

Installation and Maintenance Manual

HYDRAULIC CYLINDERS FOR SIDE MOUNT APPLICATIONS

UC 68-OBS



UC 132-OBS



UC 133-IOB



CE

 **ULTRAFLEX**



UK
page. 2

I
pag. 23

F
page. 45

ENGLISH

ITALIANO

FRANÇAIS



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 (see attached document "Application Spare Parts").

ULTRAFLEX and UFLEX Quality Management Systems are certified CISQ-IQNet by the Italian Shipping Registry (RINA), in conformity with the UNI EN ISO 9001:2000 rule. ULTRAFLEX certification No. 6669/02/S (former 420/96). UFLEX certification No. 8875/03/S.

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;
- constantly test the products to verify their conformity with the 94/25/CE, ISO 10592 and ABYC (American Boat and Yacht Council) requirements.



"ULTRAFLEX has over 70 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) Italia - Via Crose, 2

TABLE OF CONTENTS

MANUAL USE AND SYMBOLS USED.....	4
INTRODUCTION.....	5
WARRANTY.....	5

SECTION 1 - PRODUCT DESCRIPTION

1.1 HYDRAULIC STEERING SYSTEM OPERATION.....	6
1.2 WARNINGS FOR THE CORRECT PRODUCT USE	6
1.3 CONFIGURATIONS.....	7
1.4 CYLINDER DESCRIPTION.....	8
1.5 TECHNICAL FEATURES.....	8

SECTION 2 - TRANSPORT

2.1 GENERAL WARNINGS.....	9
2.2 PACKAGING CONTENTS.....	9

SECTION 3 - INSTALLATION

3.1 DIMENSIONS.....	10
3.2 NECESSARY TOOLS.....	10
3.3 CYLINDER INSTALLATION.....	11
3.4 HOSE INSTALLATION.....	12
3.5 TYPE OF INSTALLATION.....	12
3.6 FILLING AND PURGING.....	14
3.6.1 POSITIONING OF THE OIL BOTTLE	14
3.6.2 SINGLE STEERING STATION/ SINGLE CYLINDER.....	17
3.6.3 SINGLE STEERING STATION/DUAL CYLINDER.....	18
3.6.4 DUAL STEERING STATION/SINGLE CYLINDER.....	18
3.6.5 DUAL STEERING STATION/DUAL CYLINDER.....	17
3.7 GENERAL RECOMMENDATIONS.....	17

SECTION 4 - SAFETY WARNINGS

4.1 SAFETY WARNINGS DURING USE AND INSTALLATION	19
4.2 CLOTHING.....	18

SECTION 5 - MAINTENANCE

5.1 ORDINARY MAINTENANCE.....	20
5.2 TROUBLESHOOTING.....	19

SECTION 6 - DISMANTLING

6.1 DISMANTLING.....	21
----------------------	----



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:

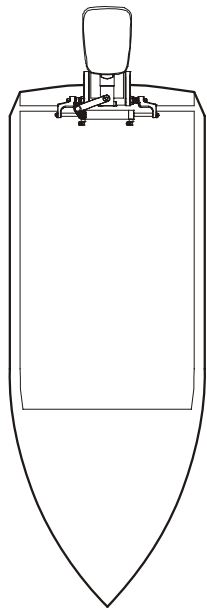

 **DANGER**  Immediate hazards which CAUSE severe personal injury or death.

 **WARNING**  Hazards or unsafe practices which COULD CAUSE severe personal injury or death.

 **CAUTION**  Hazards or unsafe practices which COULD CAUSE minor injury or product or property damage.

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.

STARBOARD  **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 94/25/CE and to the ABYC (U.S.A.) requirements.

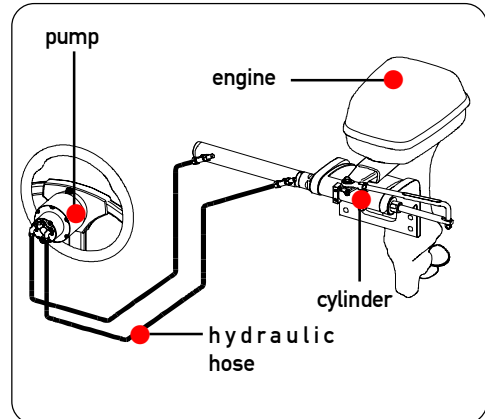
We remind you that only  marked steering systems must be used on the boats marked . (Art. 3 and Art. 5 of the Directive 94/25/CE). We inform you that the ULTRAFLEX warranty is null if some ULTRAFLEX components are installed on a steering system together with products of other brands.



1 PRODUCT DESCRIPTION

1.1 Hydraulic steering system operation

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 -20°C ($+22^{\circ}\text{F}$) and $+60^{\circ}\text{C}$ ($+166^{\circ}\text{F}$). 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 (cm^3 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 cm^3 [1.7 cu.in.] and the cylinder has a volume of 132 cm^3 [7.3 cu.in.], the formula looks like this: $132/28=4.7$. Accordingly, the steering wheel will turn 4 times and an half 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 7.0 MPa (70 bar) (1000 PSI).

1.2 Warnings for the product correct use

⚠ WARNING

Before beginning the installation, check the mounting compatibility of the UC 68-OBS, UC 132-OBS and UC 133-IOB cylinders 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

The UC 68-OBS, UC 132-OBS and UC 133-IOB side mount cylinders must not be installed on race boats.

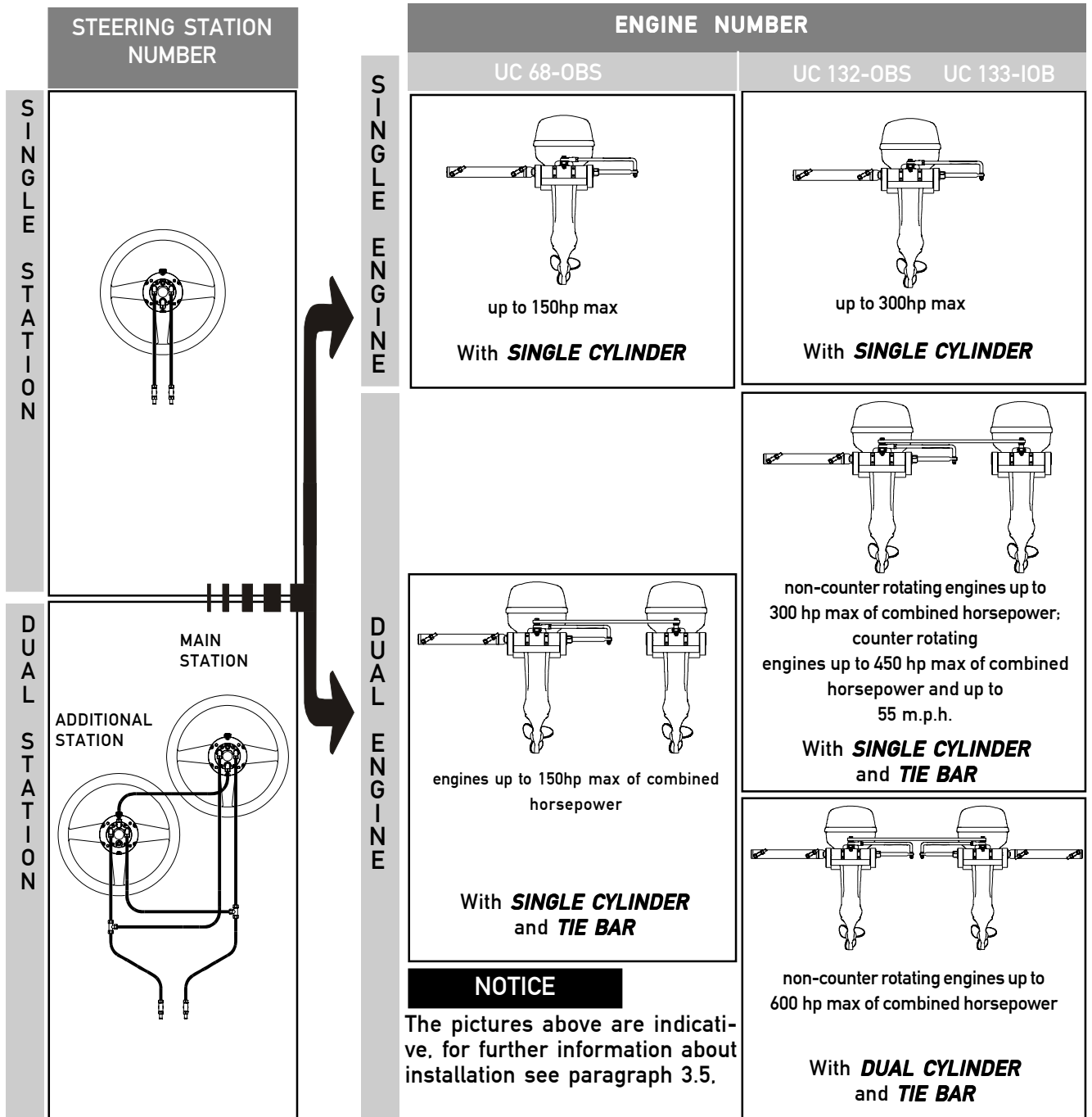
⚠ WARNING

Dual engine applications require two steering cylinders and tie bar, when the combined engine horsepower exceeds 450hp, and/or when the boat speed exceeds 55 m.p.h.



1.3 Configurations

The hydraulic cylinders for side mount installations UC 68-OBS, UC 132-OBS, UC 133-IOB 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
The pictures above are indicative, for further information about installation see paragraph 3.5.

⚠ DANGER

Dual engine installations require the use of a tie bar.



ENGLISH

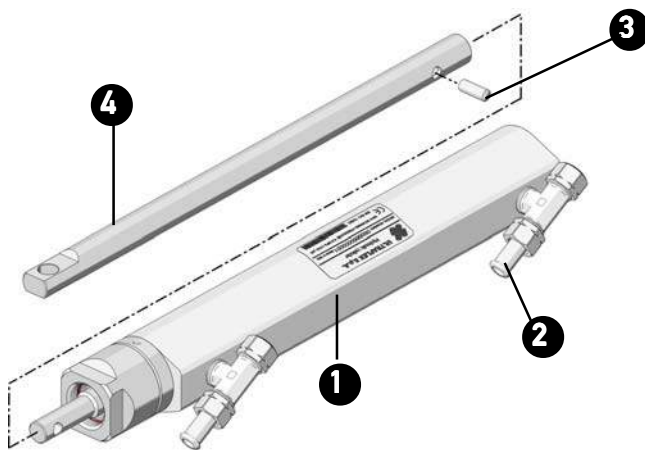
1.4 Cylinder description

UC 68-OBS, UC 132-OBS and UC133-IOB are hydraulic side mount cylinders which have been designed and manufactured to be used as a component in the hydraulic steering systems, as described in the previous paragraph.

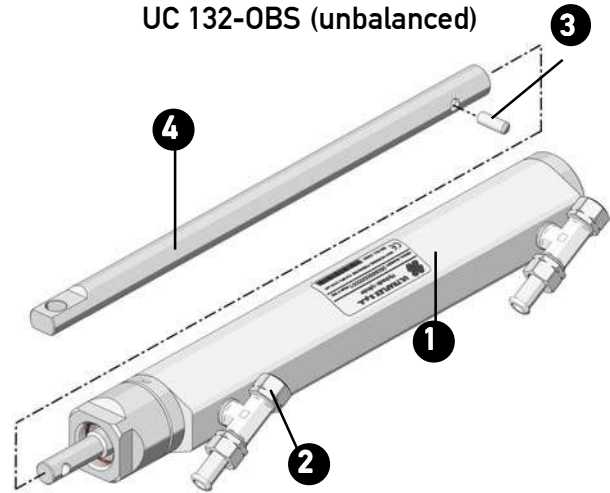
The cylinders are installed on the right side of the tilt tube of the available outboard engines on the market, and, according to the same instructions described in this manual, they are also installed on the tilt tubes of the inboard-outboard applications. It is possible to adjust the cylinder to all the different engine applications thanks to the link arm supplied with the engine. The following pictures show the main cylinder components:

ENGLISH

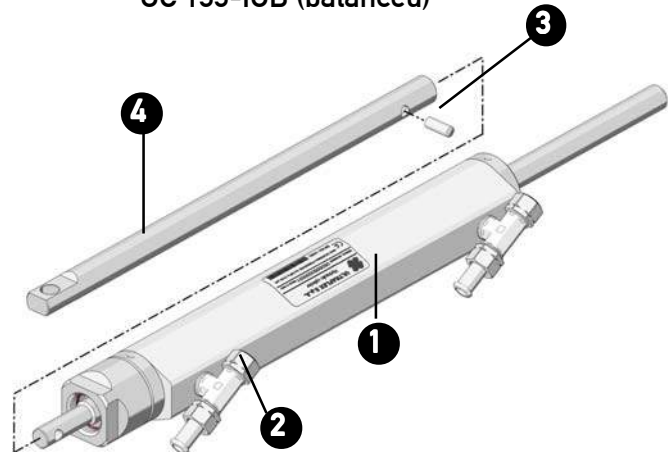
UC 68-OBS (unbalanced)



UC 132-OBS (unbalanced)



UC 133-IOB (balanced)



- 1 Cylinder body
- 2 Bleeders
- 3 Pin
- 4 Extension

⚠ WARNING

The unbalanced cylinders can be used only with ULTRAFLEX pumps.

1.5 Technical features

SPECIFICATIONS	UC68-OBS	UC132-OBS	UC133-IOB
Volume	68/100 cc - 4.1/6.1 cu. in	132/163 cc - 8/9.95 cu. in	132 cc - 8 cu. in
Outout force	185/270 kg - 408/595 lbs	455/563 kg - 1003/1240 lbs	455 kg - 1003 lbs
Inside diameter	25 mm - 0.98"	32 mm - 1.25"	32 mm - 1.25"
Stroke	203 mm - 8"	203 mm - 8"	203 mm - 8"
Oil	in compliance with ISO VG 15	in compliance with ISO VG 15	in compliance with ISO VG 15



2 TRANSPORT

2.1 General warnings

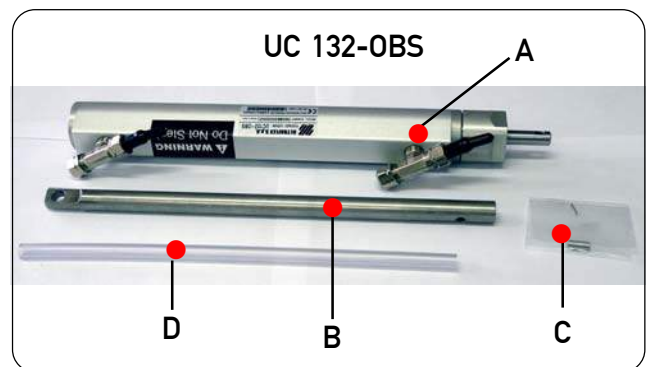
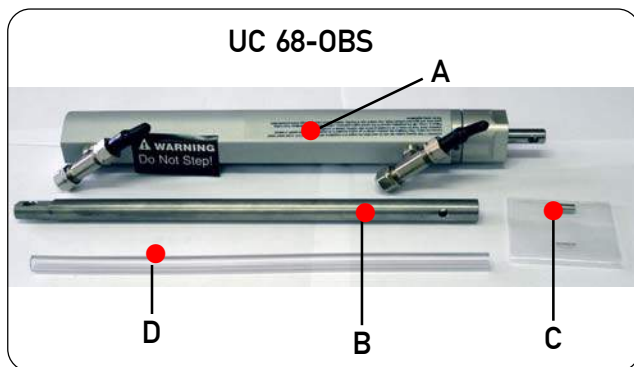
The product weight with its packaging is 3kg (7 pounds) and so it can be handled manually.

⚠ WARNING

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

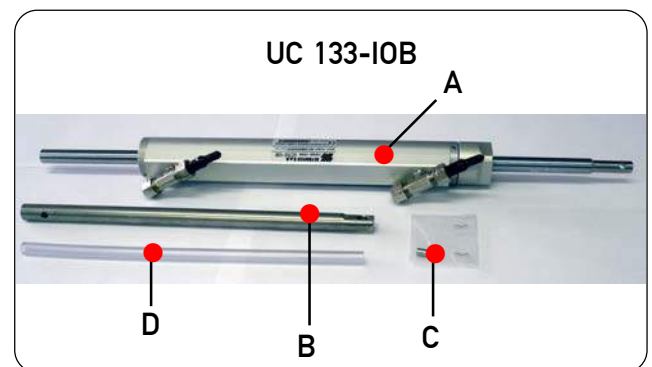
2.2 Packaging contents

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:
- B) No.1 extension:
- C) pin:
- D) No.1 plastic hose for the hydraulic circuit bleeding:



⚠ CAUTION

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

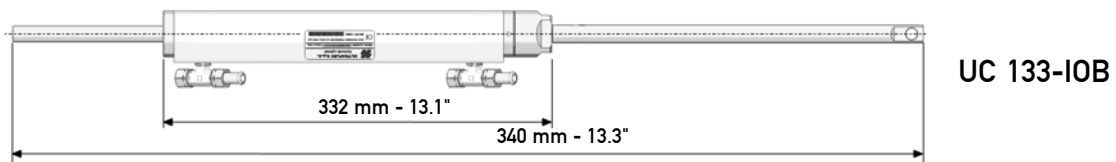
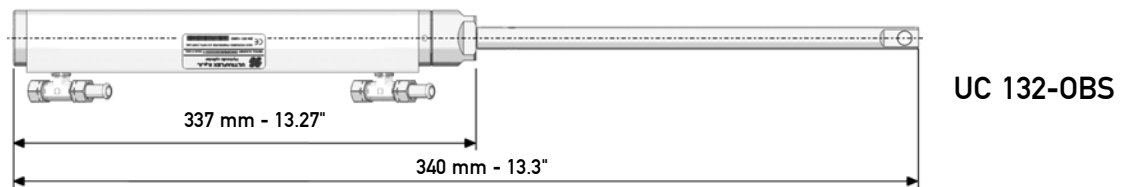
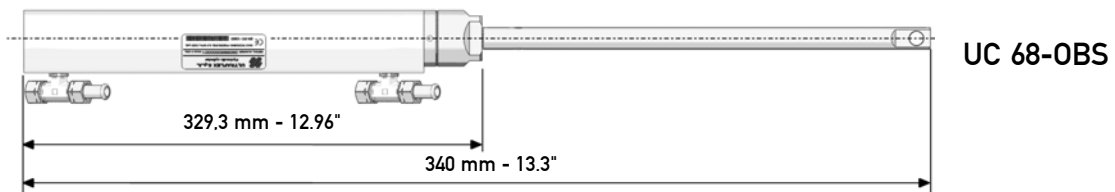


3 INSTALLATION

3.1 Dimensions

The following pictures show the dimensions of the various models. Before the installation consider the dimensions in order to avoid damages to the cylinder and to the boat.

ENGLISH



3.2 Necessary tools



Open end
wrench
32mm [1 1/4"]



Torque wrench



Open end
wrench
16mm [5/8"]

CAUTION

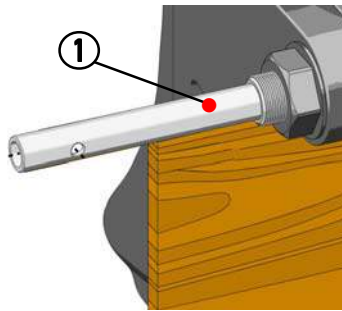
During installation use only stainless steel tools to prevent the corrosion of the metal parts.





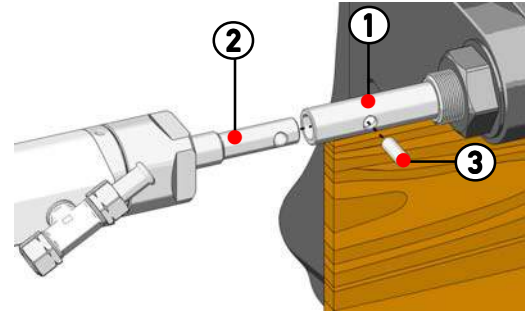
3.3 Cylinder installation

1 Carry out the standard installation on the right side of the engine (see notice par. 3.5). Grease the extension (1) and the rod (2), by using marine grease to prevent the corrosion of the metal parts.

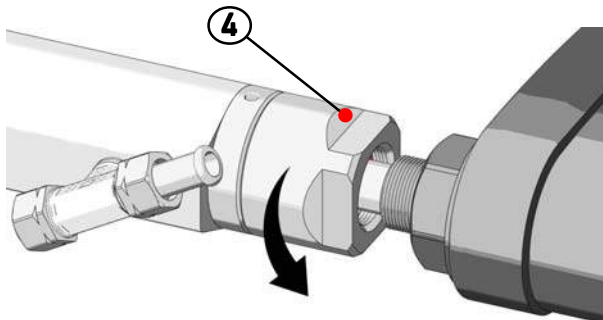


2 Insert the first part of the extension (1) into the tilt tube.

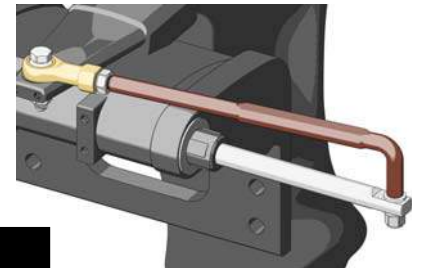
3 Insert the cylinder rod (2) in the extension (1) by locking it by means of the pin (3), then holding the pin with your hand continue to insert the tilt tube rod into the tilt tube.



4 Screw the lock collar (4) to the threaded part of the tilt tube and tighten it with a torque of 40 [Nm] (29.5[lb·ft]).



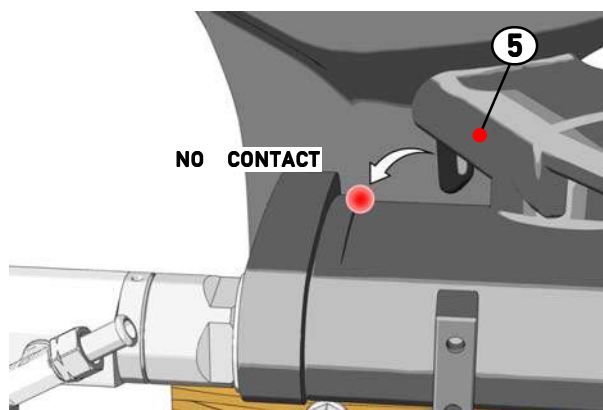
5 Connect the link arm (supplied by the engine manufacturer) to the extension according to the engine manufacturer's instructions, then connect it to the link arm, making reference to the data supplied by the engine manufacturer's instructions.



⚠ WARNING

The link arm is supplied with the engine and for its installation follow the manufacturer's instructions.

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



NOTICE

When the engine in central position, the cylinder rod must be in the middle of its stroke. If it is necessary adjust the ball joint on the link arm according to the engine manufacturer's instructions.

⚠ WARNING

The engine must stop through the cylinder end stroke without coming into contact with the mechanical stop (5) on the engine.



3.4 Hose installation



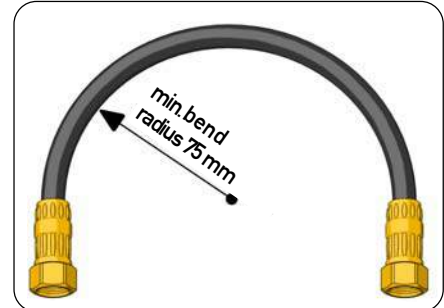
The two fittings mounted on the cylinder body are already oriented and are ready to be used.

⚠ DANGER

The fittings mounted on the cylinder **CANNOT** be orientated. If they are unscrewed, they will be damaged and so the cylinder cannot be used.

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 75 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



NOTICE

According to the standards in force there must be a 7/8"-14 UNF thread only on the right side with a minimum length of 16mm (0.62") of the tilt tube, check these dimensions before the cylinder installation.

In case of installation of the left side or dual installation, check that even the thread is located on the left side and that its features correspond to the ones described in the standards.

Do not install the cylinder in this configuration, if there is no thread or in case of non-compliance with the standards.

⚠ WARNING

Before installing the cylinders in applications with inboard-outboard engines (whether they are supplied with servomechanism or not), check that the features of the 7/8"-14 UNF threaded tubes mounted by the engine manufacturer correspond to the ones of the tilt tubes for the outboard engines. For this type of installation follow the warnings and cautions described in this manual for the other types of applications.

The hydraulic cylinders UC 68-OBS, UC 132-OBS and UC 133-IOB for side mount applications can be installed with different configurations according to the number and the type of engines used with a single or dual steering system.

NOTICE

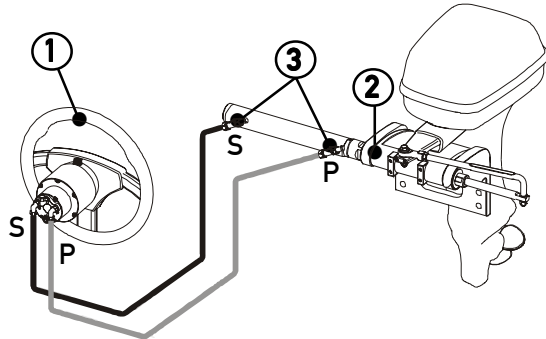
With reference to the boat the hose connected with the port side (P) of the pump must be always connected with the port side (P) of the fitting, while the hose connected with the starboard side (S) of the pump must be always connected with the starboard side (S) of the fitting.

⚠ CAUTION

Connect hoses as shown in the pictures of the following page.



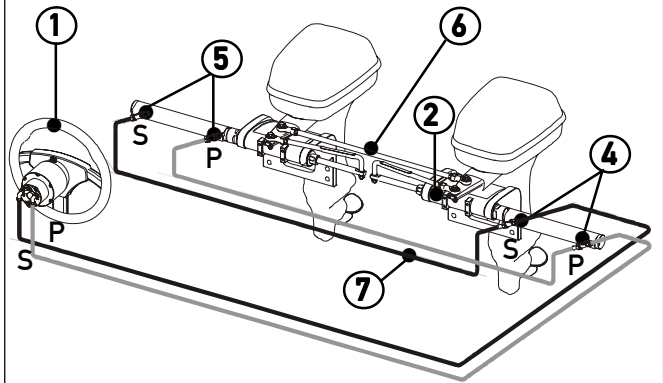
SINGLE STATION / SINGLE CYLINDER:



- 1. helm
- 2. cylinder
- 3. bleed valves

For: UC 68-OBS, UC 132-OBS, UC 133-IOB

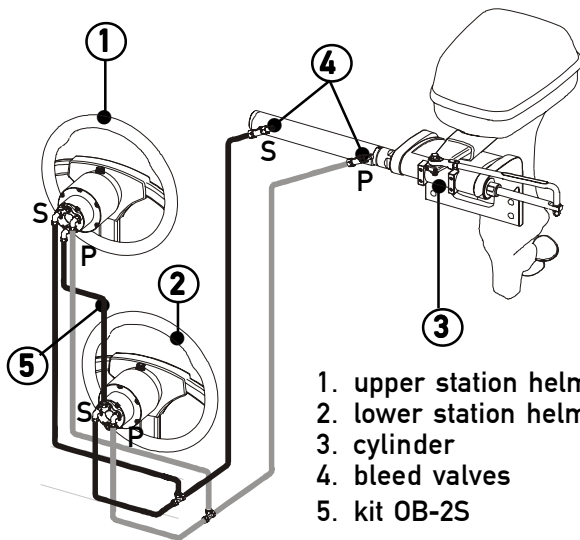
SINGLE STATION / DUAL CYLINDER:



- 1. helm
- 2. cylinder
- 3. cylinder
- 4. "T" fittings
- 5. bleed valves
- 6. tie bar
- 7. kit OB-2C

For: UC 68-OBS, UC 132-OBS, UC 133-IOB

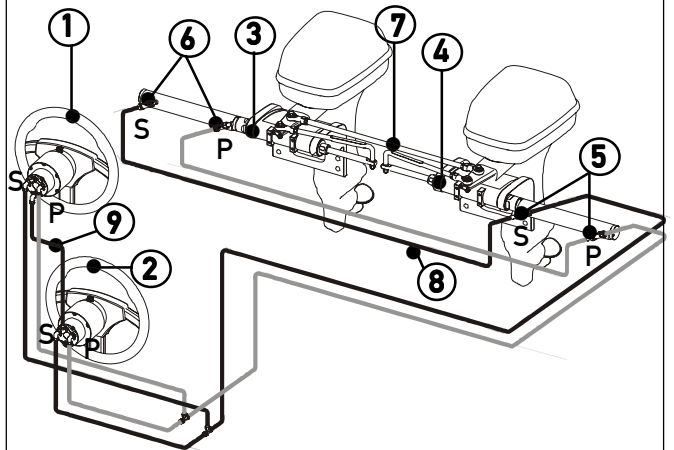
DUAL STATION / SINGLE CYLINDER:



- 1. upper station helm
- 2. lower station helm
- 3. cylinder
- 4. bleed valves
- 5. kit OB-2S

For: UC 68-OBS, UC 132-OBS, UC 133-IOB

DUAL STATION / DUAL CYLINDER:



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

For: UC 132-OBS, UC 133-IOB





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.

⚠ DANGER

Use ULTRAFLEX oil or other compatible oils.

COMPATIBLE OILS

AGIP OSO 15
MOBIL DTE 11M
SHELL TELLUS T15
ESSO NUTO H15
Q8 HAYDN 15

TECHNICAL FEATURES

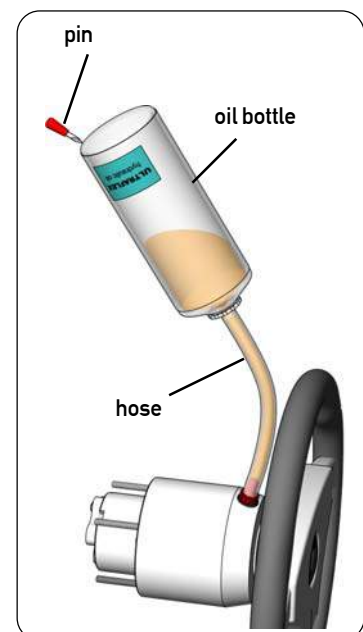
Viscosity at 40°C	14.3 cSt
Viscosity at 100°C	3.3 cSt
Viscosity index	96
Flash point V.A.	190°C
Yield point	-30°C
Volumic mass 15°	0.860 kg/l

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

- 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 supplied 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 on 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 valves and manually push the rod up to the end stroke 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 rod with the hand to prevent movements caused by the air present in the cylinder chamber (picture 2).

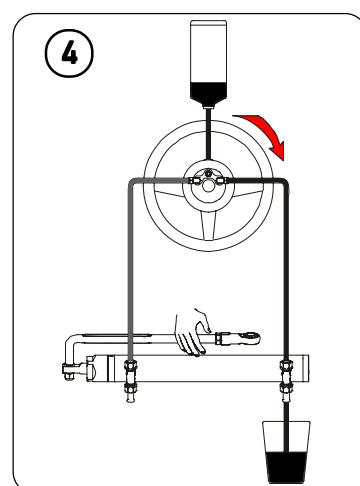
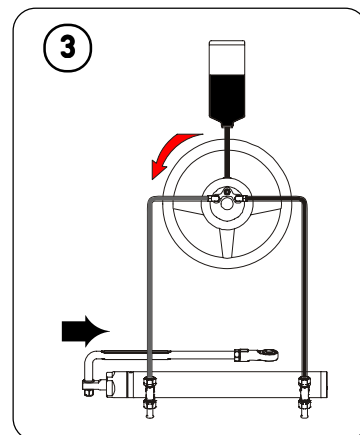
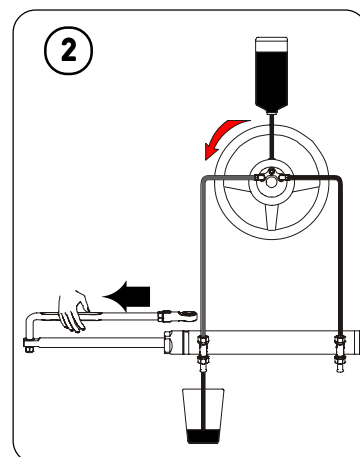
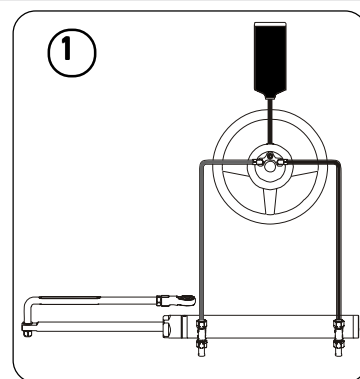
- When the oil comes out of the bleed valve (without air bubbles), close the bleed valve and continue to turn the steering wheel in the same direction to fill the cylinder chamber (picture 3). During this phase the cylinder rod will move to the opposite direction up to the end stroke.

- 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.

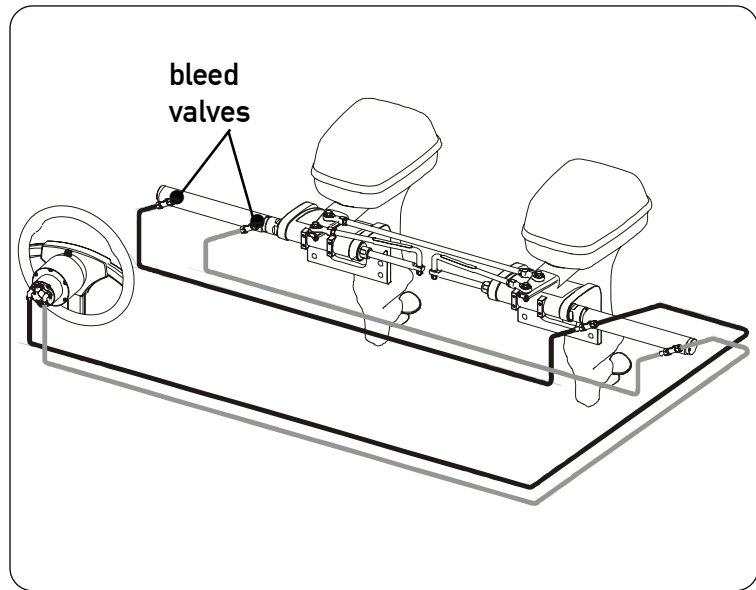
NOTICE

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.

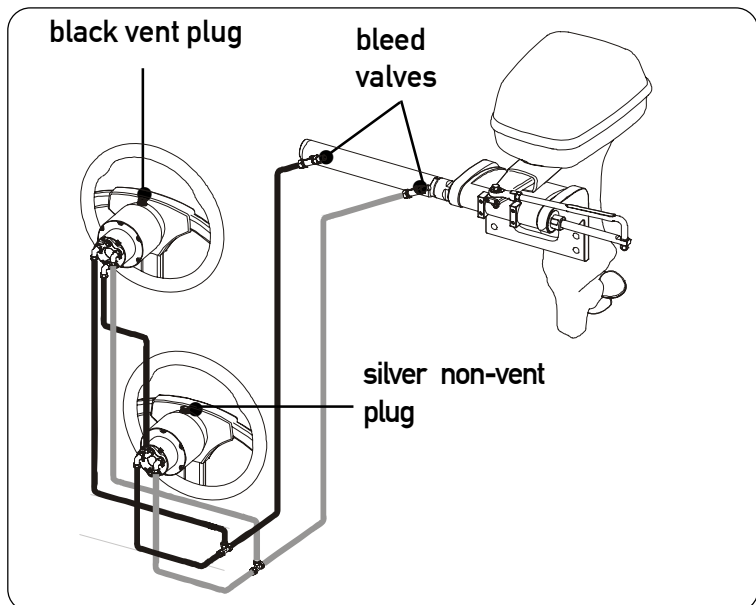
⚠ WARNING

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.



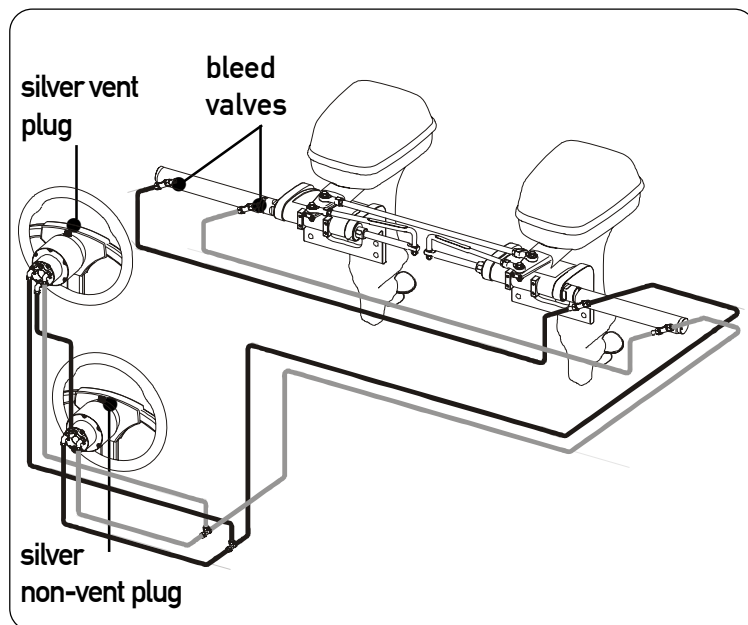
3.6.5 Dual steering station/dual cylinder

- 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.



ENGLISH

⚠ 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

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 two years 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.

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.
	<ul style="list-style-type: none"> Helm has been mounted upside down. 	<ul style="list-style-type: none"> Mount the helm with the filling hole in up position.
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.



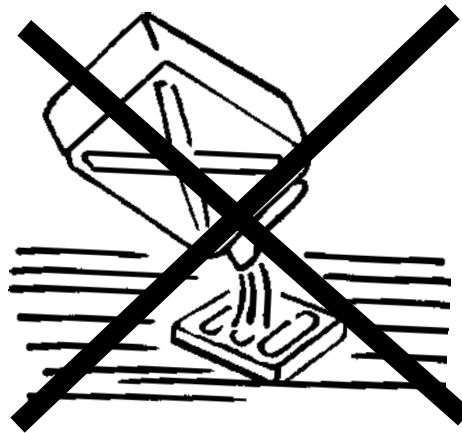
6 DISMANTLING

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