

**V**olvo Penta have developed a number of control units with correctly formed hand levers and distinct operational functions that provide maximum safety and comfort when manoeuvring a vessel. All controls can disengage the transmission in order to warm up the engine. In addition the controls are fitted with, or are prepared ready for the installation of, a neutral safety switch which prevents starting the engine when in gear.

27.3  
**CONTROL LEVER  
ASSEMBLY**



27

Control system



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27.110-129

**ELECTRONIC CONTROL**

Volvo Penta's electronic control system guarantees easy, safe, feather-light movement of the controls for acceleration and gear shift. The compact design of the control unit and watertight construction allow great flexibility in location. Separate controls can be installed at up to 3 different driving positions. It suits most types of engine/ reverse gear combinations.

Volvo Penta's electronic control system is a single lever type with combined throttle and gearchange for marine engines. The system provides for up to three linked control units. Only one unit is active at any point in time. The system makes it possible to change driving position while under way without losing speed.

Volvo Penta's electronic control system has a smart back-up that ensures power supply to the controls for optimal safety. The system can operate on 12 or 24 V.

The control system is supplied with electric cables in various, pre-cut, lengths which have plug-in contacts to the control unit and processor to ease installation. A start blocking relay (extra) can prevent engine start when in gear.

**Product features:**

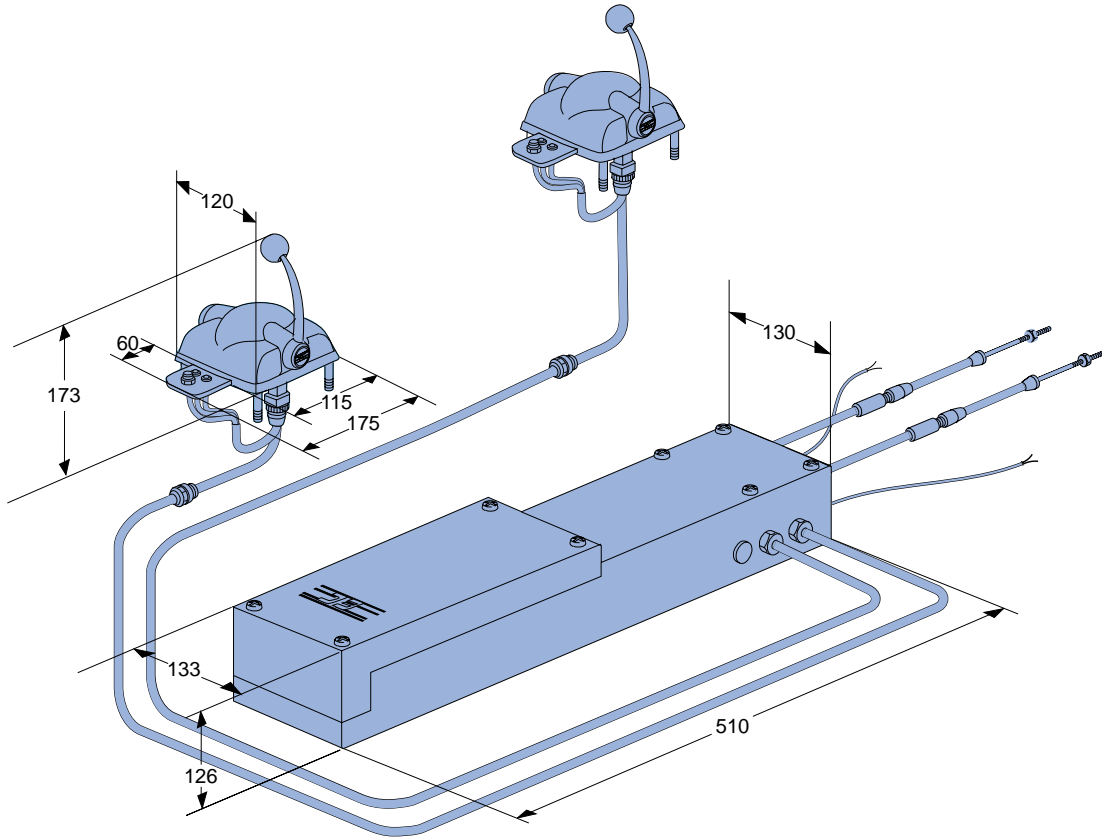
Possible for driver to change position while under way

Can be installed at up to 3 manoeuvring positions

Block prevents engine start when in gear

Throttle movement (revving-up) without gear engaged

Programmable throttle delay on changing gear (0-5 s)



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**27.110****DRIVE UNIT/PROCESSOR**

Part no. 3860487-2. The drive unit is in stainless steel sheet. Electrical linear switching unit for throttle and gear-change. The system can operate on 12 or 24 V. The processor is mounted on the drive unit and controls the switching unit. The processor has a display and buttons for use in calibrating the system, and checking operating state and fault codes, if any. The drive unit is supplied complete with double power cable (3 x 1.5 mm), 6.5 m in length.

**27.111-112****CONTROLS**

Water resistant stove enamelled aluminium housing with stainless steel lever/s.

Pos.no.	Part no.	
27.111	3861025-9	Single lever assembly
27.112	3861026-7	Double lever assembly

**27.113-114****CONTROL PANEL**

One function button and two LEDs for each engine.

Pos.no.	Part no.	
27.113	3860491-4	Single
27.114	3860492-2	Double

**27.115-119, 125-129****SIGNAL CABLE**

Signal cable is to connect the control with the drive unit/processor.

Pos.no.	Part no.	
27.115	3860494-8	5 m
27.116	3860495-5	10 m
27.117	3860496-3	15 m
27.118	3860497-1	20 m
27.119	3860498-9	25 m
27.125	3860506-9	30 m
27.126	3860507-7	35 m
27.127	3860508-5	40 m
27.128	3860509-3	45 m
27.129	3860511-9	50 m

**27.120****ADAPTER CABLE**

Part no. 3860490-6. For connecting signal cable to control or manoeuvre panel.

**27.121****INSTALLATION CABLE**

Part no. 3860493-0. A 4 m long extension cable can be ordered as an optional accessory to help in system calibration. This allows the processor to be disconnected from the drive unit and be used as a remote control in setting the throttle and gear changing functions.

**27.122-123****START BLOCK RELAY**

Relay for starting only when the control lever is in neutral.

Pos.no.	Part no.	Volt	Amp.
27.122	841177-9	12V	40A
27.123	873611-8	24V	20A

**27.124****AUTOMATIC FUSE**

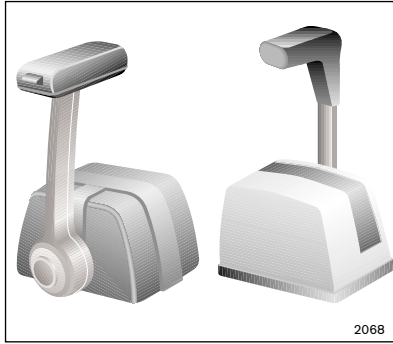
Part no. 966689-2. An 8A automatic fuse must be installed between the main switch and the processor, on Main plus and Back-up plus.

**Single lever controls**

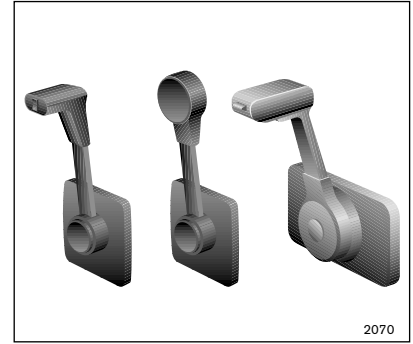
All single lever controls have a combined acceleration and gear shift function. They are suitable for all types of Volvo Penta engines with related drive and reversing gear as well as other engine/transmission combinations with SAE J960 connections. Top mounted single lever assemblies are available for single or twin engine installations, whilst side mounted controls are only intended for use with single engine installations.

**Twin lever control**

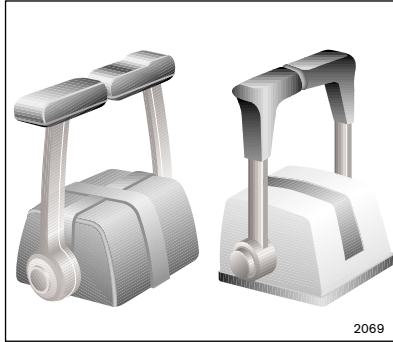
The twin lever control has separate levers for acceleration and gear-changing.



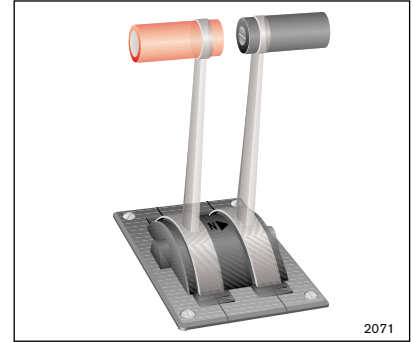
**Top mounted single control lever assembly, single engine installation.**



**Side mounted single control lever assembly.**



**Top mounted single control lever assembly, twin engine installation.**



**Twin control lever assembly.**



**EDC CONTROL**

Single control lever assembly with accelerator and gear changing plus control panel, developed especially for Volvo Penta's new engines equipped with EDC - Electronic Diesel Control.

Contact your Volvo Penta dealer for further information.





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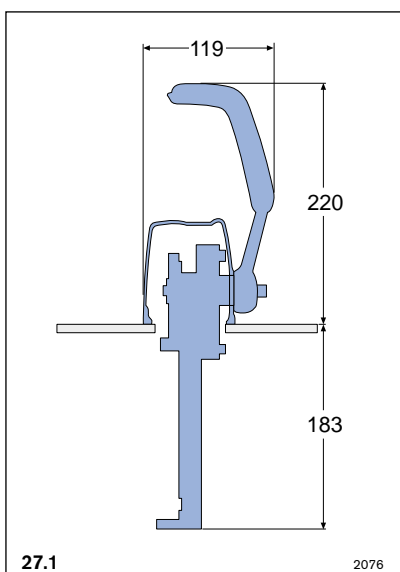
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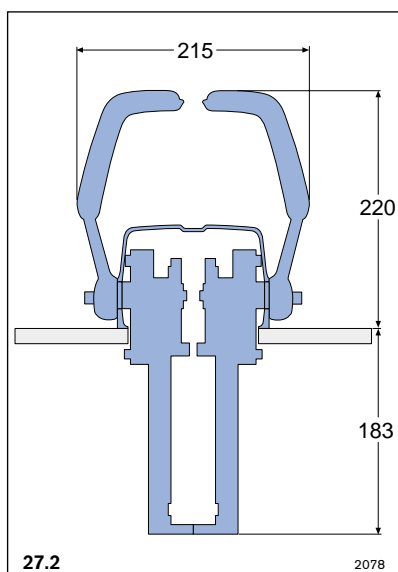
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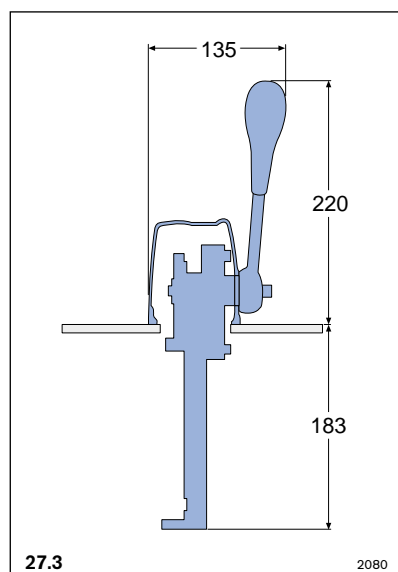
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**27.1 CONTROL LEVER ASSEMBLY PC-740, TOP MOUNTED, SINGLE ENGINE INSTALLATION**

Part no. 851602-3. Control mechanism for top mounting, part no. 851600-7.

**27.2 CONTROL LEVER ASSEMBLY PC-740, TOP MOUNTED, TWIN ENGINE INSTALLATION**

Part no. 851603-1. Control mechanism for top mounting, 2 x part no. 851600-7.

**27.3 CONTROL LEVER ASSEMBLY PC-740 WITH SAILING BOAT LEVER, TOP MOUNTED**

Part no. 1140022-3. The sailing boat control lever is specially designed so as not to foul sheets and other lines. Control mechanism for top mounting, part no. 851600-7.

**27**

**Control system**



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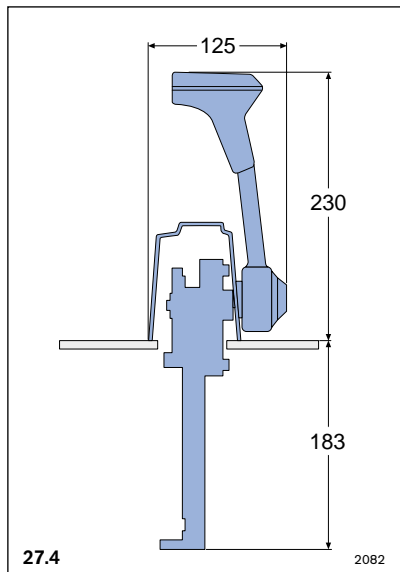
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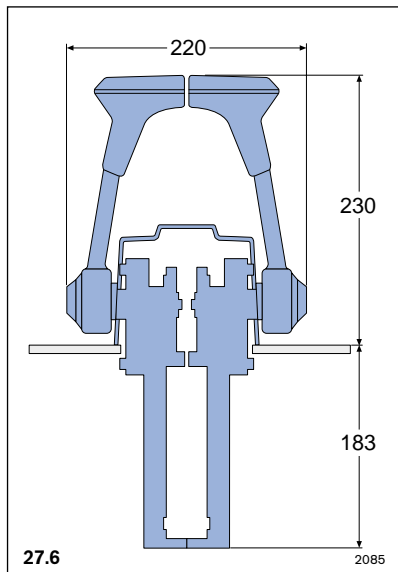
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**27.4 CONTROL LEVER ASSEMBLY PC-840, TOP MOUNTED, SINGLE ENGINE INSTALLATION**

Part no. 853168-3. Control mechanism for top mounting, part no. 851600-7.

**27.5 CONTROL LEVER ASSEMBLY PC-840, TOP MOUNTED, SINGLE ENGINE INSTALLATION WITH POWER TRIM FUNCTION**

Part no. 1140043-9. Control mechanism for top mounting, part no. 851600-7.

**27.6 CONTROL LEVER ASSEMBLY PC-840, TOP MOUNTED, TWIN ENGINE INSTALLATION**

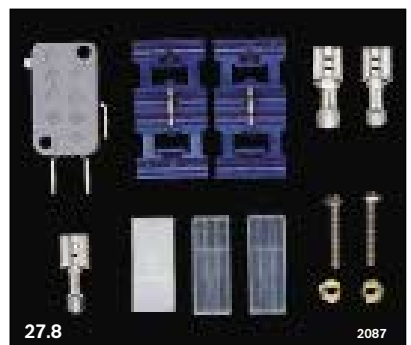
Part no. 853169-1. Control mechanism for top mounting, 2 x part no. 851600-7.

**27.7 CONTROL MECHANISM FOR TOP MOUNTING**

Part no. 851600-7. The control mechanisms must be ordered separately for PC-740 and PC-840 control lever assembly kits.

Volvo Penta's control mechanisms have a simple and safe design and are manufactured of a corrosion-resistant material. The mechanism has an accelerated action which transmits lever movements into even and economic engine acceleration.

Two control mechanisms are required for twin engine installations with single lever controls.



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**27.8 NEUTRAL SAFETY SWITCH**

Part no. 855352-1. Suitable for PC-740/741 and PC-840/841. The switch prevents unintentional manoeuvring of the vessel as it only permits starting of the engine when the gear shift is in the neutral position.



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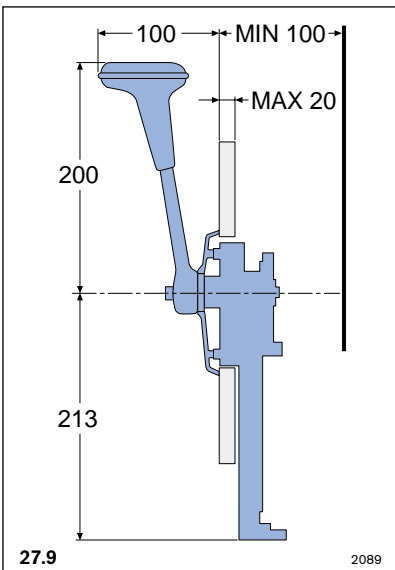
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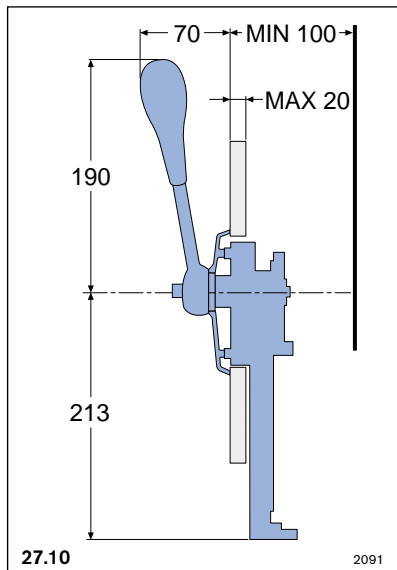
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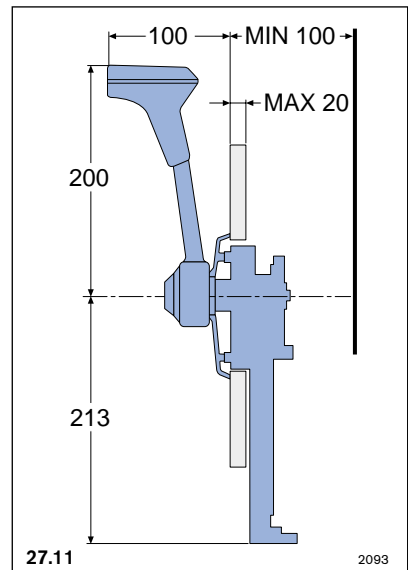
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**27.9 CONTROL LEVER ASSEMBLY PC-741, SIDE MOUNTED**

Part no. 1140092-6. Control mechanism for side mounting, part no. 1140095-9.

**27.10 CONTROL LEVER ASSEMBLY PC-741, WITH SAILING BOAT LEVER, SIDE MOUNTED**

Part no. 1140093-4. The sailing boat control lever is specially designed so as not to foul sheets and other lines.

Control mechanism for side mounting, part no. 1140095-9.

**27.11 CONTROL LEVER ASSEMBLY PC-841, SIDE MOUNTED**

Part no. 1140090-0. Control mechanism for side mounting, part no. 1140095-9.



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**27.12 CONTROL LEVER ASSEMBLY PC-841, SIDE MOUNTED WITH POWER TRIM FUNCTION**

Part no. 1140091-8. Control mechanism for side mounting, part no. 1140095-9.



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**27.15 CONTROL MECHANISM FOR SIDE MOUNTING**

Part no. 1140095-9. The control mechanism must be ordered separately for PC-741 and PC-841 assemblies. Volvo Penta's control mechanisms have an uncomplicated and safe design and are manufactured of corrosion-resistant material. The mechanism has an accelerated action which transmits lever movements into even and economic engine acceleration.



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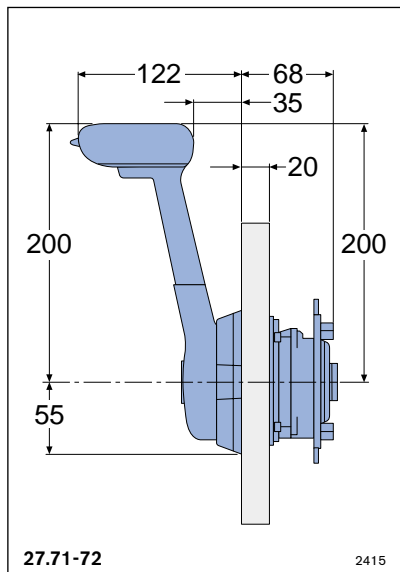
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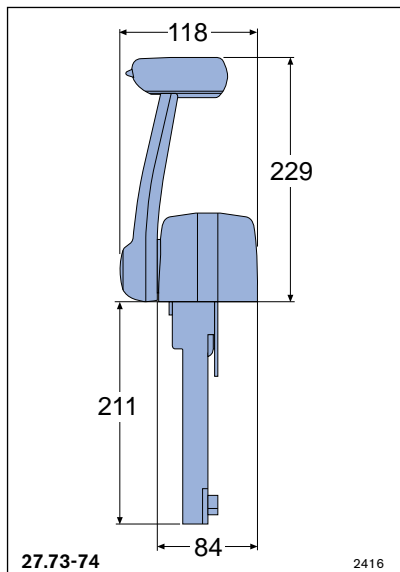
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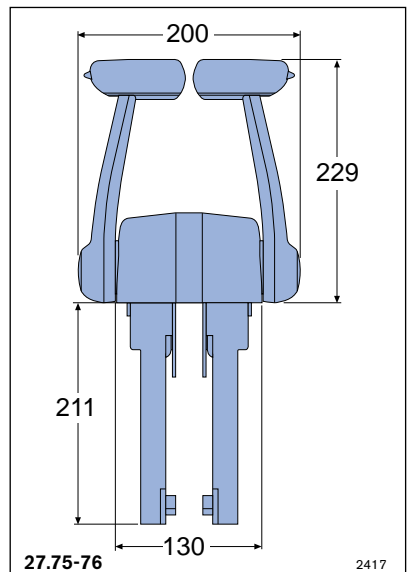
27.71-72

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27.73-74

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27.75-76

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**27.71-72**

**SIDE-MOUNTED CONTROLS**

Controls with combined throttle and gear-change, equipped with a series of features to improve comfort and safety.

- Release button for starting and warming up the engine in neutral position.
- Adjustable friction brake for individual speed setting of the lever.
- Electrical neutral position switch, prevents engine being started in gear.
- Mechanical neutral position lock, prevents unintentional gear change.
- Integral switches for simple operation of the drive's trim and tilt functions. (Applies to pos. 27.71.)

The controls are supplied with a control mechanism and cable connection kit.

Pos.no.	Part no.	
27.71	3856901-8	With Power Trim-function
27.72	3856781-4	Without Power Trim-function

**27.73-74**

**TOP-MOUNTED CONTROLS FOR SINGLE INSTALLATION**

Controls with combined throttle and gear-change, equipped with a series of features to improve comfort and safety.

- Release button for starting and warming up the engine in neutral position.
- Adjustable friction brake for individual speed setting of the lever.
- Electrical neutral position switch, prevents engine being started in gear.
- Integral switches for simple operation of the drive's trim and tilt functions. (Applies to pos. 27.73.)

The controls are supplied with a control mechanism and cable connection kit.

Pos.no.	Part no.	
27.73	3856902-6	With Power Trim-function
27.74	3856782-2	Without Power Trim-function

**27.75-76**

**TOP-MOUNTED CONTROLS FOR TWIN INSTALLATION**

Controls with combined throttle and gear-change, equipped with a series of features to improve comfort and safety.

- Release button for starting and warming up the engine in neutral position.
- Adjustable friction brake for individual speed setting of the lever.
- Electrical neutral position switch, prevents engine being started in gear.
- Integral switches for simple operation of the drive's trim and tilt functions. (Applies to pos. 27.75.)

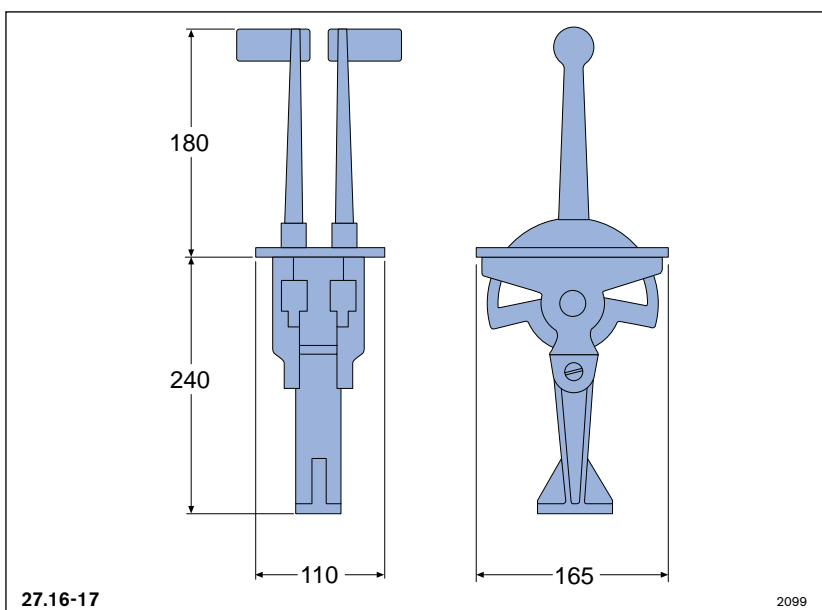
The controls are supplied with a control mechanism and cable connection kit.

Pos.no.	Part no.	
27.75	3856903-4	With Power Trim-function
27.76	3856783-0	Without Power Trim-function



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**27.16-17  
DOUBLE CONTROL LEVER ASSEMBLIES  
PC-870/871, TOP MOUNTED**

Double control lever assemblies have separate levers for gear changing and acceleration. The accelerator lever has an adjustable friction brake making it possible to adjust the "feel" of the lever to personal requirements. Two models of gear shift control levers are available for starboard or port sides. Double control lever assemblies for twin engine installations can be combined so as to have both accelerator levers in the centre of the installation. A mechanical neutral locking device allows gear shifting only at engine idling speeds. As an additional safety measure, a neutral safety switch, which only allows the engine to be started in the neutral position, is also fitted as standard.

Pos.no.	Part no.	Control	Gear shift
27.16	1140067-8	PC-870	Port
27.17	1140068-6	PC-871	Starboard

The control lever is supplied complete with assembly kit for easy installation and 333 control cable.

**For installations with 443 control cables:**

Start at the engine with two short 333 cables for acceleration and gear change, connect these to the 443 cable by means of 2 adapter sets, part no. 1140081-9 (27.27) and connect to the control mechanism by means of adapter set, part no. 1140073-6 (27.24).

**For dual control stations with the PC-870/871 controls, the following parts are required:**

- 2 x control lever assembly
- 2 x connection fork, part no. 1140074-4 (27.25) for 333 cables
- 2 x connection fork, part no. 1140075-1 (27.26) for 443 cables
- 2 x control cable between upper and lower control station
- 2 x control cable to engine and transmission respectively

**Note!** For dual control station installations with the PC-870/871 control mechanisms, no DS unit is required.

**27.78  
SHIFT INTERRUPTER**

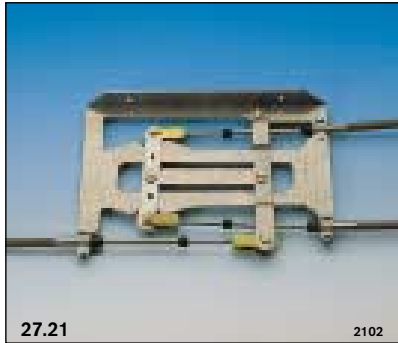
Part no. 3858179-9. Simplifies gear changing by momentarily (for one millisecond) switching off engine ignition. For 8.2GSi and 7.4GSi.





27.18-19

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**27.23, 28, 77**

**DS UNIT FOR ACCELERATION**

Used in conjunction with a Flybridge for the coordination of two accelerator levers to the engine.

Pos.no.	Part no.
27.23	3581042-3
27.28	3581041-5
27.77	3581749-3



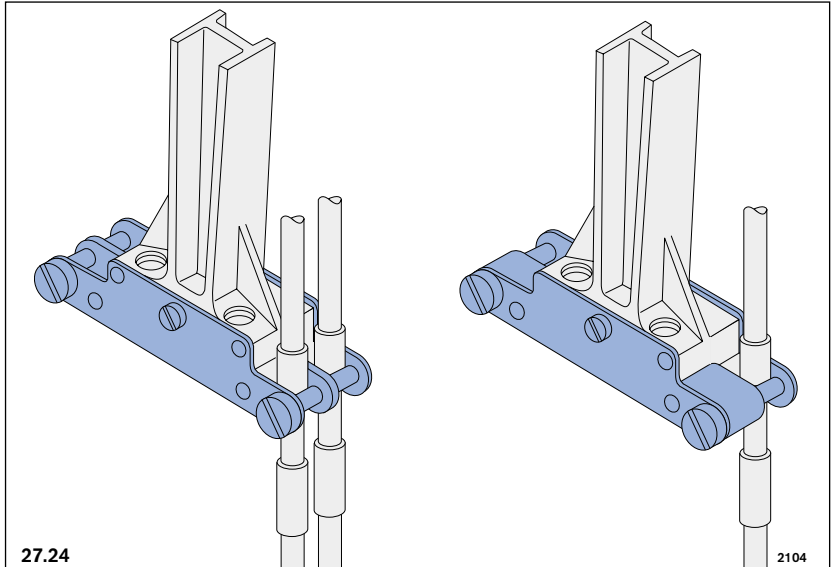
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27.25-26

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**27.18-19**

**STOP CONTROL**

Cable with pull handle for installation on the bridge. The cable should be cut to the required length.

Pos.no.	Part no.	Length, m
27.18	825765-1	3.3
27.19	825764-4	6.9

**27.20**

**VERTICAL CONNECTION OF CONTROL CABLES**

Part no. 851441-6. Used when there is limited length, this connection makes it possible to connect the control cable from above.

**27.21**

**DS UNIT FOR GEAR SHIFTING**

Part no. 828164-4. Suitable for the PC-740, PC-840, PC-860 single control levers.

Used in conjunction with a Flybridge for the coordination of two control levers with a single common cable for gear shifting. For twin engine installations two DS units are required. The cables should be no longer than 7 metres with the DS unit installed as close to the transmission as possible (not more than 1.5 metres from the transmission). For best results, the DS unit should be installed horizontally. Contact your Volvo Penta agent prior to installation, for more detailed information.

**27.24**

**CONNECTION KIT FOR 443 CONTROL CABLE**

Part no. 1140073-6. For the connection of the 443 cable to PC-870/871 double lever control unit.

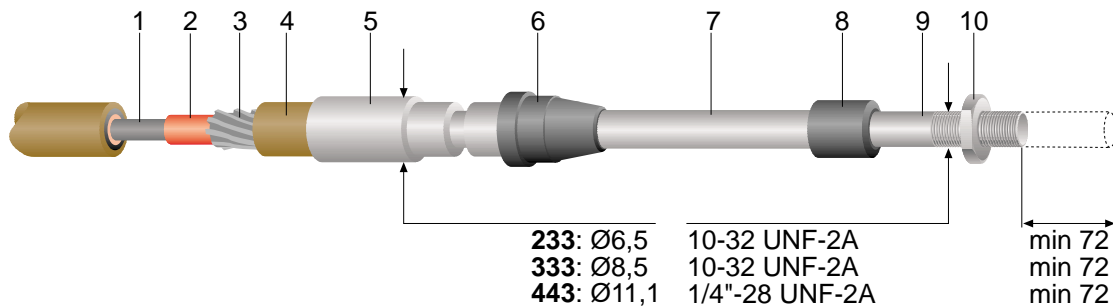
**27.25-26**

**FLYBRIDGE - CONNECTION FORK**

Suitable for the PC-870/871 double lever controls. For vessels with a Flybridge an extra connection fork is required for the connection of double control cables between standard and flybridges. An extra connection fork is required for each cable.

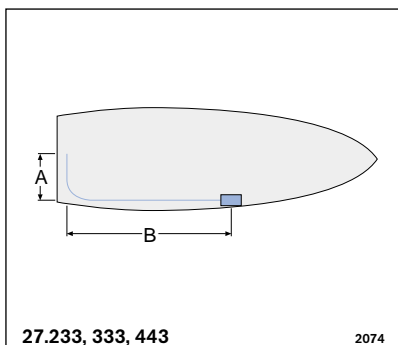
A connection kit, part no. 1140073-6 (27.24), is also required for the connection of the 443 cable.

Pos.no.	Part no.	Control cable
27.25	1140074-4	333
27.26	1140075-1	443



27.233, 333, 443

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27.233, 333, 443

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**27.27 CONNECTION KIT FOR JOINING 333 AND 443 CONTROL CABLES**

Part no. 1140081-9.

**27.233, 333, 443 CONTROL CABLES**

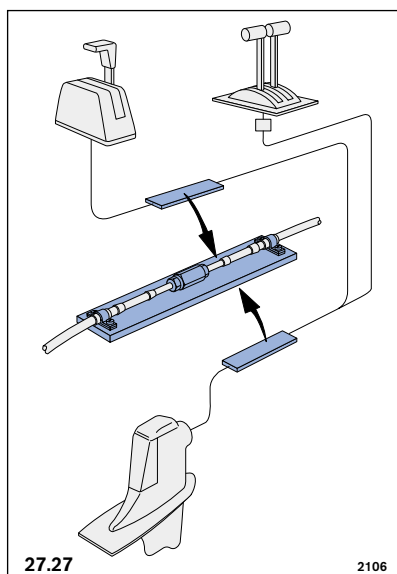
Volvo Penta's control cables are manufactured of corrosion-resistant material with an outer sheath of HD polyethylene. They are designed following Volvo Penta's extremely stringent requirements for efficient operation with a minimum of play. They are permanently lubricated to ensure a minimum of friction and long service life. Single engine installations require two cables, twin installations require four.

It is extremely important to select the exact cable length, fewer bends mean better operation and durability. Measure, in as straight a line as possible, the distance between the control unit and the engine/transmission connections. Calculate a radius of 200 mm for all bends. Adapt the cable as shown in the illustration  $L = A + B + 200$  mm. If the measurement falls between two standard cable lengths, select the longer cable.

The cables must not be cut to size.

**27.233 Control cable 233**

L, m	Part no.
1.25	1140131-2
1.50	1140132-0
1.75	1140133-8
2.00	1140134-6
2.25	1140135-3
2.50	1140136-1
2.75	1140137-9
3.00	1140138-7
3.25	1140139-5
3.50	1140140-3
3.75	1140141-1
4.00	1140142-9
4.25	1140143-7
4.50	1140144-5
4.75	1140145-2
5.00	1140146-0



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**27.333 Control cable 333**

L, m	Part no.
1.00	1140171-8
1.25	1140172-6
1.50	1140173-4
1.75	1140174-2
2.00	1140175-9
2.25	1140176-7
2.50	1140177-5
2.75	1140178-3
3.00	1140179-1
3.25	1140180-9
3.50	1140181-7
3.75	1140182-5
4.00	1140183-3
4.25	1140184-1
4.50	1140185-8
4.75	1140186-6
5.00	1140187-4
5.25	1140188-2
5.50	1140189-0
5.75	1140190-8
6.00	1140191-6
6.25	1140192-4
6.50	1140193-2
6.75	1140194-0
7.00	1140195-7
7.25	1140196-5
7.50	1140197-3
7.75	1140198-1
8.00	1140199-9
8.50	1140200-5
9.00	1140201-3
9.50	1140202-1
10.00	1140203-9
10.50	1140204-7
11.00	1140205-4
11.50	1140206-2
12.00	1140207-0
12.50	1140208-8
13.00	1140209-6

1. Drawn stainless steel wire
2. Low friction ethylene sheathing
3. Hardened steel wire armature
4. Protective sheathing of HD polyethylene
5. End sleeve
6. Rubber seal
7. Telescopic sleeve
8. Rubber seal
9. Threaded stainless steel end sleeve
10. Coupling nut

**27.443 CONTROL CABLE 443**

The 443 cable is a heavy duty control cable and is suitable for use with the PC-870/871 double lever control units. This cable is recommended for use where longer cables are required.

**Control cable 443**

L, m	Part no.
2.00	1140101-5
2.50	1140102-3
3.00	1140103-1
3.50	1140104-9
4.00	1140105-6
4.50	1140106-4
5.00	1140107-2
5.50	1140108-0
6.00	1140109-8
6.50	1140110-6
7.00	1140111-4
7.50	1140112-2
8.00	1140113-0
8.50	1140114-8
9.00	1140115-5
9.50	1140116-3
10.00	1140117-1
11.00	1140118-9
12.00	1140119-7
13.00	1140120-5
14.00	1140121-3
15.00	1140122-1