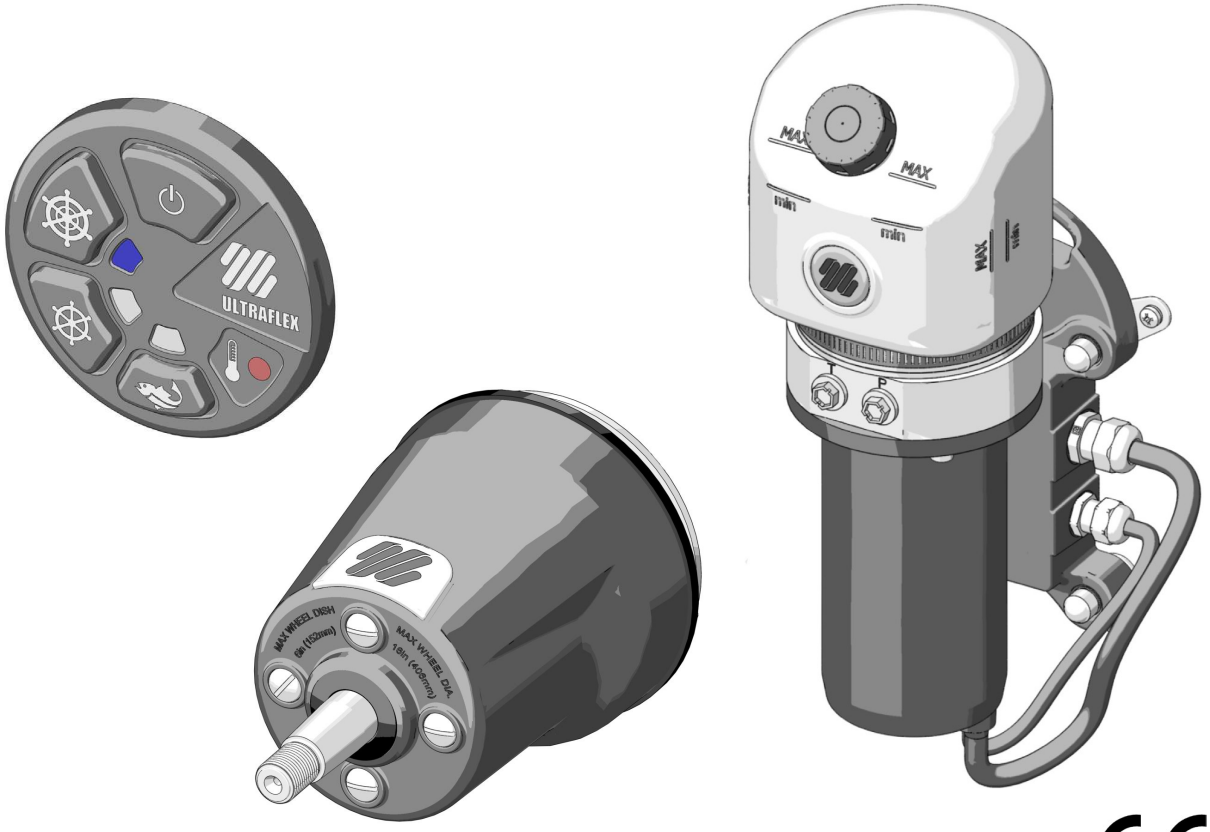
Installation, maintenance and owner's manual

POWER ASSISTED STEERING SYSTEM

MASTERDRIVE



CE

UFLEX

NMMA

UCINA PARTNER

MEMBER ABYC Setting Standards for Safer Boating

QUALITY SYSTEM CERTIFICATION DNV ISO 9001

(dr./dis./des. n° 28676/j 09/01/2024)

(CODE 74232R - REV 08)

Dear Customer,

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

ULTRAFLEX SpA has been a leader in steering systems for pleasure and professional boats for many years.

All **ULTRAFLEX** SpA products are designed and manufactured to ensure the best performance.
To ensure your safety and to maintain a high quality level, **ULTRAFLEX** SpA products are guaranteed only if they are used with original spare parts (see attached document "Application Spare Parts").

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 2013/53/EU.

"Established in 1989 **UFLEX** USA is a leader in steering and control systems for the marine industry.
With full manufacturing capabilities in Sarasota, Florida, **UFLEX** USA can support all sectors of the marine industry regardless of volume and/or product requirements. And, as an affiliate of the **ULTRAFLEX** Group, **UFLEX** USA has tremendous resources to draw upon for new product development in hydraulics, electronics and many other technologies.

Innovative product design and unparalleled dedication to quality customer service and products continue to be cornerstone of **UFLEX** USA's growth. Today our products can be found as originally installed equipment on many of the most widely known and respected boat brands in the world.
Aftermarket parts can be sourced from trained and experienced distributor network throughout North and South America.

Our dedication to providing the highest quality products and service is only matched by our commitment to developing new products employing the latest materials and technology to enhance our customer's boating experience. From steering wheels to sophisticated electronic controls, **UFLEX** USA has everything you need to make sure that your boat looks and perform it's best for many, many years."

UFLEX USA

Sarasota, FL 34243 - 6442 Parkland Drive

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6 DISMANTLING

DOCUMENT REVISIONS

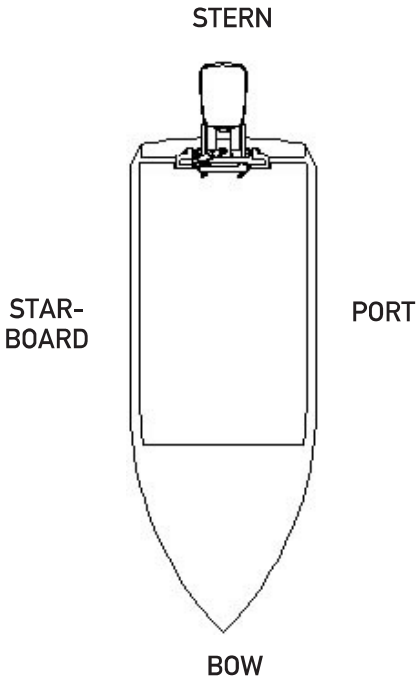
Rev.	Date	Revision description
0	10/02/2012	First edition
1	08/03/2013	Addition of automatic start
2	25/06/2013	Addition of Slave helm
3	29/10/2013	Addition of start customization
4	17/07/2014	Use with inboard cylinders has been added
5	04/11/2014	List modification of inboard cylinders
6	17/12/2014	Addition of 50cc helm - Oil specification change
7	04/10/2016	Addition of fuse use prescription on the key cable
8	09/10/2023	Addition of MasterDrive version without user interface

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.

LEGEND

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.
10 km/h = 5,4 knots

INFORMATIVE LETTER

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.

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

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www.uflexusa.com

WARRANTY

1. Two Year Limited Warranty. **UFLEX** USA, Inc. warrants that all products manufactured by **UFLEX** USA, Inc. or **UFLEX** S.p.A. and sold by **UFLEX** USA to the retail purchaser ("Purchaser") that for two (2) years after the date of manufacture to be free from defects due to material or workmanship, subject to the exclusions below. Improper installation AVOIDS this warranty. Installation should only be attempeted by a trained and qualified technician.

2. Exclusions. This limited warranty does not cover and does not extend to any of the following:
   (a) Failure caused by normal wear and tear, climatic conditions, misure, neglect, lack of proper maintenance, accident, fire or other casualty damage, racing, overloading, negligence, modification, beaching or grounding of vessel, collision, impact, towing, acts of war or hostilities;
   (b) components not manufactured by **UFLEX** USA, Inc., or its affiliates;
   (c) cost of removal or reinstallation of any component (including components manufactured by **UFLEX** USA, Inc.) or disassembly or reassembly of the unit containing the component;
   (d) components not manufactured by **UFLEX** USA, Inc. or **UFLEX** S.p.A., whether or not warranted by the other manufacturer;
   (e) any product which has not been properly installed.

3. Limitations. THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS SHALL BE PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND **UFLEX** USA, INC.'S SOLE AND EXCLUSIVE LIABILITY UNDER THIS WARRANTY. LABOR FOR REPLACEMENT IS NOT INCLUDED. **UFLEX** USA, Inc.'s obligation under this warranty is limited to the repair or replacement (at **UFLEX** USA, Inc.'s sole election) of any covered item found to be defective, when delivered by Purchaser pursuant to written authorization and instructions from **UFLEX** USA, Inc., shipping prepaid to **UFLEX** USA, Inc.'s plant or other designated repair facility. Repaired or replaced items are warranted as provided herein for the unexpired portion of the applicable warranty period.
THIS WARRANTY, AND THE RIGHTS AND REMEDIES UNDER IT, IS EXCLUSIVE AND IS GIVEN IN PLACE OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WHETHER ARISING BY LAW, CUSTOM, CONDUCT OR USAGE OF TRADE, PURCHASER'S REMEDIES SHALL BE LIMITED AS STATED HEREIN AND **UFLEX** USA, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES OR LOSSES RESULTING FROM DEFECTS. THE RETAIL SELLER IS NOT A CO-WARRANTOR AND IS NOT AUTHORIZED BY **UFLEX** USA, INC. TO AMEND OR MODIFY THIS LIMITED WARRANTY IN ANY MANNER.

4. Transferability of Warranty. This limited warranty may not be transferred to subsequent purchasers.

5. Miscellaneous. **UFLEX** USA, Inc. is an affiliate of **UFLEX** S.p.A. **UFLEX**, USA, Inc., reserves the right to make changes in the design and construction of its products at any time, without notice and without any obligation to incorporate such changes into products of prior manufacture. This limited warranty applies to new components sold by **UFLEX** USA, Inc.. This limited warranty contains the entire agreements between **UFLEX** USA, Inc. and Purchaser and suspersedes all prior agreements, discussions, negotiations, commitments and representations, whether oral or written, between them regarding **UFLEX** USA, Inc's warranty. If any provision of this limited warranty, or the application of it, is determined to be invalid of unenforceable for any reason, the remainder of this limited warranty and the application of it shall not be affected.

6. Ultron 3000 and PowerC. The Ultron 3000 and "PowerC - User and Installation Manual" describes activities, operations, technical specifications which must be followed during the installation and/or usage of the product, in order to keep a valid warranty. Descriptions and drawings in that manual are suitable to allow installation and use of the product to skilled persons. In case of doubt and/or for any information, please contact our Technical Service.

All communications and notices from Purchaser regarding this limited warranty should be sent to: **UFLEX** USA, INC., 6442 Parkland Drive, Sarasota, FL 34243; (941) 351-2628.

Return policy

Any product that is presumed defective should be reported to **UFLEX** USA within 48 hours of receipt or discovery in the field. Upon notification **UFLEX** USA will attempt to troubleshoot the problem with our customer over the phone. If we are unable to resolve the problem **UFLEX** will issue a Return Goods Authorization number and we require that the product in question be returned to **UFLEX** with all its parts in its original packaging. The product should be returned freight prepaid to:

UFLEX USA
RGA Department - RGA #
6442 Parkland Drive
Sarasota, Florida 34243

Upon receipt **UFLEX** will examine the product to determine the cause of the defect. If the product is determined to have a defect in workmanship or material, it will be repaired at our discretion.

Our warranty does not cover labor, towing or other expenses. Further, it does not cover products that have been improperly installed, damaged in installation, misapplied, or misused.

Our products are not intended for use in racing applications.

1 PRODUCT DESCRIPTION

1.1 Product description and features

All UFLEX hydraulic steering systems are designed in conformity with UNI-EN-ISO 10592 and A.B.Y.C. P21 regulations. All UFLEX 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 two main components: helm and power unit, and an optional component, the user interface. If it is present, it is located on the boat dashboard and allows the boater to select different power modes according to the sailing conditions:
- fishing
- cruise
- MasterDrive™

When the user interface is not present, the system operates automatically switching between the Cruise and MasterDrive™ modes only.

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 oder to ensure a proper steering responsein 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	4
MD32F	UC168	5
MD32F	UC215	7
MD40F	UC215	5
MD40F	UC293	7

DOUBLE CYLINDER APPLICATIONS		
MASTERDRIVE™ KIT	CYLINDER	STEERING WHEEL REVOLUTIONS
MD32F	2 UC116	7
MD40F	2 UC168	8
MD50F	2 UC215	9

⚠ 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:
- High efficiency, low Amp draw
- Immediate control in any sea conditions through the system always running

- When the user interface is present, three different selectable levels of power (PATENTED)
- When the user interface is present, ON/OFF switch to enable/disable the system (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 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.

1.3 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 (optional)
- 4 Llitres of hydraulic oil OL 150 **UFLEX**
- 3 Hoses with vibration-damping function (optional)

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 **UFLEX** 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 **UFLEX** catalogue.

1.4 Operation in safety conditions

The safety warnings below give information about any risk that could occur during the boat operation and the prescriptions for a safe navigation.
In no event shall **UFLEX** be held responsible for material or physical damage due to the non-compliance with these prescriptions.

⚠ WARNING

It is necessary to read and understand the instructions contained in this manual as well as any other documentation supplied with the boat.
We recommend keeping on the boat a copy of this manual to consult it immediately if necessary.

⚠ 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 (causing possible impacts and capsizing) and its occupants (causing physical injuries that can lead to death).

⚠ WARNING

All **UFLEX** 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

UFLEX hydraulic steering systems must not be installed on race boats.

⚠ DANGER

It is forbidden to disassemble the components which are supplied preassembled to avoid compromising the product integrity.

⚠ WARNING

The boat must be used EXCLUSIVELY by users knowing its features and controls. All the people on the boat must wear the personal protective equipment approved by the Maritime Authorities.

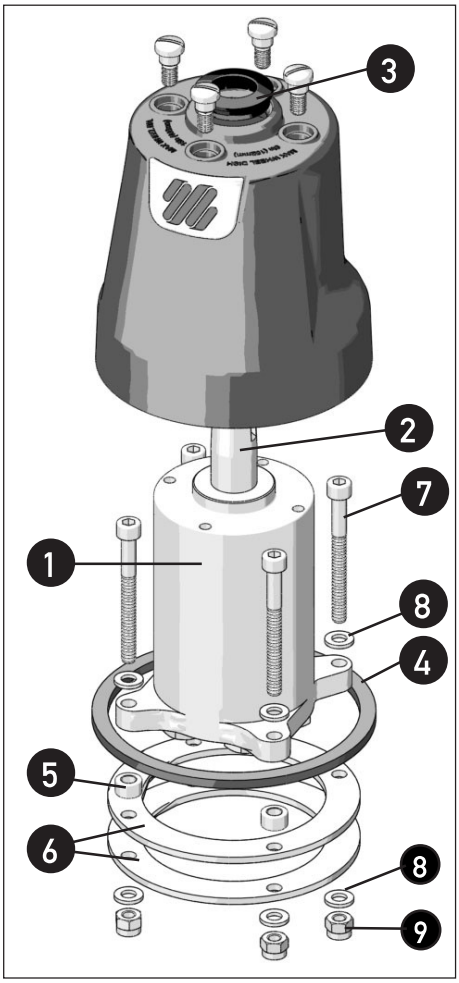
⚠ DANGER

The boat must NEVER be driven by people under the influence of alcohol or drugs.

⚠ WARNING

After using the boat, its components must be rinsed with clean and low pressure fresh water.
It is not allowed to use any water-jet pipe or pressure washing equipment. Do not use detergents containing acetone, ammonia, acids or other corrosive substances.
In particular, it is necessary to prevent the components from coming into contact with some specific detergents used for cleaning fiberglass hulls since they could corrode the stainless steel components.

1.5 Helm technical features



- 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

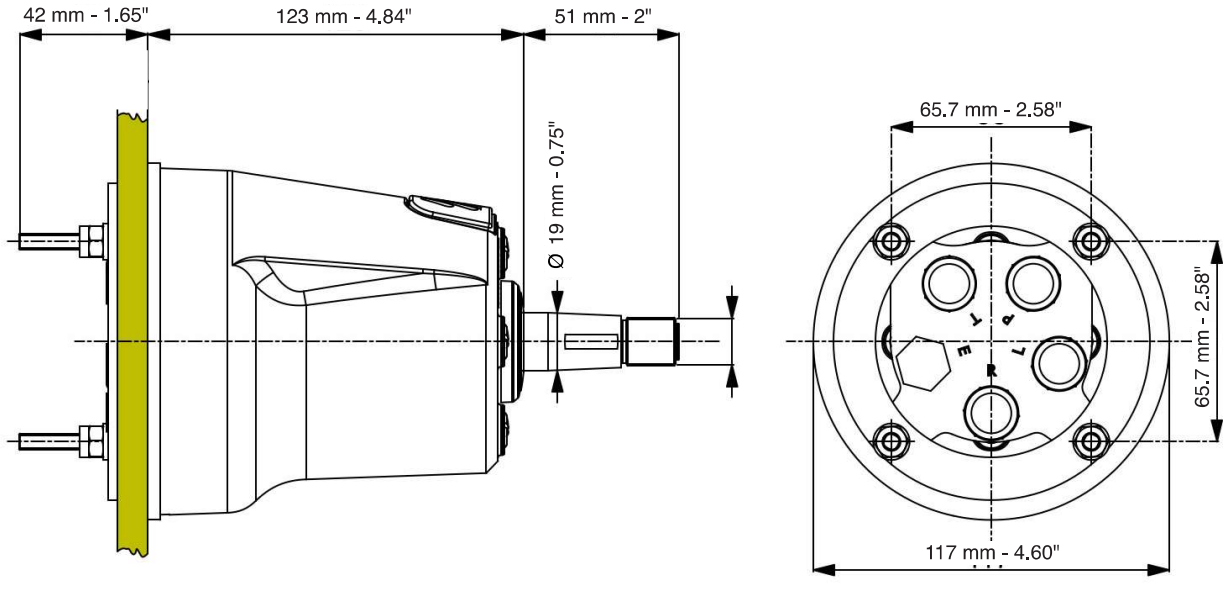
FRONT MOUNT VERSION:

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. I32cc/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

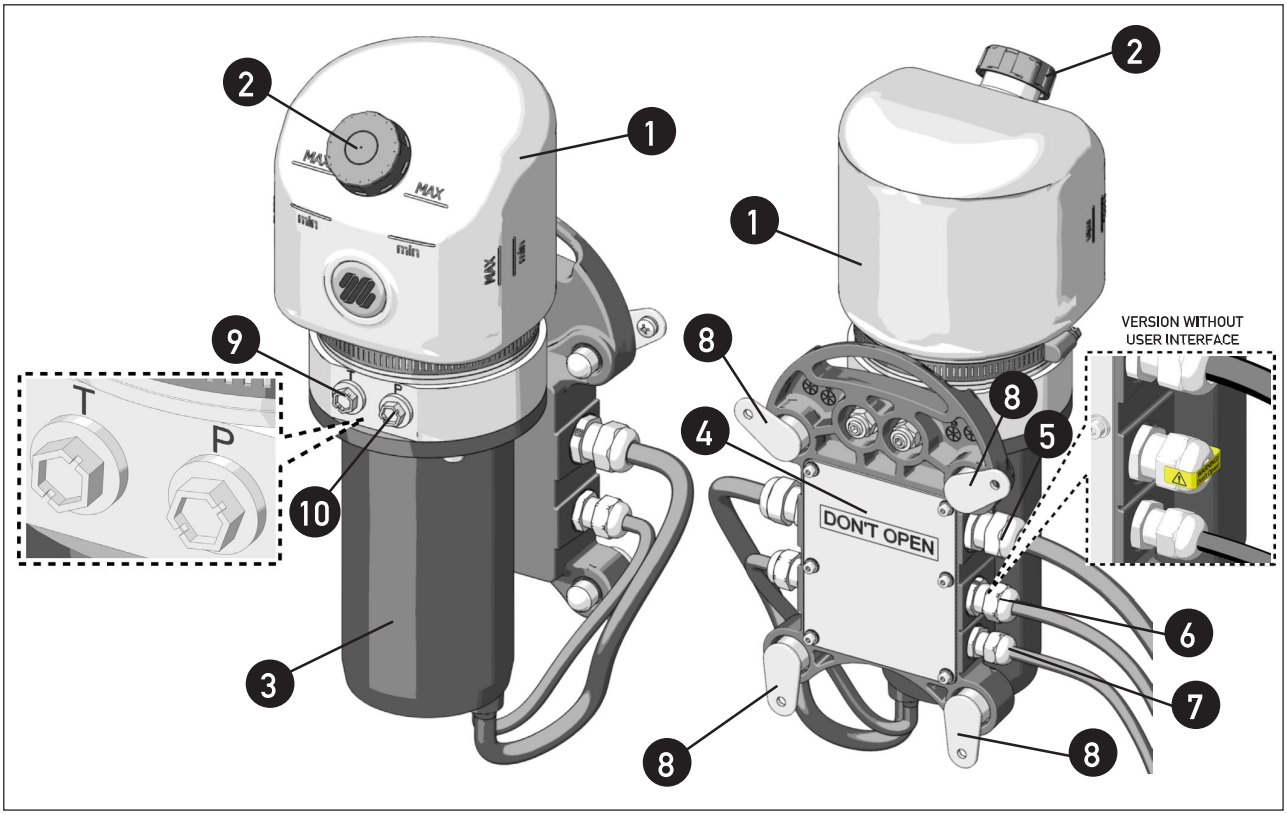
NEVER use the Slave helm as single station since it is not equipped with proper safety systems. Refer to the installation diagram!

A wrong installation will prevent the system from operating properly!

1.6 Power unit technical features

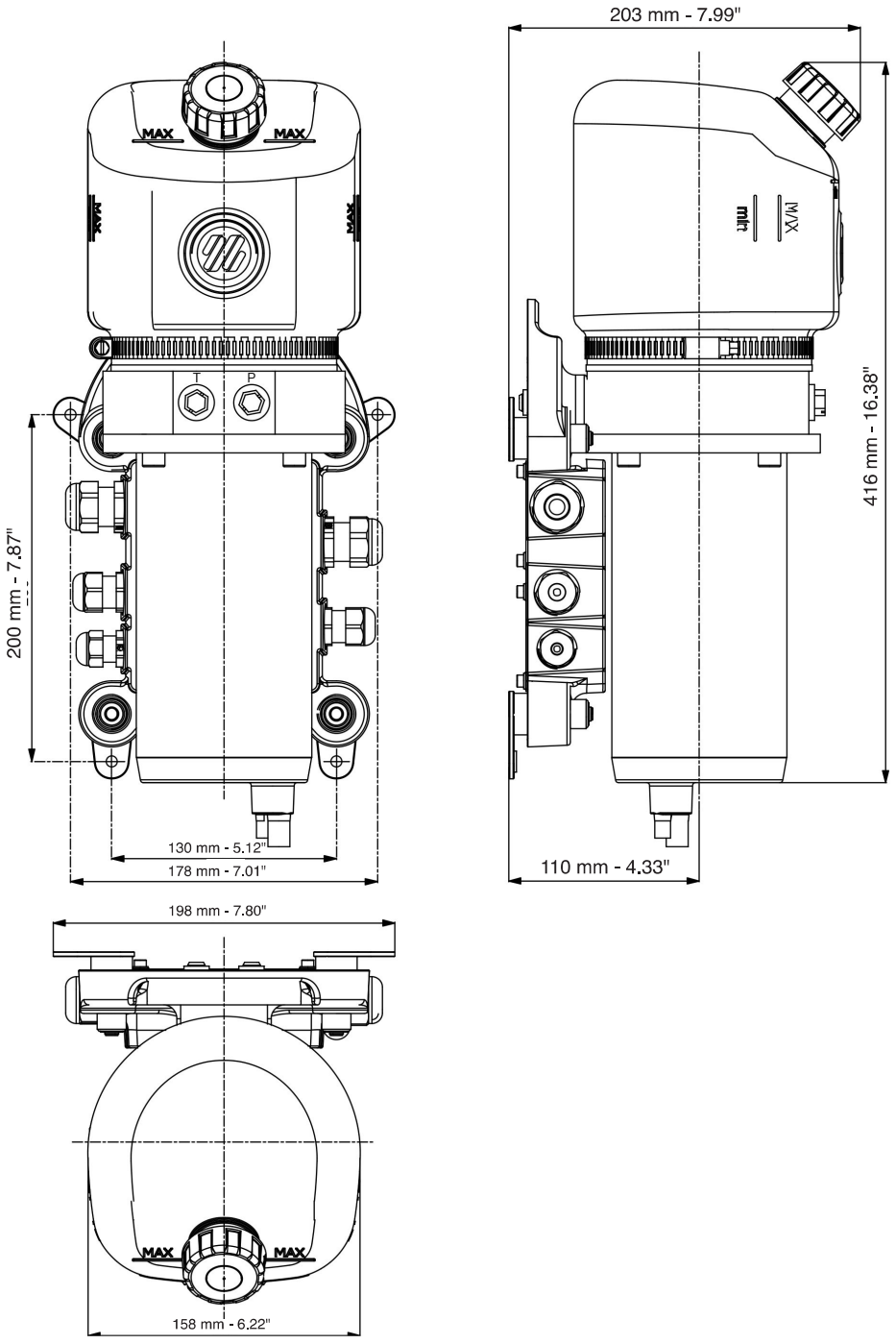
- 12VDC Motor
- 90° swiveling fittings for easy installation
- Semitransparent 2 litre (0.52 gal) tank gives immediate level vision
- Vented filler plug
- 40A fuse
- Maximum rated current of the power unit 35A
- Wall or floor mount
- Hydrocarbon and hydraulic oil resistant
- Salt water resistant motor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

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



1. Power unit oil tank with filter
2. Vented filler plug
3. Motor
4. Power control electronic unit
   WARNING: Never remove the cover, otherwise warranty will be void and the system explosion-proof safety will no longer be ensured
5. Power cable
6. Communication cable (optional with user interface)
7. Key cable
8. Fixing brackets
9. Delivery of high pressure oil
10. Return to the low pressure tank

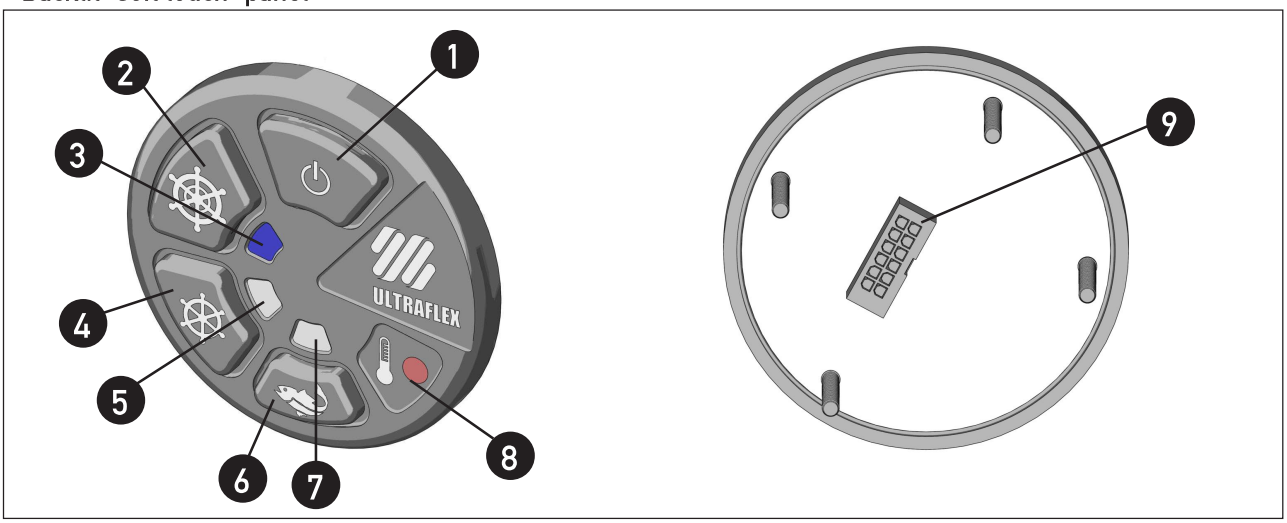
APPLICATION EXAMPLE - OVERALL DIMENSIONS



NOTICE: Consider the wiring harness and hydraulic hose dimensions

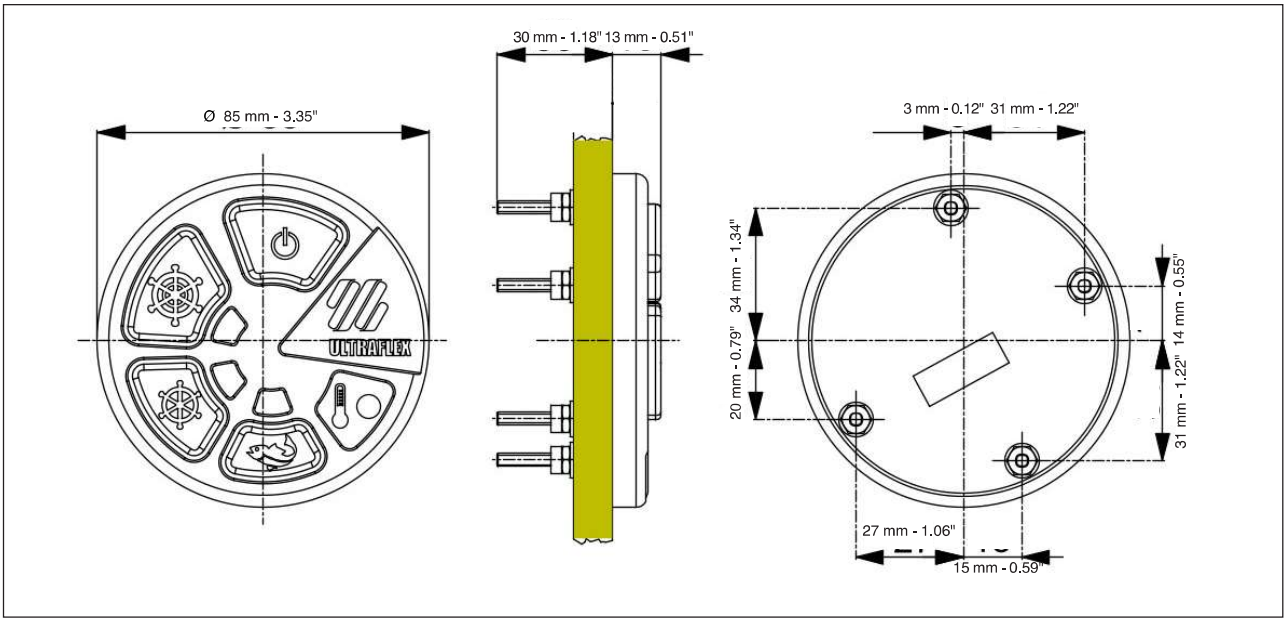
1.7 User interface technical features (optional)

- ON/OFF switch to enable/disable the system (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



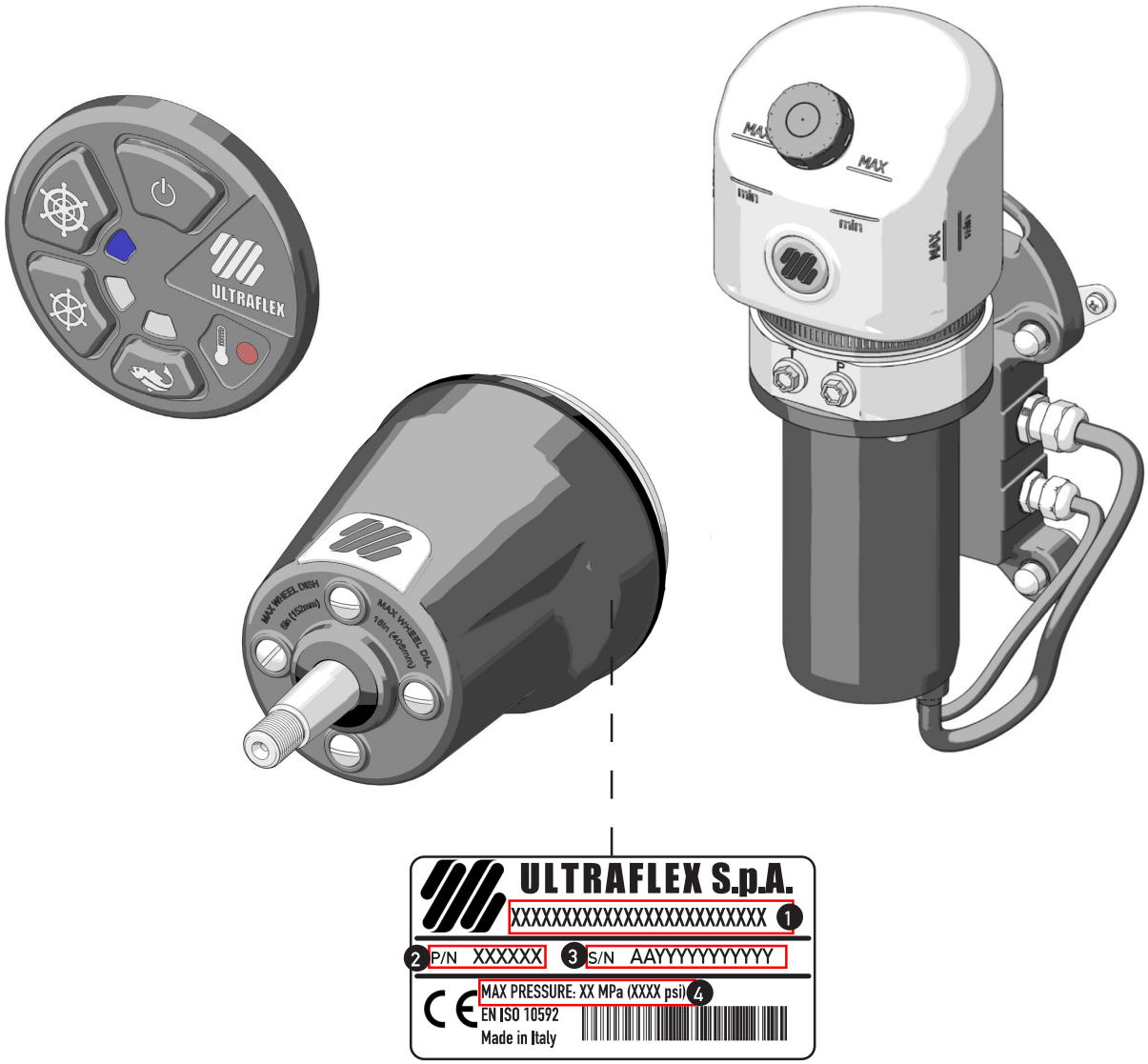
1. On push button (red when in standby/ white when on)
2. MasterDrive™ mode selection push button (backlit in white)
3. MasterDrive™ mode indicator led (blue when on)
4. Cruise mode selection push button (backlit in white)
5. Cruise mode indicator led (blue when on)
6. Fishing mode selection push-button (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!



1.8 Marking and safety stickers

The CE conformity plate is positioned on the components of the system. It contains the manufacturer's logotype and several product data (see the picture below).
The plate must not be removed at all.
For any communication with the manufacturer always mention the serial number (indicated on the plate itself).



1. Component type and model
2. Component code
3. Year of manufacture and serial number
4. Maximum operating pressure

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 (the communication cable is not present in the version without user interface)
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 (optional)
n° 4 stainless steel nuts for fixing to the dashboard
n° 4 stainless steel washers
n° 1 seal
n° 3 hoses with vibration-damping function (optional)

MD KIT - TILT APPLICATION:
n° 1 helm (UH32-T or UH40-T or UH50-F)

n° 4 litres of hydraulic oil OIL15 **UFLEX**

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 (optional)
n° 4 stainless steel nuts for fixing to the dashboard
n° 4 stainless steel washers
n° 1 seal
n° 3 hoses with vibration-damping function (optional)

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 OIL15 **UFLEX**

n° 1 Slave helm communication cable

n° 1 straight fitting

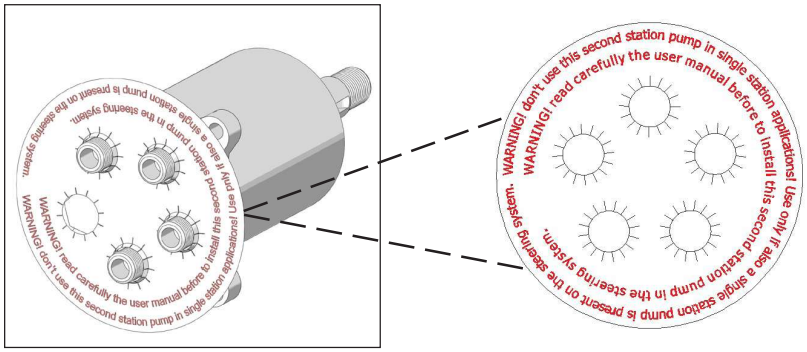
n° 2 "T" fitting

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 for installation

RESPECT STRICTLY the following safety rules.
UFLEX 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

- The hydraulic components must not be installed in places where the operating temperature is over 80°C.
- DO NOT PUT HANDS BETWEEN THE MOVING PARTS.
- Do not disable the safety devices.
- Do not modify or add devices to the system without **UFLEX** written authorisation or technical intervention. Any modification made or authorised by **UFLEX** must be documented by a written description of the intervention.
- 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.
- The equipment must not be installed by unskilled staff but only by the manufacturer or by an authorised dealer.
- 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 **UFLEX**, 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.
- In the version without user interface, do not remove the fairlead 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

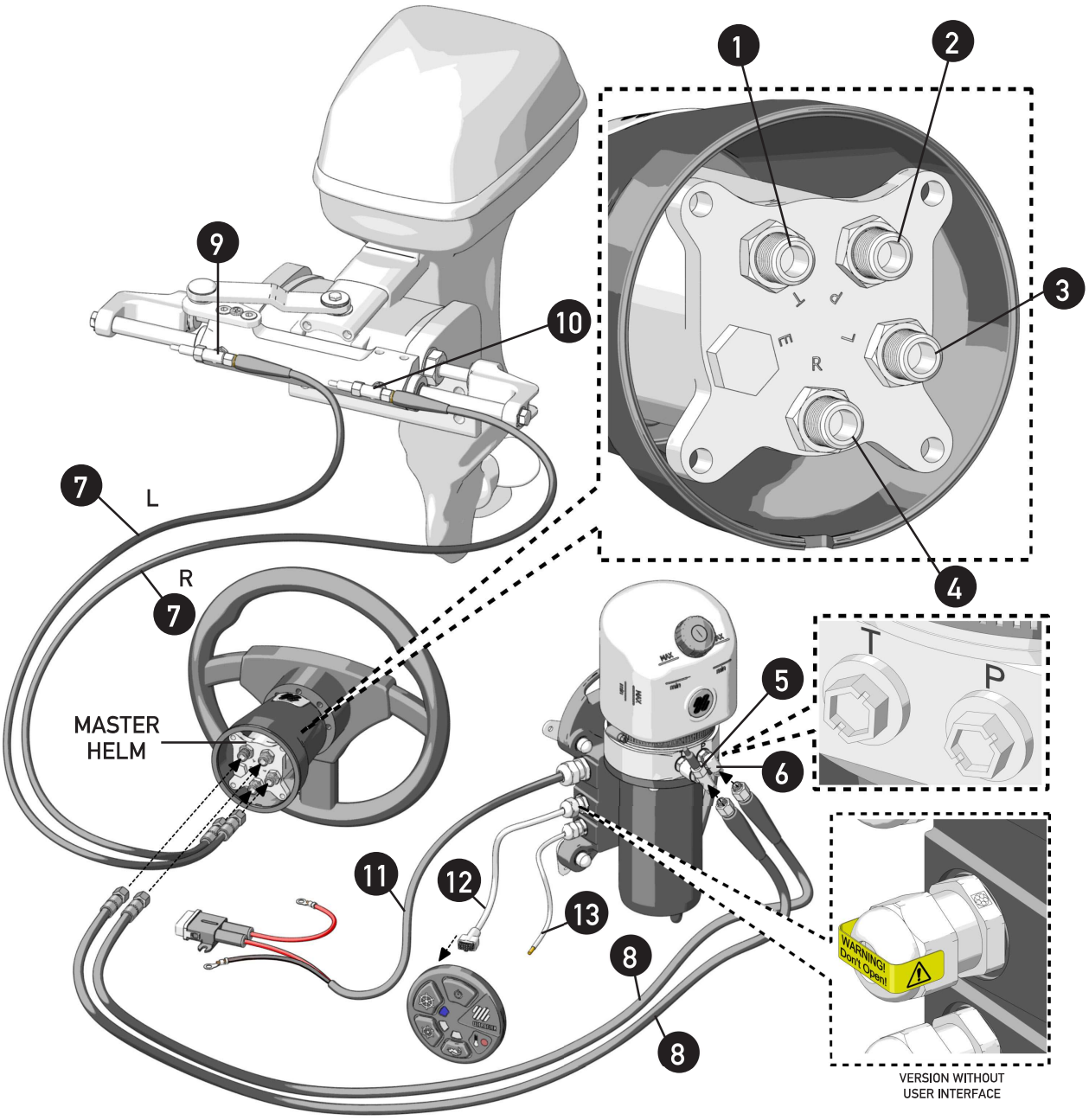
- Read and understand the instructions given in this manual as well as any other documentation supplied with the boat indicating installation procedures. If an instruction is not very clear or contradictory and in case of doubts, contact **UFLEX** Customer Service.
- Make sure all the necessary components are available for installation.
- Do not connect any switch on the steering wheel to prevent the cables from twisting.
- During installation, make sure to tighten the connectors correctly in compliance with the tightening torques recommended for the different components. Any incorrect fastening could cause a loss of control and possible boat impacts and/or capsizing with material damage and physical injuries that could lead to death.
- After installing and purging the system, check before starting the navigation. Turn the steering wheel until the cylinder or the cylinders installed reach the end of stroke. Repeat this operation turning the steering wheel in the opposite direction. Repeat this operation with all the steering systems until you are sure they are installed correctly and the system works properly.
- 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 injested, 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.
- Check the system and eliminate any interferences (see par. 4.1.2)
- 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.

NOTICE

- The installation must be carried out according to the prescriptions of the system manufacturer. The hydraulic lines must be fixed by means of clips, belts or any other system preventing damage due to friction or vibrations. The clips, the belts or the other devices must be corrosion resistant and must be conceived to avoid cuts, abrasions or damage to the hydraulic lines. They must also be compatible with the materials making up the hydraulic line.
- The hydraulic lines must not go below the waterline.
- During the first installation, in case of changes to the system components and when maintenance requires disconnecting/connecting mechanical or hydraulic interfaces, some tests must be carried out to check the integrity and the good operation of each steering system installed on the boat. In particular, these tests must ensure the absence of any type of interference (see par. 4.1.1 and 4.1.2) and of leaks from the hydraulic and mechanical components by submitting the system to a precise test pressure for about 60 seconds.

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

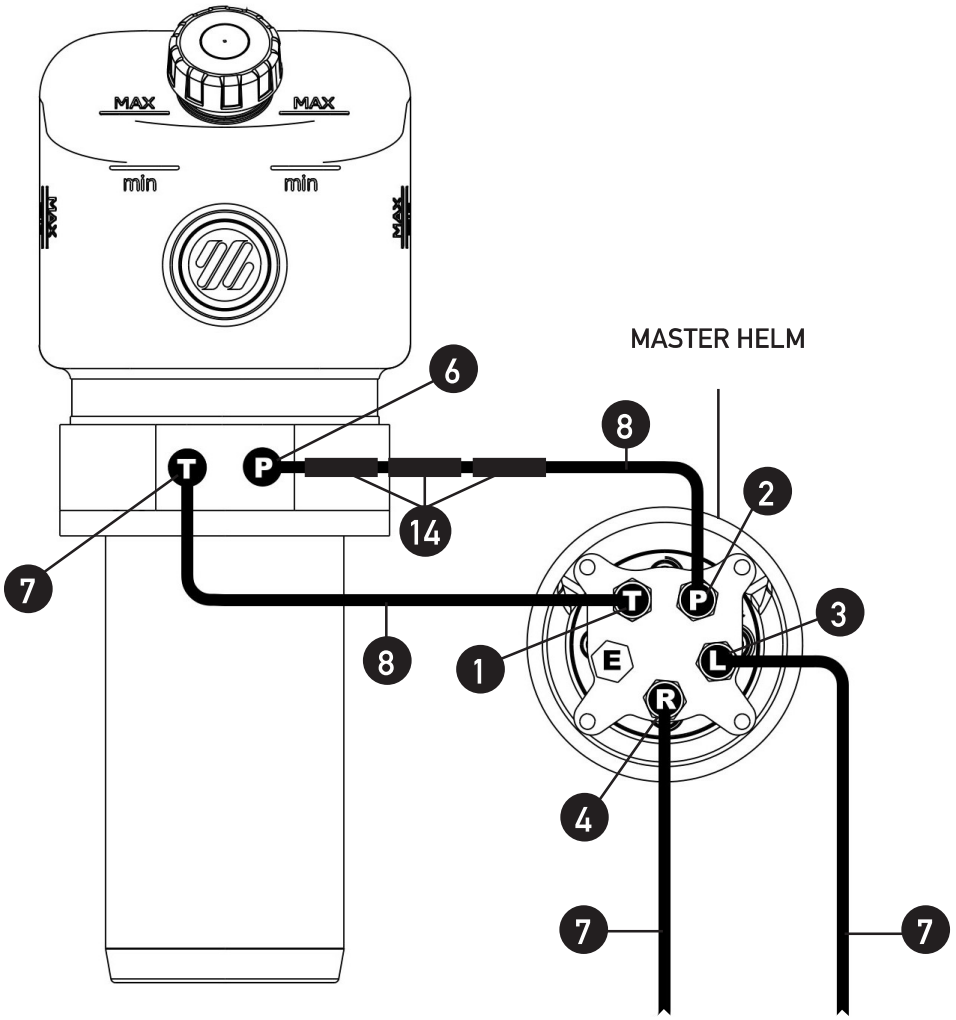


WARNING: Check the correct connection of the Kit OB-MD (8) between the helm and the power unit; the hose coming from fitting "T" on the helm must be connected to fitting "T" on the power unit and the hose coming from fitting "P" on the helm must be connected to fitting "P" on the power unit.

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.

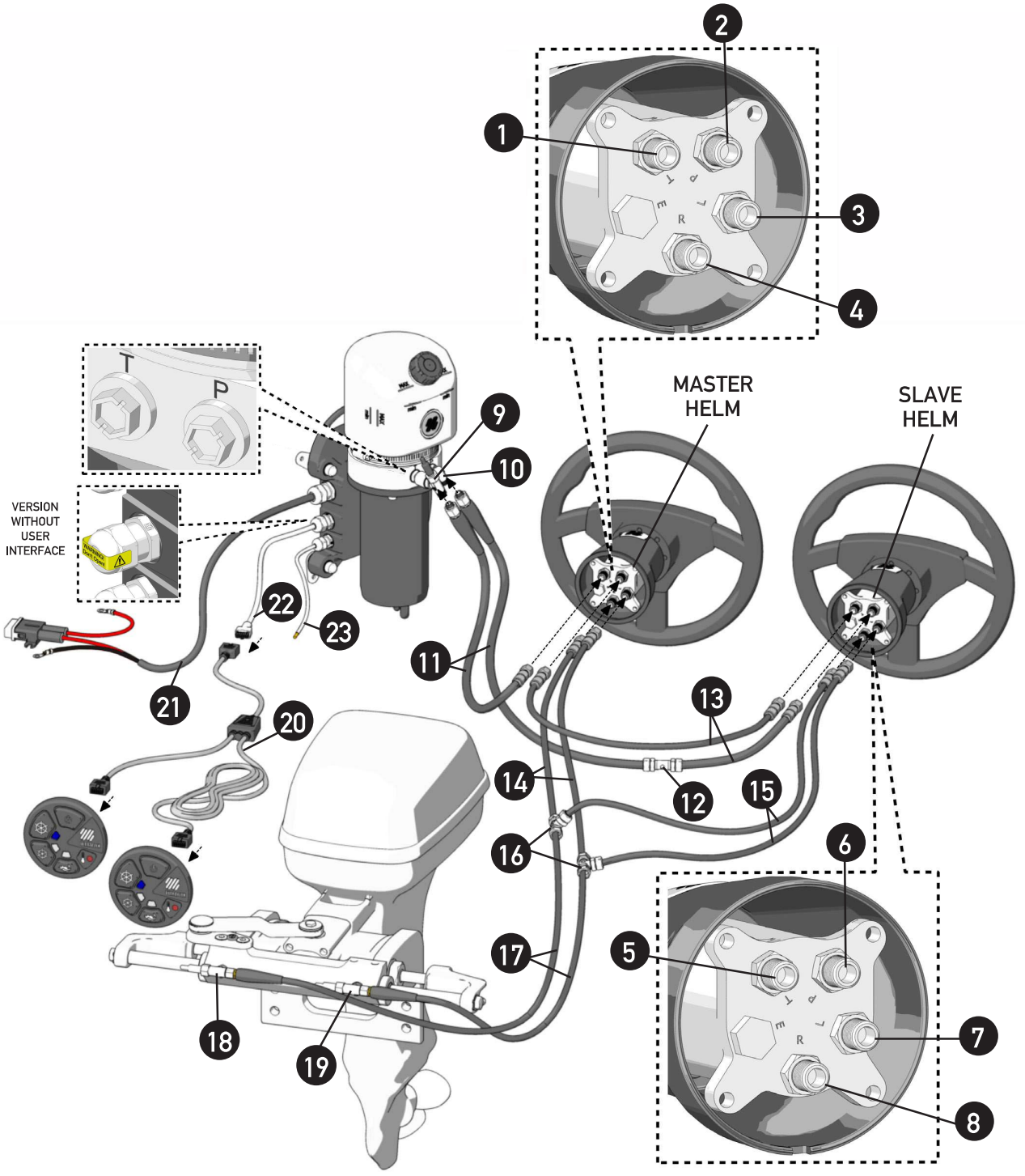
WARNING: Since the section between the helm and the cylinder may be subject to pressure up to 105 bar (1500 PSI) use SVS cylinders and hoses.

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
14		Vibration-damping hose (optional)	Power unit

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

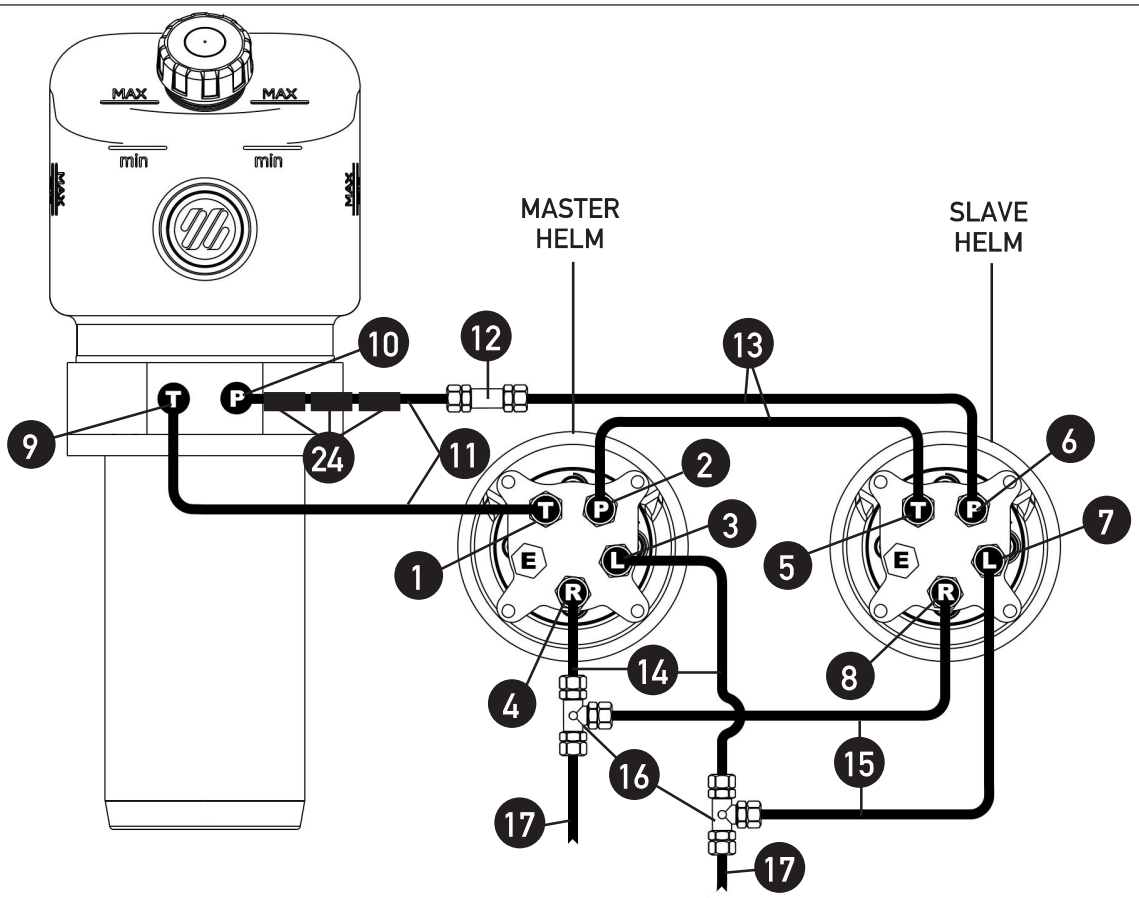


If the MASTERDRIVE system with single station is present, drain all the oil out of the system without dispersing it into the sea.

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
24		Vibration-damping hose (optional)	Power unit

3.2 Necessary tools


MOLYKOTE® 1000


Torque wrench


Drill


Drill bit Ø 5 / 0.2"


Drill bit Ø 6,5 / 0,25"


Hole saw Ø 75 / 3"


Hole saw Ø 50 / 2"


Open end wrench 10 mm


Open end wrench 7mm


Open end wrench 13mm


Open end wrench 11/16"


Open end wrench 15/16"


Open end wrench 17 mm


Screwdriver


Phillips screwdriver

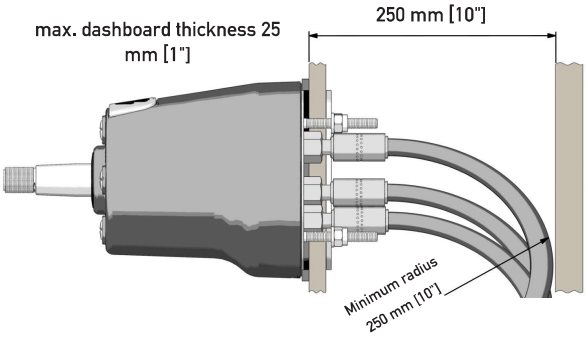

Allen wrench 5mm

3.3 Installation of the front mount helm

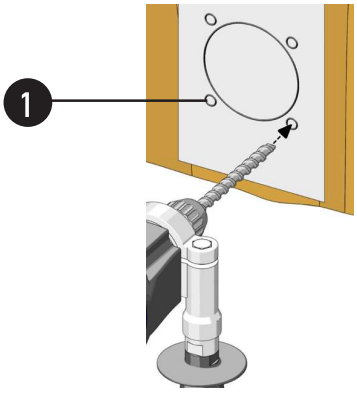
1 Select a suitable place for the steering station. Make sure that there is enough manoeuvering space for the steering wheel and for the helm and its pipes and fittings.

⚠ WARNING

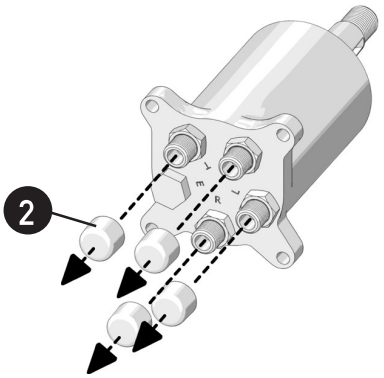
In order to fix the helm properly, the maximum dashboard thickness must be 25 mm [1"].
Different thicknesses could compromise the driving safety.
Make sure that the fixing screws pass through the supplied self-locking nuts completely.



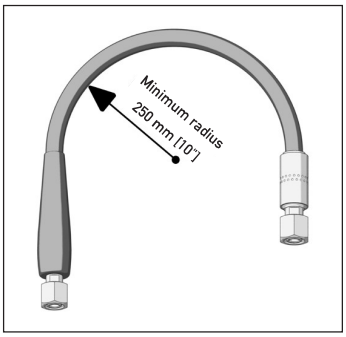
2 By using the proper template supplied with this manual, make the holes (1) for installation in the suitable position on the dashboard.



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

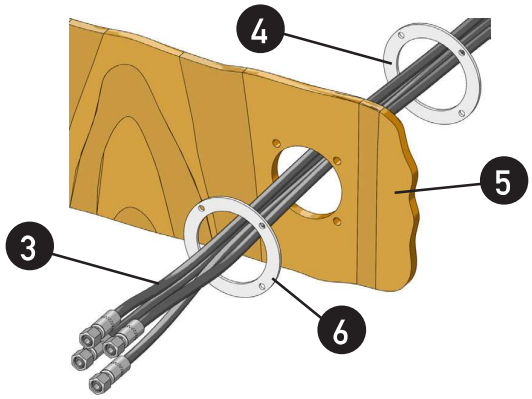
Keep clean. Make sure that working areas are free from dust and dirt. The protective plugs of threaded holes must be removed only before the connection of fittings and pipes. Make sure that pipes are perfectly clean and free from swarf. If copper or steel pipes are used, cleaning is mandatory. If the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

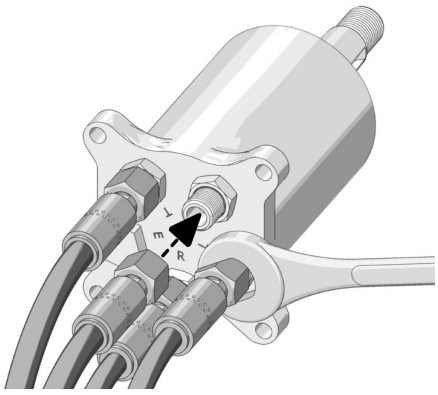
⚠ WARNING

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 **UFLEX** kit OB-MD as shown in the picture on page 22 for single station applications and on page 24 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.

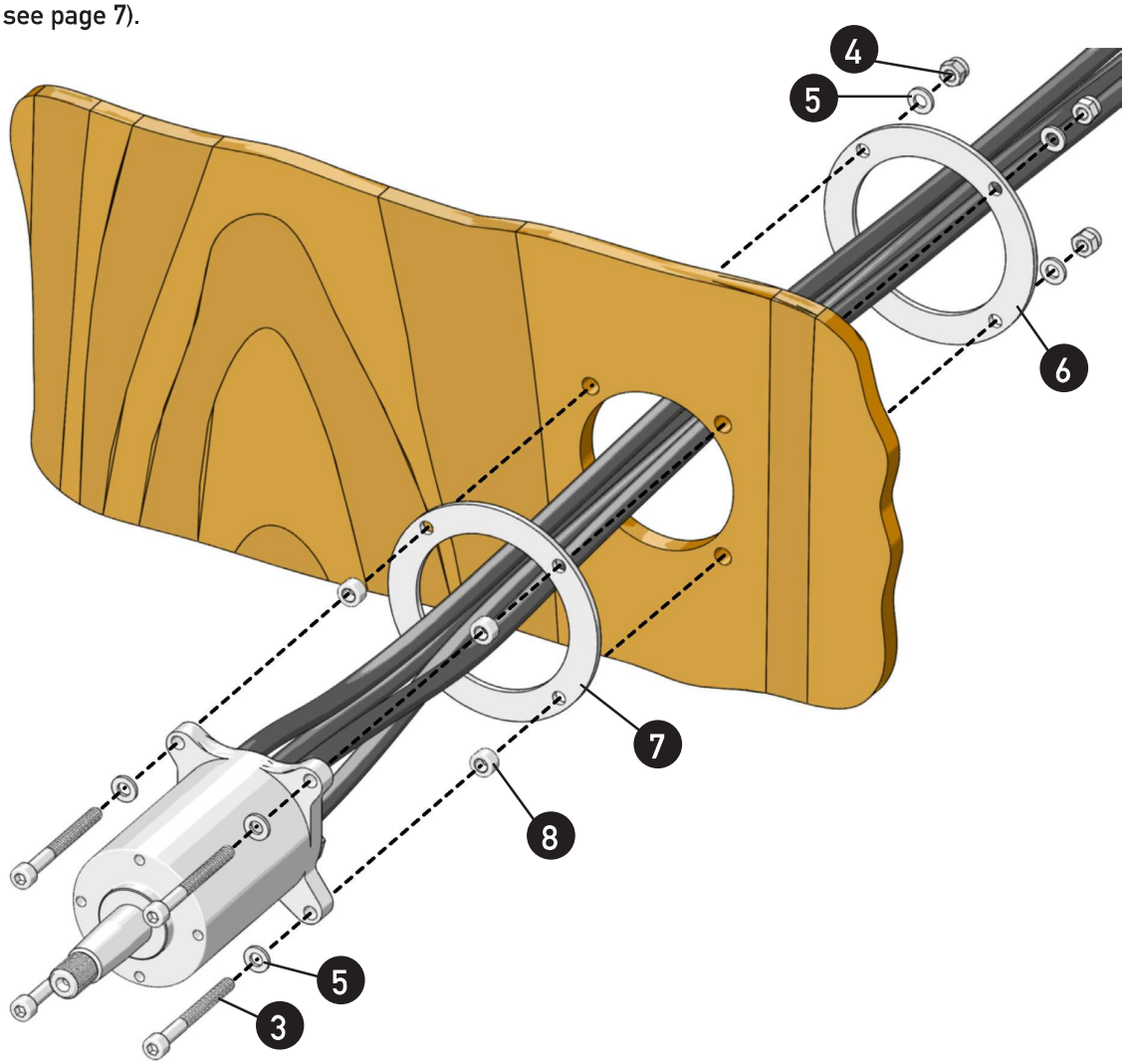
⚠ WARNING Never exceed the recommended torque of 20Nm (15 lb·ft) to prevent the hydraulic system from being damaged.

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).

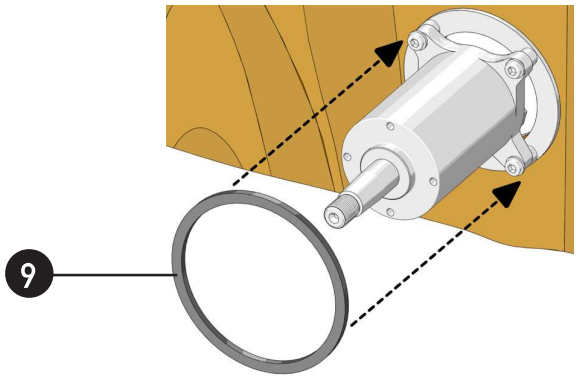
Tighten the four self-locking nuts (4) by using a 10 mm wrench with a torque of 10 Nm (7,37 lb·ft).

⚠ 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.

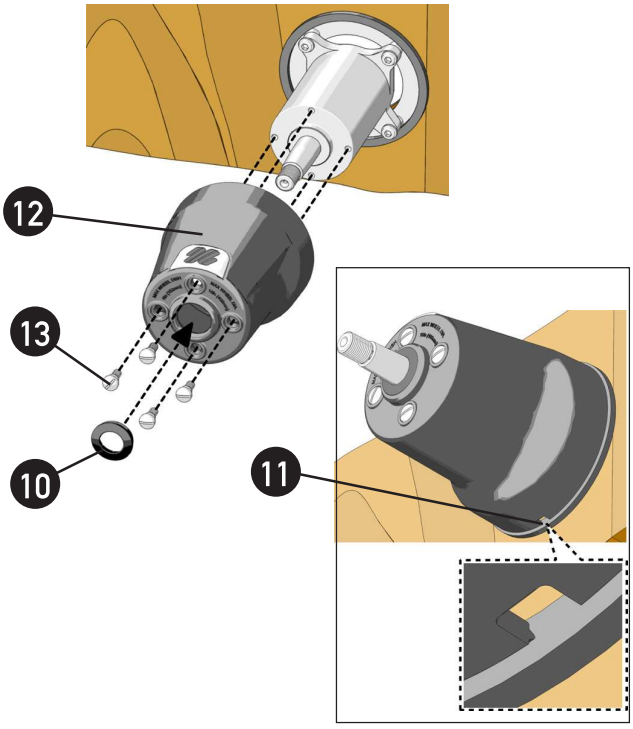
NOTICE

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

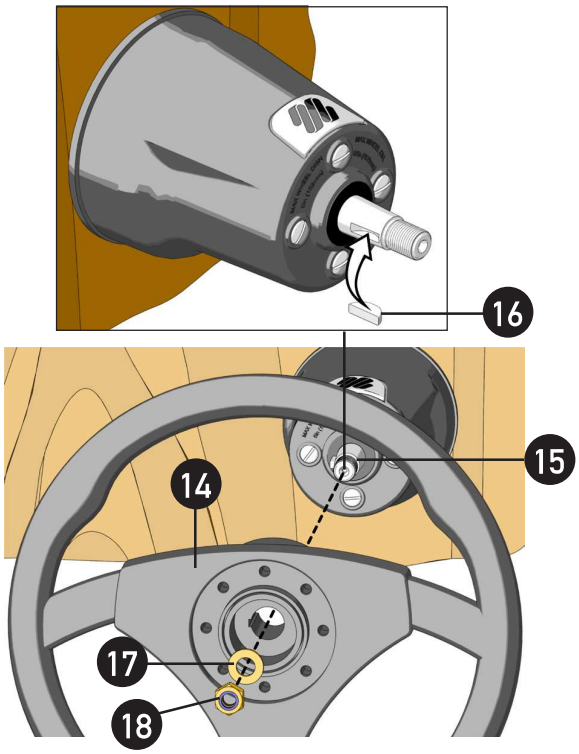
Make sure the seal is properly fixed inside its seat.



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).

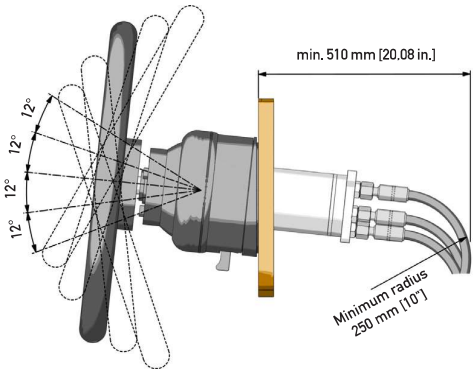


3.4 Installation of the TILT mount helm

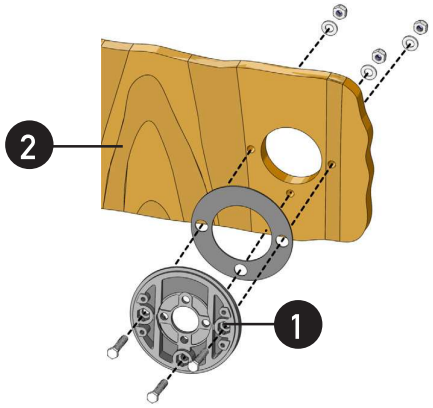
⚠ CAUTION

Tilt X66 is supplied separately.

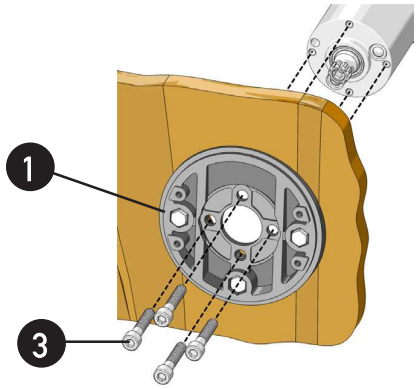
1 Select a suitable place for the steering station. Make sure that there is enough manoeuvering space for the steering wheel and for the helm and its pipes and fittings.



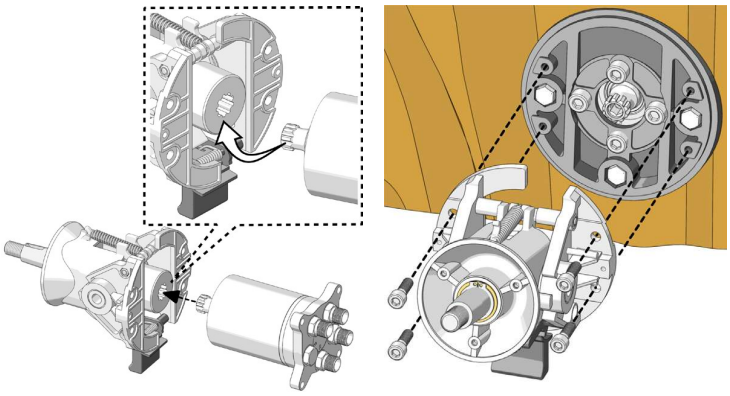
2 Fix bracket (1) supplied with tilt X66 to dash-board (2) following the instructions supplied with tilt X66.



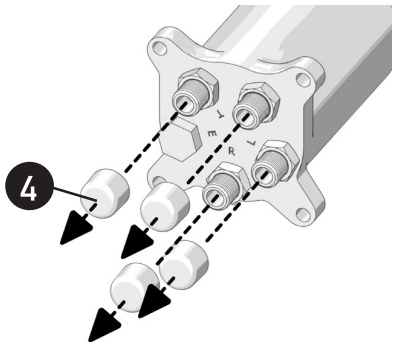
3 Fix the helm to bracket (1) supplied with tilt X66 by using the three M6 screws (3) supplied with tilt X66 following the instructions provid-ed with tilt X66.



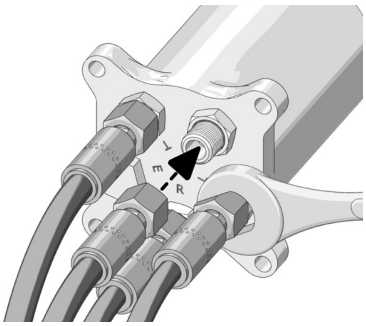
4 Position mechanism X66 putting it on the helm shaft.



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



6 Connect the hydraulic holes **UFLEX** kit OB-MD between the helm and the power unit and the hydraulic hoses **UFLEX** kit OB-SVS between the helm and the cylinder as shown in the picture on page 22 for single station applications and on page 24 for dual station applications.

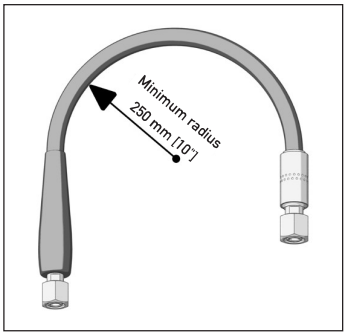


⚠ CAUTION

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.

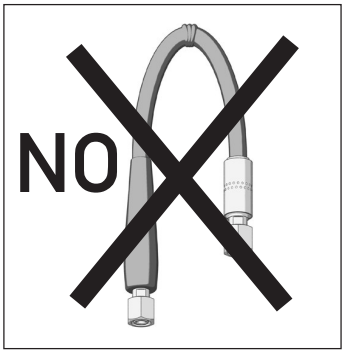


⚠ WARNING

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 **UFLEX**, verify that the system is dimensioned to bear pressures up to 105 bar (1500 psi).

3.5 Installation of the power unit

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.

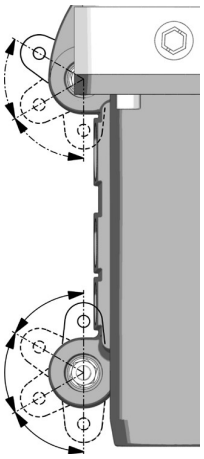
⚠ WARNING

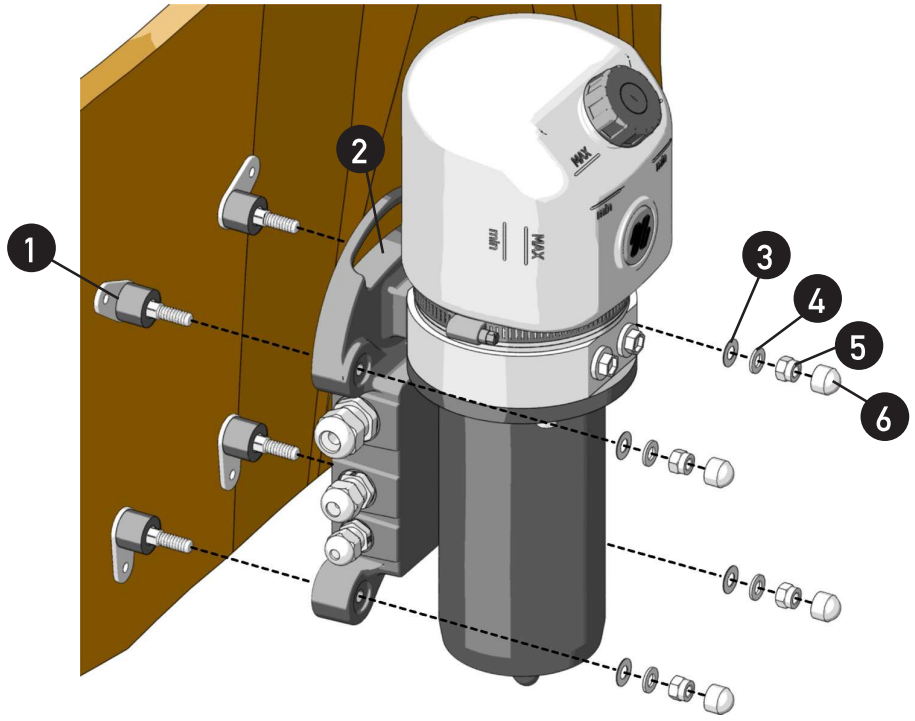
Do not extend the cables.

⚠ WARNING

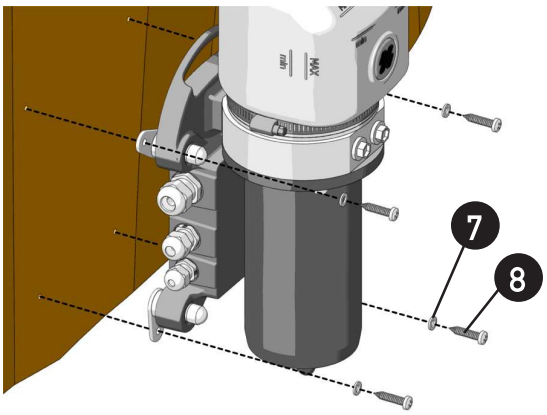
Do not loosen or tamper with the fairleads and their connections.

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).





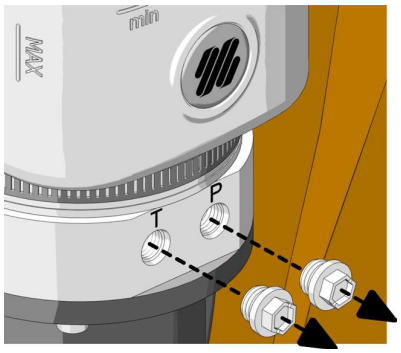
2 Fix the power unit to the wall or to the floor by using the four self-tapping screws (7) and washers (8) with a proper torque according to the support type, without exceeding 8 Nm (5,9 lb·ft).



⚠ 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)

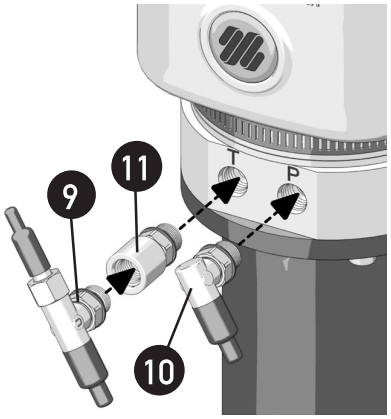
3 Remove the protection plugs. Put T fitting (9) near side TANK (identified with T) and put the 90° fitting (10) near side P and tighten them manually; then turn them after unscrewing them and tighten the nut by means of a 11/16" open end wrench with a torque of 20 Nm (15 lb·ft) until the washer touches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



⚠ DANGER

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

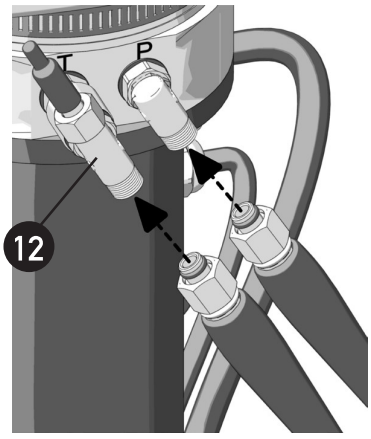
An extension bushing (11) is provided with fittings to make hydraulic hose connection easier.
Tighten the bushing manually, then lock it by tightening the nut using a 11/16" open end wrench with a torque of 20 Nm (15 lb·ft).



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 22 for single station applications and on page 24 for dual station applications.

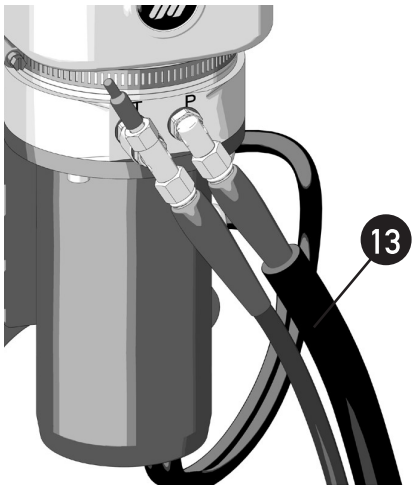


⚠ WARNING

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

NOTICE

If vibrations are detected in the system, add one or more parts of the vibration-damping hose (13) (supplied when the user interface is present) on the hydraulic hose that comes out of P on the power unit.



NOTES FOR AUTOPILOT CONNECTION

⚠ WARNING

Before installing an autopilot, contact **UFLEX** Technical Assistance Center.
UFLEX declines any responsability 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

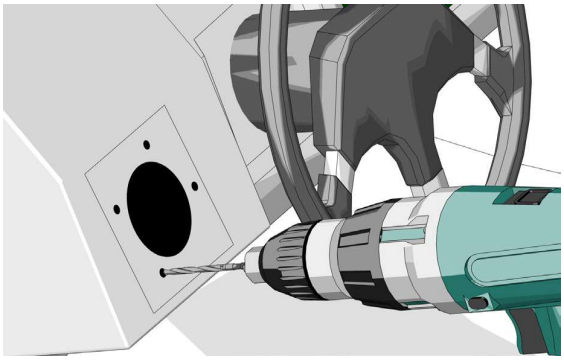
The autopilot must be placed at a lower height with respect to the power unit.

3.6 Installation of the user interface (if present)

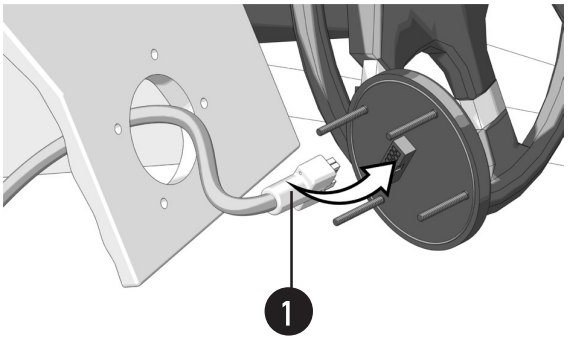
1 Position the user interface so that it does not hinder other controls or that it is not hindered by them.

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

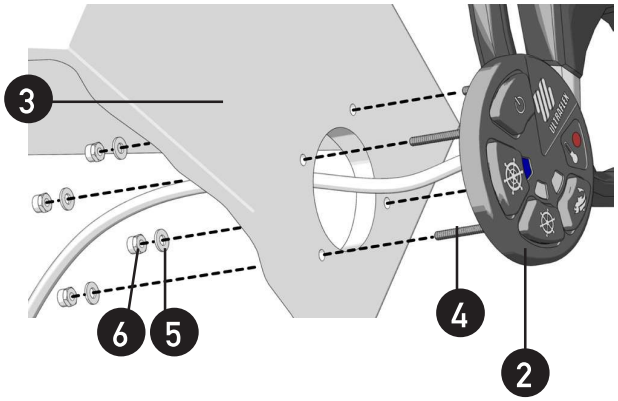
3 After choosing the right position, make the holes to insert the user interface with the suitable template.



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

UFLEX is not to be held responsible for possible damages or malfunctions deriving from operation not workman-like 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.

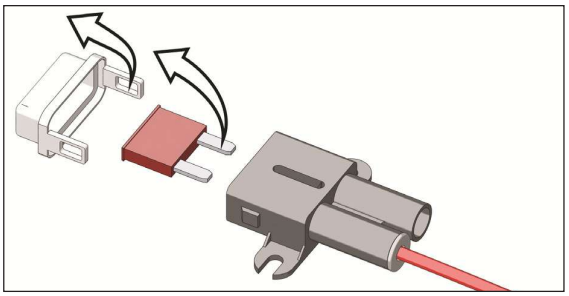
3.7.1 Power cable (if the user interface is included)

The power cable supplied by **UFLEX** is a high-quality, salt water environment 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:

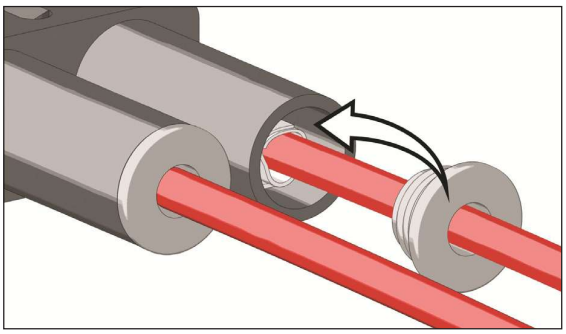
Colour	Use
Red	Positive wire
Black	Ground wire

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:

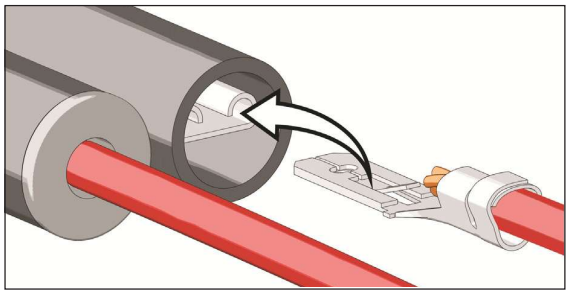
Remove the transparent cover of the fuse holder and the fuse.



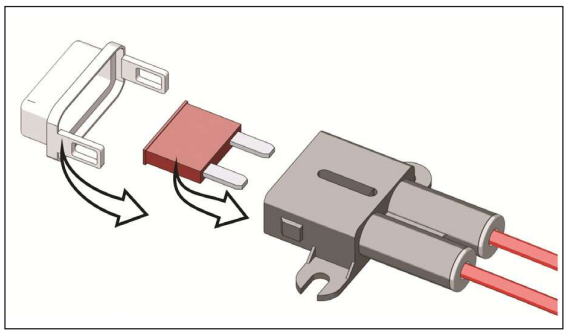
Put the seal on the conductor until it adheres to the fuse holder checking that it has been inserted properly.



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



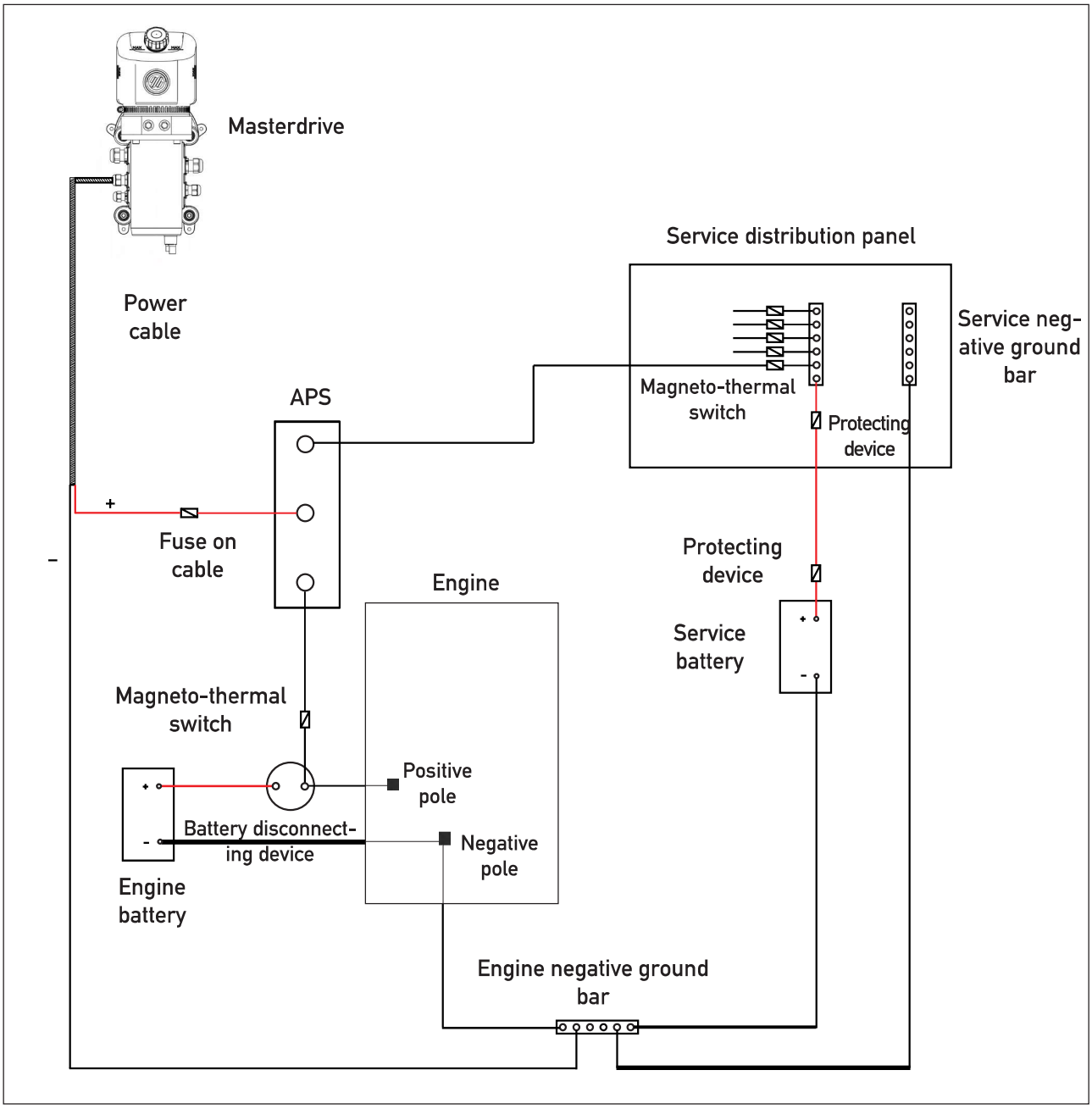
Place the fuse in the fuse holder and put the proper transparent cover.



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.

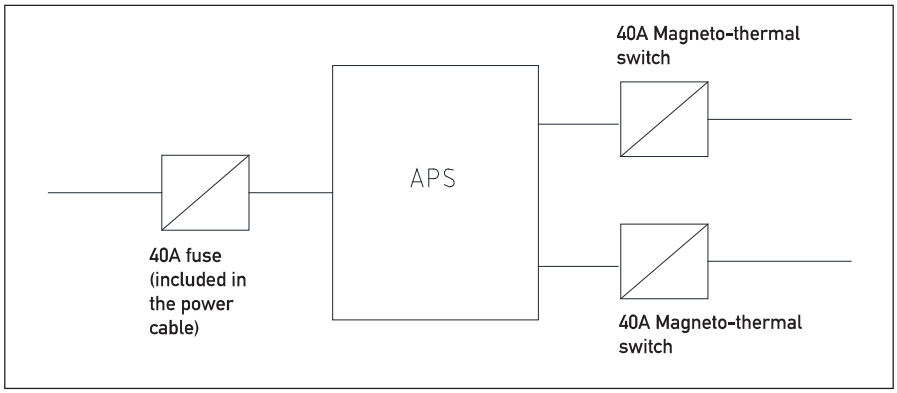


NOTICE

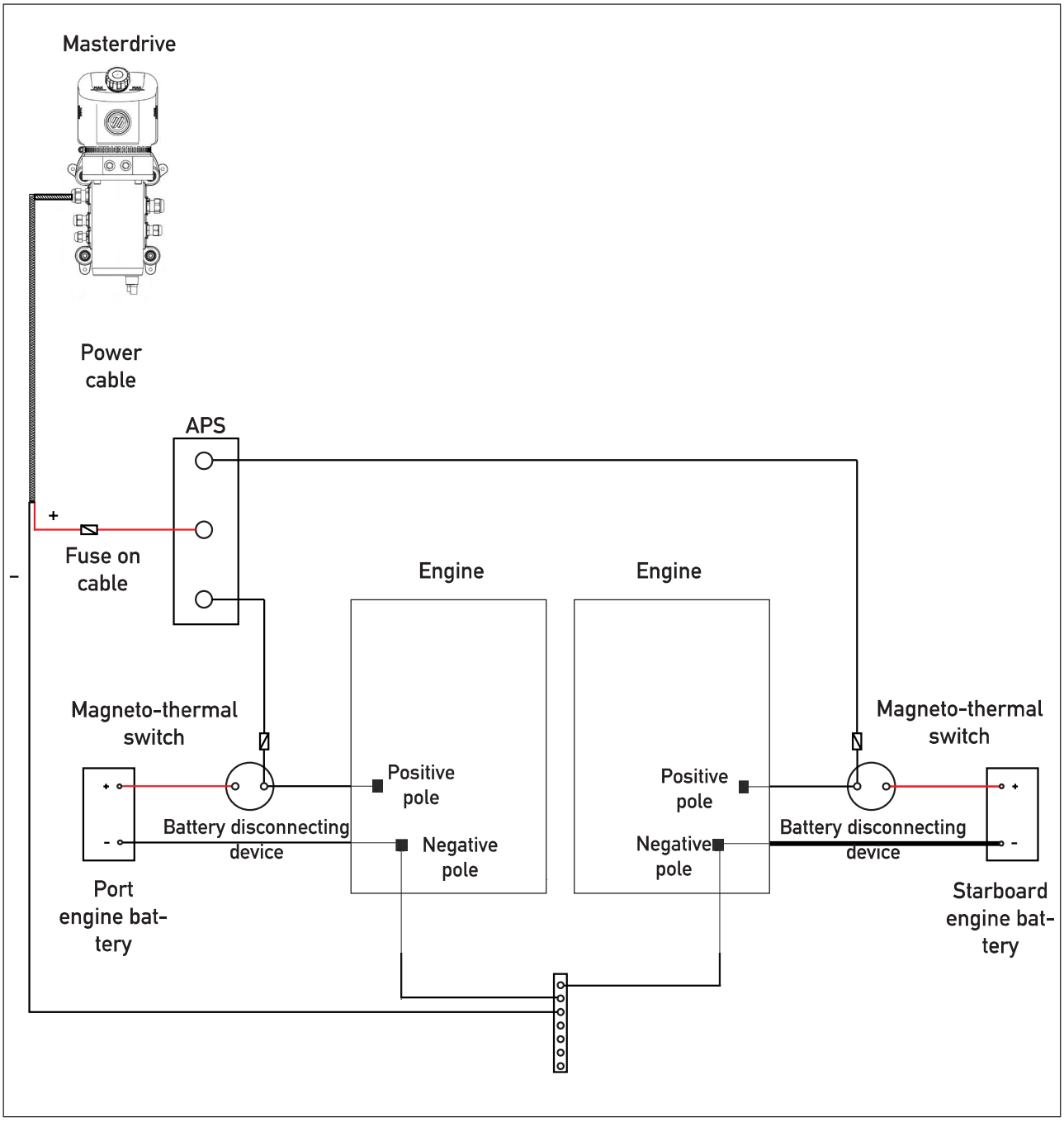
A 40A fuse is needed on each APS power line

NOTICE

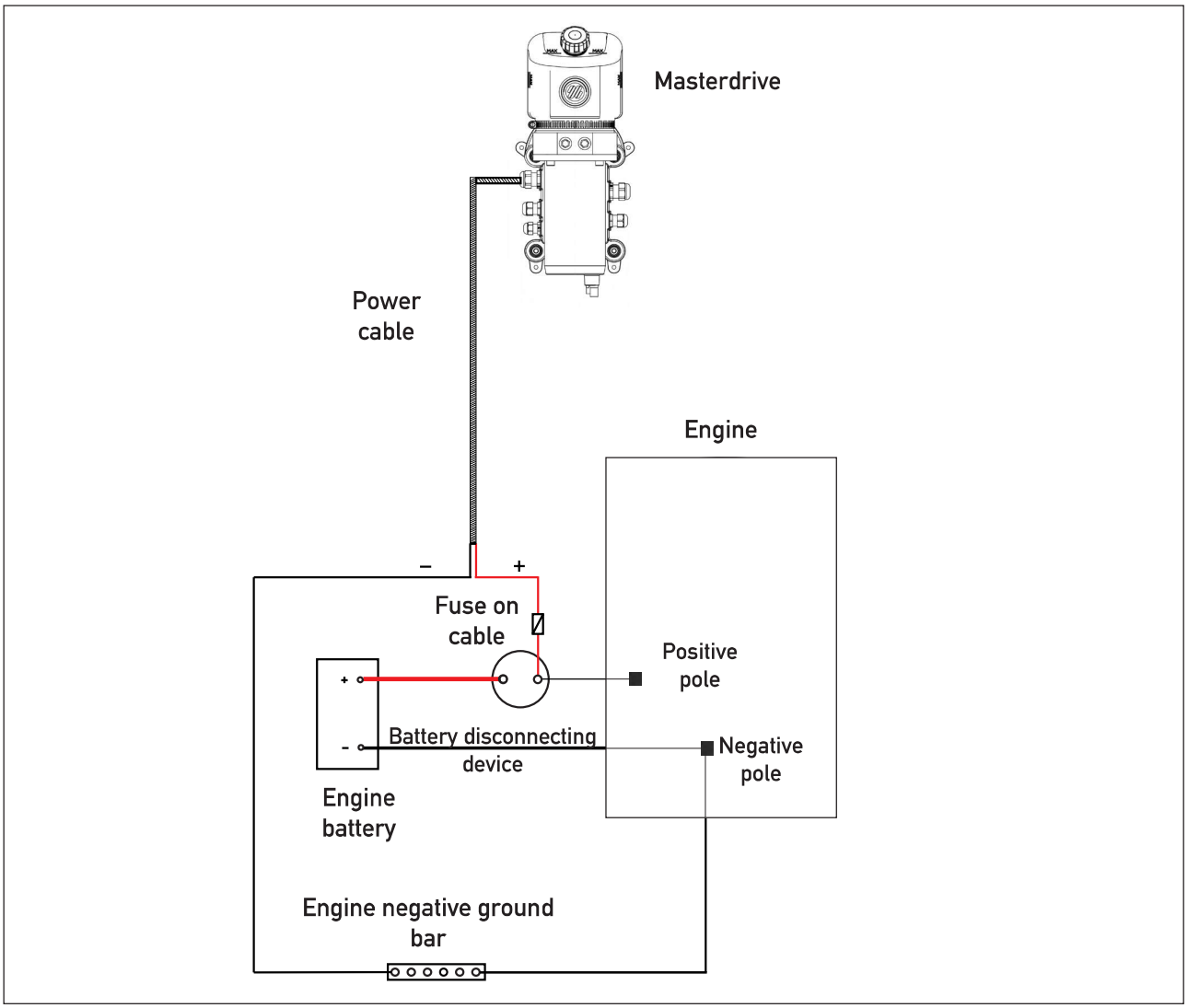
The magneto-thermal switches must be as close as possible to the power source



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



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



WARNING

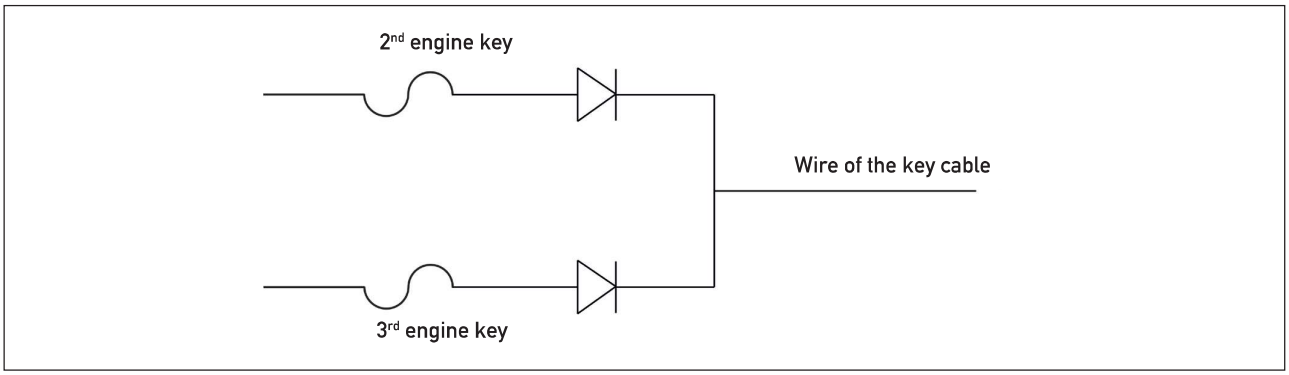
Do not use other power sources as switching suppliers (DC/DC, AC/DC), inverters, alternator shunts, portable batteries, solar cells etc.
The ground wire must be directly connected to the engine negative ground bar.

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.
Each conductor of the key cable must be connected to the relating positive of the panel key by means of a 1 A fuse not supplied and to be installed by the customer.
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:



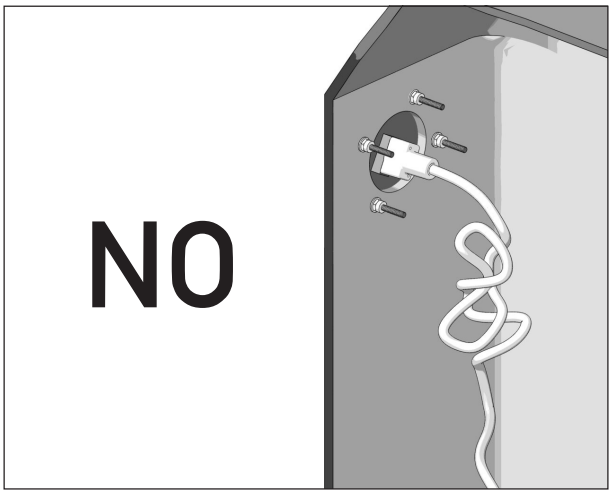
The installer must use diodes with the following minimum features:
Id = 200mA
Vbr = 32 VDC
The connection of the key connectors and of the relating fuses must be carried out so that the relating interconnection is waterproof.

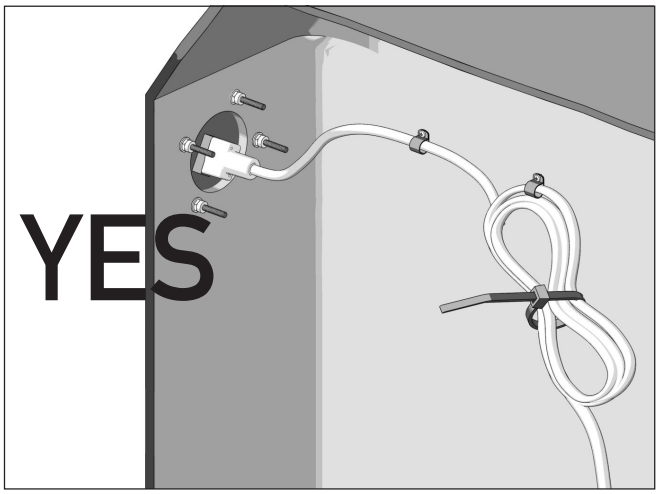
NOTICE

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

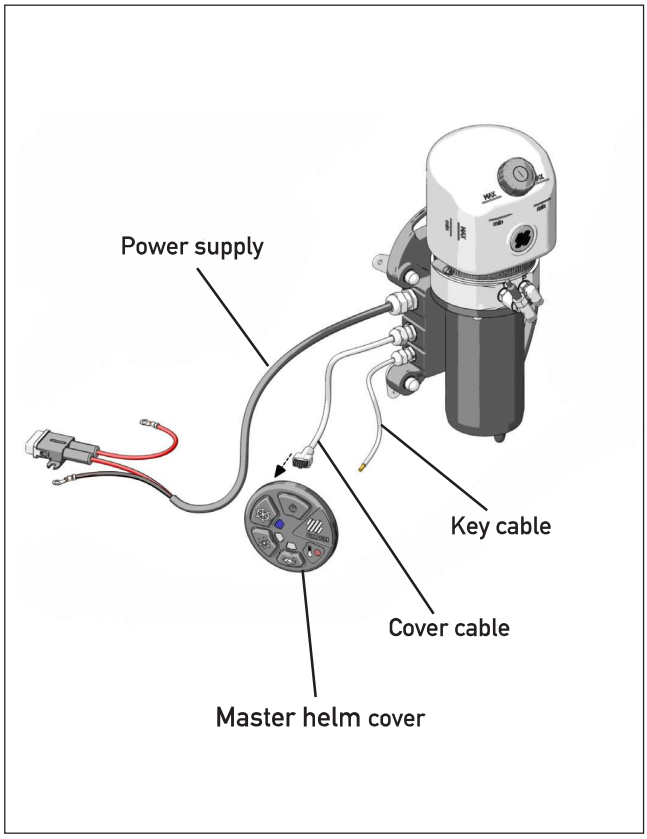
3.7.3 User interface cable (if the user interface is included)

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.

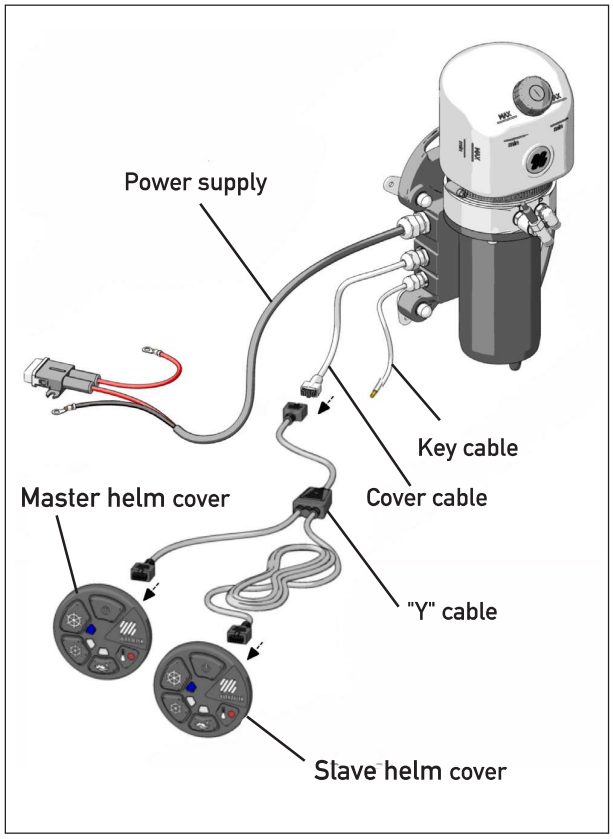




SINGLE STATION



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 **UFLEX** oil or other compatible oils.

Hydraulic oil OIL15 has been specifically formulated for **UFLEX** to ensure high quality performance level of **UFLEX** products throughout time.
The special mix of anti-wear and stabilizing components of OIL15 allow ensuring great results as far as the product duration and performances are concerned in several environmental conditions. **UFLEX** is not to be held responsible for any damages or performance deterioration if oils different from OIL15 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 OIL15 **UFLEX** are:
- Shell Tellus T15 and Shell Tellus T22
- Mobil DTE 11M

NOTICE

UFLEX will not be able to ensure the compatibility of the above mentioned oils with OIL15 if the oil manufacturers vary their formulation. Under no circumstances **UFLEX** is to be held responsible for any damages or performance deterioration.

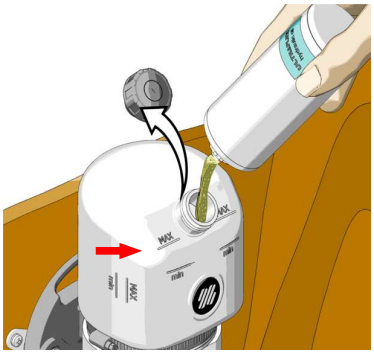
In the days after the filling, check the oil level; if necessary top off the system.
At the beginning the oil level can lower, as small amounts of air can be released in a homogeneous way. According to the types of installation, it is necessary to carry out the different bleeding procedures, as it follows.

3.8.1 System filling

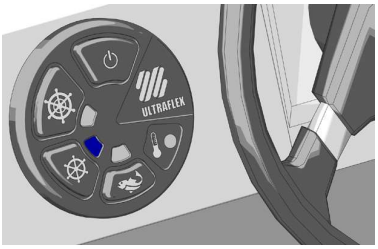
1 Remove the tank plug and fill the tank completely

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.

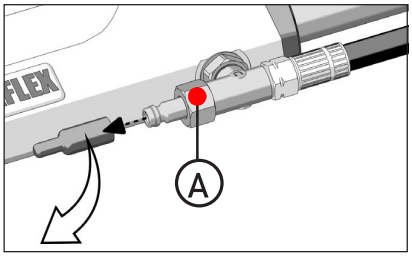
4 Top up the tank until reaching the maximum level.

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,

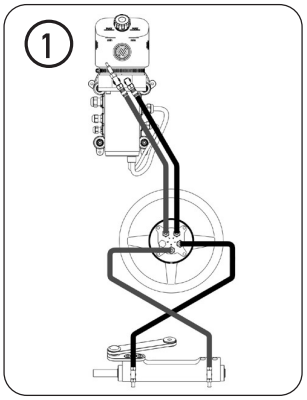
NOTICE

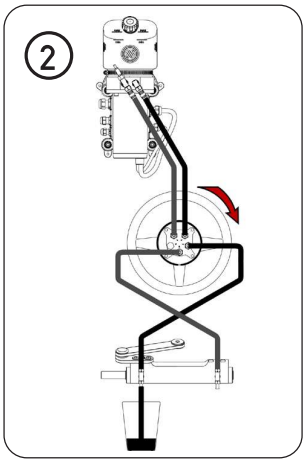
Make sure the cylinder remains in its position; if necessary, turn the steering wheel in the opposite direction so that the cylinder returns to its proper position and repeat the operation.

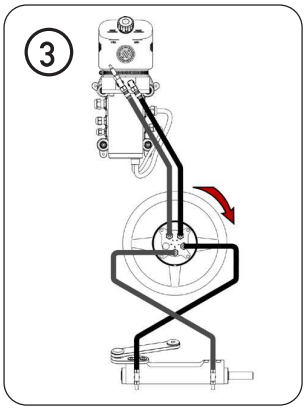
NOTICE

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.

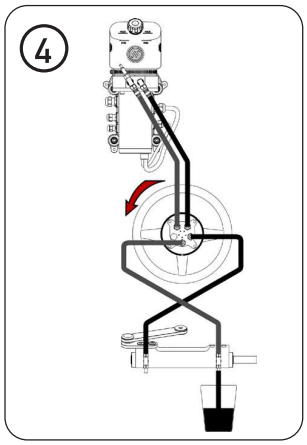






- Open the other bleed valve and move the oil recovery tank to the other side. Holding the cylinder body in this position, turn the steering wheel as shown in picture 4, until oil without air bubbles comes out of the bleed valve.
  Then close the bleed valve.

- Repeat the entire procedure to be sure there is no air in the system.

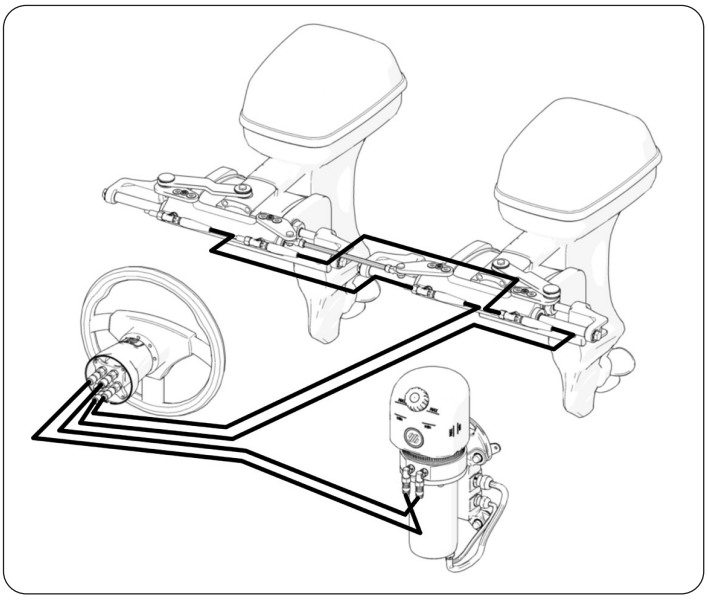


3.8.3 Single steering station/ dual cylinder

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

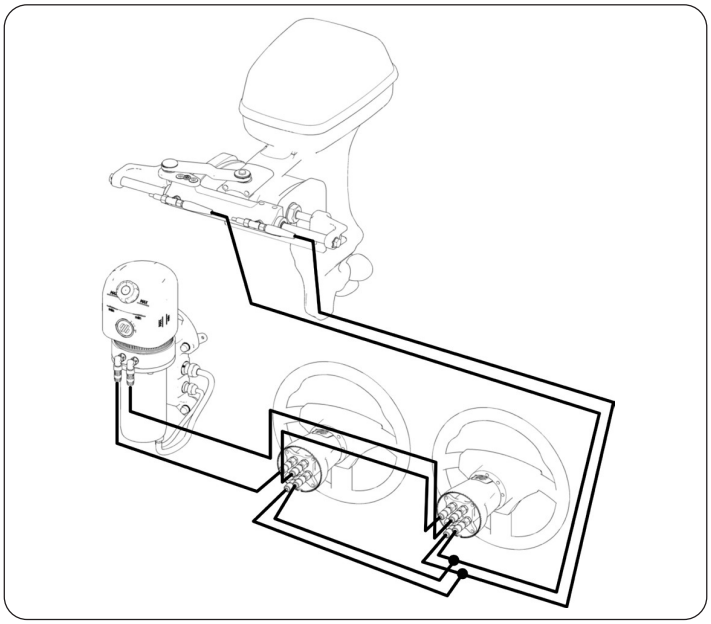
In case of use with inboard cylinders, follow the indications in the corresponding use and maintenance manuals for the hydraulic hose connection.

- 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.

3.9.1 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.

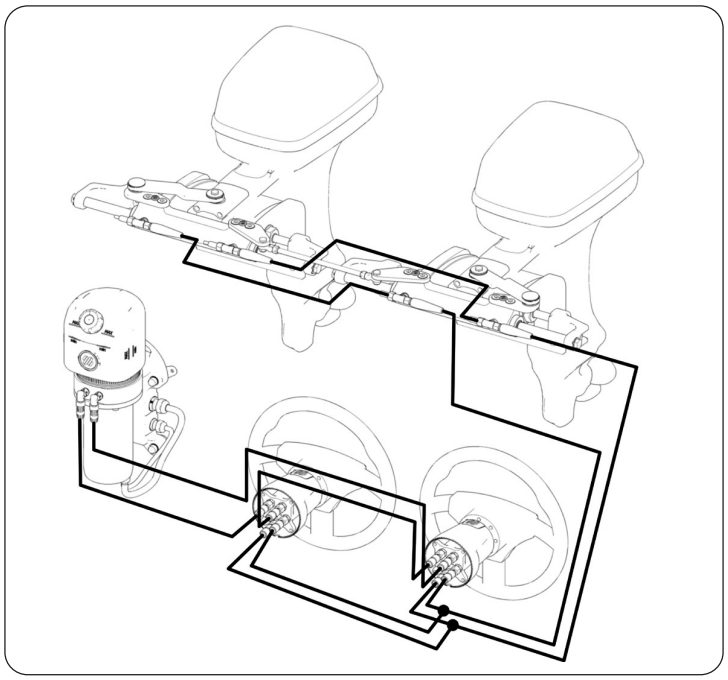
- Manually unscrew the two bleed valves on the cylinder "T" fittings and push the cylinders to one side up to the end stroke.

- 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 SYSTEM USE

4.1 First use

Before starting the boat for the first time do as follows:

- Consult section 1 "Product description" in this manual to find information about the position and the function of the different components of the system. The operator must read and understand this information before starting the boat.

- Check the system as described in paragraph 4.1.1

- The first navigation must be carried out with calm sea conditions. After checking that all occupants wear the personal protective equipment, drive at a moderate speed checking the response of the boat controls. After reaching safe waters, steer the boat at different speeds until you master the boat completely.

4.1.1 System check

To check the system correctly follow the instructions below.

⚠ DANGER

If these instructions are not followed, this may result in a loss of control causing possible impacts and/or capsizing of the boat with material damage and physical injuries that could lead to death.

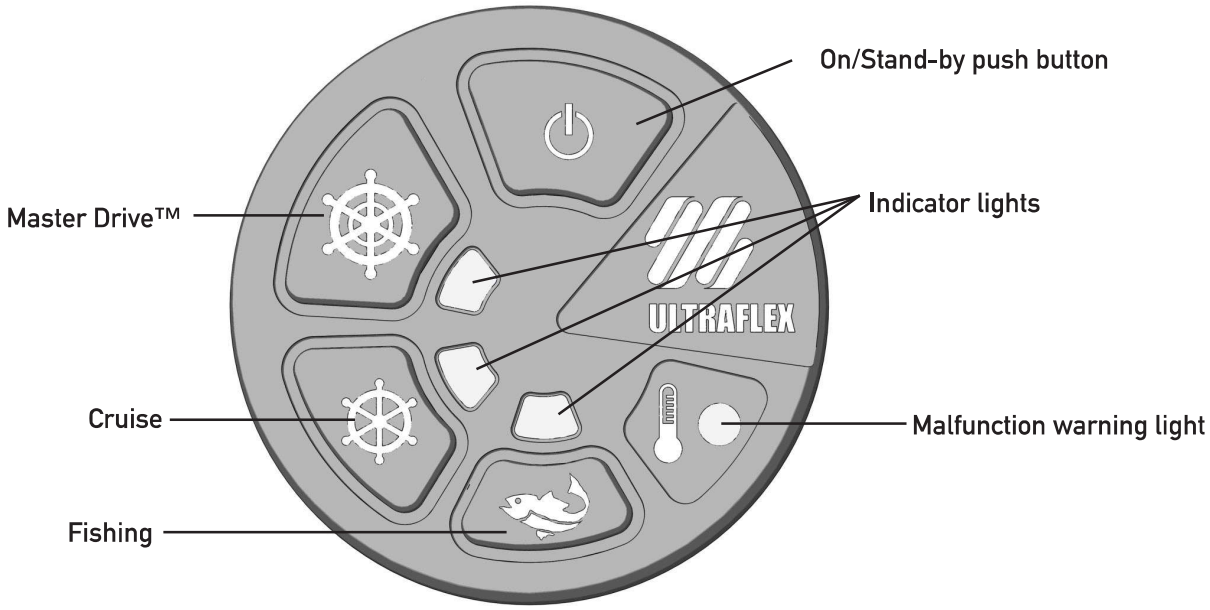
- Check the steering response when the steering wheel is turned in port and starboard position.

- Check the pipes and any connecting cables are not damaged. Check the connections are tightened correctly and the cable bending complies with the instructions included in the installation manuals of KIT OB-SVS and KIT OB-MD.
  Check the mechanical components are not damaged and worn out.

- Check the cylinder and the corresponding connections move freely during the steering. The cylinder and the steering wheel movement must be smooth. In case of systems with more than one engine, this check must be carried out on all steering stations.

- Check the control levers move freely and the motors work correctly according to the control. Also check the throttle and inverter cables move freely and they are not damaged, worn out or corroded.

4.2 MasterDrive version with user interface

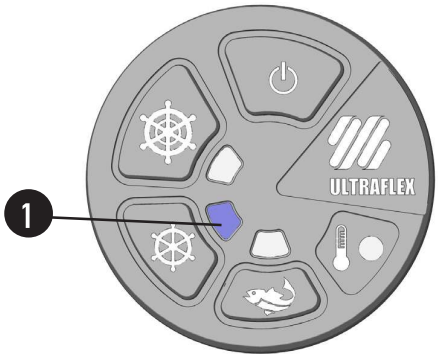


4.2.1 Automatic switch-on, stand-by mode and switch-off

1 Turn the key on the dashboard to start the engine. After a self-checking cycle, the system goes to the Cruise position and the relevant indicator (1) lights up: the system is ready to be used.

NOTICE

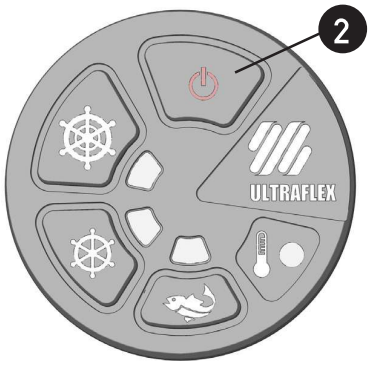
In such a condition, the system is enabled and battery consumption is about 3A without turning the steering wheel.



2 If the system is enabled, pressing button (2) puts the system in STAND BY mode and button (2) lights up red.

NOTICE

In such a condition, the system is not enabled and battery consumption is about 200mA.



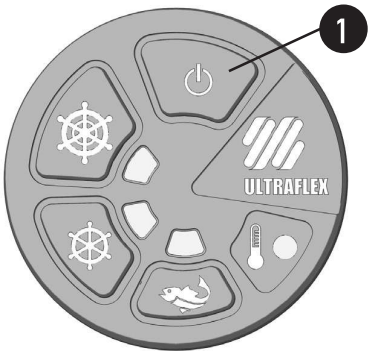
3 When the engine is turned off, the system turns off too.

4.2.2 Start customization

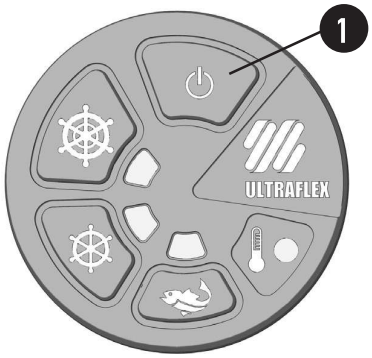
It is possible to customize the system start and to select the system mode during the first start.
These settings can be changed by the user.

4.2.2.1 Automatic start disabling/enabling

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.



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.

4.2.2.2 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.

4.2.3 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.

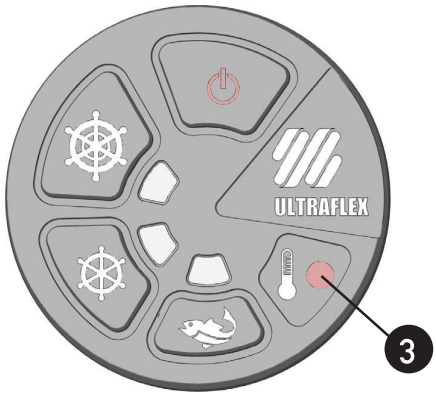
This allows a reduced battery consumption ensuring a quick and effective system responsiveness

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.

4.2.4 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. NOTICE: 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		

4.3 MasterDrive version without user interface

4.3.1 Automatic operation of the system

When the user interface is not present, the system is enabled when the user starts the boat turning the ignition key, and operates automatically switching between the Cruise (default mode) and MasterDrive™ modes according to the force detected on the steering wheel.

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

This ensures reduced battery consumption and quick and effective system responsiveness.

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

NOTICE: The MasterDrive™ position implies higher energy consumption.

4.3.2 Possible malfunctions

Malfunctions may occur due to power unit overheating or other problems (not signalled by the user because the user interface is not present): in these cases, the power unit goes to stand-by mode; however, it is possible to continue the steering manually, but the steering wheel rotation will be harder.
It is advisable to turn off the motor as soon as possible and to wait for a few minutes. If the problem persists, please contact the Assistance Service.

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 **UFLEX** 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 **UFLEX** OIL 15 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

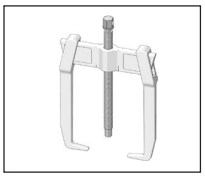
Ordinary cleaning ensures good operation and optimum product aesthetics.
Only the helm cover and the user interface, if present, need to be cleaned.
We recommend using no aggressive products that might damage the metal parts or the external plastic parts.

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

⚠ DANGER

Every time any malfunction or damage is detected in the system, immediately stop navigating, take the boat to a safe place and contact **UFLEX** Customer Care.

⚠ WARNING

Whenever the following checks need the removal and/or disassembly of the steering system components, such operation must be carried by specialized staff. **UFLEX** 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.	• Blockage in the hoses between steering system and cylinder.	• Replace hoses. **⚠ DANGER** The damaged hose must be replaced, otherwise it may cause loss of steering and severe personal injury or boat damage.
	• The system is off.	• Switch the system on.
The system is very difficult to fill. Air keeps bubbling at the top of the steering system tank even after filling the system completely.	• Incorrect hose assembly	• Install hoses properly; repeat the bleeding procedure of the system.
	• Low oil level	• Add oil in the tank to the maximum level
	• Leaks from the cylinder bleeder.	• Tighten the bleeder on the cylinder.
	• Coiled hose.	• Uncoil and straighten the hose. Replace it, if necessary.
The steering system is easy to turn when the boat is moving at low speed but it becomes stiff at the dock.	• Rapid manoeuvres (mooring) in fishing mode	• Select the MasterDrive mode.
When turning the steering wheel, the cylinder body does not move.	• Incorrect hose installation.	• Install hoses properly; repeat the bleeding procedure of the system.
	• Oil leak.	• Look for the leak and contact specialized staff.
Oil leaks from steering system fittings.	• Bad tightening or low torque of the fittings.	• Tighten the fittings with a maximum torque of 20Nm (15 in.lbs).
Oil leaks from the tank plug.	Oil leaks from the tank plug.	• Tighten the plug.
	• Too high oil level.	• Restore the correct level.
	• Incorrect power unit installation	• Install it properly.
When turning the steering wheel to starboard, the boat turns to the left and viceversa.	• Hoses between the helm and the cylinder are reversed.	• Reverse hoses

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.

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