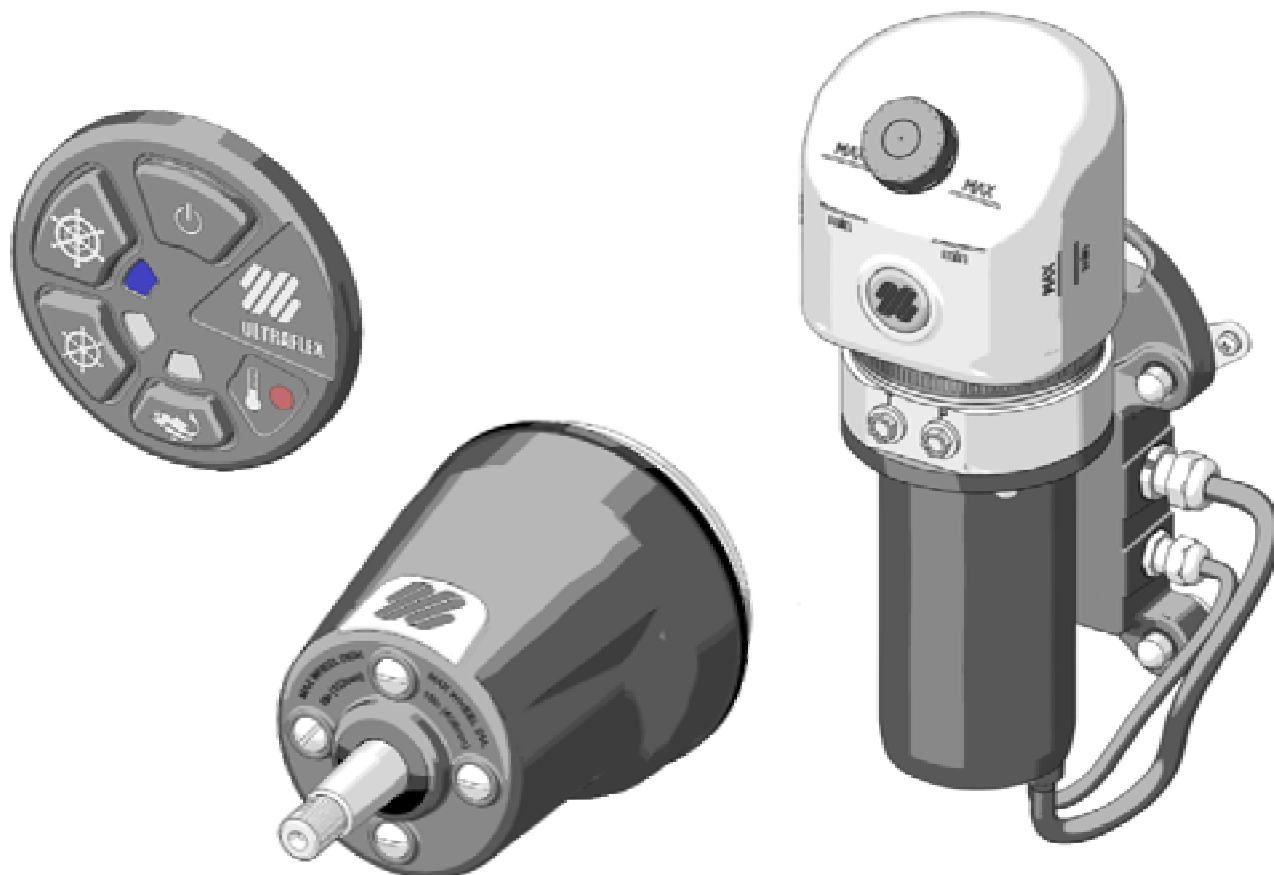


# Installation, maintenance and owner's manual

## POWER ASSISTED STEERING SYSTEM

# MASTERDRIVE



CE



# ULTRAFLEX



PARTNER



# **ULTRAFLEX**

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.

**ULTRAFLEX** and **UFLEX** Quality Management Systems are certified CISQ-IQNet by the Italian Shipping Registry (RINA), in conformity with the UNI EN ISO 9001:2008 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

**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) Italia - Via Crose, 2

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**DOCUMENT REVISIONS**


<b>Rev.</b>	<b>Date</b>	<b>Revision description</b>
0	10/02/2012	First edition
1	08/03/2013	Addition of automatic start
2	25/06/2013	Addition of Slave helm
3	29/10/2013	Addition of start customization
4	17/07/2014	Use with inboard cylinders has been added
5	04/11/2014	List modification of inboard cylinders
6	17/12/2014	Addition of 50cc helm - Oil specification change


### MANUAL USE AND SYMBOLS USED

THE INSTALLATION AND MAINTENANCE MANUAL is the document accompanying the product from sale to 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 product working.

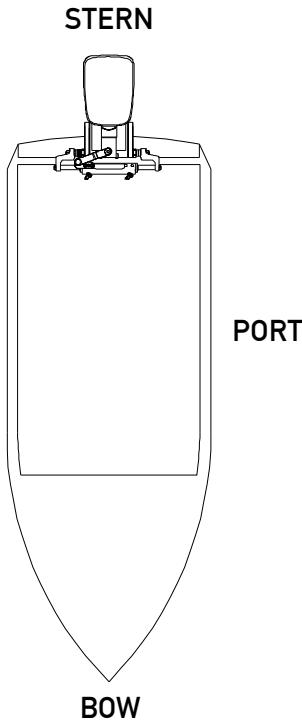
 **DANGER** → Immediate hazards which CAUSE severe personal injury or death.

 **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.



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

**KEY**  
 m.p.h. = miles per hour  
 km/h = kilometres per hour

10 m.p.h. = 8,69 knots  
 10 m.p.h. = 16,1 km/h  
 10 knots = 11,5 m.p.h.  
 10 knots = 18,5 km/h  
 10 km/h = 6,21 m.p.h.



## INFORMATIVE LETTER

This installation and maintenance manual is an integrant part of the product and should be easily available to staff in charge of 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.

Although the main features of the type of product described are not subject to change, **ULTRAFLEX** Company reserves the right to modify any parts, details and accessories it deems necessary to improve the product or for manufacturing or commercial requirements, at any time and without being obliged to update this manual immediately.

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 working, the product must be installed by qualified staff. In the event of part damage or malfunction, please contact the qualified staff or our Technical Assistance Service.

#### TECHNICAL ASSISTANCE SERVICE

##### **UFLEX S.r.l.**

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[www.uflexusa.com](http://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 Product description and features

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.

**MASTERDRIVE** is a power assisted steering system operated by an electrohydraulic pump which delivers fingertip control regardless of speed or torque conditions, ensuring full control of the boat both during manoeuvres and in bad sea conditions.

The **MASTERDRIVE** is made up of three main components: helm, power unit and user interface.

The user interface, which is located on the boat dashboard, allows the boater to select three different power modes according to the sailing conditions:

- fishing
- cruise
- MasterDrive™

Please, refer to section "Sistem use" for details on use conditions.

The **MASTERDRIVE** system must be used only with the following cylinders:

- UC128-SVS
- UC116-I
- UC168-I
- UC215-I
- UC293-I

### ⚠ WARNING

The 32cc helm (3.75 total steering wheel revolutions) must be used with single UC 128-SVS cylinder systems, while the 40 cc helm (6 total steering wheel revolutions) or the 50cc helm (4.8 total steering wheel revolutions) must be used with double UC 128-SVS cylinder systems.

The system can be installed with single or dual station.

### ⚠ DANGER

In order to ensure a proper steering response in safety conditions, configurations with steering wheel revolutions lower than 3.5 or higher than 9 are not recommended.

The calculation can be carried out by using the following formula:

$$\text{Revolution No.} = \frac{\text{cylinder volume}}{\text{pump volume}}$$

## RECOMMENDED APPLICATIONS

SINGLE CYLINDER APPLICATIONS		
MASTERDRIVE™ KIT	CYLINDER	STEERING WHEEL REVOLUTIONS
MD32F	UC116	3,6
MD32F	UC168	5,2
MD32F	UC215	6,7
MD40F	UC215	5,3
MD40F	UC293	7,3

DOUBLE CYLINDER APPLICATIONS		
MASTERDRIVE™ KIT	CYLINDER	STEERING WHEEL REVOLUTIONS
MD32F	2 UC116	7,2
MD40F	2 UC168	8,4
MD50F	2 UC215	8,6

### ⚠ DANGER

NEVER use the Slave helm as single station since it is not equipped with proper safety systems.

The main features of the system are:

- Three different selectable levels of power (PATENTED)
- High efficiency, low Amp draw
- Immediate control in any sea conditions through the system always running
- Safety switch ON/OFF (SMART BUTTON)
- Suitable for use with autopilot



- Low noise
- Voltage: 12VDC
- Automatically reverts to manual mode in case of power loss.
- CE marked and compliant with ABYC P21, ISO 10592 and EN 60945 safety standards
- Ignition protected (SAE J-1171 and UNI EN 8846)

## 1.2 Warnings for the correct use of the product

### **⚠ DANGER**

Do not modify the system in any way to fit it to your application, otherwise its components will no longer operate in safety and they 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** steering systems must not be installed on race boats.

## 1.3 System configurations

### **⚠ WARNING**

The **MASTERDRIVE** system must be used only with the following cylinders UC128-SVS, UC116-I, UC168-I, UC215-I, UC293-I or, in double cylinder applications, with an hydraulic cylinder UC128-SVS together with an hydraulic cylinder UC128/P-SVS.

### **⚠ CAUTION**

Always connect the hoses correctly as indicated in the installation and maintenance manuals of the corresponding components.

## 1.4 System components

The **MASTERDRIVE** system is supplied with the following components:

- 1 Power unit **UPMD**, 4,5 m (15') Wiring Harness included.
- 1 Front Mount or Tilt Mount Helm, Tilt Mount version is suitable for use with **X66** (not supplied), 1 User Interface **UCMD**, 4 litres of hydraulic oil OL 150 **ULTRAFLEX**.

The following components must be ordered separately:

- 1 or 2 cylinders UC128 SilverSteer™ according to the application or with cylinders UC128-SVS, UC116-I, UC168-I, UC215-I, UC293-I for inboard applications.

### **⚠ WARNING**

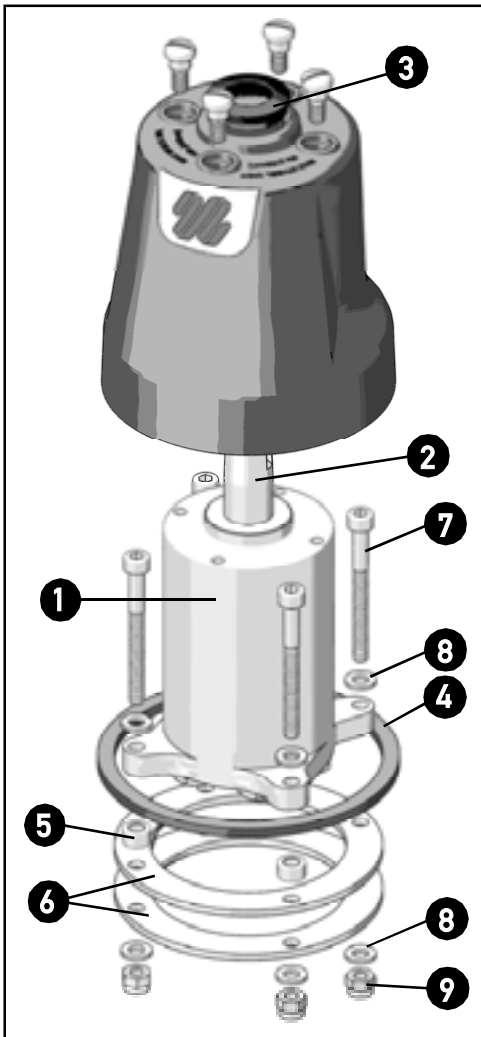
Before ordering the cylinder/s, please read carefully the **ULTRAFLEX** catalogue to check limitations.

- 1 **KIT OB-MD**: antidumping hydraulic hose kit with fittings.
- 1 **KIT OB-SVS**: hydraulic hose kit with fittings SilverSteer™.
- 1 **KIT OB-2C-SVS**: hydraulic hose kit with fittings SilverSteer™ to connect cylinders (in dual cylinder applications only).
- 1 Tie bar for dual cylinder applications: please refer to the corresponding installation and maintenance manual.
- 1 Steering wheel: please, refer to the corresponding section of the **ULTRAFLEX** catalogue.



### 1.5 Helm technical features

ENGLISH



- Available in three different displacement sizes: 32 cc (1.95 cu.in) , 40 cc (2.44 cu.in) and 50 cc (3.05 cu.in).
- Front Mount and Tilt Mount versions. Tilt Mount version is suitable for use with X66 (not supplied)
- Built-in relief valves (Master Front version only)
- 3/4" tapered shaft (Master Front version only)
- Corrosion resistant painted body (Master Front version only)
- Waterproof

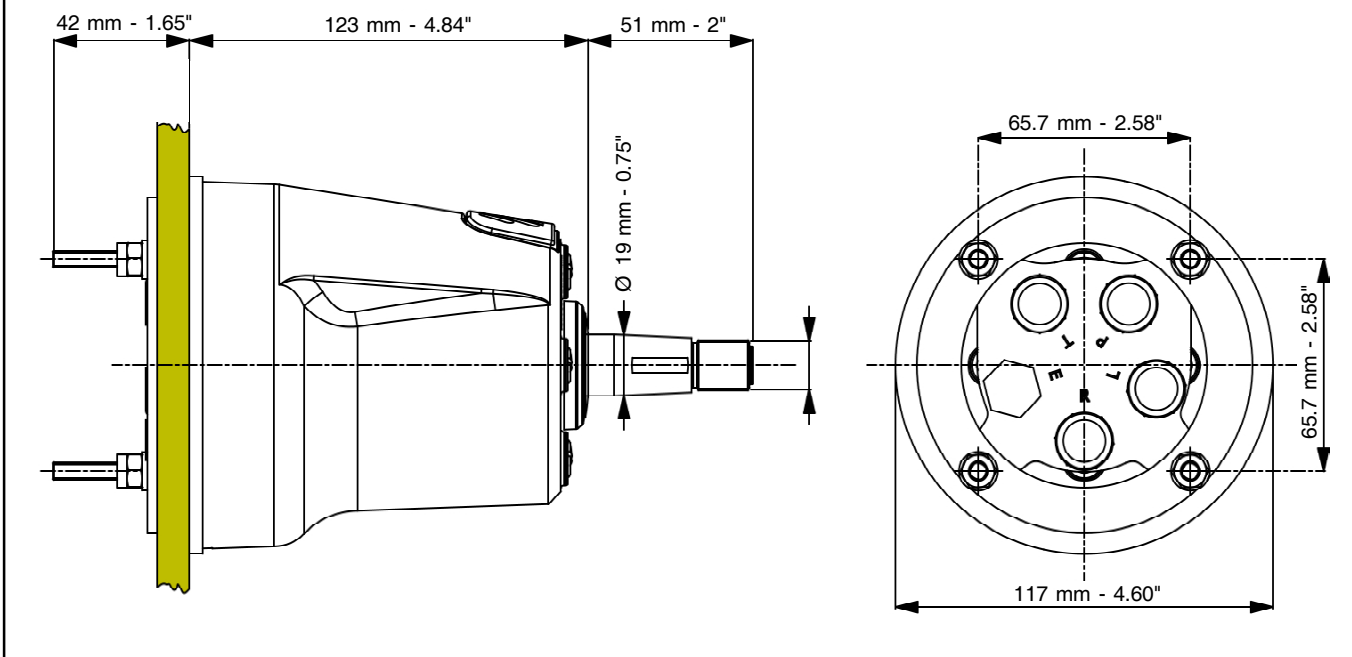
#### FRONT MOUNT VERSION:

- 1 32cc/40cc/50cc Helm
- 2 Shaft for steering wheel connection
- 3 Shaft seal
- 4 Dashboard seal
- 5 Spacer (4x) (not supplied for 50cc helms)
- 6 Fixing flanges (2x)
- 7 Fixing screw to the dashboard
- 8 Washers
- 9 Self-locking nuts

#### TILT MOUNT VERSION:

- 1 32cc/40cc/50cc Helm

#### FRONT MOUNT VERSION



### NOTICE

For TILT version dimensions, refer to point 1 in paragraph 3.4.

Model	Mounting	Displacement/ Revolution	Application	Steering wheel max.Ø	Release pressure of relief valves
UH32-F	front mount	32 cc- 1.95 cu. in	Master helm	Max Ø 711 mm - 28" Max cone 152 mm - 6"	105 bar (1500 psi)
UH32-T	with X66 tilt	32 cc- 1.95 cu. in	Master helm	Max Ø 508 mm - 20" Max Cone 152 mm - 6"	105 bar (1500 psi)
UH40-F	front mount	40 cc- 2.44 cu. in	Master helm	Max Ø 711 mm - 28" Max Cone 152 mm - 6"	105 bar (1500 psi)
UH40-T	with X66 tilt	40 cc- 2.44 cu. in	Master helm	Max Ø 508 mm - 20" Max Cone 152 mm - 6"	105 bar (1500 psi)
UH50-F	front mount	50 cc- 3.05 cu. in	Master helm	Max Ø 711 mm - 28" Max Cone 152 mm - 6"	105 bar (1500 psi)
UH50-T	with X66 tilt	50 cc- 3.05 cu. in	Master helm	Max Ø 508 mm - 20" Max Cone 152 mm - 6"	105 bar (1500 psi)
UHD32-F	front mount	32 cc- 1.95 cu. in	Slave helm	Max Ø 711 mm - 28" Max Cone 152 mm - 6"	not applicable
UHD32-T	with X66 tilt	32 cc- 1.95 cu. in	Slave helm	Max Ø 508 mm - 20" Max Cone 152 mm - 6"	not applicable
UHD40-F	front mount	40 cc- 2.44 cu. in	Slave helm	Max Ø 711 mm - 28" Max Cone 152 mm - 6"	not applicable
UHD40-T	with X66 tilt	40 cc- 2.44 cu. in	Slave helm	Max Ø 508 mm - 20" Max Cone 152 mm - 6"	not applicable
UHD50-F	front mount	50 cc- 3.05 cu. in	Slave helm	Max Ø 711 mm - 28" Max Cone 152 mm - 6"	not applicable
UHD50-T	with X66 tilt	50 cc- 3.05 cu. in	Slave helm	Max Ø 508 mm - 20" Max Cone 152 mm - 6"	not applicable

### ⚠ WARNING

The release pressure of the relief valves is not the one considered for the system normal use but for the system use in extreme conditions.

### NOTICE

In dual station systems, it is possible to use front and tilt version helms together but they must have the same cylinder capacity. Always comply with the installation instructions.

### ⚠ DANGER

**NEVER** use the Slave helm as single station since it is not equipped with proper safety systems. Refer to the installation diagram!

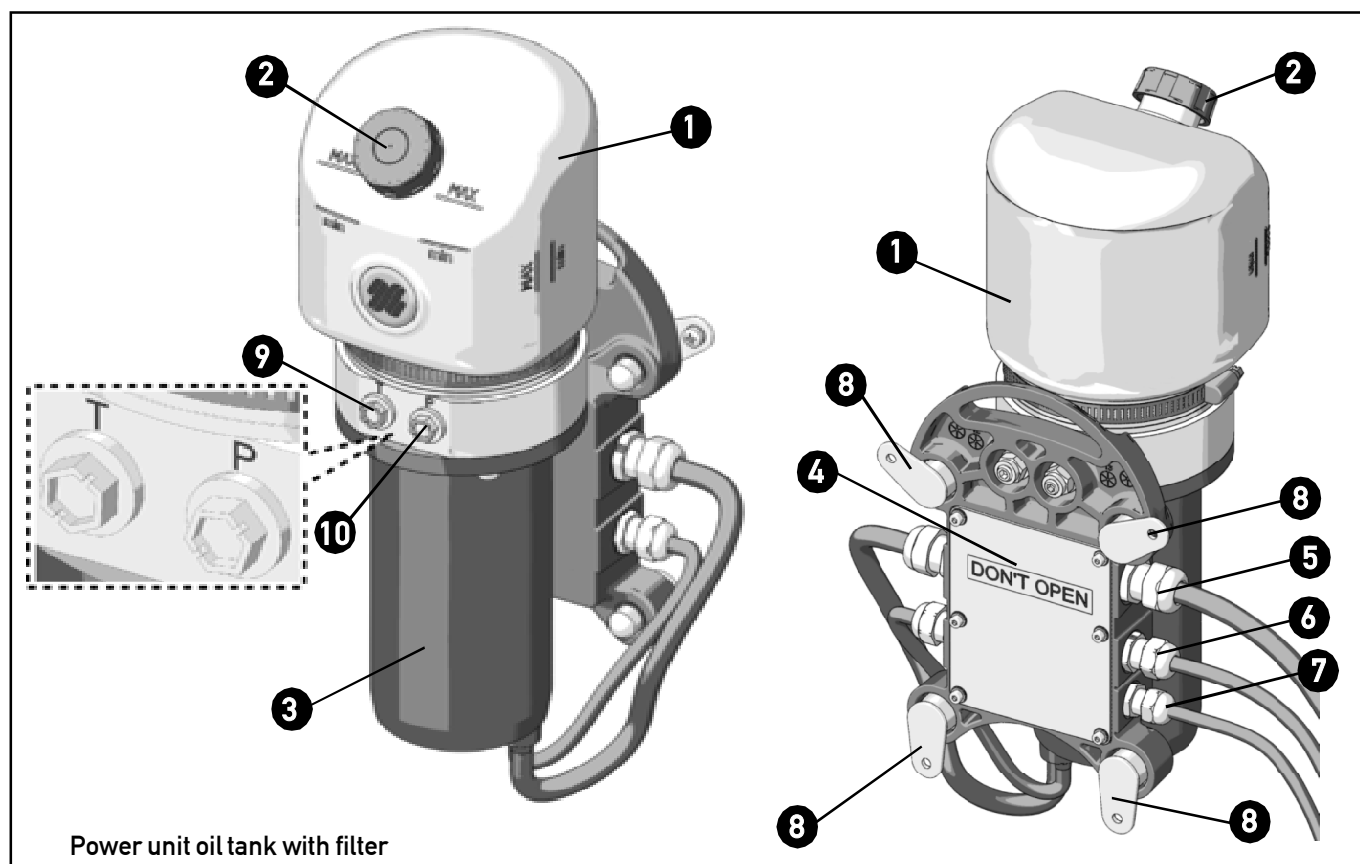
A wrong installation will prevent the system from operating properly!



### 1.6 Power unit technical features

- 12VDC Motor
- 90° swiveling fittings for easy installation
- Semitransparent 2 litre (0.52 gal) tank gives immediate level vision
- Vented filler plug
- 40A fuse
- Maximum rated current of the power unit 35A
- Wall or floor mount
- Hydrocarbon and hydraulic oil resistant
- Salt water resistant motor
- 4,5 m (15') Wiring Harness to key, battery and user interface included
- Waterproof (except for the vent filler plug)

The release pressure of the power unit relief valve is 38 bar (550 psi).



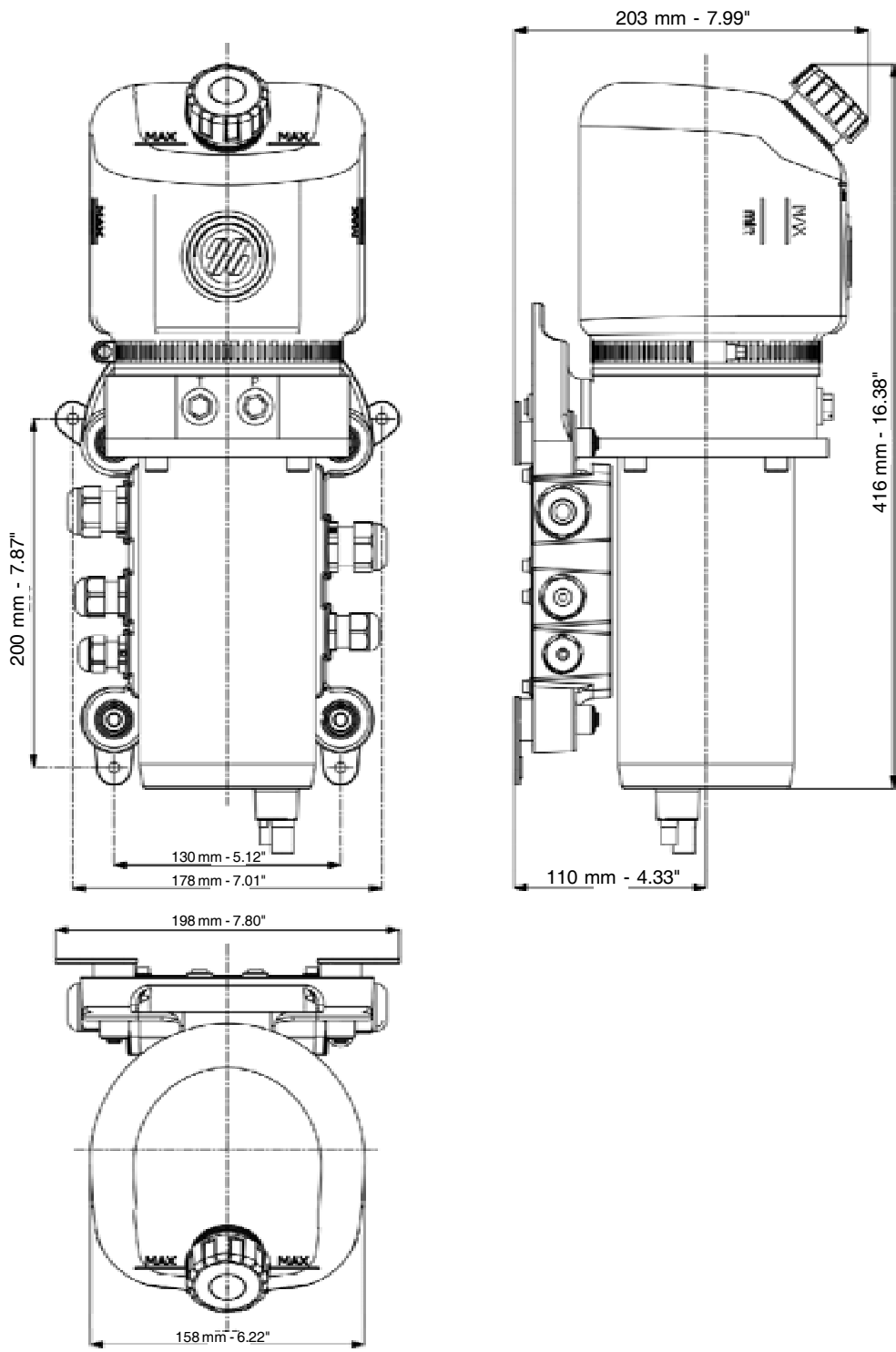
Power unit oil tank with filter

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1 Vented filler plug</li> <li>2 Motor</li> <li>3 Power control electronic unit</li> <li>4 <b>WARNING:</b> Never remove the cover, otherwise warranty will be void and the system explosion-proof safety will no longer be ensured</li> </ul> | <ul style="list-style-type: none"> <li>5 Power cable</li> <li>6 Communication cable</li> <li>7 Key cable</li> <li>8 Fixing brackets</li> <li>9 Delivery of high pressure oil</li> <li>10 Return to the low pressure tank</li> </ul> |
|---|---|





**APPLICATION EXAMPLE - OVERALL DIMENSIONS**

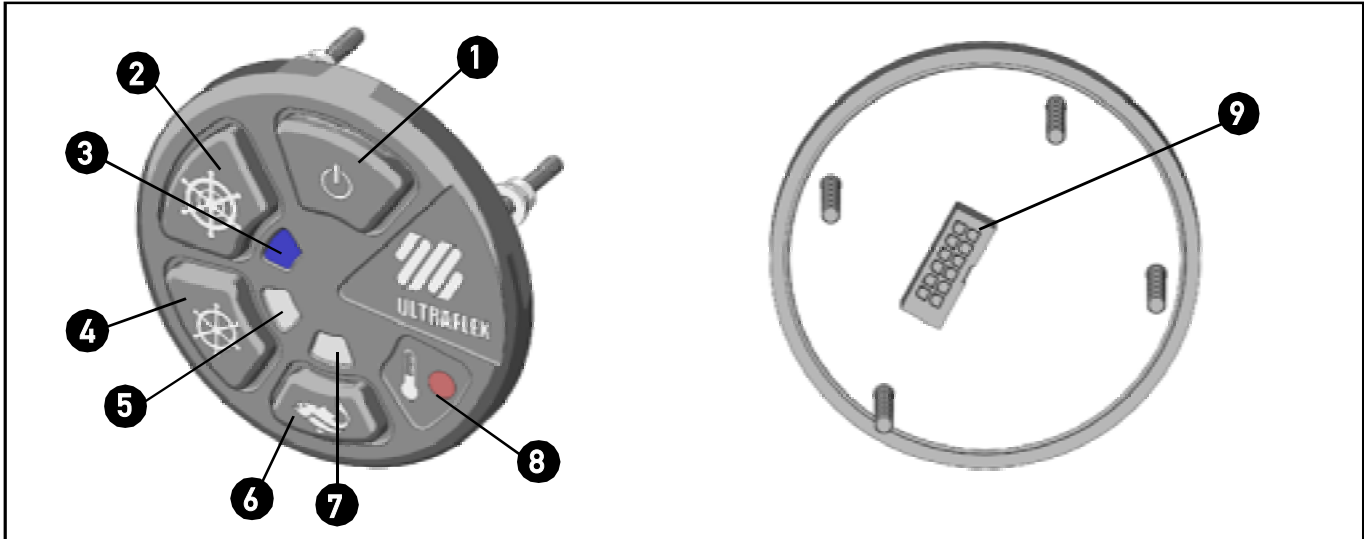


**NOTICE:** Consider the wiring harness and hydraulic hose dimensions



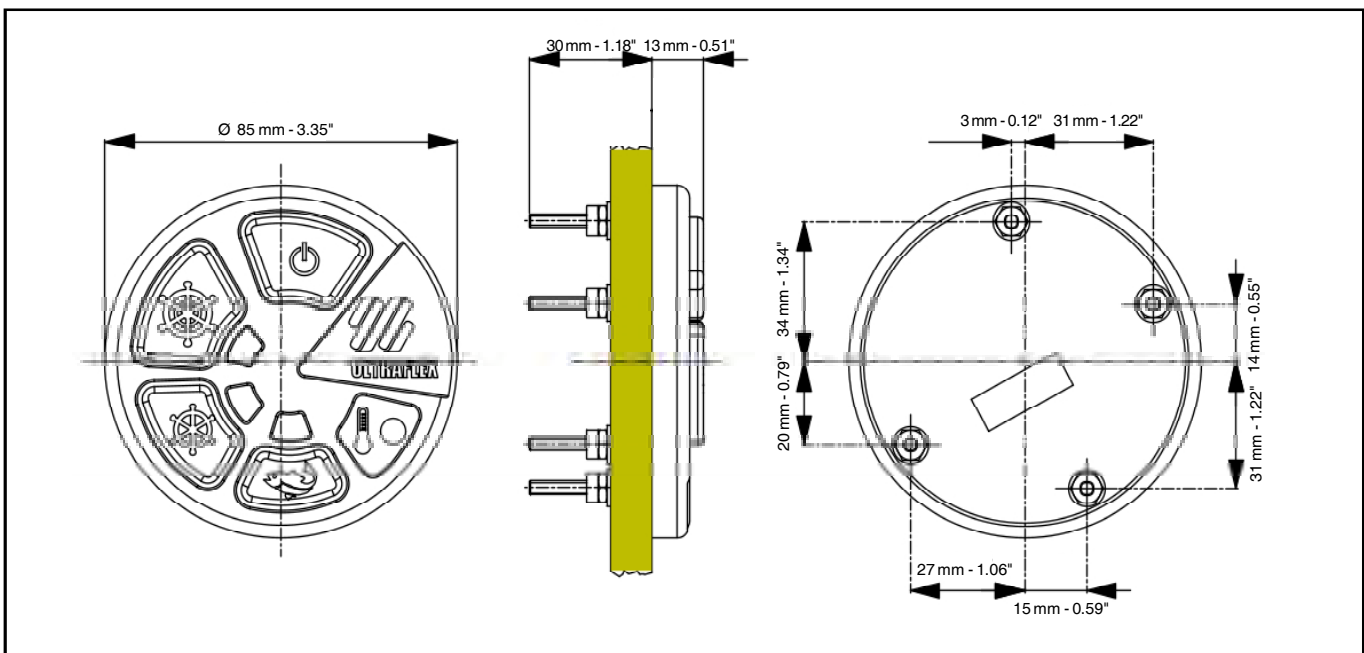
### 1.7 User interface technical features

- Safety switch ON/OFF (SMART BUTTON)
- Three different power levels with light indicator (PATENTED)
- Motor temperature visual indicator
- Stand-by position indicator
- Plug-in wiring harness
- Backlit "soft touch" panel



- 1** On push button (red when in standby/ white when on)
- 2** MasterDrive™ mode selection push button (backlit in white)
- 3** MasterDrive™ mode indicator led (blue when on)
- 4** Cruise mode selection push button (backlit in white)
- 5** Cruise mode indicator led (blue when on)
- 6** Fishing mode selection push-button (backlit in white)
- 7** Fishing mode indicator led (blue when on)
- 8** Malfunction signalling led (red)
- 9** Communication cable connector

**NOTICE:** The user interface is equipped with a seal. DO NOT REMOVE THE SEAL!



## 2 TRANSPORT

### 2.1 General warnings

The weight of the **MASTERDRIVE** system components is 18 Kg (39 pounds) with their packaging; therefore they 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 or storage. 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.



**⚠ CAUTION**

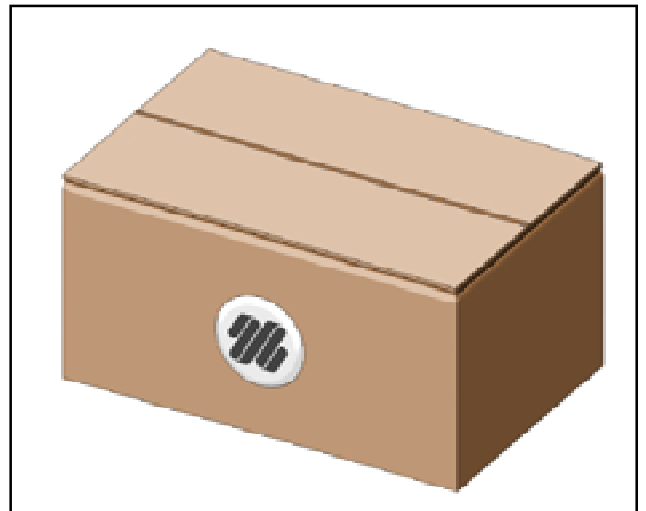
The packaging must be disposed of according to the existing laws.

#### 2.2.1 Single station packaging contents

- n° 1 power unit with cables
- n° 4 silent blocks (fixing brackets)
- n° 4 sealing washers for silent block fixing
- n° 4 stainless steel washers for silent block fixing
- n° 4 self-locking nut for silent block fixing
- n° 4 nut cap covers for silent block fixing
- n° 4 self-tapping screws for the power unit fixing to the wall and 4 stainless steel washers

**MD KIT - FRONT MOUNT APPLICATION:**

- n° 1 helm (UH32-F or UH40-F or UH50-F)
- n° 2 flanges for fixing to the dashboard
- n° 4 screws for fixing to the dashboard
- n° 4 spacers (not supplied for 50cc helms)
- n° 8 washers
- n° 4 self-locking nuts
- n° 1 plastic cover
- n° 4 screws for cover fixing
- n° 1 key for steering wheel fixing
- n° 1 stainless steel washer for steering wheel fixing
- n° 1 stainless steel self-locking nut for steering wheel fixing
- n° 1 helm shaft seal
- n° 1 dashboard seal
- n° 1 user interface
- n° 4 stainless steel nuts for fixing to the dashboard
- n° 4 stainless steel washers
- n° 1 seal



**MD KIT - TILT APPLICATION:**

- n° 1 helm (UH32-T or UH40-T or UH50-F)

- n° 4 litres of hydraulic oil OL 150 **ULTRAFLEX**

**NOTICE:** cylinders and hydraulic hoses (Kit OB-SVS and Kit OB-MD) are ordered and packed separately (see the relevant installation manuals).

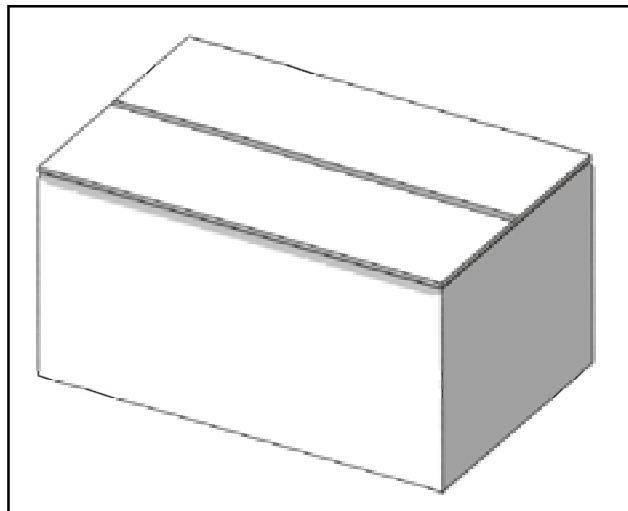


### 2.2.2 Dual station packaging contents

#### STANDARD PACKAGING CONTENTS:

##### MD KIT - FRONT MOUNT APPLICATION:

- n° 1 helm (with the same cylinder capacity as the Master helm: UHD32-F or UHD40-F or UHD50-F according to the Master helm)
- n° 2 flanges for fixing to the dashboard
- n° 4 screws for fixing to the dashboard
- n° 4 spacers (not supplied for 50cc helms)
- n° 8 washers
- n° 4 self-locking nuts
- n° 1 plastic cover
- n° 4 screws for cover fixing
- n° 1 key for steering wheel fixing
- n° 1 stainless steel washer for steering wheel fixing
- n° 1 stainless steel self-locking nut for steering wheel fixing
- n° 1 helm shaft seal
- n° 1 dashboard seal
- n° 1 user interface
- n° 4 stainless steel nuts for fixing to the dashboard
- n° 4 stainless steel washers
- n° 1 seal



##### MD KIT - TILT APPLICATION:

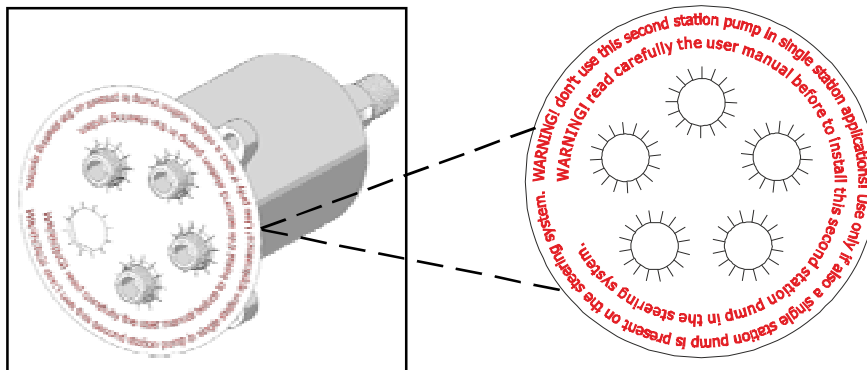
- n° 1 helm (with the same cylinder capacity as the Master helm: UHD32-T or UHD40-T or UHD50-T according to the Master helm)
- n° 1 litre of hydraulic oil OL 150 **ULTRAFLEX**
- n° 1 Slave helm communication cable
- n° 1 straight fitting
- n° 2 "T" fitting

##### ORDER SEPARATELY:

- n° 1 OB-MD kit whose length corresponds to the distance between the Master helm and the Slave helm
- n° 2 Kit OB-SVS

**NOTICE:** cylinders and hydraulic hoses (OB-SVS kit and OB-MD kit) are ordered and packed separately (see the relevant installation manuals).

**NOTICE:** The Slave helm is identified by a PVC disc to be removed during installation only.



#### **⚠ DANGER**

NEVER use the Slave helm as single station since it is not equipped with proper safety systems. Refer to the installation diagram!

A wrong installation will prevent the system from operating properly!



## 3 INSTALLATION

### 3.1 Safety rules during 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**

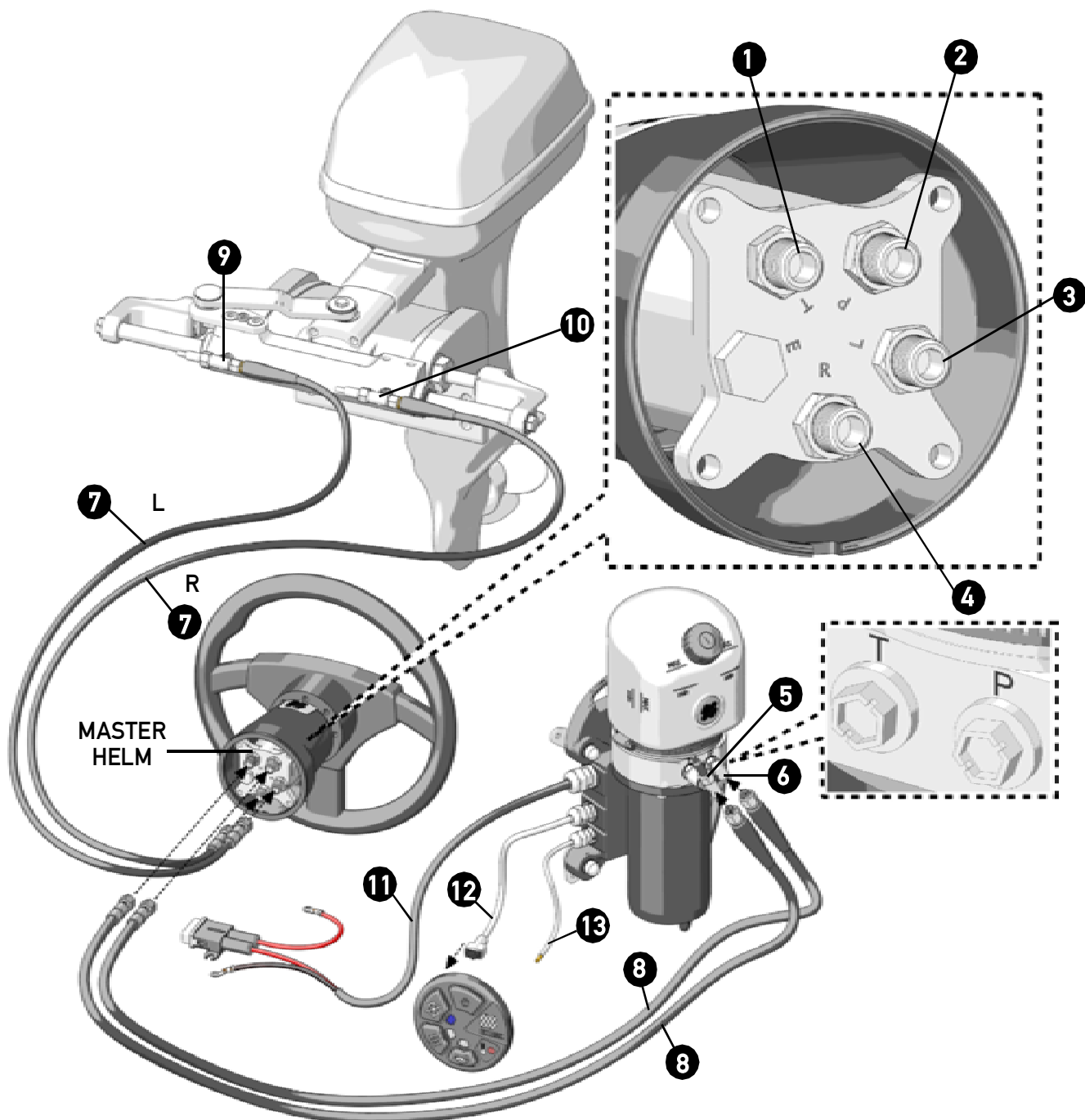
- **DO NOT PUT HANDS BETWEEN THE MOVING PARTS.**
- Do not disable the safety devices.
- Do not modify or add devices to the system, without **ULTRAFLEX** written authorisation or technical intervention which will prove the modification.
- Do not use the equipment for a purpose different from the one 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.
- Do not disassemble the electrical connections before disconnecting the system from the mains.
- For the connection to the cylinder, use **ALWAYS SVS** series hoses. If the system is used with hoses, which are not supplied by **ULTRAFLEX**, verify that the system is dimensioned to bear pressures up to 105 bar (1500 psi).
- Do not disassemble or tamper with any assembled component.
- Do not remove the electronic unit cover displaying the warning "Don't open", otherwise, warranty will be void and the system explosion-proof safety will no longer be ensured.
- **NEVER** use the Slave helm as single station since it is not equipped with proper safety systems.

#### **⚠ WARNING**

- Do not put the feet on the cylinder.
- Check the system after the installation and the purging, before operating the boat. Turn the steering wheel until the cylinder/s reaches/reach the end of stroke.  
Turn the steering wheel to the opposite direction. Repeat on each installed helm to verify the correct installation and the system operation.
- Use sealing fluids (such as Loctite) carefully. If they reach the hydraulic system, they can cause damages and mechanical failure.
- Do not use teflon tape or adhesive tape to seal the fittings, as this material might be sucked, causing failures.
- 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.
- During installation, inspection or maintenance, **IT IS STRICTLY FORBIDDEN** to wear necklaces, bracelets or clothes which could get caught in the moving parts.



### EXAMPLE OF HYDRAULIC CONNECTION OF THE UH32-F SINGLE STATION WITH SINGLE CYLINDER



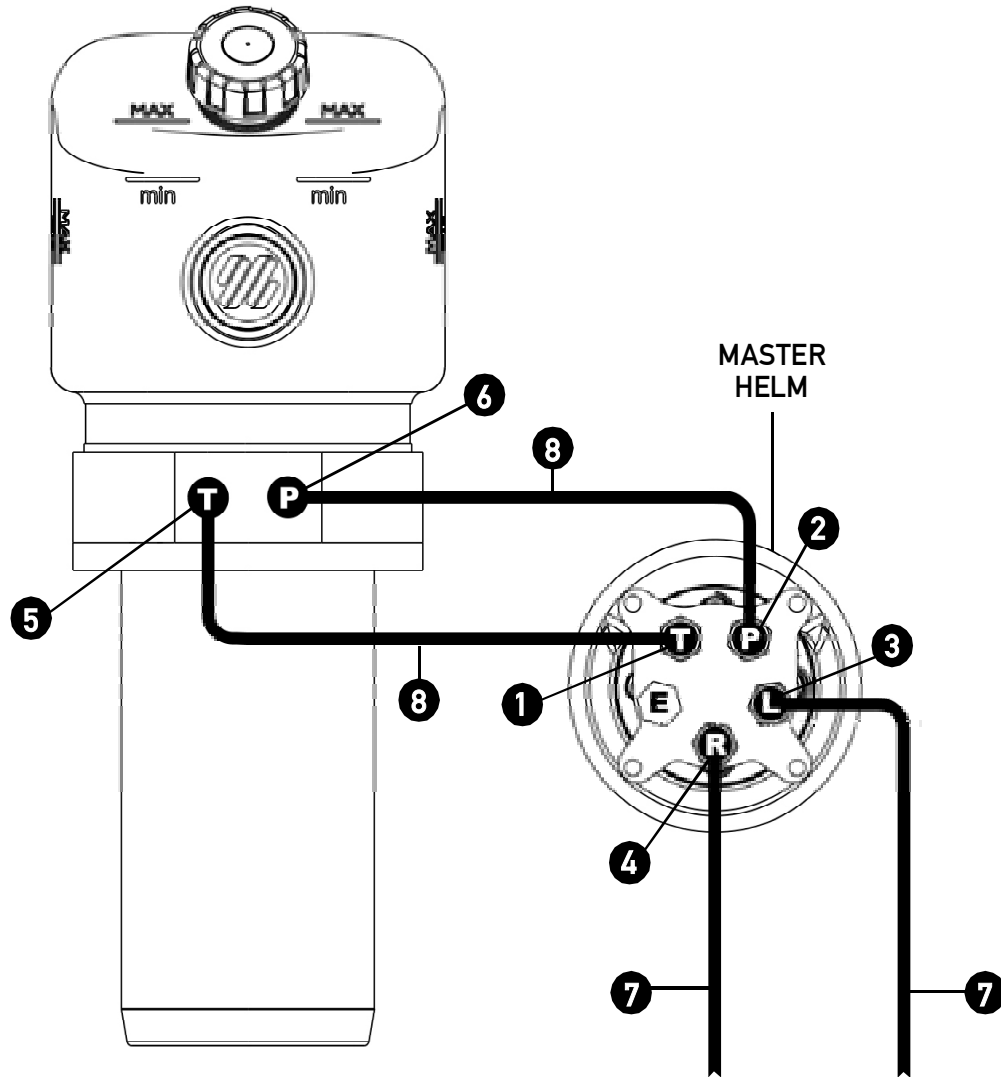
**WARNING:** Check the correct connection of the Kit OB-MD (8) between the helm and the power unit; the hose coming from fitting "T" on the helm must be connected to fitting "T" on the power unit and the hose coming from fitting "P" on the helm must be connected to fitting "P" on the power unit.

**WARNING:** Check the correct connection of the Kit OB-SVS (7) between the helm and the cylinder; the hose coming from fitting "R" on the helm must be connected to the cylinder "PORT" side fitting and viceversa.

**WARNING:** Since the section between the helm and the cylinder may be subject to pressure up to 105 bar (1500 PSI) use SVS cylinders and hoses.

**NOTICE:** In case of use with inboard cylinders, follow the indications in the corresponding use and maintenance manuals for the hydraulic hose connection.

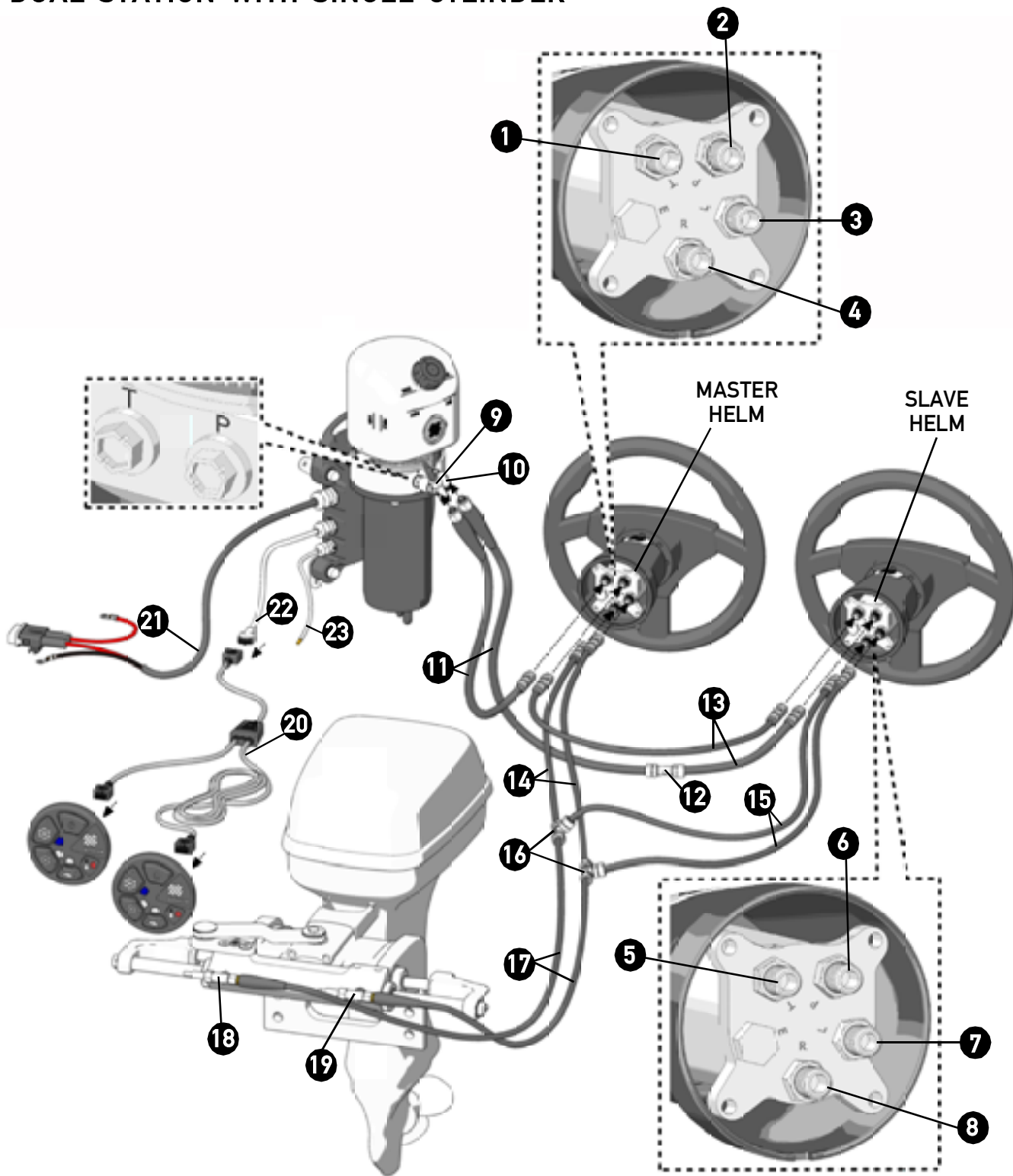




REF.	MARKING	DESCRIPTION	COMPONENT
1	T	Fitting to connect the oil return hose to the power unit tank	Helm
2	P	Fitting to connect the high pressure hose from the power unit	Helm
3	L	Fitting to connect the helm and the cylinder on STARBOARD side	Helm
4	R	Fitting to connect the helm and the cylinder on PORT side	Helm
5	T	Fitting to connect the oil return hose from the helm	Power unit
6	P	Fitting to connect the high pressure hose to the helm	Power unit
7		Kit OB-SVS to connect the helm and the cylinder/s (grey)	Kit OB-SVS
8		Kit OB MD-MD to connect the helm and the power unit (black)	Kit OB-MD
9		STARBOARD side fitting for connection with helm (L)	Cylinder
10		PORT side fitting for connection with helm (R)	Cylinder
11		Power supply cable	Power unit
12		Communication cable	Power unit
13		Key cable	Power unit



### EXAMPLE OF HYDRAULIC CONNECTION OF THE UH32-F and UHD32-F DUAL STATION WITH SINGLE CYLINDER



If the **MASTERDRIVE** system with single station is present, drain all the oil out of the system without dispersing it into the sea.

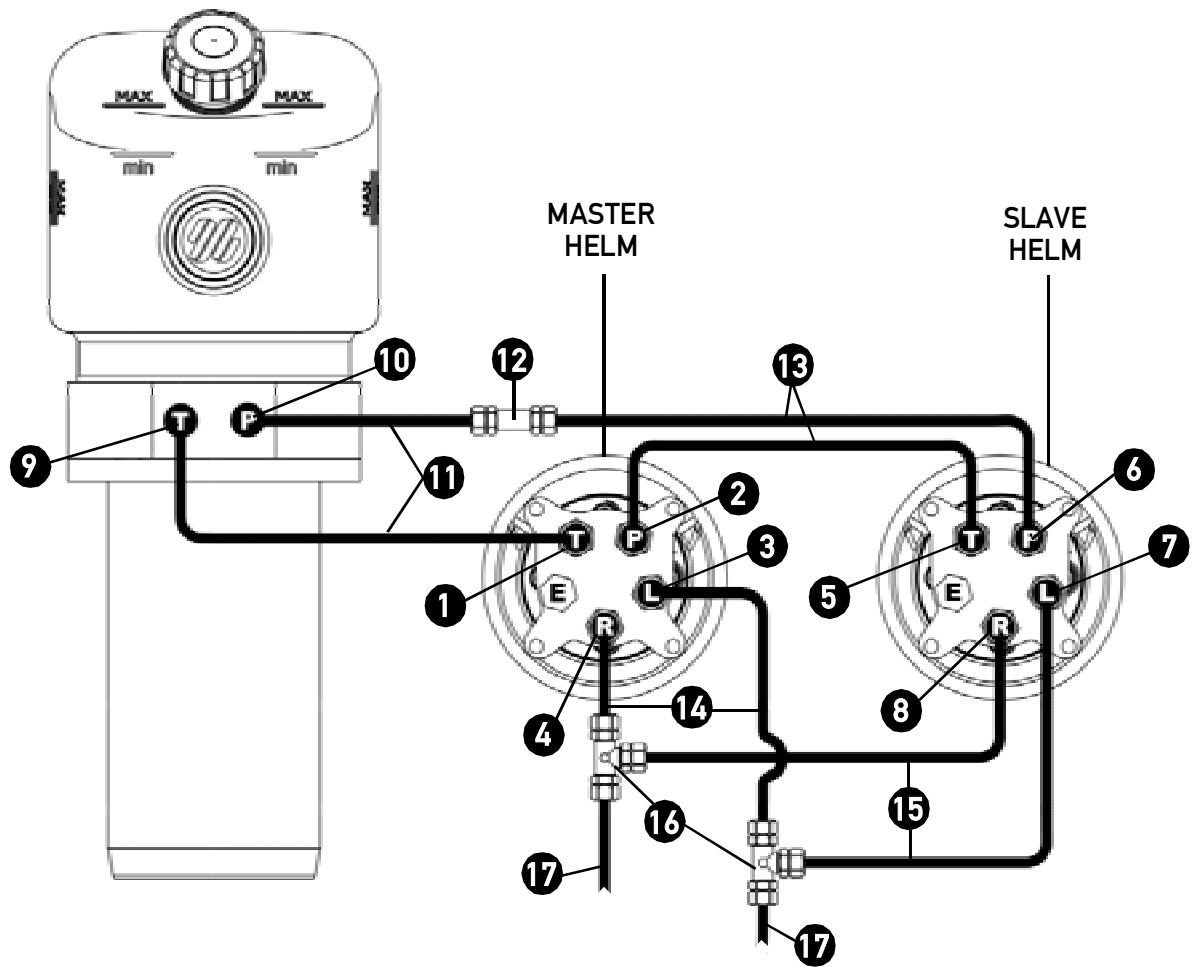
**NOTICE:** It is advisable to replace the existing oil with new oil and to dispose of the used oil in accordance with the regulations in force.

**NOTICE:** The Slave helm is identified by a PVC disc to be removed during installation only.

**NOTICE:** In case of use with inboard cylinders, follow the indications in the corresponding use and maintenance manuals for the hydraulic hose connection.



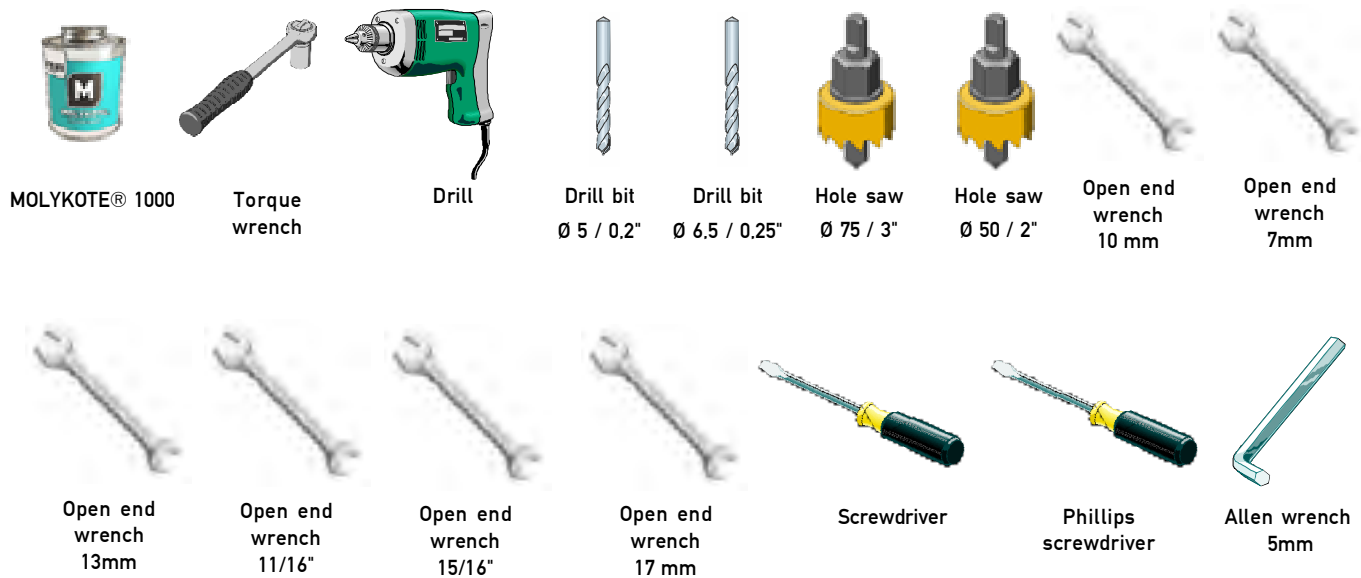




REF.	MARKING	DESCRIPTION	COMPONENT
1	T	Fitting to connect the oil return hose to the power unit tank	Master helm
2	P	Fitting to connect the hose coming from Slave helm T	Master helm
3	L	Fitting to connect the Master helm and the cylinder STARBOARD side	Master helm
4	R	Fitting to connect the Master helm and the cylinder PORT side	Master helm
5	T	Fitting to connect the hose between Slave helm T and Master helm P	Slave helm
6	P	Fitting to connect the high pressure hose from the power unit	Slave helm
7	L	Fitting to connect the Slave helm and the cylinder STARBOARD side	Slave helm
8	R	Fitting to connect the Slave helm and the cylinder PORT side	Slave helm
9	T	Fitting to connect the oil return hose from the helm	Power unit
10	P	Fitting to connect the high pressure hose to the helm	Power unit
11		OB-MD kit for connection between power unit P and straight fitting (black) and between Master helm T and power unit T (black)	Kit OB-MD
12		Straight fitting	Slave helm kit
13		OB-MD kit for connection between the straight fitting and Slave helm P (black) and between Slave helm T and Master helm P (black)	Kit OB-MD
14		OB-SVS kit to connect Master helm and "T" fittings (grey)	Kit OB-SVS
15		OB-SVS kit to connect Slave helm and "T" fittings (grey)	Kit OB-SVS
16		"T" fitting	Slave helm kit
17		OB-SVS kit to connect "T" fittings and cylinder(s) (grey)	Kit OB-SVS
18		STARBOARD side fitting to connect helm (L)	Cylinder
19		PORT side fitting to connect helm (R)	Cylinder
20		"Y" communication cable	Slave helm kit
21		Power supply cable	Power unit
22		Communication cable	Power unit
23		Key cable	Power unit



### 3.2 Necessary tools



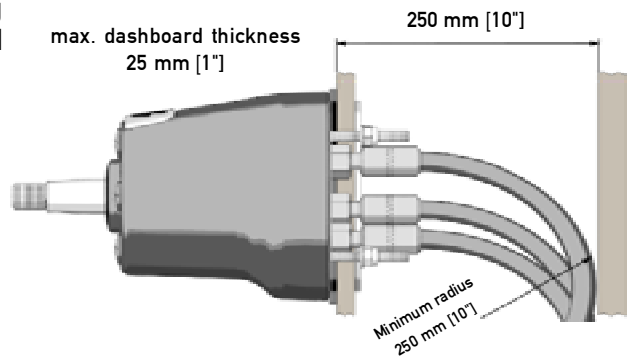
### 3.3 Installation of the front mount helm



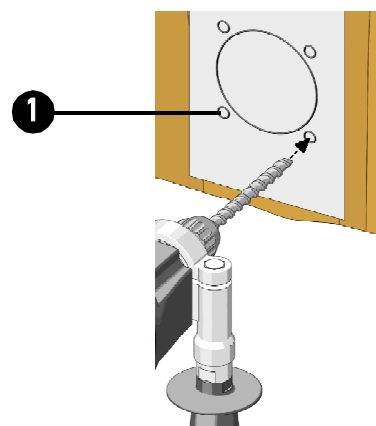
- 1 Select a suitable place for the steering station. Make sure that there is enough manoeuvring space for the steering wheel and for the helm and its pipes and fittings.

#### ⚠ WARNING

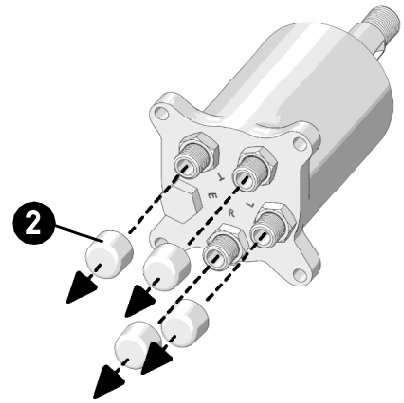
In order to fix the helm properly, the maximum dashboard thickness must be 25 mm [1"]. Different thicknesses could compromise the driving safety. Make sure that the fixing screws pass through the supplied self-locking nuts completely.



- 2 By using the proper template supplied with this manual, make the holes (1) for installation in the suitable position on the dashboard.



- 3 Remove protection plugs (2) from the fittings on the rear part of the helm.



- 4 Make hydraulic hoses (3) pass through rear flange (4), dashboard (5) and front flange (6), then connect them to the helm (20Nm - 15 lb ft).

**⚠ WARNING**

Keep the pipes far from heat sources and from chemical substances. Protect the pipes that must pass through bulkheads by using suitable thru hulls. The bends must be perfectly smooth; any bent pipe or dent would prevent the hydraulic oil passage.

**⚠ WARNING**

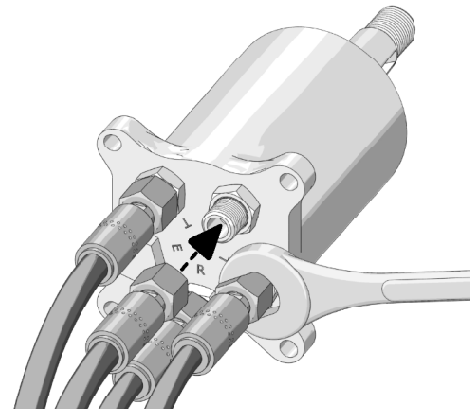
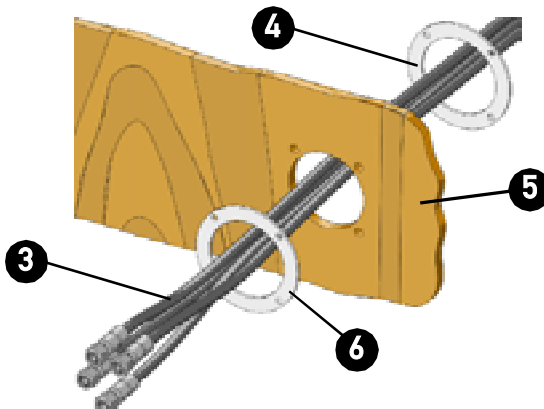
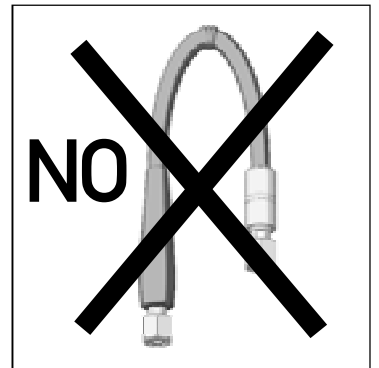
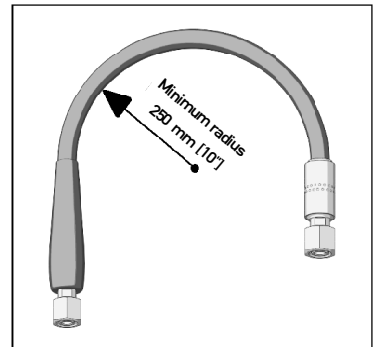
Keep clean. Make sure that working areas are free from dust and dirt. The protective plugs of threaded holes must be removed only before the connection of fittings and pipes. Make sure that pipes are perfectly clean and free from swarf. If copper or steel pipes are used, cleaning is mandatory. If the installer uses pipes that are different from those indicated in this manual, he must take full responsibility for it.

**⚠ WARNING**

At the end of the installation make sure that the pipes do not interfere with the engine and with fixed or mobile parts of the boat or of the steering system itself.

**⚠ WARNING**

The minimum bending radius of the pipes is 250 mm [10"]. Any excessive pipe bending could break them by compromising the good operation of the system. If necessary, replace the damaged pipe.



Connect the hydraulic hoses **ULTRAFLEX** kit OB-MD as shown in the picture on page 18 for single station applications and on page 20 for dual station applications.

**⚠ CAUTION**

As far as tools are concerned, please refer to the installation manuals of KIT OB-SVS and KIT OB-MD.

**⚠ WARNING**

Never exceed the recommended torque of 20Nm (15 lb ft) to prevent the hydraulic system from being damaged.

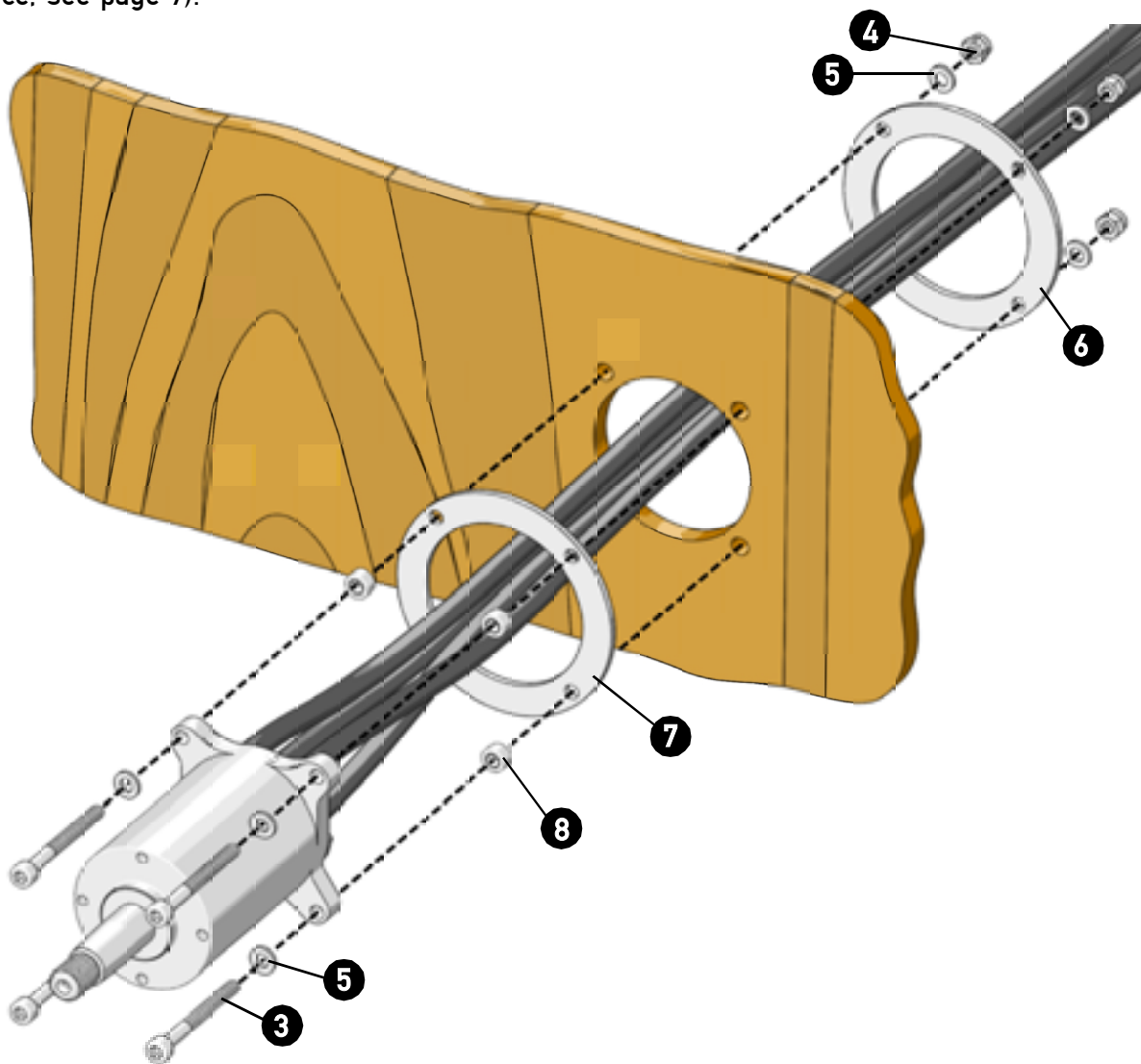


- 5 By using a 5 mm Allen wrench, fix the helm to the dashboard by means of screws (3) nuts (4) and washers (5) after positioning flange (6) in the rear part of the dashboard and flange (7) with spacers (8) in the front part of it (not supplied for 50cc helms).

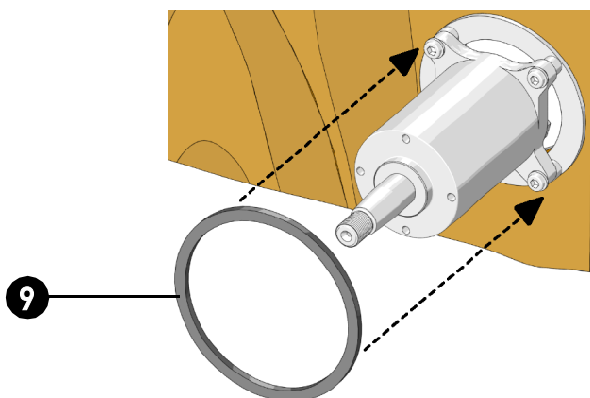
Tighten the four self-locking nuts (4) by using a 10 mm wrench with a torque of 10 Nm (7.37 lb ft).

**⚠ CAUTION**

If the self-locking nuts (4) are disassembled, they must be replaced. (Contact our Technical Assistance Service, see page 7).



- 6 Put seal (9) on the external part of the front flange

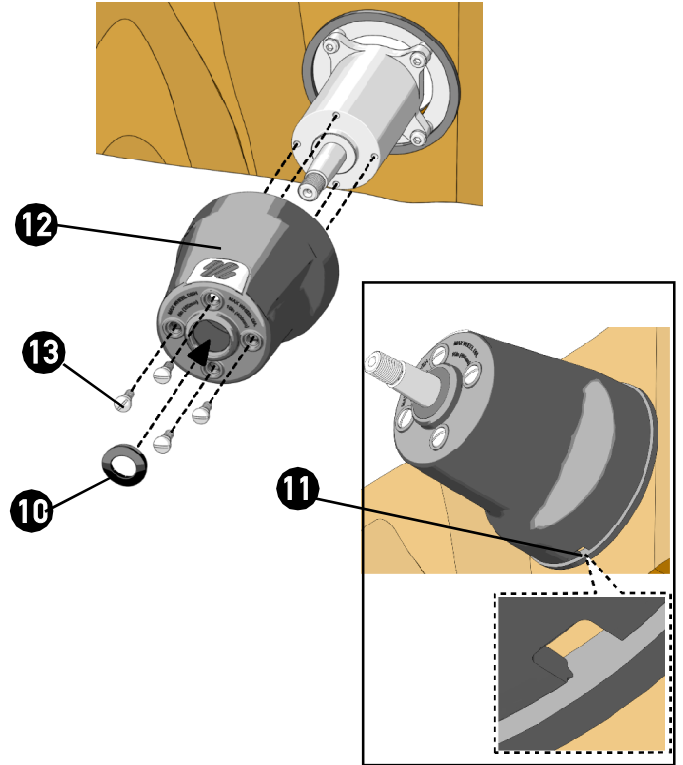


- 7** Put seal (10) on the hub paying great attention not to damage it, especially when making it pass through the the milled profile of the key.

**NOTICE:** Make sure hole (11) is positioned downwards so that condensation can be drained.

Put cover (12) and fix it by means of the four screws (13) with a maximum torque of 8 Nm (5.9 lb ft).

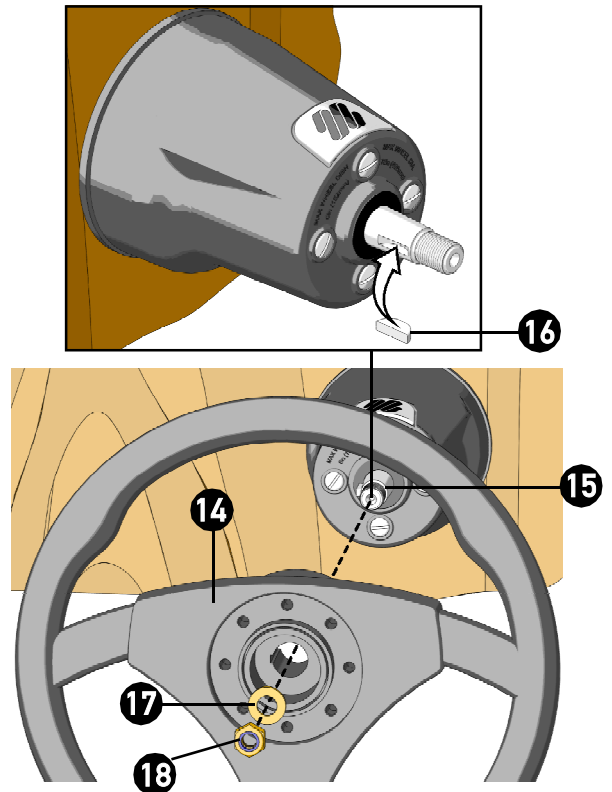
**NOTICE:** Make sure the seal is properly fixed inside its seat.



- 8** Position the steering wheel supplied separately (14) on the helm shaft (15) by using the suitable key (16). Insert washer (17) and tighten the self-locking nut (18) with a 15/16" open end wrench and with a torque of 40 Nm (29.5 lb ft); then grease the thread by using some anti-seize grease MOLYKOTE® 1000 or a similar one.

**⚠ CAUTION**

If the self-locking nut (18) is disassembled, it must be replaced. (Contact our Technical Assistance Service, see page 7).



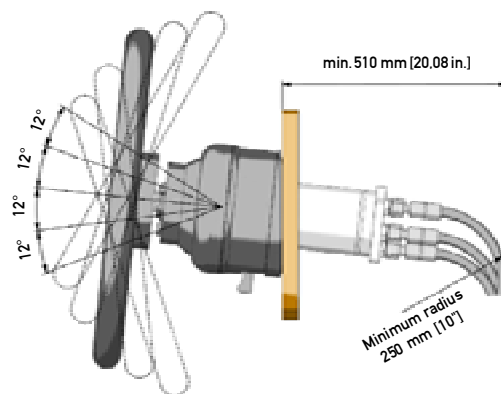
### 3.4 Installation of the TILT mount helm



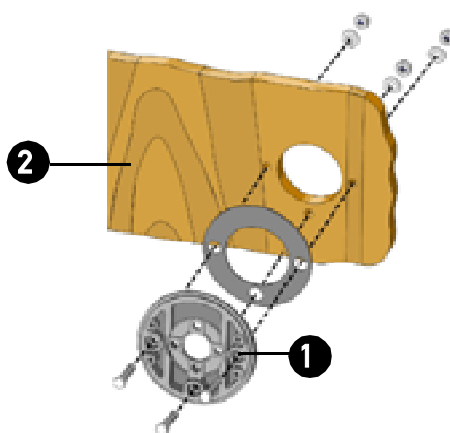
#### ⚠ CAUTION

Tilt X66 is supplied separately.

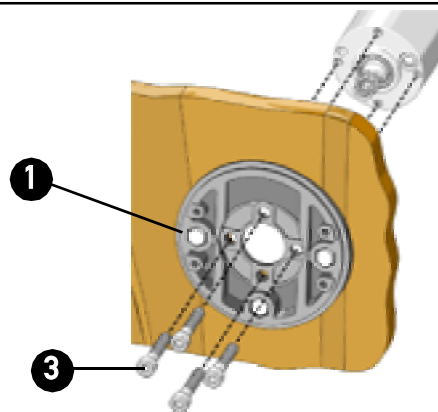
- 2 Select a suitable place for the steering station. Make sure that there is enough manoeuvring space for the steering wheel and for the helm and its pipes and fittings.



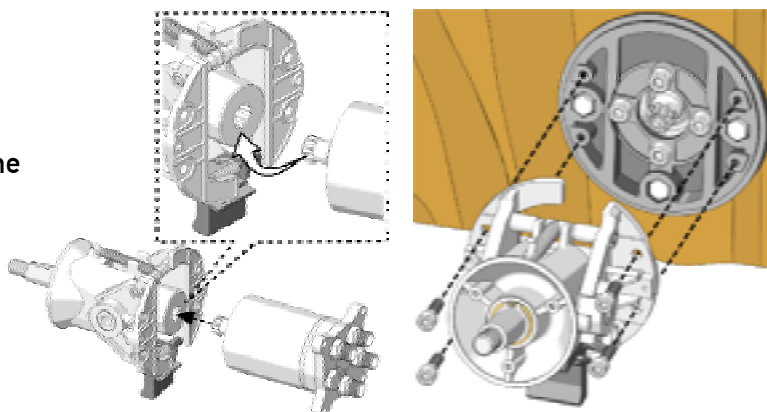
- 2 Fix bracket (1) supplied with tilt X66 to dashboard (2) following the instructions supplied with tilt X66.



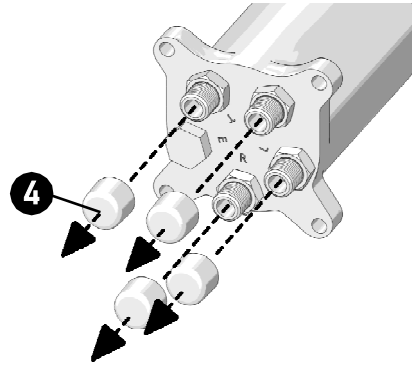
- 3 Fix the helm to bracket (1) supplied with tilt X66 by using the three M6 screws (3) supplied with tilt X66 following the instructions provided with tilt X66.



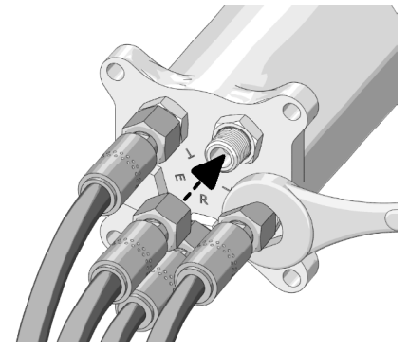
- 4 Position mechanism X66 putting it on the helm shaft.



- 5 Remove protection plugs (4) from the fittings on the rear part of the helm.



- 6 Connect the hydraulic hoses **ULTRAFLEX** kit OB-MD between the helm and the power unit and the hydraulic hoses **ULTRAFLEX** kit OB-SVS between the helm and the cylinder as shown in the picture on page 18 for single station applications and on page 20 for dual station applications.



### ⚠ CAUTION

As far as tools and torque are concerned, please refer to the installation manuals of KIT OB-SVS and KIT OB-MD.

### ⚠ WARNING

Never exceed the recommended torque to prevent the hydraulic system from being damaged.

### ⚠ WARNING

Keep the pipes far from heat sources and from chemical substances. Protect the pipes that must pass through bulkheads by using suitable thru hulls. The bends must be perfectly smooth; any bent pipe or dent would prevent the hydraulic oil passage.

### ⚠ WARNING

Keep clean. Make sure that working areas are free from dust and dirt. The protective plugs of threaded holes must be removed only before the connection of fittings and pipes. Make sure that pipes are perfectly clean and free from swarf. If copper or steel pipes are used, cleaning is mandatory. If the installer uses pipes that are different from those indicated in this manual, he must take full responsibility for it.

### ⚠ WARNING

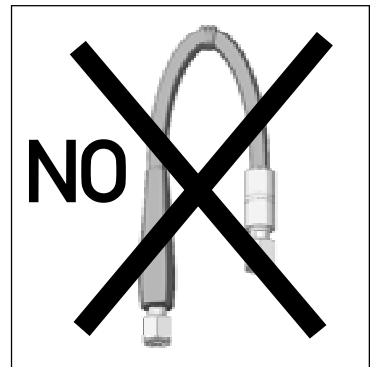
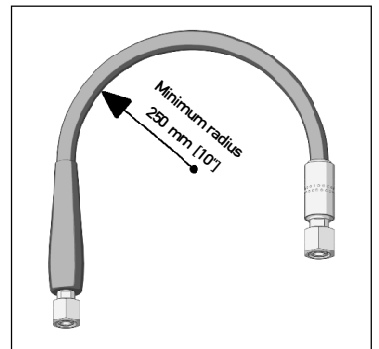
At the end of the installation make sure that the pipes do not interfere with the engine and with fixed or mobile parts of the boat or of the steering system itself.

### ⚠ WARNING

The minimum bending radius of the pipes is 250 mm [10"]. Any excessive pipe bending could break them by compromising the good operation of the system. If necessary, replace the damaged pipe.

### NOTICE

In case of use with inboard cylinders, follow the indications in the corresponding use and maintenance manuals for the hydraulic hose connection. For the connection to the cylinder, use ALWAYS SVS series hoses. If the system is used with hoses, which are not supplied by **ULTRAFLEX**, verify that the system is dimensioned to bear pressures up to 105 bar (1500 psi).



### 3.5 Installation of the power unit



ENGLISH

#### NOTES FOR CORRECT INSTALLATION

- It is advisable to install the power unit far from heat sources, humid areas and fuel tanks in order to ensure its longer duration in good working and efficiency conditions.
- The power unit should be installed in the battery compartment.
- Select a proper surface which can bear the weight of the product.
- In order to ensure a correct working in any sea condition and operation mode, the power unit must be mounted vertically or horizontally.
- In case of floor mounting, put the power unit far from water puddles.
- Make sure electrical cables are not crushed.

#### **⚠ WARNING**

Never cut the cables; gather and store the exceeding part of them in a proper place.

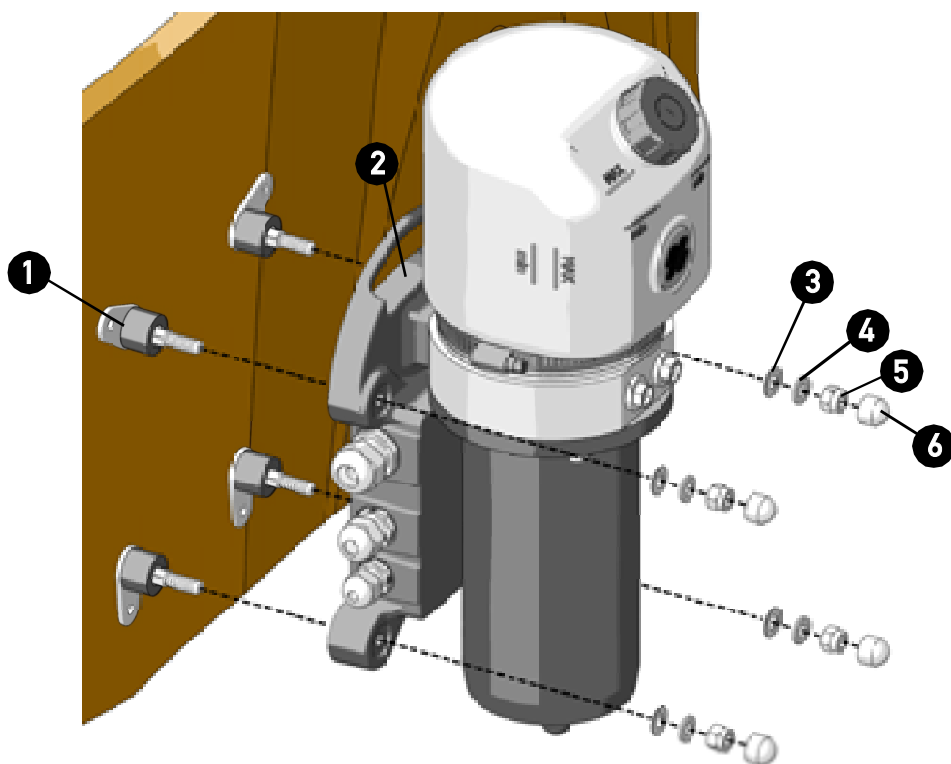
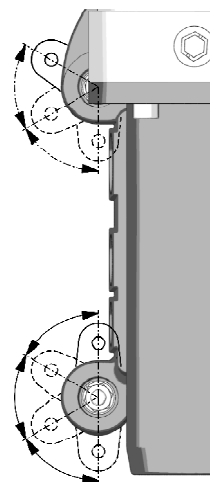
#### **⚠ WARNING**

Do not extend the cables.

#### **⚠ WARNING**

Do not loosen or tamper with the fairleads and their connections.

- 1 After selecting a suitable place for the power unit installation (see the previous note), turn the four silent block fixing plates (1) in the proper position, then mount them on bracket (2). Put the other components according to the following sequence: sealing washer (3), steel washer (4), self-locking nut (5) and protective plug (6).

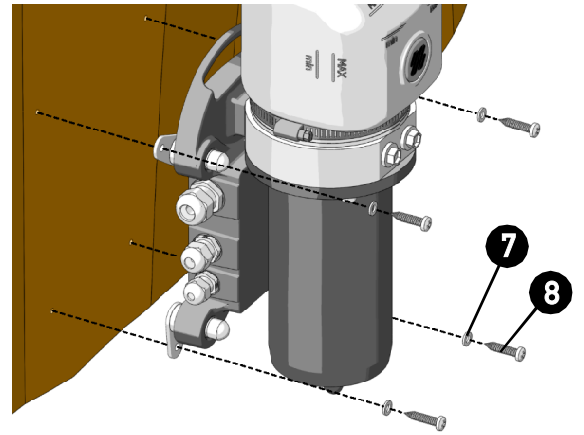




- Fix the power unit to the wall or to the floor by using the four self-tapping screws (7) and washers (8) with a proper torque according to the support type, without exceeding 8 Nm (5.9 lb ft).

**⚠ WARNING**

Make sure the wall or the floor where the power unit will be installed can bear its weight (about 12 Kg, 26.4 pounds)



- Remove the protection plugs. Put T fitting (9) near side TANK (identified with T) and put the 90° fitting (10) near side P and tighten them manually; then turn them after unscrewing them and tighten the nut by means of a 11/16" open end wrench with a torque of 20 Nm (15 lb ft) until the washer touches the unit.

**⚠ DANGER**

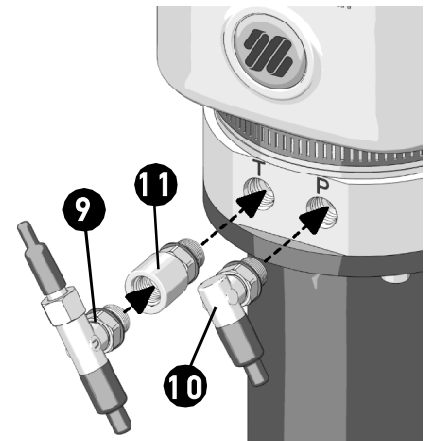
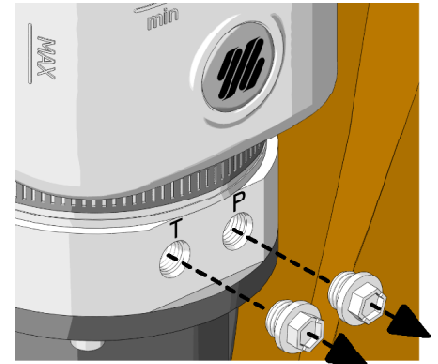
Do not unscrew them more than one turn (360°).

An extension bushing (11) is provided with fittings to make hydraulic hose connection easier.

Tighten the bushing manually, then lock it by tightening the nut using a 11/16" open end wrench with a torque of 20 Nm (15 lb ft).

**NOTICE**

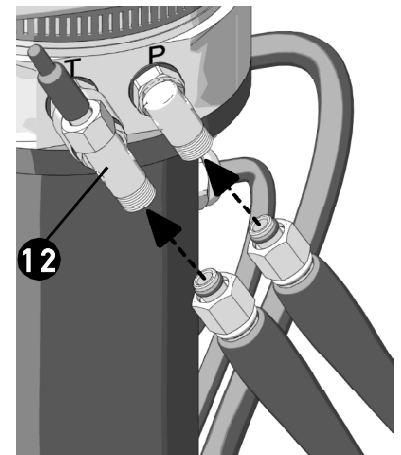
The bushing can be positioned near connection T or connection P.



Remove the protection plugs from the fittings, then connect the proper hydraulic hoses as shown in the "Hydraulic connection layout" on page 18 for single station applications and on page 20 for dual station applications.

**⚠ WARNING**

Check the proper tightening of the bleed nut (12) 20 Nm (15 lb ft).



**NOTES FOR AUTOPILOT CONNECTION****⚠ WARNING**

Before installing an autopilot, contact **ULTRAFLEX** Technical Assistance Center. **ULTRAFLEX** declines any responsibility about the compatibility and the correct operation of the system after installing an autopilot.

After checking compatibility, remove vent from T fitting (9) by unscrewing nut (12) (see previous page). Connect the compensation pipe coming from the autopilot to the 9/16"-24 UNEF thread on the fitting.

**NOTICE**

The autopilot must be placed at a lower height with respect to the power unit.



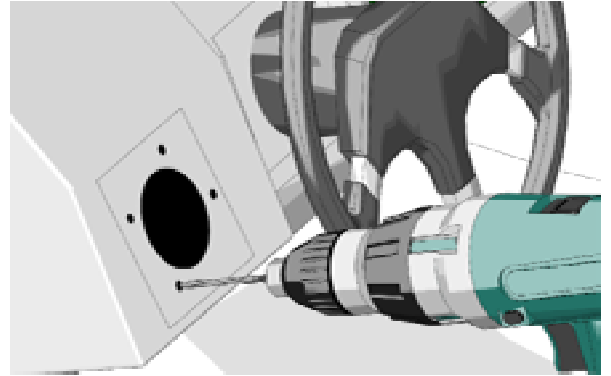
### 3.6 Installation of the user interface



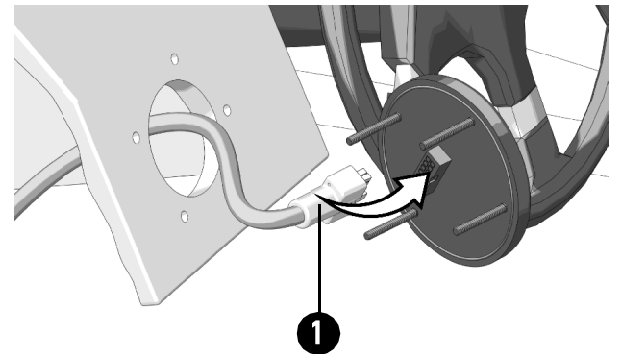
**1** Position the user interface so that it does not hinder other controls or that it is not hindered by them.

**2** Refer to the overall dimensions indicated in paragraph 1.7 to make sure the interface can be installed in the chosen position.

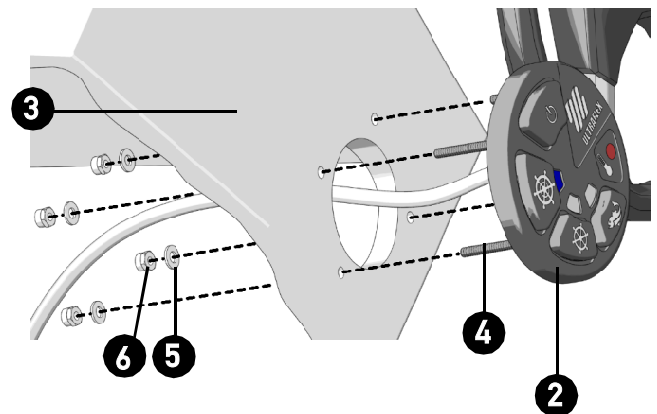
**3** After choosing the right position, make the holes to insert the user interface with the suitable template.



**4** Before fixing the system to the dashboard, connect connector (1) from the power unit in case of single station and connector from the "y" cable in case of dual station.



**5** Position the user interface (2) and fix it to dashboard (3) by means of the four threaded pins (4) washers (4) and nuts (5) with a maximum torque of 2Nm (1,47 lb ft).



### 3.7 Electrical connections



#### ⚠ WARNING

**ULTRAFLEX** is not to be held responsible for possible damages or malfunctions deriving from operation not workmanlike performed.

#### ⚠ DANGER

Do not bend the electrical cables near the power unit fairleads: the system explosion-proof safety would no longer be ensured.

#### NOTICE

Even though the communication cable is made up of quality materials, install it in a dry and sheltered place, far from saline mist, splashes, etc. Do not install it on external parts.

### 3.7.1 Power cable

The power cable supplied by **ULTRAFLEX** is a high quality salt water and oil resistant cable.

To ensure a correct operation, the power cable cannot be tampered with. It is forbidden to change the cable length, the fuse or its container and the indications below must be strictly followed. It is only possible to replace the eyelet connectors supplied as cable ends; in this case, it is necessary to keep the contact protective covers supplied with the cable or replace them with other ones which can properly cover the electrical contacts.

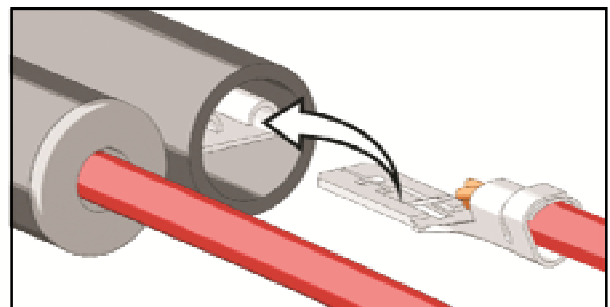
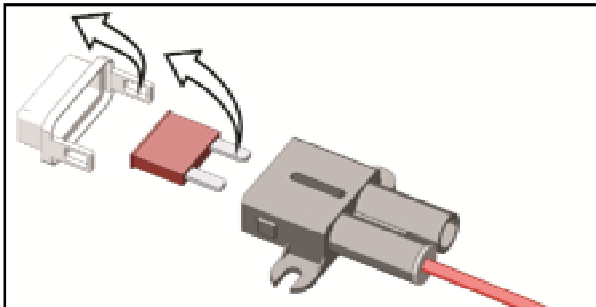
Find the wiring diagram below:

Colour	Use
Red	Positive wire
Black	Ground wire

To make cable passage easier, the fuse holder has been disconnected from the power cable. In order to connect the fuse holder, after laying the cable, do as follows:

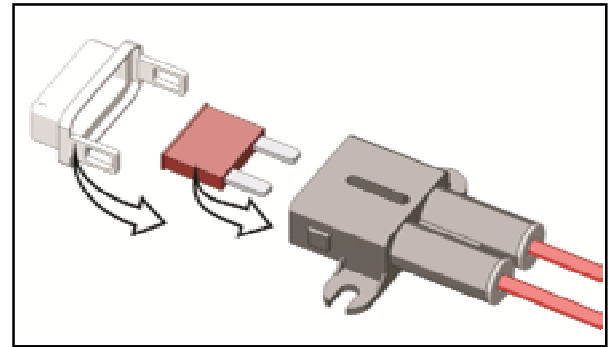
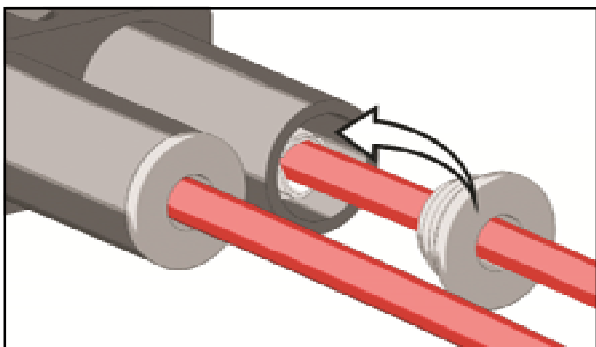
Remove the transparent cover of the fuse holder and the fuse.

Insert the faston into the free space of the fuse holder.



Put the seal on the conductor until it adheres to the fuse holder checking that it has been inserted properly.

Place the fuse in the fuse holder and put the proper transparent cover.

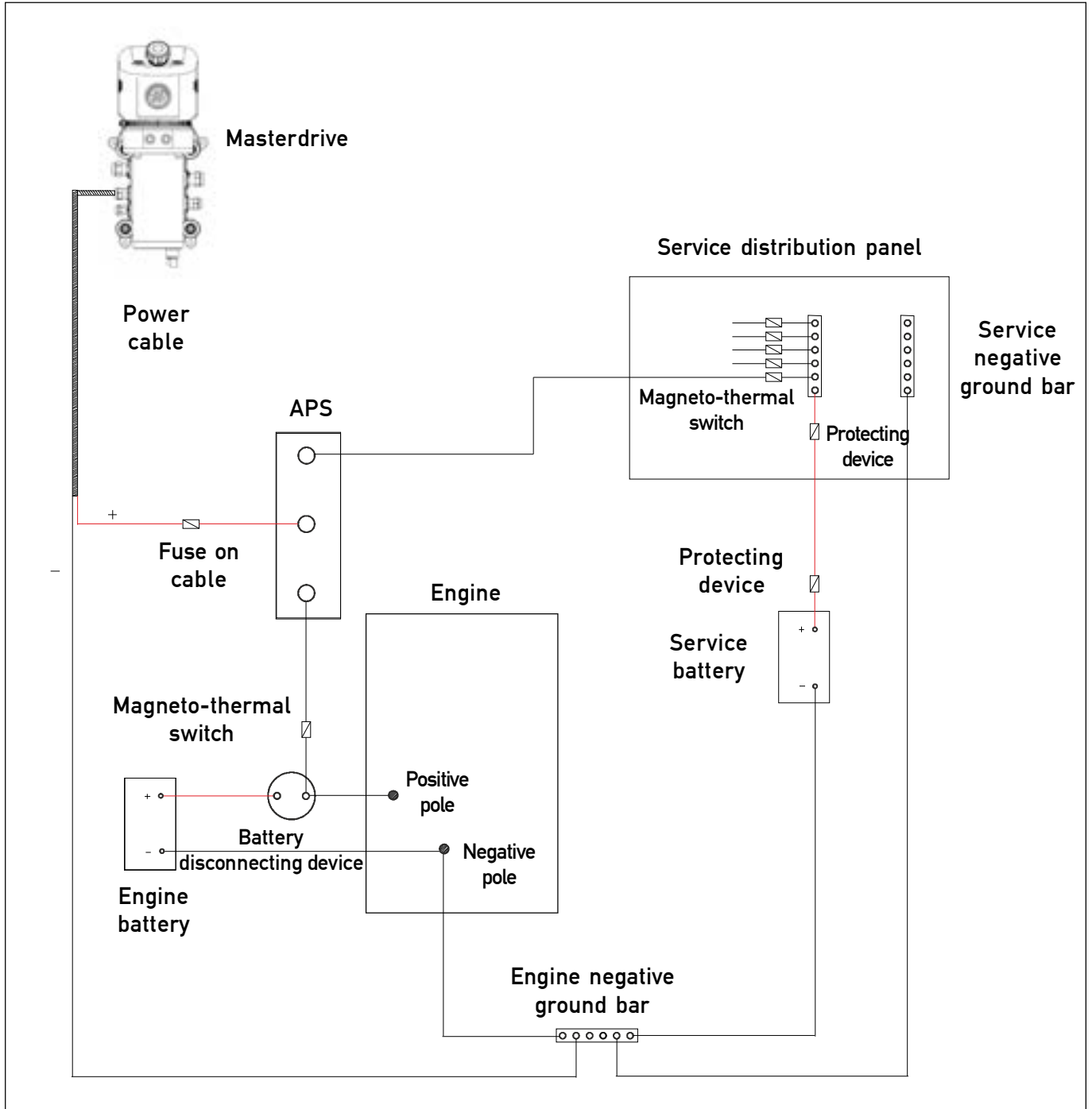


#### ⚠ WARNING

Make sure the fuse holder seal has been inserted properly to prevent water penetration.



The **MASTERDRIVE** system features a very low electrical input: in any case, it is advisable to use an APS (Automatic Power Selector) to use the charge of two batteries: in single-engine systems, the power cable must be connected to the engine battery and to the service battery.

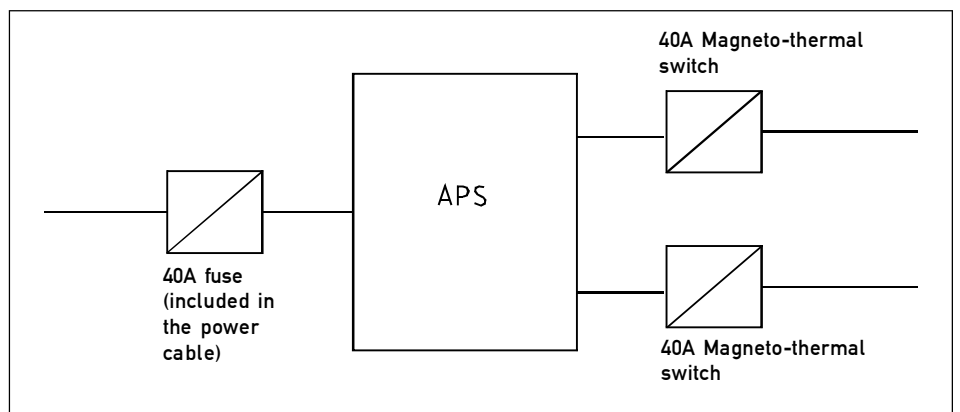


### NOTICE

A 40A fuse is needed on each APS power line

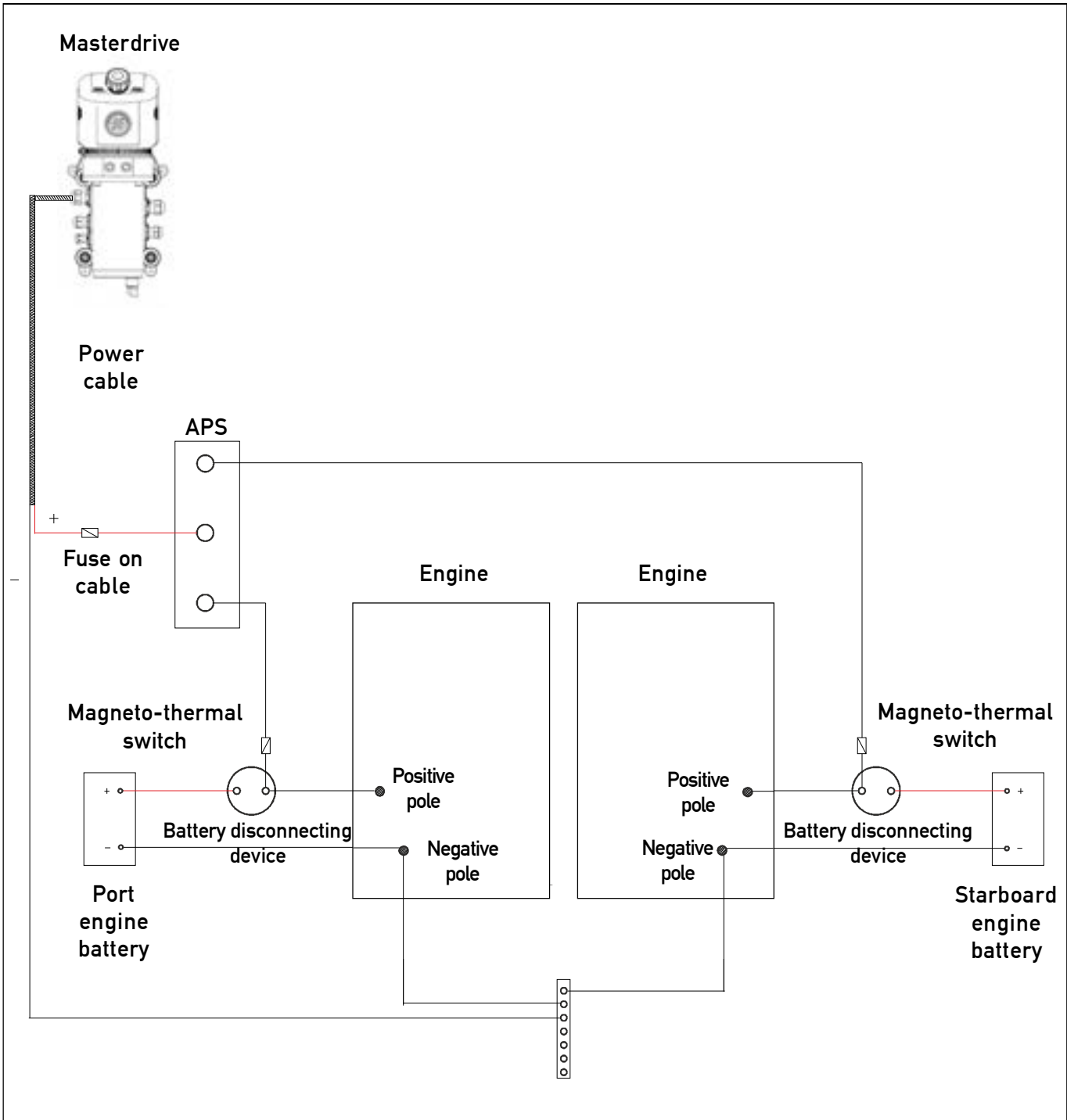
### NOTICE

The magneto-thermal switches must be as close as possible to the power source

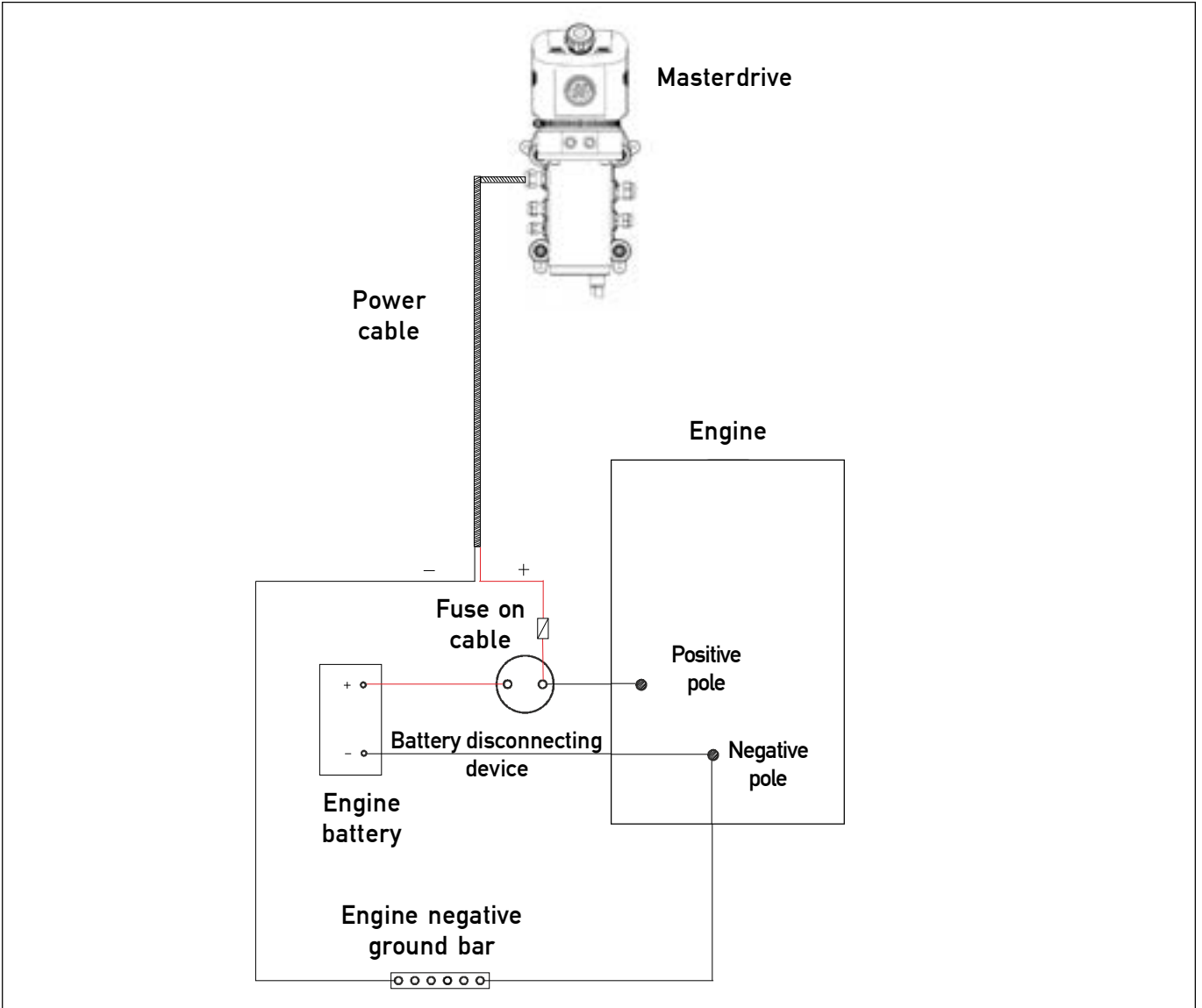


In twin-engine system, it must be connected to both batteries.

ENGLISH



If a APS is not used, it is necessary to connect the power cable to the engine battery.



**⚠ WARNING**

Do not use other power sources as switching suppliers (DC/DC, AC/DC), inverters, alternator shunts, portable batteries, solar cells etc.

The ground wire must be directly connected to the engine negative ground bar.

**NOTICE**

It is possible that the negative ground bar is not used on the boat. In this case, the ground of the power cable should be located on the ground common point, near the battery disconnecting devices.



### 3.7.2 Key cable



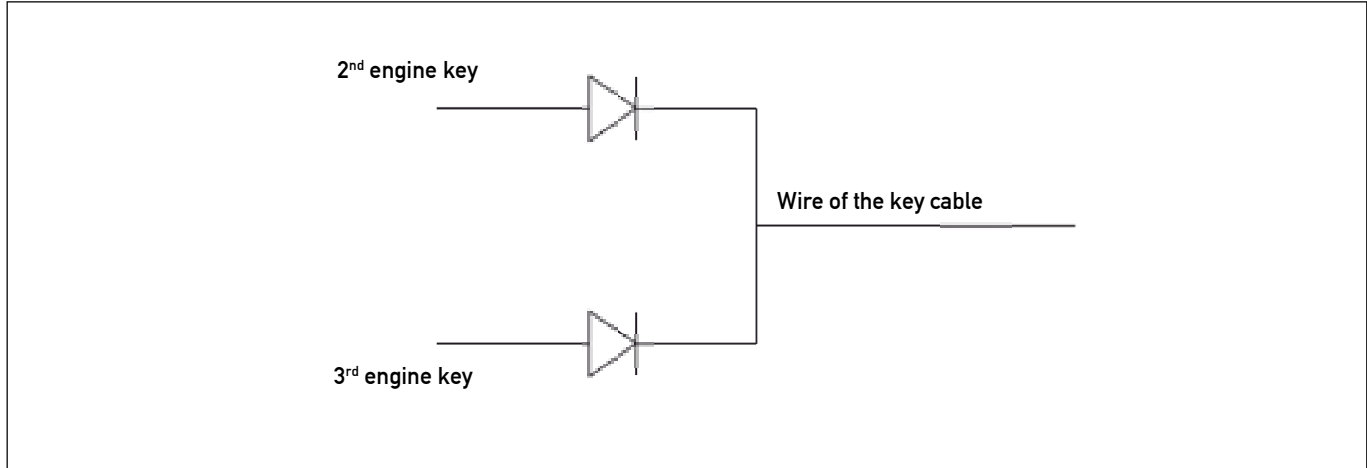
Two engine keys can be connected to the cable.

The black wire and the red wire are used in the same way; therefore, a wiring diagram is not necessary.

In single-engine systems, it is sufficient to connect one key wire to the positive wire of the panel key.

In twin-engine systems, it is necessary to connect both key wires to the positive wires of the panel keys.

In three-engine systems, follow the diagram below:



The installer must use diodes with the following minimum features:

$I_d = 200\text{mA}$

$V_{br} = 32\text{ VDC}$

Key connectors must be connected in a proper way, in order to ensure a waterproof connection

#### NOTICE

In case of dual station, it is not necessary to connect the key cable to the second panel.

### 3.7.3 User interface cable



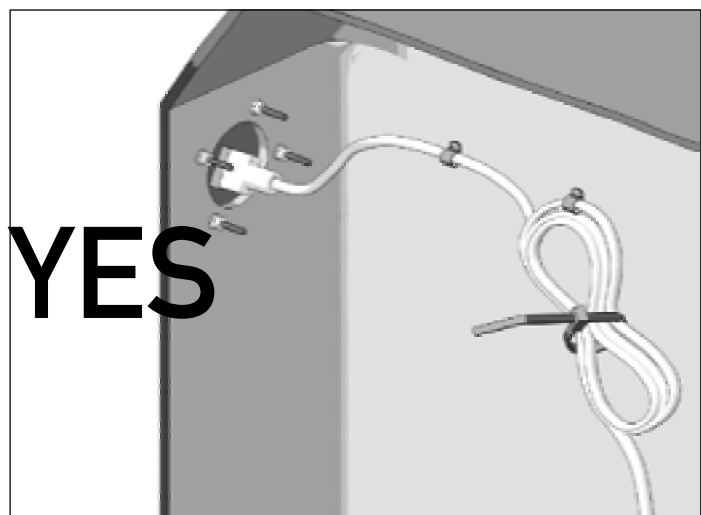
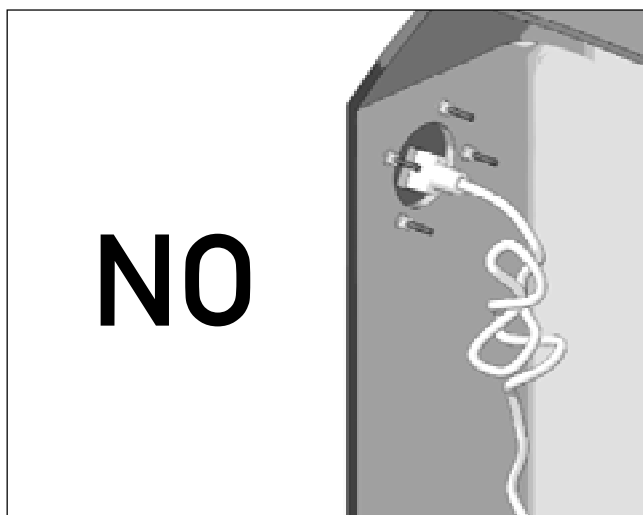
The user interface cable is supplied ready to be connected.

Make sure you hear a "click" confirming the connection.

Slightly pull the connector to check that connection has been properly performed.

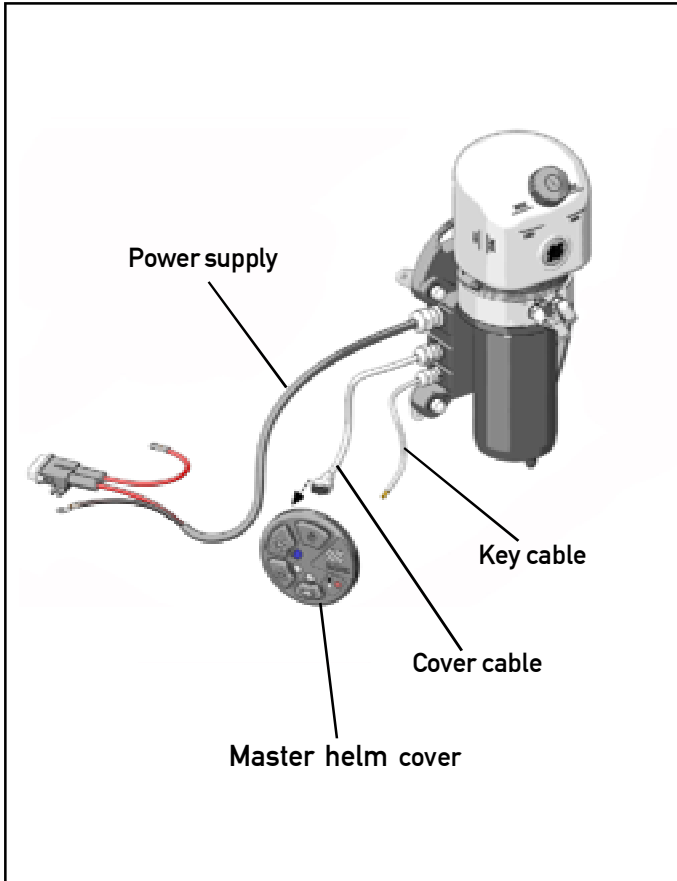
Make sure the user interface cable is not stretched: the connector could be damaged.

Possible exceeding parts of the cable must be properly wound and fixed so that the weight of the cable winding is not excessive in order to prevent the connector from being damaged.

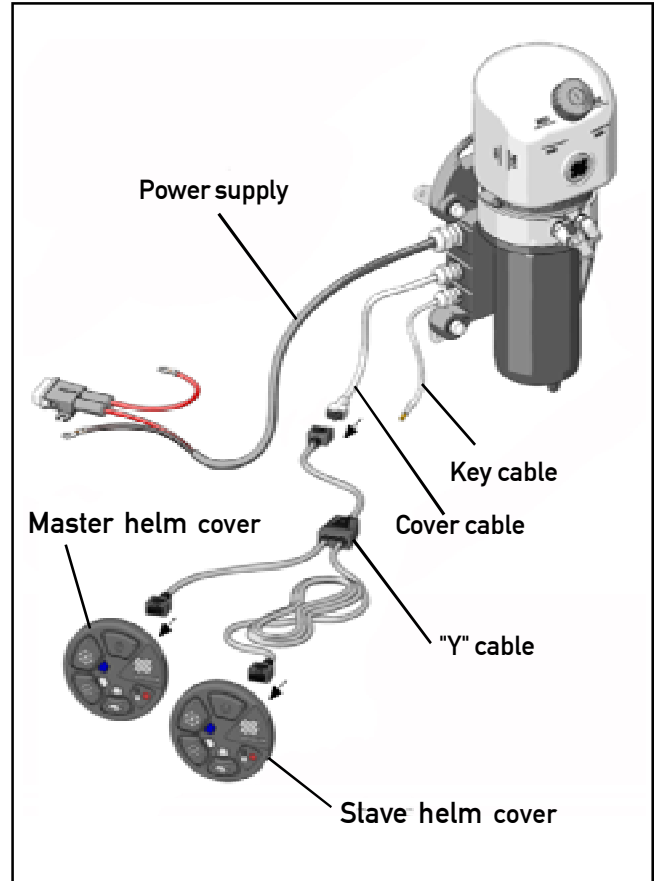




### SINGLE STATION



### DUAL STATION



### 3.8 System filling and bleeding



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.

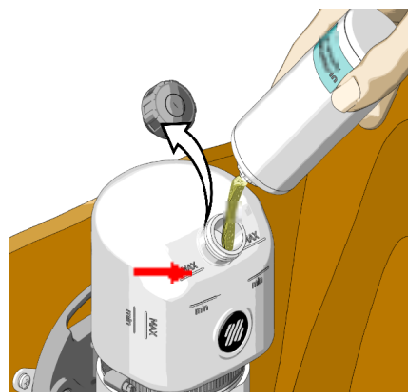
At the beginning the oil level can lower, as small amounts of air can be released in a homogeneous way. According to the types of installation, it is necessary to carry out the different bleeding procedures, as it follows.

#### 3.8.1 System filling

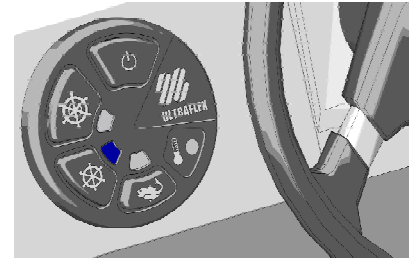


- 1 Remove the tank plug and fill the tank completely

**NOTICE:** The tank is equipped with a filter which must be removed only for cleaning.



2 Turn the system on.



3 Oil starts circulating in the system, filling the hydraulic hoses and lowering the oil level inside the tank.

4 Top up the tank until reaching the maximum level.

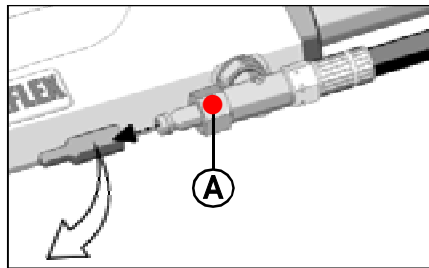
### 3.8.2 Single cylinder system bleeding



#### NOTICE

In case of use with inboard cylinders, follow the indications in the corresponding use and maintenance manuals for the hydraulic hose connection.

- When the system is off, unscrew the two bleed valve protections and loosen nuts "A" of the two bleed valves 1.5 turns max.



- Manually push the cylinder body to one side until it stops as shown in picture 1.
- Close the bleed valve on the cylinder end of stroke side with a torque of 20 Nm (15 lb ft) and put an oil recovery tank near the other bleed valve (as shown in picture 2).
- Turn the system on.
- Turn the steering wheel slowly (as shown in picture 2) so that the oil can come out of hoses.

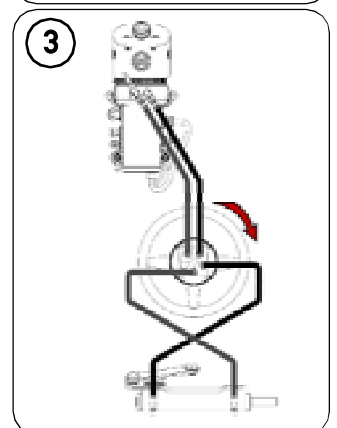
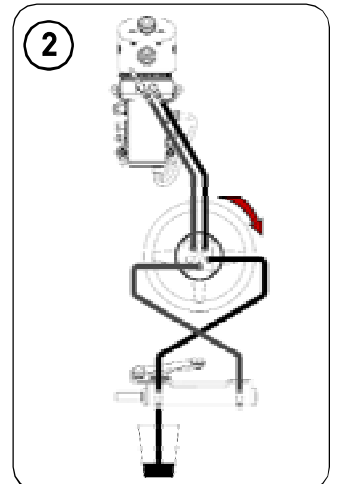
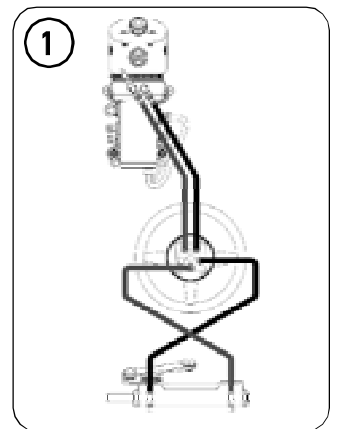
#### NOTICE

Make sure the cylinder remains in its position; if necessary, turn the steering wheel in the opposite direction so that the cylinder returns to its proper position and repeat the operation.

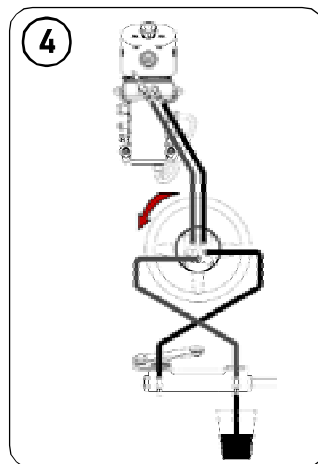
#### NOTICE

During the whole bleeding procedure, make sure that oil inside the tank is at the maximum level. If necessary, top it up.

- When oil comes out of the bleed valve (without air bubbles), close the bleed valve with a torque of 20 Nm (15 lb ft) and continue to turn the steering wheel in the same direction to fill the cylinder chamber (picture 3). During this operation, the cylinder body will move to the opposite direction up to the end of stroke.



- Open the other bleed valve and move the oil recovery 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 be sure there is no air in the system.



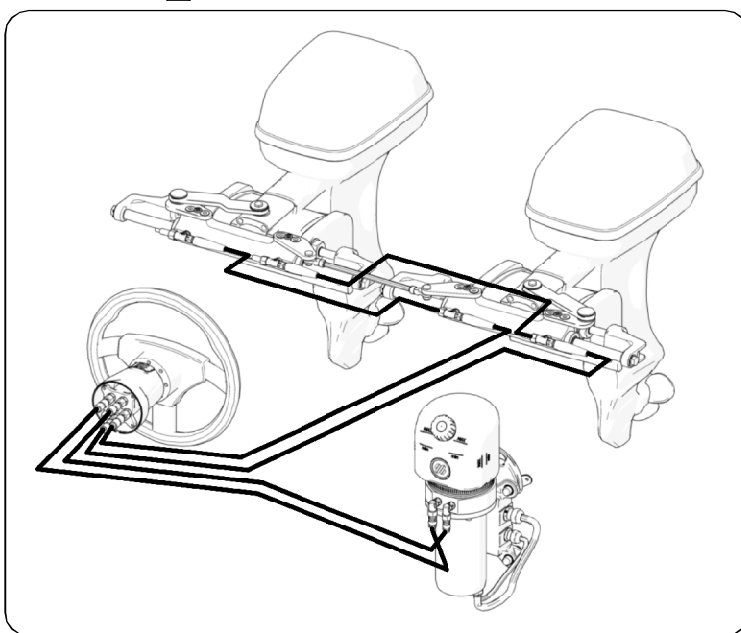
### 3.8.3 Single steering station/ dual cylinder



#### NOTICE

In case of use with inboard cylinders, follow the indications in the corresponding use and maintenance manuals for the hydraulic hose connection.

- Manually unscrew the two bleed valves on the cylinder "T" fittings 1.5 turns max and push the cylinders to one side up to the end of stroke.
- Fill the tank completely and, if necessary, top it up during bleeding operations.
- Follow the same bleeding procedure described for the single cylinder (paragraph 3.8.2). While turning the steering wheel, both cylinders move.
- Repeat the entire procedure several times to be sure there is no air in the system.

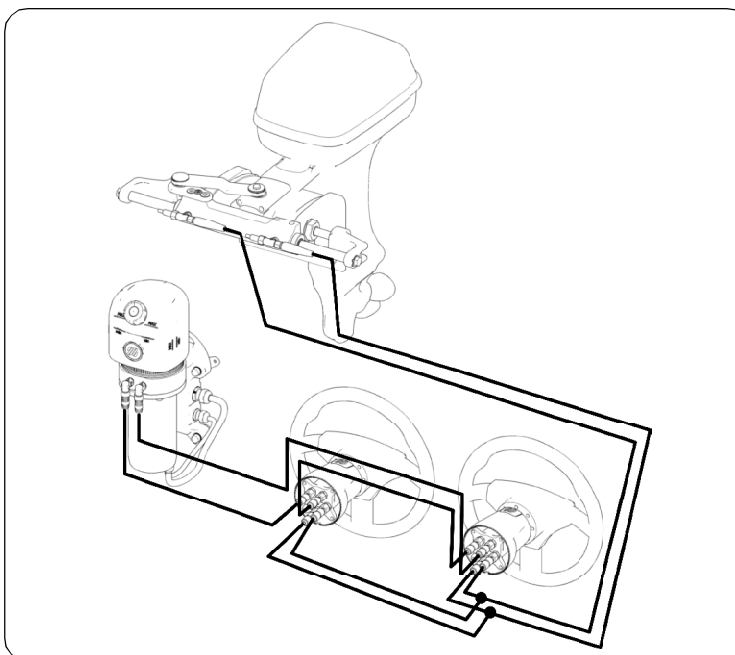


### 3.8.4 Dual steering station/ single cylinder

#### NOTICE

In case of use with inboard cylinders, follow the indications in the corresponding use and maintenance manuals for the hydraulic hose connection.

- 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 Master helm according to what is described in paragraph 3.8.1.



#### ⚠ WARNING

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



- Follow the same bleeding procedure described in paragraph 3.8.2 starting from the Slave helm and repeat it for the Master helm.
- 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 engine, single cylinder and tie bar.

## 3.8.5 Dual steering station/dual cylinder

### NOTICE

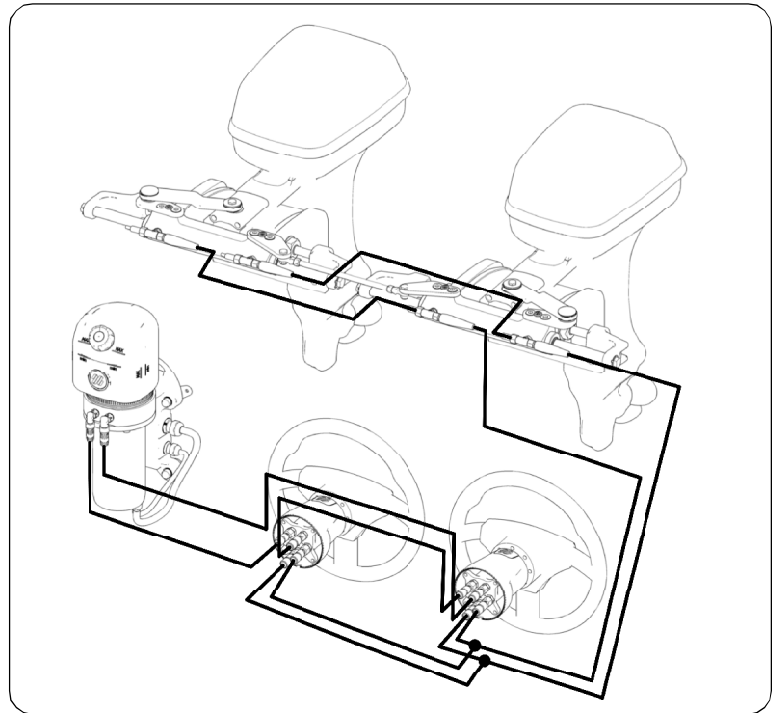
In case of use with inboard cylinders, follow the indications in the corresponding use and maintenance manuals for the hydraulic hose connection.

- 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 Master helm according to what is described in paragraph 3.8.1.

### ⚠ WARNING

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

- Follow the same purging procedure described in paragraph 3.8.2 starting from the Slave helm and repeat it for the Master helm.



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

## 3.9 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/s or the helm/s towards port and starboard, paying attention to any movement of the cylinder shaft.

If the movement between the cylinder body and the shaft is excessive, there is still air in the system. The air presence in the system can cause bad responses to the controls causing damage, injuries or death.

### ⚠ WARNING

Check the system response by turning the steering wheel, even when the power unit is off.

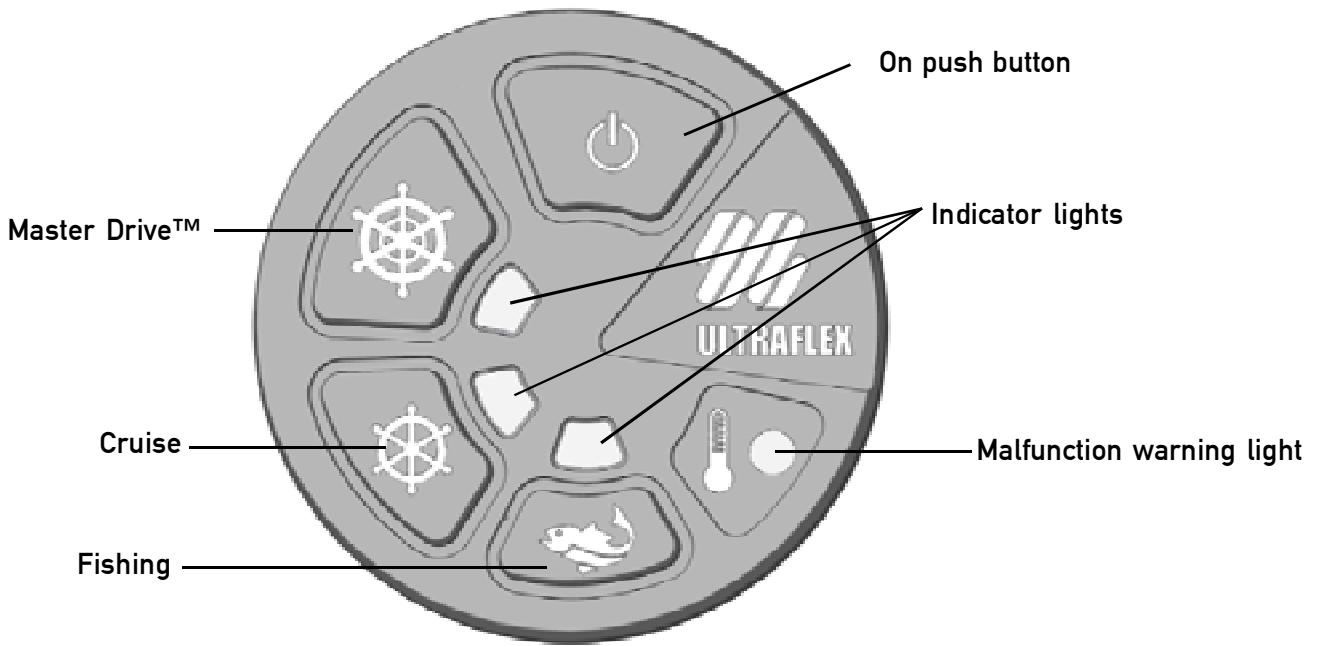
### NOTICE

When the power unit is off, the steering wheel rotation will be harder.

### ⚠ DANGER

After 24 hours repeat the bleeding procedures and make sure there are no leaks from each connection.



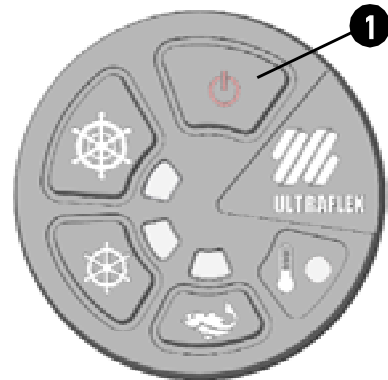


### 4.1.1 (Preset) Manual start

1 Turn the engine key on the dashboard.

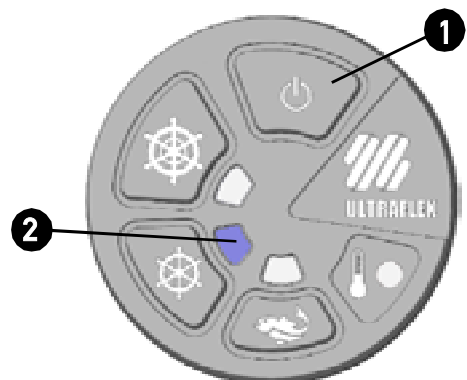
2 After a system self-checking cycle, the user interface goes to stand-by mode and the on push button lights up in red. The system is ready to be used.

**NOTICE:** in such a condition, the system is not enabled and battery consumption is about 200mA.



3 Press the on push button (1), the system starts and goes to (preset) Cruise position and the relevant indicator (2) lights up. The system is ready to be used.

**NOTICE:** in such a condition, the system is enabled and battery consumption is about 3A without turning the steering wheel.



### 4.1.2 Start customization

It is possible to customize the system start by selecting the (preset) manual mode or automatic mode and to select the system mode during the first start. These settings can be changed by the user.

#### 4.1.2.1 Automatic start enabling/disabling

##### ENABLING

To enable the automatic start mode, when the start key is in OFF position (engine off), press start push button (1) and keep it pressed while turning the engine key to ON position.

Do not release the start push button (1) and wait about 3 seconds.

After 3 seconds, the system confirms automatic start is enabled by lighting all the indicators up five times.

Release push button (1) the **MASTERDRIVE** system will start immediately in the selected mode (the default position is Cruise).

From now on, each time the boat is started (engine key ON) , the **MASTERDRIVE** system will go to the selected mode (the default position is Cruise) automatically.



##### ⚠ WARNING

If automatic mode is selected, after supplying the system with power (engine key ON), it is advisable to start engines immediately to avoid battery discharge.

##### DISABLING

To disable the automatic start mode, when the start key is in OFF position (engine off), press start push button (1) and keep it pressed while turning the engine key to ON position.

After 3 seconds, the system confirms automatic mode is disabled by lighting all the indicators up five times.

Release push button (1) the system goes to stand-by.

Press the on push button (1) to start the system.



#### 4.1.2.2 Mode change at first start

It is possible to set the system so that it goes to Cruise (default), Fishing or Master Drive™ mode at start.

In order to set the desired mode, do as follows:

- turn the start key on the dashboard
- the system starts or it goes to standby mode according to settings
- press the push button relating to the desired mode for 10 seconds
- after 10 seconds, the indicator of the selected mode will flash 5 times
- from now on, the system goes to the set mode any time it starts, with both manual and automatic start

In order to change mode, you will have to perform this procedure again.



### 4.2 System use

It is possible to select three different power levels according to sailing conditions, by pressing the relevant push buttons. The indicator lights will show the enabled mode:

**FISHING** - low speed, good steering comfort and minimum power consumption

**CRUISE** - cruise speed, optimum steering comfort and low power consumption

**MASTER DRIVE™** - best responsiveness with the minimum effort. It must be used during rapid manoeuvres and mooring.

If the steering wheel is not turned for 4 seconds while the Master Drive™ mode is enabled, the system returns to the Cruise mode automatically. If the steering wheel is turned again, the system returns to the Master Drive™ mode.

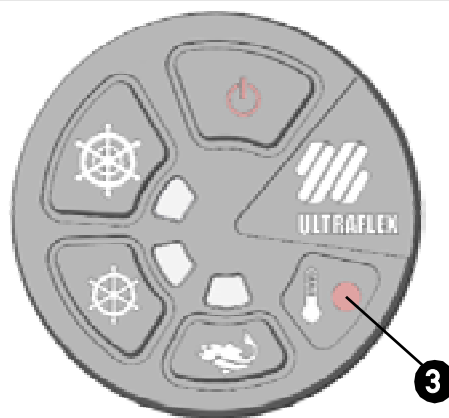
This allows a reduced battery consumption ensuring a quick and effective system responsiveness

**NOTICE:** In Master Drive™ mode, the boater could feel light vibrations on the steering wheel.

**NOTICE:** The Master Drive™ position implies higher energy consumption.

If the red warning light (3) lights up, it indicates a malfunction.

For further details, refer to the next paragraph.



#### NOTE FOR DUAL STATION SYSTEMS

##### **⚠ WARNING**

The **MASTERDRIVE** steering system is not equipped with a safety device which can disable one of the two stations. Therefore, if two stations are installed, the actions on each station are added together if they are carried out at the same time.

The controls on the panel work in parallel: if an action is carried out on one station, it is carried out on the other station too at the same time.

### 4.3 Errors and signals

Possible malfunctions are signalled by the red warning light on the user interface.

MALFUNCTION	SIGNAL	SOLUTION
Power unit overtemperature	Steady red light	Power unit overheating. The system goes to stand-by mode. Wait until the power unit cools off (the red light turns off) and try to restart the system. <b>NOTICE:</b> due to great thermal inertia, the system could restart even after a long time.
Low power voltage	Flashing red light 1 second on/1 second off	The system goes to stand-by mode. Contact the Technical Assistance Service
General malfunction		





## 5 MAINTENANCE

### 5.1 Routine maintenance



The routine maintenance consists in a series of periodical checks and actions to keep the product in optimum operating condition thus avoiding that the external environment may jeopardize its operation and safety.

#### **⚠ 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 fittings. 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 3.7 and in bleeding procedures for **ULTRAFLEX** cylinders. 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.

#### **⚠ DANGER**

Use only hydraulic oil **ULTRAFLEX** OL 150 as shown in paragraph "System filling and bleeding". Never use brake oils or automatic transmission fluid (ATF).

#### **⚠ CAUTION**

If the self-locking nuts are disassembled, replace them. (Contact our Technical Assistance Service, see page 7).

#### **⚠ WARNING**

During boat seasonal maintenance and at the beginning of each season, always check that electrical connections are clean and fastened securely.

### 5.1.1 Cleaning operations

Ordinary cleaning ensures good operation and optimum product aesthetics.

Only the helm cover and the user interface need to be cleaned.

We recommend using no aggressive products that might damage the metal parts or the external plastic parts.

### 5.1.2 Annual inspections

Every year:

- Check possible damages or deterioration on the hydraulic hoses.
- Check possible damages or deterioration on the electrical cables of the system.
- Check of the correct insertion and/or tightening of all connectors located on the system.  
When checking the electric cables, make sure that the interconnections have not been damaged while handling them.  
Check that the ground connections have no surface oxidation. In that case, we recommend using sprays or common products to protect and preserve the electric contacts.
- Check of the components fastening the system.
- Check the absence of corrosion or damage on the system components.
- Check Silent Block integrity.

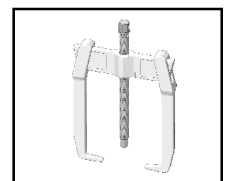
### 5.2 Steering wheel disassembly



To remove the steering wheel from the pump shaft, use a suitable extractor.

#### **⚠ WARNING**

Do not use a hammer or other tools that could seriously damage the pump.



### 5.3 Troubleshooting

ENGLISH

#### **⚠ WARNING**

Whenever the following checks need the removal and/or disassembly of the steering system components, such operation 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 is stiff and hard to turn.	<ul style="list-style-type: none"> <li>Blockage in the hoses between steering system and cylinder.</li> </ul>	<ul style="list-style-type: none"> <li>Replace hoses.</li> </ul> <p><b>⚠ DANGER</b> The damaged hose must be replaced, otherwise it may cause loss of steering and severe personal injury or property damage.</p>
	<ul style="list-style-type: none"> <li>The system is off.</li> </ul>	<ul style="list-style-type: none"> <li>Switch the system on.</li> </ul>
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"> <li>Incorrect hose assembly</li> </ul>	<ul style="list-style-type: none"> <li>Install hoses properly; repeat the bleeding procedure of the system.</li> </ul>
	<ul style="list-style-type: none"> <li>Low oil level</li> </ul>	<ul style="list-style-type: none"> <li>Add oil in the tank to the maximum level</li> </ul>
	<ul style="list-style-type: none"> <li>Leaks from the cylinder bleeder.</li> </ul>	<ul style="list-style-type: none"> <li>Tighten the bleeder on the cylinder.</li> </ul>
The steering system is easy to turn when the boat is moving at low speed but it becomes stiff at the dock	<ul style="list-style-type: none"> <li>Coiled hose.</li> </ul>	<ul style="list-style-type: none"> <li>Uncoil and straighten the hose. Replace it, if necessary.</li> </ul>
	<ul style="list-style-type: none"> <li>Rapid manoeuvres (mooring) in fishing mode</li> </ul>	<ul style="list-style-type: none"> <li>Select the MasterDrive mode.</li> </ul>
When turning the steering wheel, the cylinder body does not move.	<ul style="list-style-type: none"> <li>Incorrect hose installation.</li> </ul>	<ul style="list-style-type: none"> <li>Install hoses properly; repeat the bleeding procedure of the system.</li> </ul>
	<ul style="list-style-type: none"> <li>Oil leak.</li> </ul>	<ul style="list-style-type: none"> <li>Look for the leak and contact specialized staff.</li> </ul>
Oil leaks from steering system fittings.	<ul style="list-style-type: none"> <li>Bad tightening or low torque of the fittings.</li> </ul>	<ul style="list-style-type: none"> <li>Tighten the fittings with a maximum torque of 20Nm (15 in.lbs).</li> </ul>
Oil leaks from the tank plug.	<ul style="list-style-type: none"> <li>Bad tightening of the plug.</li> </ul>	<ul style="list-style-type: none"> <li>Tighten the plug.</li> </ul>
	<ul style="list-style-type: none"> <li>Too high oil level.</li> </ul>	<ul style="list-style-type: none"> <li>Restore the correct level.</li> </ul>
	<ul style="list-style-type: none"> <li>Incorrect power unit installation</li> </ul>	<ul style="list-style-type: none"> <li>Install it properly.</li> </ul>
When turning the steering wheel to starboard, the boat turns to the left and viceversa	<ul style="list-style-type: none"> <li>Hoses between the helm and the cylinder are reversed.</li> </ul>	<ul style="list-style-type: none"> <li>Reverse hoses</li> </ul>



## 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.*



**NOTES**

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**ULTRAFLEX S.p.A.**

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