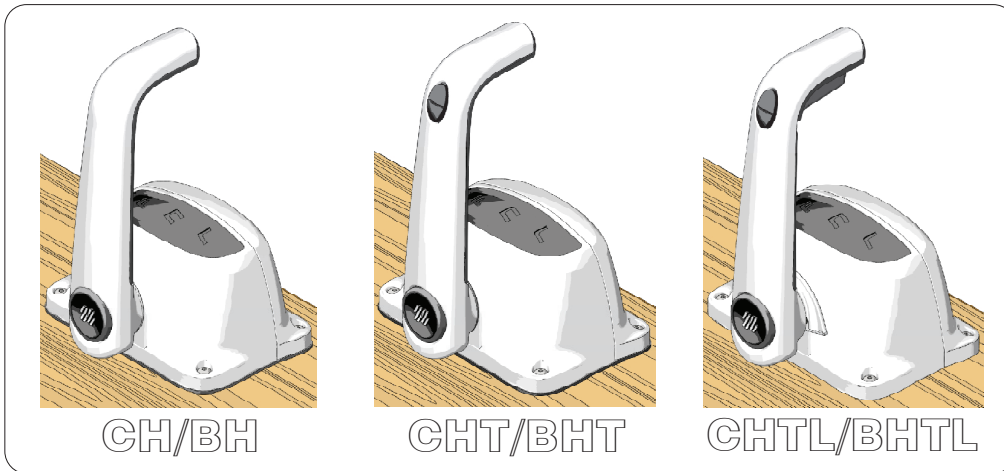


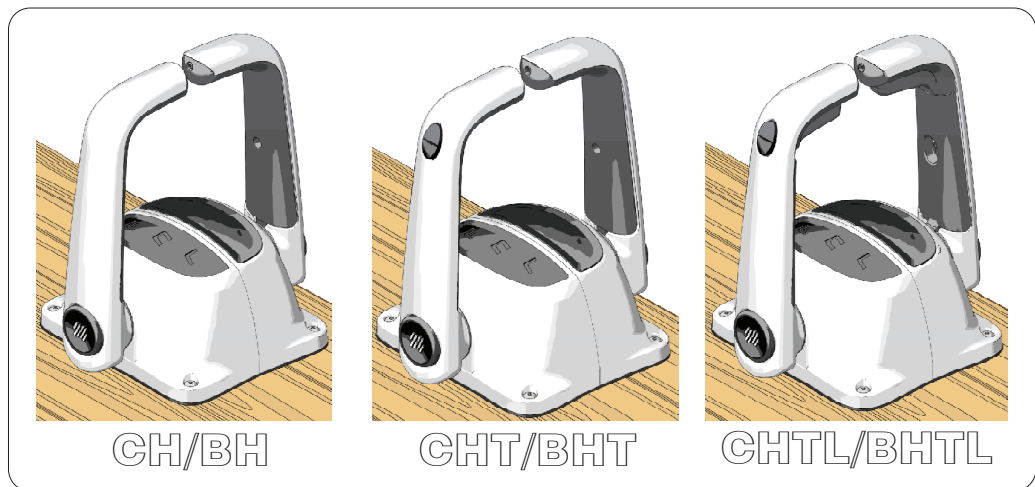
Installation and maintenance manual

SINGLE LEVER CONTROL



B 501

B 502



ENGLISH

ITALIANO

FRANÇAIS

 **ULTRAFLEX** ^{CE}



PARTNER



UK
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page. 41

Dear Customer,

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

ULTRAFLEX has been a leader in steering systems for pleasure and professional boats for many years. **ULTRAFLEX** production is since ever synonymous of reliability and safety.

All **ULTRAFLEX** products are designed and manufactured to ensure the best performance. To ensure your safety and to maintain a high quality level, **ULTRAFLEX** products are guaranteed only if they are used with original spare parts.

ULTRAFLEX and **UFLEX** Quality Management Systems are certified CISQ-IQNet by the Italian Shipping Registry (RINA), in conformity with the UNI EN ISO 9001:2008 rule. **ULTRAFLEX** certification No. 6669/02/S (former 420/96). **UFLEX** certification No. 8875/03/S.

The quality management system involves all the company resources and processes starting from the design, in order to:

- ensure product quality to the customer;
- maintain and improve the quality standards constantly;
- pursue a continuous process improvement to meet the market needs and to increase the customer satisfaction

ULTRAFLEX Environmental Management System is certified CISQ-IQNet by the Italian Shipping Registry (RINA), in conformity with the UNI EN ISO 14001 rule. **ULTRAFLEX** certification No. EMS-1282/S.

Products for pleasure boats are constantly tested to check their conformity with the 2013/53/EU.



"**ULTRAFLEX** has over 80 years of experience in the marine industry and is a world leader in the production of mechanical, hydraulic and electronic steering systems, control boxes and steering wheels for any kind of pleasure, fishing or commercial boats.

The key factors which explain the increasing success of our products all over the world are the reliability of our products and the before and after sale service, the quality of the company organization and of the human resources and the continuous spending in research and development".

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IMPORTANT:

The additional documents "Application Guide" and "Spare Parts List" are attached to this manual.

USE OF THIS MANUAL AND SYMBOLS


ENGLISH


THE INSTALLATION AND MAINTENANCE MANUAL is the document accompanying the product from sale to replacement and disposal, and should be considered an integral part of the product.

Read the manual before undertaking ANY ACTIVITY involving the product, including movement and unloading from the vehicle on which it is delivered.

In order to protect the user's safety and guarantee correct functioning of the product, this manual uses the symbols described below.

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

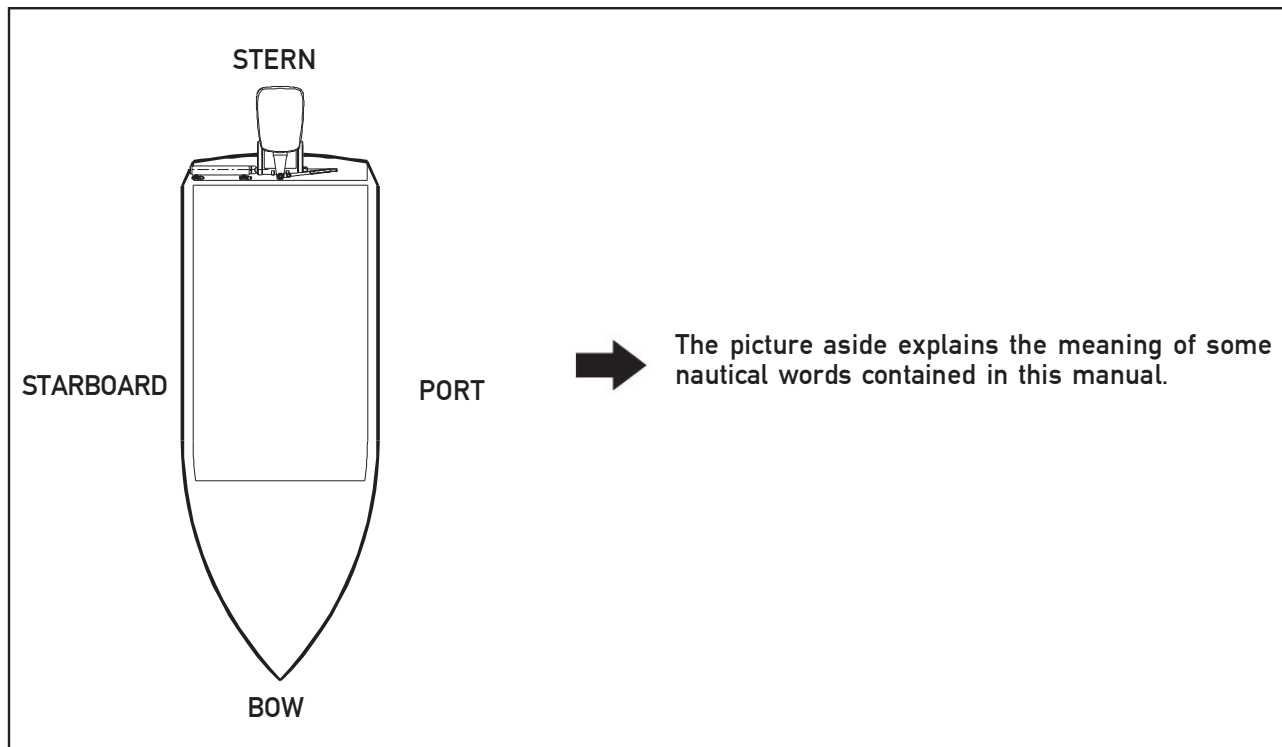
 **WARNING** → Denotes that a hazard exists which can result in injury or death if proper precautions are not taken.

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

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



→ Operations which should be performed by qualified or specialized personnel to avoid risks are identified by the symbol shown here. Provide the personnel who will be installing the product with appropriate training and make sure that they understand and implement the instructions provided.



INTRODUCTION

This installation and maintenance manual constitutes an integral part of the product and must be made easily accessible for personnel using the product and performing maintenance work on it.

The user must know the content of this manual.

ULTRAFLEX shall not be held liable for any inaccuracies due to printing errors in the manual.

Without altering the basic features of the product described **ULTRAFLEX** reserves the right to make any changes to descriptions, details and illustrations that it may consider appropriate for its improvement or for manufacturing or commercial reasons at any time, without being required to update this publication immediately.

ALL RIGHTS RESERVED. Rights to publication, trademarks, logos and photographs of **ULTRAFLEX** products present in this manual are the property of **ULTRAFLEX** and may not be reproduced in full or in part. Great care has been taken to collect and verify documentation to make this manual as complete and easy to understand as possible. None of the information obtained in this publication may be interpreted as a guarantee or an express or implicit condition- including but not limited to, the guarantee of suitability for a particular purpose. None of the information contained in this publication may be interpreted as a change to or assertion of the terms of any contract of purchase.

WARNING

The product must be installed by experienced personnel to ensure correct functioning of the product and its components. In the event of breakage of the components or malfunctioning, contact specialized personnel or our Technical Assistance Service.

TECHNICAL ASSISTANCE SERVICE

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WARRANTY

ULTRAFLEX warrants that its products are built according to the standards of good workmanship and are free of defects in materials and workmanship.

This warranty is valid for two years starting on the date of manufacture with the exception of cases in which products are installed and used on working vessels or on vessels commercial use, in which case the guarantee is limited to 1 year from the date of manufacture.

This warranty is limited to free replacement or repair of the item, which must be returned carriage paid, provided we find it to be effectively defective in materials and/or workmanship.

The warranty does not cover any direct or indirect damages. The warranty specifically does not cover, and we shall not be liable for (except for replacement or repair of defective items under the terms and conditions set forth above), malfunctioning of our products if their failure or poor functioning is attributable to incorrect installation or to negligent or improper use.

This warranty does not cover products installed on racing boats or used in a competitive context. The descriptions and illustrations in this manual are indicative only.

Please contact our Assistance Service for more detailed information.

The components of **ULTRAFLEX** steering and control systems with EC marked components. (See Art. 3 and Art. 5 of directive 94/25/EC.) Note that the **ULTRAFLEX** warranty shall be automatically forfeited if any **ULTRAFLEX** components are installed in a steering and control system along with products of other brands.



1 PRODUCT DESCRIPTION

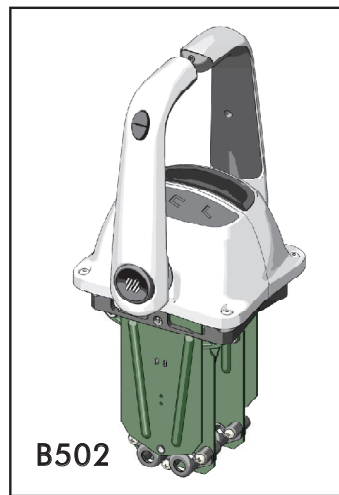
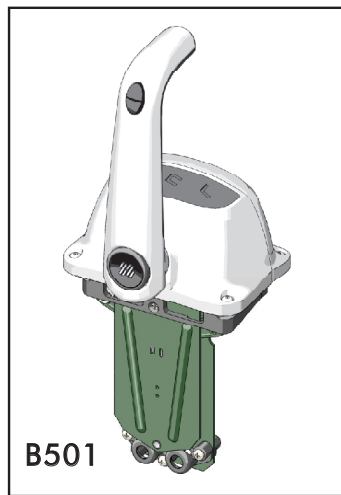
1.1 Product description and recommendations for use

ENGLISH

The B501 single engine and the B502 dual engine controls are designed as a single lever dual function per engine. They are specifically designed to operate with outboard, stern drive (I/O) and inboard marine propulsion engines. The controls can operate with all Ultraflex cables except the C4; **K59 kit is included with both the controls, necessary to install Ultraflex C2, C8, C0, and Mach 0 cables.**

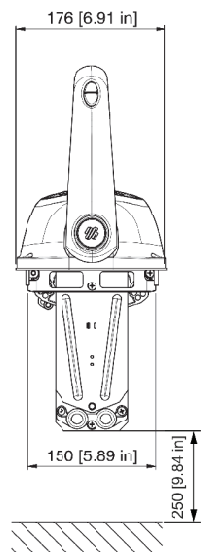
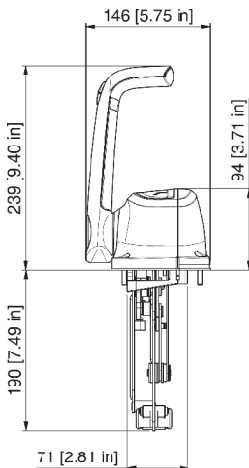
For all the other cables the following kits are available on demand:

- K 60 for cables Ultraflex C5 - C16 - MACH 5;
- K 61 for cables Ultraflex C22;
- K 62 for cables Ultraflex C36 - MACH 36.
- The cables C14 and MACH14 require no installation kit.

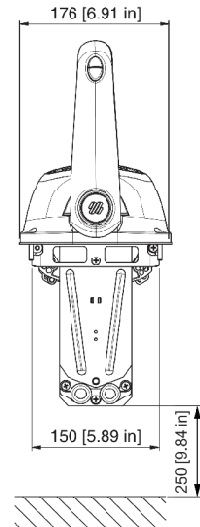
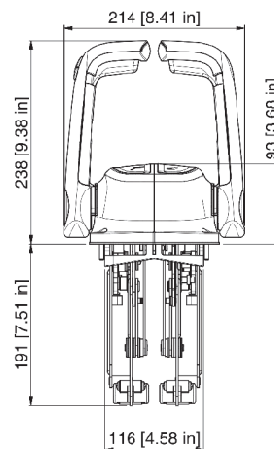


1.2 Dimensions

The pictures below show the lever control B501 and B502 dimensions.



Minimum distance to allow the cable installation



Minimum distance to allow the cable installation



2 TRANSPORTATION

2.1 General warnings

The product and its packaging weigh about 3.4 kg (7.5 pounds) and can therefore be moved by hand.

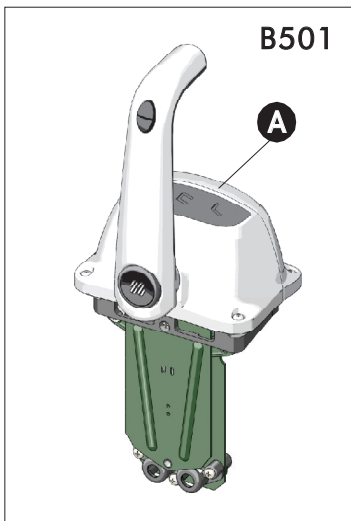
! WARNING

Personnel handling the load must work with safety gloves and footwear.

2.2 Package contents

Before using the device, check that it has not suffered damage during transportation or storage. Also check that all the components supplied with it are contained in the package (refer to list). If you identify any damage, notify the carrier and your supplier.

Contents of the control system packaging:

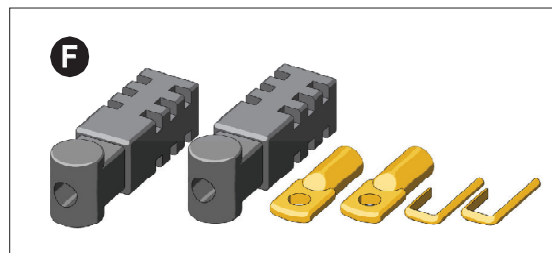
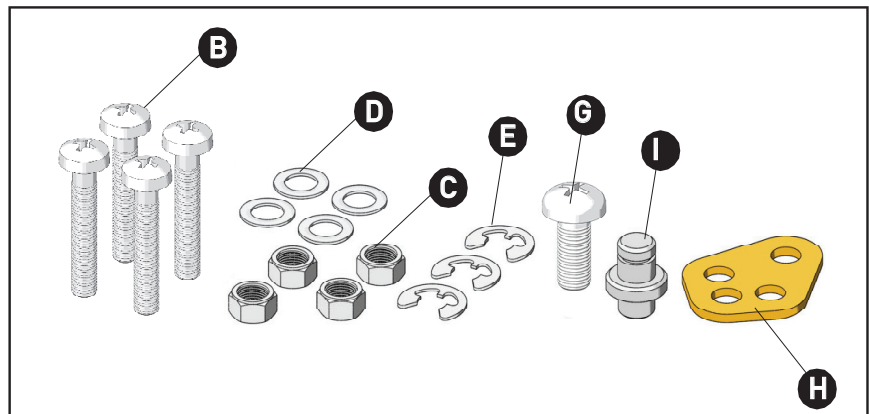


B501



B502

REF	B501	B502
A	1 lever control	1 lever control
B	4 screws M5x30	4 screws M5x30
C	4 nuts M5	4 nuts M5
D	4 washers	4 washers
E	3 snap rings	6 snap rings
F	1 kit K59 for cable installation	2 kits K59 for cable installation
G	1 screw M5x12	2 screws M5x12
H	1 plate	2 plates
I	1 pin	2 pins



! WARNING

Dispose of packaging in accordance with the law.



3 INSTALLATION

3.1 Tools required

ENGLISH



Phillips screwdriver



Pliers



Open end wrench
8mm [0.31"]



Socket wrench
17mm [0.66"]

3.2 Control box installation



1 Install the control in a position that allows the lever to rotate free and take care that it can reach the full forward and full reverse stroke.

2 Refer to the overall dimensions given in paragraph 1.2 to check that the box can effectively be installed in the desired position.

⚠ WARNING

When the cable is installed avoid too narrow bends.

3 After determining the appropriate location, drill the holes required to assemble the control box using the template provided for single or dual control.

NOTICE

Connect the cables to the lever before the lever control to the dashboard.

⚠ CAUTION

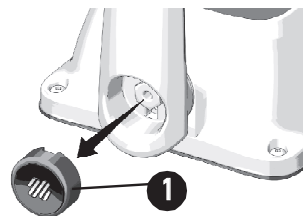
The use of a proper killing switch system is recommended for each ULTRAFLEX control system installation.

3.3 Adjustment of the lever inclination (Except CHTL/BHTL version not included)

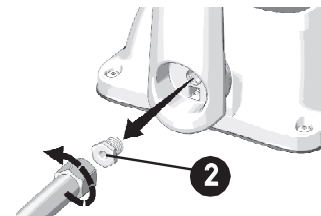


The lever angular position can be adjusted both forward and backward according to the control position. Follow the instructions below:

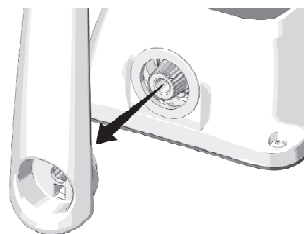
1 Remove the hub plug of the lever (1).



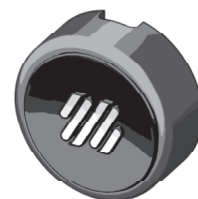
2 Take out the hexagonal head screw (2) with a 17 socket wrench.



3 Extract the lever and turn it to the desired position, then reinsert it by putting into gear with the shaft of the control box.



4 Apply threadlocking low strength (Loctite 222) on the screw (2) and fasten it completely. Insert the hub plug by paying attention to position the plug cut upward as shown in the picture.



⚠ WARNING

Make sure the chosen angular position allows the correct stroke of the cable.

3.4 Connecting control cable



- 1 Select a direct path with a minimum number of bends and without any obstacles.

⚠ WARNING

Avoid too narrow bends (the minimum bend radius is 203 mm (8")).

NOTICE

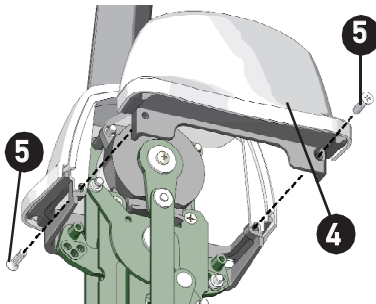
Outboard engine installations require an additional length of about 120 cm (47") of the cables to allow engine swing.

The cables can be fixed with suitable cable hangers (supplied separately) or routed through segments of conduit (supplied separately too) for long straight runs.

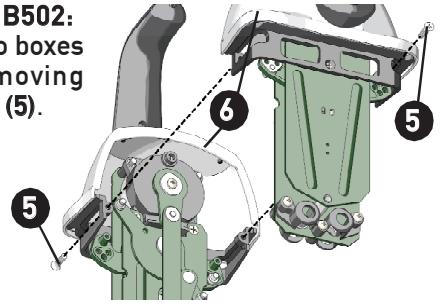
⚠ WARNING

To avoid the control stiffening, do not fix the cables near the control outlet (the minimum fixing distance is 500 mm) and in any case do not use fixing systems that can deform the cable conduit.

- 2 **CONTROL B501:** Remove the rear cover (4) of the control by (unscrewing) the screws (5) so as to reach easily the elements where the cables are to be fixed.



- 2 **CONTROL B502:** Split the two boxes (6), by removing the screws (5).



- 3 A specific fitting kit is available for each cable type. K59 kit is also included with both single levers B501 and B502.

To install the cables on the control/controls follow the instructions provided with each kit.

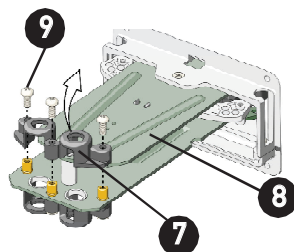
To install the cables C14 and MACH14 follow the instructions given below.

3.5 Installation of cables C14 and Mach14

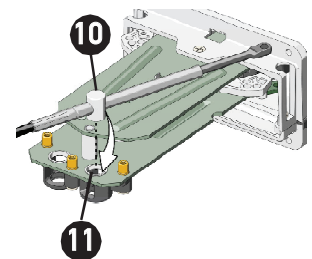


3.5.1 Shift cable connection

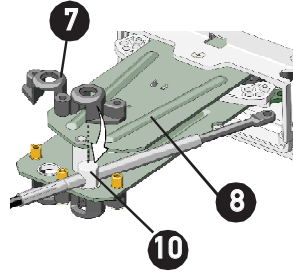
- 1 Position the control box on a plane surface as in the picture (the Ultraflex logo on the lever must be visible). Remove the cable fastener (7) from the plate (8) through the screws (9).



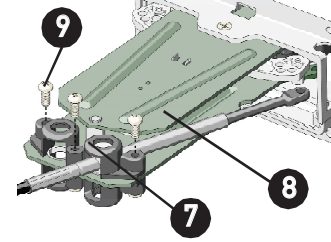
- 2 Mount the cable making sure the cable cylinder (10) is placed inside the plate hole (11).



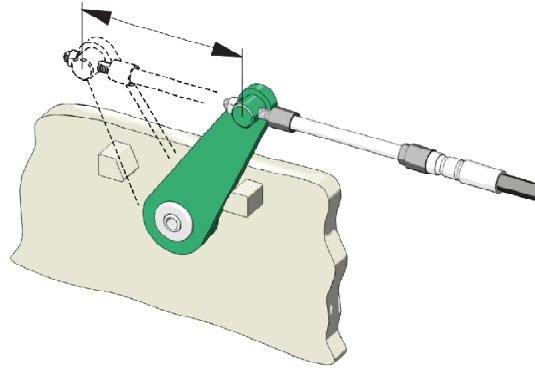
3 Remount the cable fastener (7) on the plate (8) aligning the cylinder of the connector (10) with the hole of the cable fastener.



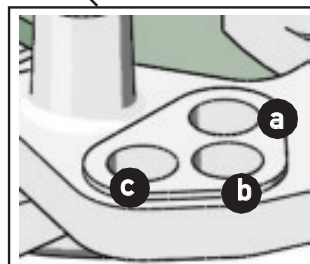
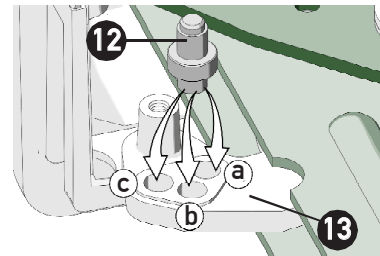
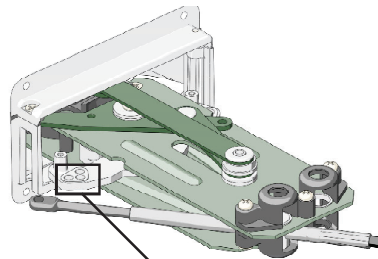
4 Fix the cable fastener (7) to the plate (8) with the screws (9).



5 Measure the engine shift lever stroke from the forward gear to the reverse gear. See the possible strokes on the control device and select the nearest one; for instance, if the stroke on the engine (from one end of stroke to the other) is 67 mm, the cable must be connected to the more internal hole (68 mm stroke). If a stroke of 70 mm is detected, check if the 68 mm stroke is sufficient otherwise connect the cable to the central hole (76 mm stroke); some millimeters (5-6) of surplus stroke on the control device are counterbalanced by the cable play.



6 Turn the control box upside down (internal mechanism looking upward). Put the pin (12) in one of the three holes (a), (b), or (c) of the lever (13).



NOTICE

The hole is chosen according to the stroke of the cable (see the table below).

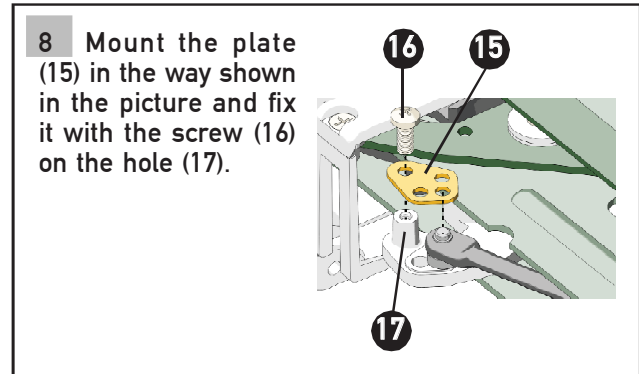
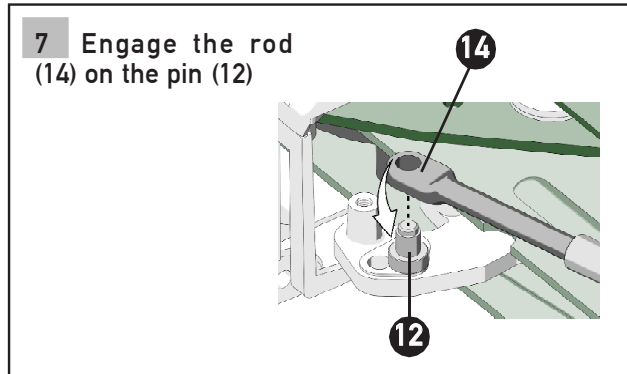
HOLE	a	b	c
STROKE [mm]	68	76	82



⚠ WARNING

Adjust the shift cable stroke in order to not force the top and the bottom of the engine stroke.
The non-compliance with this recommendation causes the control system malfunction such as:

- High resistance to the lever operation
- Early wear of the mechanism that can cause its locking.

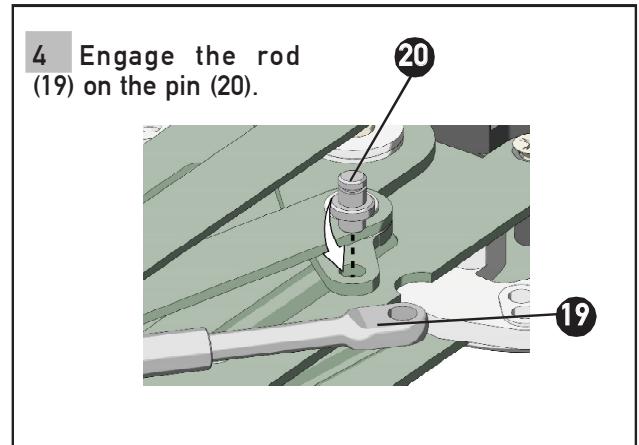
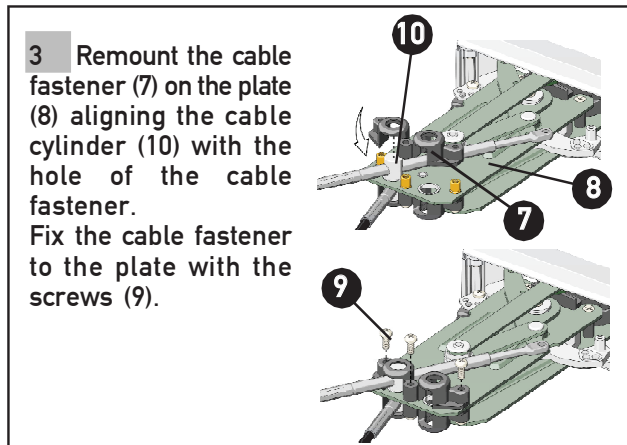
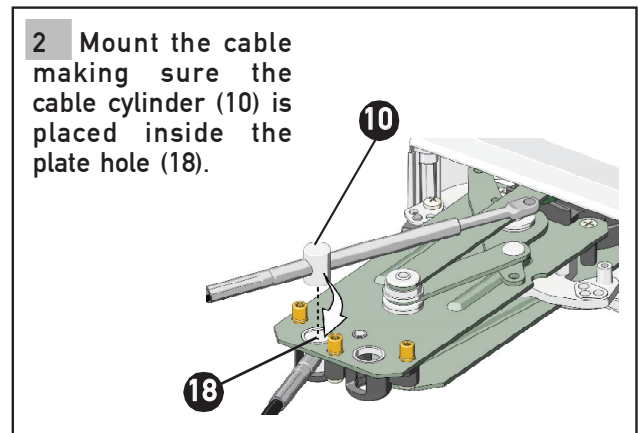
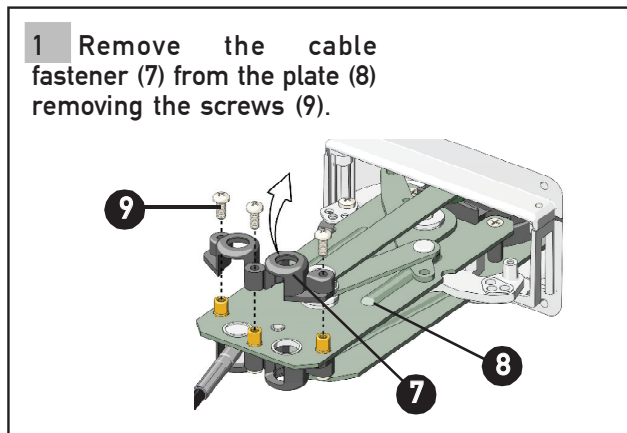


⚠ WARNING

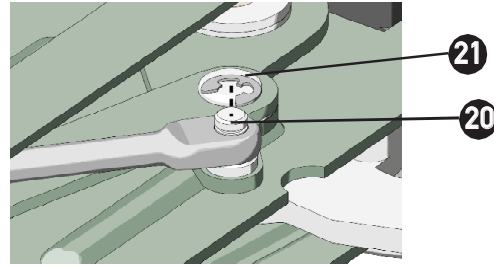
Check the right setting of shift cable stroke and make sure that is compliant with the following conditions.

During the shift engagement, the lever movement must be always fluid with a constant resistance. The lever must no become stiffer during the throttle engagement, otherwise check that the control shift stroke corresponds to the engine one.

3.5.2 Throttle cable connection



- 5 Fix the cable inserting the circlip (21) in the groove of the pin (20).



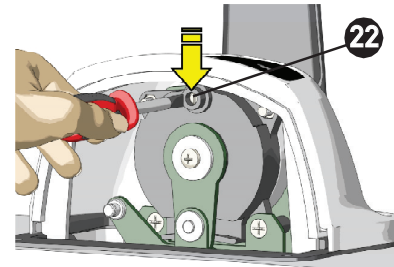
3.6 Adjusting the clutch



Both the control boxes B501 and B502 allow the adjustment of the clutch. Follow the instructions below:

- 1 Rotate the lever in the middle throttle position:

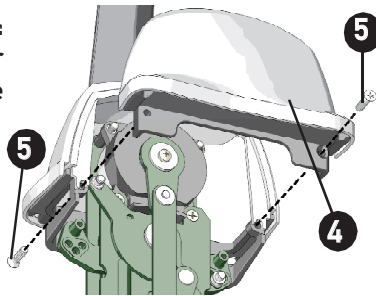
- 2 Screw the dowel (22) to obtain the hardening of the clutch, or unscrew it to obtain a smoother movement. To check the friction of the lever, move it clockwise and counter clockwise. **ADJUSTING THE CLUTCH MUST BE PERFORMED WITH ENGINE TURNED OFF AND THE LEVER IN THROTTLE POSITION.**



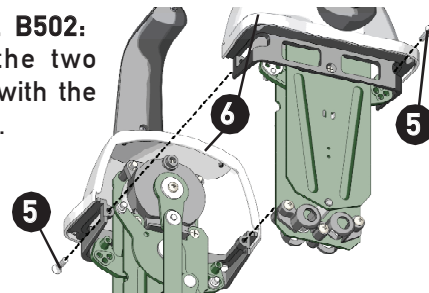
⚠ WARNING

DOING THIS SETTING IN GEAR POSITION CAN DAMAGE THE SYSTEM.

- 3 **CONTROL B501:** Place the rear cover (4) fixing it with the screws (5).



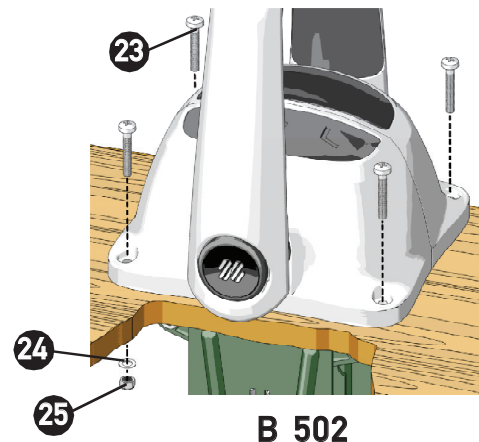
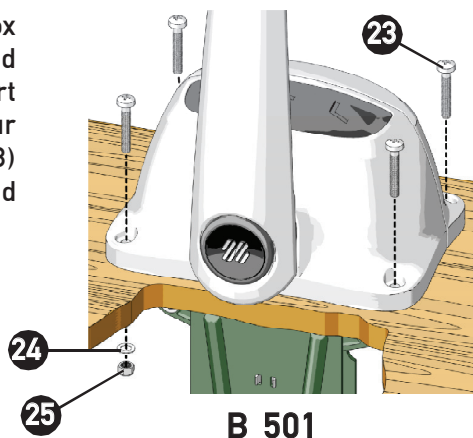
- 3 **CONTROL B502:** Connect the two boxes (6) with the screws (5).



3.7 Lever control box mounting



- 1 Put the control box in the selected position, then insert and tighten the four screws M5x30 (23) with washers (24) and nuts (25).



3.8 Installation of the neutral safety switch



This optional device allows starting the engine only with the shift in neutral position, avoiding unexpected movements of the boat.

To assemble it do as follows:

ENGLISH

1 Put the lever forward until the holes on the plate (27) can be seen through the slot on the plate (26).

2 Position the device (30) on plate (29) inserting the cylinder (31) inside the plastic guide (32).

3 Through the slot located on the plate (28), insert the screw (33) in the switch hole through the hole of the plate (29). Insert the nut (34) from the outer side of the plate (29) and tighten the screw (33).

NOTICE

If you are installing the switch X12, the screw and the nut must be inserted inside the hole (A). For the switch X43, the reference hole is (B).

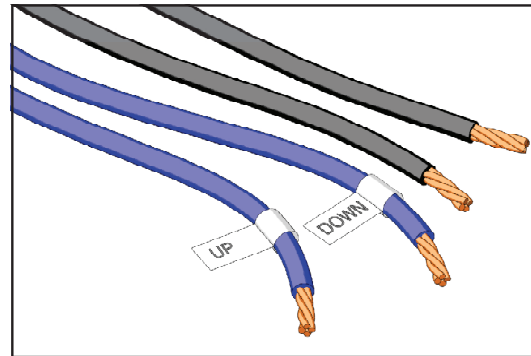


3.9 Trim electrical connections

ENGLISH

Carry out the electrical connections of the cables coming from the lever following the diagrams shown below depending on the used engine.

The lever cables will be marked by a little flag "UP" and "DOWN" for the trim controls and "GND" for the earth.



⚠ WARNING

Before fixing the cables definitively, check that the lever can move freely in all positions.

NOTICE

The following diagram is only a guideline for the most common engines. For a specific detail of the wiring refer to the manuals of your boat.

	MERCURY MERCURISER MARINER	OMC STERNDRIIVE	SUZUKI	CHRYSLER I/O	VOLVO I/O	JOHNSON EVINRUDE YAMAHA		
TRIM UP	P	B/O	Pk/R	Y	Bl	G	G	Green
NEUTRAL	R	P	B with W line	P	P	R	R	Red
TRIM DOWN	G	G/O	Bl	G	G	Bl	Bl	Black
TILT switch necessity	YES	YES	NO	YES	YES	NO	W	White
							P	Purple
							O	Orange
							Pk	Pink
							Bl	Blue
							Y	Yellow

⚠ WARNING

The circuit diagram for MERCURY, MERCURISER and MARINER requires the use of Mercury solenoid kit and conductor complex.

⚠ CAUTION

In case of high inductive load, we recommend to use a supporting relay in order to protect the switch.

⚠ CAUTION

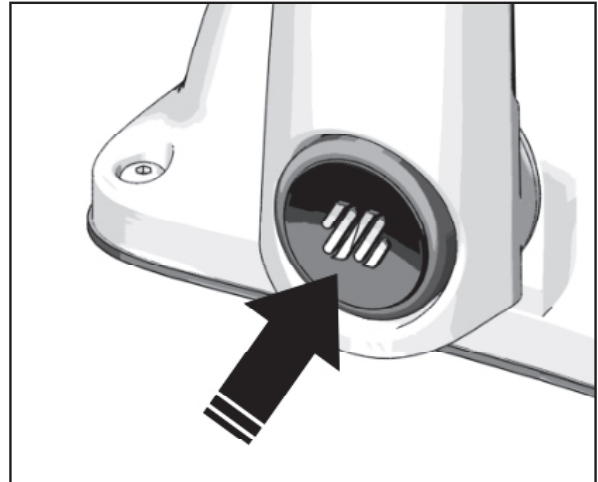
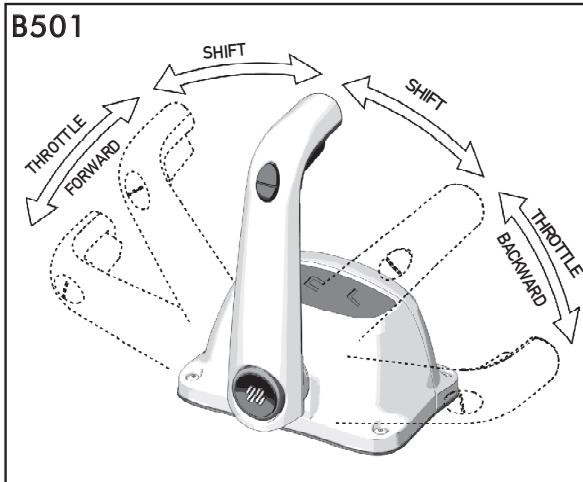
In case of dual engine both solenoid valves are actuated by a single switch. In this case a suitable relay is required for the proper operation of the system.



4 USE

4.1 Lever use

The lever stroke is made up of two movements: operating the shift in the first 30° and the throttle in the rest of the stroke. The boat moves forward when the lever is in forward position, and it moves backward when the lever is put in reverse position. To unlock the throttle without engaging the gear press the button located on the lever hub and at the same time put the lever forward. To unlock the B501/B502 control lever CHTL/BHTL version from the neutral position, pull the lock in neutral trigger located on the lower part of the handle and at the same time push the lever forward.

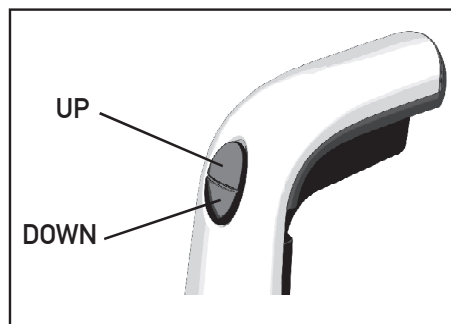


⚠ DANGER

Before starting the engine, if the control is not provided with safety switch, make sure that the lever is in neutral position.

4.2 Trim operation

The trim buttons allow the adjustment of the engine position. Pressing the button "UP", the engines lift up; pressing the button "DOWN", the engines lower down.



5 SAFETY WARNINGS

This section illustrates the safety regulations to be applied for proper use of the apparatus.

Read this section very carefully and also read the manuals supplied with other components of the single lever control.

ENGLISH

5.1 Safety warnings during installation and use

OBLIGATORY FOLLOW the precautions and safety criteria indicated below.

ULTRAFLEX shall not be held liable for the user's failure to observe these precautions and criteria and shall not be held liable for any negligence in use of the system.

DANGER

- **NEVER PUT HANDS BETWEEN THE MOVING PARTS.**
- Do not deactivate safety devices or render them inoperative.
- Do not modify the system or add devices to it without written authorization or the intervention of an **ULTRAFLEX** technician describing the change made in the description of the work performed.
- Do not use the apparatus for any purpose other than its intended purpose as specified in the installation and maintenance manual.
- Do not allow untrained personnel to perform installation.

WARNING

- During installation of the system, take particular care to keep everything clean to ensure that no foreign bodies can get into the system. Even a tiny object can cause permanent damage which may not be immediately obvious.
- Avoid cable curve radiuses of < 200 mm (8").
- Do not let cables come into contact with sharp corners or edges.
- Do not let cables come into contact with heat sources.

5.2 Clothing

WARNING

DO NOT wear necklaces, bracelets or any loose garments that could get caught in moving parts during installation, inspection or maintenance work.



6 MAINTENANCE

6.1 Ordinary maintenance

WARNING

Failure to apply maintenance controls may result in loss of control when driving, which can result in damage to property and/or injury.

Maintenance requirements will vary depending on climate and frequency and type of use. Inspections must be conducted at least every two years by an experienced nautical mechanic.

Perform the following maintenance operations:

- Periodically wash components with fresh water and remove any salt deposits
- Once a month, check all nuts holding the system in place and tighten if necessary.

DANGER

Loosening or separation of nuts holding the system in place can cause not only malfunctioning of the single lever control but damage or injury.

- Periodically check the absence of corrosion on the metal parts of the cable terminals and of abrasions on the sheath.
- Replace damaged parts that may compromise the integrity of the single lever control.

6.2 Special maintenance

Technical Assistance

For any information or assistance with particular applications please contact our technical assistance service (See paragraph "Introduction").

7 DISMANTLING

7.1 Dismantling

If you intend not to use the single lever control system any more, dispose of it in an environmentally sound way.

Sheaths, hoses and components made of plastic or other non-metallic materials must be dismantled and disposed of separately.

