

Installation and Maintenance Manual

HYDRAULIC CYLINDER FOR OUTBOARD ENGINES UC 128-0BF



CE

 **ULTRAFLEX**



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Dear Customer,

We would like to thank you for choosing an **ULTRAFLEX** product.

ULTRAFLEX has been a leader in steering systems for pleasure and professional boats for many years. **ULTRAFLEX** production is since ever synonymous of reliability and safety.

All **ULTRAFLEX** products are designed and manufactured to ensure the best performance. To ensure your safety and to maintain a high quality level, **ULTRAFLEX** products are guaranteed only if they are used with original spare parts.

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The quality management system involves all the company resources and processes starting from the design, in order to:

- ensure product quality to the customer;
- maintain and improve the quality standards constantly;
- pursue a continuous process improvement to meet the market needs and to increase the customer satisfaction

ULTRAFLEX Environmental Management System is certified CISQ-IQNet by the Italian Shipping Registry (RINA), in conformity with the UNI EN ISO 14001 rule. **ULTRAFLEX** certification No. EMS-1282/S.

Products for pleasure boats are constantly tested to check their conformity with the 2013/53/EU.



"**ULTRAFLEX** has over 80 years of experience in the marine industry and is a world leader in the production of mechanical, hydraulic and electronic steering systems, control boxes and steering wheels for any kind of pleasure, fishing or commercial boats.

The key factors which explain the increasing success of our products all over the world are the reliability of our products and the before and after sale service, the quality of the company organization and of the human resources and the continuous spending in research and development".

ULTRAFLEX S.p.A

16015 Casella (Genova) Italy - Via Crose, 2

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IMPORTANT:


The additional documents "Application Guide" and "Spare Parts List" are attached to this manual.


MANUAL USE AND SYMBOLS USED

THE INSTALLATION AND MAINTENANCE MANUAL is the document accompanying the product from its sale to its replacement and discharge. The manual is an important part of the product itself. It is necessary to read carefully the manual, before ANY ACTIVITY involving the product, handling and unloading included.

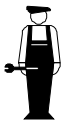
In this manual the following symbols are used to ensure the user safety and to guarantee the correct operation of the product:

 **DANGER** → Immediate hazards which CAUSE severe personal injury or death.

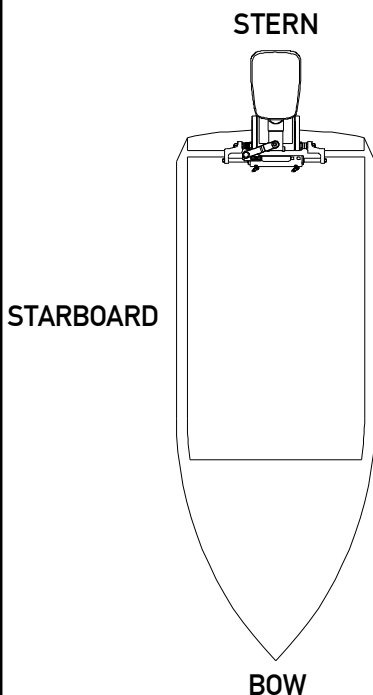
 **WARNING** → Denotes that a hazard exists which can result in injury or death if proper precautions are not taken.

 **CAUTION** → Denotes a reminder of safety practices or directs attention to unsafe practices which could result in personal injury or damage to the craft or components or to the environment.

NOTICE → Important information for the correct installation and for maintenance, that does not cause any damage.



→ The symbol aside indicates all the operations which must be carried out by qualified or skilled staff, in order to avoid hazards. We recommend training the staff in charge of the product installation and checking their knowledge.



PORT → The picture aside explains the meaning of some nautical words contained in this manual.



INTRODUCTION

This installation and maintenance manual represents an important part of the product and must be available to the people in charge of its use and maintenance.

The user must know the content of this manual.

ULTRAFLEX declines all responsibility for possible mistakes in this manual due to printing errors.

Apart from the essential features of the described product, **ULTRAFLEX** reserves the right to make those modifications, such as descriptions, details and illustrations, that are considered to be suitable for its improvement, or for design or sales requirements, at any moment and without being obliged to update this publication.

ALL RIGHTS ARE RESERVED. Publishing rights, trademarks, part numbers and photographs of **ULTRAFLEX** products contained in this manual are **ULTRAFLEX** property.

Great care has been taken in collecting and checking the documentation contained in this manual to make it as complete and comprehensible as possible. Nothing contained in this manual can be interpreted as warranty either expressed or implied - including, not in a restricted way, the suitability warranty for any special purpose. Nothing contained in this manual can be interpreted as a modification or confirmation of the terms of any purchase contract.

WARNING

To ensure the correct product and component operation, the product must be installed by qualified staff. In case of part damage or malfunction, please contact the qualified staff or our Technical Assistance Service.

TECHNICAL ASSISTANCE SERVICE

UFLEX S.r.l.

Via Milite Ignoto,8A
16012 Busalla (GE)-Italy
Tel: +39.010.962.0239 (Italy)
Tel: +39.010.962.0244 (abroad)
Fax: +39.010.962.0333
Email: ut@ultraflexgroup.it
www.ultraflexgroup.it

North - South - Central America:

UFLEX USA

6442 Parkland Drive
Sarasota, FL 34243
Tel: +1.941.351.2628
Fax: +1.941.360.9171
Email: uflex@uflexusa.com
www.uflexusa.com

WARRANTY

ULTRAFLEX guarantees that its products are well designed and free from manufacturing and material defects, for a period of two years from the date of manufacturing.

For the products which are installed and used on working or commercial boats the warranty is limited to one year from the date of manufacturing.

If during this period the product proves to be defective due to improper materials and/or manufacture, the manufacturer will repair or replace the defective parts free of charge.

Direct or indirect damage is not covered by this warranty. In particular the company is not responsible and this warranty will not cover the damage resulting from incorrect installation or use of the product (except for replacement or repair of defective parts according to the conditions and terms above).

This warranty does not cover the products installed on race boats or boats used in competitions.

The descriptions and illustrations contained in this manual should be used as general reference only.

For any further information please contact our Technical Assistance Service.

ULTRAFLEX steering system components are marked  according to the Directive 2013/53/EU.

We remind you that only  marked steering systems must be used on the boats marked .

We inform you that the **ULTRAFLEX** warranty is null if some **ULTRAFLEX** components are installed on a steering system together with products of other brands.

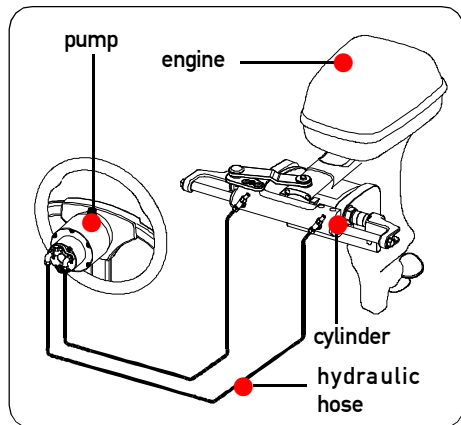


1 PRODUCT DESCRIPTION

1.1 Hydraulic steering system operation

ENGLISH

All **ULTRAFLEX** hydraulic steering systems are designed in conformity with UNI-EN-ISO 10592 and A.B.Y.C. P21 regulations. All **ULTRAFLEX** steering systems can operate at temperatures between -18°C (0°F) and +77°C (+170°F). All the components are made for the marine environment, using materials and working processes which offer long life and safety under the most extreme conditions. A hydraulic steering system consists of a steering pump, a cylinder tied to the rudder or to the outboard or sterndrive engine and the connecting hoses (see picture). Under normal operating conditions, a turn of the steering wheel will pump the oil, which flows in through the hoses to the cylinder, according to the turn direction. With the consequent cylinder movement the oil will flow to the pump through the hoses and at the same time moves the engine or the helm which are connected to the cylinder. The pumps are equipped with a valve, which prevents outgoing fluid from returning along the same hose. It also allows the operation of the steering systems with two or more steering stations. The cylinders are double acting and may be balanced or unbalanced. In the unbalanced cylinders the two chambers have different volumes and so they need a different number of turns of the steering wheel and a different rotation effort. The balanced cylinders have same number of steering wheel turns in order to move the helm from the center to the end stroke in the two opposite directions. A well balanced steering system needs a correct choice of the pump for the cylinder. **ULTRAFLEX** produces different pump models, which have different capacity (cm³ of oil moved each steering wheel turn) and for each type of installation. While choosing the pump it is important to consider the cylinder volume. The number of starboard and port turns is determined by the ratio between the cylinder volume and the pump capacity.



Example: if the pump has a capacity of 28 cm³[1.7cu.in.] and the cylinder has a volume of 120 cm³[7.3cu.in.], the formula looks like this: $120/28=4.2$. Accordingly, the steering wheel will turn 4.2 times before the cylinder will completely turn from one side to the other. In case of installations with double cylinders connected in parallel the cylinder volume must be added. Applications with less than 4 turns are not recommended, as they need a higher effort, also applications with more than 8 turns are also not recommended, as the response of the boat to steer is slowly. The maximum operating pressure is 7.0MPa (70 bar) (1000 PSI).

1.2 Warnings for the product correct use

⚠ WARNING

Before beginning the installation, check the mounting compatibility of the UC128-OBF cylinder to the engine by consulting the attached document "Application Guide" contained in the packaging.

⚠ DANGER

Do not modify the steering cylinder in any way to fit it to your engine application, otherwise the cylinder will no longer operate in safety and it will endanger the boat and the occupants.

⚠ WARNING

All **ULTRAFLEX** steering systems must not be installed on boats equipped with engines whose maximum horsepower is higher than the horsepower rating approved by boat manufacturer.

⚠ WARNING

ULTRAFLEX hydraulic steering systems should not be used in racing applications.

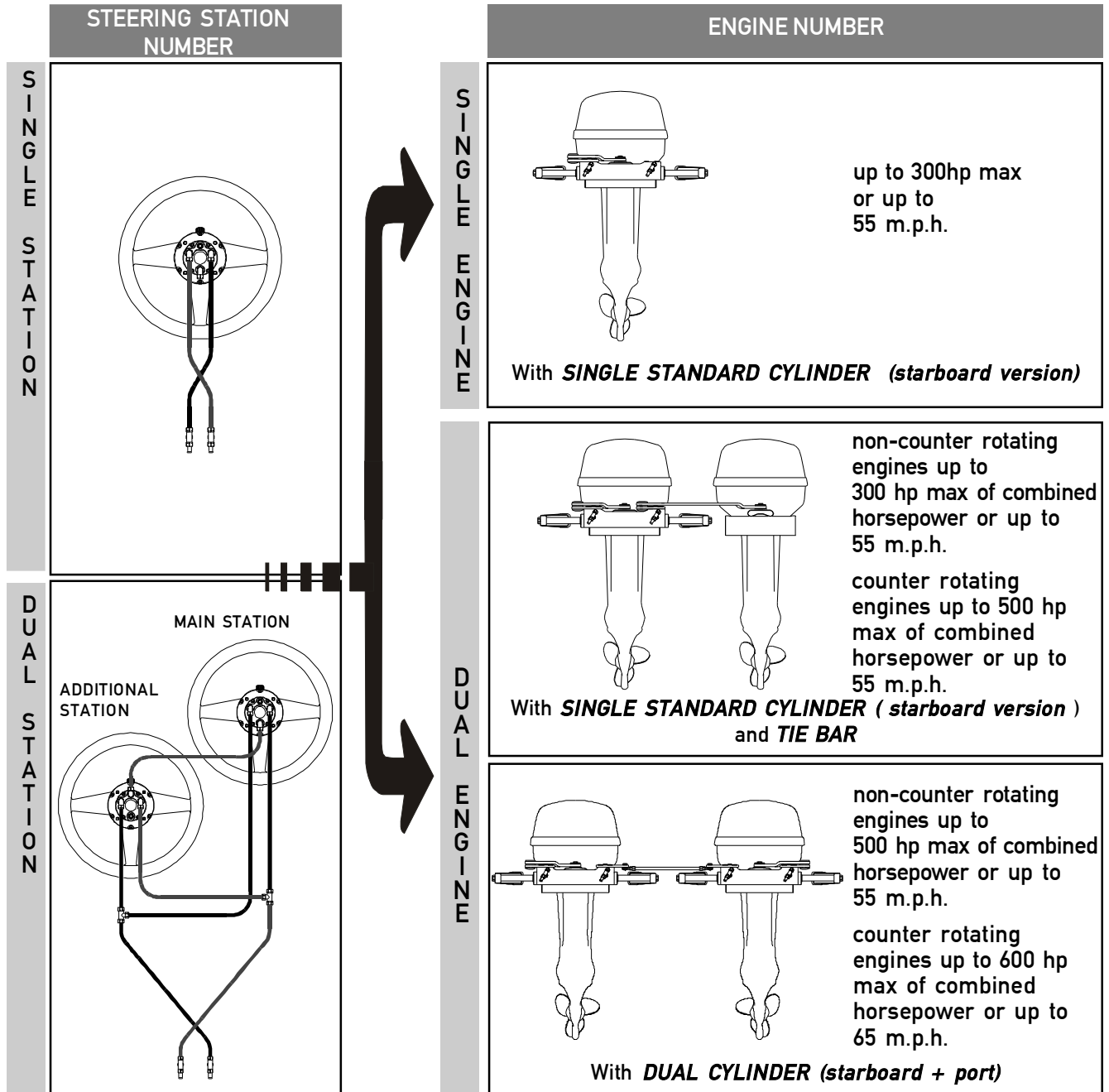
⚠ DANGER

To avoid product damage, do not disassemble pre-assembled components.



1.3 Configurations

The hydraulic cylinder for outboard engine UC128-0BF model can be installed with different configurations according to the number and the type of engines used with a single or dual engine steering system. The possible configurations are:



NOTICE

On request, triple outboard engine applications are available. For detailed information, please contact **ULTRAFLEX** Assistance Service.

⚠ DANGER

Dual engine installations require the use of a tie bar.

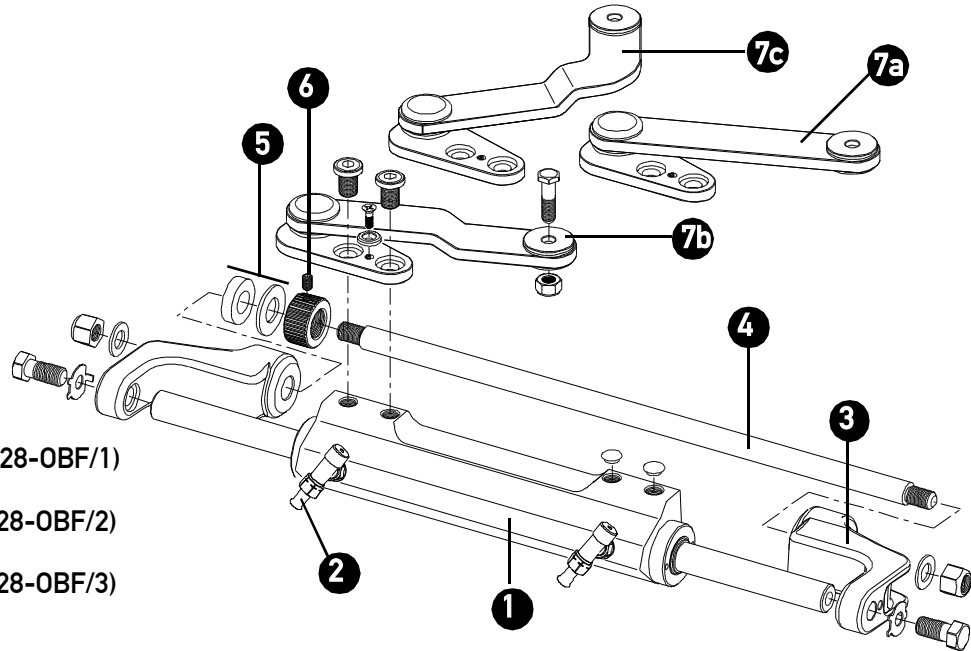


1.4 UC128-OBF cylinder description

UC128-OBF is a hydraulic outboard front mount cylinder which has been designed and manufactured to be used as a component in the hydraulic steering systems, as described in the previous paragraph. The cylinder is installed to the tilt tube rod of the available engines on the market as shown in the attached document "Application guide". It is possible to meet all the different cylinder applications due to the three different link arms and a proper spacer kit. For the dual engine application, the single cylinder must be mounted with a tie bar (see par. 1.3) or two cylinders (standard + port) connected by a tie bar can be used. In the standard version the link arm is mounted on the starboard side, while in the port version it is mounted on the port side (see picture in par. 1.5). The following picture shows the main cylinder components:

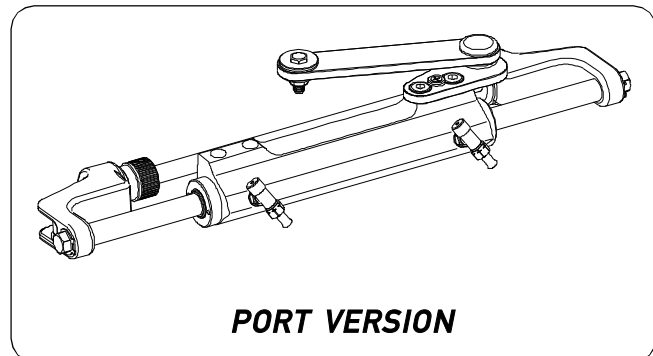
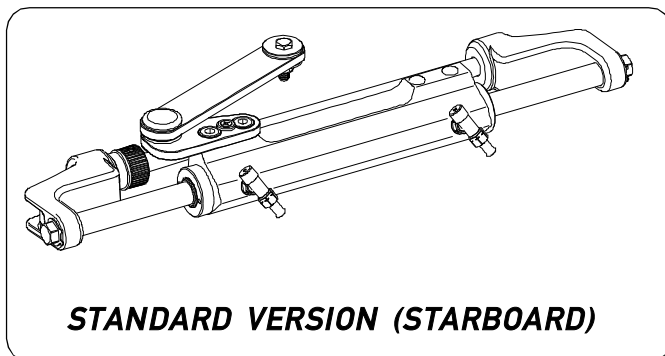
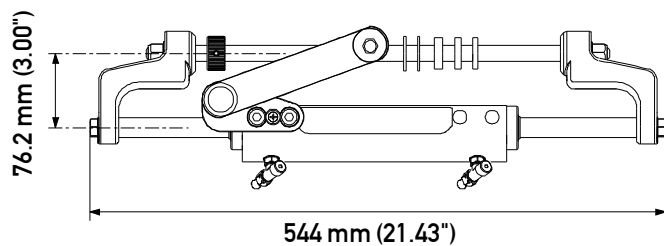
ENGLISH

- 1 Cylinder body
- 2 Bleeders
- 3 Bull horns
- 4 Tilt tube rod
- 5 Spacers
- 6 Adjustment collar
- 7a Straight link arm (UC128-OBF/1)
- 7b Shaped link arm (UC128-OBF/2)
- 7c Curved link arm (UC128-OBF/3)



1.5 Technical features

SPECIFICATIONS	UC128-OBF/1 -/2 -/3
Volume	120 cc - 7.8 cu. in
Output force	450 Kg - 992 lbs (@70 bar)
Inside diameter	35 mm - 1.37"
Stroke	198 mm - 7.79"
Oil	OL150 Ultraflex



⚠ CAUTION

*The cylinder output force is a theoretical force with a system pressure of 105 bar. This force does not correspond to the one normally used by the system but it represents the limiting conditions of use.



2 TRANSPORT

2.1 General warnings

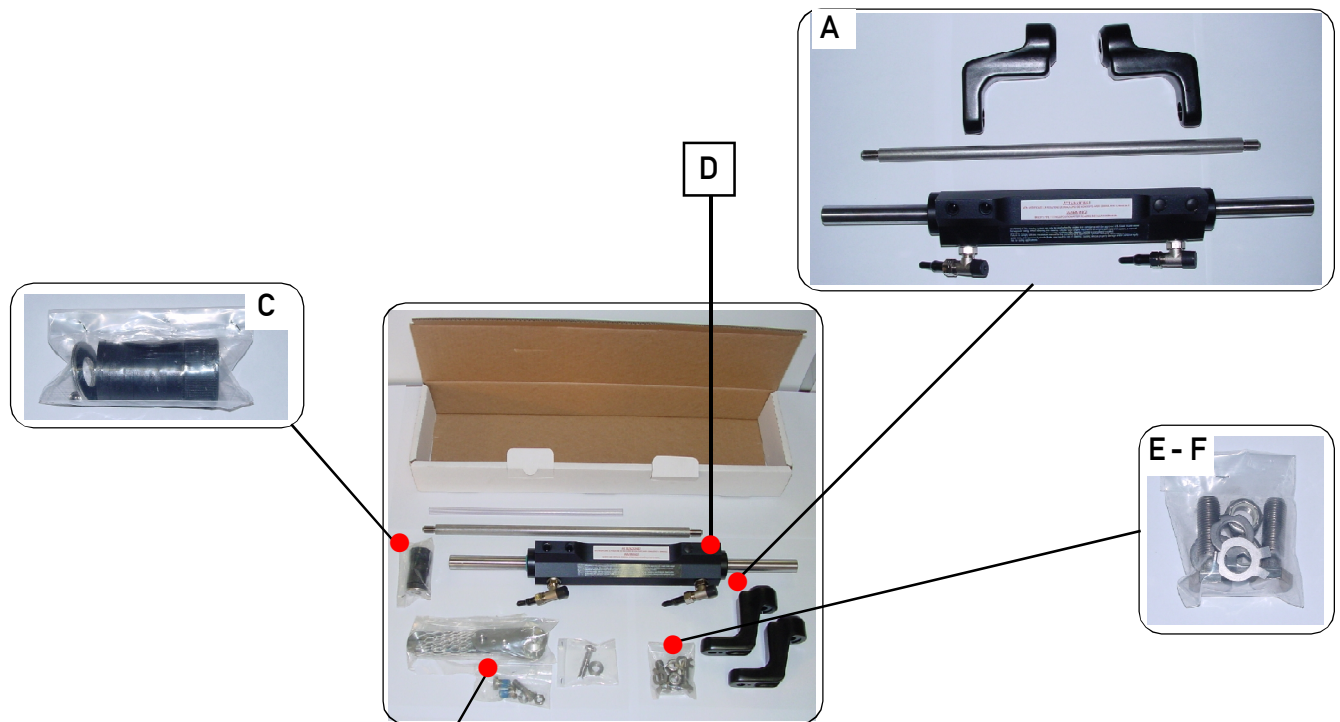
The product weight with its packaging is 8kg (18 pounds) and so it can be handled manually.

⚠ WARNING

The staff in charge of handling must operate with protective gloves and safety shoes.

2.2 Packaging contents

Before using the equipment check that the product has not been damaged during transport. Also make sure that all the standard components are in the packaging (see list). In case of damage, notify the claim to the forwarder and inform the supplier.



CONTENTS OF THE STANDARD PACKAGING:

- A) No.1 cylinder body with rod, fittings and bull horns;
- B) No.1 link arm kit composed of:
 - No.1 link arm;
 - No.2 allen screws with No.1 safety screw and lock washer;
 - No.1 bolt + nut;
 - No.1 kit for Suzuki engines (not OBF/3 version);
- C) No. 1 spacer kit composed of:
 - No.8 plastic spacers;
 - No.2 steel spacers;
 - No.1 ring nut for adjustment collar;
- D) No.2 caps for the cylinder body;
- E) No.2 bolts + No.2 lock washers;
- F) No.2 locknuts + n°2 washers;

⚠ CAUTION

The packaging must be disposed of according to the existing laws.

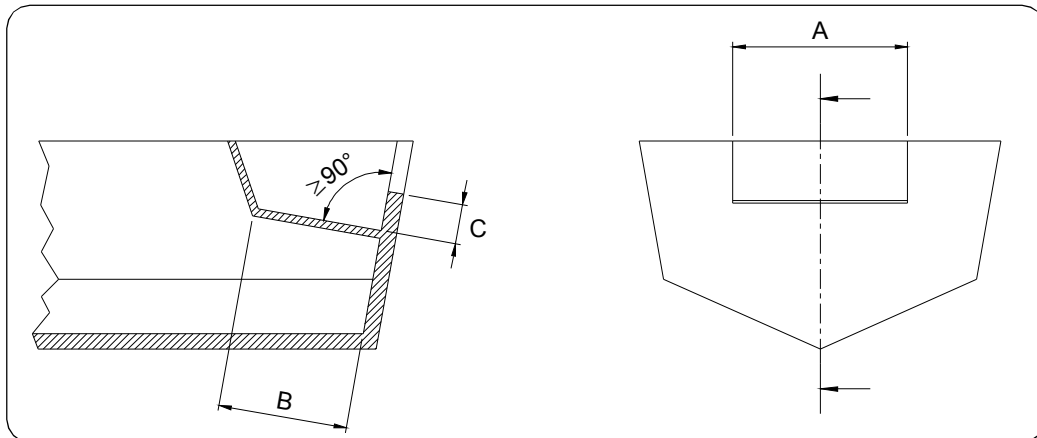


3 INSTALLATION

3.1 Minimum transom requirements

ENGLISH

The following picture shows the minimum splash well dimensions. These dimensions must be respected in order to prevent the cylinder from being damaged when the outboard engine is completely tilted upwards. The picture shows also the minimum transom dimensions, needed for the installation and the correct operation of the engine steering cylinder.



MINIMUM SPLASH WELL DIMENSION REQUIREMENTS			
Engine No.	A	B	C
1	560 mm - 21.25"	152 mm - 5.98"	152 mm - 5.98"
2	1110 mm - 43.70"	152 mm - 5.98"	152 mm - 5.98"

⚠ WARNING

ENGINE JACK PLATE APPLICATION TO THE TRANSOM.

A jack plate installation will change all the application clearances. A new clearance check must be completed with the tilting of the engine in conjunction with the vertical movement of the jack plate in all the possible positions. If the steering cylinder comes into contact with the splash well, transom and/or jack plate, **stop the installation immediately!** Use the jack plate manufacturer's instructions to limit the upper or lower direction in which the interference occurs. If this is not possible please contact specialized staff.

3.2 Necessary tools



Allen wrench
8mm [5/16"]



Allen wrench
[1/8"]



Open end
wrench
9/16"



Open end
wrench
19mm



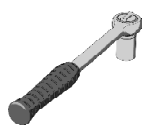
Open end
wrench
14mm



Open end
wrench
3/4"



Open end
wrench
11/16"



Torque wrench



MOLYKOTE® 1000



Phillips
screwdriver



Pliers

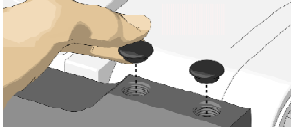


3.3 Standard (starboard) cylinder installation



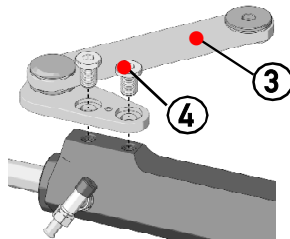
⚠ CAUTION

During the installation phases use only stainless steel tools to avoid the corrosion of the metal parts.

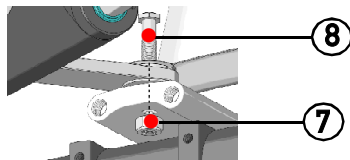


1 In case of single cylinder installation mount the supplied caps on the cylinder body as shown in the picture.

3 Mount the link arm (3) on the cylinder body as shown in the picture by means of the supplied screws (4). Tighten the supplied screws by using a 8mm Allen wrench with a torque of 76[Nm] (56 [lb ft]).



5 Position the engine straight so that its arm is perpendicular to the transom.



6 With reference to the application instructions contained in the Application Guide, connect the link arm to the tiller arm by means of the screw (8), tighten it by using a 14mm wrench with a torque of 40[Nm] (29.5 [lb ft]). Tighten the self-locking nut (7) by using a 9/16" wrench with a torque of 25[Nm] (18.5 [lb ft]). After tightening the locknut (7), check for the right torque 40[Nm] (29.5 [lb ft]) of the screw (8).

⚠ WARNING

In order to tighten screw (8) and the self-locking nut (7) on the tiller arm, ask your mechanic the maximum allowed torque. If it is lower than that shown in this manual, always use the torque indicated by your mechanic.

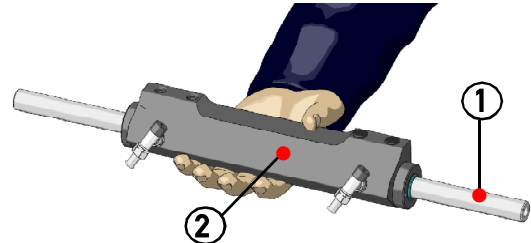
⚠ CAUTION

If the self-locking nut (7) is disassembled, replace it. (Contact our technical assistance service, see page 5).

⚠ WARNING

It is important to check periodically, at least every 3 months (or every month for professional uses), the right torque of this screw (8) and of the locknut (7).

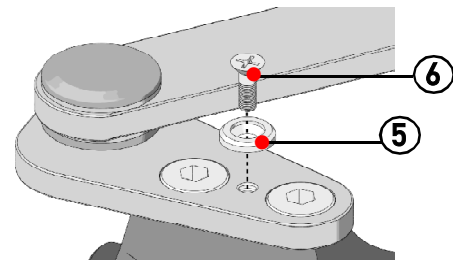
2 After removing the protective caps of the fittings, manually center the rod (1) on the cylinder body (2).



⚠ CAUTION

During this phase an oil leak from the fittings can occur. This oil must not be discharged into the sea in any case.

4 Position the lock washer (5) and tighten it with the screw (6), by using Loctite 270 (torque 3[Nm] (2 [lb ft])).

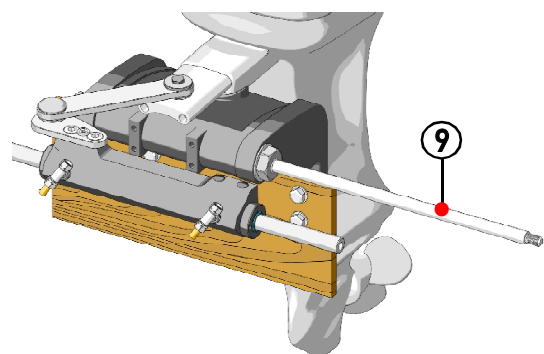


⚠ WARNING

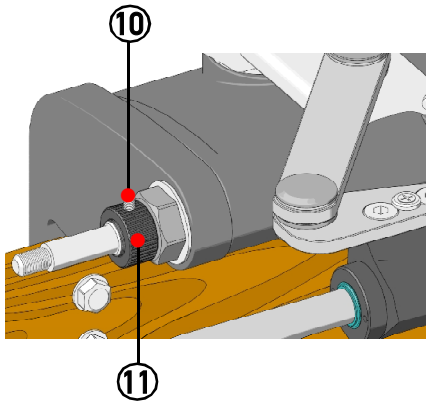
The operations described in points 3 and 4 must be carried out only during the first installation. The choice of the link arm depends on the engine type (see attached Application Guide). Do not disassemble the arm from the cylinder body in any case.

7 Grease the tilt tube rod (9), by using marine grease.

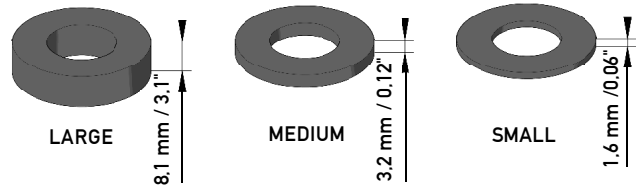
8 Insert the tilt tube rod (9) into the tilt tube.



9 Fit the set screw (10) on the adjustment collar (11) and screw it to the right side of the tilt tube until it comes into contact with the tilt tube stop nut, even in case of port applications.



10 With reference to the 'Application Guide' choose the spacers for the tilt tube rod.

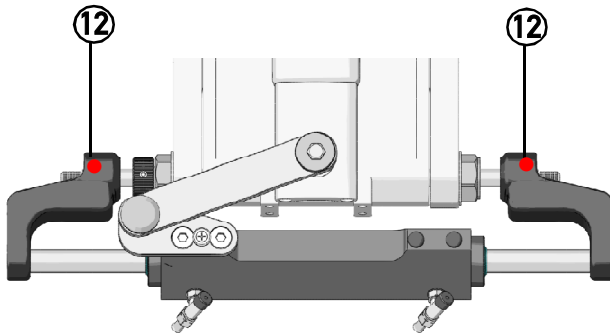


NOTICE

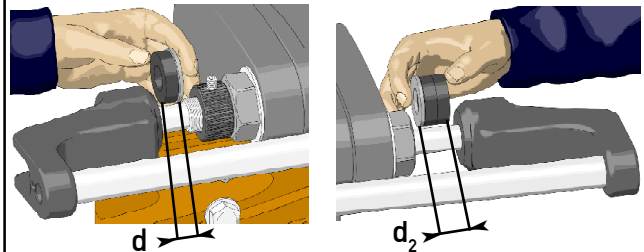
In this phase ensure that the cylinder body is centered on the rod and that the engine is perpendicular to the transom.

The number and position of the spacers shown in the Application guide are indicative only.

11 Insert the right and left bull horns (12) by connecting the rod and the tilt tube rod as shown in the picture without tightening them.



12 Choose and check the spacers to fill the gap between ring nut and bullhorn d and d_2 between tilt tube and bullhorn considering the thickness of the stainless washer.



WARNING

Always leave a minimum clearance between spacers and bullhorn in order to allow the rod tilting in the tilt tube.

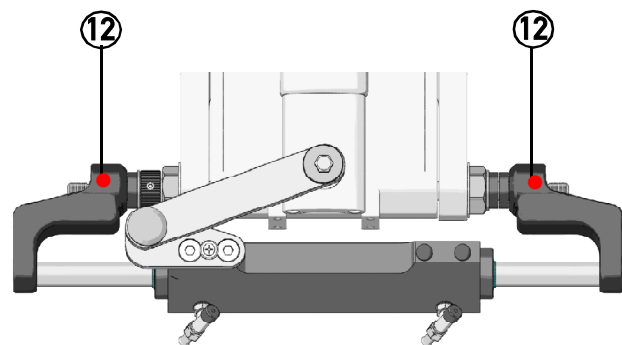
13 Once the correct spacers have been chosen, remove the bull horns.

14 Insert the plastic and stainless steel spacers and the two stainless washer on the tilt tube rod.

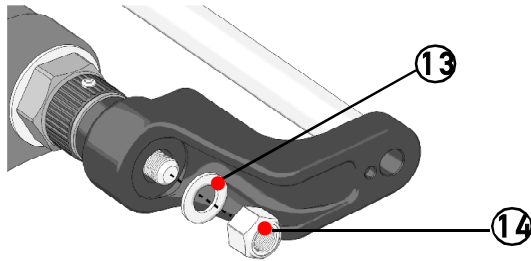
NOTICE

Both the stainless steel spacers must be positioned towards the tilt tube on the opposite side of the bull horns to avoid their wear during engine lifting and lowering.

15 Insert the right and left bull horns (12) by connecting rod and tilt tube rod as shown in the picture.



16 Insert the washers (13) on the two ends of the tilt tube rod, grease the nut thread (14) with some anti-seize grease type MOLYKOTE® 1000 or a similar one, screw them by using a 3/4" wrench and tighten them with a torque of 70[Nm] (52[lb ft]).



⚠ WARNING

If the self-locking nuts (14) are disassembled, replace them. (Contact our technical assistance service, see page 5).

17 Position the lock washers (15) and lock screw (16) by using a 19mm wrench with a torque of 70[Nm] (52 [lb ft]) after greasing them with anti-seize grease type MOLYKOTE® 1000 or a similar one.

NOTICE

The lock washer tabs must be bent afterwards (see point 22).

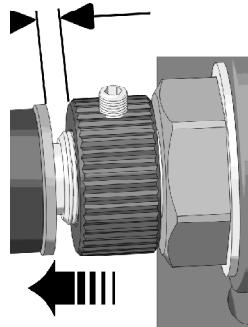


18 Check the correct tilting of the engine.

⚠ WARNING

If while tilting the engine is blocked, reduce the overall dimensions of the spacers.

19 Unscrew the adjustment collar (11) and bring it into contact with the stainless washer, until the clearance is eliminated.



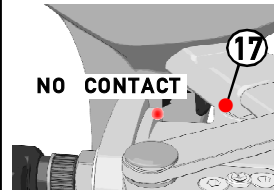
NOTICE

Do not use any tool for this operation.

20 Check the correct cylinder installation by moving manually the engine on the right and on the left.

NOTICE

The rotation must be as symmetric as possible between port and starboard so that the steering angle is the same on both sides.



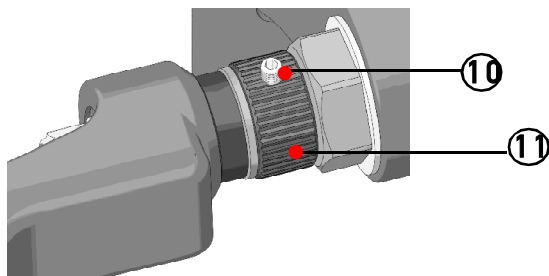
⚠ WARNING

The engine must stop through the cylinder end stroke without coming into contact with the mechanical stop (17) on the engine.

NOTICE

Otherwise it is necessary to modify the installation, by changing the thickness of the spacers and by repeating the procedure from point 13.

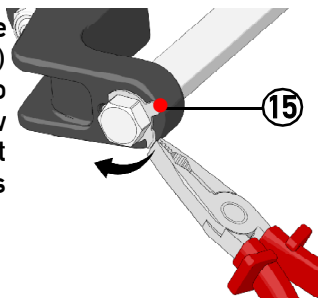
21 Tighten the set screw (10) on the adjustment collar (11) by a 1/8" Allen wrench with a torque of 3[Nm] (2 [lb ft]).



NOTICE

Check periodically the clearance absence between the ring nut and the tilt tube otherwise eliminate the clearance through the adjustment ring nut (11).

22 Bend the tabs of the lock washers (15) bringing them into contact with the screw head and taking care not to damage the bull horns while using the pliers.



23 Check again the correct engine movement both during the right/left rotation and during the tilting.

⚠ WARNING

In this phase clearance should be enough to avoid frictions but it should not be excessive since it could cause engine instability. In case of contact with the transom, stop the installation and contact the specialized staff.

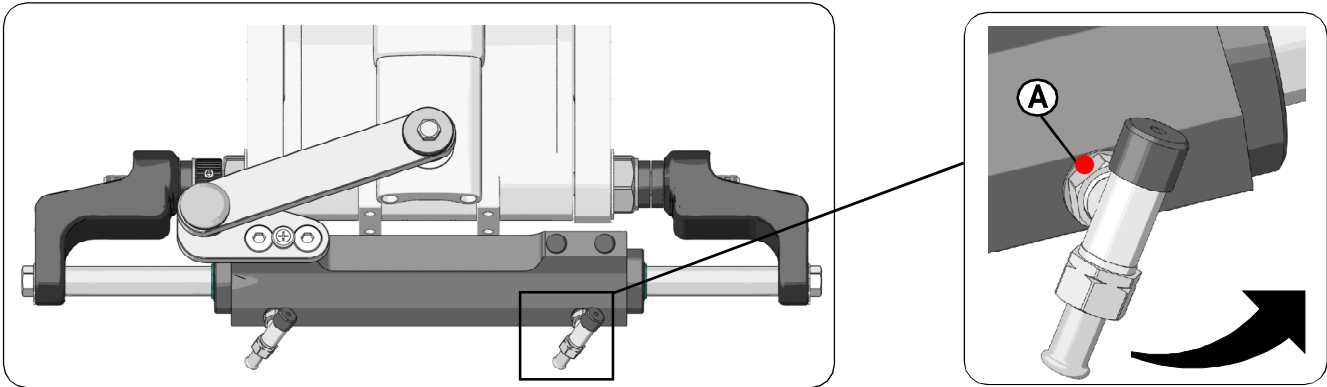


3.4 Hose installation



The two fittings mounted on the cylinder body are already oriented and are ready to be used. If for practical reasons the orientation must be changed, do as follows:

ENGLISH



1. loose the locknut (A) by using a 11/16" wrench;
2. orient the fittings according to the requirements;

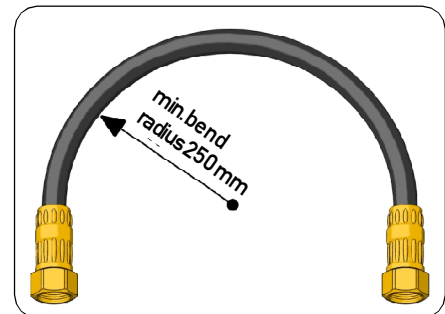
⚠ DANGER

Do not unscrew the fittings more than one turn (360°).

3. tighten again the stop nut with a torque of 20[Nm] (15[lb ft]) until the washer comes into contact with it.

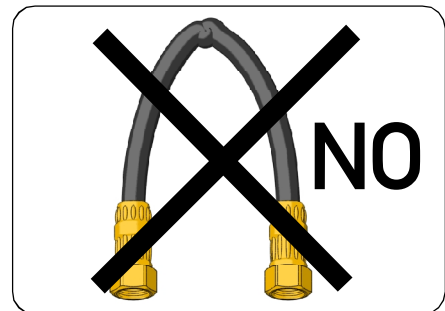
Screw the hoses on the cylinder fittings with a torque of 20[Nm] (15[lb ft]) according to the following instructions:

- minimum hose bend radius 250 mm;
- no interference during engine tilting;
- no interference with the transom;



⚠ WARNING

An excessive hose bend could result in its internal breaking which will cause a bad operation of the system. In this case it is necessary to replace the damaged hose.



3.5 Type of installation

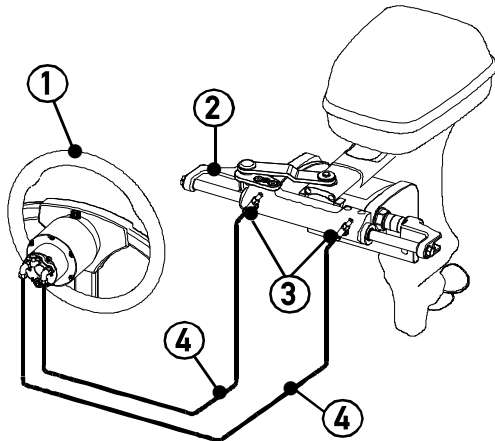


The UC128-OBF hydraulic cylinder for outboard engines can be installed with different configurations according to the number and the type of engines used with a single or dual steering system. The possible configurations are:

⚠ CAUTION

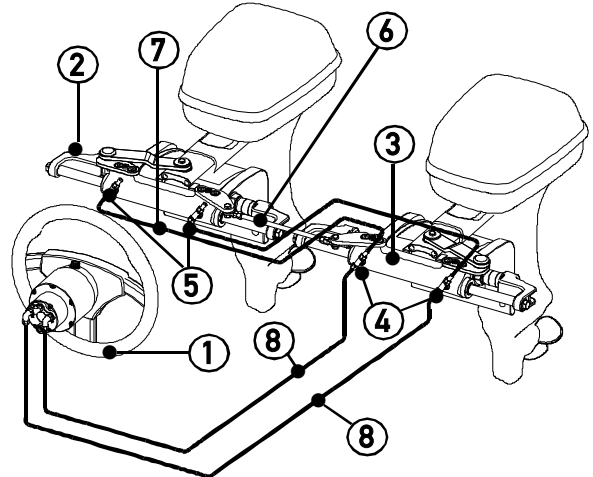
Connect hoses as shown in the following pictures:

SINGLE STATION / SINGLE CYLINDER:



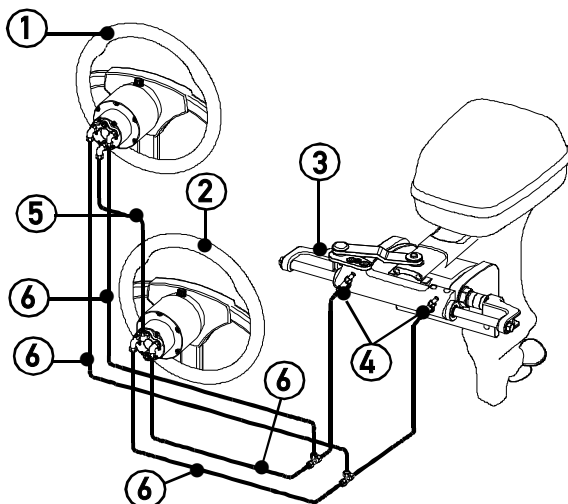
- 1. helm
- 2. starboard cylinder
- 3. "T" fittings
- 4. kit OB

SINGLE STATION / DUAL CYLINDER:



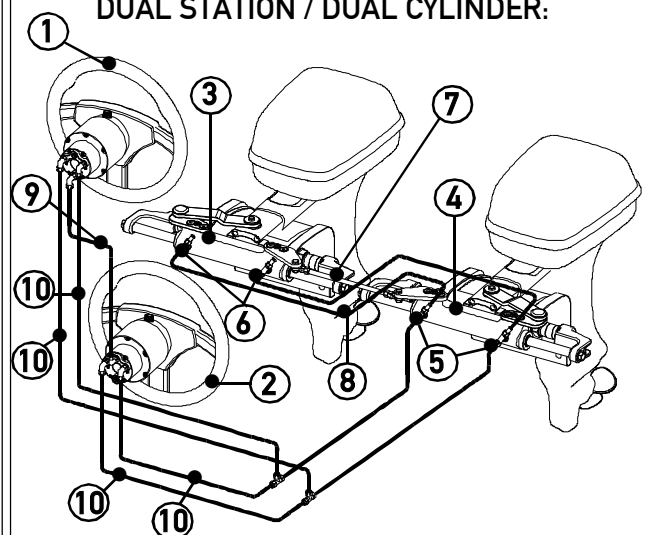
- 1. helm
- 2. starboard cylinder
- 3. port cylinder
- 4. "T" fittings
- 5. "T" fittings
- 6. tie bar
- 7. kit OB-2C
- 8. kit OB

DUAL STATION / SINGLE CYLINDER:



- 1. upper station helm
- 2. lower station helm
- 3. starboard cylinder
- 4. "T" fittings
- 5. kit OB-2S
- 6. kit OB

DUAL STATION / DUAL CYLINDER:



- 1. upper station helm
- 2. lower station helm
- 3. starboard cylinder
- 4. port cylinder
- 5. "T" fittings
- 6. "T" fittings
- 7. tie bar
- 8. kit OB-2C
- 9. kit OB-2S
- 10. kit OB



3.6 Filling and purging



After the first installation and after maintenance operations it is necessary to fill the system with hydraulic oil. This operation must avoid the air in the system, to ensure the good system operation. The hydraulic system must be filled from the highest point of the system, which means from the upper steering station.

⚠ CAUTION

To avoid air bubbles in the oil, it is necessary to fill the tank slowly.

⚠ WARNING

The filling and bleeding operations must be carried out at least by two operators

NOTICE

The filling and purging operations can be facilitated by using the automatic purging equipment BUBBLE BLUSTER® (supplied separately).

⚠ DANGER

Use **ULTRAFLEX** oil or other compatible oils.

Hydraulic oil OL150 has been specifically formulated for **ULTRAFLEX** to ensure high quality performance level of **ULTRAFLEX** products throughout time.

Its special "Zinc Free" formula enhances protection against marine oxidation. The special mix of anti-wear and stabilizing components of OL150 allow ensuring great results as far as the product duration and performances are concerned in several environmental conditions. **ULTRAFLEX** hydraulic oil complies with standard ISO 10592 concerning hydraulic steering systems. **ULTRAFLEX** is not to be held responsible for any damages or performance deterioration if oils different from OL150 are used.

⚠ DANGER

Do NOT use ATF Dexron II transmission oils or brake oils which could cause the steering system seizing.

Oils which are compatible with OL150 **ULTRAFLEX** are:

- Shell Tellus T15 and Shell Tellus T22
- Mobil DTE 11M

NOTICE

ULTRAFLEX will not be able to ensure the compatibility of the above mentioned oils with OL150 if the oil manufacturers vary their formulation; in particular, it will not be able to ensure its compliance with standard ISO 10592 concerning hydraulic steering systems. Under no circumstances **ULTRAFLEX** is to be held responsible for any damages or performance deterioration.

In the days after the filling, check the oil level; if necessary top off the system.

At the beginning the oil level can lower, as small amounts of air can be released in a homogeneous way. According to the types of installation, it is necessary to carry out the different bleeding procedures, as it follows.



3.6.1 Positioning of the oil bottle

To carry out this operation, it is necessary to use the oil filling kit (1 needle, 1 transparent pipe, 1 pipe connection and 1 spout for the oil bottle). This kit is NOT supplied.

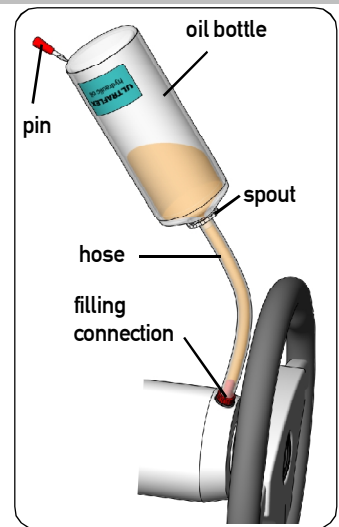
- Remove the pump cap and insert the fittings.
- Attach the spout to a new bottle of hydraulic oil and connect the hose to the fittings and the bottle spout.
- Turn the bottle upside down and pierce it with the pin, as shown in the picture, to ease the oil passage towards the pump.
Fill the pump until no air bubbles are visible in the hose.

⚠ WARNING

While replacing the oil bottle, during the filling process, close all the bleed valves of the cylinder/s. To bleed the system, check that oil is always present in the filling hose. If some air is in the system during the bleeding process, the whole bleeding process must be started again.

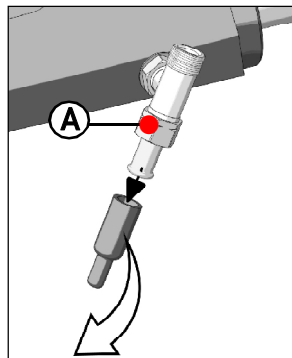
⚠ CAUTION

Replace the bottle before it empties and use recovered oil only after 24 hours.



3.6.2 Single steering station/ single cylinder

- Unscrew the two bleed valve protections and loosen 1.5 turns max. the nuts "A" of the two bleed valves.

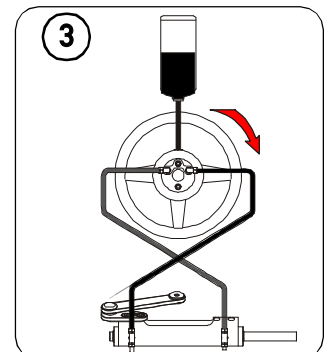
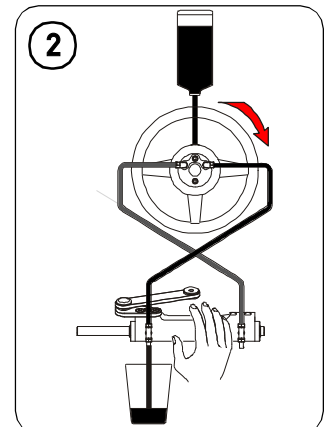
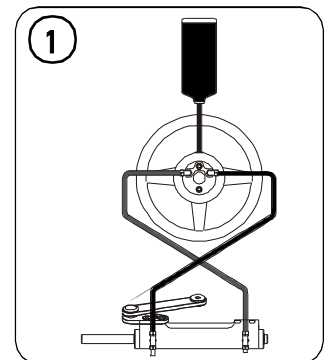


- Unscrew the two bleed valves and manually push the cylinder body to one side until it stops as shown in picture 1.
- Position the oil bottle as explained in paragraph 3.6.1.
- Close the bleed valve on the cylinder end stroke side and put a purged oil tank near the other bleed valve (as shown in picture 2).
- Turn the steering wheel slowly (as shown in picture 2) so that the oil can come out of hoses.

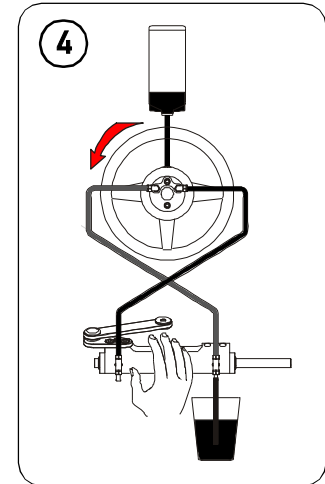
NOTICE

Hold the cylinder body with the hand to prevent movements caused by the air present in the cylinder chamber (picture 2).

- When the oil comes out of the bleed valve (without air bubbles), close the bleed valve and continue to turn the steering wheel in the same direction to fill the cylinder chamber (picture 3).
During this phase the cylinder body will move to the opposite direction up to the end stroke.



- Open the other bleed valve and move purged oil tank to the other side. Holding the cylinder body in this position, turn the steering wheel as shown in picture 4, until oil without air bubbles comes out of the bleed valve. Then close the bleed valve.
- Repeat the entire procedure to ensure the absence of air in the system.

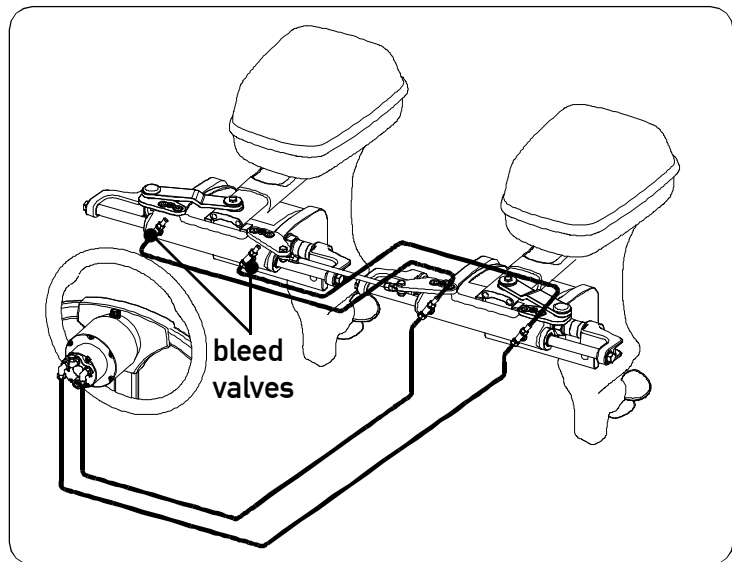


NOTICE

The described procedure is the same even in case of single station, dual engine, single cylinder and tie bar.

3.6.3 Single steering station/ dual cylinder

- Manually unscrew the two bleed valves on the cylinder "T" fittings and push the cylinders to one side up to the end stroke.
- Position the oil bottle as described in paragraph 3.6.1.
- Follow the same bleeding procedure described for the single steering station / single cylinder (paragraph 3.6.2). While turning the steering wheel be careful because both cylinders move.
- Repeat the entire procedure several times to ensure the air absence in the system.



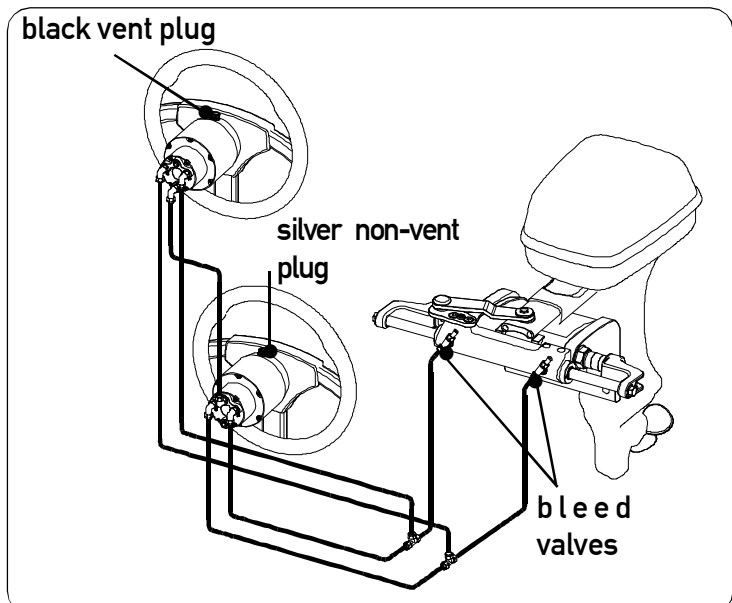
3.6.4 Dual steering station/ single cylinder

- Manually unscrew the two bleed valves on the cylinder "T" fittings and push the cylinder to one side up to the end stroke.
- Position the oil bottle near the main steering station (upper) according to what is described in paragraph 3.6.1.

⚠ WARNING

Wait until the oil reaches the lower tank and both tanks are filled.

- Follow the same bleeding procedure described in paragraph 3.6.2 starting from the lower station and repeat it for the upper station.



⚠ WARNING

For the additional steering station (lower) tank use only the silver non-vent plug (supplied with the "kit OB-2S"). For the main steering station (upper) tank use only the black vent plug.

- Repeat the procedure at least 3 times to ensure the absence of air in the system.

NOTICE

The purging procedure is the same for dual station, dual motor, single cylinder and tie bar.

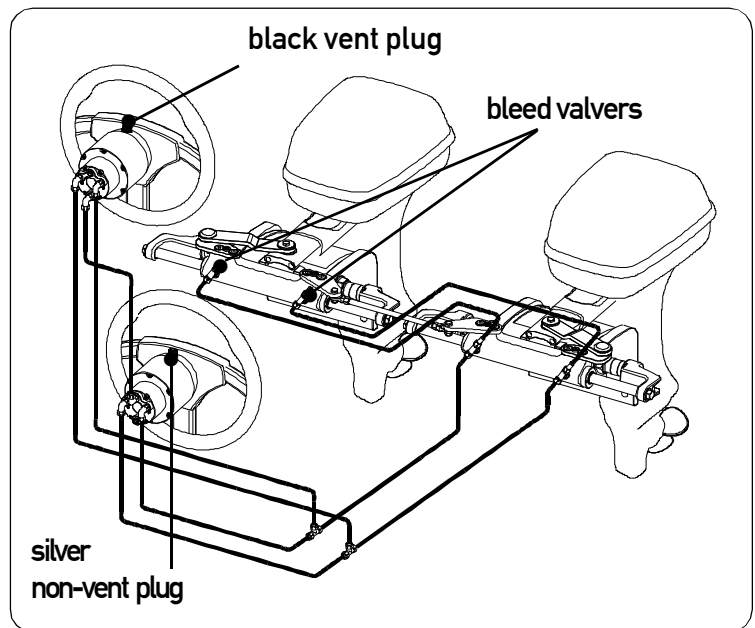
3.6.5 Dual steering station/dual cylinder

- Manually unscrew the two bleed valves on the cylinder "T" fittings and push the cylinders to one side up to the end stroke.
- Position the oil bottle near the main steering station (upper) according to what is described in paragraph 3.6.1.

⚠ WARNING

Wait until the oil reaches the lower tank and both tanks are filled.

- Follow the same purging procedure described in paragraph 3.6.2 starting from the lower station and repeat it for the upper station.



⚠ WARNING

For the additional steering station (lower) tank use only the silver non-vent plug (supplied with the "kit OB-2S"). For the main steering station (upper) tank use only the black vent plug.

- Repeat the entire procedure at least 4 times to ensure the absence of air in the system.

3.7 General recommendation

⚠ WARNING

It is very important to check the absence of air in the system before using the boat! We recommend trying to manually move the engine towards port and starboard, making sure that there is no movement of the cylinder body on the main cylinder shaft.

If the cylinder body moves more than 1/6 inches (15mm), there is still air in the system. The air presence in the system can cause bad responses to the controls and so it can cause damage, injuries or death.



4 SAFETY WARNINGS

This section shows the safety rules which must be followed for the correct equipment operation. We recommend reading carefully this section and also the other manuals supplied with the steering system components.

4.1 Safety warnings during use and installation

RESPECT STRICTLY the following safety rules:

ULTRAFLEX declines all responsibility in case the user does not follow these rules and it is not responsible for negligence during the use of the system.

DANGER

- **DO NOT PUT HANDS BETWEEN THE MOVING PARTS.**
- Do not disable the safety devices.
- Do not modify or add devices to the system, without **ULTRAFLEX** written authorisation or technical intervention which will prove the modification.
- Do not use the 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 non-specialized staff perform the installation.
- Do not disassemble the hydraulic connections before bleeding the oil in the system completely. The hoses can contain high pressure oil.

WARNING

- Do not put the feet on the cylinder.
- Check the system after the installation and the purging but before operating the vessel. Turn the steering wheel until the cylinder/s reaches/reach the end stroke. Turn the steering wheel to the opposite direction. Repeat on each installed helm to verify the correct installation and the system operation.
- Carefully use sealing fluid (such as Loctite). If it reaches the hydraulic system, it may cause damage and mechanical failure.
- Do not use teflon tape or adhesive tape to seal the fittings, as this material may be injected, by causing the system fail.
- During the system installation, prevent foreign matters from entering the system. Even a little object may cause lasting damage that are not detected immediately.
- Avoid too narrow bend radius of hoses.
- Avoid the hose contact with edges or sharp corners.
- Avoid the hose contact with heat sources.

4.2 Clothing

WARNING

During installation, inspection or maintenance,

IT IS STRICTLY FORBIDDEN to wear necklaces, bracelets or clothes which could get caught in the moving parts.

5 MAINTENANCE

ENGLISH

5.1 Ordinary maintenance

⚠ WARNING

Poor installation and maintenance may result in loss of steering and cause property damage and/or personal injury. Maintenance requirements change according to climate, frequency and the use. Inspections are necessary at least every year and must be carried out by specialized marine mechanics. Check the cylinder fittings and the seals and the helm gaskets to prevent leaks. Replace them if necessary. To keep a suitable oil level in the tank, fill and bleed the system as described in this manual in paragraph 3.6. Check the hose and the entire system wear, the nut and bolt tightening every six months and make sure that they are not damaged. Clean the system using water and non-abrasive soap.

⚠ WARNING

Use only compatible hydraulic oils, indicated in the paragraph "technical features" and "filling and bleeding ". Do not use brake oils or automatic transmission fluid (ATF) in any case.

⚠ WARNING

After the first 10 hours of use and then periodically check the connection integrity and tightening.

⚠ CAUTION

If the self-locking nuts are disassembled, replace them. (Contact our assistance service, see page 5).

5.2 Troubleshooting

⚠ WARNING

Whenever the following checks need the removal and/or disassembly of the steering system components, such work must be carried by specialized staff. **ULTRAFLEX** offers general information only and is not responsible for any consequences resulting from incorrect disassembly.

PROBLEM	CAUSE	SOLUTION
During the filling, the steering system becomes completely jammed.	<ul style="list-style-type: none"> Blockage in the hoses between steering system and cylinder. 	<ul style="list-style-type: none"> Replace hoses. <p>⚠ WARNING</p> <p>The damaged hose must be replaced, otherwise it may cause loss of steering and severe personal injury or property damage.</p>
The system is very difficult to fill. Air keeps bubbling at the top of the steering system tank even after filling the system completely.	<ul style="list-style-type: none"> Air in the system. 	<ul style="list-style-type: none"> Repeat the filling and the bleeding procedure of the system. Install horizontally the hoses and in any case with a maximum inclination of 3cm each meter.
	<ul style="list-style-type: none"> Leaks from the cylinder bleeder. 	<ul style="list-style-type: none"> Tighten the bleeder on the cylinder.
	<ul style="list-style-type: none"> Coiled hose. 	<ul style="list-style-type: none"> Uncoil and straighten the hose.
The steering system is stiff and hard to turn, even when the boat is not moving.	<ul style="list-style-type: none"> Restrictions in hoses or fittings. 	<ul style="list-style-type: none"> Look for and remove the restriction.
	<ul style="list-style-type: none"> Air in oil 	<ul style="list-style-type: none"> Repeat the filling and the bleeding procedure of the system.



<p>The steering system is stiff and hard to turn, even when the boat is not moving.</p>	<ul style="list-style-type: none"> • Wrong oil has been used. 	<ul style="list-style-type: none"> • Drain the filling and bleeding system. <p>⚠ WARNING ULTRAFLEX is not responsible for damage caused by fluids that are not recommended in this manual and so the warranty is cancelled.</p>
<p>The steering system is stiff and hard to turn, even when the boat is not moving, if unbalanced cylinders are used.</p>	<ul style="list-style-type: none"> • Dirt in the valve. 	<p>⚠ WARNING Do not use the boat and contact a specialized technician for the valve cleaning.</p>
<p>The steering system is easy to turn at the dock but becomes hard to turn when the boat is in motion.</p>	<ul style="list-style-type: none"> • The steering wheel is too small. 	<ul style="list-style-type: none"> • Replace the steering wheel with a bigger one. <p>⚠ WARNING Only within the maximum dimensions allowed by the helm.</p>
	<ul style="list-style-type: none"> • Incorrect setting of the torque tab. 	<ul style="list-style-type: none"> • Adjust the torque tab.
	<ul style="list-style-type: none"> • Air in oil. 	<ul style="list-style-type: none"> • Check the oil level and repeat the bleeding procedure as explained in this manual.
<p>When the steering wheel is turned, the rod (movable rod cylinders) or the body (fixed cylinder rod) of the cylinder do not move.</p>	<ul style="list-style-type: none"> • Air in the system. 	<ul style="list-style-type: none"> • Repeat the filling and bleeding procedure of the system.
	<ul style="list-style-type: none"> • Oil leak. 	<ul style="list-style-type: none"> • Look for the leak and contact specialized staff.
	<ul style="list-style-type: none"> • Helm mounted upside down. 	<ul style="list-style-type: none"> • Mount the helm with the filling hole in up position.
<p>Leaks from steering system fittings.</p>	<ul style="list-style-type: none"> • Bad tightening or low torque of the fittings. 	<ul style="list-style-type: none"> • Tighten the fittings with a maximum torque of 20Nm (15 in.lbs).
	<ul style="list-style-type: none"> • Lack of fitting sealant. <p>⚠ WARNING Never use teflon tape or adhesive tape on any fitting.</p>	<ul style="list-style-type: none"> • Drain and disassemble the steering system. Remove the fittings and remove the oil from threads. Put the sealant on the fittings and tighten them, install the helm. <p>⚠ WARNING After this operation it is necessary to carry out another bleeding.</p>
<p>Leaks from the tank plug.</p>	<ul style="list-style-type: none"> • Bad tightening of the plug. 	<ul style="list-style-type: none"> • Tighten the plug.
	<ul style="list-style-type: none"> • The vent plug (black) on the additional helm is in the lower position. 	<ul style="list-style-type: none"> • Replace the vent plug (black) with the plug for the additional helm kit (silver).
	<ul style="list-style-type: none"> • Worn and damaged seal. 	<ul style="list-style-type: none"> • Replace the plug.
	<ul style="list-style-type: none"> • Too high oil level. 	<ul style="list-style-type: none"> • Follow the procedure to maintain the suitable oil level, which is described in the pump manual.



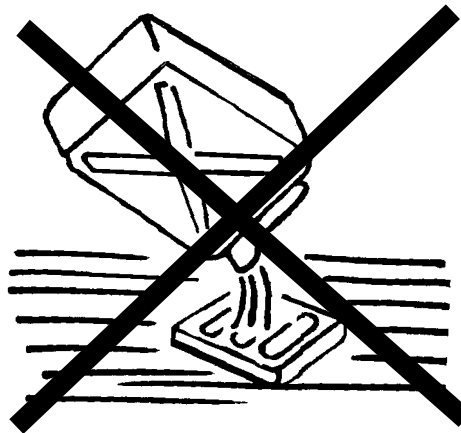
6 DISMANTLING

6.1 Dismantling

When for any reason, the steering system is put out of service, it is necessary to follow some rules in order to respect the environment.

Sheaths, pipelines, plastic or non-metallic components must be disassembled and disposed of separately.

***The steering system CONTAINS POLLUTING OILS
which must be disposed of according to the rules in force in the country.***



ULTRAFLEX S.p.A.

16015 Casella (Genova) Italia - Via Crose, 2