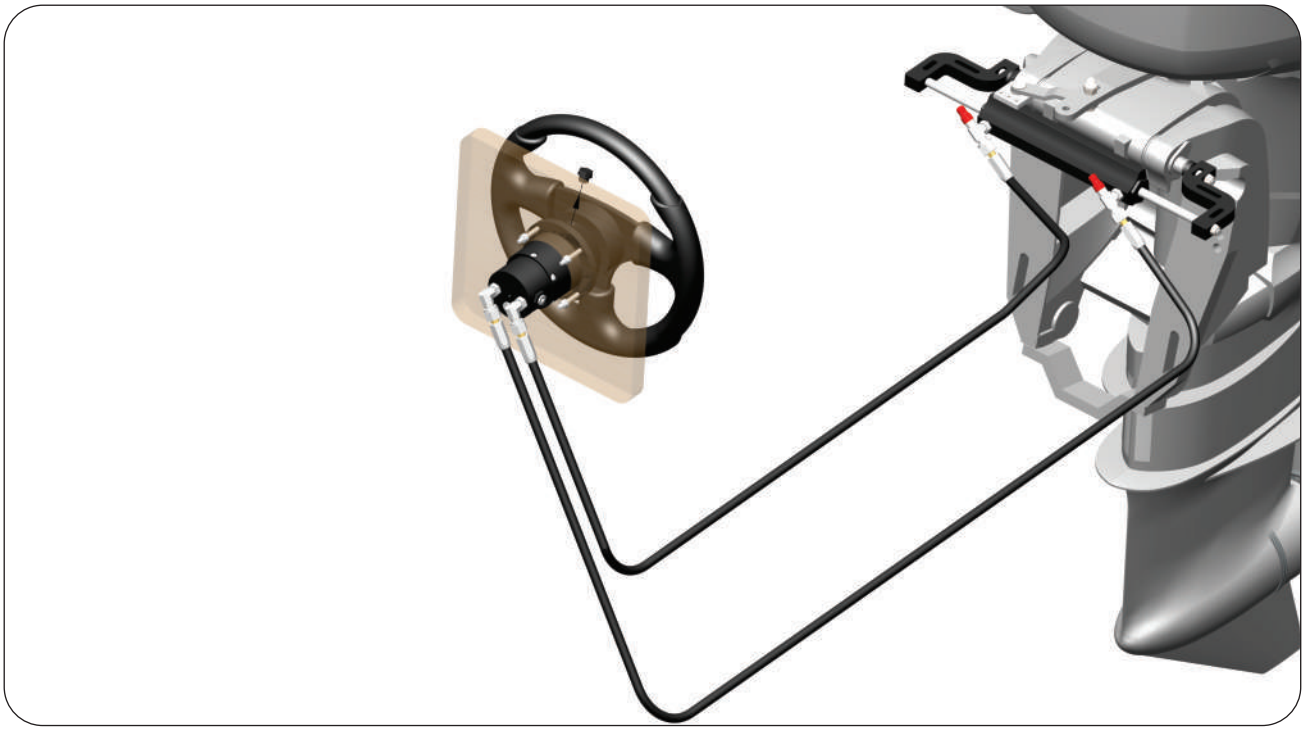
⚠ SKILLED LABOR REQUIRED :

STEP 11 : For Oil Filling and Purging, it is necessary to use the Oil Filling Kit.

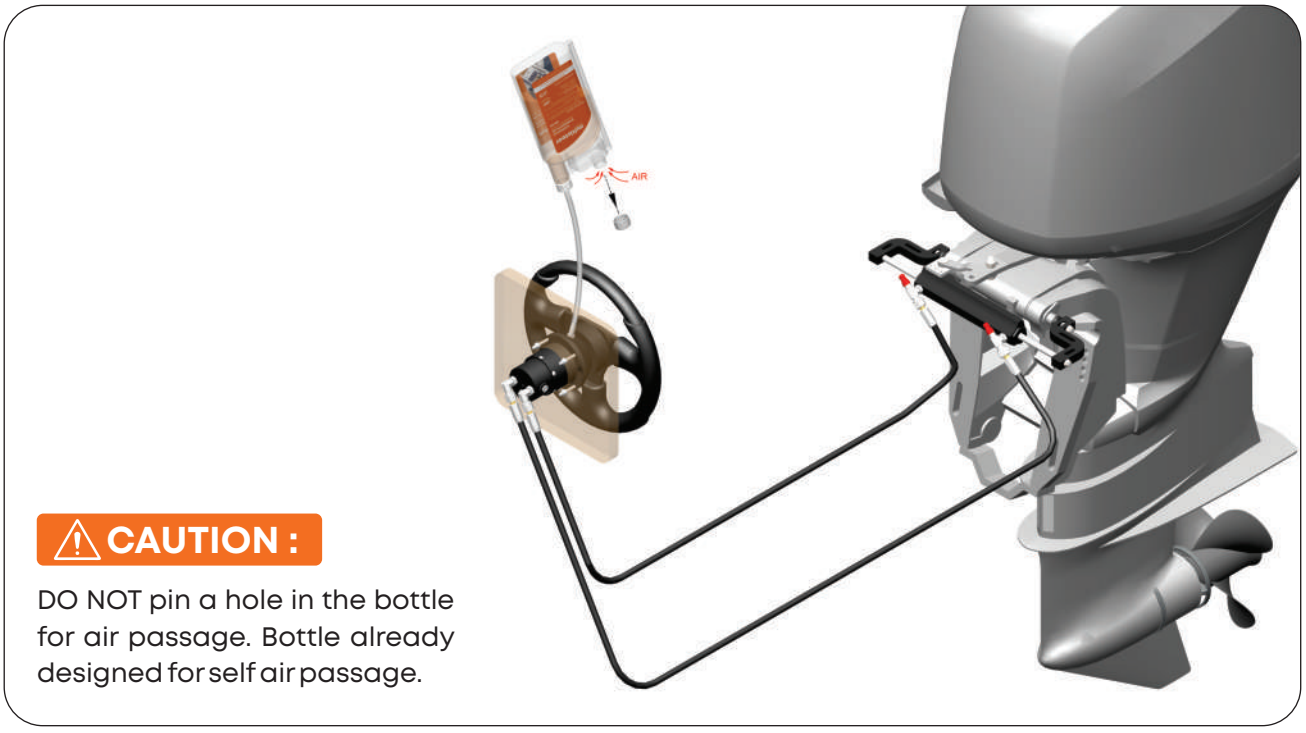
STEP 12 : Replace the cap of Oil Bottle with Oil Filling Kit as shown in the picture.



STEP 13 : Remove the Oil Filling Plug of Helm.



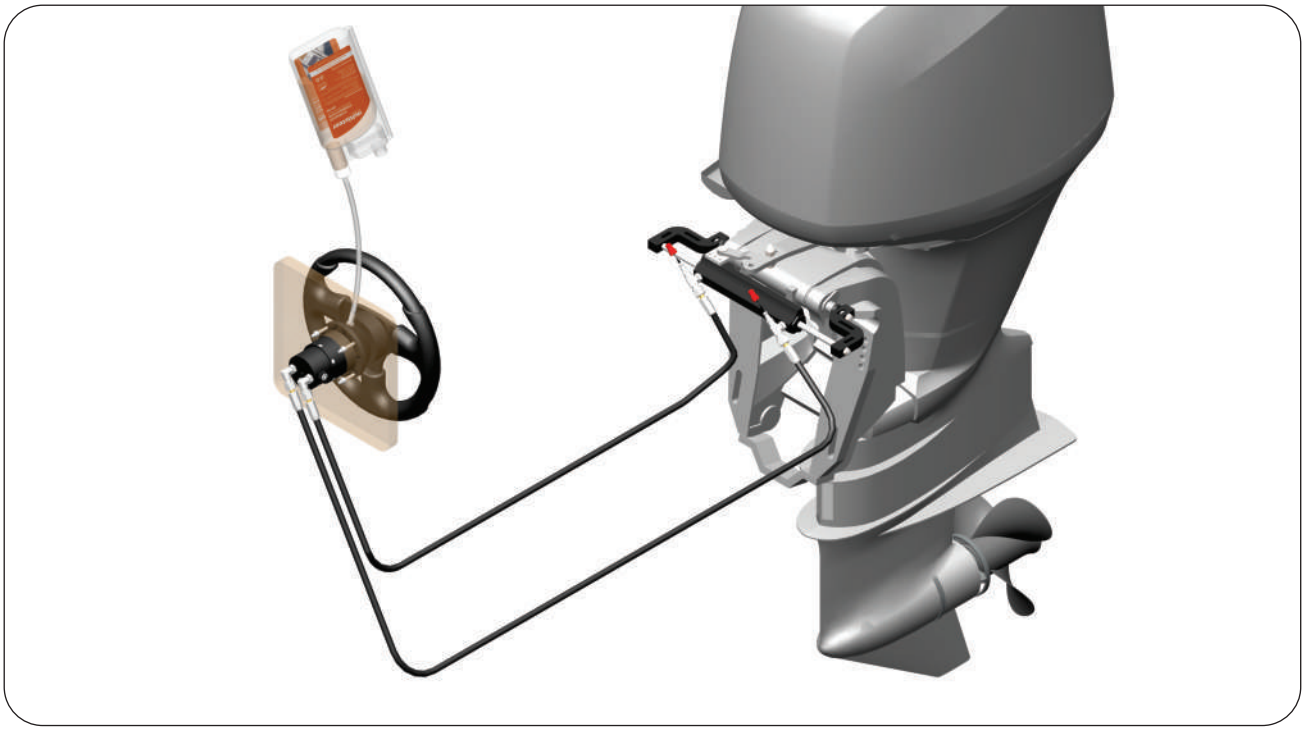
STEP 14 : Insert the threaded port of pipe into the Oil Filling Port of Helm. Turn the bottle upside down and carefully remove the other side of cap to ease the Oil passage towards the Helm. Fill the Helm until no air bubbles are visible in the pipe.



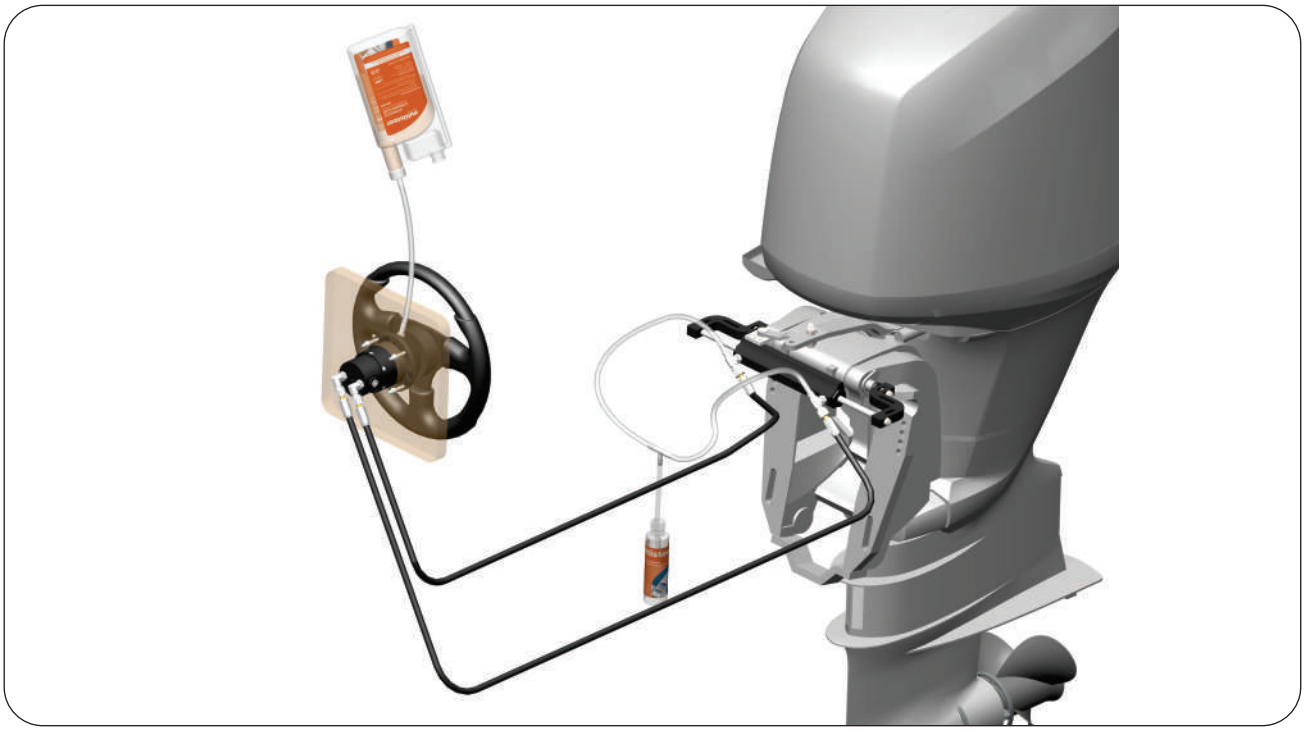
⚠ CAUTION :

DO NOT pin a hole in the bottle for air passage. Bottle already designed for self air passage.

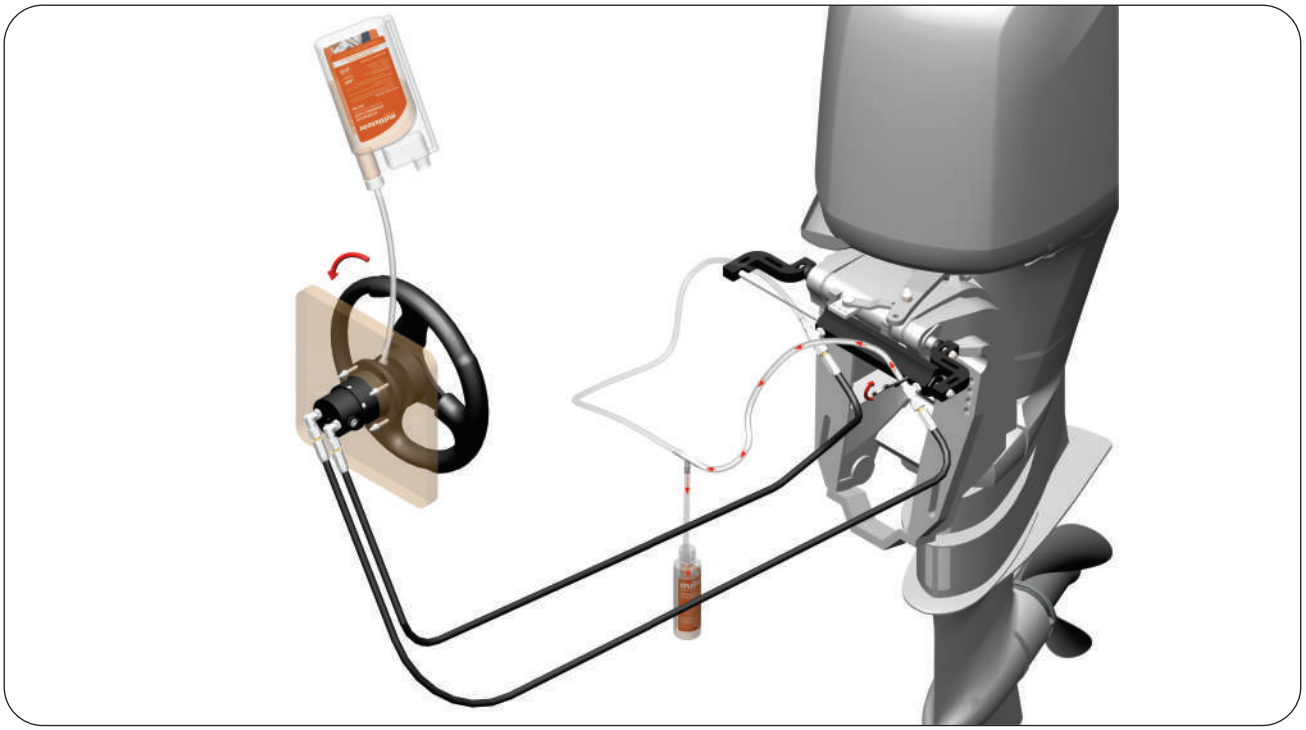
STEP 15 : Remove the protector cap of both the air bleeders.



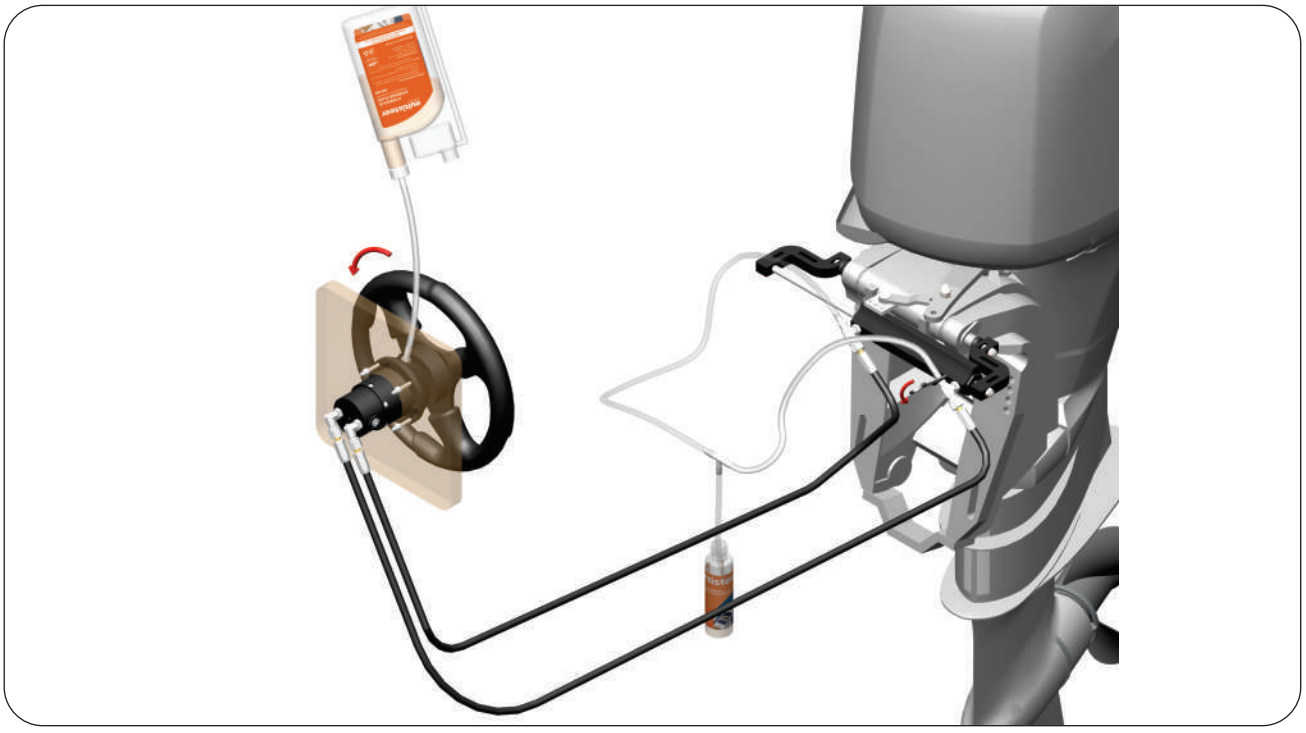
STEP 16 : Insert the other pipe supplied with the Cylinder into the air bleeders for collecting the Oil, coming out from the air bleeders during purging process.



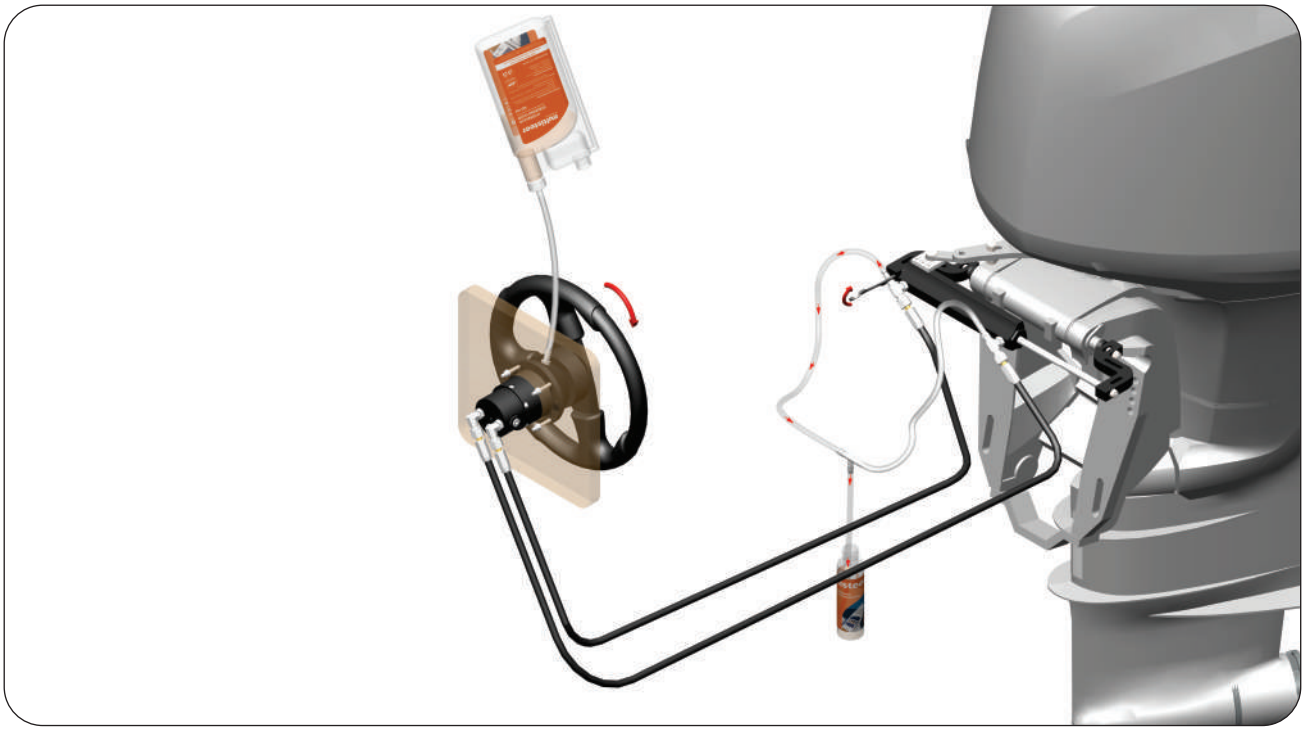
STEP 17 : Turn the Steering Wheel slowly towards starboard side, so that the Oil can come out of Hoses. Unscrew the port side air bleeder and allow the air & Oil (air bubbles) come out from air bleeder.



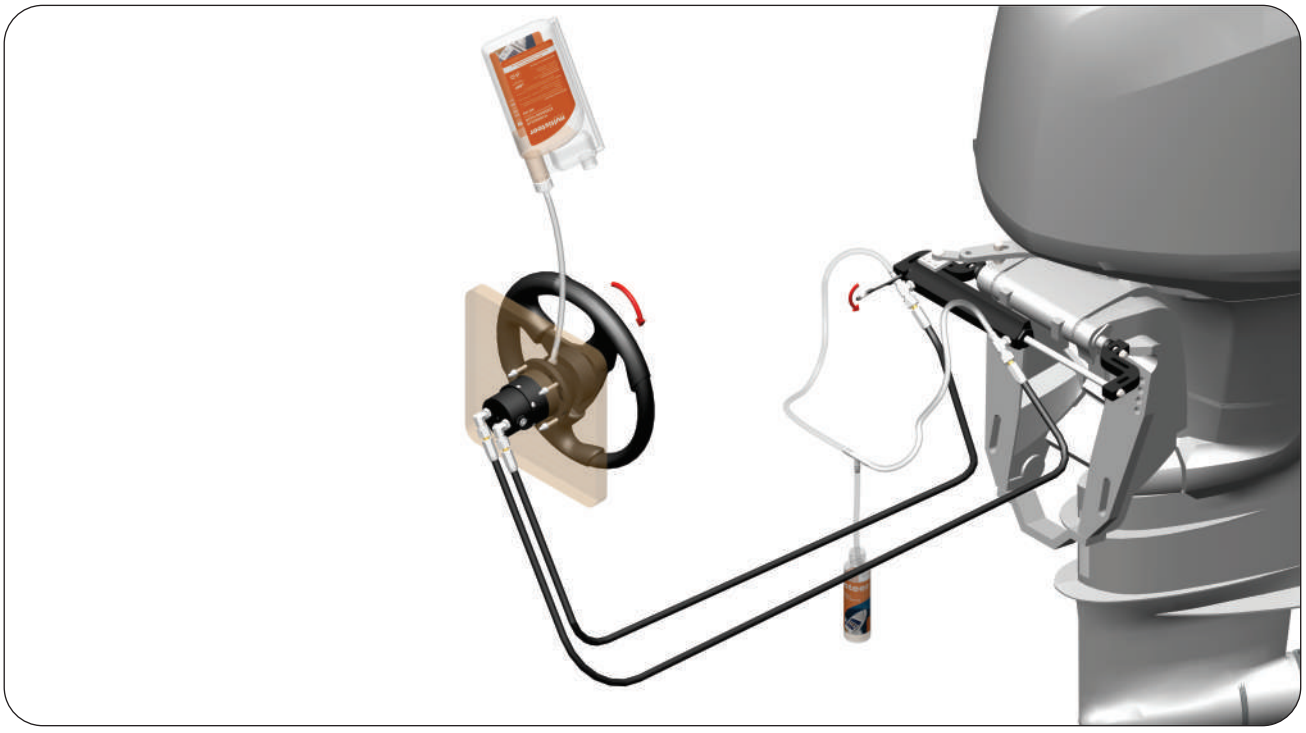
STEP 18 : Continue to turn the Steering Wheel towards starboard side. When the Oil comes out from air bleeder without air bubbles then carefully close the air bleeder. Do not overtight the air bleeder. Continue to turn the Steering Wheel in the same direction to fill the Cylinder chamber. During this phase, the Cylinder body will move to the opposite direction up to the end stroke.



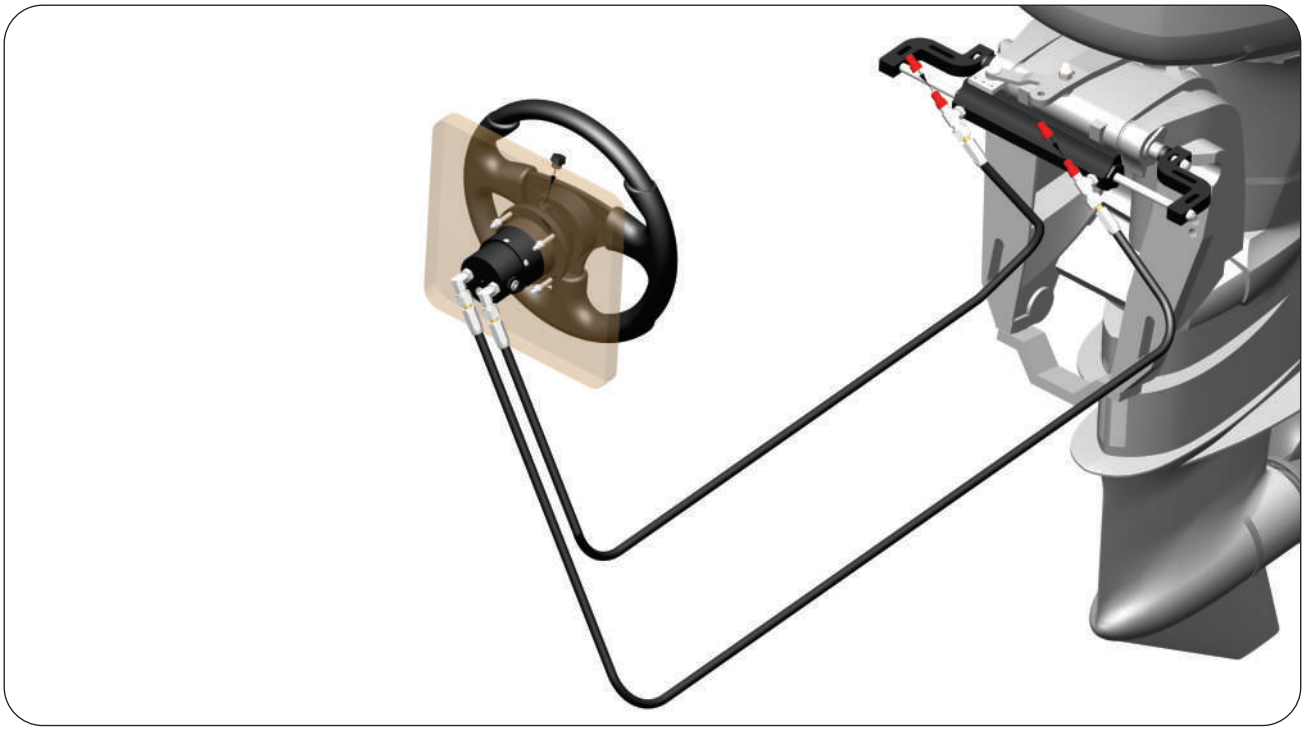
STEP 19 : Similarly turn the Steering Wheel slowly towards port side, so that the Oil can come out of Hoses. Unscrew the starboard side air bleeder and allow the air & Oil (air bubbles) come out from air bleeder.



STEP 20 : 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 overtight 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 21 : After completion of purging process insert the Oil Filling Plug into the Oil Filling Port of Helm and protector cap into the air bleeders.



STEP 22 : 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 STEERING SYSTEM AIR TESTING :

- 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 10 mm, 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 10 mm.

SYSTEM DIAGRAM

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SECTION 4 – TROUBLESHOOTING

4.1 FAULTS, CAUSE & SOLUTION

OH-115

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 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.

4.2 DISASSEMBLING

For any reason, if the system has to be put off, 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.

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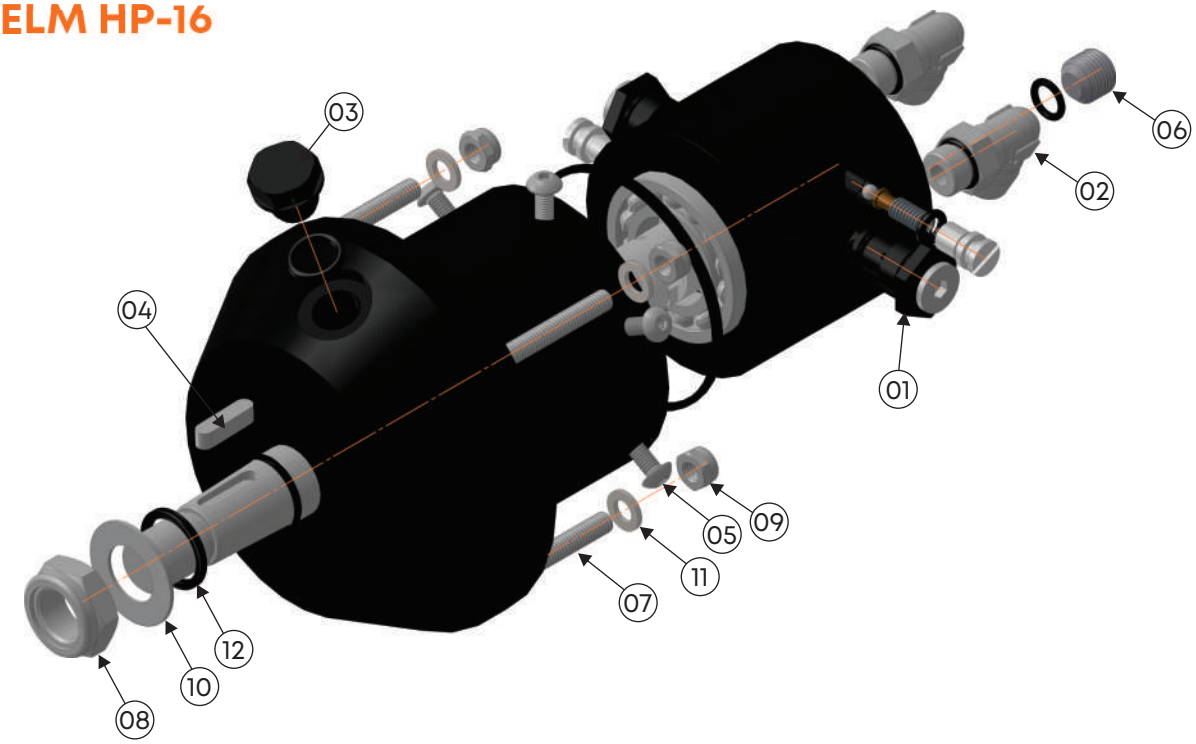
BY MULTIFLEX

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	OF1	Oil Fill Plug with Breather Hole	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

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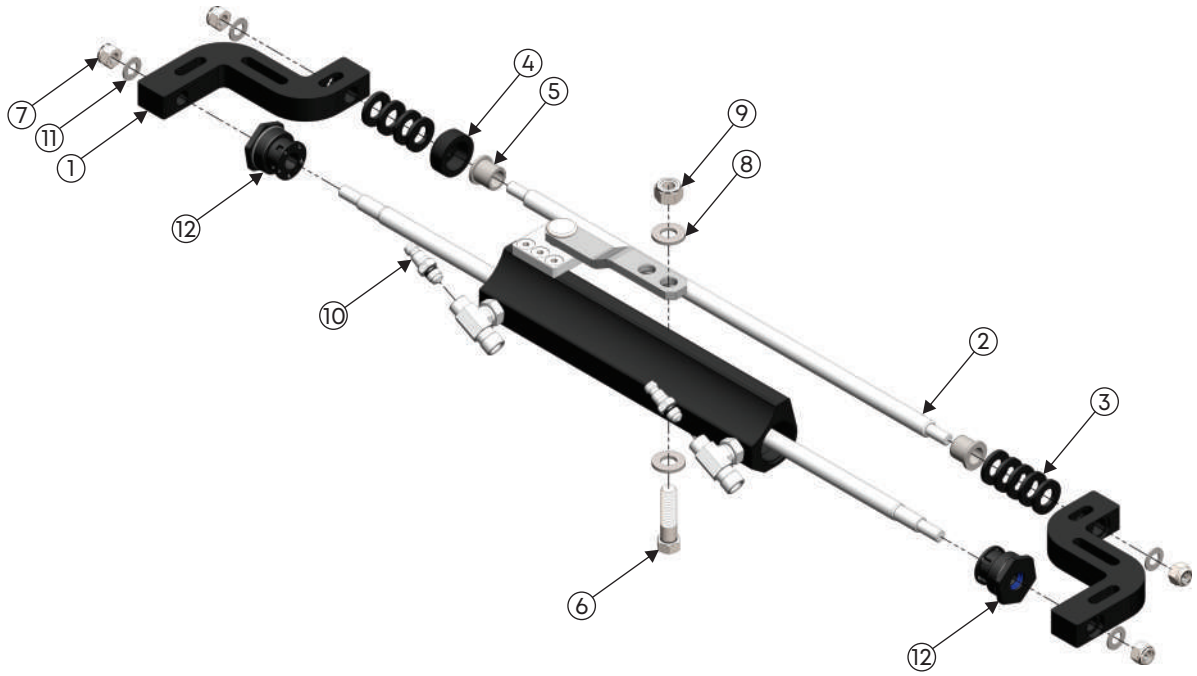
5.2 FRONT MOUNT CYLINDER OC-115



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

SECTION 6 – MAINTENANCE

6.1 PREVENTIVE MAINTENANCE

Hydraulic Steering System exterior surfaces should be cleaned after every use of the boat. It is very important to clean the Steering System as it is 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. MULTIFLEX recommends 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 manufacturer's recommended new fluid to fill your entire system. (You MUST NOT reuse the old Oil that was removed from system).
12. Once all your lines and parts are cleaned, put the system back together, refill with new fluid (read the owner's manual) and purge the system.

6.2 ROUTINE MAINTENANCE

Multisteer Steering System if properly installed and maintained, gives you years of safe and reliable performance.

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

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

1. Always check Oil level in Helm Pump.
2. Verify Steering response when turning the Steering 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.