

QL Boat Trim System



- (ENG)** **QL Boat Trim System**
User & installation Instructions
- (GER)** **QL Bootstrimm-System**
Benutzer- und Einbauanleitung
- (FRE)** **Système de correction d'assiette QL**
Instructions d'utilisation et d'installation
- (SPA)** **Sistema de Trimado de Embarcaciones QL**
Instrucciones de usuario y de instalación

- (ITA)** **QL Sistema di assetto per imbarcazioni**
Istruzioni d'uso e installazione
- (SWE)** **QL Båttrimssystem**
Användar- och monteringsanvisning
- (DUT)** **QL Boottrimmsysteem**
Gebruikersinstructie & Installatievoorschriften
- (FIN)** **QL-trimmijärjestelmä**
Käyttö- ja asennusohjeet



Marine Accessories
By Volvo Penta

IMPORTANT!

This batch with its accompanying instructions is produced for Volvo Penta's service workshops, boat-builders, machine manufacturers and other authorized workshops which have personnel with qualified professional training.

The installation instructions are only produced for professional use and are not intended for non-professional use. Volvo Penta will not assume any liability whatsoever for damage incurred, either damage to materials or personal injury, which may result if the installation instructions are not followed or if the work is carried out by non-professional personnel.

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Dieser Satz mit vorliegender Einbauanleitung ist für Volvo Penta Kundendienst-werkstätten, Werften, Maschinenbauer und für andere ermächtigte Werkstätten mit beruflich geschultem Personal vorgesehen.

Die Einbauanleitung ist nur für den berufsmäßigen Gebrauch vorgesehen und nicht für unprofessionelle Anwendung gedacht. Volvo Penta übernimmt nicht die geringste Haftung für irgendwelchen Schäden an Personen oder Sachen, die als Folge einer Nichtbefolgung der Einbauanleitung oder wegen Ausführung der darin beschriebenen Arbeiten durch nicht beruflich geschulte Personen entstehen.

IMPORTANT!

Ce kit, avec instructions de montage, est destiné aux ateliers de service Volvo Penta, aux constructeurs de bateaux et autres ateliers de construction agréés avec un personnel qualifié.

Les instructions de montage sont exclusivement conçues pour une utilisation professionnelle. Volvo Penta se dégage de toute responsabilité pour d'éventuels dommages, corporels ou matériels, résultant du non respect des instructions ou d'un travail effectué par un personnel non compétent.

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El presente juego con las instrucciones de montaje se destina a los talleres de servicio Volvo Penta, constructores de embarcaciones y máquinas y a otros talleres autorizados que cuentan con personal capacitado.

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Questo kit e le relative istruzioni di montaggio sono stati realizzati per le officine di servizio Volvo Penta, i cantieri, i fabbricanti di macchine e tutte le altre officine autorizzate il cui personale ha ricevuto un addestramento qualificato e specializzato.

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VIKTIGT!

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Monteringsanvisningen är enbart framtagen för yrkesbruk och är inte avsedd för icke yrkesmässig användning. Volvo Penta påtager sig inget som helst ansvar för eventuella skador, såväl materiella som personskador, som kan bli följden om monteringsanvisningen ej följs, eller om arbetet utförs av icke yrkeskunnig personal.

VIGTIGT!

Dette sæt med tilhørende monteringsvejledning er blevet udviklet for Volvo Pentas serviceværksteder, bådbyggere, maskinproducenter og andre autoriserede værksteder, som har medarbejdere med kvalificeret, faglig uddannelse.

Monteringsvejledningen er udelukkende beregnet til professionel anvendelse og ikke til hobby- eller fritidsbrug. Volvo Penta påtager sig intet som helst ansvar for eventuelle skader på såvel materiel som personer, som kan være en følge af at monteringsvejledningens anvisninger ikke blev overholdt, eller hvis arbejdet blev udført af ikke-professionelt personale.

TÄRKEÄ!

Tämä sarja ja asennusohje on tarkoitettu Volvo Pentan huolto- korjaamoille, veneenrakentajille, konevalmistajille ja muille valtuutetuille korjaamoille, joiden henkilökunta on saanut pätevän ammattikoulutuksen.

Asennusohje on tarkoitettu ainoastaan ammattikäyttöön. Volvo Penta ei vastaa mahdollisista materiaali- tai henkilövahingoista, joita asennusohjeen laiminlyöminen tai ammattitaidottoman henkilökunnan suorittama asennustyö voi aiheuttaa.

BELANGRIJK!

Deze set met de bijgevoegde montage-aanwijzing is ontwikkeld voor de werkplaatsen van Volvo Penta, botenbouwers, machinefabrikanten en overige bevoegde werkplaatsen, die personeel hebben met een gekwalificeerde vakopleiding.

De montage-aanwijzing is alleen ontwikkeld voor professioneel gebruik en is niet bedoeld voor niet-professioneel gebruik. Volvo Penta neemt geen enkele verantwoordelijkheid op zich voor eventuele schade, zowel materiële schade als persoonlijk letsel, die het gevolg kan zijn als de montage-aanwijzing niet wordt gevolgd, of als het werk wordt uitgevoerd door niet-vakkundig personeel.

IMPORTANTE!

Este jogo, juntamente com as respectivas instruções de montagem, foi concebido para as oficinas de serviço da Volvo Penta, construtores navais, construtores de máquinas e outras oficinas autorizadas, com pessoal devidamente formado.

As instruções de montagem foram concebidas unicamente para utilização profissional e não se destinam a utilização não profissional. A Volvo Penta não se responsabiliza por quaisquer danos eventuais, tanto materiais como pessoais, que possam resultar no caso de as instruções de montagem não serem seguidas, ou se os trabalhos forem executados por pessoal não profissional.

Σημαντικό!

Η παρτίδα αυτή μαζί με τις οδηγίες που τη συνοδεύουν, παράγεται για τα συνεργεία της Volvo Penta, για κατασκευαστές σκαφών, κατασκευαστές μηχανημάτων και άλλα εξουσιοδοτημένα συνεργεία τα οποία απασχολούν εξειδικευμένο, κατάλληλα εκπαιδευμένο προσωπικό.

Οι οδηγίες εγκατάστασης παράγονται μόνο για επαγγελματική χρήση και δεν προορίζονται για χρήση από ερασιτέχνες. Η Volvo Penta δεν αναλαμβάνει καμία ευθύνη για ζημιές, είτε σε υλικά είτε σε άτομα, η οποία μπορεί να συμβεί εάν δεν τηρηθούν οι οδηγίες εγκατάστασης, ή εάν οι εργασίες δεν γίνουν από επαγγελματίες.

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Presentation of the QL Boat Trim System

The system comprises:

- A. Control Unit
- B. Control Panel
- C. Interceptor Units
- D. Cable between Control Unit and Interceptor Unit
- E. Cable between Control Unit and Control Panel

The system is designed for planing boats, max boat speed of 50 knots (57 miles/h). The system can also be used on semi-planing boats, see sizing guide lines.

The Interceptor units are available in two lengths, 300 mm and 450 mm. They can be installed individually or side by side, i.e. two units on each side of the transom (300 + 300, 300 + 450 or 450 + 450).

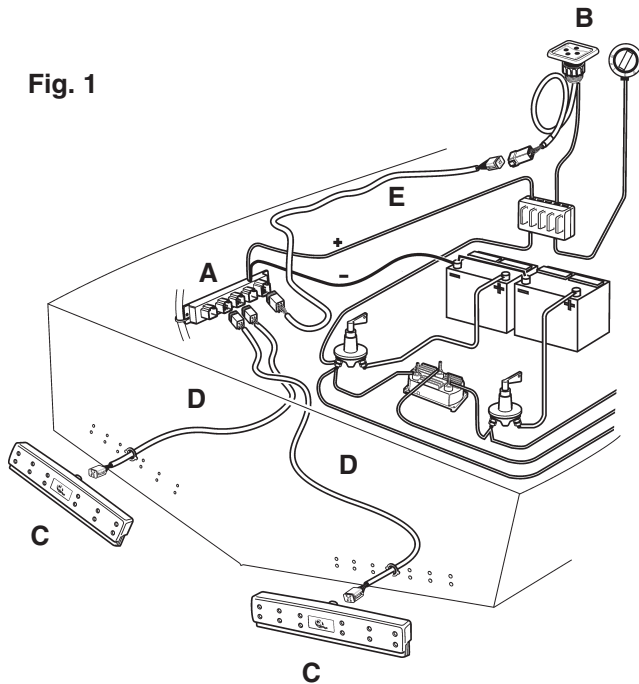


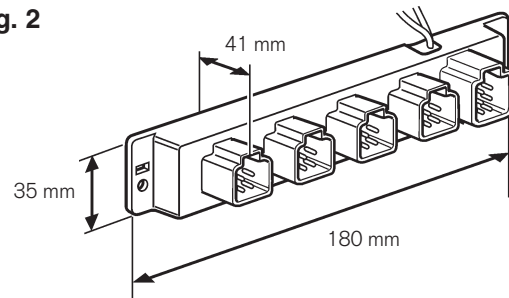
Fig. 1

Control unit (A)

The control unit is the brain of the system, and is available in two versions, one for 1 pair of Interceptors and one for 2 pairs of Interceptors. Ambient operating temperature: Min -40°C, Max +85°C.

Length (mm)	Width (mm)	Height (mm)
180	35	41

Fig. 2



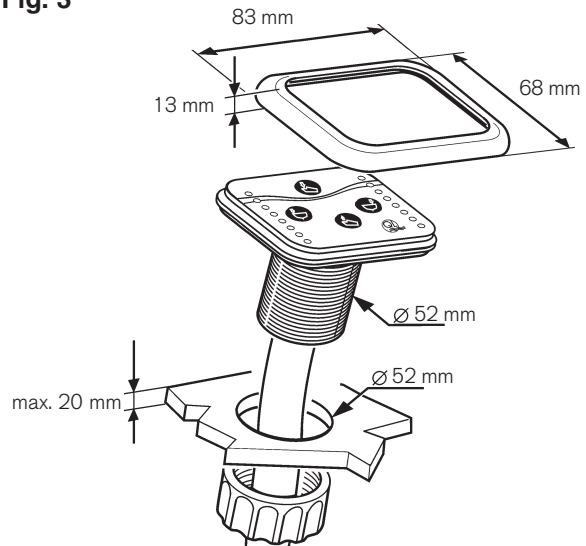
Control panel (B)

The control panel is equipped with 4 push buttons for smooth operation of the trim system. For push button functions, see **Operating the system**. The panel is also equipped with two rows of LEDs for exact trim indication.

Length (mm)	Width (mm)	Height (mm)	Hole cutting (mm)
83	68	13	52*

* Surface mounted, see fig 22 (A).

Fig. 3



Interceptor unit (C)

Two different sizes are available.

Length (mm)	Width (mm)	Height (mm)
300	100	42**
450	100	42**

** Outside transom.

Each interceptor unit is supplied with necessary stainless steel screws, for installation in fibre-glass hulls.

Note! Maximum stroke of the Interceptor blade is 35 mm.

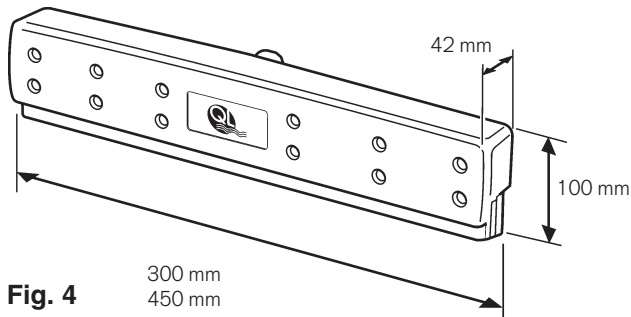


Fig. 4

Cable (E) between Control Unit (A) and Control Panel (B)

Each end of the cable is equipped with a 6-pole socket plug.

Five lengths of the cable are available i.e:

- * 5 m
- * 7 m
- * 9 m
- * 11 m
- * 13 m

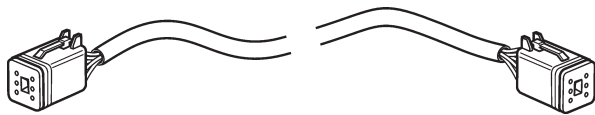


Fig. 5

There is also a 6-pole Y-cable and a 6-pole extension cable available, used when more than one helm station is installed.

Cable (D) between Control Unit (A) and Interceptor Unit (C)

Each end of the cable is equipped with 4-pole socket plug and one of the ends also with an installation grommet.

Two lengths of the cable are available, i.e:

- * 2.5 m
- * 4 m



Fig. 6

For installation of the components, see chapter **Installation of the QL Boat Trim System**.

Sizing guide lines

Many factors affect the choice of properly sized trim unit configurations, and the ultimate responsibility for selection is up to the boat owner/boat builder. These sizing recommendations are based on average boat performance. Your choice may vary based on power, engine configuration, weight distribution, type of boat and use.

When making a choice, please remember that the largest interceptor configuration that will comfortably fit on the transom will be the most efficient. The QL Boat Trim System is designed to fully replace conventional trim tabs.

Boat length	Single engine installation	Twin engine installation
15' - 24'	QL300	
22' - 30'	QL450	QL300
28' - 34'	QL450	QL450
32' - 44'	QL450 + QL300	QL450
42' - 50'	QL450 x 2	QL450 x 2

For semi-planing hulls, it may be necessary to increase the length of the trim unit configuration.

Component guide

Before starting the installation, be sure you have all and the appropriate components available. See selection guide below: *

Description	Part No.	1 helm station 2x300	1 helm station 2x450	1 helm station 2x300 + 2x450	1 helm station 4x300	1 helm station 4x450	2 helm stations 2x300	2 helm stations 2x450	2 helm stations 2x300 + 2x450	2 helm stations 4x300	2 helm stations 4x450
Mandatory components											
Control panel	1140717	1	1	1	1	1	2	2	2	2	2
6-pole cable (select length)		1	1	1	1	1	1	1	1	1	1
5 m	874789										
7 m	889550										
9 m	889551										
11 m	889552										
13 m	888013										
6-pole T-cable	3588972						1	1	1	1	1
6-pole extension cable (select length)							1	1	1	1	1
3 m	874779										
5 m	874780										
7 m	874781										
9 m	874782										
11 m	874783										
Control unit											
1-pair	1140718	1	1				1	1			
Control unit											
2 pairs	1140719			1	1	1			1	1	1
4-pole cable		2	2	4	4	4	2	2	4	4	4
2.5m	3817171										
4.0m	3817172										
Interceptor unit											
300mm	1140714	2		2	4		2			4	
Interceptor unit											
450mm	1140712	2	2	2		4		2			4
Optional component											
Resettable breaker 8A**	966689	2	2	2	2	2	2	2	2	2	2

* **Note!**For each extra helm station (max 4 helm stations possible), add one control panel, one 6-pole T-cable and one 6-pole extension cable.

** **Note!** The wiring diagrams as specified in these instructions, fig. 23 and 24, show the preferred protection of the Control Unit and the Control Panel. If the boat does not have a separate fuse box, Volvo Penta resettable 8A breaker may be used. Breaker 966689 is not explosion proof and must therefore not be used in gasoline engine rooms.

Installation of the QL Boat Trim System

Note! Before starting the installation of your QL Boat Trim System, read carefully the next coming pages! Especially notice the "Note!", "Important!" and "Warning!" remarks.

The interceptor units (C) **fig. 1 and 4** shall be installed on the transom close to the boat bottom. The exact positioning is set by the template, included in the delivery (for detailed instructions, see below). The further outboard the interceptor units are mounted, the greater the lateral (side-to-side) control. Position the interceptor min. 50 mm from the chine and run towards the centerline of the boat. Boats with Outboard Motors, Inboard/Outboard (I/Os) or Water Jet installation, must maintain a minimum of 200 mm from the centerline of the actual drive unit to the closest edge of the interceptor units. **See fig. 7.**

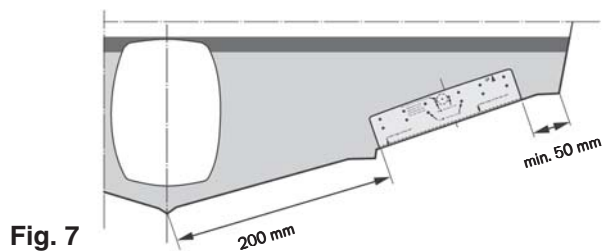


Fig. 7

Boats with inboard motors may utilize the entire run of the transom, still leaving min. 50 mm from the chine. If the boat has strakes reaching the transom, the interceptor units shall preferably be installed next to these strakes. **See fig. 8.**

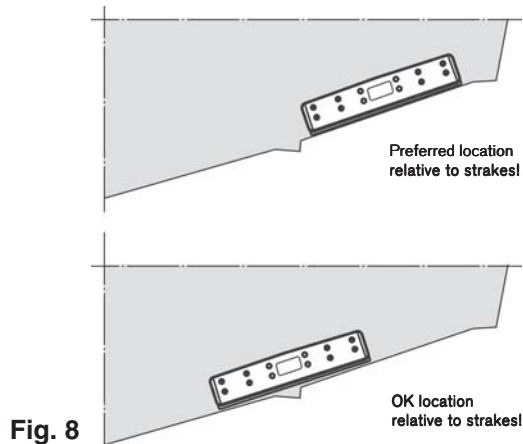


Fig. 8

Note! Check the flatness (with a ruler) in different areas, vertical plane and horizontal plane, of the transom area intended for the interceptor mounting. If the mounting area is not within 2mm flatness, grind it accordingly. It might be necessary to fill the unevenness with a suitable material before grinding. Alternatively a shim of suitable material can be used and fixed to the transom, in order to provide a straight, flat and smooth mounting surface. Before continuing the installation, recheck (with a ruler) that the flatness of the prepared surface is kept within the 2 mm. **See fig. 9a-b.**

The template, **see fig 10**, is equipped with pilot holes for marking on the transom. Place the template on the transom considering the guidelines as specified above. If

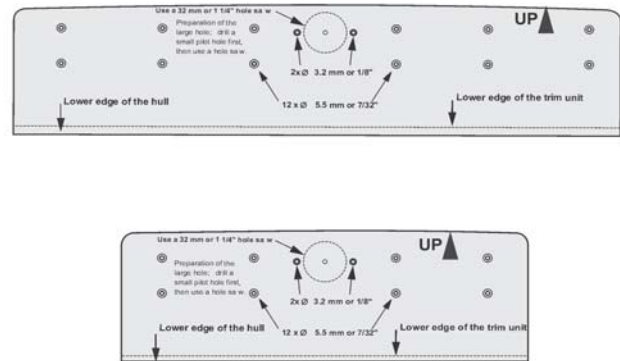


Fig. 10

two pairs of Interceptors are installed, i.e. two units on each side of the transom, leave approx 3 mm between the two templates. **See fig 11.**

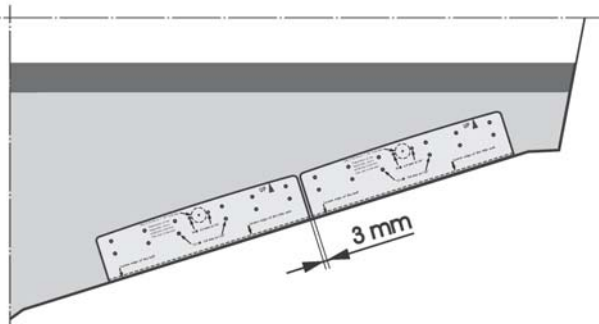


Fig. 11

Before the installation is continued, always check there are no obstacles on the inside of transom (bulkheads, tanks, fuel lines etc.) that can interfere with or be damaged by the interceptor installation. **See fig 12.**

Warning! Be sure the bilge is completely ventilated and free of gas fumes. Drilling into a hull contaminated with gas fumes may cause a violent explosion.

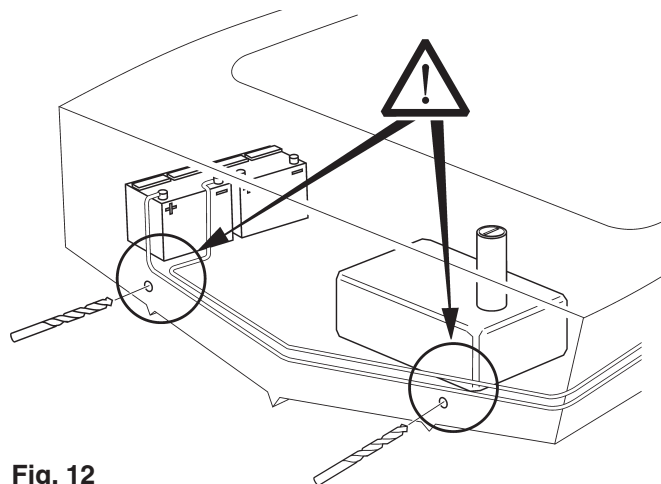


Fig. 12

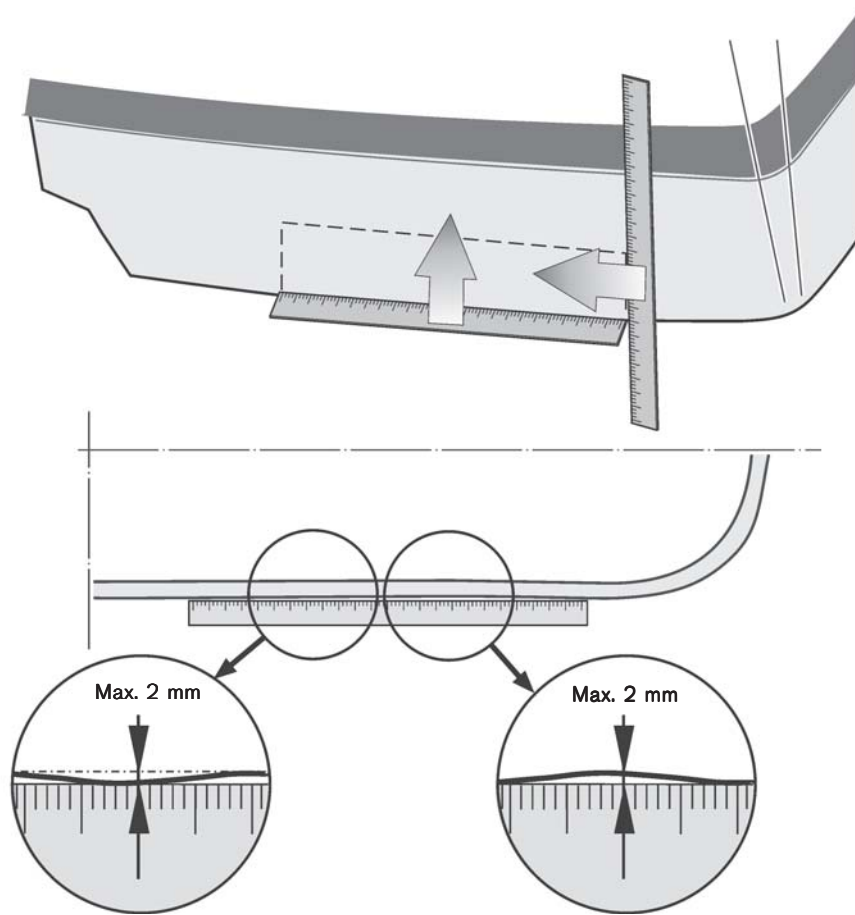


Fig. 9a

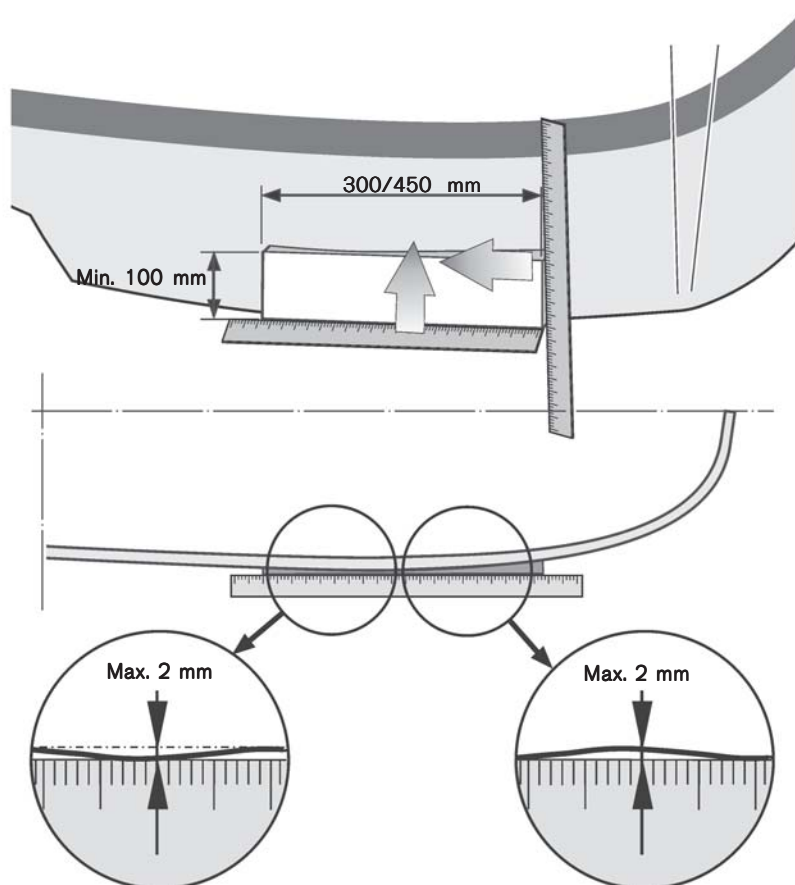


Fig. 9b

Locate the lower edge of the template flush to the boat bottom, however no part of the template must overlap the transom profile. **See fig. 13.**

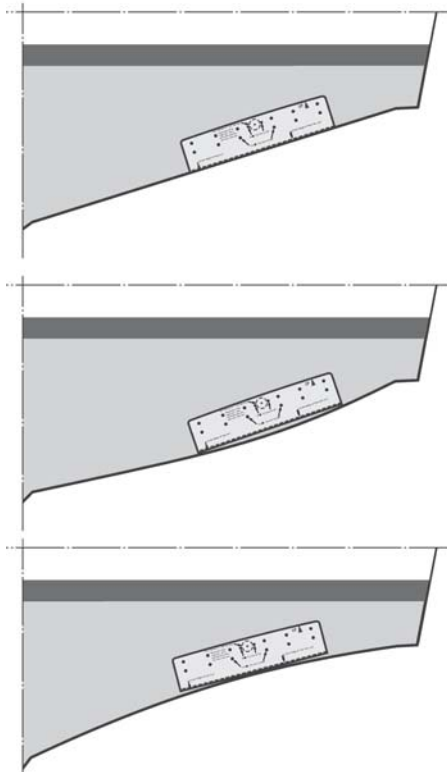


Fig. 13

Once you have reached the desired position of the template, keep it firm and steady and mark the pilot holes to the transom by means of a marking pencil. Remove the template and check that the pilot holes are all clearly visible. Re-check that no obstacle on the inside of transom will interfere with the installation nor be damaged by the drilling, before continuing the installation. **See fig. 12.**

Start to drill the hole (center hole) for the interceptor grommet. Use a drill with diameter smaller than the center drill of the hole cutter that you will use for the final hole diameter of 32 mm.

Machine the 32 mm hole through transom, using a **high quality** hole cutter. **Note!** Only use a hole cutter of 32 mm, no other diameters of the tool is accepted. **Note!** Machine the hole perpendicular to the transom surface (vertically as well as horizontally), **see fig. 14 and 15.**

Note! To check whether the tool you are going to use really will end up in the correct hole diameter, make a test hole in a piece of wood and check the diameter.

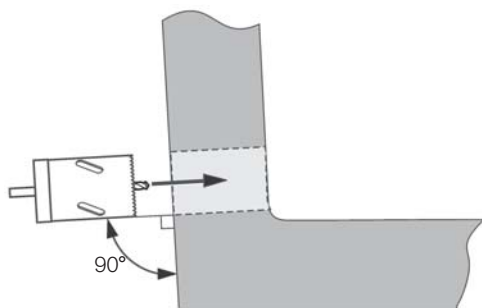


Fig. 14

If the transom thickness makes it impossible to reach through with the hole cutter, a hole connection from inside will be necessary to prepare. **Note!** Be sure that the edge of the 32 mm center hole is not damaged when preparing the through-hull. If the hole is damaged, the grommet will not fit in a proper way, which may result in insufficient sealing. The diameter of hole must permit the 4-pole plug to pass through. Approx. diameter 25 mm is required, **see fig 15.**

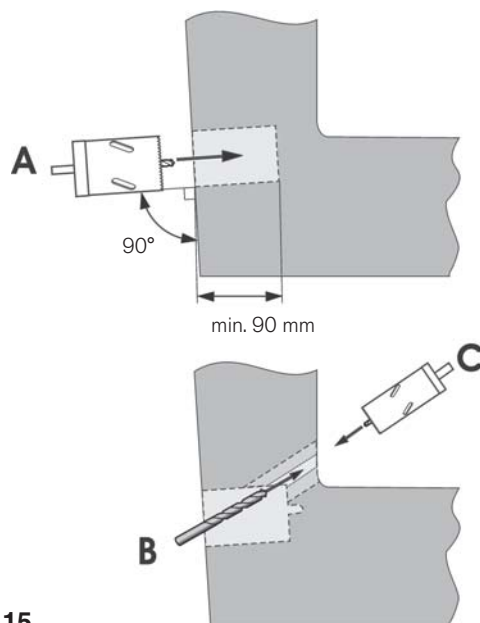
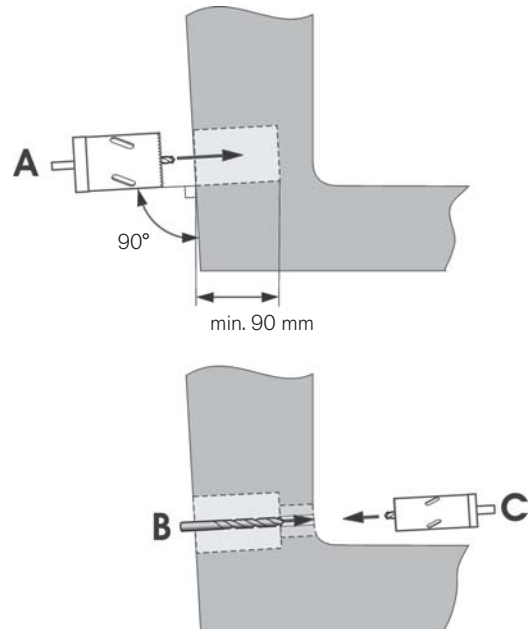


Fig. 15

Note! Different boats may have different transom constructions, and in case the transom material being used, is specially sensitive to water and moisture intrusion, it's advisable that the transom through hole surface is treated with a water resistant topcoat before the installation is continued. Moisture and damp may occur from inside of the transom, due to high bilge water level or to air temperature variances. Be sure that the hole diameter will not be too tight for the installation of the grommet, due to thick coating.

Drill the remaining holes as marked on the transom.

Note! The hole dimensions as specified on the templates (except for the grommet hole), only refer to glass-fibre reinforced plastic hulls. Eight holes diameter 5.5 mm and two holes 3.2 mm for the 300 mm interceptor and twelve holes 5.5 mm and two holes 3.2 mm for the 450 mm interceptor. Drill depth 20 mm. The hole dimensions are determined to fit the acid resistant stainless steel screws as supplied in the delivery.

Note! No other screws nor other hole dimensions are accepted.

For aluminium or steel hulls, other fasteners e.g. machine screws, washers and nuts may be required, however not included in the delivery. **Note!** For the grommet mounting, screw head must not exceed the height of 2.5 mm and the diameter of 5.5 mm.

Note! All through hull holes must be carefully sealed!

Push the 4-pole cable (the end with only the plug socket, i.e. without the grommet) from outside of transom, through the center hole and alternately pull/push the entire length through the transom, however leaving the grommet approx. 50 mm out from the transom. **Note!** Check that the grommet easily slides on the cable casing. If not, drip some soapy water into the grommet sleeve that surrounds the cable casing and recheck. **See fig 16.**

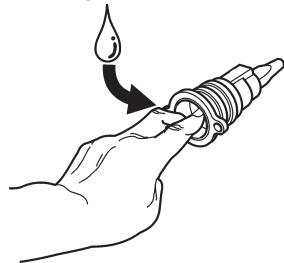


Fig. 16

Press the grommet into the transom hole and check that the grommet flange ends up flush to the transom. There should not be any gap between the flange and the transom surfaces. Now pull out the grommet. If gap was noticed, slightly shape the edge of the hole as shown in **figure 17**, using a fine round file or grinding paper. Be careful not to damage the drilled holes for the grommet screws. Now recheck whether the grommet ends up flush to the transom. If there still is a gap, continue to shape the edge until the gap is gone. Turn the grommet so that the marking "UP" will be directed upwards and twist the cable so that the 4-pole plug will fit into the grommet. **See fig. 18.**

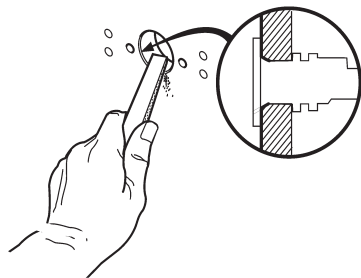


Fig. 17

Now apply marine sealant (see sealant specification) on the grommet flange (flange towards the transom), **see fig. 18**, and push/pull the grommet into the hole. Press it towards the transom, and adjust it so the two flange holes fit to the pre-drilled holes in the transom. Screw up the grommet (use the two small screws as supplied) and tighten. Use a Phillips head screwdriver, tighten by hand and make sure the grommet ends up flush to the transom

surface. **Note!** Do not use any pneumatic or electric tools that can cause over-tightening. Remove any residual sealant before it's hardened. Push the cable from inside, so that the plug reaches approx 50 mm out from the grommet. **See fig. 20.**

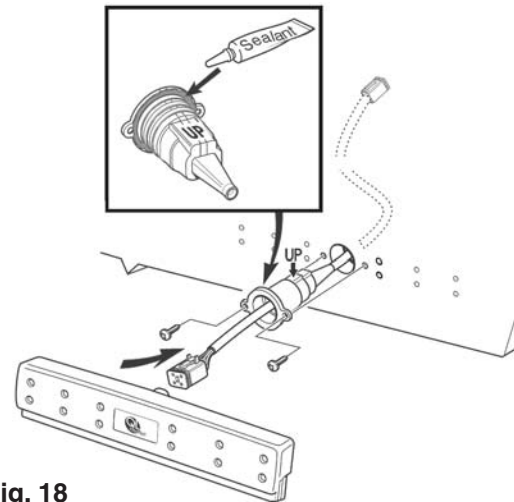


Fig. 18

The interceptor unit is equipped with an integrated gasket, part of the front cover, which seals towards the transom surface, thus avoiding water spray between the interceptor unit and the transom. Once the grommet has been installed as specified, check that the interceptor unit fits properly. Press the 4-pole plug into the corresponding socket in the interceptor neck. See to that the plug reaches the bottom of the socket, a "click sound" can be noticed.

Apply a thin layer of soapy water on the inside of the grommet (use your finger). **See fig.16.** Move the interceptor unit carefully towards the transom, so that the neck enters into the grommet. It might be necessary to pull the cable simultaneously from the inside of the transom. Be sure the cable follows smoothly through the grommet and that it does not twist inside the grommet. Now check that the interceptor really ends up flush to the transom, all around it's circumference. If not, investigate what is hindering, and remedy. Recheck, and when OK, dismount the interceptor from the transom, but keep the cable plug into the interceptor socket.

Now apply amply of marine sealant (see specification) around the interceptor neck as well as around each of the screw holes. **see fig. 19.**

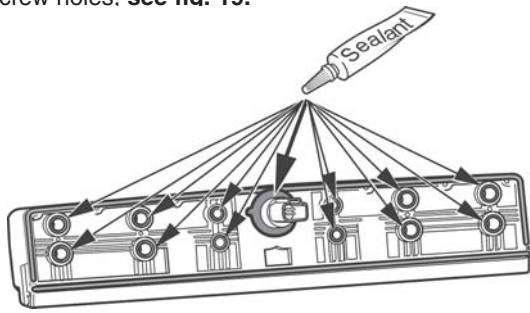


Fig. 19

⚠ Important! Never apply any sealant on the surface below the lower part of the gasket.

Specified sealants:

- * Sikaflex-291 (preferred)
- * Boatlife Life Caulk
- * Boatlife Life Seal
- * 3M 4200 Marine Adhesive Sealant

⚠ Important! Do not use any other type of sealing than those specified above. **Never** use sealing of hard caulk type. For all handling, preparation of surfaces, applying, cleaning etc. always follow the instructions and recommendations given by the manufacturer/supplier of the sealant being used.

Apply a thin layer of soapy water on the inside of the grommet (use your finger). **See fig. 16.** Move the interceptor unit carefully against the transom, so that the neck enters into the grommet. It might be necessary to pull the cable simultaneously from inside of the transom. Be sure the cable follows smoothly through the grommet and that it does not twist inside the grommet. Once you have reached the correct position of the interceptor, it's time to insert the screws (included in the delivery), and screw them into the predrilled transom holes and tighten them alternately. Use a Phillips head screwdriver, tighten by hand and make sure the interceptor unit ends up flush to the transom surface. **Note!** Do not use any pneumatic or electric tools that can cause over-tightening and damage the interceptor unit. **Note!** Torque to apply is 4-5 Nm. **See fig. 20.** Remove any residual sealant before it's hardened.

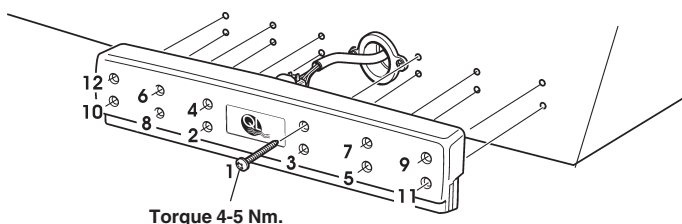


Fig. 20

The control unit shall be firmly fixed on a dry and easily accessible location, e.g. inside of transom. Screws are not included. Check that the distances from the control unit to each of the interceptors are not too long, i.e. the connecting cables are 2.5 meters or 4 meters long, depending on your choice.

Connect the 4-pole cables to the control unit. **See fig. 1, 2 and 21.** There are two versions of the control unit, one for 1-pair of interceptors and one for 2-pairs of interceptors. Each control unit is equipped with four 4-pole sockets marked P2 (port 2), P1 (port 1), SB1 (starboard 1), SB2 (starboard 2), one 6-pole socket marked AUX and one red cable and one black cable for power supply. One pair of interceptors: use P1 for the port interceptor and SB1 for the starboard interceptor. Two pairs of interceptors: use P1 and P2 for the two port interceptors and SB1 and SB2 for the starboard interceptors. **See fig. 21.**

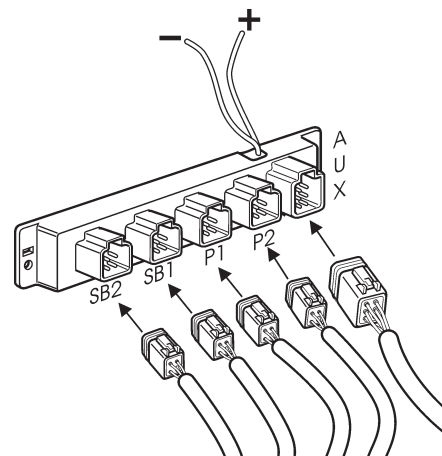


Fig. 21

Install the control panel (B), **see fig. 1, 3 and 22**, easily accessible at the helm station. Hole cutting is diameter 52 mm. **See fig. 3**. Use the gasket, included in the supply (**See fig. 22A**). For flush mounting of the panel, press the center section out and use the rest of the gasket for assembly **see fig. 22B**. See also the hole template for the control panel at the end of this manual.

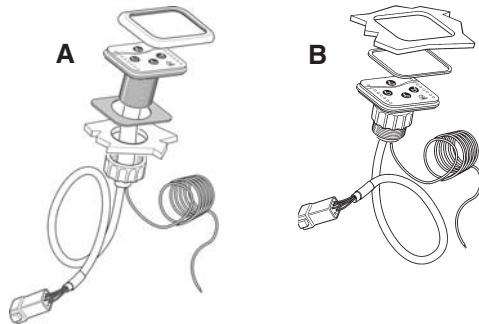


Fig. 22

Install the 6-pole connection cable (E) **fig. 1** between the control unit (connector marked AUX) and the control panel.

Connect the control unit power supply cables to 12V or 24V DC (red cable to plus and black cable to minus). Protect the installation by a 6-8A fuse on the plus cable. **See wiring diagrams fig. 25 and 26.**

Connect the red plus cable from the control panel to the start lock running position.

Note! For Volvo Penta EVC EC engines, the red cable must not be connected directly to the start key, but instead to the relay for external accessories. **Note!** Always check with your engine supplier whether there are any other recommendations or requirements that concern the wiring to the start lock. Protect the installation by a 3-8A fuse on the plus cable.

If more than one helm station is installed, only the main station control panel (red cable) shall be connected to the start lock or to the relay, as described above. For mechanical governed engines as well as for Volvo Penta EVC MC engines, **see wiring diagram fig. 25** and for EVC EC engines, **see wiring diagram fig. 26.**

If a suitable fuse box is not available in the boat, Volvo Penta resettable 8A breaker, part No 966689, can be used for protection of the installation. Breaker 966689 is not explosion proof and must therefore not be used in gasoline engine rooms. **See fig. 23** as well as the section "Component guide".

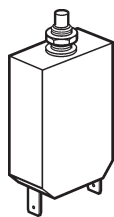


Fig. 23

Note! Perform the "system start up" as well as test run the trim system before the boat is launched. Before starting the "start up" procedure, carefully read the instructions below.

System start up

Once the QL Boat Trim System is mechanically installed and all electrical cables are connected, it's time to carry out the calibration of the system before the system can be operated. This is done in order to determine the blade position when fully retracted and fully extended respectively.

The calibration is performed as follows:

1. Turn on the main switch.
2. Press the upper and lower button on the control panel simultaneously and keep them in.
3. Turn the start key to running position (without starting the engine).
4. Wait minimum 10 sec. until the interceptor blades start to move out and then release the panel buttons. The blades may start moving before the 10 sec. have passed, however the upper and lower buttons must still be pressed down, until at least 10 sec. have passed.
5. The blades will go fully out, stop and then retract fully. Once this has been done in a proper way, the two upper and two lower LEDs on the control panel will flash twice. **See fig. 24.**

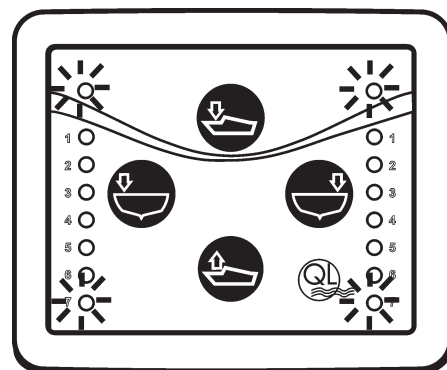


Fig. 24

This is the confirmation that the calibration is correctly done. If the calibration was not successful, an error code will pop up. If starboard interceptor was not successfully calibrated, the right LEDs, No 6 and 7 will flash. If port interceptor was not successfully calibrated, the left LEDs, No 6 and 7 will flash (see also under the headline Error codes). If this will happen, shut off the power to the system, and investigate why the blades do not move (mechanical obstacle, clogged up by paint or acorn barnacles). Remove the obstacle and recalibrate.

If a control unit for two pairs of interceptor units is used, but only one pair of interceptors is installed, thus the control unit is calibrated with only one pair of interceptors, it is necessary to re-calibrate the system if another pair of interceptors is installed later on.

If the control unit or any of the interceptor units, for any reason later on are replaced, the system has to be recalibrated.

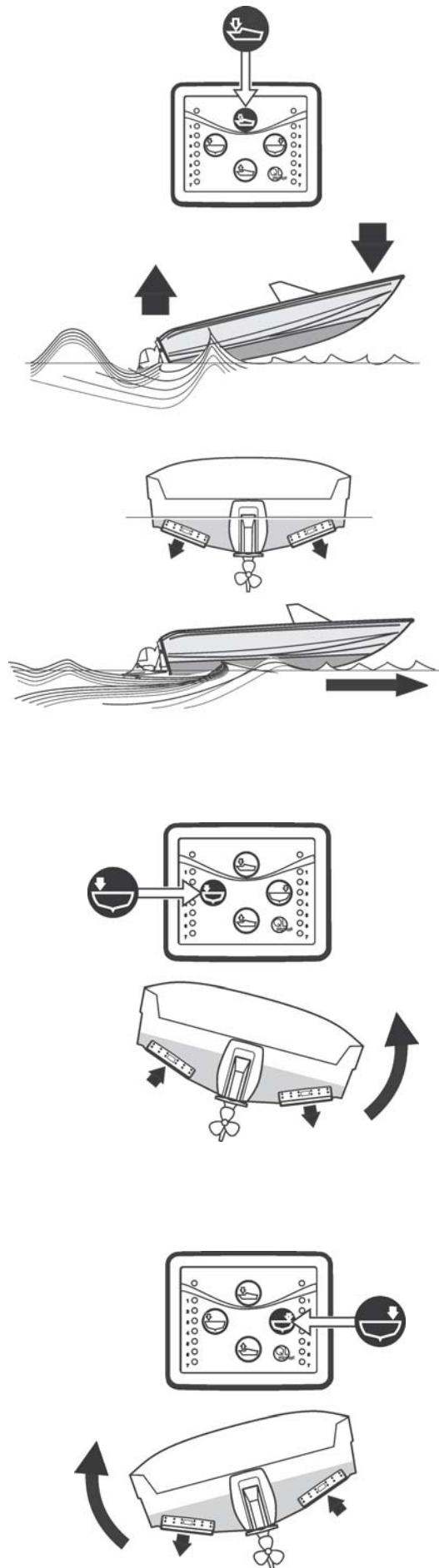
Now the system is ready for operation. **Note!** In connection to the boat launch, always check the interceptor installation regarding water leakage through the transom! If any leakage, the installation is not properly done and must be redone.

Operating the system

The control panel has four buttons. The upper button lowers the blades in parallel (bow down). The lower button retracts the blades in parallel (bow up). The left button lowers the starboard blade and retracts the port blade (tilt port). The right button lowers the port blade and retracts the starboard blade (tilt starboard). The blade operation starts when pressing the button and stops when releasing it. The LED:s on the panel have variable light intensity in four steps and OFF. By pressing the left and right buttons simultaneously for approx 1 second, the light intensity of the LED:s takes one step down. As long as the 2 buttons are pressed in, the intensity takes one more step down for each 0.5 second. When the intensity reaches the OFF level, it returns to maximum intensity again and keeps toggling like this as long as the 2 buttons are pressed in. When the buttons are released, the intensity of the LED:s will stay at the current value. If several panels are connected to the system, only the panel where the buttons are pressed will be affected. After power off, the panel LED:s will restart at maximum light intensity when power on.

When the engine stops (power supply to the panel is lost), the blades will fully retract.

Note! If more than one helm station is installed, the engine must be stopped from the main station (the station where the red cable from the control panel is connected to 12V or 24V).



Error codes

To help troubleshooting a system that is malfunctioning, there are some Error Codes (EC) implemented. If an EC is set, it is communicated to the user by flashing with some of the LEDs on the control panel. The following ECs/flashing can occur:

- EC 1; Flashing: LED number 1 and 2 on both starboard and port side are flashing. Error: Indicates that a button is stuck on one of the control panels. Action: Check so that no button is pressed in by mistake, by for example an object laying on the control panel.
- EC 2; Flashing: LED number 3 and 4 on port side are flashing. Error: Indicates that no communication is detected between the control unit and the interceptor(s) on port side. Action: Check so that the cable(s) between control unit and the interceptor(s) are connected properly. Check so that the cable(s) are not damaged.
- EC 3; Flashing: LED number 3 and 4 on starboard side are flashing. Error: Indicates that no communication is detected between the control unit and the interceptor(s) on starboard side. Action: Check so that the cable(s) between control unit and the interceptor(s) are connected properly. Check so that the cable(s) are not damaged.
- EC 4; Flashing: LED number 6 and 7 on port side are flashing. Error: Indicates that the interceptor blade(s) on port side are stuck and can not reach the correct position. Action: Check so that the interceptor blade(s) are not stuck due to marine growth, dirt, mechanical damage etc. Clean/replace them if necessary.

- EC 5; Flashing: LED number 6 and 7 on starboard side are flashing. Error: Indicates that the interceptor blade(s) on starboard side are stuck and can not reach the correct position. Action: Check so that the interceptor blade(s) are not stuck due to marine growth, dirt, mechanical damage etc. Clean/replace them if necessary.

- EC 6; Flashing: The two upper green LEDs are flashing. Error: Indicates that there is no communication between the control panel and the control unit. Action: Check so that the cable between the control unit and the control panel is connected properly. Check so that the cable is not damaged.

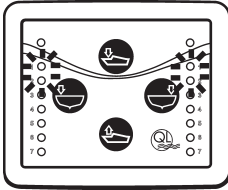
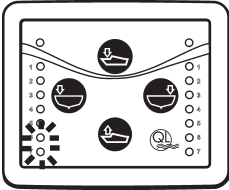
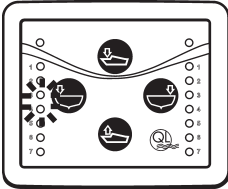
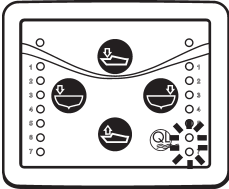
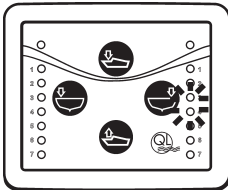
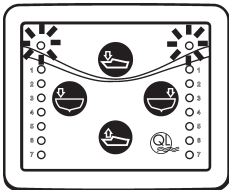
Maintenance of the system

As for all through hull fittings, regular check for any water intrusion where the interceptor units are mounted. Depending of the type of water condition where the boat is operated, marine growth can vary from almost non-existent to extremely severe.

When needed, paint the external surface of the interceptor unit with anti-fouling. **Note!** Do not paint any moving parts, e.g. the blade!

When the boat has been docking for a longer period of time and the marine environment is aggressive concerning marine growth, lower the interceptor blade and clean carefully away any growth. **Note!** Do not use any sort of high-pressure cleaning device. **Note!** Do not use any aggressive solvents, like acetone, methanol, corrosive acids etc.

Please keep these User and installation instructions with your boat's operating manuals!

Error code	Flash pattern	Error code	Flash pattern
1 Button stuck		4 Blade stuck port	
2 No communication between control unit and port interceptors		5 Blade stuck starboard	
3 No communication between control unit and starboard interceptors		6 No communication between control unit and control panel	

Volvo Penta EVC MC and other mechanical engines

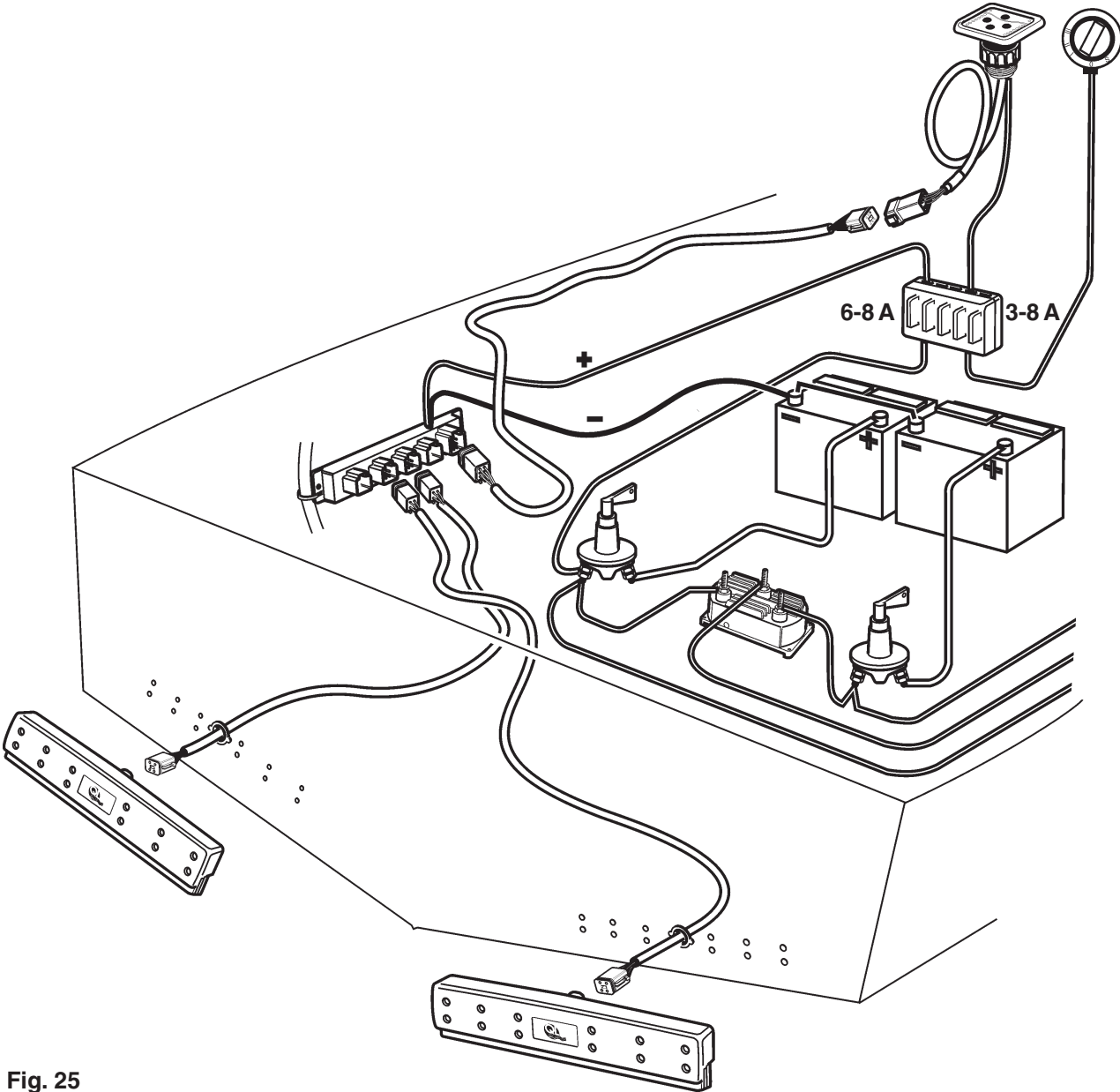


Fig. 25

Volvo Penta EVC EC (electronical engines)

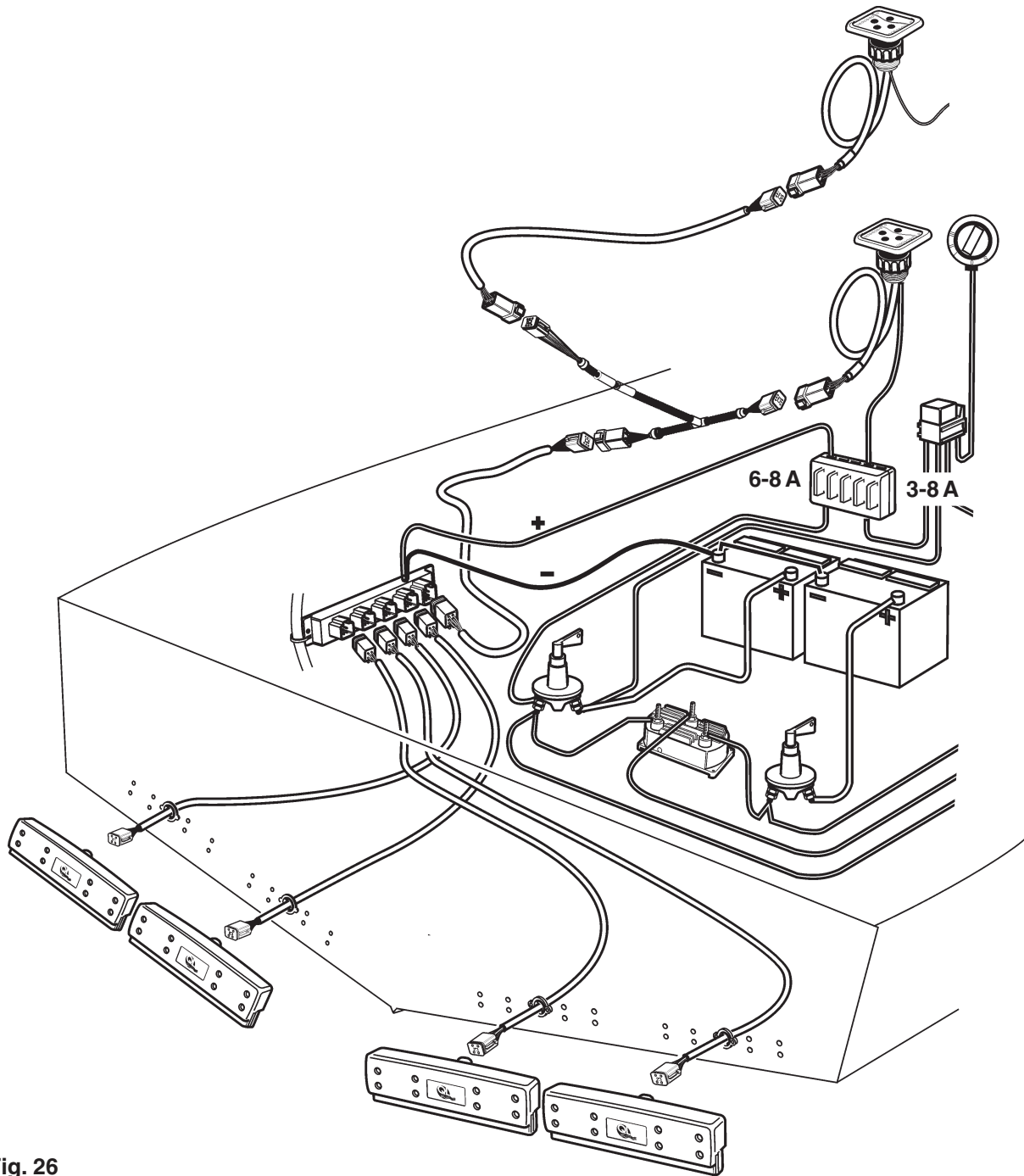


Fig. 26