

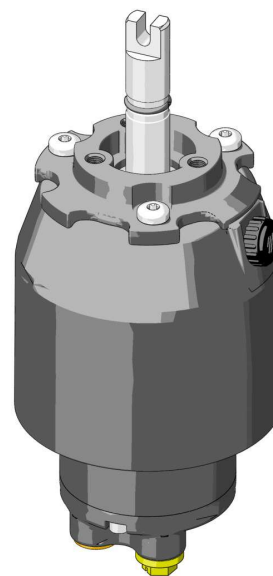
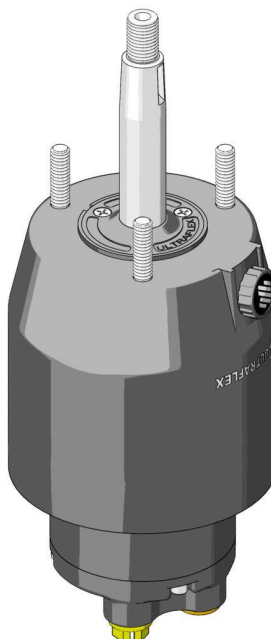
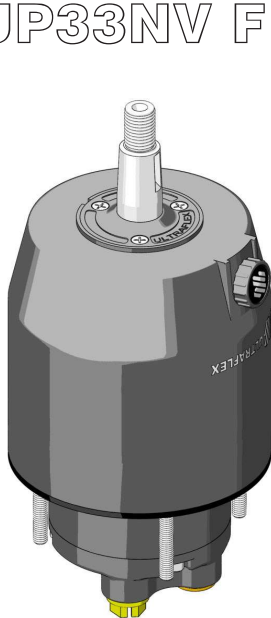
# Installation and Maintenance Manual

## PUMP FOR HYDRAULIC STEERING SYSTEMS

UP25 F  
UP28 F  
UP33 F  
UP39 F  
UP45 F  
UP25NV F  
UP33NV F

UP28 R  
UP33 R  
UP39 R  
UP39-I R  
UP45 R  
UP45-I R

UP25 T  
UP28 T  
UP33 T  
UP39 T  
UP45 T



PARTNER





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

# TABLE OF CONTENTS



DOCUMENT REVISIONS.....	4
USE OF THE MANUAL AND SYMBOLS USED .....	5
INTRODUCTION .....	6
WARRANTY .....	6

## 1 PRODUCT DESCRIPTION



1.1 HYDRAULIC STEERING SYSTEM OPERATION .....	8
1.2 SYSTEM CONFIGURATIONS .....	8
1.3 OPERATION IN SAFETY CONDITIONS .....	9
1.4 PUMP DESCRIPTION .....	10
1.5 PUMP TECHNICAL FEATURES.....	11
1.6 MARKING AND SAFETY STICKERS .....	14

## 2 TRANSPORT



2.1 GENERAL WARNINGS .....	15
2.2 PACKAGING CONTENTS .....	15

## 3 INSTALLATION



3.1 SAFETY RULES FOR INSTALLATION .....	18
3.2 TOOLS NECESSARY FOR THE INSTALLATION OF PUMPS UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F.....	20
3.3 PUMP UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F INSTALLATION .....	20
3.4 TOOLS NECESSARY FOR THE INSTALLATION OF PUMPS UP28 R - UP33 R - UP39 R - UP45 R .....	22
3.5 PUMP UP28 R - UP33 R - UP39 R - UP45 R INSTALLATION.....	22
3.6 TOOLS NECESSARY FOR THE INSTALLATION OF PUMPS UP39-I R - UP45-I R.....	24
3.7 PUMPS UP39-I R - UP45-I R INSTALLATION.....	24
3.8 TOOLS NECESSARY FOR THE INSTALLATION OF PUMPS UP25 T - UP28 T - UP33 T - UP39 T - UP45 T .....	26
3.9 PUMP UP25 T - UP28 T - UP33 T - UP39 T - UP45 T INSTALLATION.....	26
3.10 TYPES OF INSTALLATION .....	29
3.11 HOSE CONNECTION TO THE SYSTEM .....	30
3.11.1 HOSE CONNECTION TO THE SYSTEM FOR MODELS UP 25 F-R-T, UP 28 F-R-T, UP 33 F-R-T, UP 39 F-R-T, UP 45 F-R-T.....	30
3.11.2 HOW TO CHOOSE THE RIGID PIPES FOR MODELS UP39-I R AND UP 45-I R .....	32
3.11.3 HOSE CONNECTION TO THE SYSTEM FOR MODELS UP39-I R AND UP45-I R .....	33
3.12 FILLING AND PURGING.....	34
3.12.1 POSITIONING OF THE OIL BOTTLE.....	35
3.12.2 PURGING PROCEDURE.....	35
3.13 GENERAL RECOMMENDATION .....	35

## 4 SYSTEM USE



4.1 FIRST USE .....	36
4.1.1 SYSTEM CHECK .....	36
4.2 SYSTEM OPERATION .....	36

## 5 MAINTENANCE



5.1 ORDINARY MAINTENANCE .....	37
5.2 STEERING WHEEL DISASSEMBLY .....	37
5.3 TROUBLESHOOTING .....	38

## 6 DISMANTLING



6.1 DISMANTLING .....	40
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## DOCUMENT REVISIONS

Rev.	Date	Revision description
0	30/05/2023	First edition



## USE OF THE MANUAL AND SYMBOLS USED

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

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

**⚠ DANGER**



Immediate hazards which CAUSE severe personal injury or death.

**⚠ WARNING**



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

**⚠ CAUTION**



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

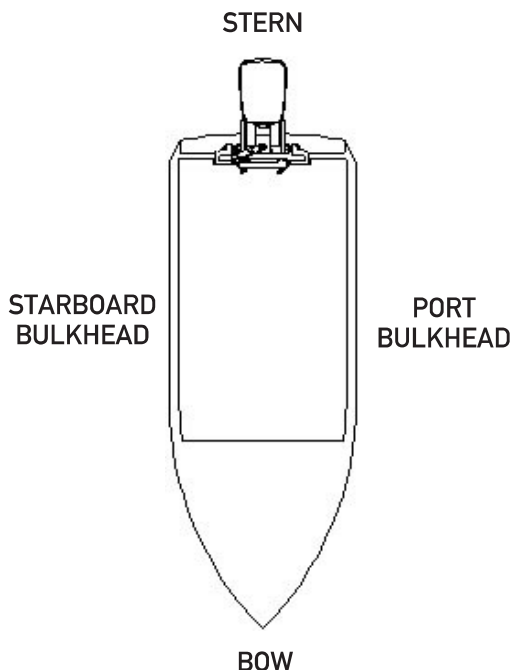
**NOTE**



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



## INTRODUCTION

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

The user must know the content of this manual.

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

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

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

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

### WARNING

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

#### TECHNICAL ASSISTANCE SERVICE

North - South - Central America:

**UFLEX USA**

6442 Parkland Drive

Sarasota, FL 34243

Tel: +1.941.351.2628

Email: [sales@uflexusa.com](mailto:sales@uflexusa.com)

[www.uflexusa.com](http://www.uflexusa.com)

**UFLEX S.r.l.**

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16012 Busalla (GE)-Italy

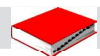
Tel: +39.010.962.01

Email: [service@ultraflexgroup.it](mailto:service@ultraflexgroup.it)

[www.ultraflexgroup.it](http://www.ultraflexgroup.it)

## WARRANTY

1. Two Year Limited Warranty. **UFLEX** USA, Inc. warrants that all products manufactured by **UFLEX** USA, Inc. or **ULTRAFLEX** 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 attempted 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, misuse, 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 **ULTRAFLEX** 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 **ULTRAFLEX 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 supersedes 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 or 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.



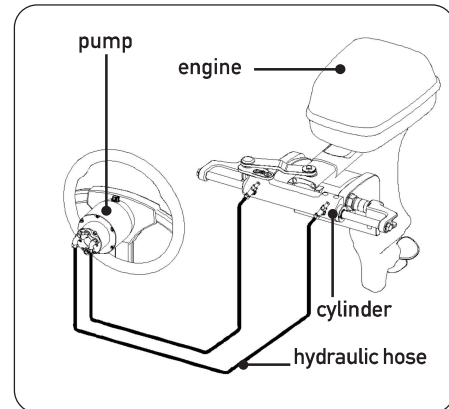
# 1 PRODUCT DESCRIPTION

## 1.1 Hydraulic steering system operation

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  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) and  $+77^{\circ}\text{C}$  ( $+170^{\circ}\text{F}$ ). All the components are made for the marine environment, using materials and working processes which offer long life and safety under the most extreme conditions. A hydraulic steering system consists of a steering pump located on the dashboard, a cylinder tied to the rudder or to the outboard or sterndrive engine and the connecting hoses (see picture). Under normal operating conditions, a turn of the steering wheel will pump the oil, which flows in through the hoses to the cylinder, according to the turn direction. With the consequent cylinder movement the oil will flow to the pump through the hoses and at the same time moves the engine or the helm which are connected to the cylinder. The pumps equipped with a nonreturn valve, which prevents outgoing fluid from returning along the same hose, allow the operation of the steering systems with two or more steering stations. The pumps series "NV" are not equipped with a nonreturn valve so they cannot be used with two or more steering systems. The cylinders are double-acting and they can be balanced or unbalanced. In unbalanced cylinders the two chambers have different volumes and therefore they require a different number of steering wheel turns and a different steering wheel rotation effort with the same movement in the two directions. The unbalanced cylinders cannot be used with the pumps series "NV". The balanced cylinders require the same number of turns of the steering wheel to move the helm from the centre to the end of stroke in the two opposed directions.

A well balanced steering system needs a correct choice of the pump for the cylinder. **UFLEX** produces different pump models, which have different capacity ( $\text{cm}^3$  of oil moved each steering wheel turn) and for each type of installation. While choosing the pump it is important to consider the cylinder volume. The number of starboard and port turns is determined by the ratio between the cylinder volume and the pump capacity.

Example: if the pump has a capacity of  $28 \text{ cm}^3$  [ $1.7 \text{ cu.in.}$ ] and the cylinder has a volume of  $120 \text{ cm}^3$  [ $7.3 \text{ cu.in.}$ ], the formula looks like this:  $120/28=4.2$ . Accordingly, the steering wheel will turn about 4 times before the cylinder will completely turn from one side to the other. In case of installations with double cylinders connected in parallel the cylinder volume must be added. Applications with less than 4 turns are not recommended, as they need a higher effort, also applications with more than 8 turns are not recommended, as the response of the boat to steer is slowly.



## 1.2 System configurations

The pumps UP25 - UP28 - UP33 - UP39 - UP45 can be installed in a single or double steering system and used with different types of configurations of front, side or inboard cylinders.

The pumps series "NV" cannot be installed in a double steering system and they cannot be used with unbalanced cylinders.

### CAUTION

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



## 1.3 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**

Before beginning the installation, check the mounting compatibility of the pump to the hydraulic cylinder used. It is also 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 steering cylinder in any way to fit it to your application, otherwise the cylinder will no longer operate in safety and it will endanger the boat and the occupants.

### **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.

### **WARNING**

The pumps UP25NV F and UP33NV F cannot be used with unbalanced cylinders and with double steering system.



## 1.4 Pump description

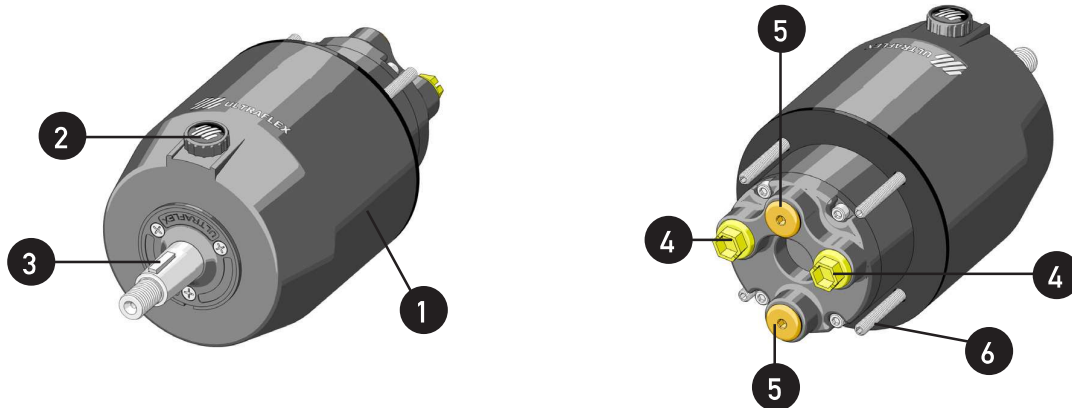
The pumps UP25 - UP28 - UP33 - UP39 - UP45 have been designed and manufactured to be used as a component in the hydraulic steering systems, as described in the previous paragraph.

The pumps UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F must be installed on the front part of the boat dashboard or semi-built-in through flanges X64 or X57 (supplied separately), the pumps UP28 R - UP33 R - UP39 R - UP39-I R - UP45 R - UP45-I R must be assembled on the rear part of the boat dashboard, and the pumps UP25 T - UP28 T - UP33 T - UP39 T - UP45 T must be assembled by means of tilt X82 (supplied separately).

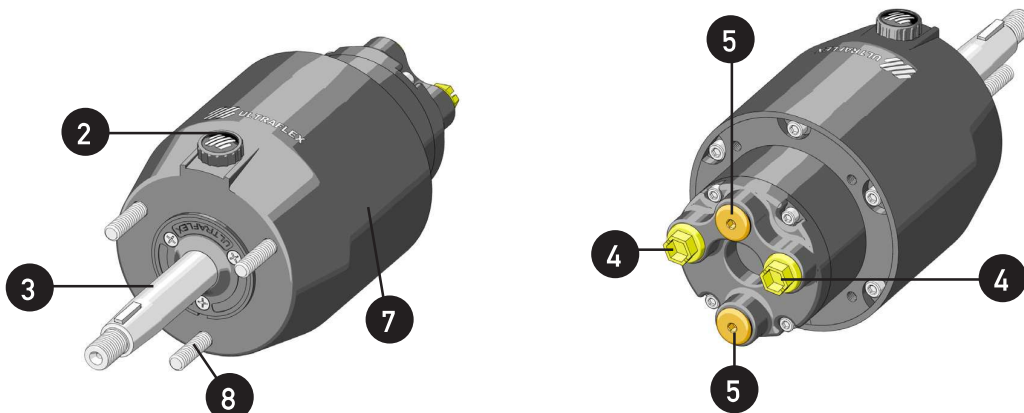
The following pictures show the main pump components:

- |  |  |
|--|--|
| 1 Pump UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F      | 6 M6 dowels for fixing the pump to the dashboard               |
| 2 Tank plug with bleed   | 7 Pump UP28 R - UP33 R - UP39 R - UP39-I R - UP45 R - UP45-I R |
| 3 Steering wheel connection shaft  | 8 M8 dowels for fixing the pump to the dashboard               |
| 4 Connections to the cylinder/s  | 9 Pump UP25 T - UP28 T - UP33 T - UP39 T - UP45 T              |
| 5 Connections to the additional stations (that can be used with series "NV") | 10 Connection shaft to tilt X82                                |

### UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F

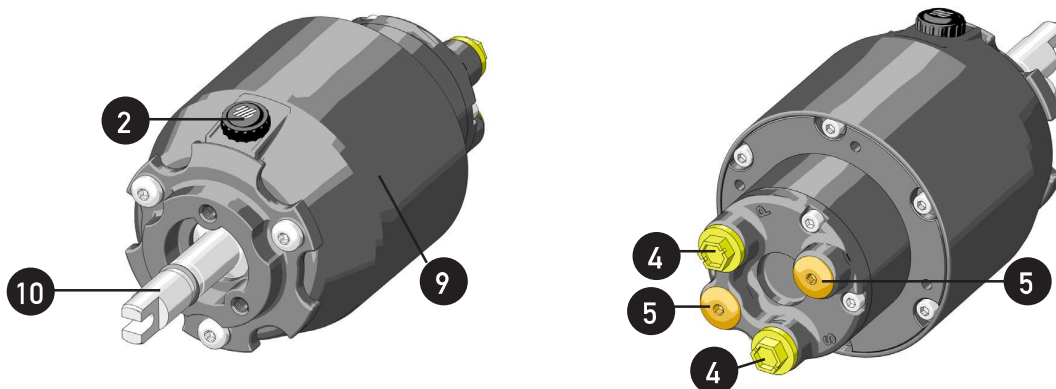


### UP28 R - UP33 R - UP39 R - UP39-I R - UP45 R - UP45-I R





## UP25 T - UP28 T - UP33 T - UP39 T - UP45 T



### 1.5 Pump technical features

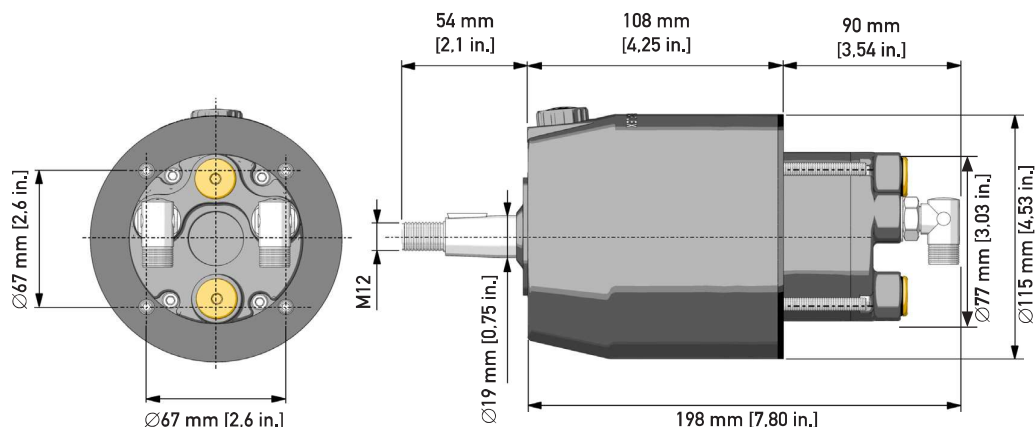
SPECIFICATIONS	PUMP UP25 F	PUMP UP25NV F	PUMP UP28 F	PUMP UP33 F	PUMP UP33NV F	PUMP UP39 F	PUMP UP45 F
Capacity	23,5 cc/rev. - 1,4 cu.in/rev.	23,5 cc/rev. - 1,4 cu.in/rev.	28 cc/rev. - 1,7 cu.in/rev.	33 cc/rev. - 2,0 cu.in/rev.	33 cc/rev. - 2,0 cu.in/rev.	39 cc/rev. - 2,4 cu.in/rev.	45 cc/rev. - 2,7 cu.in/rev.
Pressure relief valve release pressure	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)
No. of pistons	5	5	5	7	7	7	7
Max. steering wheel diameter	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)
Max. steering wheel height	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)
Weight	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)
Oil	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex

#### CAUTION

The release pressure of the pressure relief valves does not correspond to the system normal pressure but it represents only the use limits.



## UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F

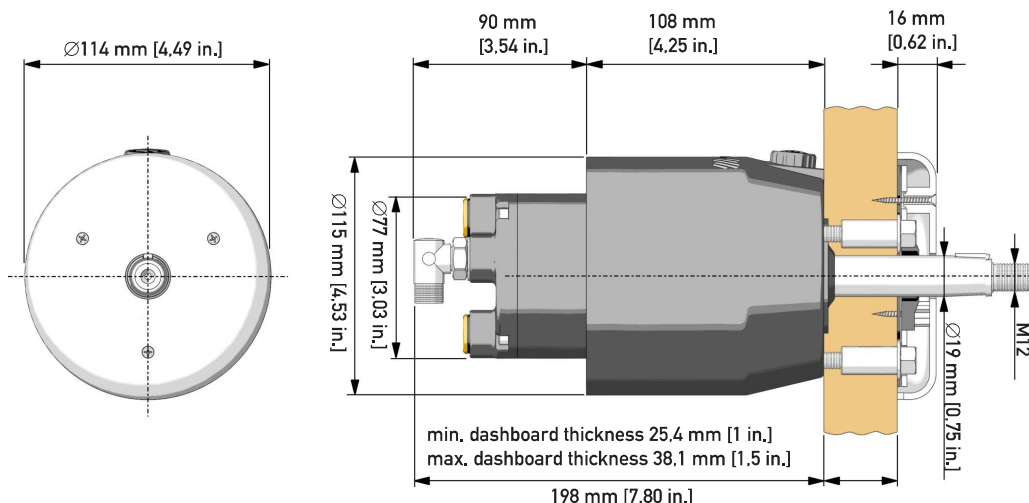


SPECIFICATIONS	PUMP UP28 R	PUMP UP33 R	PUMP UP39 R	PUMP UP45 R	PUMP UP45-I R
Capacity	28 cc/rev. - 1.7 cu.in/rev.	33 cc/rev. - 2.0 cu.in/rev.	39 cc/rev. - 2.4 cu.in/rev.	45 cc/rev. - 2.7 cu.in/rev.	45 cc/rev. - 2.7 cu.in/rev.
Pressure relief valve release pressure	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)
No. of pistons	5	7	7	7	7
Max. steering wheel diameter	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)
Max. steering wheel height	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)
Weight	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)
Oil	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex

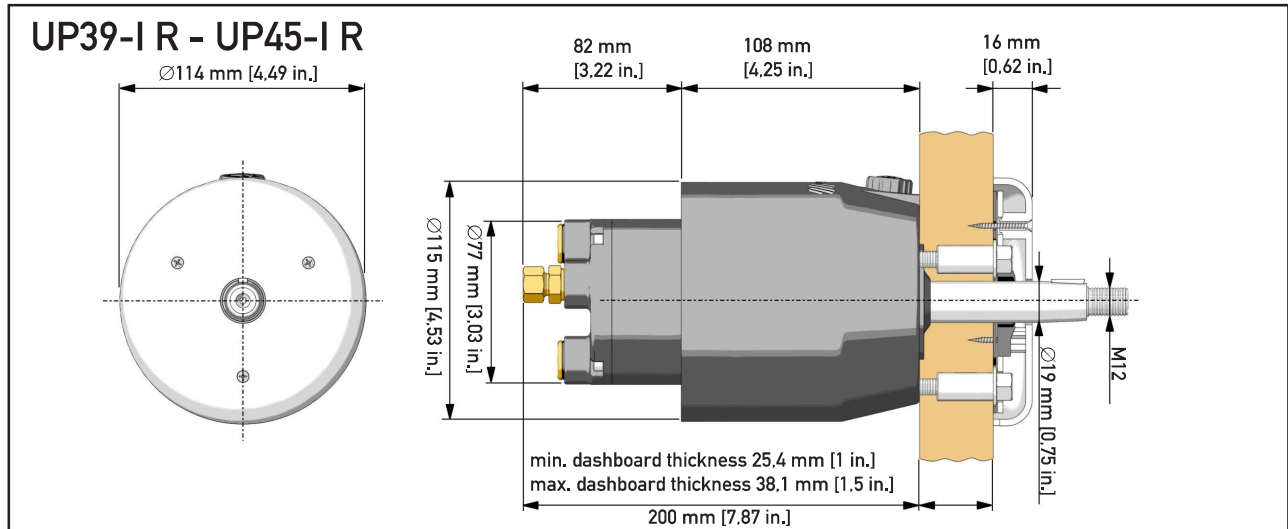
### ⚠ CAUTION

The release pressure of the pressure relief valves does not correspond to the system normal pressure but it represents only the use limits.

## UP28 R - UP33 R - UP39 R - UP45 R



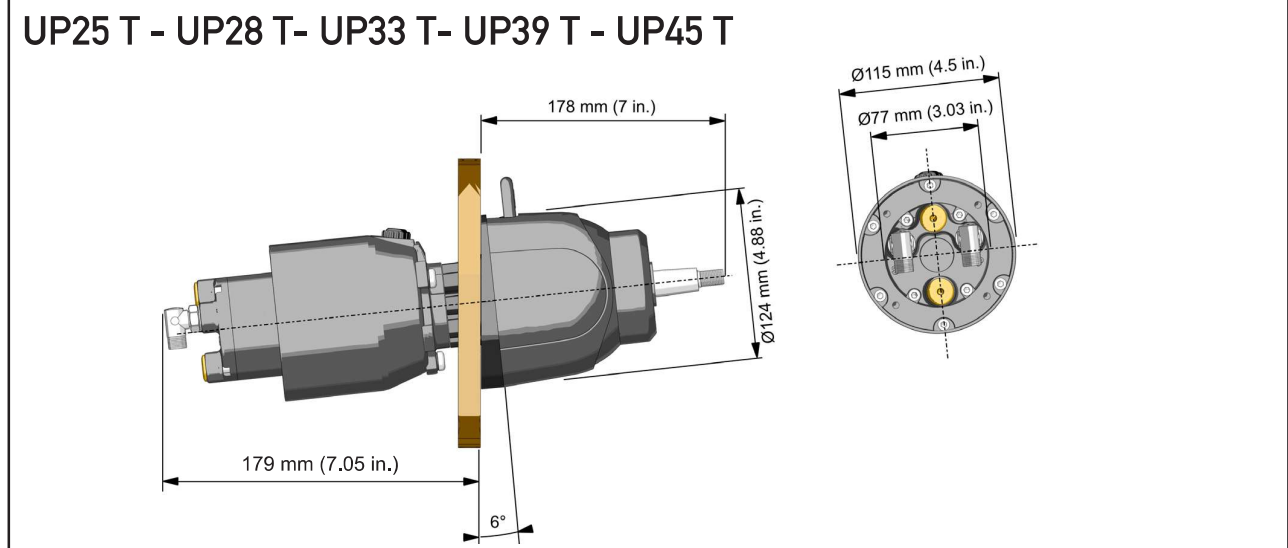




SPECIFICATIONS	PUMP UP25 T	PUMP UP28 T	PUMP UP33 T	PUMP UP39 T	PUMP UP45 T
Capacity	25 cc/rev. - 1.5 cu.in/rev.	28 cc/rev. - 1.7 cu.in/rev.	33 cc/rev. - 2.0 cu.in/rev.	39 cc/rev. - 2.4 cu.in/rev.	45 cc/rev. - 2.7 cu.in/rev.
Pressure relief valve release pressure	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)	70 bar (1000 psi)
No. of pistons	5	5	7	7	7
Max. steering wheel diameter	406 mm (16 in.)	406 mm (16 in.)	406 mm (16 in.)	406 mm (16 in.)	406 mm (16 in.)
Max. steering wheel height	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)	152 mm (6 in.)
Weight	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)	5 kg (11 lbs)
Oil	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex	OIL 15 Uflex

### ⚠ CAUTION

The release pressure of the pressure relief valves does not correspond to the system normal pressure but it represents only the use limits.



### ⚠ CAUTION

The pumps UP25 T - UP28 T - UP33 T - UP39 T - UP45 T can only be used with tilt **UFLEX X82** (supplied separately).

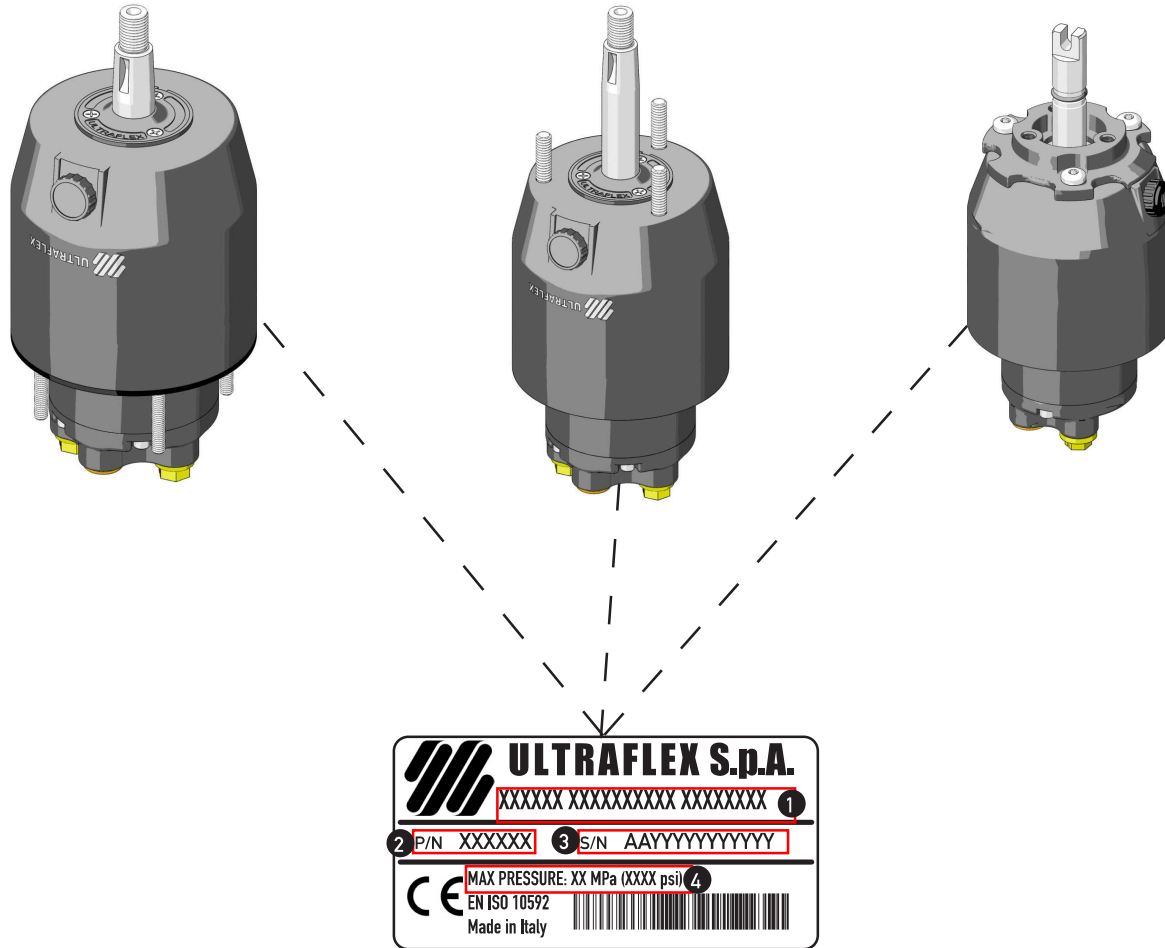


## 1.6 Marking and safety stickers

The **CE** conformity plate is positioned on the pump. 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 pumps UP25-UP28-UP33-UP39-UP45 weight with their packaging is 5kg (11 pounds) and so they can be handled manually.

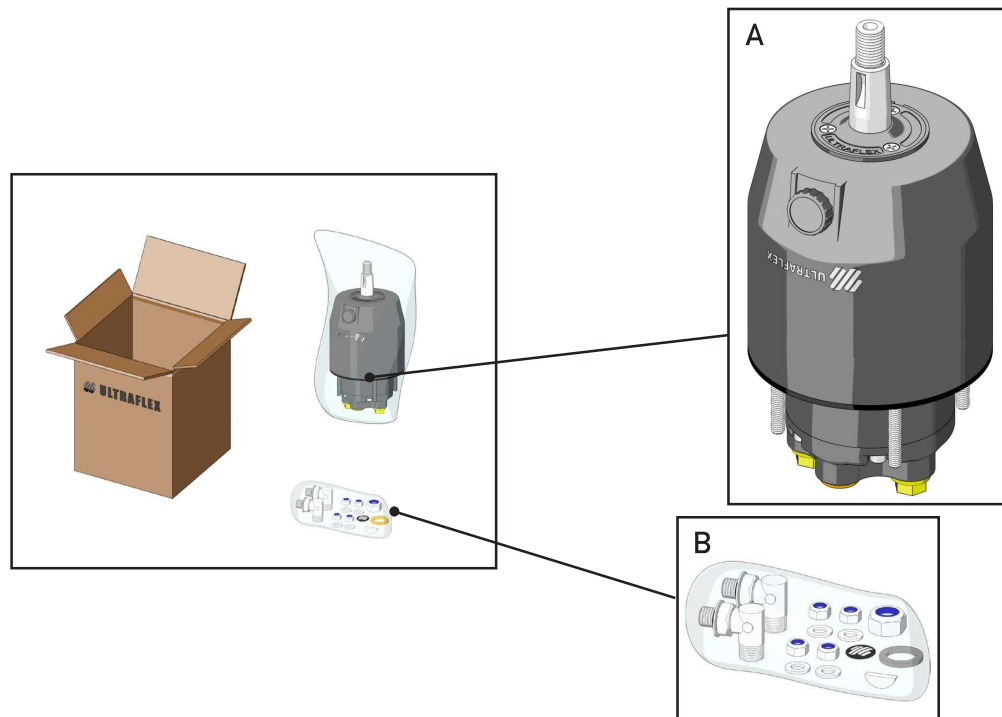
#### WARNING

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. 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.

**UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F**



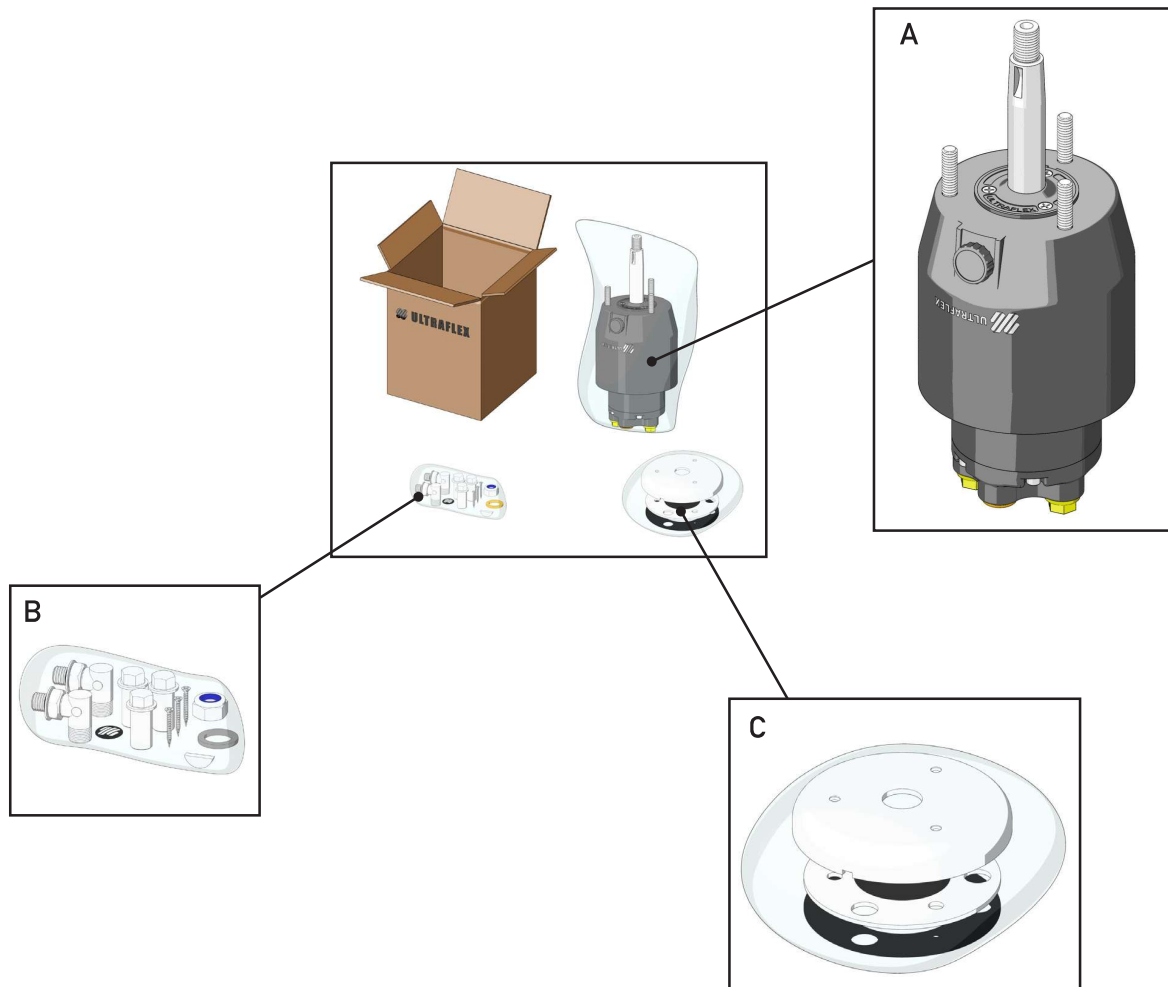
THE STANDARD PACKAGING CONTAINS:

A ) No.1 pump UP25 F or UP28 F or UP33 F or UP39 F or UP45 F or UP25NV F or UP33NV F with gaskets to fix it to the instrument panel.

B ) No. 2 90° swinging unions to connect the Kit OB hoses (supplied separately);

- No. 4 nuts for fixing the pump to the dashboard;
- No. 4 washers for fixing the pump to the dashboard;
- No. 1 nut for steering wheel tightening;
- No. 1 washer for steering wheel tightening;
- No. 1 key for steering wheel tightening;
- No. 1 label for plug.

## UP28 R - UP33 R - UP39 R - UP39-I R- UP45 R - UP45-I R



### THE STANDARD PACKAGING CONTAINS:

A ) No. 1 pump UP28 R or UP33 R or UP39 R or UP39-I R or UP45 R or UP45-I R.

B ) No. 2 90° swinging unions (except pumps UP39-I R and UP45-I R) to connect the Kit OB hoses (supplied separately);  
 No. 3 special screws for fixing the pump to the dashboard;  
 No. 3 self-tapping screw for hub-cap fixing;  
 No. 1 nut for steering wheel tightening;  
 No. 1 washer for steering wheel tightening;  
 No. 1 key for steering wheel tightening;  
 No. 1 label for plug;

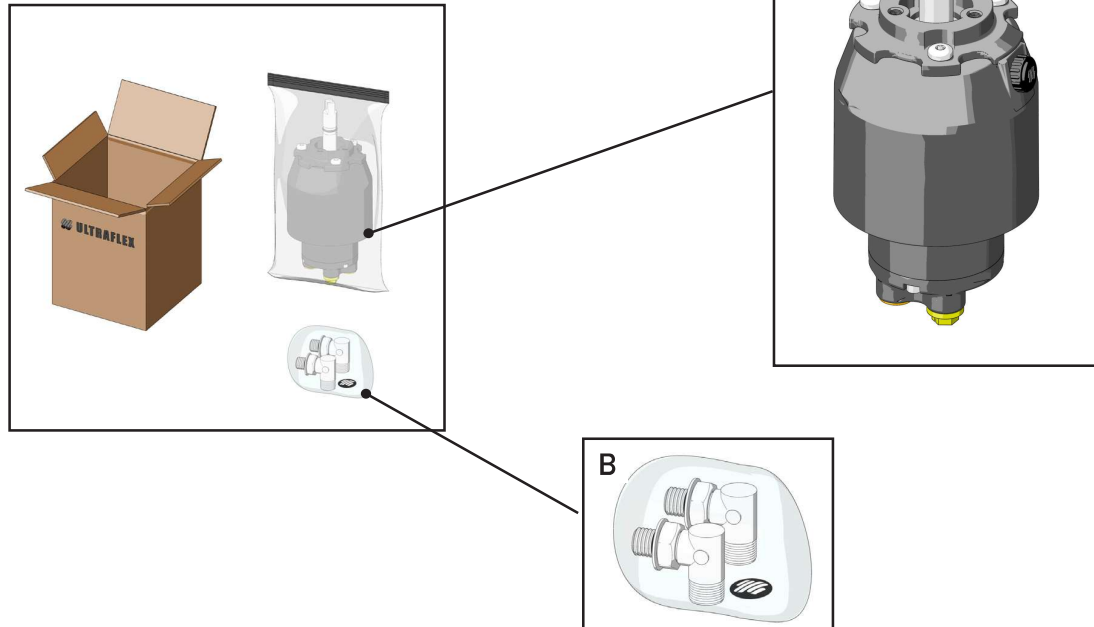
C) No. 1 gasket;  
 No. 1 flange;  
 No. 1 hub-cap.

### NOTICE

Versions UP39-I R and UP45-I R are supplied with a special 1/4 NPT straight union for Ø 12 mm metal pipe.



## UP25 T - UP28 T - UP33 T - UP39 T - UP45 T



### THE STANDARD PACKAGING CONTAINS:

A ) n°1 pump UP25 T or UP28 T or UP33 T or UP39 T or UP45 T.

B ) n°2 90° swinging unions to connect the Kit OB hoses (supplied separately);  
 n°1 label for plug.

### CAUTION

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

## 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 which will prove the modification. Any replacement or unauthorised addition can compromise the equipment performances, reliability and safety.
- 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.

#### 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.
- 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 injected, by causing the system fail.
- During the system installation, prevent foreign matters from entering the system. Even a little object may cause lasting damage that are not detected immediately.
- Avoid too narrow bend radius of hoses.
- Avoid the hose contact with edges or sharp corners.
- Avoid the hose contact with heat sources.
- During installation, inspection or maintenance, IT IS STRICTLY FORBIDDEN to wear necklaces, bracelets or clothes which could get caught in the moving parts.

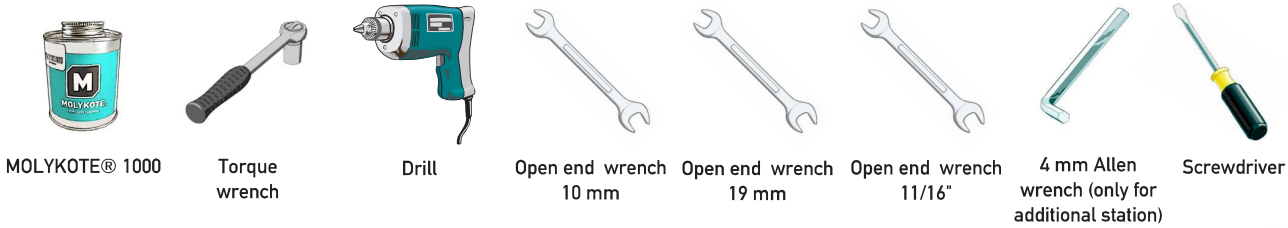


**NOTICE**

- 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 and of leaks from the hydraulic and mechanical components by submitting the system to a precise test pressure for about 60 seconds.



## 3.2 Tools necessary for the installation of pumps UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F



## 3.3 Pump UP25 F - UP28 F - UP33 F - UP39 F - UP45 F - UP25NV F - UP33NV F installation

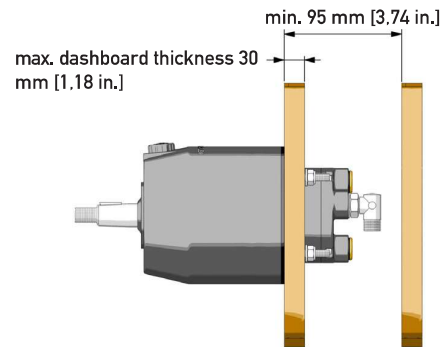
### NOTICE

Unless expressly stated, for the tightening torques consider a tolerance of  $\pm 5\%$  as to the value indicated.

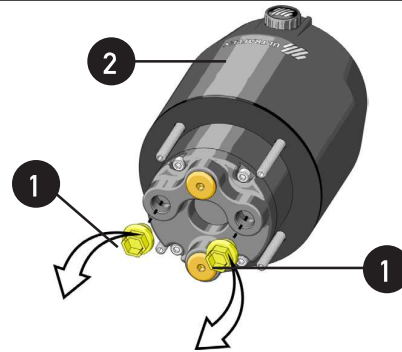
- 1 Select a suitable place for the steering station. Make sure that there is enough manoeuvring space for the steering wheel and for the steering pump and its pipes and fittings.

### ⚠ WARNING

In order to fix the pump properly, the maximum dashboard thickness must be 30 mm [1.18 in.]. Different thicknesses could compromise the driving safety. Make sure that the breaking ring of the 4 self-locking nuts supplied is engaged by the dowel thread.



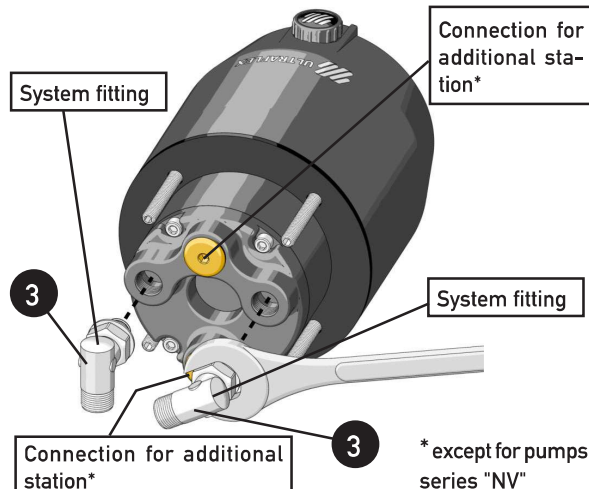
- 2 Remove the plugs (1) from the pump (2) by using a screwdriver.



- 3 Screw the nuts completely on the corresponding 90° unions (3). Fit and screw the unions manually as indicated in the picture until they are inserted completely. Turn them until they are positioned correctly with respect to the pipes by unscrewing them no more than one revolution, then tighten the nuts with a 11/16" Allen wrench with a torque of 17,6 Nm (13 lb ft) until the washer touches the nut.

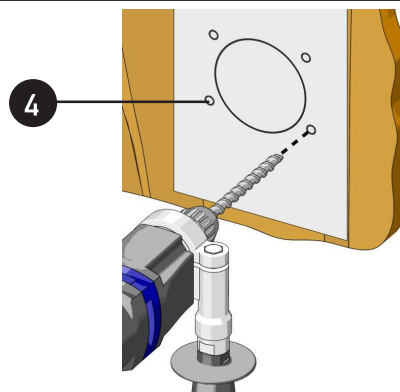
### ⚠ WARNING

DO NOT USE teflon tape or adhesive tape.  
DO NOT PUT any thread sealant like Loctite 542 or similar products.





- 4** By using the proper template supplied with this manual, make the holes (4) required by the installation in the suitable position on the dashboard.



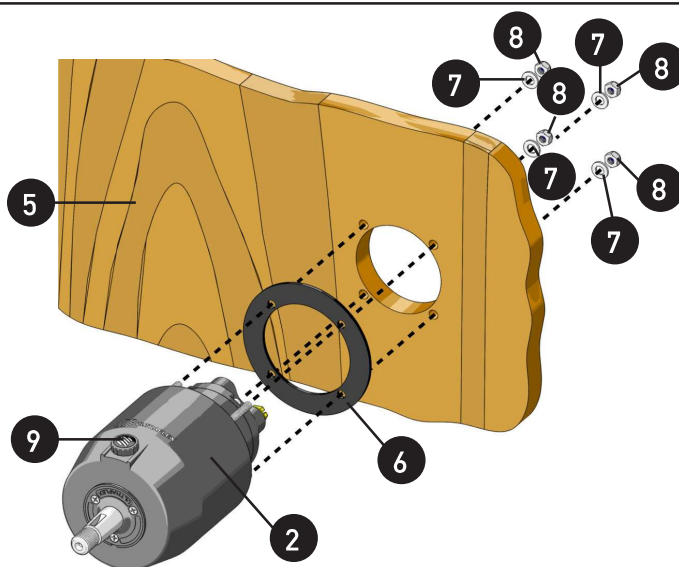
- 5** Position the pump (2) on the dashboard front side (5) interposing the gasket (6) and fix it by inserting the 4 washers (7) and by tightening the 4 self-locking nuts (8) with a 10 mm wrench and a torque of 10 Nm (7,4 lb-ft).

#### ⚠ CAUTION

If the self-locking nuts are disassembled (8), they must be replaced. (Contact our assistance service, see page 6).

#### ⚠ WARNING

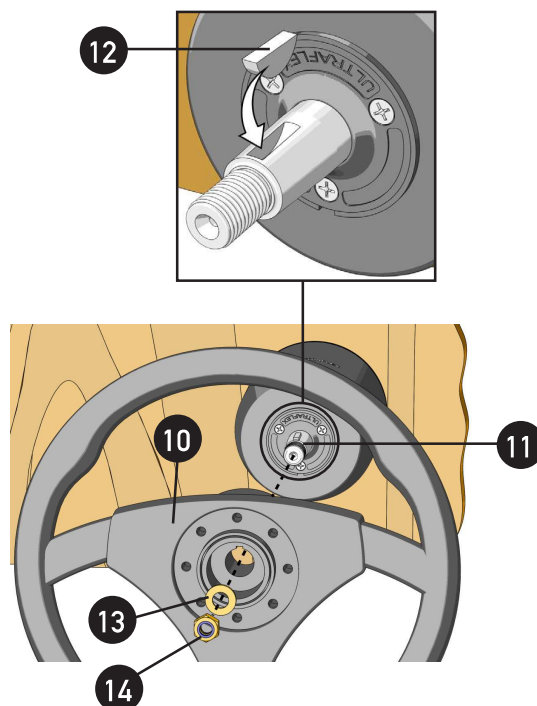
Install the pump by positioning the filling hole (9) towards the top (see the picture) for the right pump operation and to allow filling and purging the system completely (see par. 3.12).



- 6** Position the steering wheel supplied separately (10) on the pump shaft (11) by using the suitable key (12). Insert the washer (13) and tighten the self-locking nut (14) with a 19 mm 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 (14) is disassembled, it must be replaced. (Contact our assistance service, see page 6).



### 3.4 Tools necessary for the installation of pumps UP28 R - UP33 R - UP39 R - UP45 R



MOLYKOTE® 1000



Torque wrench



Drill



Screwdriver


 Open end wrench  
13 mm

 Open end wrench  
19 mm

 Open end wrench  
11/16"

### 3.5 Pump UP28 R - UP33 R - UP39 R - UP45 R installation



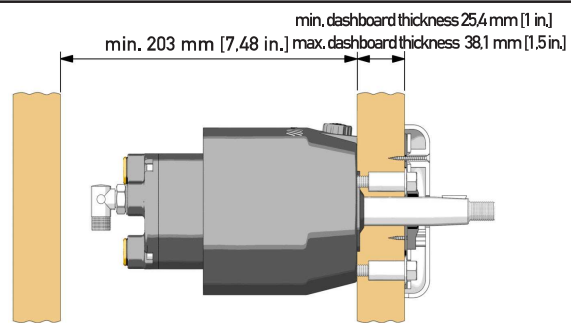
#### NOTICE

Unless expressly stated, for the tightening torques consider a tolerance of  $\pm 5\%$  as to the value indicated..

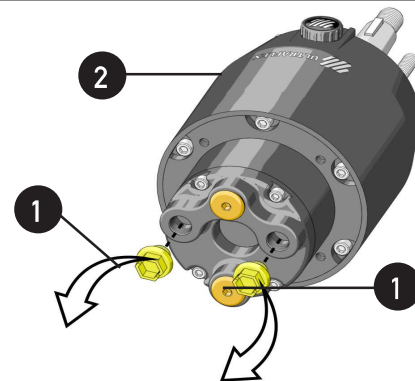
- 1 Select a suitable place for the steering station. Make sure that there is enough manoeuvring space for the steering wheel and for the steering pump and its pipes and fittings.

#### ⚠ WARNING

In order to fix the pump properly, the minimum dashboard thickness must be 25.4 mm [1 in.] and the maximum dashboard thickness must be 38.1 mm [1.5 in.]. Different thicknesses could compromise the driving safety.



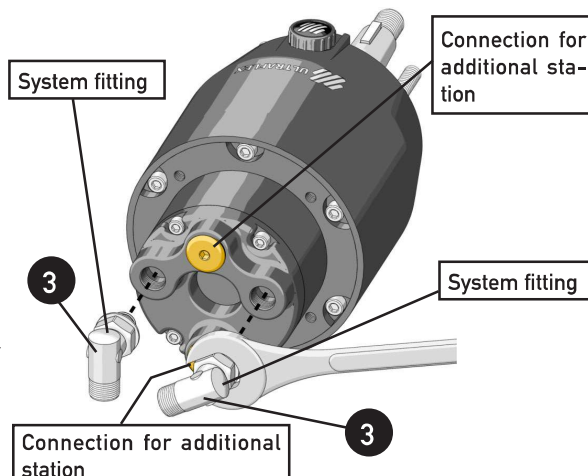
- 2 Remove the plugs (1) from the pump (2) by using a screwdriver.



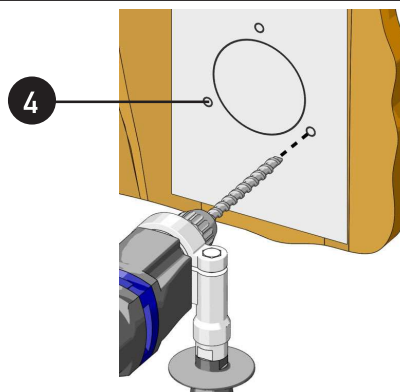
- 3 Screw the nuts completely on the corresponding 90° unions (3). Fit and screw the unions manually as indicated in the picture until they are inserted completely. Turn them until they are positioned correctly with respect to the pipes by unscrewing them no more than one revolution, then tighten the nuts with a 11/16" Allen wrench with a torque of 17,6 Nm (13 lb ft) until the washer touches the nut.

#### ⚠ WARNING

DO NOT USE teflon tape or adhesive tape.  
DO NOT PUT any thread sealant like Loctite 542 or similar products.



- 4** By using the proper template supplied with this manual, make the holes required by the installation in the suitable position on the dashboard.



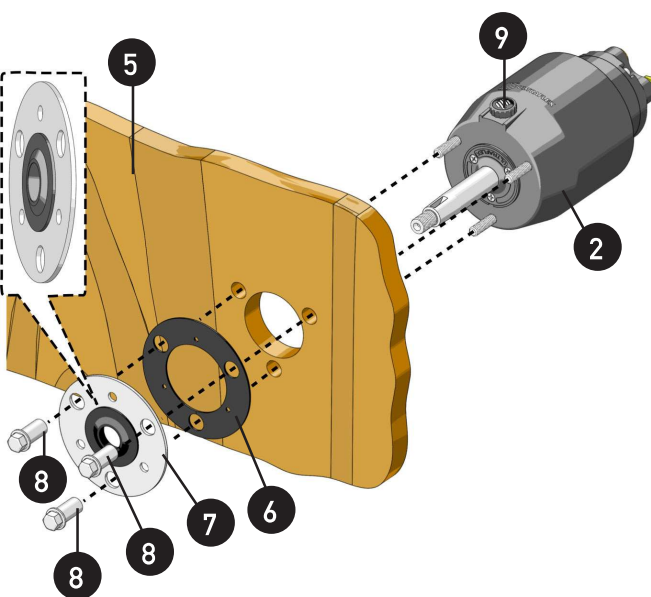
- 5** Position the pump (2) on the dashboard rear side (5). Then position the gasket (6) as shown in the picture and the flange (7) with the protective projecting part towards the dashboard outside. Fix the pump (2) with the 3 special screws (8) with a torque of 25 Nm (18.5 lb-ft).

**⚠ CAUTION**

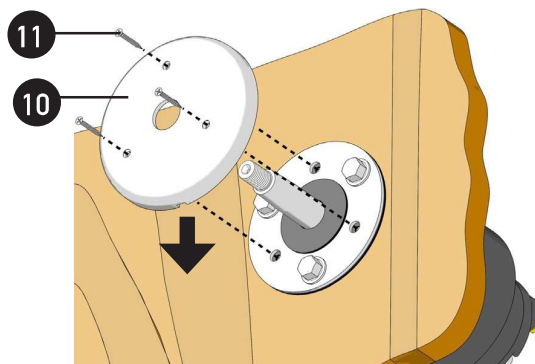
Make the shaft pass through the flange equipped with gasket by preventing the key seat from damaging the gasket itself.

**⚠ WARNING**

Install the pump by positioning the filling hole (9) towards the top (see the picture) for the right pump operation and to allow filling and purging the system completely (see par. 3.12).



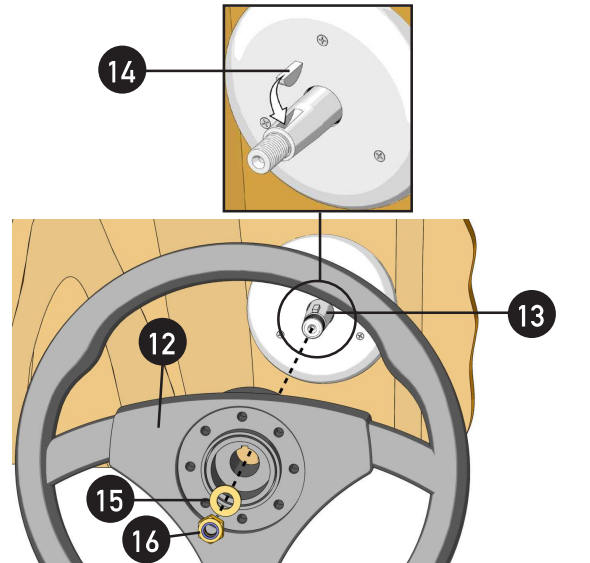
- 6** Position the plastic hub-cap (10) with the water discharge towards the bottom and fix it with the 3 self-tapping screws (11) supplied with a 1,5Nm (1,13 lb-ft) torque.



- 7** Position the steering wheel supplied separately (12) on the pump shaft (13) by using the suitable key (14). Insert the washer (15) and tighten the self-locking nut (16) with a 19 mm 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 (16) is disassembled, it must be replaced. (Contact our assistance service, see page 6).



## 3.6 Tools necessary for the installation of pumps UP39-I R - UP45-I R



Loctite  
542/545



MOLYKOTE® 1000



Torque  
wrench



Drill



Screwdriver



Open end wrench  
13 mm



Open end wrench  
19 mm



Open end wrench  
7/16"

## 3.7 Pumps UP39-I R - UP45-I R installation

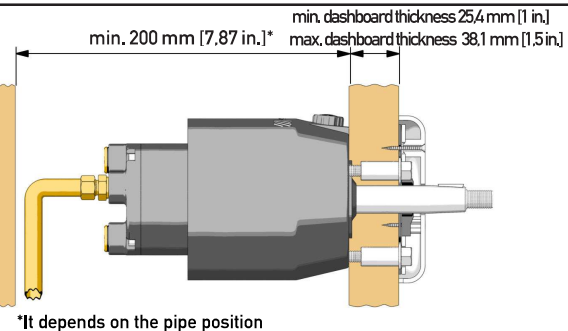
### NOTICE

Unless expressly stated, for the tightening torques consider a tolerance of  $\pm 5\%$  as to the value indicated.

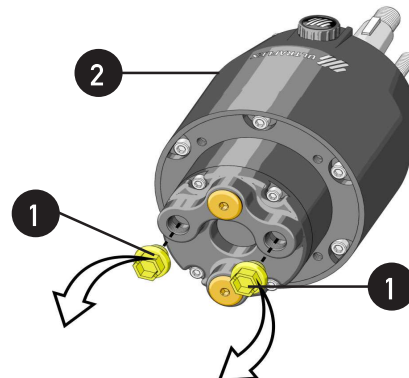
- 1** Select a suitable place for the steering station. Make sure that there is enough manoeuvring space for the steering wheel and for the steering pump and its pipes and fittings.

### ⚠ WARNING

In order to fix the pump properly, the minimum dashboard thickness must be 25.4 mm [1 in.] and the maximum dashboard thickness must be 38.1 mm [1.5 in.]. Different thicknesses could compromise the driving safety.



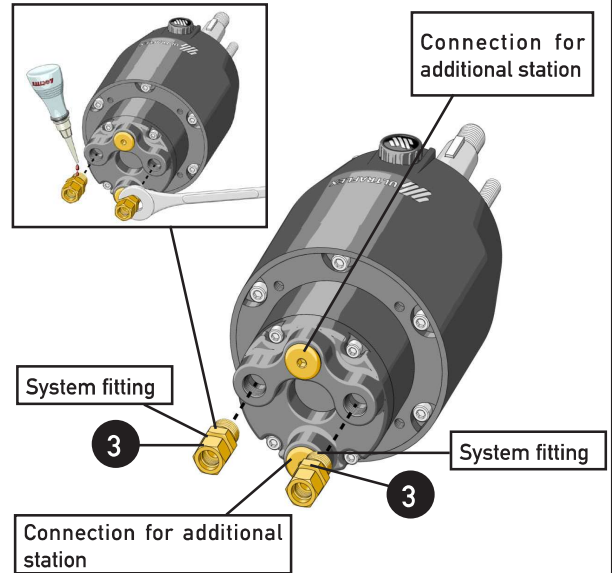
- 2** Remove the plugs (1) from the pump (2) by using a screwdriver.



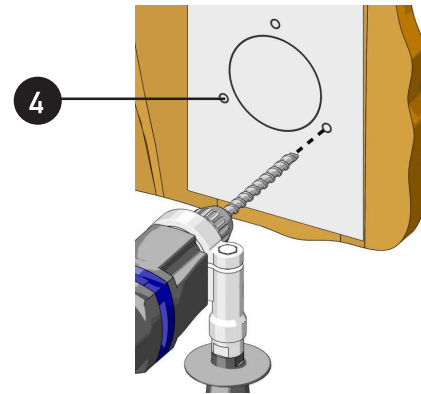
- 3** Put some fitting sealant type Loctite 542 or Loctite 545 on the thread. Fit and screw manually the conical fittings (3) until they are completely inserted; then tighten them with a 7/16" open end wrench with a torque of 17.6 Nm (13 lb-ft).

**⚠ WARNING**

Do not use teflon tape or adhesive tape. Pay attention to the sealant positioning: if it is inserted into the system, it could block it and make it unusable.



- 4** By using the proper template supplied with this manual, make the holes required by the installation in the suitable position on the dashboard.



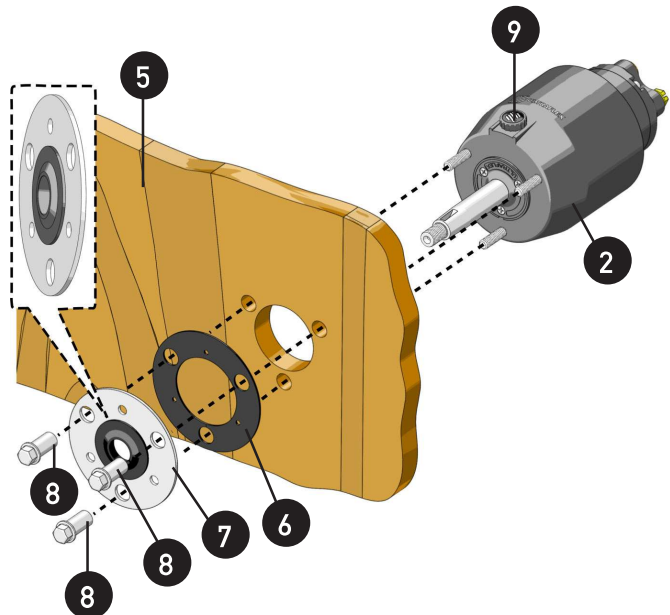
- 5** Position the pump (2) on the dashboard rear side (5). Then position the gasket (6) as shown in the picture and the flange (7) with the protective projecting part towards the dashboard outside. Fix the pump (2) with the 3 special screws (8) with a torque of 25 Nm (18.5 lb-ft).

**⚠ CAUTION**

Make the shaft pass through the flange equipped with gasket by preventing the key seat from damaging the gasket itself.

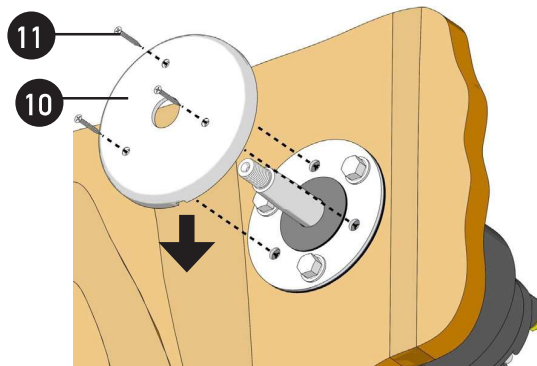
**⚠ WARNING**

Install the pump by positioning the filling hole (9) towards the top (see the picture) for the right pump operation and to allow filling and purging the system completely (see par. 3.12).





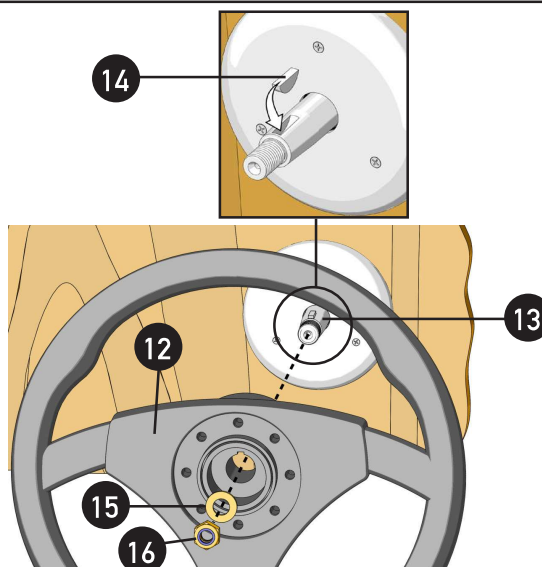
- 6** Position the plastic hub-cap (10) with the water discharge towards the bottom and fix it with the 3 self-tapping screws (11) supplied.



- 7** Position the steering wheel supplied separately (12) on the pump shaft (13) by using the suitable key (14). Insert the washer (15) and tighten the self-locking nut (16) with a 19 mm 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 (16) is disassembled, it must be replaced. (Contact our assistance service, see page 6).



## 3.8 Tools necessary for the installation of pumps UP25 T - UP28 T - UP33 T - UP39 T - UP45 T



Open end wrench  
11/16"



Screwdriver

\* The tools to assemble tilt X82 are listed in the manual enclosed to tilt X82.

## 3.9 Pump UP25 T - UP28 T - UP33 T - UP39 T - UP45 T installation



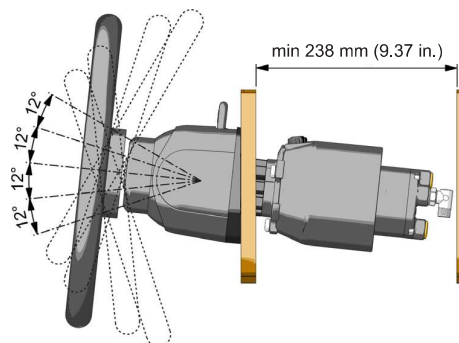
### NOTICE

Unless expressly stated, for the tightening torques consider a tolerance of  $\pm 5\%$  as to the value indicated.

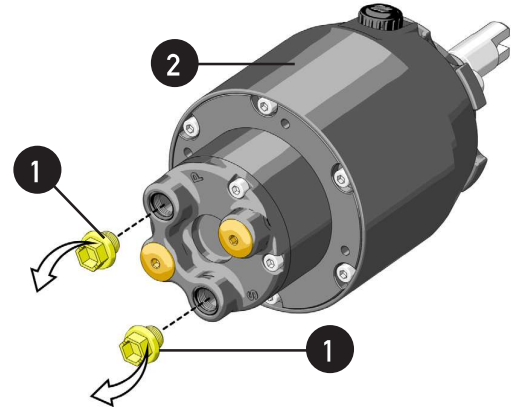
### ⚠ CAUTION

The tilt X82 mechanism is supplied separately.

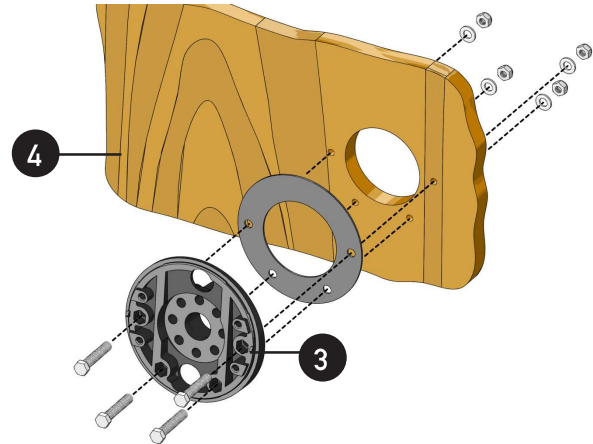
- 1** Select a suitable place for the steering station. Make sure that there is enough manoeuvring space for the steering wheel and for the steering pump and its pipes and fittings.



- 2** Remove the plugs (1) from the pump (2) by using a screwdriver.



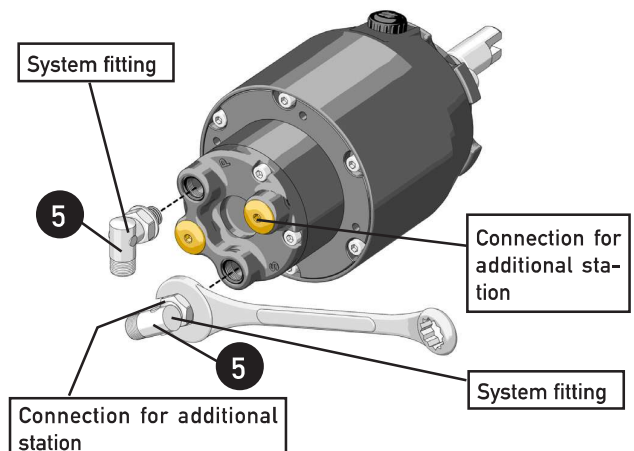
- 3** Fix the bracket (3) supplied with tilt X82 to the dashboard (4) by following the instructions enclosed to tilt X82.



- 4** Screw the nuts completely on the corresponding 90° unions (3). Fit and screw the unions manually as indicated in the picture until they are inserted completely. Turn them until they are positioned correctly with respect to the pipes by unscrewing them no more than one revolution, then tighten the nuts with a 11/16" Allen wrench with a torque of 17,6 Nm (13 lb ft) until the washer touches the nut.

**⚠ WARNING**

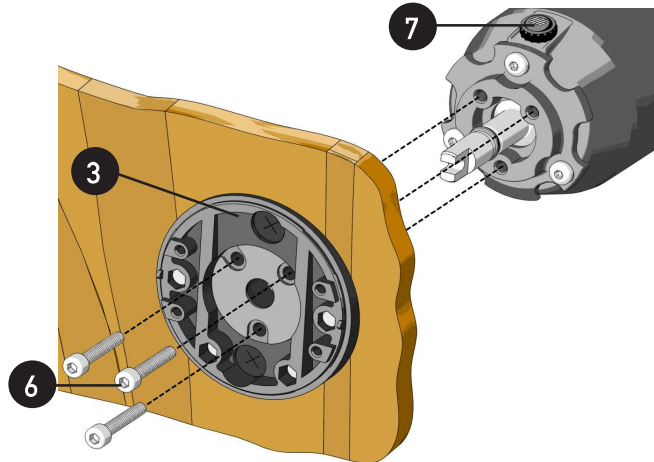
DO NOT USE teflon tape or adhesive tape.  
 DO NOT PUT any thread sealant like Loctite 542 or similar products.



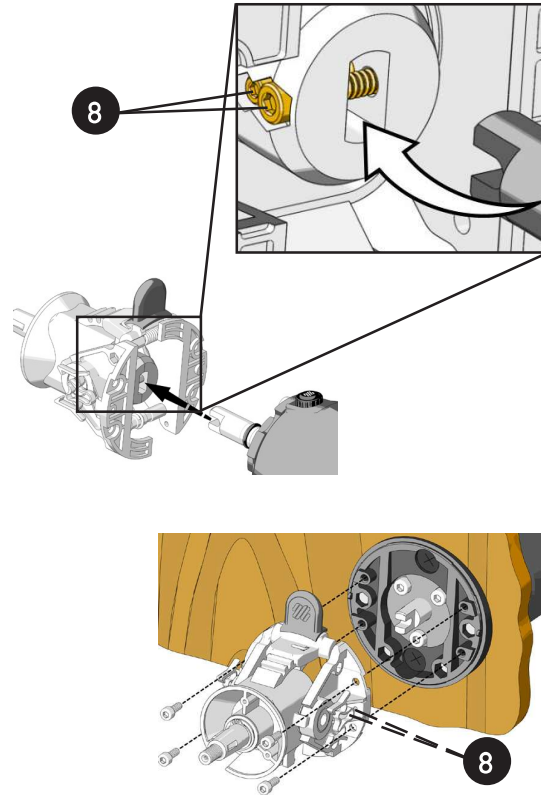
- 5 Fix the pump to the bracket (3) supplied with tilt X82 by using the 3 M8 screws (6) supplied with tilt X82 according to the instructions enclosed to tilt X82.

**⚠ WARNING**

Install the pump by positioning the filling hole (7) towards the top (see the picture) for the right pump operation and to allow filling and purging the system completely (see par. 3.12).



- 6 Align and insert the tilt universal joint into the pump shaft by loosening about 1-1.5 turns the screws (8) on the universal joint itself always according to the procedure described in the installation manual supplied with tilt X82. Retighten the screws (8) and fix the tilt.



**NOTICE**

The kit **UFLEX** supplied separately (see the corresponding instructions) can be used on pumps UP28 R-UP33 R-UP39 R - UP39-I R - UP45 R - UP45-I R and UP25 T-UP28 T-UP33 T-UP39 T - UP45 T to simplify the hydraulic system filling and purging.





### 3.10 Types of installation

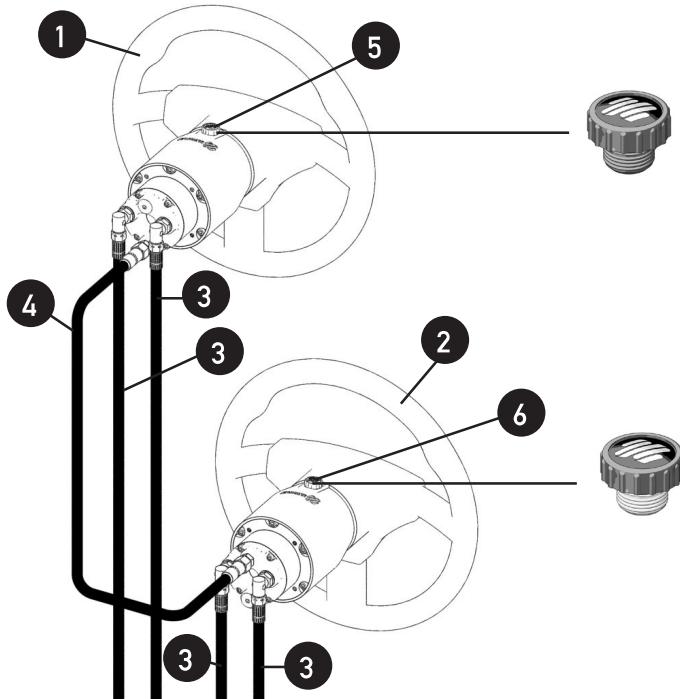


The pumps UP25-UP28-UP33-UP39-UP45 can be installed in a single or dual station (except the pumps series "NV") and they can be used with different types of front mount, side or inboard cylinder configurations. The pumps series "NV" cannot be used with unbalanced cylinders.

#### ⚠ CAUTION

Connect hoses as shown in the installation and maintenance manual of the corresponding hydraulic cylinders.

MODELS UP 25 F-R-T, UP 28 F-R-T, UP 33 F-R-T, UP 39 F-R-T, UP 45 F-R-T

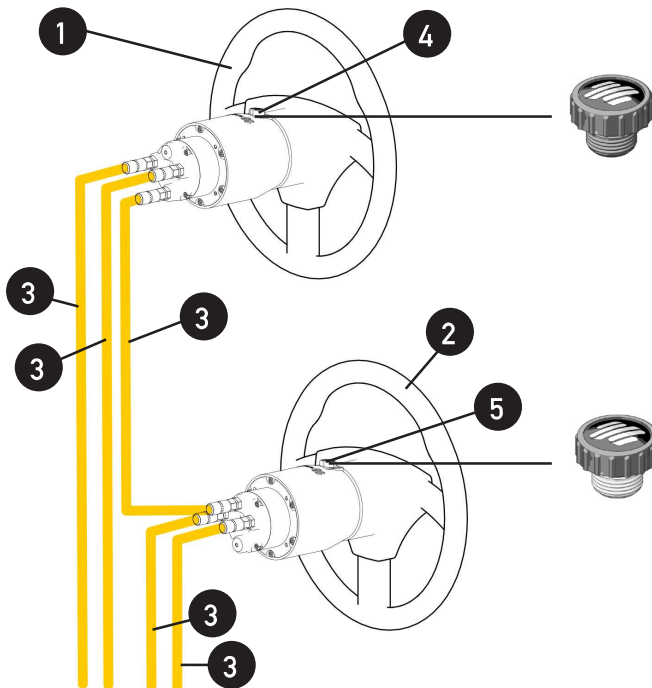


1. main steering station
2. additional steering station (not usable with pumps series "NV")
3. kit OB
4. 3/8" pipe included kit OB-2S
5. vent plug (black plug)
6. plug without vent (grey plug)

#### NOTICE

Kit OB-2S is supplied separately in case of applications with double station.

MODELS UP39-I R and UP 45-I R



1. main steering station
2. additional steering station (not usable with pumps series "NV")
3. rigid metal pipe
4. vent plug (black plug)
5. plug without vent (grey plug)

#### NOTICE

Kit OB 120 U-2S is supplied separately in case of applications with double station.



## 3.11 Hose connection to the system

### 3.11.1 Hose connection to the system for models UP 25 F-R-T, UP 28 F-R-T, UP 33 F-R-T, UP 39 F-R-T, UP 45 F-R-T



- 1 Connect the hydraulic hoses **UFLEX** kit OB (supplied separately) joining the pump and the cylinder by following the instructions given in the installation manual of the kit OB.
- 2 If one or more additional steering stations are installed (except the pumps series "NV"), use the kit OB-2S by following the suitable instructions.

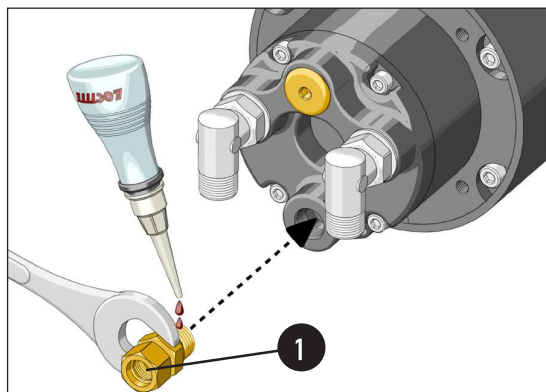
Position 3/8" straight unions (1) on the pumps as indicated in the picture.

Put some fitting sealant type Loctite 542 or Loctite 555 on the thread. Fit and screw manually the fittings (1) until they are completely inserted; then tighten them with a 7/16" open end wrench with a torque of 17.6 Nm (156 lb-ft).

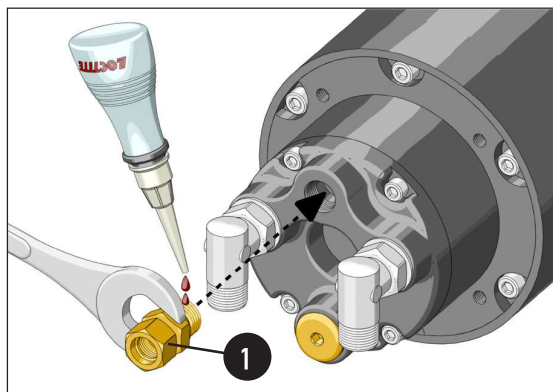
#### WARNING

Do not use teflon tape or adhesive tape. Pay attention to the sealant positioning: if it is inserted into the system, it could block it and make it unusable.

MAIN STEERING STATION

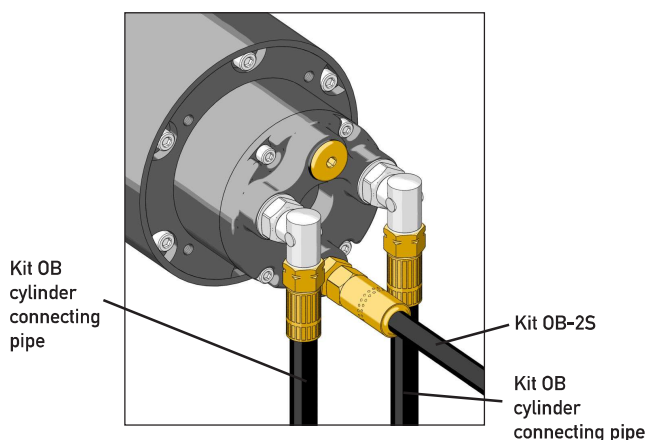


ADDITIONAL STEERING STATION

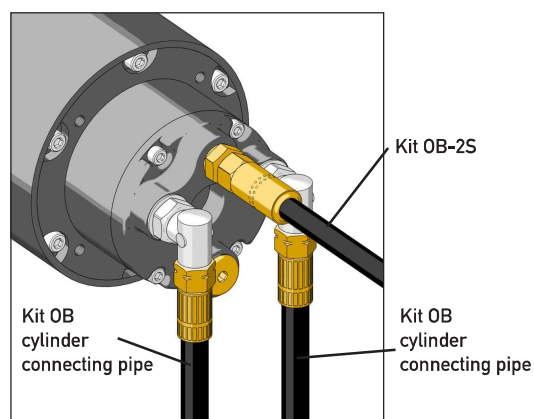


- 3 Connect pipes as shown in picture following the manual instructions.

MAIN STEERING STATION



MAIN STEERING STATION



**⚠ 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 Kit OB, he must take full responsibility for it.

**⚠ WARNING**

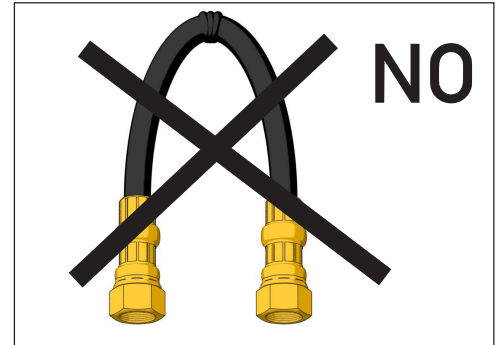
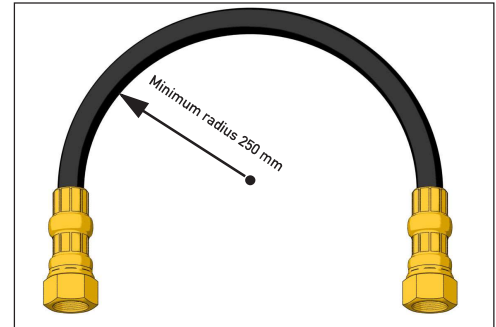
At the end of the installation make sure that the pipes do not interfere with the engine and with fixed or mobile parts of the boat or of the steering system itself.

**⚠ WARNING**

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

**NOTICE**

Unless expressly stated, for the tightening torques consider a tolerance of  $\pm 5\%$  as to the value indicated.





### 3.11.2 How to choose the rigid pipes for models UP39-I R and UP 45-I R

PIPE MATERIAL: STEEL	SPECIFICATIONS	STRUCTURE	CONDITIONS	TOLERANCE BETWEEN EXT. DIAM./ WALL THICKNESS	SURFACE	
St. 37.4 (=St 35.4, 1.0255)	DIN 2391/ DIN 1630	Cold-drawn without welding	NBK, DIN 2391-2	DIN 2391-1-C	Phosphated, lubricated or A3C (coated with zinc and yellow chromium- plated)	
E 235 (= 1.0308)	EN 10305-4		+N (=normal annealed)	EN 10305-4		
R37	ISO 3304		NBK (=normal annealed)	ISO 3304		
St 52.4 (= 1.0580)	DIN 2391		NBK, DIN 2391-2	DIN 2391-1		
E355 (= 1.0580)	EN 10305-4		+N (=normal annealed)	EN 10305-4		
R50	ISO 3304		NBK (=normal annealed)	ISO 3304		
PIPE MATERIAL: STAINLESS STEEL	SPECIFICATIONS	STRUCTURE	CONDITIONS	TOLERANCE BETWEEN EXT. DIAM./ WALL THICKNESS	SURFACE	
1.4571 (= TP 316 Ti)	DIN 2391	Cold-drawn without welding	Soft annealed DIN 17458	DIN 2391-1	Smooth	
1.4541 (= TP 321)			Soft annealed	D4/T3 (EN ISO 1127)		
1.4404 (= TP 316L)	Weld-in pipe					DIN 17457-K2 for 6-12 mm ext. diam., cold-drawn welded (CDW) with smooth external surface for 14-42 mm ext. diam.
1.4301 (= TP 304)						
1.4401 (= TP 316)		EN ISO 1127				
1.4301 (= TP 304)	Smooth, almost invisible welding					
1.4541 (= TP 321)						
PIPE MATERIAL: COPPER	SPECIFICATIONS	STRUCTURE	CONDITIONS	TOLERANCE BETWEEN EXT. DIAM./ WALL THICKNESS	SURFACE	
R 290	EN 1057	Weldless pipe	EN 1057	EN 1057	Clean and smooth	

#### NOTICE

This table is only indicative.

**UFLEX** cannot be held responsible for the pipe choice, since the installer must do this according to the operating pressure.

#### ⚠ WARNING

**UFLEX** UP Series pumps are provided with a valve protecting them against overpressure when the pressure is higher than about 70 bar (1000 PSI).

The references to the standards are updated at the date of issue of this document. The installer must make sure that there are no other updates.



### 3.11.3 Hose connection to the system for models UP39-I R and UP45-I R



- 1 Connect the rigid pipes ( 12 mm external diameter) to connect the pump to the cylinder.
- 2 If one or more additional steering stations are installed (except the pumps series "NV"), use the kit OB 120 U-2S by following the suitable instructions.

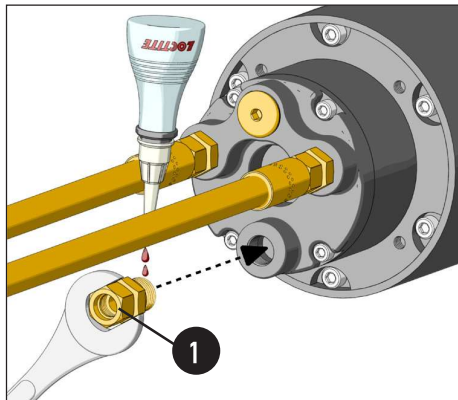
Position 3/8" straight unions (1) as indicated in the picture.

Put some fitting sealant type Loctite 542 or Loctite 545 on the thread. Fit and screw manually the fittings (3) until they are completely inserted; then tighten them with a 7/16" open end wrench with a torque of 17.6 Nm (13 lb-ft).

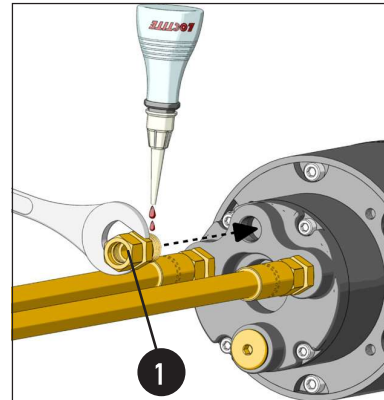
#### **⚠ WARNING**

Do not use teflon tape or adhesive tape. Pay attention to the sealant positioning: if it is inserted into the system, it could block it and make it unusable.

MAIN STEERING STATION

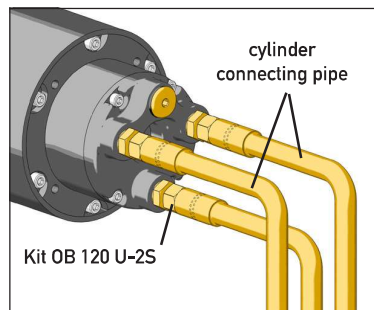


ADDITIONAL STEERING STATION

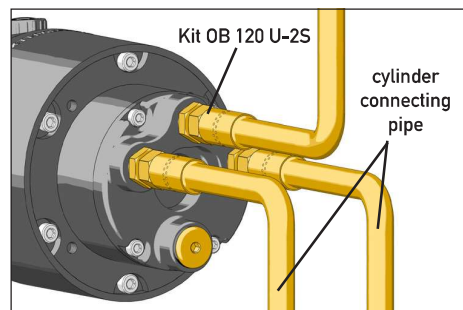


- 3 Connect pipes as shown in picture and tighten them with a proper torque according to the pipe manufacturer specifications.

MAIN STEERING STATION



ADDITIONAL STEERING STATION



#### **NOTICE**

Kit OB 120 U-2S is supplied separately for applications with double station and it includes all the necessary unions for 12 mm copper pipe.

The copper pipe must be bought separately.

#### **⚠ DANGER**

The unions assembled on the pump are NOT swinging. If they are unscrewed they get broken and the pump cannot be used anymore.

#### **NOTICE**

The rigid pipe assembly (cutting, bending and bulkhead passage) must be carried out by skilled staff according to the manufacturer's instructions. In case of copper or steel pipes flushing is compulsory.



### 3.12 Filling and purging



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

#### CAUTION

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

#### WARNING

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

#### DANGER

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

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.



### 3.12.1 Positioning of the oil bottle

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

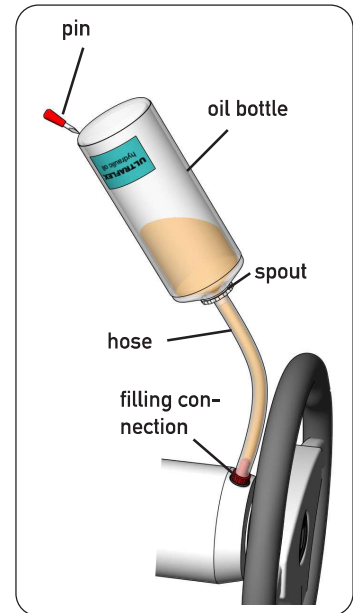
- Remove the pump cap and insert the fittings.
- Attach the spout to a new bottle of hydraulic oil and connect the hose to the fittings and the bottle spout.
- Turn the bottle upside down and pierce it with the pin, as shown in the picture, to ease the oil passage towards the pump. Fill the pump until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

#### ⚠ WARNING

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

#### ⚠ CAUTION

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



### 3.12.2 Purging procedure

#### NOTICE

Carry out the purging procedure as indicated in the installation and maintenance manual of the cylinder used. Then check that the oil level is suitable by turning 1/2 turn the steering wheel and by making the oil come out of the bleed valve. Close the valve and check the system.

### 3.13 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, making sure that there is no movement of the cylinder body on the main cylinder shaft.

If the cylinder body moves too much, there is still air in the system. The air presence in the system can cause bad responses to the controls and so it can cause damage, injuries or death.

#### ⚠ WARNING

Check the system response by moving the pump.

#### ⚠ DANGER

After 24 hours repeat the purging and make sure there are no leaks.



## 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 in paragraph 3.11.  
Check the mechanical components are not damaged and worn out.
- 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 System operation

##### **WARNING**

Never start and use the system if any component does not work correctly: this may result in a loss of control causing impacts and/or capsizing of the boat with material damage and physical injuries that could lead to death..

##### **WARNING**

While the boat is moving, avoid moving from one steering station to the other one. Put the engine in neutral position and wait until the boat stops.





## 5 MAINTENANCE

### 5.1 Ordinary maintenance

#### **⚠ WARNING**

Poor installation and maintenance may result in loss of steering and cause property damage and/or personal injury. Maintenance requirements change according to climate, frequency and the use. Inspections are necessary at least every year and must be carried out by specialized marine mechanics. Check the cylinder fittings and the seals and the helm gaskets to prevent leaks. Replace them if necessary.

To keep a suitable oil level in the tank, fill and bleed the system as described in this manual in paragraph 3.12 and in the bleeding procedure of **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 compatible hydraulic oils, indicated in the paragraph "technical features" and "filling and purging". Do not use brake oils or automatic transmission fluid (ATF) in any case.

#### **⚠ CAUTION**

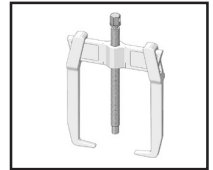
If the self-locking nuts are disassembled, they must be replaced. (Contact our assistance service, see page 6).

### 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 work 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 becomes completely jammed.	<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>  <b>DANGER</b> The damaged hose must be replaced, otherwise it may cause loss of steering and severe personal injury or property damage.
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>Air in the system.</li> </ul>	<ul style="list-style-type: none"> <li>Repeat the filling and the bleeding procedure of the system.</li> <li>Install horizontally the hoses and in any case with a maximum inclination of 3 cm each meter.</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>
	<ul style="list-style-type: none"> <li>Coiled hose.</li> </ul>	<ul style="list-style-type: none"> <li>Uncoil and straighten the hose.</li> </ul>
	<ul style="list-style-type: none"> <li>Helm has been mounted upside down.</li> </ul>	<ul style="list-style-type: none"> <li>Mount the helm with the filling hole in up position.</li> </ul>
The steering system is stiff and hard to turn, even when the boat is not moving.	<ul style="list-style-type: none"> <li>Restrictions in hoses or fittings.</li> </ul>	<ul style="list-style-type: none"> <li>Look for and remove the restriction.</li> </ul>
	<ul style="list-style-type: none"> <li>Air in oil</li> </ul>	<ul style="list-style-type: none"> <li>Repeat the filling and the bleeding procedure of the system.</li> </ul>
The steering system is stiff and hard to turn, even when the boat is not moving.	<ul style="list-style-type: none"> <li>Wrong oil has been used.</li> </ul>	<ul style="list-style-type: none"> <li>Drain the filling and bleeding system.</li> </ul>  <b>WARNING</b> <b>UFLEX</b> is not responsible for damage caused by fluids that are not recommended in this manual and so the warranty is cancelled.
The steering system is stiff and hard to turn, even when the boat is not moving, if unbalanced cylinders are used.	<ul style="list-style-type: none"> <li>Dirt in the valve.</li> </ul>	 <b>WARNING</b> Do not use the boat and contact a specialized technician for the valve cleaning.

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



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**UFLEX USA**

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