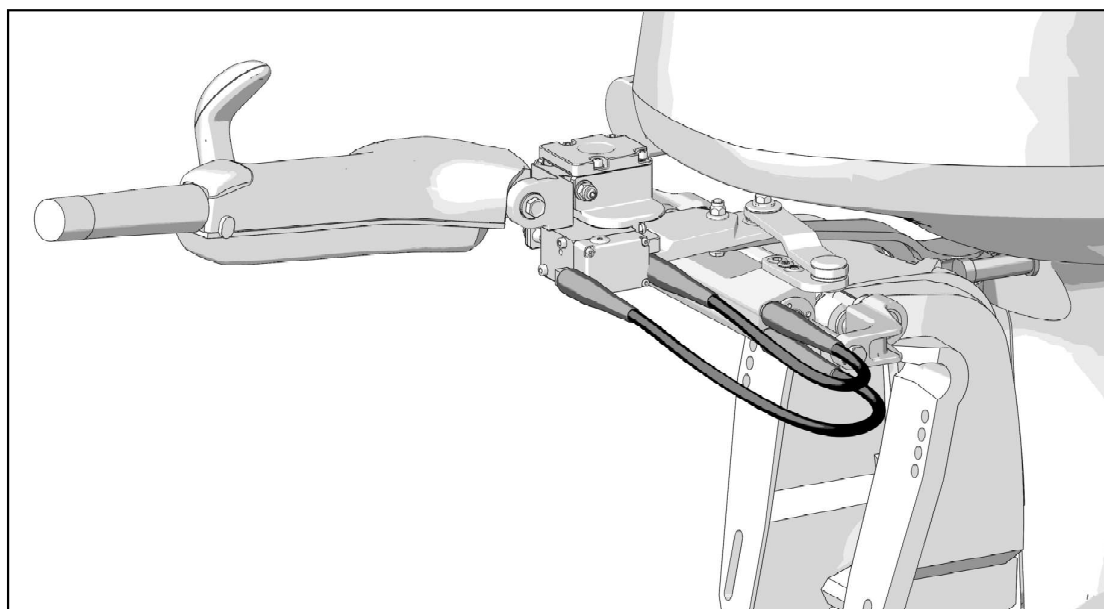

Installation manual

ZTF TILLER SYSTEM





Dear Customer,

The ZTF tiller systems is produced by **UFLEX**, a member of the **ULTRAFLEX GROUP**. **ULTRAFLEX GROUP** has been a leader in marine steering systems for recreational and commercial for more than 85 years.

Our products are designed and manufactured to offer the best performance when installed and used properly.

Carefully read this manual to ensure proper installation and use of your ZTF Tiller System.

Service should be performed only by experienced and skilled marine technicians.



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DOCUMENT REVISIONS

Rev.	Date	Revision description
0	25/01/2019	First edition

MANUAL USE AND SYMBOLS USED

THE INSTALLATION AND MAINTENANCE MANUAL is the document going with 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 icons are used to ensure the user safety and to guarantee the correct operation of the product:

 **DANGER**



Immediate hazards which CAUSE severe personal injury or death.

 **WARNING**



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

 **CAUTION**



Hazards or unsafe practices which COULD CAUSE minor injury or damage to the craft or components or to the environment.

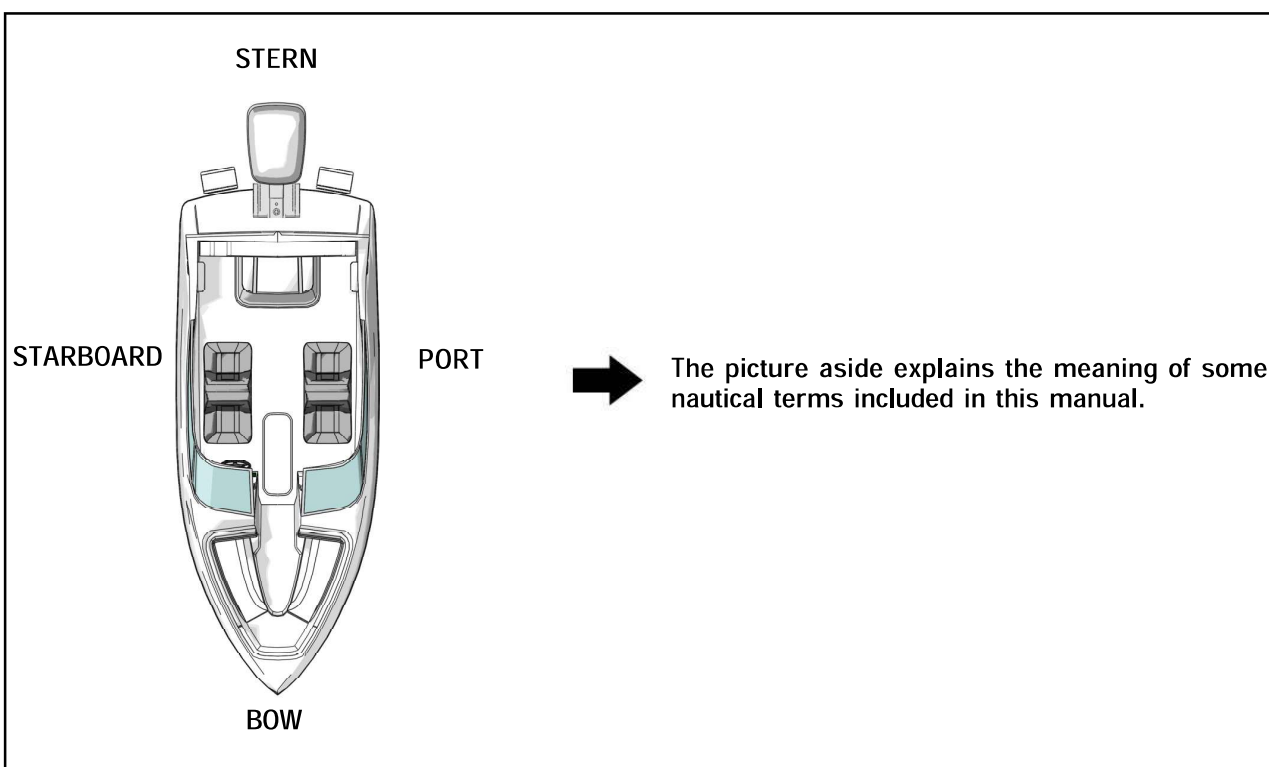
NOTICE



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



The icon 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.



INTRODUCTION LETTER

This installation and maintenance manual is an integral part of the product and should be easily accessible to the operator and the service technicians.

The operator should read this manual and use the product only for its intended purpose without modification.

UFLEX reserves the right to modify any parts, design details and accessories as it deems necessary to improve the product at any time with or without the obligation to modify this manual immediately.

Care has been taken in collecting and checking the documentation contained in this manual to make it as complete and comprehensive as possible. Nothing contained in this manual should be interpreted as warranty either expressed or implied beyond the stated warranty below.

UFLEX declines liability for any possible mistakes in the manual due to printing errors.

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

WARNING

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

TECHNICAL ASSISTANCE SERVICE

UFLEX S.r.l.

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16012 Busalla (GE)-Italy
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WARRANTY

UFLEX USA, INC., LIMITED 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 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 **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 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.

All communications and notices from Purchaser regarding this limited warranty should be sent to:

UFLEX USA, INC.
6442 Parkland Drive
Sarasota, Florida 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.

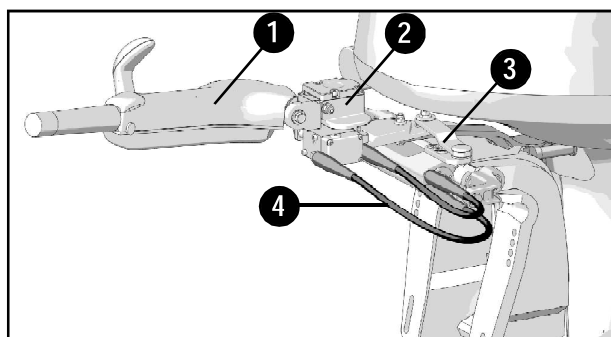
1 PRODUCT DESCRIPTION

1.1 ZTF Tiller System description

The ZTF Tiller System is a hydraulic device that neutralizes the propeller torque of outboard engines on the tiller handle while the operator is not actively making a steering course change. It enables the operator to maintain the right course without excessive physical effort.

The hydraulic valve opens the moment the operator makes a steering course change at which point the propeller torque will be present on the tiller handle. It is important that the operator maintains a firm grip on the tiller handle at all times while operating the boat; especially when making steering course changes. The ZTF tiller system consists of four main components:

- 1 Tiller handle (supplied directly by Yamaha® or one of its resellers)
- 2 Main device
- 3 UC130 ZTF hydraulic cylinder
- 4 Hydraulic hoses



NOTICE

The ZTF Tiller System is always supplied oil-filled, purged, functioning and with properly connected hoses.

⚠ CAUTION

Avoid twisting, damaging, bending and disconnecting the hoses.

⚠ CAUTION

The ZTF Tiller System must be used combined with Yamaha® outboard engines of 90-115-130 HP produced from 2015 to date, and engines of 150-175-200 HP - models 2.7L F150 Mechanical, VF150 V MAX SHO, F175, VF175 V MAX SHO, and F200 Mechanical - and must be assembled only on boats specifically designed and suitably equipped for being steered with the tiller handle. The installer and the operator are responsible for ensuring the proper functioning of the ZTF tiller system on the boat, bearing in mind factors like speed, motor loads and working conditions.

⚠ CAUTION

Do not use this device for purposes other than those it was made for, as specified in the installation manual.

⚠ CAUTION

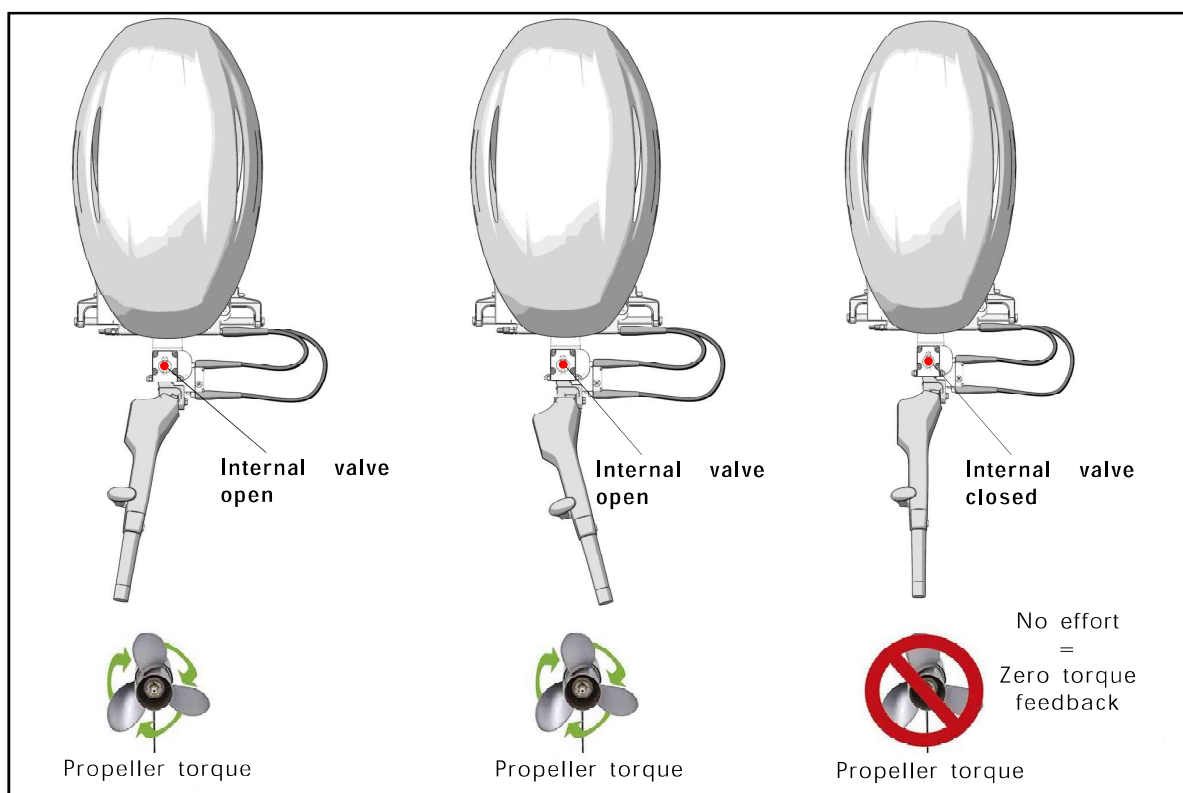
For installations other than the ones required for above-mentioned Yamaha® engines, please contact **UFLEX** Technical Assistance Service.



1.2 Operating principle

The patented hydraulic valve and corresponding cylinder of the ZTF Tiller system opens and closes in case the operator pushes or pulls the tiller handle. When the operator neither pushes nor pulls the tiller handle (changing steering course), the hydraulic valve closes eliminating the steering load from propeller torque on the tiller handle.

The operator **MUST** maintain a firm grip on the tiller handle under ALL operating conditions; while actively changing course or while maintaining a fixed course (with valve closed) as sea conditions, floating debris, or other conditions could change the steering course without input directly from the operator.



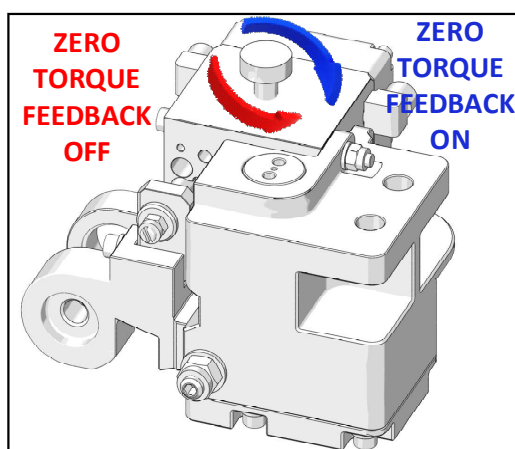
The ZTF Tiller has a By-Pass Knob underneath the primary assembly that can be used to engage or disengage the hydraulic valve. Turning the knob clockwise completely will activate the ZTF valve - locking out the propeller torque while not actively changing steering course. Turning the knob counter-clockwise will disengage the ZTF Tiller valve which will allow the propeller torque to reach the tiller handle - even when not actively making a steering course change.

WARNING

It is essential that the operator confirms the functionality and status of the ZTF Tiller System before each use.

To determine whether the system is active and functional, first check to ensure that the By-Pass Knob is firmly closed by turning the By-pass Knob clockwise. Then firmly push on the back of the engine to simulate a steering change (without pushing on the tiller handle simultaneously). If the engine does not turn in either direction, the ZTF is engaged.

If the engine moves, tighten the By-Pass Knob in the clockwise direction and check again to see if the engine moves. If it continues to move, do not use the boat and contact your dealer or **UFLEX** for technical support.



2 TRANSPORT

2.1 General warnings

The product weight with its packaging is 20kg (44 lbs). Therefore, it can be handled manually.

⚠ WARNING

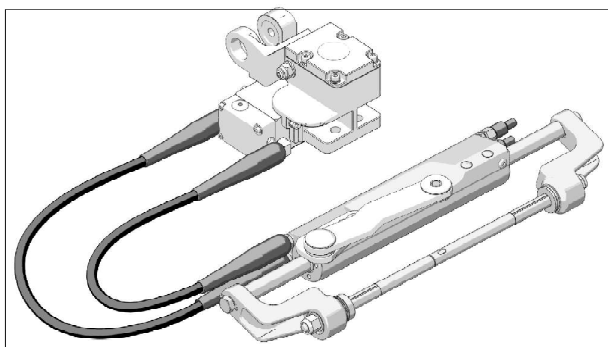
The staff in charge of handling must operate with protective gloves and safety shoes.

2.2 Packaging contents

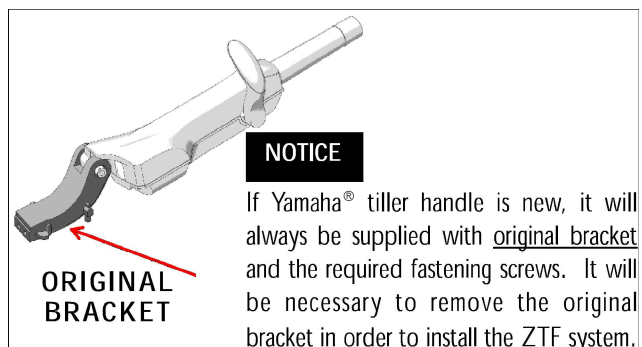
Before using the equipment check that the product has not been damaged during transport. Also make sure that all the standard components are in the packaging. In case of damage, do not use the ZTF Tiller System and notify the freight carrier and your dealer/distributor immediately.

The ZTF Tiller System is provided with the following items:

1 Main device



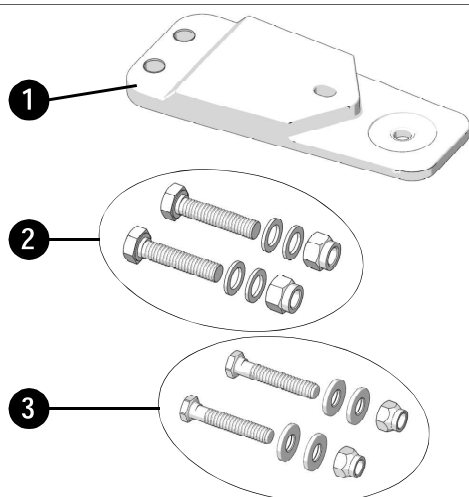
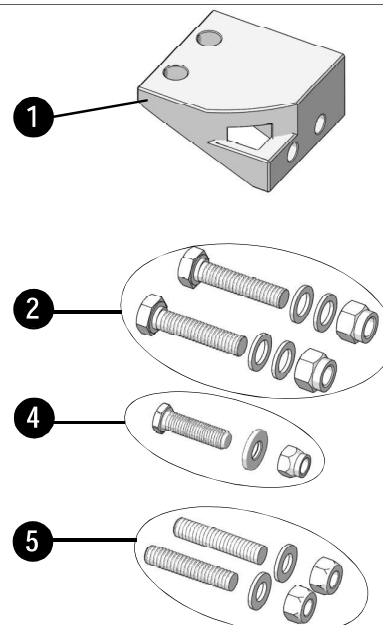
2 Yamaha® tiller handle



3 Accessory kit based on installation type, provided separately (see the following table with related drawings and paragraph 3.2)

	KIT QU1 (150-175-200 HP ENGINES)	KIT ND1 (90-115-130 HP ENGINES FROM 2015)
1. Bracket	✓	✓
2. Hardware fastening the device to the bracket (2 screws M12, 2 nuts, 4 washers)	✓	✓
3. Hardware fastening the cylinder link arm to the engine arm (2 special bolts ULTRABOLT, 2 high nuts, 4 washers)	✓	✗
4. Hardware fastening the cylinder link arm to the engine arm (1 svs bolt ULTRABOLT, 1 svs washer, 1 thin nut)	✗	✓
5. Hardware fastening the bracket to the engine arm (2 pivots, 2 washers, 2 nuts) CAUTION: this hardware is always included in Yamaha® tiller handles	✗	✓



KIT QU1

KIT ND1


⚠ CAUTION

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

3 INSTALLATION

3.1 Safety warnings

Strictly follow the precautions and the safety warnings throughout this entire manual. Failure to do so could result in loss of steering with possible damage, injuries and death.

UFLEX declines all responsibility for errors during installation, mis-application, mis-use, neglect, or lack of maintenance or routine inspection.

⚠ DANGER

- DO NOT PUT HANDS BETWEEN THE MOVING PARTS.
- Do not disable in any way the safety devices.
- Do not modify or add devices to the system, without **UFLEX** written authorisation or technical intervention which will prove the modification.
- Installation should only be performed by well experienced and trained marine technicians.

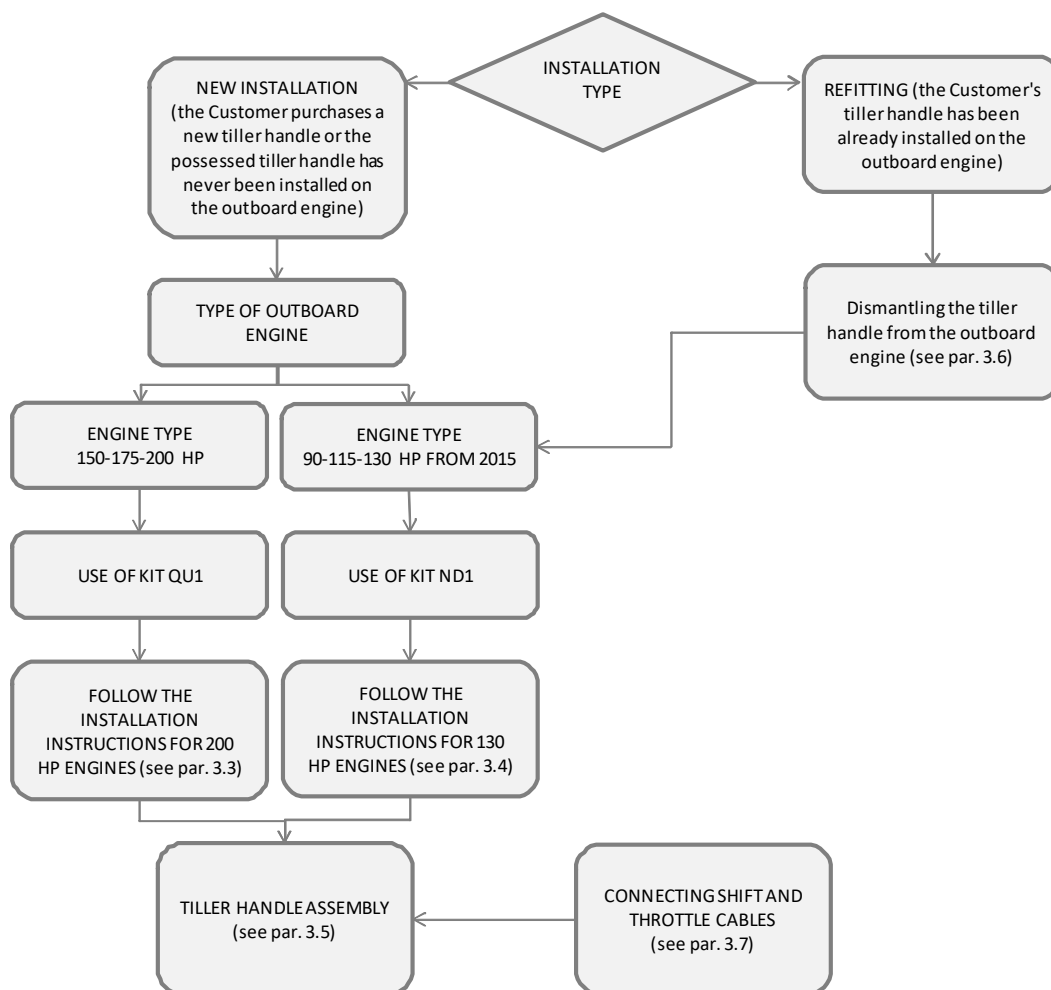
3.2 Installation types

The ZTF system has two different installation types:

1) **NEW INSTALLATION:** the Customer purchases a new Yamaha® tiller handle or, more generally, the possessed tiller handle has never been installed on the outboard engine.

2) **REFITTING:** the Customer's Yamaha® tiller handle has been already installed on the outboard engine.

Moreover, the installation procedure varies according to the type of Yamaha® outboard engine on which the ZTF system is installed, as described in the following scheme:





3.3 Installation with 150-175-200 HP Yamaha® engines

As reported on the previous pages, the ZTF installation with 150-175-200 HP engines requires the use of KIT QU1 (see also par. 2.2).

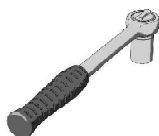
NECESSARY TOOLS



(2 x) Open end wrench
18mm



MOLYKOTE® 1000

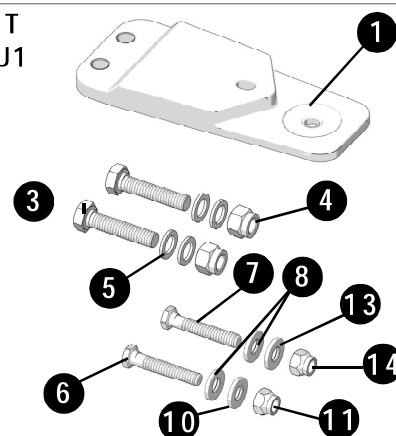


Torque wrench



Open end wrench
9/16"

KIT
QU1



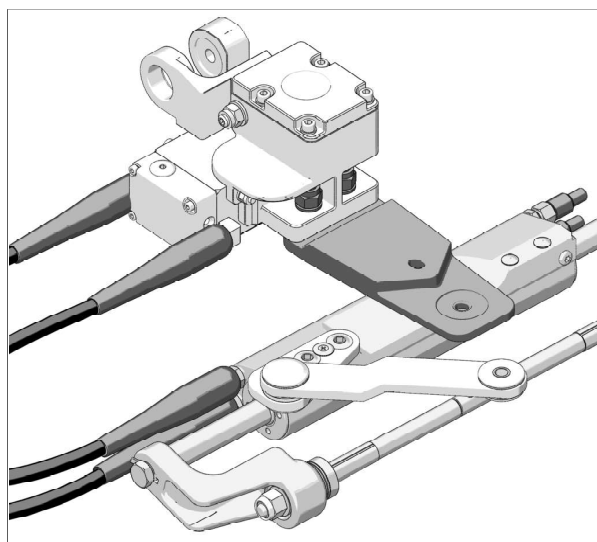
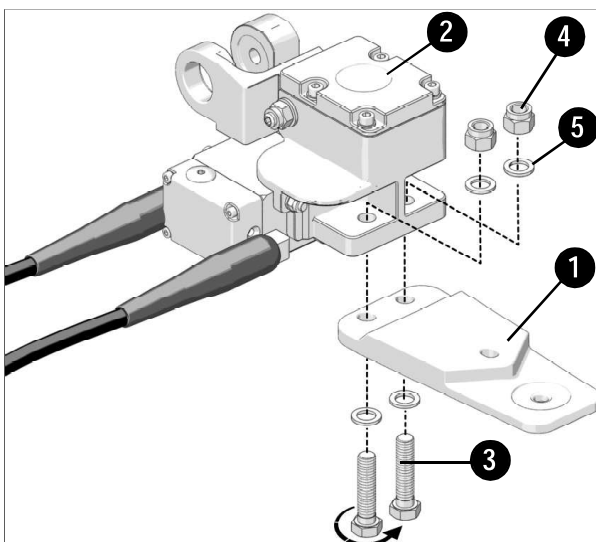
- 1 Fasten bracket (1) on device (2) using screws (3) and nuts (4) after having properly placed washers (5). Lock using 2 18mm wrenches with a tightening torque of 80 Nm (59 lb ft).

⚠ CAUTION

Apply grease to the screw shafts before tightening the nuts.

⚠ CAUTION

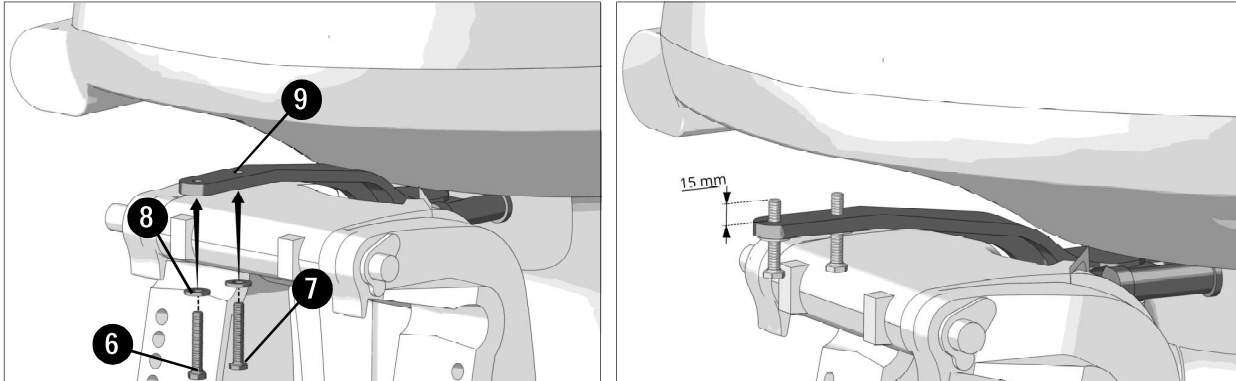
The bracket must be oriented as shown in the picture.



- 2** Place the two ultrabolts (6) and (7) with washers (8) into the engine arm (9) up to half of their length.

NOTICE

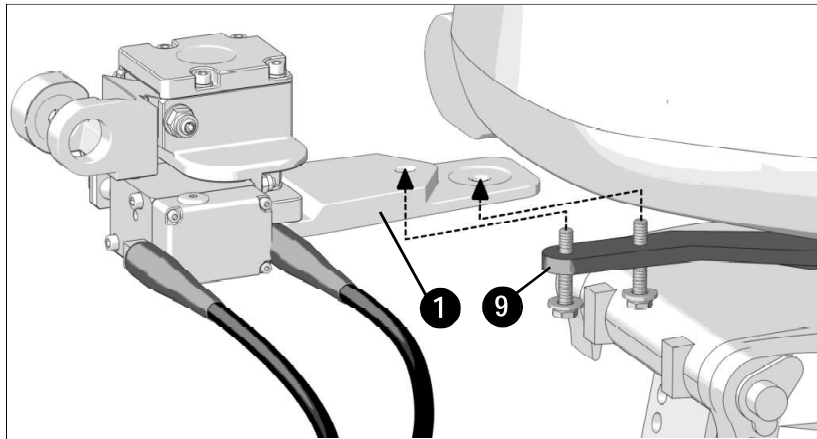
The screws must protrude from the engine arm by around 15 mm.



- 3** Assemble the device with bracket (1) on the engine arm (9).

⚠ CAUTION

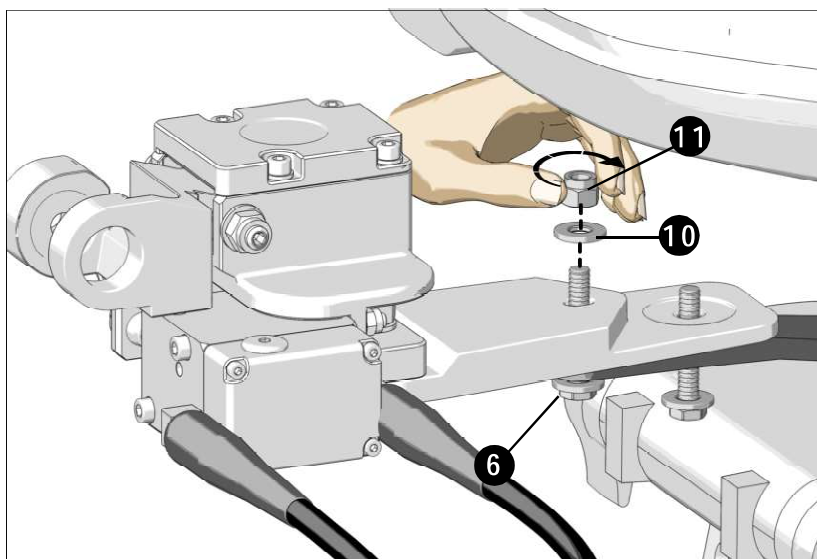
Be careful not to bend, kink or disconnect hydraulic hoses.



- 4** Place washer (10) on the front ultrabolt (6), which is the closest to the device and tighten manually the self-locking nut (11).

⚠ CAUTION

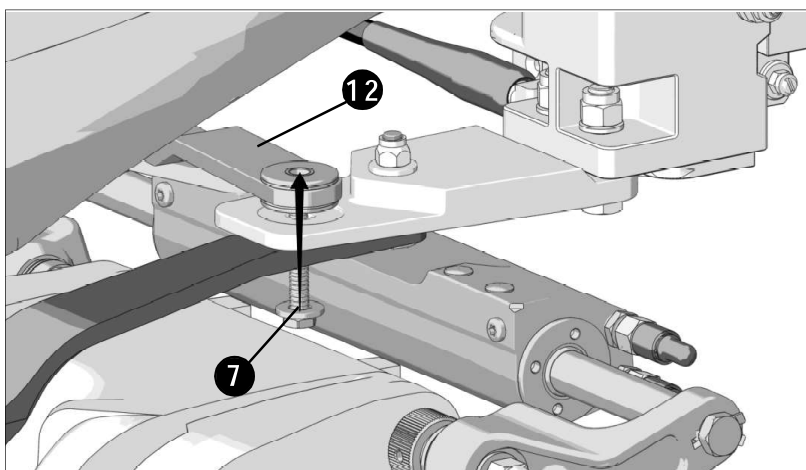
Apply grease to the screw shafts before tightening the nuts.



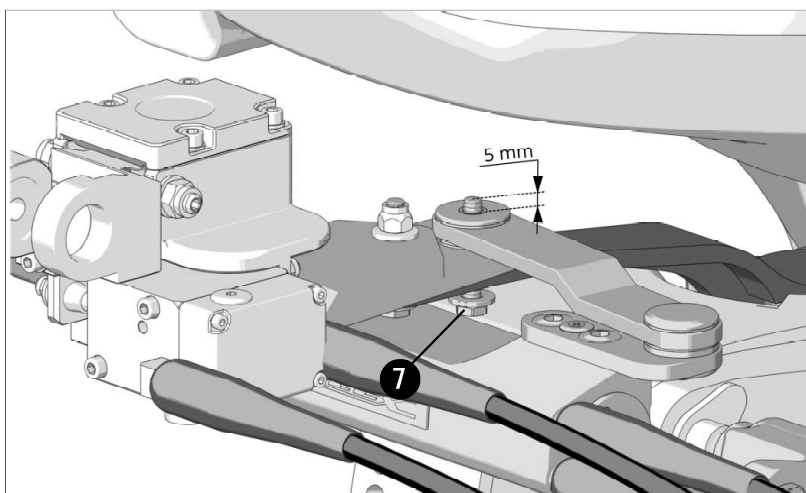
- 5** Place the cylinder link arm (12) on the rear screw (7).

NOTICE

In order to complete the fastening process of the cylinder to the engine hose, refer to the instructions contained in the manual of the cylinder.



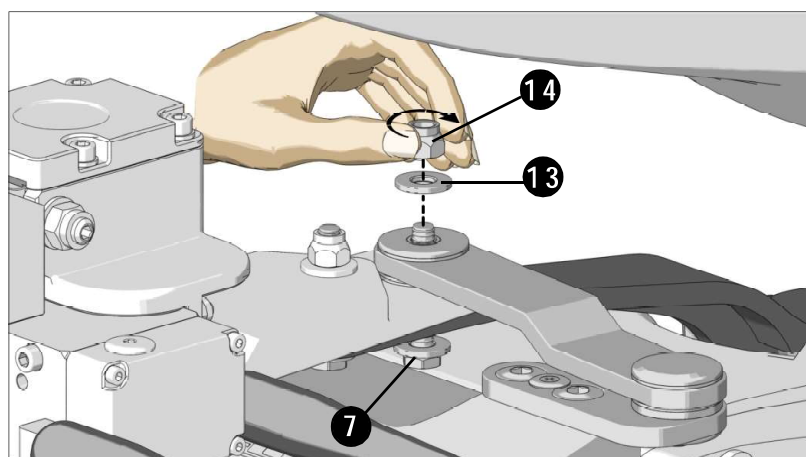
- 6** Screw ultrabolt (7) letting it protrude from the cylinder link arm by at least 5mm, then place washer (13) (see picture below).



- 7** Manually tighten the self-locking nut (14) on screw (7).

⚠ CAUTION

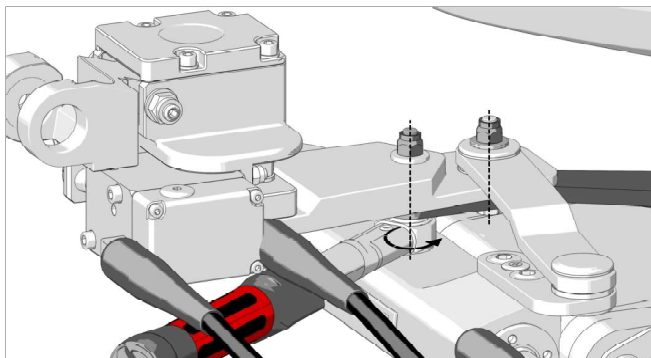
Apply grease to the screw shaft before tightening the nut.



- 8** Bring the two ultrabolts into contact with the engine tiller arm and fasten them using a 9/16" wrench with a torque of 54 Nm (40 lb ft).

⚠ CAUTION

This operation requires careful attention.

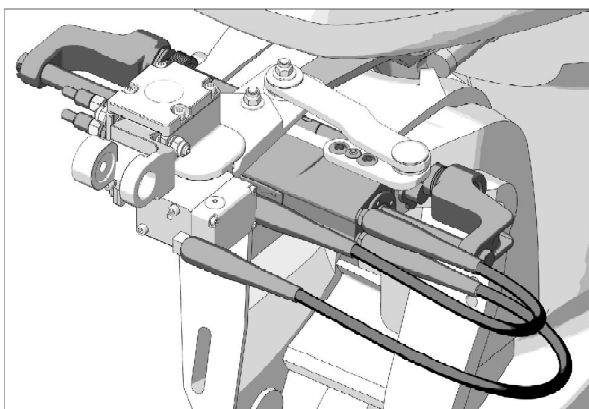
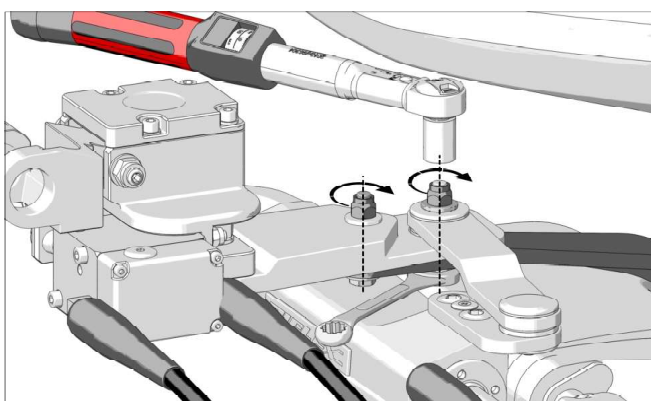


- 9** Afterwards, while holding a screw with a 9/16" wrench, fasten the corresponding nut with a torque of 54 Nm (40 lb ft). Repeat this operation on the other nut always by holding its screw.

Double-check the tightening of screws and nuts by repeating the same procedure described in points 8 and 9 (fastening screws and nuts while holding screws).

⚠ CAUTION

This check requires careful attention.



- 10** Complete the assembly of UC130 cylinder on the outboard engine following what is reported on the installation and maintenance manual of the cylinder itself, except for the fastening phase of the cylinder link arm to the engine arm, which is described in the previous points.

NOTICE

Do not disconnect the hydraulic hoses for any reason.

- 11** Assemble Yamaha® tiller handle on the ZTF device as described in paragraph 3.5.





3.4 Installation with 90-115-130 HP Yamaha® engines from 2015 until now

As reported on the previous pages, the ZTF installation with 90-115-130 HP engines from 2015 requires the use of KIT ND1 (see also par. 2.2).

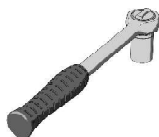
NECESSARY TOOLS



(2 x) Open end wrench 18mm



MOLYKOTE® 1000



Torque wrench

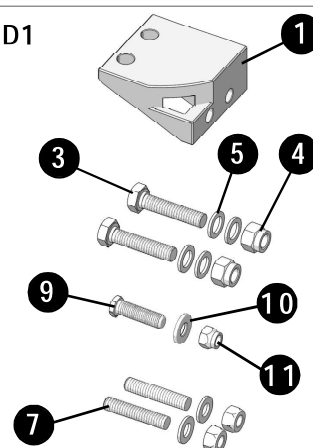


Open end wrench 14mm



Open end wrench 9/16"

KIT ND1



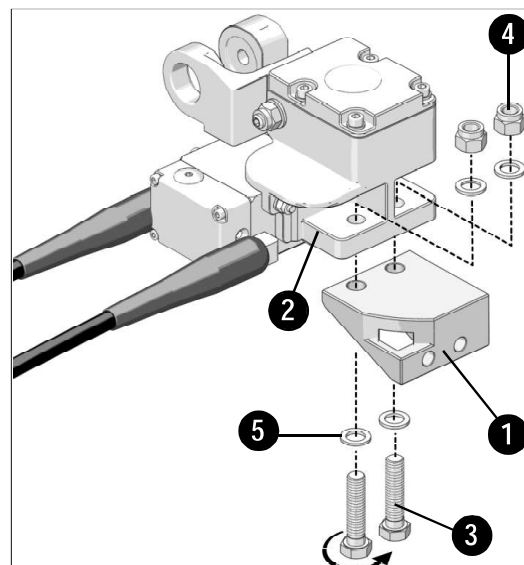
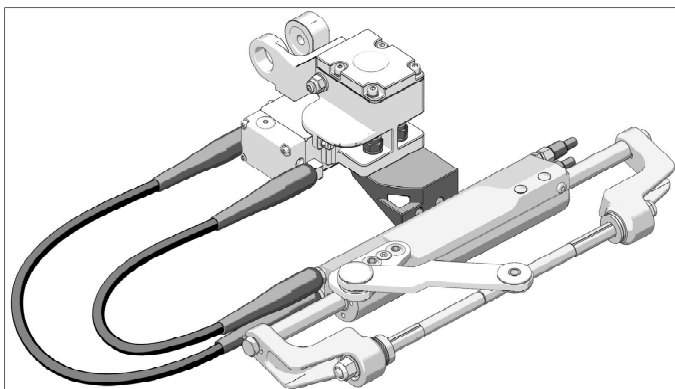
- 1 Fasten bracket (1) on device (2) using screws (3) and nuts (4) after having properly placed washers (5). Lock using 2 18mm wrenches with a tightening torque of 80 Nm (59 lb ft).

⚠ CAUTION

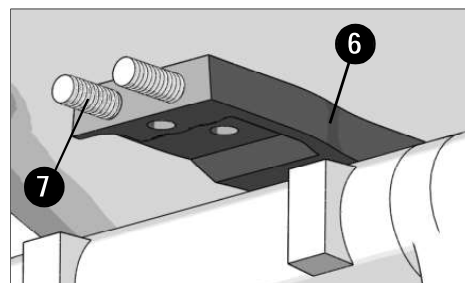
Apply grease to the screw shafts before tightening the nuts.

⚠ CAUTION

The bracket must be oriented as shown in the picture.



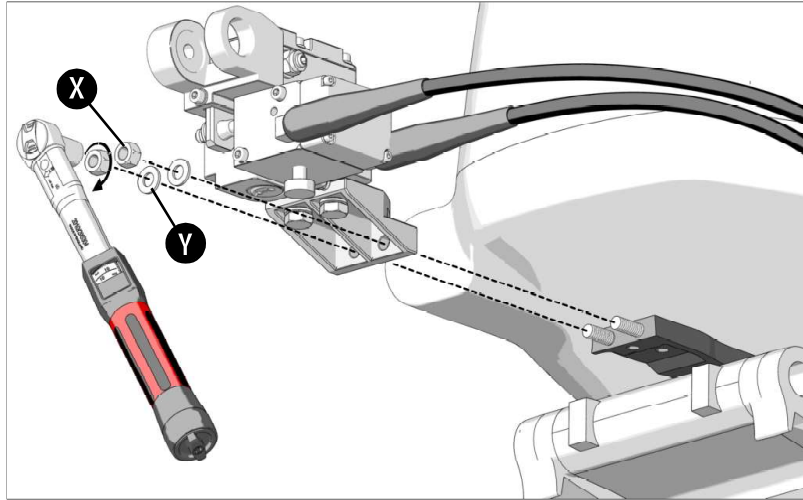
- 2 Screw and lock the studs (7) to the engine arm (6) following the tightening torque and the instructions contained in the manual of Yamaha® tiller handle.



- 3** Fasten the device with the bracket on the engine arm using nuts (X) and interposing washers (Y), following the tightening torque and the instructions contained in the manual of Yamaha® tiller handle. Apply grease to the pivots before tightening the nuts.

⚠ CAUTION

During this operation, pay attention not to damage, bend and disconnect the hydraulic hoses.

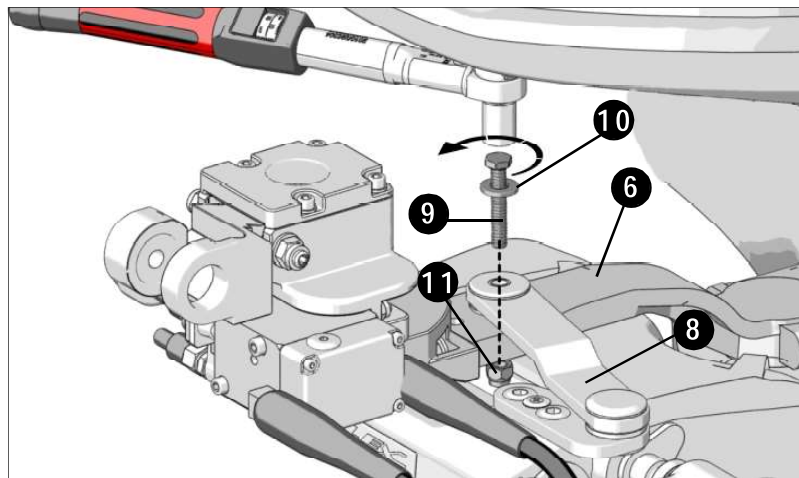


- 4** Fasten the cylinder link arm (8) to the engine arm (6) by screwing a 3/8" ultrabolt (9) in the closest hole to the stern, by interposing washer (10): tighten the ultrabolt using a 14 mm wrench with a torque of 54 Nm (40 lb ft).

Screw the self-locking nut (11) with a 9/16" wrench and tighten it with a torque of 27 Nm (20 lb ft). After having fastened the nut (11), recheck that the tightening torque - 54 Nm (40 lb ft) - of the screw (11) is correct.

⚠ CAUTION

Apply grease to the screw shafts before tightening the nuts.



- 5** Complete the assembly of UC130 cylinder on the outboard engine by following what is reported on the installation and maintenance manual of the cylinder itself, except for the fastening phase of the cylinder link arm to the engine arm, which is described in the previous points.

NOTICE

Do not disconnect the hydraulic hoses for any reason.

- 6** Assemble the tiller handle on the ZTF device as described in paragraph 3.5.



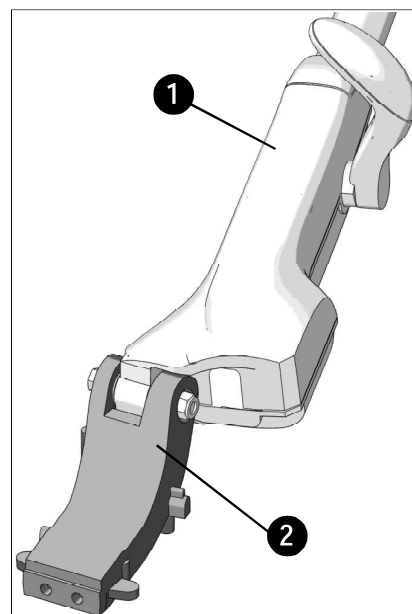
3.5 Yamaha® tiller handle assembly



The Yamaha® tiller handle is composed of the main body (1) and the original bracket (2) for connecting it to the engine arm.

In order to install the tiller handle on the ZTF device, it is necessary to remove bracket (2) and assemble the main body (1) directly on the ZTF device.

To this end, refer to what is reported in following paragraphs.



3.5.1 Original bracket removal



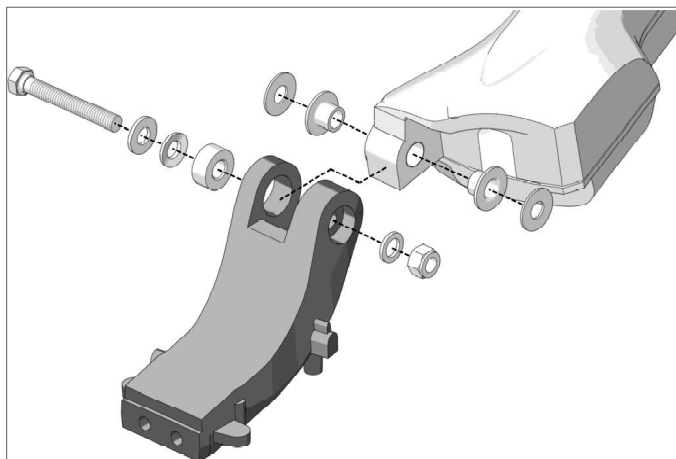
1 In order to install the tiller handle on the ZTF device, it is necessary to remove the original bracket, taking care not to damage the screw, the bushings, the washers and the connecting nut. Pay attention to the position of these parts, since they will be used again for assembling the main body of the tiller handle to the device.

NOTICE

During disassembly, ALL components must be removed, since they will be reused for the following reassembling.

CAUTION

If these components are damaged, they must be replaced. In this case, contact the technical assistance.



3.5.2 ZTF device assembly on tiller handle



1 The main body of the tiller handle must be fastened to the device in line with the fork.

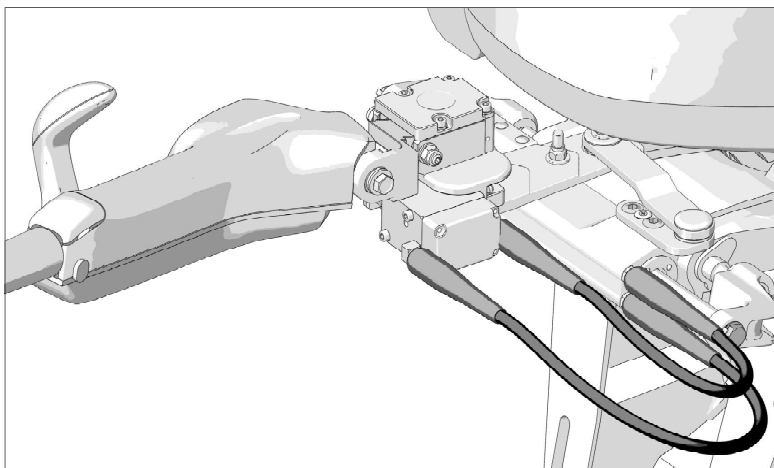
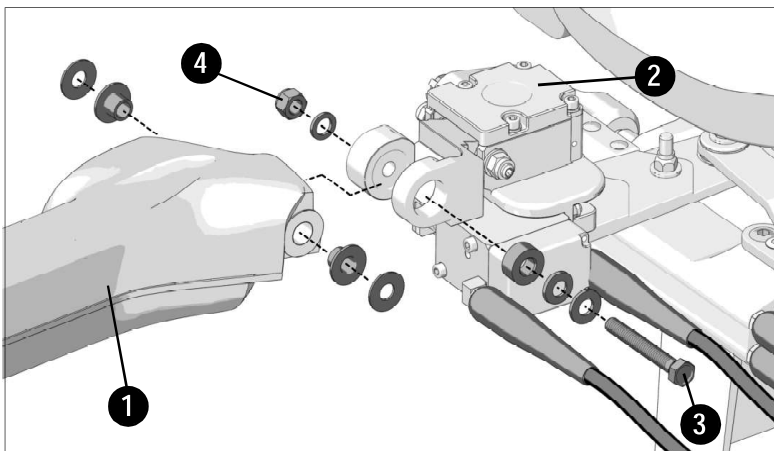
Fasten the tiller handle (1) to device (2), taking care of positioning bushings, spacers and washers as shown in the picture aside (following the same order in which they were disassembled).

After having lubricated bolt (3), fasten nut (4) with a tightening torque between 29.4 and 34.3 Nm (from 21.68 to 25.29 lb ft), avoiding excessive play of the handle allowing its tilt to any angle.

Check that the upward and downward movements of tiller handle are correct and there is no free play along the horizontal axle, enabling the proper functioning of the device.

⚠ CAUTION

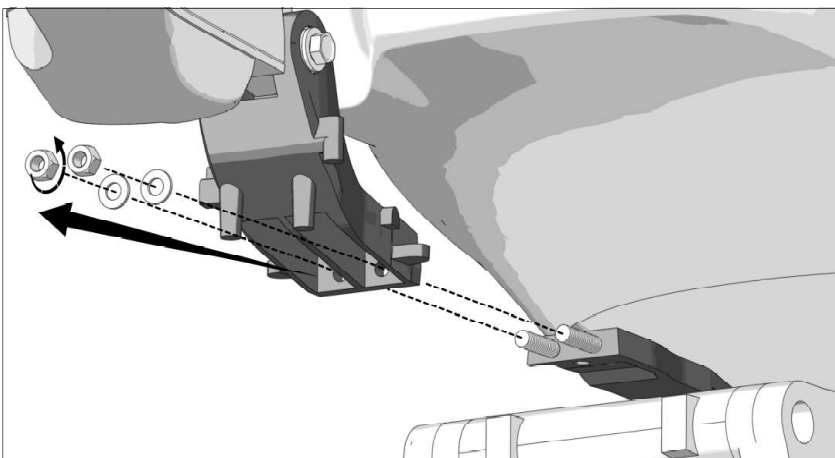
Apply grease to the screw shafts before tightening the nuts.



3.6 Tiller handle disassembly from outboard engine ("refitting" installation)



- 1 Remove the tiller handle from the engine arm, taking care of keeping the extracted nuts and washers. Check their conditions together with the ring preventing the nut lock. Replace any even slightly damaged components (in this case, contact the technical assistance).
Proceed with assembling the device following what is reported in paragraph 3.4.



3.7 Wiring



Proceed with connecting the tiller handle to the engine controls (throttle, shift, ignition, etc.) following the instructions supplied by Yamaha®.



4 MAINTENANCE

4.1 Ordinary maintenance

An proper maintenance is a key factor for a greater durability of the ZTF system in optimal operating and performance conditions and functionally ensures safety over time. It is recommended that well experienced and trained marine technicians carry out maintenance operations. Regular inspections and proper care of the ZTF Tiller System is recommended for safe use and proper performance. The personnel must be provided with PPE (Personal Protective Equipment), which is commonly used for similar operations, and follow the safety procedures specified below.

WARNING

The main precautions to be taken while carrying out maintenance interventions on the ZTF system are:

- Do not wear rings, chains, bracelets, etc.
- Always use PPE (gloves).
- Do not use open flames for cleaning.
- Do not smoke

WARNING

Before each use, before the beginning of the season:

- with the engine turned off, test the good functioning of the ZTF system, trying to move the outboard engine acting on the motor hood and checking that it is fixed in position;
- check the correct functioning of the cylinder on the shaft and, in case of necessity, purge the system;
- check that the hoses are not twisted or damaged;
- check that nuts and bolts are in good conditions and properly tightened.

Technical Assistance

For any information or for assistance with unusual applications, please contact our Technical Assistance Service (See paragraph "Informative letter").

4.2 ZTF system filling and purging

The ZTF system is already supplied oil-filled and purged, ready to be used. Therefore, no periodical oil topping up is required.

The following filling and purging procedure must be carried out only after having repaired a fault, e.g. in case of hose breaking or replacement of the cylinder gaskets. This kind of events entails oil leakage from the system and, consequently, refilling is required.

Fault situations must be examined on case-by-case basis.

The purging procedure of the ZTF system requires the use of Ultraflex Bubble Buster, which is not provided in this kit.

NECESSARY TOOLS



Open end
wrench 16mm



Allen wrench
4mm

NOTICE

In order to proceed with the system filling and purging, a hydraulic oil (Ultraflex OL150 or compatible ones) is recommended, as indicated in the use and maintenance manual of UC130 cylinder.

Before connecting the Bubble Buster to the system, read its manual in order to identify its constituent parts.

NOTICE

The purging procedure must be carried out once the ZTF system has been already assembled on the outboard engine.

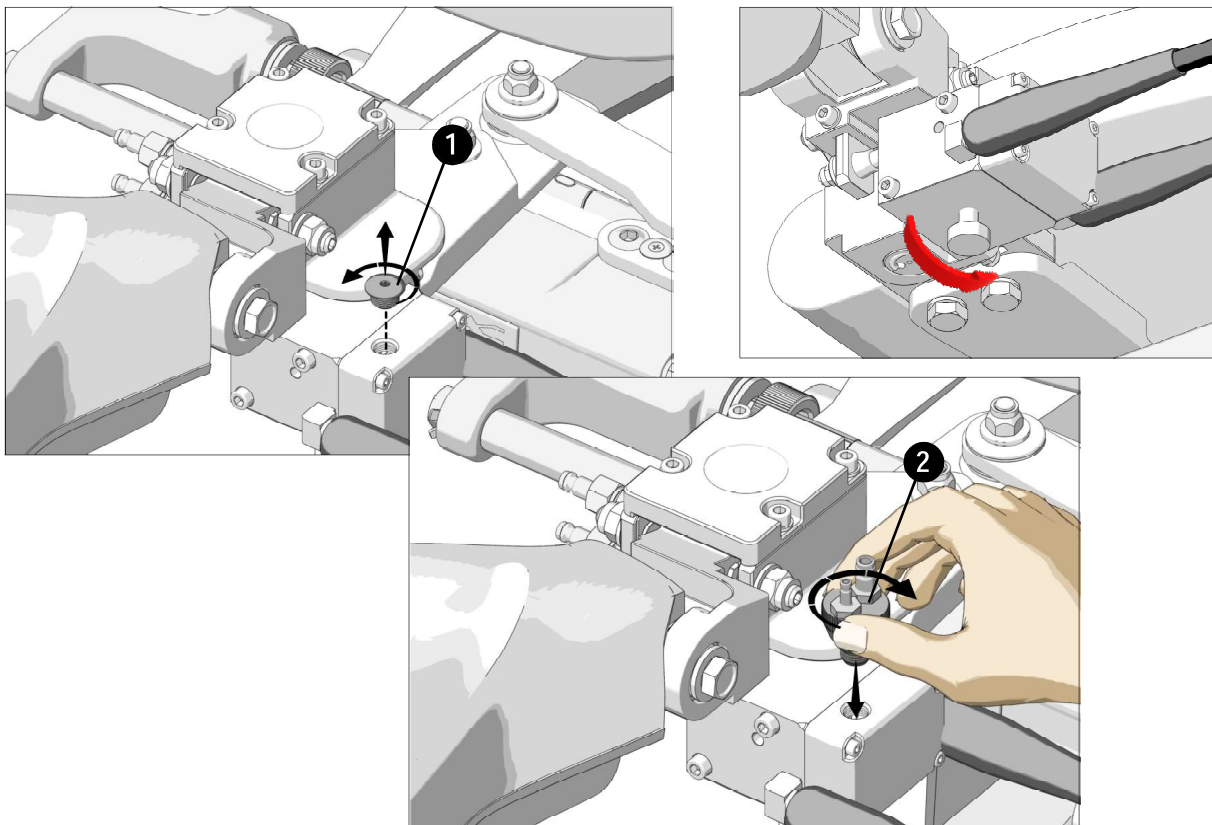
Follow the four steps below:

- 4.2.1 Connecting the Bubble Buster to the system;
- 4.2.2 Filling and purging operation;
- 4.2.3 Disconnecting the Bubble Buster;
- 4.2.4 Check the ZTF system functioning.

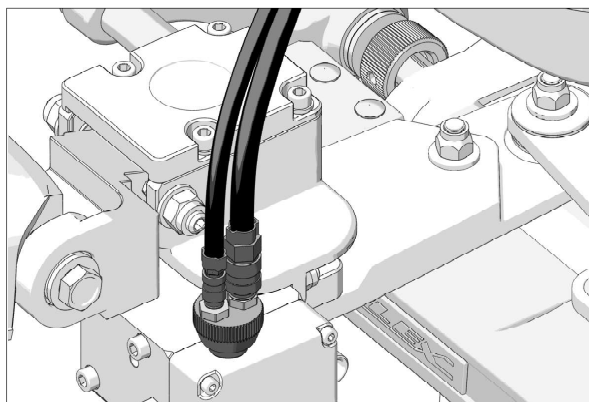
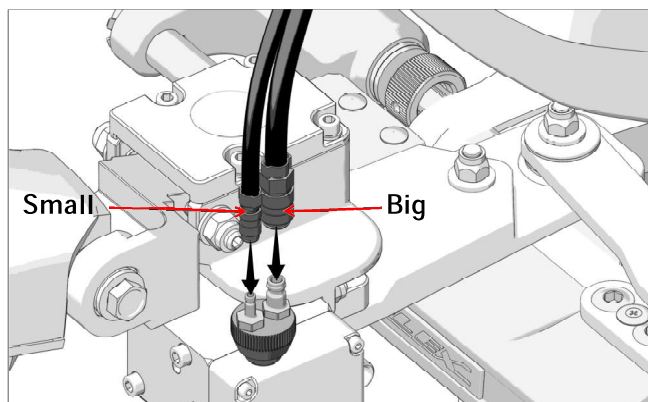
4.2.1 Connecting the Bubble Buster to the system

Proceed as follows:

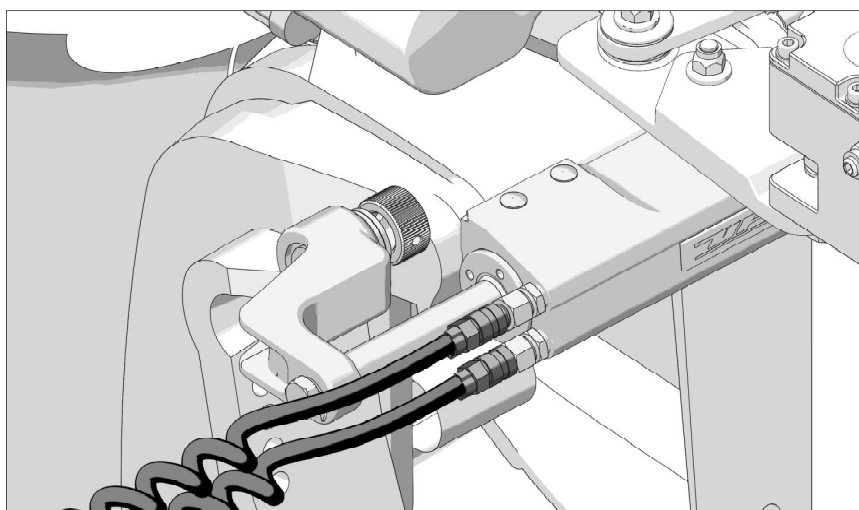
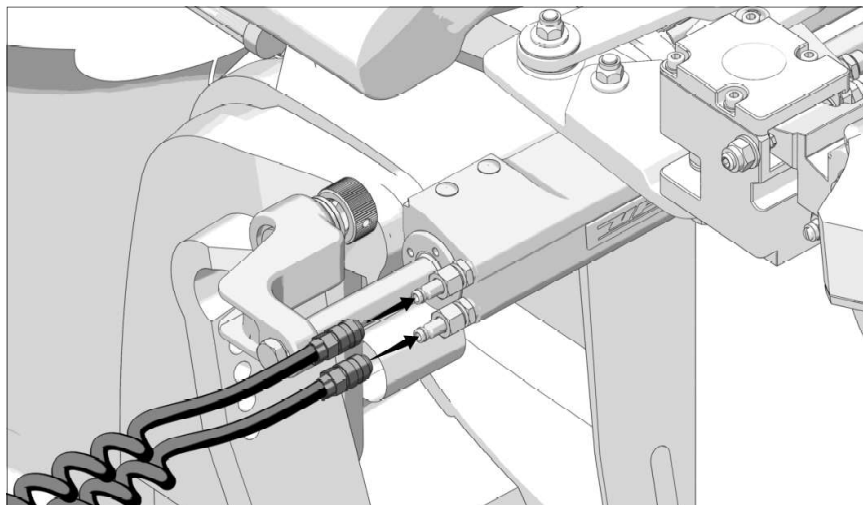
1. After having assembled the system on the outboard engine, loosen the by-pass knob in order to set the system in by-pass mode (see page 8). Remove cap (1) with a 4mm Allen wrench and keep it until operations end.
2. Manually tighten the filling fitting (2) of the Bubble Buster provided with quick couplings.



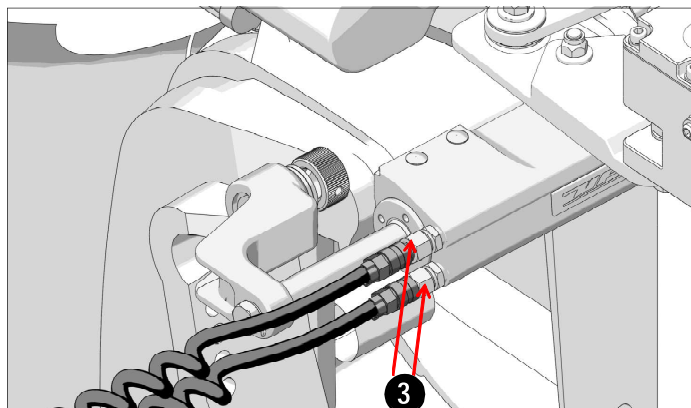
3. Connect the pair of transparent hoses to the Bubble Buster fitting. Such hoses are provided with a small and a big quick coupling at their end,



4. Connect the other pair of transparent hoses to the cylinder purge valves. Such hoses have the same dimension and are provided with quick couplings at their end,



5. Loosen the release nuts (3) for enabling the oil to pass through. Do not unscrew more than one turn and a half. Use a 16 mm wrench.



6. Connect the battery clamps: the red clip to the positive terminal and the black one to the negative terminal.

⚠ CAUTION

Only 12 Vdc power supplies are allowed.

4.2.2 Filling and purging operation



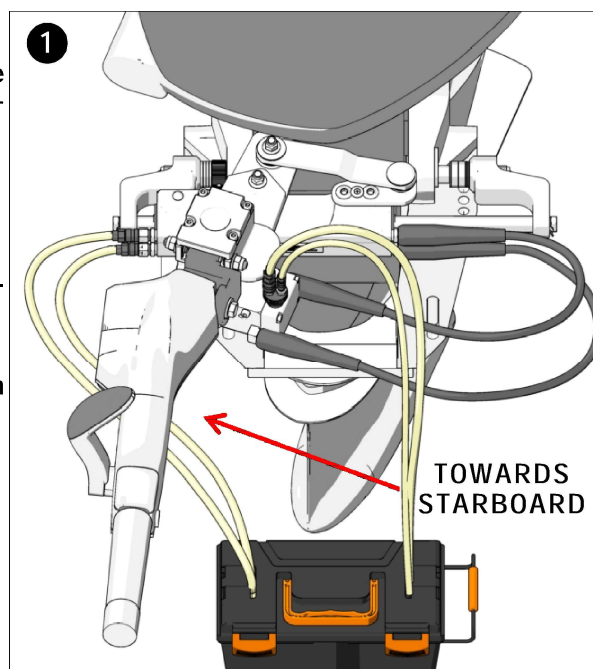
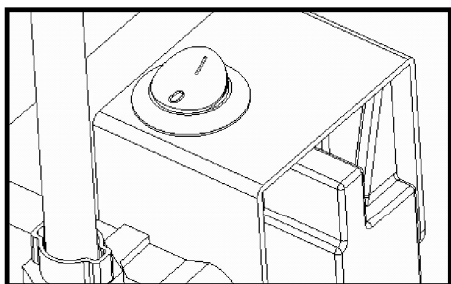
Proceed as follows:

1. Move the cylinder towards the end of stroke on the starboard side (see picture 1) by steering the tiller handle in the same way as during navigation.

NOTICE

The by-pass knob must be fully loosened (system in by-pass mode).

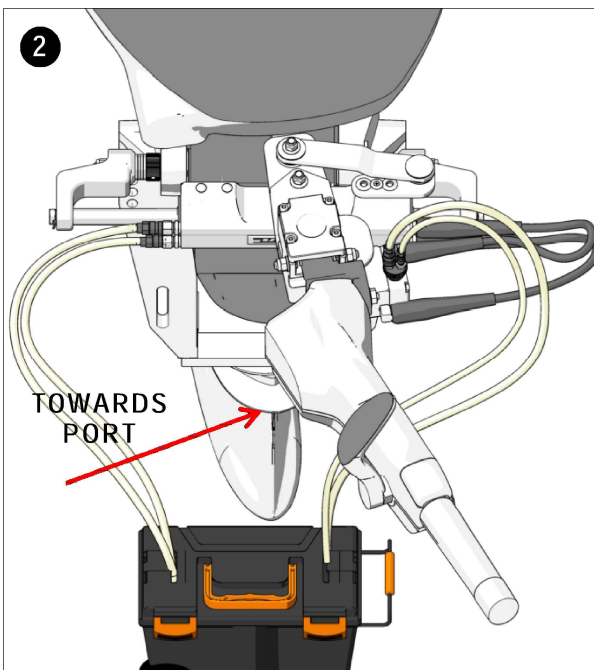
2. Start the Bubble Buster by pressing the switch shown below.



3. The oil will start circulating into the system and, from the two transparent hoses connected to the cylinder, oil together with air will start flowing.
4. Without moving the tiller handle and, therefore, the cylinder, wait for a couple of minutes until the transparent hoses show only oil with very few air bubbles.



5. Move the cylinder slowly towards the opposite side (port, see picture 2), by always acting on the tiller handle.
6. Once on the port side, leave the cylinder in this position and wait again for a few minutes.
7. Always moving slowly the cylinder with tiller handle, repeat the steering movement from starboard to port and viceversa at least 3 times.
8. With the cylinder placed at the end stroke (port), push the handle again towards port: the cylinder cannot move, since it is at the end stroke. This push on the handle will further expel air bubbles (keep pushing for 10 seconds).
9. Move the cylinder slowly towards starboard and repeat the previous operation.
10. Tighten the by-pass knob: the system will be in by-pass off mode, neutralizing the propeller torque effect on the throttle knob.
11. Move the cylinder slowly using the tiller handle and repeat the steering movement from starboard to port and viceversa at least 3 times.
12. At this stage, the system will be oil-filled and purged: looking at the transparent hoses of the Bubble Buster, no air bubbles should be visible. If they are still visible, repeat the whole purging procedure again.



CAUTION

It is always recommended to start the purging operation with the cylinder at the end of stroke.

4.2.3 Disconnecting the Bubble Buster

Proceed as follows:

1. Tighten the release nuts using a 16 mm wrench and a torque of 20 Nm (15 lb ft).
2. Turn the Bubble Buster off by pressing the suitable switch.
3. Disconnect the 4 transparent hoses of the Bubble Buster, two from the cylinder and two from the pump fitting.
4. Unscrew the pump fitting and screw immediately the cap with a 2 Nm torque using a 4 mm Allen wrench.

4.2.4 Check the ZTF system functioning

Before using the purged ZTF system during navigation, check carefully its functioning.

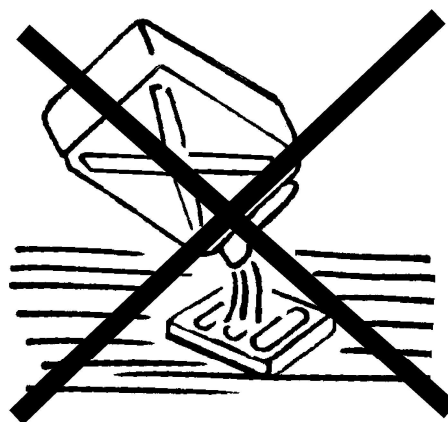
1. Move the cylinder along the whole stroke, making sure that there are no malfunctions or jammings.
2. With the outboard engine in central position, push and pull the engine by acting on the motor hood: if the system has been properly purged, the engine will not move.
3. By slightly pushing the knob towards starboard and, at the same time, pushing the engine towards port by acting on the motor hood, the engine must not rotate towards port.
4. Repeat the previous check by inverting the movement directions,

5 DISMANTLING

5.1 Dismantling

When for any reason, the ZTF 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.





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