

VOLVO PENTA

SERVICE BULLETIN

Industrial Products

File 2

Repair Part

Volvo Penta Service Bulletins

are in two files. File no. 1 contains datas, tables and general theoretical service information while file no. 2 contains the service bulletins which are usually associated with repairs.

Service bulletins shall be inserted in their respective file under the appropriate tab/group in consecutive number order.

Service Bulletins are issued from Volvo Penta for both Marine and Industrial products, within the same numbering system. This file contains Service Bulletins for Industrial Products only and therefore some reference numbers can be missing.

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PART

2

engine unit

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PART

2

engine unit

GROUP	DESCRIPTION	SECTION
20	General Replacing the engine Reconditioning the engine Engine mountings Frame	200 201 202 203 204

CONCERNING

Points to be observed when replacing
an engine

PRODUCT

Industrial engines
series 60-70, 100-120

DISTRIBUTION

1

DATE

10-1981

When a new or reconditioned engine is installed in exchange of a worn one, there are some important measures which must be followed if the engine is to function satisfactorily. See the points below.

1. Checking the radiator Make sure that the cell radiator is clean and not covered with rust and sludge deposits. Clean the radiator when necessary in order to ensure good cooling of the engine.
If the engine is fitted with an oil cooler, this should be disassembled and cleaned. Note that a radiator blind or other screens should generally not be used.
2. Hoses Use new hoses for both the cooling and heating systems, also possibly for oil connections.
3. Drive belts Use new drive belts for the coolant pump, fan and generator, etc.
4. Air cleaner Install a new air cleaner. Check to make sure that the connections are tight
5. Turbo-compressor Check bearing wear according to the workshop manual. If bearing wear exceeds permissible values, the turbo-compressor should be reconditioned or exchanged.
6. Exhaust system Check the exhaust system for any leakage and constrictions, and if there are any faults remedy them.
7. Instruments Check coolant thermometers, oil pressure gauges and any warning equipment and controls.
8. Starting for first time When starting for the first time, run up the oil pressure with the starter motor and with the stop control pulled out in order to ensure that the engine and turbo (if fitted) are well lubricated.

General instructions

In addition to the above-mentioned points, we would like to point out that complete units such as the generator/alternator, starter motor, possibly air compressor, etc., should be without fault and preferably newly reconditioned.

The clutch should be in good condition.

Remember that the rubber components age and are influenced by climatic conditions, etc. The engine mounting blocks should be replaced.

Concerning running-in, oil changes and servicing, the same instructions apply as for a new engine.

CONCERNING

Judging cracks in engine components

PRODUCT

Marine- and industrial engines
Series 60-70, 100-120

DISTRIBUTION

MI

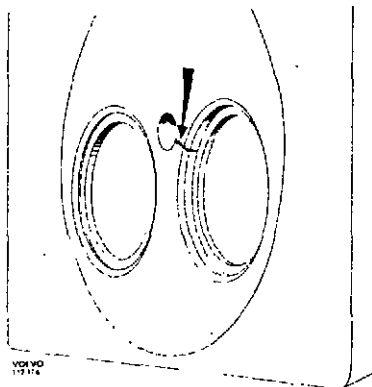
DATE

10-1981

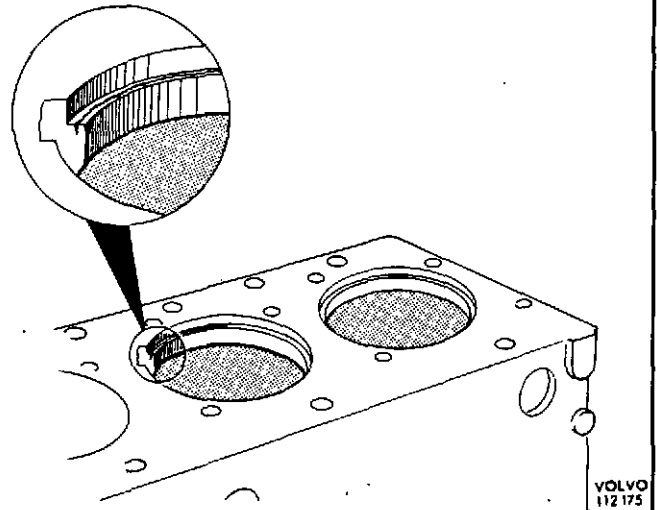
When judging cracks in engine components after long periods of operation it can often be difficult to assess whether or not the cracks are of a serious nature, necessitating replacement of the component or if the cracks are harmless, enabling the component to be re-fitted without risk. So called heat-fractures are often of the type which, after a time, cease to develop further and do not cause any damage. By carrying out investigations and tests we have found that a general rule of replacing components which show signs of cracking, is by no means justified.

The following components - vital to operational reliability - have been investigated:

- A. Cylinder block
- B. Liner seat in block
- C. Combustion chamber



Picture 1. Cracks in cylinder head



Picture 2. Cracks in liner seat

A.

Picture 1 shows a crack at the injector copper sleeve, directed towards the valve seat recess. The crack may have been caused by over-tightening the injector attachment nuts. The recommended tightening torques of 20 Nm (2.0 kpm = 14.5 lbf. ft.) for injectors with two attachment nuts and 50 Nm (5.0 kpm = 37 lbf. ft.) for injectors with one attachment nut (i.e. yoke), must be unconditionally followed. If a greater tightening torque is used then the stress in the roof of the cylinder head becomes abnormally high which can result in damage. It is therefore absolutely necessary that the specified tightening torque is strictly maintained.

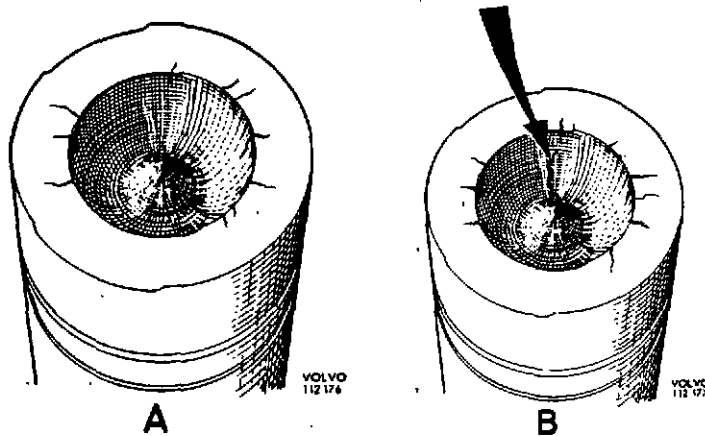
The crack in picture 1, has not caused leakage of either coolant or gas, since it has not continued through the bottom of the cylinder head. When leakage has occurred it has been shown to be caused by contaminants or damage to the copper sleeve seating. Repair of the seat surface is carried out with the special milling cutter 999 6048, see workshop manual.

The cylinder head, damaged as described above, has been re-assembled on test engines and undergone long-term testing under high loads, without the cracks deteriorating or causing problems.

B.

Picture 2 shows cracks in the liner seat, caused by a combination of too high a liner collar and too high a bolting force; resulting in too little distribution of the bolting force on the cylinder block surface.

Tests on cylinder blocks with these types of cracks in the liner seat (see picture 2) have shown that the cracks have not spread further, neither have they had any adverse effect upon the strength of the liner seat. A good mating surface is, however, of the utmost importance for a successful result when replacing the liner.



Picture 3. Piston cracking.

C.

Picture 3 shows various cracks in a piston. The cracks can be caused by the great temperature differences between, for example; full load and engine braking at low ambient temperature. Faulty injector pump settings, both the injected quantity and the injection angle settings can contribute to deterioration of these cracks.

When the cracks are localised in the area around the combustion chamber on top of the piston crown (A, picture 3), these can - in most cases - be acceptable and the piston can be re-fitted in the engine. Obviously a faulty injection quantity/angle setting must be corrected.

If there are however, one or several cracks in the piston pin (gudgeon pin) hole or in the bottom of the combustion chamber (B, picture 3), there is a great risk of resultant damage. These more serious types of cracks always necessitate, therefore, the replacement of the piston (cylinder liner kit) and the checking of the injector equipment.

As in the previous case, the underlying cause of the crack must be established, in order to prevent a reoccurrence of the cracking problem.

PART

2

engine unit

GROUP

DESCRIPTION

SECTION

21

Engine body

210

Cylinder head and cylinder head gasket

211

Cyl.block and pistons (without liners)

212

Cylinder liners with pistons

213

Valve mechanism

214

Timing gears and camshaft

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Crank mechanism (crankshaft, bearing shells,
connecting rods, flywheel, flywheel housing)

216

Oil sump

217

**VOLVO
PENTA**

service bulletin

GROUP

21
211

NO

105-1205

CONCERNING

Mounting of cylinder head

PRODUCT

All engines

DISTRIBUTION

M I

DATE

8-1982

When fitting cylinder heads, make sure that the contact surfaces for the cylinder head bolts, and their washers, if any, are free from paint at assembly. Otherwise there is a risk that the joint will not be fully effective, resulting in leakage.

**VOLVO
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service bulletin

GROUP

21
211

NO

401

CONCERNING

Pre-chamber

PRODUCT

All 40-engines

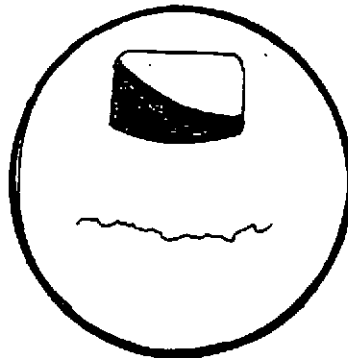
DISTRIBUTION

MI

DATE

10-1981

From and including engine no. 16243 it may happen that cracks occur in the pre-chamber (see fig.). This is not a reason for it to be replaced and continued operation is recommended.



**VOLVO
PENTA**

service bulletin

GROUP

21
211

NO

407

CONCERNING

Cylinder head gasket

PRODUCT

D40 engines

DISTRIBUTION

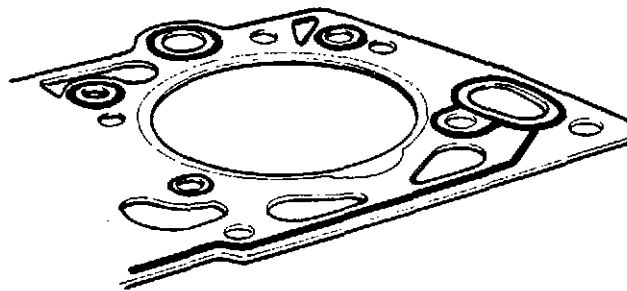
MI

DATE

8-1985

A new cylinder head gasket with improved sealing around the coolant and oil channels is now available. The new gasket, Part No. 858503-6, replaces gasket, Part No. 1545024-0, and can be ordered from Volvo Penta Parts Div.

The gasket is introduced in production as from engine No. No. 45000.



Replaces earlier Service Bulletin

CONCERNING Cylinder block, cylinder head and cylinder head gaskets	PRODUCT TAMD60B, TD60B	DISTRIBUTION M I	DATE 6-1986
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In order to improve the circulation of coolant around the rear cylinders a new cylinder block, new cylinder heads and new cylinder head gaskets have been introduced on TAMD60B and TD60B as from engine no. 47364/xxxx.

Only parts in the later version are carried as spares for these engines:

	<u>Part no. (obsolete)</u>	<u>Part no. (current)</u>
Cylinder block	465160	465720-1
Cylinder head	465440	465728-4
Set of gaskets, cylinder head	275566	275740-9

Replaceability:

1. Old cylinder block - one or two new cylinder heads

Use the new set of gaskets. Fit the sealing rings in the cylinder block and put the cylinder head gasket on. The sealing rings which are "left over" (for the holes in the cylinder head which lack corresponding holes in the cylinder block) should be placed in the cylinder head as shown in fig. 1.

2. New cylinder block - old cylinder head

With a new cylinder block either two new or two old cylinder heads must be used in order to obtain the correct distribution of coolant. Use the new set of gaskets. All the sealing rings should be fitted in the cylinder block in either case.

3. Old cylinder block - old cylinder head

Use the new set of gaskets.

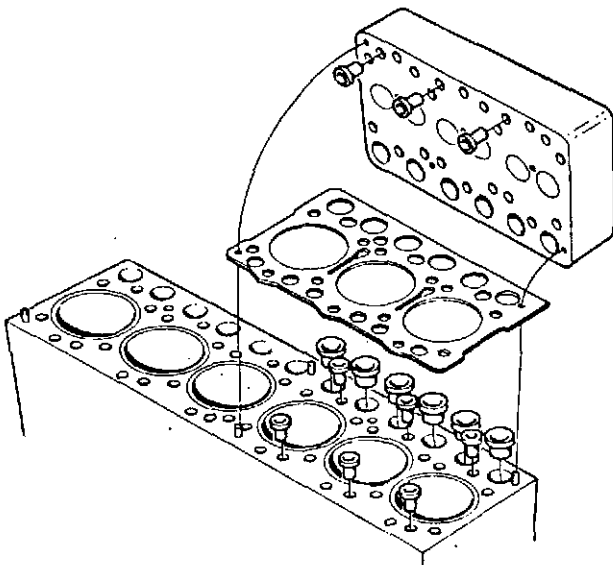


Fig. 1

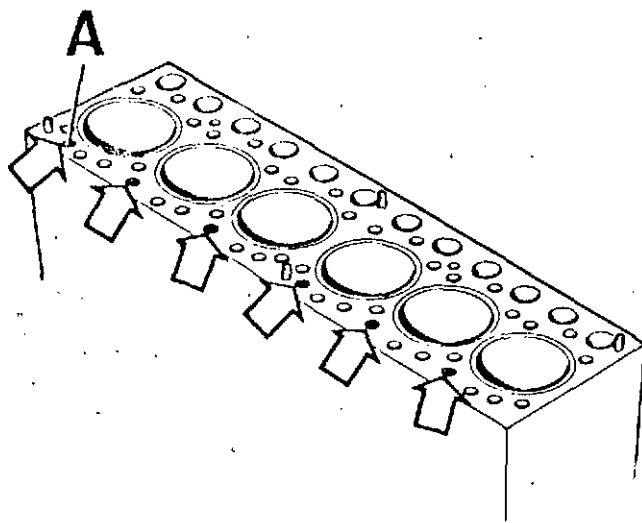


Fig. 2

Cylinder block

There are 6 additional holes for coolant in the top face. Recalibration of other holes. The leading hole (A, fig. 2) is blind.

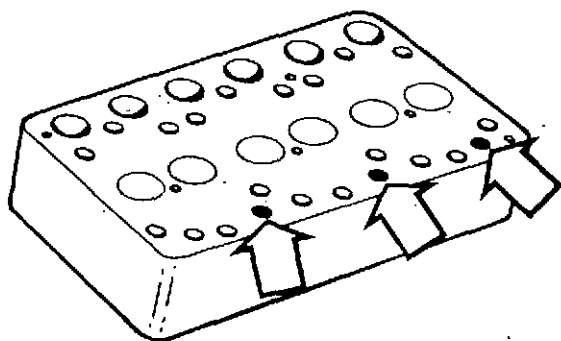


Fig. 3

Cylinder head

0.63"

There are 3 additional holes (\varnothing 16 mm) in each cylinder head (fig. 3).

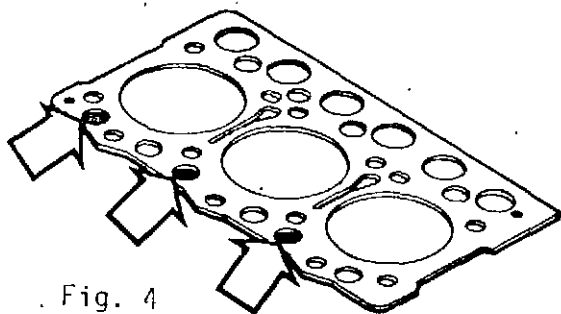


Fig. 4

Set of gaskets for cylinder head

There are new gaskets to fit the cylinder block and cylinder heads of later model, with 3 holes and 3 sealing rings for each cylinder head gasket (fig. 4)

Pressure testing of cylinder head (later model)

Pressure testing requires an additional 3 expander screws 2124 for sealing the new holes for coolant (fig. 3). Instructions are otherwise as in the workshop manual.

CONCERNING

Silicone between cylinder
liner and block

PRODUCT

100/120/121 series

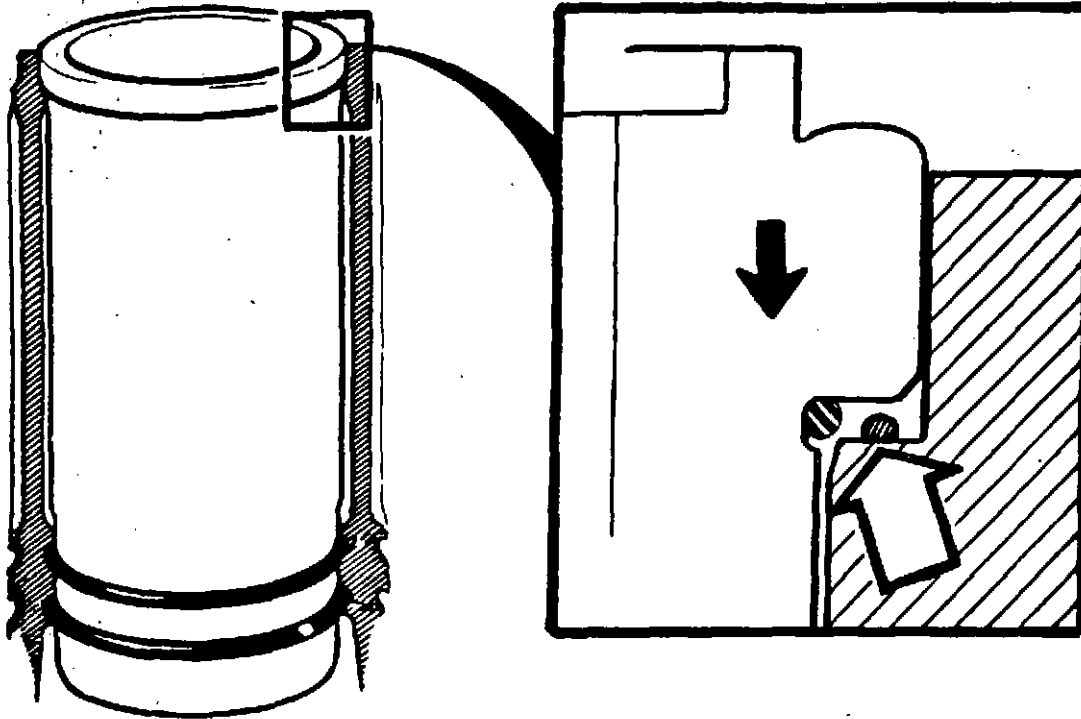
DISTRIBUTION

M I

DATE

8-1986

To further improve the sealing under the liner collar and to give protection against corrosion a thin string, max. 0.8 mm (0.030"), of silicone can be applied between the cylinder block and liner in the block's liner recess.



Method

1. Clean the sealing surface in the block's liner recess carefully. The liner recess should be dry and free from grease.
2. Clean the cylinder liner collar carefully. The liner should be dry and free from grease. Use degreasing compound, e.g. white spirit.
3. Place a new O-ring on the liner.

For sealing, use a tube of silicone (20 ml), part No. 1161277-7.

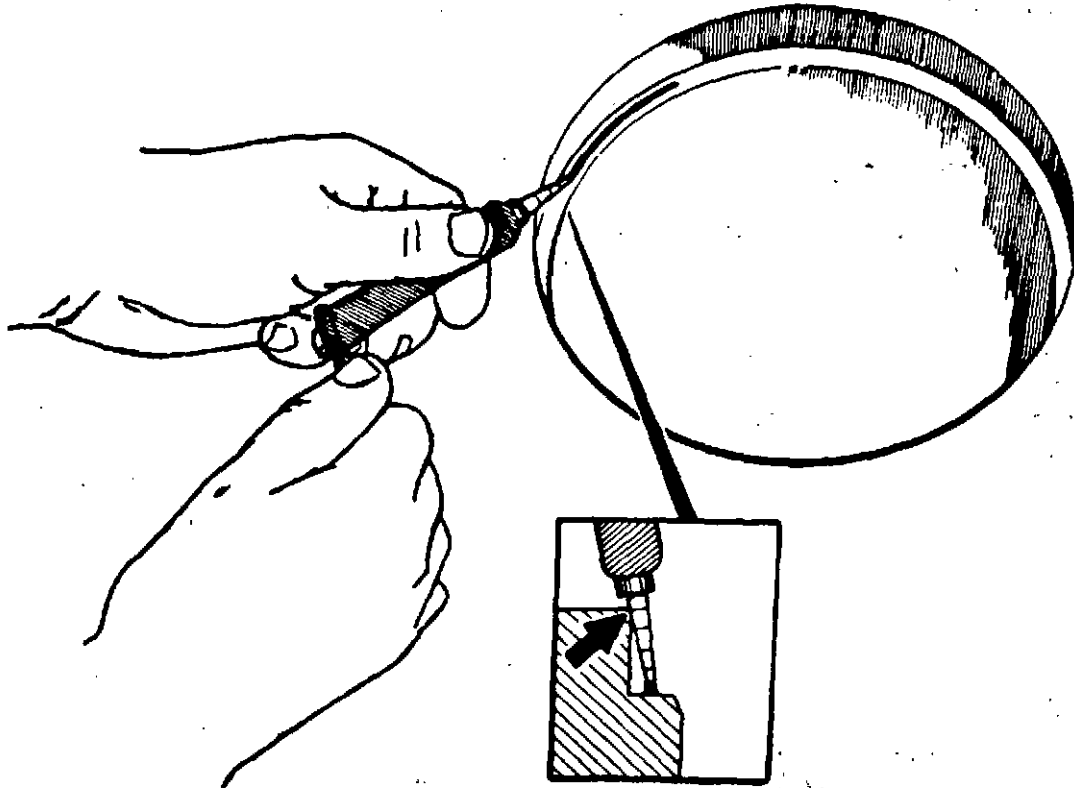
NOTE! Ordinary sealing silicone must not be used.

4. Drill or pierce a 0.8 mm (0.030") hole in the cap of the silicone tube.

5. Apply an even, appr. 0.8 mm (0.030"), string of silicone in the block's liner recess. The string should be in the middle of the liner recess. Use the tube's emptying device and the liner guides in the block as support for the tube nozzle so that the silicone string is as even as possible.

NOTE! Do not apply too much silicone

Too much silicone will press down the O-ring from its location which can result in water leakage.



6. If the liner is shimmed, the silicone string as per point 5 should be placed directly on the block's liner recess. The shim is placed on the liner collar and will consequently lay on top of the silicone string.

NOTE! No silicone between the shim and the liner collar.

7. The liner should be located in the cylinder block, the cylinder head fitted and torque tightened within 20 minutes after applying the silicone. If there is no time to fit the cylinder heads within 20 minutes, the liners must be clamped down into the block.

Old silicone is removed from the block using a liner cutter for the respective engine.

NOTE! This must be done very carefully so that no material is removed from the block's contact surface.

**VOLVO
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service bulletin

GROUP
21
212NO
1201

Replaces earlier SB

CONCERNING	PRODUCT	DISTRIBUTION	DATE
Cylinder block, liners	120, 121 series	M I	11-1985

A new cylinder block, complete, is now available as a replacement part, to fit both 120 and 121 series engines.

The oil channel for the piston cooling has been sealed with a plug on the outside of the block.

New liner kits are also required.

Cylinder block 468702-6 will be replaced as follows:

Engine type	Part No	No	Description
D120A, MD120A	470130-6 876076-1	1 6	Cylinder block Cyl liner kit
TD120A, TMD120A, TAMD120A, TD120AHC, TD120ARC, TAD120AHC	470130-6 275073-5	1 6	Cylinder block Cyl liner kit
TMD120B, TAMD120B, TD120BHC, TD120BRC, TAD120BHC, TAD120BRC, TID120F, TID120FG, TD120G, TD120GPP, TD120H, TID120H	470130-6 275074-3	1 6	Cylinder block Cyl liner kit
TD120C, TAD120CHC	470130-6 275076-8	1 6	Cylinder block Cyl liner kit

Replaces earlier bulletin

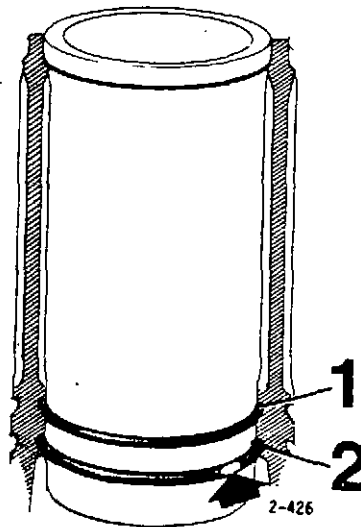
CONCERNING
Sealing ring for lower
liner sealPRODUCT
All engines in 60-70-
100 and 120 seriesDISTRIBUTION
M IDATE
6-198660-70-100 series

With effect from the engine number listed below a new lower sealing ring manufactured of fluorine rubber (previous silicone rubber) has been introduced in production. Recently the fluorine rubber sealing ring was introduced also on the upper groove for serie 100.

The new ring is black and has a colour coding to distinguish it from the nitrile ring in the upper groove. The colour coding can be either violet, yellow or green, depending on the manufacturer.

60-series with effect from engine No. 33801/xxxx
70-series with effect from engine No. 117168/xxxx
100-series with effect from engine No. 126755/xxxx *)

*) with effect from engine No. 145751/xxxx a fluorine rubber sealing ring has also been introduced on the upper groove.

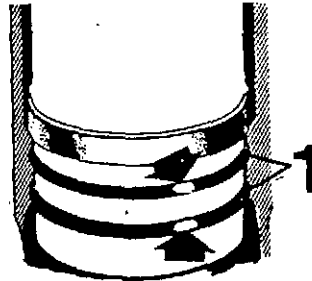


Sealing rings 60-70-100 series
1. Nitrile rubber ring
2. Fluorine rubber ring

120-series

With effect from engine No. 41277/xxxx a new lower fluorine rubber sealing ring has been introduced in production.

With effect from engine No. 46860/xxxx the upper sealing ring has also been replaced with a fluorine rubber ring. The new rings are black and have a violet colour coding.



Sealing rings 120-series
1. Fluorine rubber ring

NOTE! More force is required to press down the liner with these new sealing rings fitted. It is, therefore, important to coat the liner guide and the sealing rings with soap or liquid detergent, but take care not to fill the grooves. Then press the liner down slowly. Under no circumstances should it be banged or otherwise forced down.

Spare part kits

60-70-100-series:

60-series,	275736-7
70-"	275735-9
100-"	275734-2

120-series:

Part No. new sealing ring kits:

up to engine No. 12308/xxxx	1)	part No. 275729-2
from engine No. 12309/xxxx		part No. 275730-0

1) Engines without a protective ring

**VOLVO
PENTA**

service bulletin

GROUP

21
214

NO

401

Replaces earlier Service Bulletin

CONCERNING

Valve tappet, push rod

PRODUCT

All 40 series engines

DISTRIBUTION

M, I

DATE

6-1986

As from engine no. 17391, new tappets and push rods have been introduced in production.

The new tappet is single-tempered and has a larger spherical seat for the push rod.

The new push rod differs from the old one in that the lower section (against the tappet) is larger in diameter than on the earlier version.

It is thus very important to avoid confusing these two components by combining the old push rod and the new tappet or vice versa.

In order to assist in distinguishing between the two valve tappets, a groove has been turned on the valve tappet with the larger spherical seat for the push rod (for dimensions see figure).

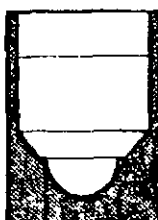
Difference between the parts.



Previous version, tappet



Previous version, push rod



Later version, tappet
Part no. 1542208-2

15 mm 0.59"



Later version, push rod
Part no. 1545239-4

**VOLVO
PENTA**

service bulletin

GROUP

21
214

NO

601

Replaces earlier Service Bulletin

CONCERNING

Protective ring on valves,
valve stem seals

PRODUCT

TD60, TAMD60

DISTRIBUTION

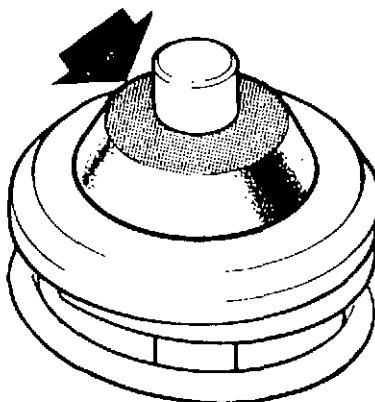
M, I

DATE

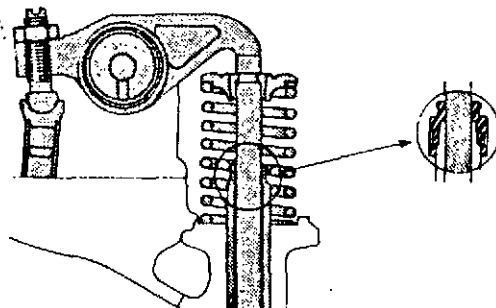
6-1986

In the event of complaints concerning excessive oil consumption, oil being thrown out through the muffler, oil leaks at the exhaust pipe or turbo unit, then we recommend the fitting of protective rings on the valves as shown in the figure (part no. 465551-0).

The rings are fitted as standard from engine no. 26678/xxxx.



If the engine operates at light loads or idles for long periods, we also recommend the fitting of valve stem seals (part no. 419702-6).



Replaces earlier Service Bulletin

CONCERNING

Valve shaft seal

PRODUCT

Marine and Industrial
engines 100-series

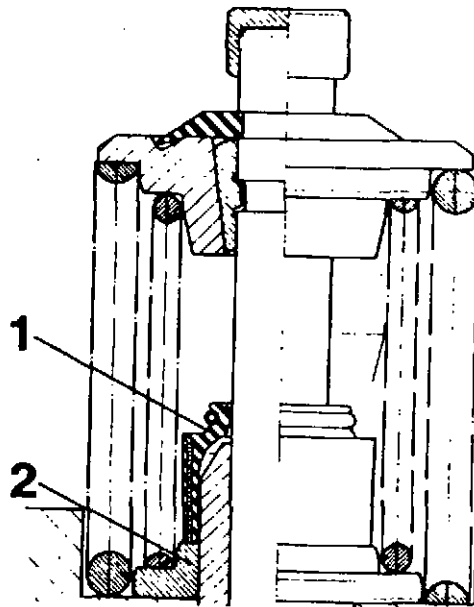
DISTRIBUTION

M, I

DATE

6-1986

If complaints are raised over oil being ejected through the exhaust manifold when running without load and with low load, the fitting of the valve shaft seal (part no. 837626-1) to the outlet valve guide as well, is recommended.



1. Valve shaft seal
2. Lower valve spring washer

CONCERNING

Valve clearance

PRODUCT

TD61, TID61

DISTRIBUTION

I

DATE

9-1986

We have earlier informed about a few changes concerning valve clearance, pump setting and oil volume. See SB 14/145 no 6.

Unfortunately some engines have been delivered with a wrong sticker for the valve clearance. Correct value is:

In = 0,40 mm (0.0157")
Out = 0,55 mm (0.0217")

If you find engines with the wrong sticker we kindly ask you to change these.

New stickers with the correct text can be ordered from the Service Department.



Correct sticker

CONCERNING

New polygon hub, new timing
gear housing and cover

PRODUCT

TD121G, TID121FG
TD120HPP, TID120HPP

DISTRIBUTION

I

DATE

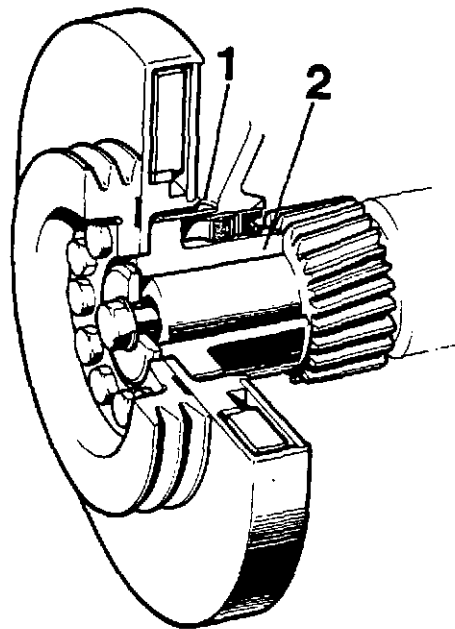
9-1984

A new version of polygon hub, timing gear housing and cover have been introduced as from engine no. 91926/xxxx.

The polygon hub is fitted with a metal protection ring, see figure, and a corresponding recess is made in the timing gear cover.

The earlier oil deflector ring has been deleted and the new hub is made somewhat longer to compensate for this.

The new timing gear housing and cover have been designed to reduce the noise level.



1. Protection ring
2. Polygon hub

Replaces earlier SB

CONCERNING

Measuring camshaft wear

PRODUCT

40, 60, 70,
100, 120 series

DISTRIBUTION

M, I

DATE

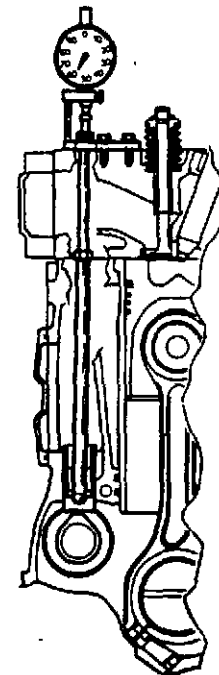
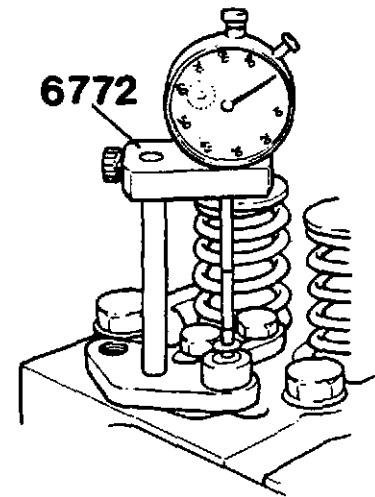
4-1985

Measuring engine camshaft wear with new tool

Special tool: 999 6771-3, 40 series
999 6772-1, 60, 70, 100, 120 series

Dial indicator: 998 9876-9

1. Remove the valve covers and the rocker arm bridges. Lift out the push rods. Place the components in order, so that they can be re-fitted in the same place.
2. Fit the tool, 6771 for the 40 series and 6772 for other engines, on the cylinder head at cylinder No. 1 (at the front). Adjust the length of the rod on the tool, if necessary, so that it makes contact with the lifter with pre-tension.
3. Rotate the engine until the rod on the tool is in its lowest position (the cam on the camshaft points downwards). Check that the rod is pre-tensioned. Set the dial indicator to zero.
4. Rotate the engine until the rod on the tool is in its upper position. Read off the dial indicator. The value must not be below the minimum lift height as per the table on the next page.
5. Continue the checking of the other cams.



Engine	Camshaft Part No.	Min. lift height mm (ins)	
		Intake	Outlet
40 series	1542029-2 1542418-7	6.7 (0.264)	6.7 (0.264)
60 series	465229-3 465587-4	7.4 (0.291)	7.4 (0.291)
D70A, MD70A TD70A, TMD70A, AB D70B, C, MD70B, C TD70B, C, T(A)MD70B, C TD70D, E, T(A)MD70D, E	421377-3 421338-5 421445-8 421446-6 466259-9	7.4 (0.291) 7.4 (0.291) 7.4 (0.291) 7.4 (0.291) 7.4 (0.291)	7.4 (0.291) 7.9 (0.311) 7.4 (0.291) 7.7 (0.303) 7.7 (0.303)
D100A, MD100A TD100A, TMD100A D100B, MD100B TD100G, TID100K, TMD100C	422348-3 422363-2, 467853-8 422583-5, 467858-7 1545071-1	7.9 (0.311) 7.4 (0.291) 8.7 (0.343) 8.0 (0.315)	7.9 (0.311) 8.6 (0.339) 8.7 (0.343) 8.6 (0.339)
D120A, MD120A TD120A T(A)MD120A 120 series, later vers.	423283-1 468022-9 845800-2 468723-2	8.5 (0.335) 8.0 (0.315) 8.0 (0.315) 8.0 (0.315)	8.5 (0.335) 8.6 (0.339) 8.6 (0.339) 8.6 (0.339)

Replaces earlier SB

CONCERNING	PRODUCT	DISTRIBUTION	DATE
Crankshafts	60, 70, 100, 120 series	M,I	6-1986

Nitrocarburated crankshafts

To increase the crankshaft's fatigue strength and consequently their length of life, a nitrocarburation process has been introduced in production. This change was introduced as follows:

- 60 series from and incl. engine No. 37799/XXXX
- MD70C, TMD70C from and incl. engine No. 167704/XXXX
- Others, 70 series from and incl. engine No. 164319/XXXX
- 100 series from and incl. engine No. 155192/XXXX
- 120 series from and incl. engine No. 68897/XXXX

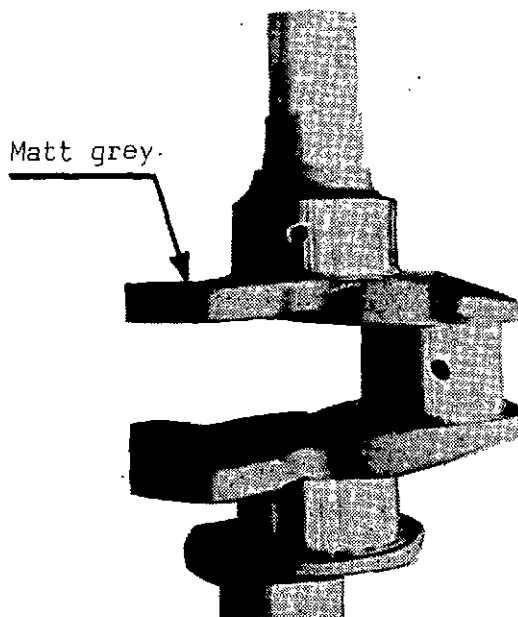


Only nitrocarburated crankshafts are available as a part.

The 60 series crankshafts are marked with "&" on the counter-weight closest to the flywheel flange, see Fig.

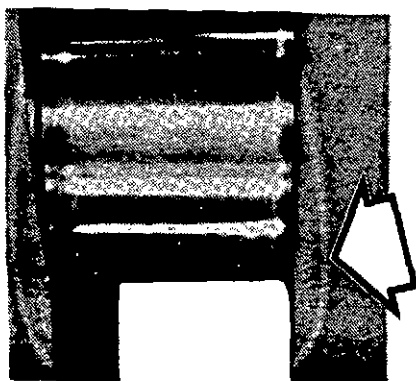
Differences between induction hardened and nitrocarburated crankshafts

- All the counter-weights are matt grey on nitrocarburated crankshafts.
- On induction hardened crankshafts the counter-weights can, however, have different colour tones, bright, yellow or blue, depending on the small variation of temperature in the tempering process.



Nitrocarburated

- The bearing journals have some discolouration around the fillets on induction hardened crankshafts.



Induction hardened crankshaft

Straightening crankshafts

The crankshaft's lengthwise trueness is measured as run-out, i.e. the total indicator reading on the forth main bearing with the shaft supported on main bearings one and seven. If the shaft's lengthwise trueness is over 0.5 mm (0.02"), then there is a great risk that when straightening, the thin hardened surface will crack at the fillets. Fatigue will start quickly in the cracks, if they are not polished away. If the cracks are so deep they cannot be polished, then the shaft must be re-ground and afterwards re-nitrocarburated.

The fatigue strength is always weakened when straightening complete crankshafts, irrespective of hardening process and should therefore be avoided.

Note! The limit for allowed lengthwise out of trueness is increased to 0.2 mm (0.008").

Surface damage to bearing journals

The nitrocarburated bearing journal surface differs from the induction hardened surface mainly by its hardness. Therefore it is necessary that in certain cases other consideration must be taken than earlier, when inspecting the crankshaft and deciding what should be done.

Scratches earlier diagnosed as dirt scratches can in certain cases be normal surface finish for a new crankshaft. On crankshafts that have run, this shows up very clearly due to the extremely polished bearing surface.

After long operation times small particles can loosen from the thin finished surface.

This can easily be diagnosed as dirt scratches, but the difference is that these crevices do not go all the way around the bearing journal and have rough edges.



Crevices

The crankshaft does not necessarily need to be re-ground for these defects. Usually it is enough to polish the bearing journal lightly with emery cloth and to fit a new bearing shell.

Re-grinding the crankshaft

Re-grinding and straightening normally mean lower fatigue strength. Therefore crankshafts should only be re-ground in exceptional cases (especially nitrocarburated crankshafts).

When analysing if or not a nitrocarburated crankshaft is to be re-ground, the following must be taken into consideration:

- is re-grinding really necessary due to incorrect measurement (wear, ovalness, draught etc.)?
- are surfaces damaged so bad that re-grinding is necessary or is polishing enough?
- does the shaft need to be straightened?

If the crankshaft is to be re-ground, then the following conditions must be followed:

- if the crankshaft is out of true lengthwise, so that it must be straightened before re-grinding, then it must be re-nitrocarburated after re-grinding.
- the shaft must be carefully polished and cleaned after the surface treatment.
- if the shaft does not need to be straightened before re-grinding, then the shaft must have a new surface treatment after the second undersize has been used.
- to avoid high local stresses special care should be taken with radii, surfaces, and the transition between journals, radii, and webs.
- the shaft must always be magnaflux tested before and after straightening and grinding.

New crankshaft, 60 series

A new crankshaft has been introduced on TAMD60B from engine No. 39051/XXXX, and on TD60B with effect from engine No. 37955/XXXX. The fillet radii for big-end and main bearing journals have been increased to 4.3 mm (0.17") (previously 3.5 mm (0.14")).

This alteration has brought with it new (1.5 mm/0.06"/narrower) main bearing shells. The big-end bearing shells are unchanged.

The main-bearing shells supplied as spares may have the same width as previously, but in that case they have instead a larger internal chamfer (for the larger fillet radii).

When changing over to the new crankshafts, later production main bearing shells must be used.

	<u>Late prod.</u>	<u>Early prod.</u>
Crankshaft	465755-7	465240
Main bearing set	std. 271230-5	270426
1st oversize	271231-3	270427
2nd oversize	271232-1	270428
3rd oversize	271233-9	270429
4th oversize	271234-7	270430
5th oversize	271235-4	270431

CONCERNING
CONNECTING ROD, CONNECTING ROD
BUSHING, BIG END BEARING

PRODUCT
100, 120 series

DISTRIBUTION
MI

DATE
9-1984

A new version of connecting rod, connecting rod bushing, and big end bearing have been introduced as follows:

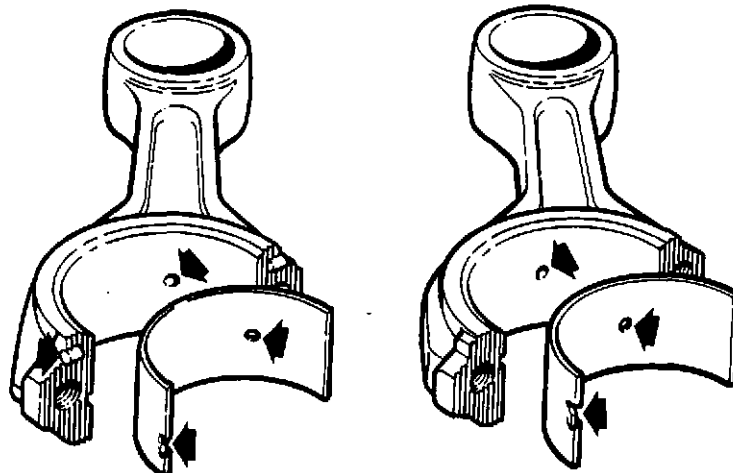
100 series as from engine no. 162079/xxxx

120 series as from engine no. 80371/xxxx

New particulars:

<u>Description</u>	<u>100 series</u>	<u>120 series</u>
Connecting rod	846731-8	846864-7
Connecting rod bushing	1545302-0	470434-2
Big end bearing, std	270124-1	270130-8
0.25	270125-8	270131-6
0.50	270126-6	270132-4
0.75	270127-4	270133-2
1.0	270128-2	270134-0
1.25	270129-0	270135-7

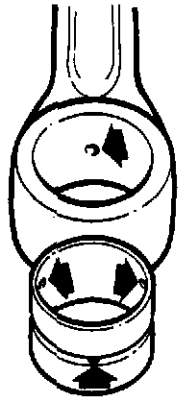
The new connecting rod has no guide pin. The location of the oil hole is changed on the connecting rod and big end bearing.



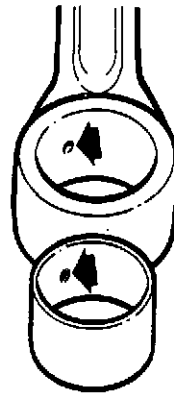
Earlier version

New version

The new bushing has one oil hole.



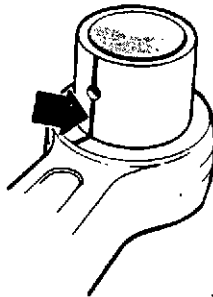
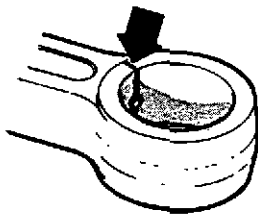
Earlier version



New version

When pressing in the connecting rod bushing it is important that the oil hole on the bushing coincides with the oil hole on the connecting rod.

Draw a line over the hole in the bushing and on the connecting rod with a felt pen. Press in the bushing with tool 1801 and 2952.



1801



2952

PART

2

engine unit

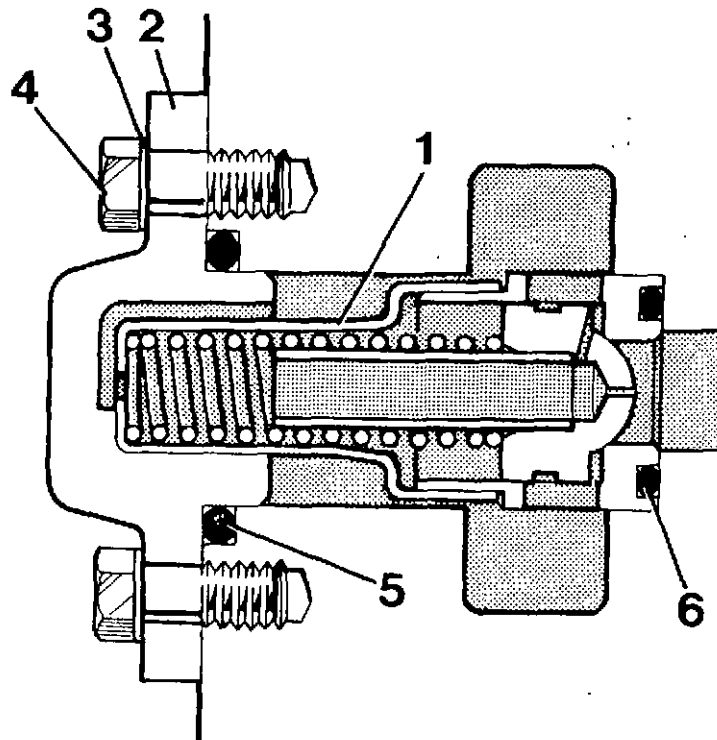
GROUP	DESCRIPTION	SECTION
22	Lubricating system Oil pump with pipes, Relief valve, Oil-cooler Oil filter	220 221 222

CONCERNING	PRODUCT	DISTRIBUTION	DATE
Relief valve piston cooling valve	All engines 60, 61, 70, M, I 71, 100, 121 series		1-1986

60, 70, 100, 121 series

A new relief valve has been introduced in the lubrication system for the above engines. The new valve is fitted as from the following engine numbers:

60 series:	89831/xxxx
70 series:	170986/xxxx
100 series*:	178075/xxxx
121 series:	106307/xxxx

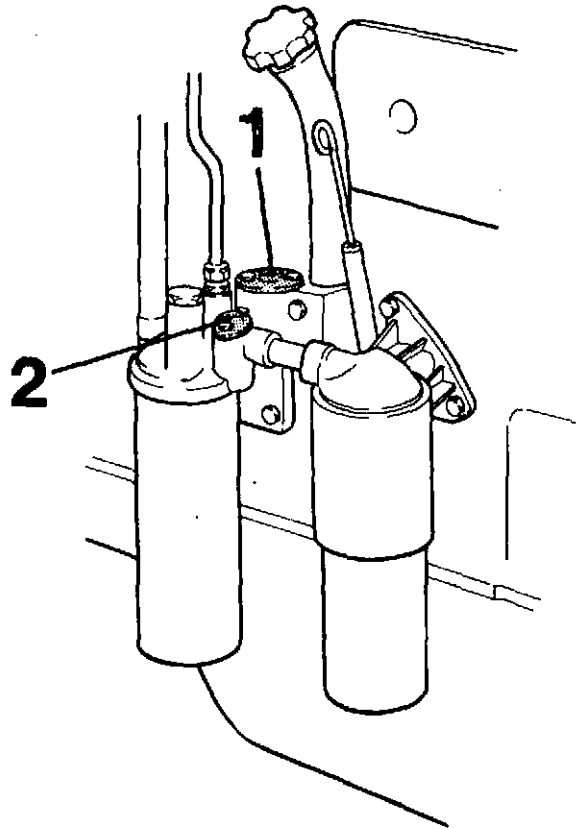


Pos	Description	Part No.	Colour marking
1	Relief valve, 60 series	471706-2	Blue
1	70 series	471812-8	Black
1	100 series*	471706-2	Blue
1	121 series	471707-0	Yellow
2	Cover	471752-6	
3	Washer	192287-1	
4	Bolt	940100-1	
5	O-ring	949658-9	
6	O-ring	469846-0	

*On TD100G and TID100K with oil sump for large inclinations the earlier relief valve is still used (part No. 875506-8).

61 and 71 series:

Engines of the 61 and 71 series are fitted with the new type relief valve from the start of production. Also the piston cooling valve on the 71 series and the relief valve controlling the oil flow through the oil cooler of the 61 series are of the same construction.



<u>Pos.</u>	<u>Description</u>	<u>Part No.</u>	<u>Colour marking</u>
1	Relief valve, 61, 71 series	471706-2	Blue
2	Relief valve*, 61 series	471640-3	Red
2	Piston cooling valve, 71 series	471646-0	White

* Controls the oil flow through the oil cooler (corresponds to the piston cooling valve on the 71 series).

NOTE! The new valves look similar. Therefore, note the colour marking. When removing, check that the colour marking is still noticeable. If necessary, add a dot of the correct colour as above.

CONCERNING

Lubricating system

PRODUCT

TD60

DISTRIBUTION

I

DATE

5-1986

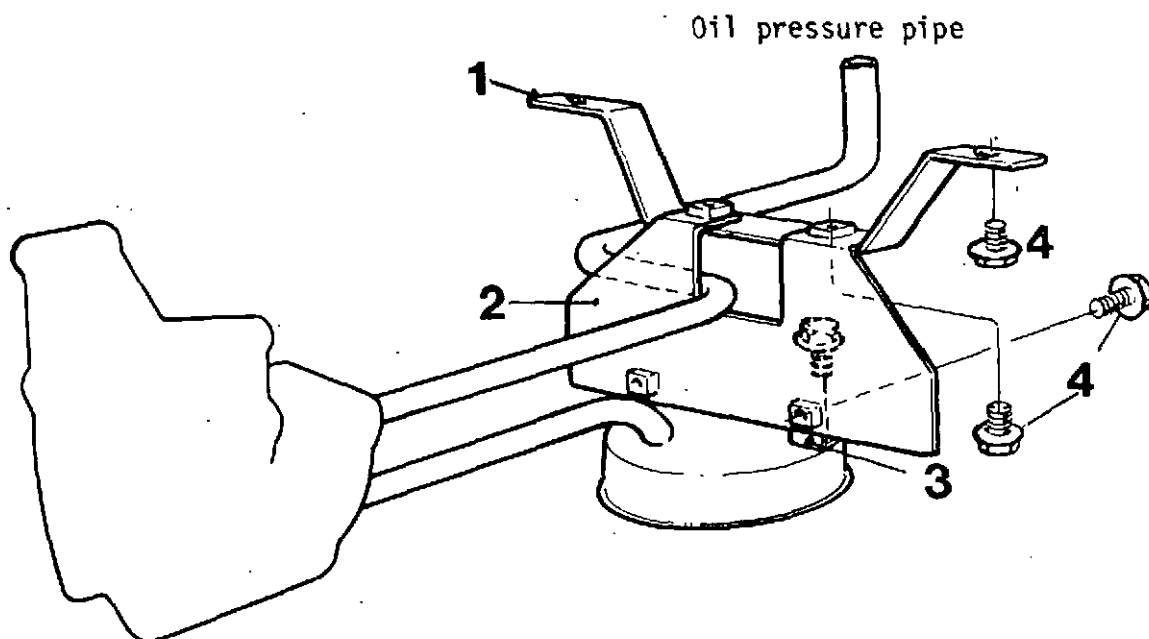
BAFFLE PLATE

The baffle plate holding the oil pump's suction pipe has sometimes broken whereby the suction strainer has come loose. It is very seldom that this causes any damage to the engine.

A replacement baffle plate has been produced and can be ordered from Parts Div. The replacement only fits with oil pressure pipe 465680-7. Earlier engines can be fitted with pressure pipe 844755-9. This must also be replaced when replacing the baffle plate.

New baffle plate, kit No. 849894-1, consists of:

Pos.	Description	Part No.	No.
1	Bracket	466667-3	1
2	Wash plate	849844-6	1
3	Fixture	465738-3	1
4	Bolt	942402-9	8



CONCERNING

Oil cooler

PRODUCT

TD/TID 61

DISTRIBUTION

I

DATE

4-1986

Some cases have occurred where the oil channel to the oil cooler has been plugged by mistake. There is a risk of plugged oil channel on engines with an engine number lower than 5462. Therefore these engines must be checked.

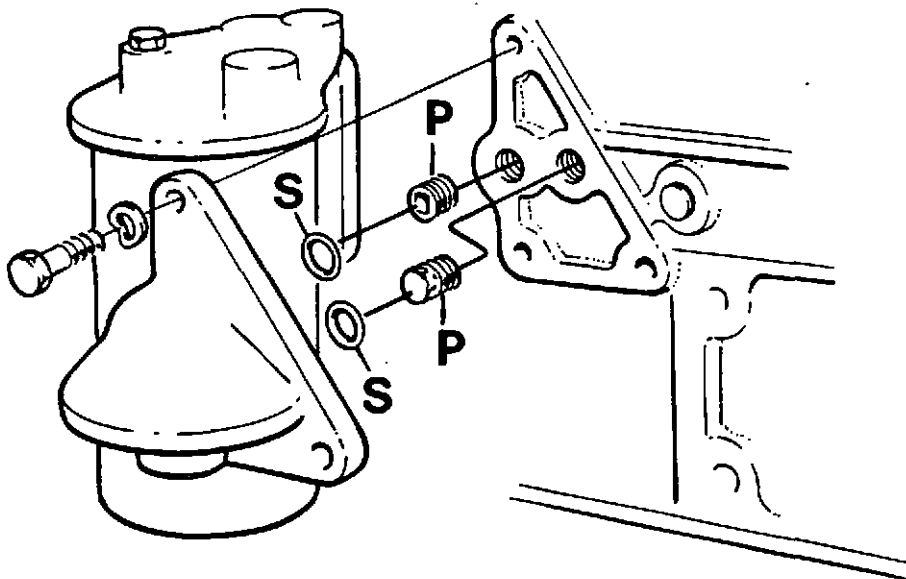
The plugs are located inside of the by-pass filter consol.

The check should be carried out in connection with servicing.

Check first if engine number plate is stamped with an "X".

If not:

1. Remove the filter consol.
2. Check if the oil channel is plugged. In that case, remove both plugs (P). Clean the holes.
3. Refit the filter consol. New sealing rings (S) must be used.
4. Mark the engine number plate with an X.



CONCERNING

OIL COOLER

PRODUCT

TD70G, TID70G, TAMD70E

DISTRIBUTION

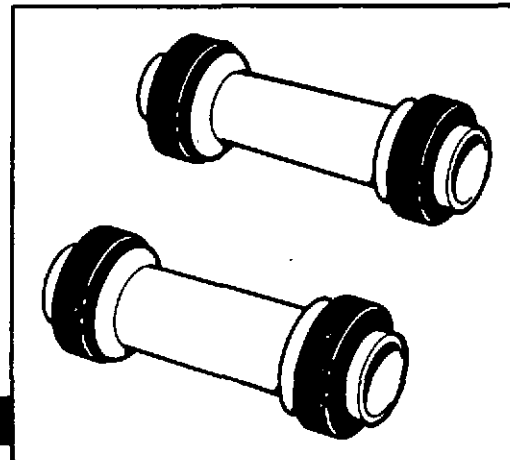
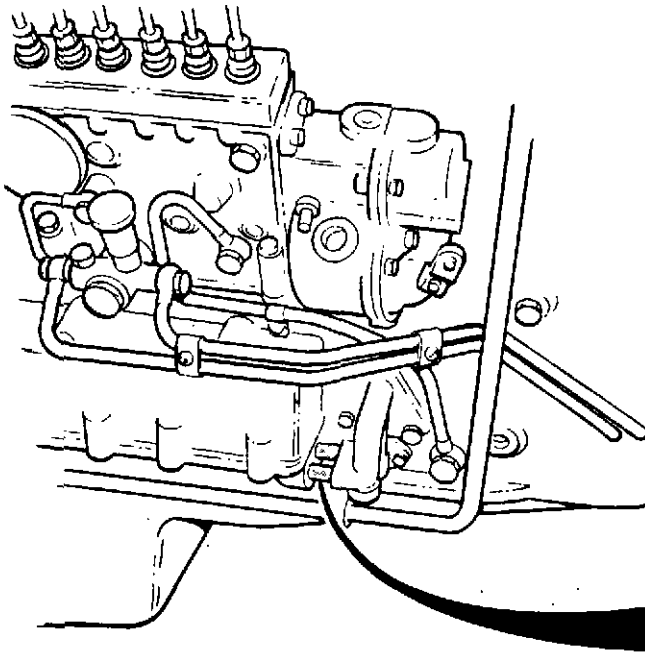
M, I

DATE

11-1983

New pipes and sealing rings between oil distributor housing and oil cooler have been introduced

To eliminate the risk of external oil leakage, new pipes (Part No. 471386-3) and sealing rings (Part No. 471387-1) between the oil distributor housing and the oil cooler have been introduced in our production. The new pipes and sealing rings can also be used on earlier engines.



CONCERNING
LUBRICATING OIL PIPE

PRODUCT
TD121G, TID121FG,
TD120HPP, TID120HPP,
TMD121C, TAMD121C

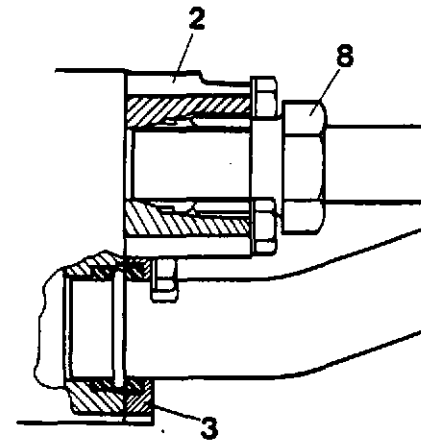
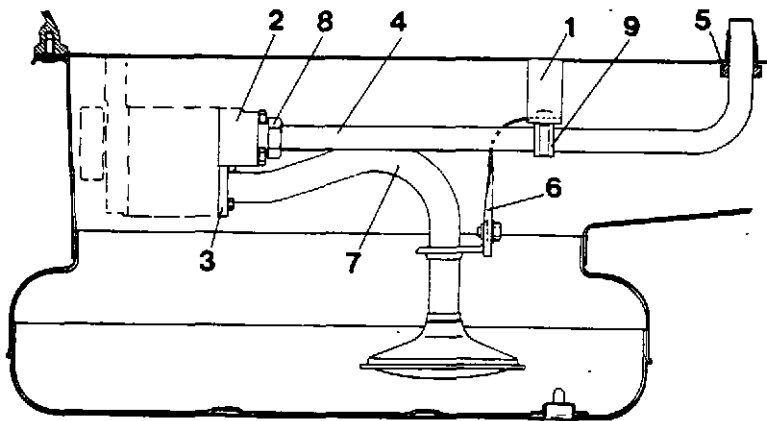
DISTRIBUTION
MI

DATE
9-1984

When removing the lube oil pipe, the pressure pipe at the pipe connection (5) against the block should be checked for deformation and replaced before refitting if necessary.

When refitting, the pipe connections (5 and 8) should be tightened 60° after having screwed in completely ($\leq 10 \text{ Nm} = 1 \text{ kpm}/7.5 \text{ lbf.ft}$).

Regarding new pipes, see the fitting instruction below.

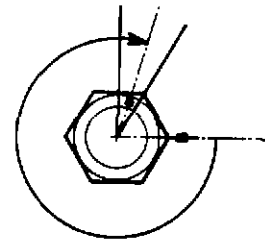
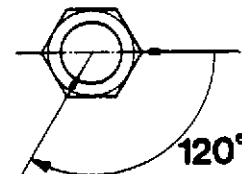


Pos	Description	Part no.
1	Bracket	470378-1
2	Intermedite part	470376-5
3	Flange	-
4	Pressure pipe	470375-7
5	Pipe connection	466908-1
6	Bracket	470385-6
7	Suction pipe	470379-9
8	Cutting ring fitting	470377-3
9	Rubber clamp	949786-8

Fitting instruction for suction and pressure pipes. NOTE! Applies for new pipes.

1. Place the cutting ring with the fitting (8), intermediate part (2), pipe connection (5) and rubber clamp on the pressure pipe (4).
2. Fit and bolt the bracket tight (1) in the engine block.
3. Oil the connection (5) and fit the pressure pipe to the engine with the intermediate part towards the pump.

4. Press in the pressure pipe until it bottoms in the block and screw in the connection (5) completely until it stops (≤ 10 Nm = 1 kpm/7.5 lbf.ft).
5. Bolt the intermediate part in the pump and screw in the cutting ring fitting in the intermediate part until it stops (≤ 10 Nm = 1 kpm/7.5 lbf.ft).
6. Place the suction pipe in the pump. Fit the bracket (6) and the rubber clamp (9).
7. Tighten the suction pipe flange to the pump. Tighten the suction pipe to the bracket (6).
8. Mark the cutting ring fitting (8) with a marking pen according to the figure and tighten it 270° - 300° in the intermediate part. NOTE! No permanent marking should be made.
9. Mark the pipe connection (5) with a marking pen according to the figure and tighten it 120° in the block.
10. Tighten the bolts for the bracket (6) and the rubber clamp (9).

**270°-300°****120°**

PART

2

engine unit

GROUP	DESCRIPTION	SECTION
23	Fuel system. Gas/petrol engines	230
	Carburetor	231
	Air cleaner, intake silencer	232
	Fuel pump, fuel filter	233
	Fuel pipes, fuel tank and fittings	234
	Injection system	235

PART

2

engine unit

GROUP	DESCRIPTION	SECTION
24	Fuel system. Diesel engines	240
	Fuel injection pump and speed governor	241
	Injectors	242
	Feed pump	243
	Fuel filter	244
	Fuel pipes, fuel tank and fittings	245

**VOLVO
PENTA**

service bulletin

GROUP
24
241

NO

602-1202

Replaces earlier SB

CONCERNING

Bosch injection pumps,
setting data

PRODUCT

Ind. engines, 45, 50,
60, 70, 100, 120 ser

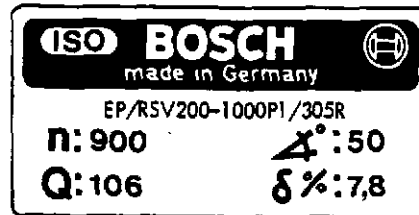
DISTRIBUTION

I(USA)

DATE

4-1985

The reason for this revised SB is the new test oil, ISO 4113, and new test equipment. A description of these can be found on the next page.



Regulator plate (example of regulator designation and setting values)

ISO = amount injected is measured with the new oil

n = pump speed

Q = amount injected, mm³/stroke at governor overrun speed in a test bench

A° = lever angle

δ% = engine speed change in %, for 6 mm R.V. (control rod travel)

When supplied from Volvo Penta, the engine's injection pump is adjusted to the values which are stated in the enclosed calibration data. On engines where the adjustment deviates from the standard adjustment these values are to be found stamped on the regulator plate (see picture). On engines with standard settings the plate is not stamped or on later engine versions it is stamped with S (standard).

NOTE! The volume which is injected as stated applies to the test oil when the temperature is 30°C (86°F). If the temperature of the test oil is 20°C (68°F) the amount of fuel supplied is 1 mm³ greater and at a temperature of 40°C (104°F) it is 1 mm³ less.

When a pump is handed into a Bosch representative for repair we request that you insist that the pump is set according to the values which are stamped on the regulator plate or that which is given in the attached calibration data.

NOTE! Adjustment and repairs on injection pumps must only be carried out by specially trained personnel. All engine warranty becomes void if the seals are broken by unauthorized personnel.

Special test nozzles and pressure pipes must be used for pumps with pump elements 12mm or larger. T-nozzles have been used earlier and for newer pumps so-called hole-washer nozzles shall be used.

The quantities in our calibration data have been marked (T) for T nozzles and (H) for hole-washer nozzles.

New test oil

Test oil meeting ISO norm 4113 must from now on be used when calibrating and testing injection pumps in a pump test bench.

Why ISO test oil?

Up until now, service stations throughout the world have used many test oils which in their physical values and chemical composition have been rather different. The introduction of only one test oil, which meets the international ISO norm, is an important step towards international standardisation of testing technology for injection pumps.

Which oil can be used?

The test oil which best meets the ISO norm 4113 as well as Volvo standards is sold in 1 gallon quantities by Volvo Penta under part No. 9900004-4. This oil should therefore be used from now on in pump test benches or injector (pop) testers.

Why hole-washer nozzles?

The introduction of hole-washer nozzles and new pressure pipes for the calibration of injection pumps with a pump element size of 12mm or larger provides conditions as close as possible to the true running conditions. Even this test equipment meets the ISO norm.

Calibration data

Older pumps are set according to the old values. The difference between the old test values and the test values with the new test oil is considered as being negligible.

Production pumps will also have test values using the new test oil.

New pumps will only have test values using the new test oil (ISO is quoted in the table heading).

Encl. Calibration data for industrial engines (replaces earlier issue)

Ersätter tid. utgåva
Replaces earlier issue

D50A

Inspr. pump (Fuel inj. pump) Bosch: PES 6A 85C 320 RS 2160
Regulator (governor) Bosch: EP/RSV 250-1000 A2B 330R
Matarpump (Fuel feed pump) Bosch: FP/KE 22 AD 202/2

Slagläge: 2.0 (+0.1)mm
Stroke position:

Volvo Penta Prod. no.	Motor avsedd för Engine intended for	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningsskruv i regulatorn Turns for setting screw in the regulator	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarvsvinkel, c:a ° Lever angle, approx. °	Varvtalsökning %, 6mm reglerst. vbg Speed increase %, 6mm contr. rod travel
9790	Industri, std. Industrial, std.	2000	2150-2200	525-575	4,5				
9791	Industri, Åkermans Industrial, Åkermans	1500	1620-1670	525-575	4	750	37	34	10,5
9792	Industri, Landsverk Industrial, Landsverk	1600	1700-1750	525-575	3	800	45	32	8,4
9794 9909	Industri, Irrig. aggr. Industrial, Irrig. unit	2000	2150-2200	525-575	4,5	1000	38	47	10,5
9796	Industri, ASJ Industrial, ASJ	2500	2650-2700	525-575	6,5	1250	50	60	8,4
9797	Industri, Lidhult Industrial, Lidhult	2200- 2250	2400	525-575	5,5	1100	50	48	8,4
9799	Industri, Bröyt Industrial, Bröyt	1830	2020	525-575	4	915	47	38	8,4
9802	Industri, Landsverk Industrial, Landsverk	1900	2050-2100	525-575	5,5	950	38	45	10,5
9806	Industri, Åkermans Industrial, Åkermans	1900	2015-2065	775-825	5,5	950	38	45	10,5
	Industri Industrial	1200	1300-1350	600-650	2,5	300/600	42	24	8,4
	Industri Industrial	1500	1620-1670	525-575	3	750	45	30	8,4
9889	Ind. gen. aggr. Ind. gen. set	1500	1560	-	1,0	300/750	45	27	6,0
	Industri Industrial	1800	1950-2000	525-575	4	900	47	37	8,4
9889	Ind. gen. aggr. Ing. gen. set	1800	1870	-	2,5	300/900	47	33	6,0
	Industri Industrial	2200	2350-2400	525-575	5,5	1100	50	48	8,4
	Industri Industrial	2500	2650-2700	525-575	6,5	1250	50	60	8,4
	Industri Industrial	2800	2920-2970	525-575	6,5	1400	52	67	7,5

TD60A

Inspr.pump (Fuel inj. pump) Bosch: PES 6MM 100/320 RS5
Regulator (Governor) Bosch: RWV 300-1250 MW17
Motorpump (Fuel feed pump) Bosch: FP/K 22 MW5

Slagläge: 2.5 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög länggång r/m Max. unloaded speed r.p.m.	Låg länggång r/m Idling speed r.p.m.	Varv för inställningskräv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hävarmsvinkel, ca° Lever angle, approx. °	Varvtalsstegring %, 6 mm reglerst. vdg Speed increase %, 6 mm contr. rod travel
Mobila installationer (effekt enl. kurva 2)	2500	2700-2800	625-675		1250	85		
Mobile application (output acc. to curve 2)	2200	2360-2410	"		1100	84		
	2100	2250-2300	"		1050	83		
	2000	2180-2230	"		1000	83		

TD60B

Inspr.pump (Fuel inj. pump) Bosch: PES 6 MW 100/320 RS 1004
Regulator (Governor) Bosch: RSV 325 - 1400 MW2/308
Motorpump (Fuel feed pump) Bosch: FP/K22 MW17

Slagläge: 2.8 (+0.1)mm
Stroke position:

Mobila installationer (effekt enl. kurva 2)	2800	2970 - 3030	600 - 650		Stämplas ej - Not stamped			
					1400	92	65	6
Mobile application (output acc to curve 2)	2500	2650 - 2700	"-		1250	90	53	6
	2200	2350 - 2400	"-		1100	87	45	6
	2100	2230 - 2270	"-		1050	87	43	6
	2000	2120 - 2160	"-		1000	86	40	6

TD60B

utrustad med RQV-regulator
fitted with RQV-regulator

Inspr.pump (Fuel inj. pump) Bosch: PE S 6 MW 100/320 RS 1004
Regulator (Governor) Bosch: RQV 300 - 1300 MW41
Motorpump (Fuel feed pump) Bosch: FP/K22 MW17

Slagläge: 2.8 (+0.1)mm
Stroke position:

Kalmar LMW	2500	2700 - 2750	900 - 950		Se Bosch datablad See Bosch data sheet			
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TD60BG

Inspr.pump (Fuel inj. pump) Bosch: PES 6 MW 100/320 RS 100Y

Slagläge: 2.8 (+0.1)mm
Stroke position:

Regulator (Governor) Bosch: RSV 325-750 MW4/311 alt. 650-750 MW4/311-1

Matorpump (Fuel feed pump) Bosch: FP/K22 MW17

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskrav i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, grad Lever angle, approx. °	Varvöverslagning %, 6 mm reglerst. väg Speed increase %, 6 mm contr. rod travel
Generatoraggregat (effekt enl punkt 1)	1500	1560	1250 - 1350		750	86	40	3.5
Generator set (output acc to point 1)	1800	1872	-"		900	89	48	3.4

TD60BPP

Regulator (Governor) Bosch: RSV 325 - 1400 MW2/308

Kraftaggregat (effekt enl kurva 4)	2500	2650 - 2700	600 - 650		1250	80	52	6
Power pack (output acc to curve 4)	2200	2350 - 2400	-"		1100	78	44	6
	2000	2120 - 2160	-"		1000	76	39	6

D70B

Inspr.pump (Fuel inj. pump) Bosch: PE6P 100A 320RS54 alt...RS291
Regulator (Governor) Bosch: EP/RSV 200 - 1250 Pl/305R
Motorpump (Fuel feed pump) Bosch: FP/K22P6

Slagläge: RS54=2.6 RS291=2.8 (+0.1)mm
Stroke position:
★Gäller pump...RS54
★Applies to pump...RS54

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/s (r/m) Governor overrun speed r.p.s. (r.p.m.)	Hög tomgång r/s (r/m) Max. unloaded speed r.p.s. (r.p.m.)	Låg tomgång r/s (r/m) Idling speed r.p.s. (r.p.m.)	Varv för inställningskräv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Hörsvarvinkel, grad Lever angle, approx. °	Varvtalsöversigt %, 6 mm reglent. väg Speed increase %, 6 mm contr. rod travel
	Intermittent effekt output (Std)	33,3 (2000)	36 + 1 (2150 ± 50)	8,3 + 1 (500 + 50)	5,0	1000	82 90*	60	5,5
	- " -	20 (1200)	22 ± 1 (1325 ± 50)	- " -	4,5	600	69 83*	42	11,5
	- " -	25 (1500)	27,5 ± 1 (1650 ± 50)	- " -	4,5	750	75 85*	48	8,5
	- " -	30 (1800)	32,5 ± 1 (1950 ± 50)	- " -	4,5	900	79 88*	54	6,0
	- " -	31,7 (1900)	34 ± 1 (2050 ± 50)	- " -	- " -	950	81	56	5,0
	- " -	36,7 (2200)	39 ± 1 (2350 ± 50)	- " -	5,5	1100	86 94*	69	5,5
	- " -	40 (2400)	42,5 ± 1 (2550 ± 50)	- " -	- " -	1200	84	76	4,0
	- " -	41,7 (2500)	44 ± 1 (2650 ± 50)	- " -	4,75	1250	86 97*	76	5,1
867055	Krafttaggr. Kontin. eff. Power pack. Contin. output	33,3 (2000)	36 ± 1 (2150 ± 50)	8,3 + 1 (500 + 50)	6,0	1000	73 75*	63 61*	7,5 6,0*
- " -	- " -	20 (1200)	22 ± 1 (1325 ± 50)	- " -	5,0	600	56 66*	42	12
- " -	- " -	25 (1500)	27,5 ± 1 (1650 ± 50)	- " -	5,0	750	63 68*	48	9,5
- " -	- " -	30 (1800)	32,5 ± 1 (1950 ± 50)	- " -	6,0	900	70 71*	58	8,0
- " -	- " -	36,7 (2200)	39 ± 1 (2350 ± 50)	- " -	6,0	1100	75 77*	68	6,0
867052	Marin hjälpmotor Marine aux. engine	25 (1500)	26 (1560)	-	3,5	750	75 85*	43	6,5
867053	Generatoraggr. Intern. eff. Generator oper. Intern. output	25 (1500)	26 (1560)	-	3,5	750	75 85*	43	6,5
- " -	- " -	30 (1800)	31,2 (1870)	-	4,5	900	79 88*	54	6,5
867057	Dyrebo, Norge	40 (2400)	42,5 + 1 (2500 + 50)	8,3 + 1 (500 + 50)	5,5	1200	84 96*	76 73*	4,0 5,2*
867058	Lidhult, Sverige	40 (2400)	42,5 + 1 (2550 + 50)	8,3 + 1 (500 + 50)	5,5	1200	84 96*	76 73*	4,0 5,2*
867060	Åkerman, Sverige	31,7 (1900)	-	9,7 - 10,3 (580 - 620)	4,5	950	81 89*	56 57*	5,0 5,7*
867221	SMV Stensele	40 (2400)	42,5 + 1 (2550 + 50)	8,3 + 1 (500 + 50)	5,5	1200	84 96*	76	4,0

D70BPP

Inspr.pump (Fuel inj. pump) Bosch: PE 6 P 100A 320 RS 291

Slagläge: 2.8 (+0.1)mm
Stroke position:

Regulator (Governör) Bosch: RSV 200-1200 P1/305R

Motorpump (Fuel feed pump) Bosch: FP/KZZ P9

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskrav i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hävarvinkel, ca° Lever angle, approx. °	Varvtalsökning %, 6 mm reglert. väg Speed increase %, 6 mm contr. rod travel
Kraftaggregat (effekt enl kurva 4)	2200	2330 - 2380	550 - 600		1100	74	65	7
Power pack (output acc to curve 4)	2000	2120 - 2160	- "-		1000	70	60	7.5
	1800	1910 - 1950	- "-		900	66	50	8

TD70A

Inspr.pump (Fuel inj. pump) Bosch: PE6P100/320 RS51
Regulator (Governor) Bosch: EP/RSV200 - 900P1/305R alt. EP/RSV250 - 1150P5/205R
Motorpump (Fuel feed pump) Bosch: FP/K22P6

Slagläge: 2.6 (+0.1)mm
Stroke position:

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/s (r/m) Governor overrun speed r.p.s. (r.p.m.)	Hög tomgång r/s (r/m) Max. unloaded speed r.p.s. (r.p.m.)	Låg tomgång r/s (r/m) Idling speed r.p.s. (r.p.m.)	Varv för inställningskrav i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, grad Lever angle, approx. °	Varvtalsökning %, 6 mm reglerst. vög Speed increase %, 6 mm contr. rod travel
9966	Intermittent effekt output (Std)	33,3 (2000)	35,7 + 1 (2140 + 50)	8,3 - 9,2 (450 - 500)	6	1000	90	53	8,8
- - -	- - -	40 (2400)	42,3 + 1 (2540 + 50)	8,3 - 9,2 (500 - 550)	5	1200	95	56	7,2
867030	Åkerman H11B	31,7 (1900)	34,2 + 1 (2050 + 50)	9,7 - 10,3 (580 - 620)	6	950	90	52	9,6
9267	Ingvar Jansson	36,7 (2200)	38,8 + 1 (2330 + 50)	8,3 - 9,2 (450 - 500)	6	1100	90	54	7,2
9966	Nordverk	41,7 (2500)	43,7 + 1 (2620 + 50)	8,3 - 9,2 (500 - 550)	4,5	1250	95	55	5,8

TD70B

Inspr.pump (Fuel inj. pump) Bosch: PE6P110A320RS1B6 alt. PE6P 100A 320 RS291
Regulator (Governor) Bosch: EP/RSV250 - 1250P2/358/2R alt. EP/RSV200 - 1000P1/305R
Motorpump (Fuel feed pump) Bosch: FP/K22P6

Slagläge: RS186=2.6 RS291=2.8 (+0.1)mm
Stroke position:

*Galler pump...RS186
*Applies to pump...RS186

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/s (r/m)	Hög tomgång r/s (r/m)	Låg tomgång r/s (r/m)	Varv för inställningskrav i regulator	Stämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m	Insprutningsmängd, mm ³ /slag, i provbänk	Höjningsvinkel, grad	Varvtalsökning %, 6 mm reglerst. vög
867065	Intermittent effekt output (Std)	33,3 (2000)	36 ± 1 (2160 ± 50)	9,2 ± 1 (550 ± 50)	3,75 2,0	1000	106 (106) 103*	65 (54) 43*	6,4 (6,7) *9,6
- - -	- - -	40 (2400)	43 ± 1 (2580 ± 50)	- - -	- - -	1200	106 103*	65 43*	6,4 *9,4
- - -	- - -	36,7 (2200)	39,5 ± 1 (2370 ± 50)	- - -	- - -	1100	106 104*	60 40*	6,6 *9,0
- - -	- - -	30 (1800)	32,5 ± 1 (1950 ± 50)	- - -	- - -	900	106 104*	50 33*	7,8 *7,7
- - -	- - -	25 (1500)	27,5 ± 1 (1650 ± 50)	- - -	- - -	750	104 103*	43 29*	8,3 *9,0
- - -	- - -	23,3 (1400)	26 ± 1 (1550 ± 50)	- - -	- - -	700	101 100*	41 27*	9,8 *9,6
867065	Krafttaggr. Kontin. eff. Power Pack. Contin. output	36,7 (2200)	39,5 ± 1 (2370 ± 50)	9,2 ± 1 (550 ± 50)	4,0 3,0	1100	93 90*	62 42*	6,9 *8,2
- - -	- - -	33,3 (2000)	36 ± 1 (2160 ± 50)	- - -	- - -	1000	92 89*	56 39*	7,7 *8,5
- - -	- - -	30 (1800)	32,5 ± 1 (1950 ± 50)	- - -	- - -	900	92 86*	51 35*	8,5 *8,9
- - -	- - -	25 (1500)	27,5 ± 1 (1650 ± 50)	- - -	- - -	750	90 82*	45 32*	9,2 *10,8
- - -	- - -	23,3 (1400)	26 ± 1 (1550 ± 50)	- - -	- - -	700	87 80*	43 30*	10,7 *12,9
- - -	Generatoraggr. Kontin. eff. Generator oper. Contin. output	25 (1500)	26 (1560)	-	2,75	750	104	40	6,1
- - -	- - -	30 (1800)	31,2 (1872)	-	3,75	900	106	49	5,6

TD70B

 Inspr.pump (Fuel inj. pump) Bosch: PE6P 100A 320RS 291 (Z)
 Regulator (Governor) Bosch: EP/RSV 200-1000 PI/305R
 Motorpump (Fuel feed pump) Bosch: FP/K22 P9

 Slagläge: 2.8 (+0.1)mm
 Stroke position:

Motor avsedd för Engine intended for	Avregleringsvarv r/s (r/m) Governor overrun speed r.p.s. (r.p.m.)	Hög tomgång r/s (r/m) Max. unloaded speed r.p.s. (r.p.m.)	Låg tomgång r/s (r/m) Idling speed r.p.s. (r.p.m.)	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
				Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarmsvinkel, ° Lever angle, approx. °	Varvtalsögring %, 6 mm reglerst. väg Speed increase %, 6 mm contr. rod travel
Intermittent effekt output (Std)	33,3 (2000)	35-37 (2100-2200)	8,2-10,2 (500-600)	Stämplat ej (1000)	Not stamped (111)	(55)	(7,7)
"-	40 (2400)	42-44 (2530-2630)	"-	1200	112	65	6,3
"-	36,7 (2200)	38,5-40,5 (2320-2420)	"-	1100	113	65	6,4
"-	30 (1800)	31,5-33,5 (1900-2000)	"-	900	113	55	7,6
"-	23,3 (1400)	25-27 (1500-1600)	"-	700	110	55	
Krafttaggr. Kontin. eff. Power Pack. Contin. output	36,7 (2200)	38,5-40,5 (2320-2420)	"-	1100	93	62	6,9
"-	33,3 (2000)	35-37 (2100-2200)	"-	1000	92	56	7,7
"-	30 (1800)	31,5-33,5 (1900-2000)	"-	900	92	51	8,5
"-	25 (1800)	26,5-28,5 (1600-1700)	"-	750	90	45	9,2
"-	23,3 (1400)	25-27 (1500-1600)	"-	700	87	43	10,7
Generatorögr. Kontin. eff. (punkt 3) Generator oper. Contin. output (point 3)	25 (1500)	26 (1560)	20-21 (1200-1250)	750	104	40	6,1
"-	30 (1800)	31,2 (1872)	"-	900	106	49	5,6

D70CHC, D70CRC

Inspr.pump (Fuel inj. pump) Bosch: PE 6 P 100A 320 RS 386
Regulator (Governor) Bosch: RSV 200-1200 P1/305 R
Motorpump (Fuel feed pump) Bosch: FP/K22 P6

Slagläge: 2.B (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskrav i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate				ISO
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, ca° Lever angle, approx. °	Varvtalsöppning %, 6 mm reglern. väg Speed increase %, 6 mm contr. rod travel	
Generatoraggregat (effekt enl punkt 1)	1500	1560	1250 - 1350		750	82	40	5.2	81
Generator set (output acc to point 1)	1800	1872	--		900	85	45	5.2	84

TD70CHC, TD70CRC

Inspr.pump (Fuel inj. pump) Bosch: PE 6 P 110A 320 RS 390
Regulator (Governor) Bosch: RSV 200-750 P4/421 R
Motorpump (Fuel feed pump) Bosch: FP/K22 P 9

Slagläge: 3.0 (+0.1)mm
Stroke position:

Generatoraggregat (effekt enl punkt 1)	1500	1560	1250- 1350		750	110	38	6	109
Generator set (output acc to point 1)	1800	1872	--		900	112	46	6	111

TD70G

 Inspr.pump (Fuel inj. pump) Bosch: PE 5 P 110A 32U PS 390
 Regulator (Governor) Bosch: RSV 200-1200 P 1/305 R
 Matarpump (Fuel feed pump) Bosch: FP/K22 P9

 Slaglage: 3.0 (+0.1)mm
 Stroke position:

Motor avsedd for: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hog tomgang r/m Max. unloaded speed r.p.m.	Lag tomgang r/m Idling speed r.p.m.	Varv for installningskrav i regulator Turns for setting screw in governor	Instampel. vorde pa regulatorskylt Valves, stamped on govern. plate				150
					Varvtal r/m Revolution r.p.m.	Insprutningsmangd, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Havarmsvinkel, o Lever angle, approx. o	Varvstaetring %, 6 mm reglerst. vag Speed increase %, 6 mm conit. rod travel	
Mobil installation (effekt enl kurva 1) Mobile application (output acc to curve 1)	2400	2550 - 2600	550 - 600		Stampas ej 1200	Not stamped 110	70	6	109
	2200	2330 - 2380	- "-		1100	109	62	6	108
	2000	2120 - 2160	- "-		1000	108	57	6	107
Mobil installation (effekt enl kurva 3) Mobile application (output acc to curve 3)	2200	2330 - 2380	- "-		1100	97	60	7	96
	2000	2120 - 2160	- "-		1000	96	55	7	95
	1800	1910 - 1950	- "-		900	95	48	7	94

TD70GPP

Kraftaggregat (effekt enl kurva 4) Power pack (output acc to curve 4) - " -	2200	2330 - 2380	550 - 600		1100	97	60	7	96
	2000	2120 - 2160	- "-		1000	96	55	7	95
	1800	1910 - 1950	- "-		900	95	48	7	94

TD70GG

Inspr.pump (Fuel inj. pump) Bosch: PE 6 P 110A 320 RS 390
Regulator (Governor) Bosch: RSV 200-750 P4/421 R alt. 650-750 P4/421R
Motorpump (Fuel feed pump) Bosch: FP/K22 P 9

Slagläge: 3.0 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskrav i regulator Turns for setting screw in governor	Inställmpl. värde på regulatorskylt Values, stamped on govern. plate				150
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, ° Lever angle, approx. °	Varvtalstegring %, 6 mm reglerst. vög Speed increase %, 6 mm contr. rod travel	
Generating set 110kw brutto (gross)	1494	1560	1250 - 1350	3 3/4	750	110	38	3.7	109
Generating set 132kw brutto (gross)	1792	1872	-"	3 2/4	900	112	48	3.6	107
Stand by-set 120kw brutto(gross)	1500	1560	-"		750	118	38	3.8	117
Stand by-set 140kw brutto(gross)	1800	1872	-"		900	118	46	3.8	117
Stand by-set* 126kw brutto(gross)	1500	1576	-"	3 3/4	750		38	3.7	133
Stand by-set* 147kw brutto(gross)	1800	1888	-"	3 2/4	900		48	3.6	125

*Max 300h/year

TD70G

utrustad med RQV-regulator
fitted with RQV-regulator

Inspr.pump (Fuel inj. pump) Bosch: PE 6 P 110A 320 RS 413 Z
Regulator (Governor) Bosch: RQV 250-1200 PA 499
Motorpump (Fuel feed pump) Bosch: FP/K22 P 9

Mobil installation (effekt enl kurva 2)	2400	2650 - 2750	475 - 550		Se Bosch datablad See Bosch data sheet
Mobile application (output acc to curve 2)					

D100A

 Inspr. pump (Fuel inj. pump) Bosch: PE6 P100/320 RS 51
 Regulator (governor) Bosch: EP/RSV 200 - 900 P1/305R
 Matarpump (Fuel feed pump) Bosch: FP/K22 P6

 Slagläge: 2.6 (+0.1)mm
 Stroke position:

Volvo Penta Prod. no.	Motor avsedd för Engine intended for	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskrav i regulatorn Turns for setting screw in the regulator	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, ca ° Lever angle, approx °	Varvtalsstegring %, 6mm reglerst. vbg Speed increase %, 6mm contr. rod travel
9754	Industri, std. Industrial, std.	1800	1950-2000	400-450	5,5	Stämplas ej (900)	(115)	Not stamped (56)	(6,5)
9756	Industri, Landsverk Industrial, Landsverk	1450	1550-1600	400-450	4	725	115	39	6,5
9757	Industri, Åkermans Industrial, Åkermans	1875	1975-2025	775-825	5,5	940	115	60	6,5
9911 9765	Industri, Irrig. aggr. Industrial, Irrig. unit	2000	2120-2170	400-450	6	1000	94	60	6,5
	Gen. aggr. Gen. set	1500	1560	-	2,5	750	115	40	4,8
	Gen. aggr. Gen. set	1800	1870	-	4,0	900	117	48	4,8
9803	Industri, Min. Transp. Industrial, Min. Transp.	2175	2275-2325	400-450	6	1085	113	65	5,5
9803	Industri, Min. Transp. Industrial, Min. Transp.	2175	2275-2325	400-450	6	1085	88	65	5,5
	Industri Industrial	1200	1275-1325	400-450	3	250-600	111	30	6,2
	Industri gen. aggr. Industrial gen. set	1200	1248	-	2	250-600	111	28	4,5
	Industri Industrial	1500	1620-1670	400-450	4	750	115	39	6,5
	Industri gen. aggr. Industrial gen. set	1500	1560	-	2,5	750	115	40	4,8
	Industri Industrial	2000	2120-2170	400-450	6	1000	115	60	6,5
	Industri Industrial	2200	2330-2380	400-450	6	1100	113	65	5,5

D100A

 Inspr. pump (Fuel inj. pump) Bosch: PE6 P100/320 RS 51
 Regulator (governor) Bosch: EP/RSV 200-900 P1/305R
 Matarpump (Fuel feed pump) Bosch: FP/K22 P6

 Slagläge: 2.6 (+0.1)mm
 Stroke position:

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för installationskräv i regulatorn 1) Turns for setting screw in the regulator	InstampL värde på regulatorskyllt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.m.	Inspr. mängd mm ³ /slag i provhänk Inj. quant. mm ³ /stroke in test bench	Hävarvinkel ca ° Lever angle approx. °	Varvtalsöktning % 6 mm reglerst. väg Speed increase % 6 mm contr. rod travel
9902	Industri, klassad Industrial, classified	1500	1560 2)	-	2,5	750	115	40	4,8
9902	Industri, klassad Industrial, classified	1800	1870 2)	-	4,0	900	117	48	4,8
9914	Reservelverk Power Plant Hägglund	1800	1870 2)	-	4,0	900	117	48	4,8
9929	Motor för Engine for Hägglund's Gen. set	1500	1560 2)	-	2,5	750	115	40	4,8
9929	Motor för Engine for Hägglund's Gen. set	1800	1870 2)	-	4,0	900	117	48	4,8
9946	Industri, Min. Transp. Industrial, Min. Transp.	2200	2330-2380	400-450	6	1100	113	65	5,5
9952	Motor för res. elverk Engine for Power Plant	1500	1560 2)	-	2,5	750	115	40	4,8
9952	Motor för res. elverk Engine for Power Plant	1800	1870 2)	-	4,	900	117	48	4,8
9962	Industri, Åkerman Industrial, Åkerman	1625	1730-1770	630-670	4,5	815	116	44	6,5

- 1) Skruven vrids moturs från bottenläget (ett varv = fyra hack).
The screw is screwed anti-clockwise from its bottom position (one turn = four notches).
- 2) Varvtalsöktningen är mätt vid 90 % effekt.
The run up is measured at 90 % output.

D100B

 Inspr. pump (Fuel inj. pump)
 Regulator (Governor)
 Matarpump (Fuel feed pump)

 Bosch: PE6P 110/320 RS138 alt. PE6P110A320RS138
 Bosch: EP/RV 200 - 900 P1/305R
 Bosch: FP/K22 P6

 Slagläge: 2,6 (+0.1)mm
 Stroke position:

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskräv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, ° Lever angle, approx. °	Varvtalstegring %, 6 mm reglerst. väg Speed increase %, 6 mm contr. rod travel
867013	Industri, std, Industrial, std.	1800	1950-2000	400-450	5	Stämplad ej		Not stamped	
						(900)	(116)	(50)	(10,0)
867014	Industri, Landsverk Industrial, Landsverk	1450	1550-1600	400-450	4	725	116	42	10,0
867015	Industri, Söjland Industrial, Söjland	1800	1950-2000	400-450	5	(900)	(116)	(50)	(10,0)
						Stämplad ej		Not stamped	
867016	Industri, Arpic Industrial, Arpic	2100	2230-2280	1175-1225	5	1050	113	58	10,6
867017	Indust. ASJ, Parka 1254 Indust. ASJ, Parka 1254	2200	2340-2390	400-450	5	1100	112	60	10,7
867019	Industri, klassad Industrial, classified	1500	1560	-	2,0	750	116	40	5
- " -	- " -	1800	1870	-	2,5	900	116	44	5
867020	Irrigationsaggregat Power Pack	2000	2140-2190	400-450	5	1000	102	56	8
867021	Reservverk Stand by gen. set Hägglund, Mexico	1800	1870	-	2,5	900	116	44	5
867022	Gen. aggregat Gen. set Hägglund	1500	1560	-	2,0	750	116	40	5
867023	Gen. aggregat Gen. set Hägglund	1500	1560	-	2,0	750	116	40	5
867025	Gen. aggregat Gen. set Hägglund	1800	1870	-	2,5	900	116	44	5
867026	Industri, Åkerman Industrial, Åkerman	1625	1750-1800	400-450	4	815	116	46	10,2
867027	Industri, Lidhult Industrial, Lidhult	2200	2340-2390	400-450	5	1100	112	60	10,7
867045	Industri, Landsverk Industrial, Landsverk	1800	1950-2000	400-450	5	(900)	(116)	(50)	(10,0)
						Stämplad ej		Not stamped	
9952	Reservverk (marin grundmotor) Stand by gen. set (marine stand. engine)	1500	1560	-	2,0	750	116	40	5
- " -	- " -	1800	1870	-	2,5	900	116	44	5

D100BPP

Inspr.pump (Fuel inj. pump) Bosch: PE 6P 100A 320 RS 138Z
Regulator (Governor) Bosch: RSV 200 - 1000 P1/305R
Motorpump (Fuel feed pump) Bosch: FP/k22 P

Slagläge: 2.6 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningsakrur i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Hövarvinkel, ca° Lever angle, approx. °	Varvtalstegring %, 6 mm reglerst. vög Speed increase %, 6 mm contr. rod travel
Kraftaggregat (effekt enl kurva 4) Power pack (output acc to curve 4)	2000	2120 - 2160	500 - 550		1000	92	55	6.5
	1800	1910 - 1950	- "-		900	94	50	7.0
	1500	1590 - 1620	- "-		750	94	40	7.0

D100BHC, D100BRC

 Inspr.pump (Fuel inj. pump) Bosch: PE 6 P 110A 320 RS 138
 Regulator (Governor) Bosch: RSV 200 - 900 P1/305R
 Motorpump (Fuel feed pump) Bosch: FP/k22 P6

 Slagläge: 2.6 (+0.1)mm
 Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskrav i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarvsvinkel, ° Lever angle, approx. °	Varvtalstegring %, 6 mm reglest. väg Speed increase %, 6 mm contr. rod travel
Generatoraggregat (hjälpmotor) (effekt enl punkt 1) Generating set (auxiliary engine) (output acc to point 1)	1500	1560			750	116	40	5
	1800	1872			900	116	44	5
Pumpaggregat (hjälpmotor) (effekt enl kurva 4) Pump set (auxiliary engine) (output acc to curve 4)	2000	2120 - 2200	500 - 550		1000	94	55	6.5
	1300	1910 - 1950	-"		900	95	50	7
	1500	1590 - 1620	-"		750	95	4	7

TD100AHC, TD100ARC

 Inspr.pump (Fuel inj. pump) Bosch: PE 6 P 130A 320 RS 101
 Regulator (Governor) Bosch: RSV 200-900 P4/305R
 Motorpump (Fuel feed pump) Bosch: FP/k22 P9

Generatoraggregat (hjälpmotor) (effekt enl punkt 1) Generating set (auxiliary engine) (output acc to point 1)	1500	1560	1250 - 1350		750	155	42	3.2
	1800	1872	-"		900	155	50	3.2
Pumpaggregat (hjälpmotor) (effekt enl kurva 4) Pump set (auxiliary engine) (output acc to curve 4)	2000	2120 - 2160	550 - 600		1000	142	57	6
	1300	1900 - 1950	-"		900	140	52	6
	1500	1600 - 1640	-"		750	140	45	6

TD100A

Inspr. pump (Fuel in. pump) Bosch: PE 6P 100/320 RS 52 alt. 101 resp. PEGP100A320RS101
 Regulator (governor) Bosch: EP/RSV 200-900 P4/305R
 Matarpump (Fuel feed pump) Bosch: FP/K22 P6

Slagläge: 2.6 (+0.1)mm
 Stroke position:

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/m Governor overtur speed r. p. m.	Hög tomgång r/m Max. unloaded speed r. p. m.	Låg tomgång r/m Idling speed r. p. m.	Varv för inst. skruv i regulatorn Turns for setting screw in the reg.	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m Revolution r. p. m.	Inspr. mängd mm ³ /slag i provbank Inj. quant. mm ³ /stroke in test bench	Hävarmsvinkel ca ° Lever angle approx. °	Varvtalsstegning % 6 mm reglerst. våg Speed increase % 6 mm contr. rod travel
9879	Industri Industrial Class: Lloyd's	1500	1560	-	3	750	138	40	3,4
9879	Industri Industrial Class: Lloyd's	1800	1870	-	3	900	140	44	3,4
9879	Industri Industrial Class: B. V. D. N. V.	1500	1560	-	2	750	150	42	3,4
9879	Industri Industrial Class: B. V. D. N. V.	1800	1870	-	3	900	150	43	3,4
9963	Åkerman H21	1750 1800	1925 1975	600 600	5,0 5,5	875	150	43	3,4
9964	Rotary Plow Co	2200	2350		6	1100	150	63	3,4
9915	Industri motor för Industrial engine for Häggglunds Gen. Set.	1800	1870	-	3	900	150	43	3,4
9931	Industri motor för Industrial engine for Häggglunds Gen. Set.	1500	1560	-	2	750	150	42	3,4
9931	Industri motor för Industrial engine for Häggglunds Gen. Set.	1800	1870	-	3	900	150	43	3,4
8200	Industri motor med red. växel för Industrial engine with red. gear for Häggglunds Gen. Set.	1890	1965	-	2,5	945	165	52	3,4
9934	Industri motor med red. växel för Industrial engine with red. gear for Häggglunds Gen. Set.	1890	1965	-	2,5	945	150	44	3,4
9953	Reservverk Power Plant	1500	1560	-	2	750	150	42	3,4
9953	Reservverk Power Plant	1800	1870	-	3	900	150	43	3,4

TD100A

Inspr. pump (Fuel inj. pump) Bosch: PE 6P 100/320 RS 52 alt. 101 resp. PE6P100A320RS101
 Regulator (governor) Bosch: EP/RSV 200-900 P4/305R Slagläge: 2.6 (+0.1)mm
 Matarpump (Fuel feed pump) Bosch: FP/K22 P6 Stroke position:

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inst. skruv i regulatorn Turns for setting screw in the reg.	Instämpl. värde på regulatorskyilt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.in.	Inspr. mängd mm ³ /slag i provbank Inj. quant. mm ³ /stroke in testbench	Hävarsvinkel ca ° Lever angle approx. °	Varvtal östgring % 6 mm reglerst. vagn Speed increase % 6 mm contr. rod travel
9766	Industri, std. Industrial, std.	1800	1950-2000	400-450	5, 5	Stämplas ej 900	162	63	4, 7
9768 9912	Industri, Irrig. aggr. Industrial, Irrig. unit	2000	2150-2200	400-450	6	1000	136	62	4, 7
	Gen. aggr. Gen. set	1500	1560	-	2	750	150	42	3, 4
	Gen. aggr. Gen. set	1800	1870	-	3	900	150	43	3, 4

TD100A

Inspr.pump (Fuel inj. pump) Bosch: PE6P 100A 320RS101 (Z)
 Regulator (Governor) Bosch: EP/RSV 200-900 P4/305R
 Matarpump (Fuel feed pump) Bosch: FP/K22 P9

Intermittent effekt output (Std)	30 (1800)	31,5-33,5 (1900-2000)	8,5-9,5 500-550	Stämplas ej (900)	Not stamped (162)	Not stamped (57)	(5, 4)
"-	36,7 (2200)	38-40 (2300-2400)	"-	1100	164	63	4, 7
"-	33,3 (2000)	35-37 (2100-2200)	"-	1000	163	62	4, 7
"-	26,7 (1600)	28-30 (1700-1800)	"-	800	163		
"-	23,3 (1400)	24,5-26,5 (1500-1600)	"-	700	161		
Kraftaggr. Kontin. eff. Power pack. Contin. output	33,3 (2000)	35-37 (2100-2200)	"-	1000	132	57	5, 1
"-	30 (1800)	31,5-33,5 (1900-2000)	"-	900	134	52	5, 8
"-	26,7 (1600)	28-30 (1700-1800)	"-	800	136	47	8, 1
Generatoraggr. Kontin. eff. (punkt 3) Generator oper. Cont. output (point 3)	25 (1500)	26 (1560)	20-21 (1200-1250)	750	165	42	3, 4
"-	30 (1800)	31,2 (1872)	"-	900	162	43	3, 4

TD100A

Inspr.pump (Fuel inj. pump) Bosch: PE 6P 100A 320 RS 101
Regulator (Governor) Bosch: RSV 200 - 900 P4/305R
Motorpump (Fuel feed pump) Bosch: FP/k22 P9

Slagläge: 2.6 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningsskruv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarvsvinkel, ca° Lever angle, approx. °	Varvtalstegring %, 6 mm reglerst. väg Speed increase %, 6 mm contr. rod travel
Mobila installationer (effekt enl kurva 2) Mobile application (output acc to curve 2)	2200	2330 - 2380	500 - 550		1100	164	63	4.7
	2000	2120 - 2160	- "-		1000	163	62	4.7
	1800	1910 - 1950	- "-		900	162	57	5.4

TD100APP

Kraftaggregat (effekt enl kurva 4) Power pack (output acc to curve 4)	2000	2120 - 2160	500 - 550		1000	139	58	5.1
	1800	1910 - 1950	- "-		900	139	52	5.4
	1500	1600 - 1650	- "-		750	139	47	5.4

TD100AG

Inspr.pump (Fuel inj. pump) Bosch: PE 6P 110A 320 RS 175 Y
Regulator (Governor) Bosch: RSV 200 - 900 P4/421R
Motorpump (Fuel feed pump) Bosch: FP/k22 P9

Slagläge: 2.6 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskräv i regulator Turns for setting screw in governor	Inställt värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, ca° Lever angle, approx. °	Varvtalsöverslagning %, 6 mm reglent. vög Speed increase %, 6 mm contr. rod travel
Generatoraggregat (effekt enl punkt 1) Generating set (output acc to point 1)	1500	1560	1250 - 1350		Stämplas ej - Not stamped 750	176	40	3.1
	1800	1872	1250 - 1350		900	167	48	3.4
Generatoraggregat (effekt enl punkt 3) Generating set (output acc to point 3)	1500	1560	1250 - 1350		750	185	38	3.0
	1800	1872	1250 - 1350		900	178	42	3.0
Akerman. Mobil installation Akerman. Mobile application	1800	1930 - 1980	550 - 600		900	178	56	6.0

D120A

Inspr. pump (Fuel inj. pump)
Regulator (Governor)
Motorpump (Fuel feed pump)

Bosch: PE6P 110/320 RS175 alt. PE6P110A320RS175
Bosch: EP/RSV 200 - 900 P1/305R
Bosch: FP/K22 P6

Slagläge: 2.6 (+0.1)mm
Stroke position:

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskräv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarvinkel, ca ^o Lever angle, approx. °	Varvtalstegring %, 6 mm reglerst. vög Speed increase %, 6 mm contr. rod travel
9921	Industri, std. inställn. Industrial, std. setting	1800	1900 - 2000	500 - 550	5	Stämplas ej. (900)	(126)	Not stamped. (50)	(10,1)
867095	Kraftaggregat, std. inställn. Power Pack, std. setting	2000	2110 - 2210	500 - 550	6	1000	115	60	11,4
867097	Hjälpmotor (klassad marin) Auxiliary engine (marine model, classified)	1500	1570 - 1670	500 - 550	5	750	115	43	11,4
"	"	1800	1900 - 2000	500 - 550	6	900	115	52	11,4
867099	Klassad motor för generatordrift (industrimod.) Classified engine for generator operation (industrial model)	1500	1560		3,75	750	126	38	6,1
867097	Hjälpmotor (klassad marin) för generatordrift Auxiliary engine for generator operation (classified marine model)								
"	"	1800	1870		4	900	128	45	6,0

TD120AG

Inspr. pump (Fuel inj. pump) Bosch: PE6P 110A 320RS175
Regulator (Governor) Bosch: EP/RSV 200-900 P4/421R
Motorpump (Fuel feed pump) Bosch: FP/K22 P9

Generator aggr. Kontin. eff. (punkt 3) Generator oper. Contin. output (point 3)	25 (1500)	26 (1560)	20-21 (1200-1250)	—	750	202	44	2,8
—	30 (1800)	31,2 (1872)	—	—	900	203	44	2,8

TD120A

 Inspr.pump (Fuel inj. pump) Bosch: PE6P110/320RS175 alt. PE6P110A320RS175
 Regulator (Governor) Bosch: EP/RSV200 - 900 P4/305R
 Motorpump (Fuel feed pump) Bosch: FP/K22P6

 Slagläge: 2.6 (+0.1)mm
 Stroke position:

Volvo Penta Prod. No.	Motor avsedd för Engine intended for	Avregleringsvarv r/s (r/m) Governor overrun speed r.p.s. (r.p.m.)	Hög tomgång r/s (r/m) Max. unloaded speed r.p.s. (r.p.m.)	Låg tomgång r/s (r/m) Idling speed r.p.s. (r.p.m.)	Varv för inställningsakrur i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
						Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarvsvinkel, ° Lever angle, approx. °	Varvtalsökning %, 6 mm reglerst. väg Speed increase %, 6 mm contr. rod travel
9922	Intermittent effekt output (Std)	30 (1800)	32,5 ± 1 (1950 ± 50)	8,3 + 1 500 + 50	3,50	Stämplat (900)	ej. (186)	Not stamped (57)	(6,6)
- - -	- - -	33,3 (2000)	36 ± 1 (2150 ± 50)	- - -	3,50	1000	187	63	6,3
- - -	- - -	36,7 (2200)	39 ± 1 (2350 ± 50)	- - -	3,50	1100	187	69	6,3
867077	Kontinuerlig effekt Continuous output Kraftaggr. Power pack								
867096	Klass. marinmotor, pumpdr. Class. marine engine, pump oper.	33,3 (2000)	36 ± 1 (2150 ± 50)	- - -	4,50	1000	173	64	5,7
867098	Klass. ind.-motor, pumpdr. Class. ind. engine, pump oper.								
- - -	- - -	25 (1500)	27,5 ± 1 (1650 ± 50)	- - -	2,75	750	171	46	7,0
- - -	- - -	30 (1800)	32,5 ± 1 (1950 ± 50)	- - -	4,00	900	170	58	7,0
867098	Intermittent effekt output Klass. ind.-motor, generatordr. Class. ind. engine, gener. oper.	25 (1500)	26 (1560)	-	1,25	750	182	42	3,6
867096	Klass. marinmotor, generatordr. Class. marine engine, gener. oper.								
- - -	- - -	30 (1800)	31,2 (1870)	-	2,00	900	183	50	3,6
- - -	- - -	35 (2100)	35,3 (2180)	-	3,75	1050	174	64	4,0
867078	Generatordr. Interm. effekt output Generator oper.	25 (1500)	26 (1560)	-	4,0	750	182	42	3,6
- - -	- - -	30 (1800)	31,2 (1870)	-	4,0	900	183	50	3,6
- - -	- - -	35 (2100)	36,3 (2180)	-	4,0	1050	174	64	4,0

TD120AGPP

Inspr.pump (Fuel inj. pump) Bosch: PE6P 110A 320 RS 175
Regulator (Governor) Bosch: RSV 200-900 P4/421R
Matarpump (Fuel feed pump) Bosch: FP/K22 P9

Slagläge: 2.6 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskräv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarmsvinkel, ° Lever angle, approx. °	Varvtalstegring %, 6 mm reglerst. vbg Speed increase %, 6 mm contr. rod travel
Kraftaggregat (effekt enl. kurva 4)	2000	2120-2160	500-550		1000	173	64	5.7
Power pack (output acc. to curve 4)	1800	1910-1950	" "		900	171	58	6.0
	1500	1600-1650	" "		750	170	46	7.0

TAD120BHC

Inspr.pump (Fuel inj. pump) Bosch: PE6P 120A 300 RS 3075
Regulator (Governor) Ambac: elektronisk reg. (electric governor)
Motorpump (Fuel feed pump) Bosch: FP/K22 P22

Slagläge: 2.6 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskrav i regulator Turns for setting screw in governor	Instämpf. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hävarvinkel, ca ° Lever angle, approx. °	Varvtalsökning %, 6 mm reglert. vög Speed increase %, 6 mm contr. rod travel
Generatoraggregat (hjälpmotor) (effekt enl. punkt 1) Generating set (auxiliary engine) (output acc. to point 1)	1500	1560			750	258(T)		
	1800	1872			900	270(T)		

TAD120BHC

Inspr.pump (Fuel inj. pump) Bosch: PE6P 120A 320 RS 3061
Regulator (Governor) Bosch: RSV 200 - 900 P4/421 R
Motorpump (Fuel feed pump) Bosch: FP/K 22 P 22

Pumpdrift (hjälpmotor) (effekt enl. kurva 4) Pump set (auxiliary engine) (output acc. to curve 4)	2000	2120- 2160	500- 550		1000	256(T)	57	7
	1800	1910- 1950	"		Stämpas ej/Not stamped			
	1500	1600- 1650	"		900	246(T)	52	7
					750	235(T)	48	7

TD120C

Inspr.pump (Fuel inj. pump) Bosch: PE6P 120A 320 RS 3046
Regulator (Governor) Bosch: RSV 200-900 P4/421R
Motorpump (Fuel feed pump) Bosch: FP/K22 P22

Stagläge: 2.6 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskrav i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hörmvinkel, ° Lever angle, approx. °	Varvtalstegring %, 6 mm reglerst. vög Speed increase %, 6 mm conf. rod travel
Mobila installationer (effekt enl. kurva 2)	2200	2330-2380	500-550		1100	252(T)	63	4.5
Mobile application (output acc. to curve 2)	2000	2120-2160	- " -		1000	243(T)	58	4.6
	1800	1910-1950	- " -		900	233(T)	50	4.6
	1500	1600-1650	- " -		750	225(T)	40	5.2
Mobila installationer (effekt enl. kurva 4)	2000	2120-2160	500-550		1000	212(T)	56	5
Mobile application (output acc. to curve 4)	1800	1910-1950	- " -		900	203(T)	48	5
	1500	1600-1650	- " -		750	190(T)	40	6

Stämpas ej - Not stamped

TID120FG

Inspr.pump (Fuel inj. pump) Bosch: PE6P 120A300 RS 3075
Regulator (Governor) Ambac: elektronisk reg. (electric governor)
Motorpump (Fuel feed pump) Bosch: FP/K22 P22

Slagläge: 2.6 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskruv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarmsvinkel, grad Lever angle, approx. °	Varvtalsökning %, 6 mm reglersk. vdg Speed increase %, 6 mm contr. rod travel
Generatoraggregat (effekt enl. punkt 1)	1500	1560			Stämplas ej - Not stamped 750	254 (T)		
Generating set (output acc. to point 1)	1800	1872			900 Stämplas ej - Not stamped	265 (T)		

TD120G

Inspr.pump (Fuel inj. pump) Bosch: PE6P 120A 320 RS 3088
Regulator (Governor) Bosch: RSV 200-900 P4/421R
Motarpump (Fuel feed pump) Bosch: FP/K22 P22

Slagläge: 2.4 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningskräv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvial r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Hövarmsvinkel, ca° Lever angle, approx. °	Varvtalstegring %, 6 mm reglerst. väg Speed increase %, 6 mm contr. rod travel
Mobila installationer (effekt enl. kurva 2)	2200	2330-2380	500-550		Stämplat ej - 1100	Not stamped 255(T)	63	4
Mobile application (output acc. to curve 2)	2000	2120-2160	"		1000	245(T)	58	4.7
	1800	1910-1950	"		900	236(T)	50	4.7
	1500	1600-1650	"		750	226(T)	40	5.3

TD120GG

Inspr.pump (Fuel inj. pump) Bosch: PE6P 110A 320 RS 175 Z
Regulator (Governor) Bosch: RSV 200-900 P4/421 R
Motorpump (Fuel feed pump) Bosch: FP/K22 P9

Slagläge: 2.6 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Värv för inställningsskruv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate			
					Varvtal r/m Revolution r.p.m.	Insprutningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, grad Lift angle, approx. °	Varvtalstegring %, 6 mm reglent., väg Speed increase %, 6 mm contr. rod travel
Generatoraggregat (effekt enl. punkt 1)	1500	1560	1250-1350		750	205	40	3.5
Generating set (output acc. to point 1)	1800	1872	"		900	205	50	3.5

TD120GPP

Kraftaggregat (effekt enl. kurva 4)	2000	2120-2160	500-550		1000	173	64	5.4
Power pack (output acc. to curve 4)	1800	1910-1950	"		900	171	58	5.8
	1500	1600-1650	"		750	170	48	6.2
	1400	1490-1520	"		700	170	43	6.2

TD60D

Inspr.pump (Fuel inj. pump) Bosch: PES 6M 100/320RS 1004
Regulator (Governor) Bosch: RSV 325-1250 MM 0/308
Motorpump (Fuel feed pump) Bosch: FP/K22 MM 17

Stagläge: 2.8 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avgj. tingsvarv r/m Governor overrun speed r.p.m.	Hög tomgång r/m Max. unloaded speed r.p.m.	Låg tomgång r/m Idling speed r.p.m.	Varv för inställningsskruv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt! Values, stamped on govern. plate				ISO
					Varv/r/m Revolution r.p.m.	Ingränsningsmängd, mm ³ /slag, i provbänk Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, grad Lever angle, approx. °	Varvökning %, 6 mm reglert. väg Speed increase %, 6 mm contr. rod travel	
Mobila installationer (intermittent effekt) Mobile applications (intermittent output)	2800	2970-3020	550-650	1 3/4	1400	95	51	5.1	93
	2500	2650-2700	550-650	1 1/2	1250	94	45	5.3	92
Mobila installationer (kontinuerlig effekt) Mobile applications (continuous output)	2200	2330-2380	550-650	1	1100	93	39	5.3	91
	2000	2120-2160	550-650	1	1000	93	36	5.4	91
Mobila installationer (intermittent effekt) Mobile applications (intermittent output)	2500	2650-2700	550-650	1 1/4	1250	82	45	6.2	80
	2200	2330-2380	550-650	1 1/4	1100	82	40	6.3	80
Mobila installationer (kontinuerlig effekt) Mobile applications (continuous output)	2000	2120-2160	550-650	1	1000	80	36	6.4	78

TD60DG

Regulator (Governor) Bosch: RSV 650-750 MM 4/311-2

Generatoraggregat (effekt enl punkt 2) Generating set (output acc. to point 2)	1494	1560	1250-1350	4 1/4	750	37	3.6	88
Stand-by-set, max 300 h/year (effekt enl punkt 3) (output acc to point 3)	1792	1872		5	900	47	3.4	92
	1500	1575		3 2/4	750	34	3.8	101
	1800	1891		4 1/4	900	45	3.6	103

TD60DPP

Regulator (Governor) Bosch: RSV 325-1250 MM 0/308

Kraftaggregat (kontinuerlig effekt) Power Pack (continuous output)	2500	2650-2700	550-650	1 1/4	1250	82	45	6.2	80
	2200	2330-2380	550-650	1 1/4	1100	82	40	6.3	80
	2000	2120-2160	550-650	1	1000	80	36	6.4	78
	1800	1910-1950	550-650	1	900	78	33	6.6	76
	1500	1590-1620	550-650	1/4	750	73	27	6.7	71

TID60D

Inspr.pump (Fuel inj. pump) Bosch: PES 6M 100/320RS 1004-1
Regulator (Governor) Bosch: RSV 325-1400 MM 2/308

Mobila installationer (intermittent effekt) Mobile applications (intermittent output)	2800	2970-3020	550-650	2.75	1400	92	48	3.3	91
	2500	2650-2700	550-650	2.25	1250	90	43	3.3	89
	2200	2330-2380	550-650	2.25	1100	89	37	4	88
	2000	2120-2160	550-650	2.0	1000	89	33	4	88

TID60DG

Regulator (Governor) Bosch: RSV 650 - 750 MM 4/311-3

Generatoraggregat (effekt enl punkt 2) Generating set (output acc. to point 2)	1792	1872	1250-1350	3 1/4	900	107	38	3.4	105
Stand-by-set, max 300 h/year (effekt enl punkt 3) (output acc. to point 3)	1494	1560	- " -	2	750	104	28	3.4	102
	1800	1884	- " -	3 1/4	900	111	38	3.3	109
	1500	1572	- " -	1 3/4	750	115	27	3.3	103

TID70G

 Insp. pump (Fuel inj. pump) Bosch: PE6P 110A 320RS 465
 Regulator (Governor) Bosch: RSV 200-1200 P1/305R
 Motorpump (Fuel feed pump) Bosch: FP/K22 P9

 Slaglage: 3.0 (+0.1)mm
 Stroke position:

Motor avsedd for: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hog tomgang r/m Max. unloaded speed r.p.m.	Lag tomgang r/m Idling speed r.p.m.	Varv for installningskrav i regulator Turns for setting screw in governor	Instamp. varde pa regulatorskylt Values, stamped on govern. plate				ISO
					Varvial r/m Revolution r.p.m.	Insprutningsmangd, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Havarvinkel, co Lever angle, approx. o	Varvialstegring %, 6 mm reglert. vag Speed increase %, 6 mm contr. rod travel	
Mobila installationer (effekt enligt kurva 1) Mobile applications (output acc. to curve 1)	2400	2520-2620	550-650	4	1200	124	57	4.7	123
	2200	2330-2380	550-650	3 3/4	1100	126	51	4.7	125
	2000	2120-2160	550-650	3 3/4	1000	129	47	4.8	128
	1800	1910-1950	550-650	3 1/4	900	133	41	4.8	132
Mobila installationer (effekt enligt kurva 3) Mobile applications (output acc. to curve 3)	2200	2330-2380	550-650	3 3/4	1100	116	50	5.2	115
	2000	2120-2160	550-650	3 1/4	1000	118	44	5.2	117
	1800	1910-1950	550-650	2 3/4	900	120	38	5.3	119

TID70GG

Regulator (Governor) Bosch: RSV 650-750 P4/421R (alt. RSV 200-750 P4/421R)

Generatoraggregat (effekt enligt punkt 2) Generating set (output acc. to point 2)	1494	1560	1250-1350	1 2/4	750	140	35	3.0	139
	1792	1872	" -"	2 3/4	900	138	47	3.0	137
Stand by-set, max 300 h/year (effekt enl punkt 3) (output acc to point 3)	1500	1572	1250-1350	2 1/4	750	151	37	3.1	150
	1800	1885	" -"	3 2/4	900	149	46	3.0	148

TID70GPP

Regulator (Governor) Bosch: RSV 200-1200 P1/305R

Kraftaggregat (kontinuerlig effekt)	2200	2330-2380	550-650	3 3/4	1100	116	50	5.2	115
	2000	2120-2160	550-650	3 1/4	1000	118	44	5.2	117
Power Pack (continuous output)	1800	1910-1950	550-650	2 3/4	900	120	38	5.3	119
	1600	1700-1730	550-650	2 1/4	800	119	33	5.5	118

Ersätter tid. utgåva
Replaces earlier issue

TD 100G

Inspr. pump (Fuel inj. pump) Bosch: PE6P 110A 32ORS 3109
Regulator (Governor) Bosch: RSV 200-900 P1/421R

Slagläge: 3.5 (+0.1)mm
Stroke position:

Motor avsedd för: Engine intended for:	Avregleringsvarv /m Governor over-run speed r.p.m.	Hög tomgång /m Max. unloaded speed r.p.m.	Låg tomgång /m Idling speed r.p.m.	Varv för inställningsskruv i regulator Turns for setting screw in governor	Instämpl. värde på regulatorskylt Values, stamped on govern. plate				ISO
					Varvtal /m Revolution r.p.m.	Insprutningsmängd, mm ³ /illog. i provbänk Injected quantity, mm ³ /stroke in test bench	Höjningsvinkel, grad Lever angle, approx. °	Varvtalöppning %, 6 mm reglerf. väg Speed increase %, 6 mm contr. rod travel	
Mobila installationer (effekt enligt kurva 1) Mobile applications (output acc. to curve 1)	2200	2300-2400	450-550	6	1100	176	56	4.3	150
	2000	2170-2190	450-550	6	1000	174	51	5	154
	1800	1910-1950	450-550	6	900	173	47	5	161
Mobila installationer (effekt enligt kurva 3) Mobile applications (output acc. to curve 3)	2000	2110-2190	450-550	6	1000	158	50	5.4	138
	1800	1910-1950	450-550	5	900	157	44	5.6	144

TD 100GG

Regulator (Governor) Bosch: RSV 200-750 P4/421

Generatoraggregat (effekt enligt punkt 2) Generating set (output acc. to point 2)	1494	1560	1250-1350	3	750	175	36	3.1	172
	1792	1872	1550-1650	3 3/4	900	166	46	3.1	165
Stand by-set 175kW brutto(gross)	1494	1560	1250-1350	1 1/4	750		31	2.4	183
Stand by-set 198kW brutto(gross)	1792	1872	1550-1650	2 1/4	900		41	2.4	179
Stand by-set* 184kW brutto(gross)	1500	1569	-"-	1 1/4	750		31	2.6	192
Stand by-set* 208kW brutto(gross)	1800	1884	-"-	2 1/4	900		42	2.7	185

*Max. 300h/year

TD 100GPP

Regulator (Governor) Bosch: RSV 200-900 P1/421R

Kraftaggregat (kontinuerlig effekt) Power pack (Continuous output)	2000	2110-2190	500-550	6	1000	158	50	5.4	138
	1800	1910-1950	500-550	5	900	157	44	5.6	144
	1500	1590-1620	500-550	5	750	152	38	6.3	152

TD 100CHC/CRC

Inspr. pump (Fuel inj. pump) Bosch: PE6P 11DA 32ORS 3109-1

Regulator (Governor) Bosch: RSV 200-900 P1/421

Generatoraggregat (hjälpmotor) Generating set (auxiliary engine)	1800	1872	1200-1300	4	900	172	44	6.6	167
	1500	1560	1200-1300	4	750	179	40	6.6	171
Pumpaggregat (hjälpmotor) Pump set	1800	1900-2000	500-550	4	900	145	44	6.6	144

TD 12 1 G

Inspr. pump (Fuel inj. pump) Bosch: PE6P 120A 320RS 3088
Regulator (Governor) Bosch: RSV 200-1000 P4/421R
Matarpump (Fuel feed pump) Bosch: FP/K22 P22

Slaglage: 2.4 (+0.1)mm
Stroke position:

Motor avsedd for: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hog tomgang r/m Max. unloaded speed r.p.m.	Lag tomgang r/m Idling speed r.p.m.	Varv for installningskrav i regulator Turns for setting screw in governor	Instamp. varde po regulatorskylt Values, stamped on govern. plate				ISO
					Varvial r/m Revolution r.p.m.	Insprutningsmang, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Havvavinkel, co Lever angle, approx. o	Varvaustegring %, o mm reglert. vdg Speed increase %, o mm contr. rod travel	
Mobila installationer (effekt enligt kurva 1) Mobile installations (output acc. to curve 1)	2200	2330-2380	550-650	5.0	1100	245 (T)	70	5.2	204(H)
	2000	2120-2160	550-650		1000	240 (T)			206(H)
	1800	1910-1950	550-650		900	235 (T)			206(H)
Mobila installationer (effekt enligt kurva 3) Mobile installations (output acc. to curve 3)	2000	2120-2160	550-650	5.0	Stampas ej 1000	217 (T)	Not stamped 64	6.1	185(H)
	1800	1910-1950	550-650		900	209 (T)			185(H)

TD 12 1 GG

Inspr. pump (Fuel inj. pump) Bosch: PE6P 120A 320 RS 3088-2
Regulator (Governor) Bosch: RSV 650-750 P4/471R
Matarpump (Fuel feed pump) Bosch: FP/K22 P22

Generatoraggregat (effekt enligt punkt 2) Generating set (output acc. to point 2)	1494	1560	1300+50	1 3/4	750	206 (T)	38	3.0	194(H)
Standby-set max. 300h/year (effekt enl. punkt 3) (output acc. to point 3)	1500	1572	"-	1 3/4	750		35	3.0	219(H)
	1800	1887	"-	3 1/4	900		46	3.1	214(H)

Inspr. pump (Fuel inj. pump) Bosch: PE6P 120A 320 RS 3075
Regulator (Governor): Electric

Slaglage: 2.6 (+0.1)mm
Stroke position:

Generatoraggregat (effekt enl. punkt 2) Generating set (output acc. to point 2)	1494	1560			750				238(H)
Stand by-set, max 300 h/year (effekt enl punkt 3) (output acc to point 3)	1500	1573			750				249(H)
	1800	1891			900				245(H)

TID 12 1 FG

Inspr. pump (Fuel inj. Pump) Bosch: PE6P 120 300 RS 3075
Regulator (Governor) Electric
Matarpump (Fuel feed pump) Bosch: FP/K22 P22

Slaglage: 2.6 (+0.1) mm
Stroke position:

Generatoraggregat (effekt enligt punkt 2) Generating set (output acc. to point 2)	1494	1560	1300+50		750	301 (T)			287(H)
Stand by-set, max 300 h/year (effekt enl punkt 3) (output acc to point 3)	1500	1568	"-		750				291(H)



TD 120HPP

Inspr.pump (Fuel inj. pump) Bosch: PE6P 120A 320RS 3088
Regulator (Governor) Bosch: RSV 200-1000 P4/421R
Matorpump (Fuel feed pump) Bosch: FP/K22 P22

Slaglage: 2.4 (+0.1)mm
Stroke position:

Motor avsedd for: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hog tomgang r/m Max. unloaded speed r.p.m.	Lag tomgang r/m Idling speed r.p.m.	Varv for installningskruv i regulator Turns for setting screw in governor	Instamp. varde pa regulatorskylt Values, stamped on govern. plate				ISO
					Varvtal r/m Revolution r.p.m.	Insprutningsmang, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Huvravvinkel, grad Lever angle, approx. 	Varvastaregning %,  mm reglem. vdg Speed increase %,  mm contr. rod travel	
Kraftaggregat (kontinuerlig effekt)	2000	2120-2160	550-650	4 1/2	1000	214(T)	54	5.0	188(H)
	1800	1910-1950	550-650	4 1/4	900	212(T)	47	5.0	188(H)
Power Pack (continuous output)	1600	1700-1730	550-650	4	800	204(T)	42	5.2	182(H)
	1400	1480-1510	550-650	3 1/4	700	189(T)	35	5.4	176(H)

TID 120FPP

Inspr.pump (Fuel inj.pump) Bosch: PE6P 120A 320 RS 3075
Regulator (Governor) Bosch: RSV 200-1000 P4/421R
Matorpump (Fuel feed pump) Bosch: FP/K22 P22

Slaglage: 2.6 (+0.1)
Stroke position:

Kraftaggregat (kontinuerlig effekt)	2000	2120-2180	550-650	6.0	1000	263(T)	50	4.7	225(H)
Power Pack (continuous output)	1800	1900-1960	550-650	6.0	900	255(T)	46	4.7	224(H)
	1500	1600-1640	550-650	6.0	750	230(T)	45	4.6	215(H)

TID 120HPP

Kraftaggregat (kontinuerlig effekt)	2000	2120-2160	550-650	4.5	1000	265(T)	54	55	225(H)
	1800	1910-1950	550-650		900	257(T)			224(H)
Power Pack (continuous output)	1600	1700-1730	550-650		800	241(T)			217(H)
	1400	1480-1510	550-650		700	230(T)			213(H)

TD 120BHC/BRC

Inspr. pump (Fuel inj. pump) Bosch: PE6P 120A 320RS 3088Z
Regulator (Governor) Bosch: EP-RSV 200-900 P4/421R
Motorpump (Fuel feed pump) Bosch: FP/K22 P22

Slaglage: 2.4 (+0.1)
Stroke position:

Motor avsedd for: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hog tomgang r/m Max. unloaded speed r.p.m.	Log tomgang r/m Idling speed r.p.m.	Varv for installeringskrav i regulator Turns for setting screw in governor	Instamp. varde po regulatorskylt Values, stamped on govern. plate				ISO
					Varvtal r/m Revolutions r.p.m.	Insprutningsmang, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Hovravningsvinkel, co Lever angle, approx. 	Varvtalsagring %, 6 mm reglerst. vag Speed increase %, 6 mm contr. rod travel	
Generatoraggregat (hjalpmotor) Generating set (auxiliary engine)	1800	1872	1300	2.5	900	222(T)	45	6.3	198(H)
	1500	1560	1300		750	207(T)	47	6.3	188(H)
Pumpaggregat (hjalpmotor) Pump set (auxiliary engine)	1800	1900-2000	525-575	2.5	900	222(T)	45	6.3	198(H)
	1500	1580-1660	525-575		750	207(T)	47	6.3	188(H)

TD 121CHC/CRC

Inspr. pump (Fuel inj. pump) Bosch: PE6 P120A 300RS 3075.
Regulator (Governor) Electric

Slaglage: 2.6 (+0.1)mm
Stroke position:

Generatoraggregat (hjalpmotor) Generating set (auxiliary engine)	1800	1872	1300	2.5	900	222(T)	45	6.3	198(H)
	1500	1560	1300		750	207(T)	47	6.3	188(H)
Pumpaggregat (hjalpmotor) Pump set (auxiliary engine)	1800	1900-2000	525-575	2.5	900	222(T)	45	6.3	198(H)
	1500	1580-1660	525-575		750	207(T)	47	6.3	188(H)

TAD 120CHC/CRC

Generatoraggregat (hjalpmotor) Generating set (auxiliary engine)	1500	1560	1250-1350	2.0	750	300(T)			283(H)
	1800	1872	1250-1350	2.25	900	330(T)			307(H)

TAD 121CHC/CRC

Generatoraggregat (hjalpmotor) Generating set (auxiliary engine)	1800	1872	1200-1300	2.25	900	330(T)	52	4.7	283(H)
	1500	1560	1200-1300		750	339(T)	47	4.5	320(H)
Pumpaggregat (hjalpmotor) Pump set (auxiliary engine)	1800	1910-1950	525-575	4	900	280(T)	52	4.7	250(H)
	1500	1600-1700	525-575	3	750	300(T)	47	4.5	280(H)

D45BPP

Inspr. pump (Fuel inj. pump) Bosch: PES 4MW 100/320 RS 1102
Regulator (Governor) Bosch: RQV 300-1150 MW39
Motorpump (Fuel feed pump) Bosch: FP/K22 MM29

Slaglage:
Stroke position: 2.8 (+0.1)mm

Motor avsedd for: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hog tomgang r/m Max. unloaded speed r.p.m.	Lag tomgang r/m Idling speed r.p.m.	Varv for installeringskruv i regulator Turns for setting screw in governor	Instampel. varde pa regulatorskylt Values, stamped on govern. plate				ISO
					Varvial r/m Revolution r.p.m.	Insprutningsmangd, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Huvvarmvinkel, co Lever angle, approx. o	Varvialstegring %,  mm reglern. vdg Speed increase %,  mm contr. rod travel	
Kraftaggregat (kontinuerlig effekt) Power Pack (continuous output)	2300	2440-2490	600-700		1150	85			83

TD45B

Regulator (Governor) Bosch: RQV 300-1200 MW 39-2

Mobila installationer (intermittent effekt)	2400	2570-2620	500-600		1200	101		99
	2200	2355-2400	500-600		1100	101		99
Mobile applications (intermittent output)	2000	2160-2200	500-600		1000	101		99
	1800	1980-2015	500-600		900	100		98
Mobila installationer (kontinuerlig effekt)	2200	2330-2375	500-600		1100	88		86
	2000	2160-2200	500-600		1000	88		86
Mobile applications (continuous output)	1800	1960-2000	500-600		900	87		85

TID 100K

Inspr. pump (Fuel inj. pump) Bosch: PE6P 110A 320RS 3 132 Slaglage: 3,5 (+ 0,1) mm
 Regulator (Governor) Bosch: RSV 200-1100 P1/421-1
 Matorpump (Fuel feed pump) Bosch: FP/K22 P22

Motor avsedd for: Engine intended for:	Avregleringsvarv r/m Governor overrun speed r.p.m.	Hog tomgang r/m Max. unloaded speed r.p.m.	Lag tomgang r/m Idling speed r.p.m.	Varv for installningskruv i regulator Turns for setting screw in governor	Instamp. varde pa regulatorskylt Values, stamped on govern. plate				150
					Varvtal r/m Revolution r.p.m.	Insprutningsmangd, mm ³ /slag, i provbank Injected quantity, mm ³ /stroke in test bench	Havormsvinkel, co Lever angle, approx. o	Varvtalsstegring %, o mm reglerst. vag Speed increase %, o mm contr. rod travel	
Mobila installationer (effekt enl kurva 1)	2200	2330-2380	500-600	3 2/4	1100	151	53	4,2	148
	2000	2120-2160	- " -	3 2/4	1000	156	49	4,2	154
Mobile installations (output acc. to curve 1)	1800	1905-1945	- " -	1	900	160	37	4,2	158
Mobila installationer (effekt enl kurva 3)	2000	2120-2160	500-600	3 2/4	1000	141	49	4,6	139
	1800	1905-1945	- " -	3 2/4	900	147	44	4,7	145
Mobile installations (output acc. to curve 3)									

TID 100KPP

Kraftaggregat (kontinuerlig effekt)	2000	2110-2150	500-600	3 2/4	1000	141	49	4,6	139
	1800	1900-1935	- " -	- " -	900	147	44	4,7	145
Power Pack (continuous output)	1600	1690-1725	- " -	2 2/4	800	151	38	4,7	149

TID 100KG

Inspr. pump (Fuel inj. pump) Bosch: PE6P 110A 320RS 3109
 Regulator (Governor) Bosch: RSV 650-750 P4/421

Generatoraggregat (effekt enl. punkt 2)	1494	1560	1250-1350	1	750	200	30	2,6	193
Generating set (output acc. to point 2)	1792	1872	- " -	1 1/4	900	191	40	2,6	185
Stand by-set, max 300 h/year (effekt enl punkt 3) (output acc to point 3)	1500	1569	- " -	1	750		30	2,6	219
	1800	1884	- " -	1 1/4	900		40	2,6	197

**VOLVO
PENTA**

service bulletin

GROUP
24
241

NO

604-1204

CONCERNING

Overspeed protection

PRODUCT

Industrial engines
60-70-100-120

DISTRIBUTION

I

DATE

10-1982

On engines fitted with electronic governors of AMBAC make, the overspeed protection supplied (part no. 843910-1) must be mounted for the engine warranty to apply. Mounting instructions are supplied with the kit.

CONCERNING
Injection pump
Pressure equalizerPRODUCT
Diesel engines
60, 70, 100, 120DISTRIBUTION
M, IDATE
10-1983

An improved quality pressure equalizer, fitted to the injection pump, has been introduced.

- The new improved version has a welded joint between the threaded section and the membrane as in fig. 2.
- The earlier version had a rolled joint with a copper washer for sealing. The copper washer is fully visible, A fig. 1. Another older version had a text stamped into the cover on the outside away from the pump, B fig. 1.

Earlier version

Later version

A Copper washer

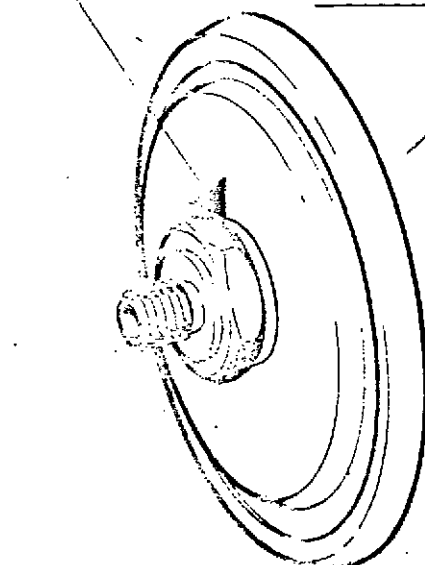
B Stamped text
on outside

Fig. 1

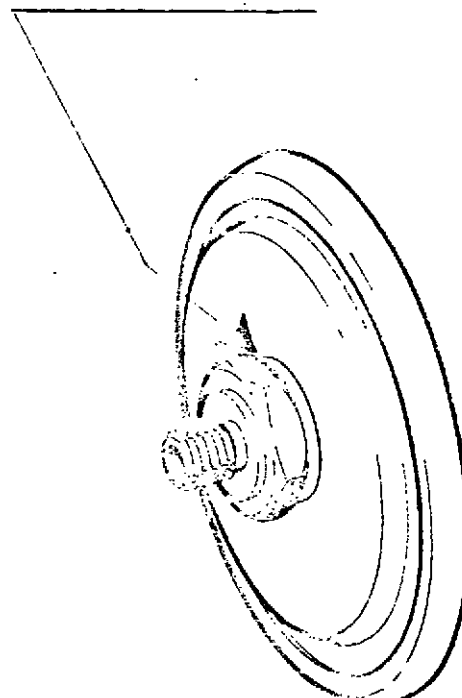
Welded
No copper washer

Fig. 2

**VOLVO
PENTA**

service bulletin

GROUP

24
241

NO

606-1206

CONCERNING

Injection pump,
electronic governor

PRODUCT

Industrial engines

DISTRIBUTION

I

DATE

6-1984

Engines equipped with an electronic governor of type - UT - earlier AMBAC - now have a hose fitted to the governor to allow the draining of lube oil. The rubber bellow for the control rod has at the same time been deleted. This bellow acted as a seal for oil between the pump and the governor housing. By deleting the bellow the control rod is more easily operated and the oil can instead flow through the regulator and back to the engine through the drain hose.

This change has been introduced in our production from week 46, 1983.

The stop solenoids' wiring has been modified. See the reverse side of this bulletin. It is very important that these instructions are followed.

Note the differences when the stop solenoid is live when the engine is stopped to when it is running.

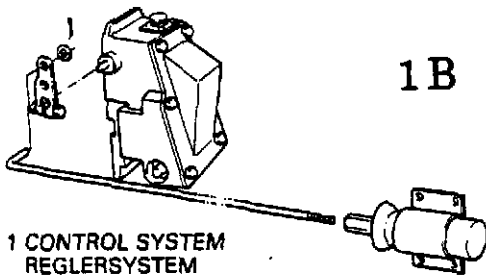
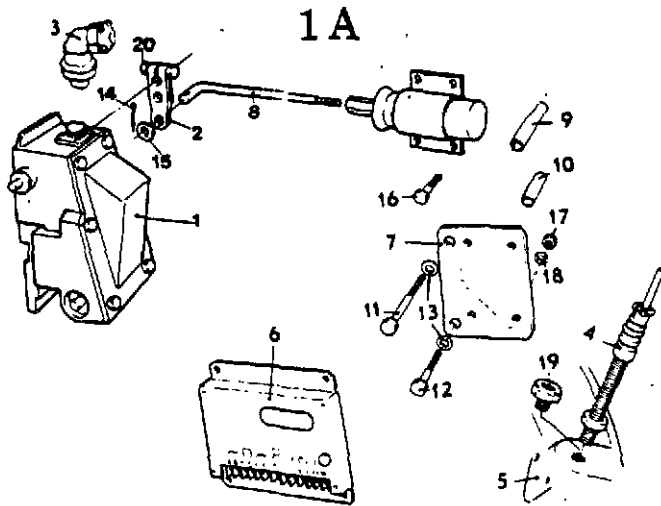


FIG. 1 CONTROL SYSTEM
REGLERSYSTEM

1A) Energized when stopping
Strömförande vid stopp
1B) Energized during running
(Longer spacers 9 and 10).
Strömförande vid drift
(Längre distanshylsor 9 och 10).

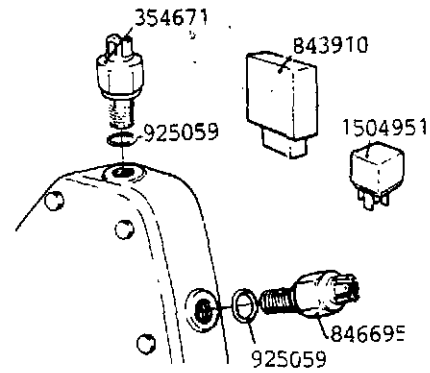
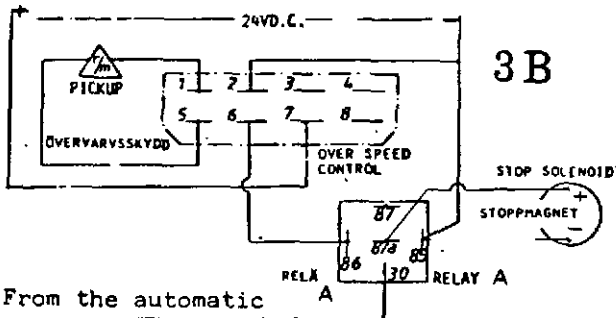
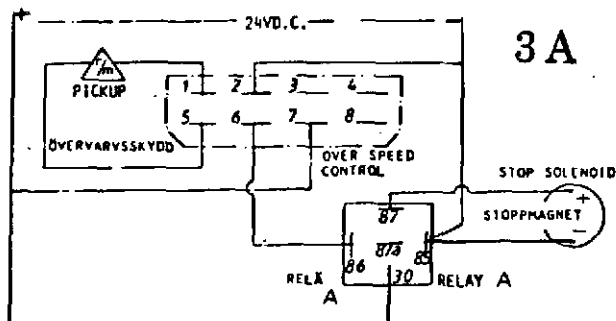


FIG. 2 OVERSPEED CONTROL UNIT
ÖVERVARVSSKYDDSATS



From the automatic stop relay +

FIG. 3 WIRING SCHEME FOR OVERSPEED CONTROL
KOPPLINGSSCHEMA FÖR ÖVERVARVSSKYDD

3A) Energized when stopping
Strömförande vid stopp

3B) Energized during running
For engines with automatic stop

"Relay A is wired in series with the relay for automatic stop. The plus (+) cable from the automatic stop relay to the stop solenoid's plus (+) terminal is removed and connected to terminal 30 on relay A. The relay's terminal 87a is then connected to the stop solenoid's plus (+) terminal".

Strömförande vid drift.

För motorer med autostopp

"Relä A monteras i serie med relä för autostopp. + kabel från auto-

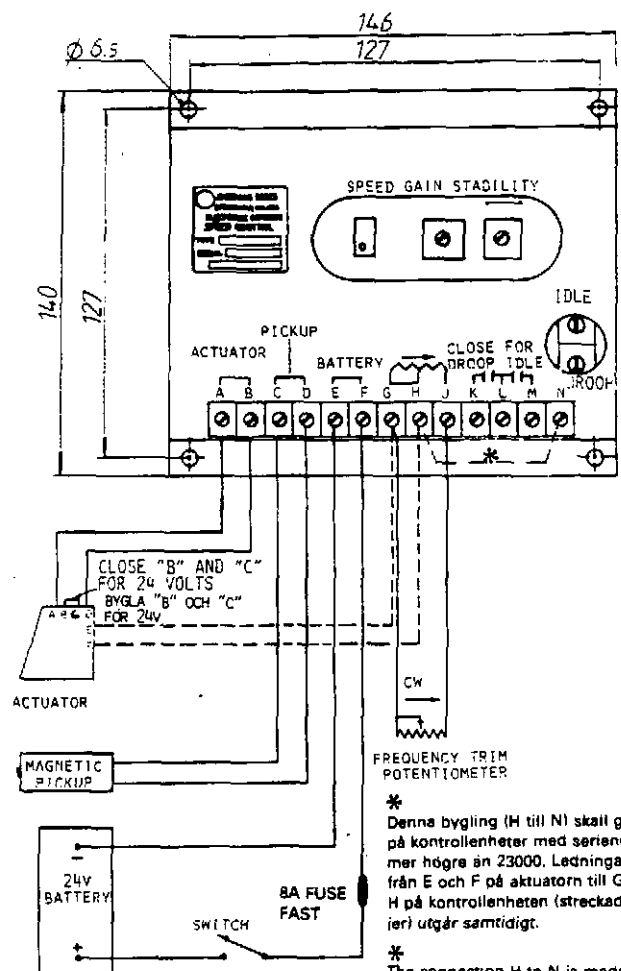


FIG. 4 WIRING DIAGRAM
KOPPLINGSSCHEMA

* Denna bygling (H till N) skall göras på kontrollenheter med serienummer högre än 23000. Ledningar från E och F på aktuatoren till G och H på kontrollenheten (sträckade linjer) utgår samtidigt.

* The connection H to N is made on control units with serial no. 23000 and up. The cables from E and F on the actuator to G and H on the control unit are not longer used, from the same number and up.

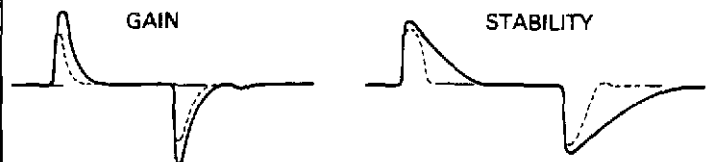


FIG. 5 PERFORMANCE ADJUSTMENT CHART.

Replaces earlier SB

CONCERNING Checking the injection angle	PRODUCT 60,61,70,71,100,121 series	DISTRIBUTION MI	DATE 10-1986
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REASON FOR NEW ISSUE: IMPROVED TOOL 9996770-5 REPLACED BY 9996848-9

In order to get the greatest possible accuracy when checking the injection angle the following method should be used.

The method implies measuring the lift from the base circle in the injection pump. A certain measurement must be obtained at the correct injection angle. This measurement, the "stroke position", is stated for all engines in SB 24-241 No. 601-1201, and 24-241 No. 602-1202.

The new method and the tools may well be used also for old engines, independent of what has been previously recommended in the Workshop Manuals.

Special tools: 9989876-6, 9996770-5 or 9996848-9.

The previous tool 9996770-5 has been replaced by 9996848-9.

NOTE! On the first version of tool 9996848-9 the measuring point is too long and must be shortened approx. 3 mm (0.118"). The correct length should be 44 ± 0.5 mm (1.732 ± 0.020 "), see Fig. 1.

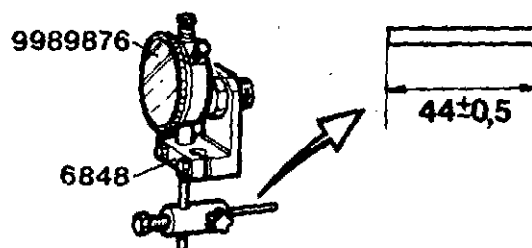


Fig. 1

1. Clean the injection pump externally. Remove both fuel pipes between the fuel filters and the pump. On marine engines relief valve should also be removed.
2. Loosen the front lubricating oil pipe from the injection pump and bend it out a little.
3. Remove the Allen plug and the washer so that the No. 1 lifter becomes visible (Fig. 2).
4. Turn the engine to the compression stroke for the No. 1 cylinder, 0° marking on flywheel (valves on cylinder No. 6 "rock").

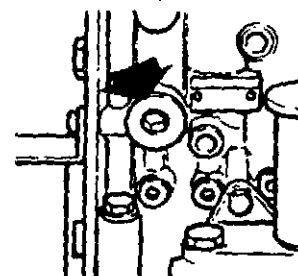


Fig. 2

Turn the flywheel back against the engine's direction of rotation abt 1/4 turn.

Check that the lifter is in its bottom position.

5. Tool 9996770-5: Fit the tool's threaded sleeve A, fig. 3, on the injection pump. NOTE! without washer. Lift the measuring point and fit the dial indicator together with the fixture on the threaded sleeve. The measuring point must be turned as per figure. NOTE! Adjust the pin so it does not touch the bottom of the sleeve.

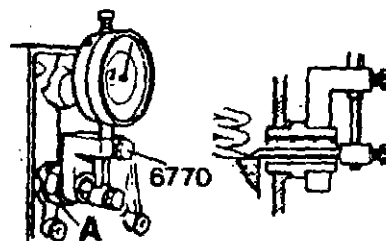


Fig. 3

- Tool: 9996848-9: Fit the tool and dial indicator according to Fig. 4. Adjust the measuring point until it makes contact on the lifter.

6. Zero the dial indicator. Turn the flywheel in the engine's direction of rotation, check that the zero setting is maintained on the dial indicator when the turning commences.

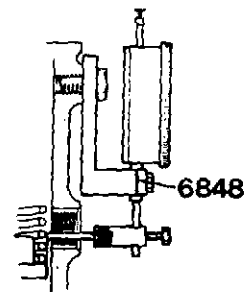


Fig. 4

7. Continue turning the flywheel in the engine's direction of rotation until the value given for the lift from the base circle is reached on the dial indicator. Read off the degrees on the flywheel.

8. Adjust the injection angle if necessary. On 71 and 121 series the shaft can be turned after the clamp bolts have been loosened, see fig. 5.

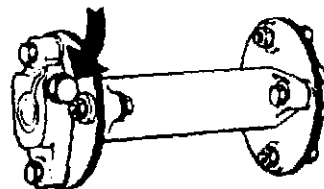


Fig. 5

9. Repeat points 4, 6, 7, and 8 after adjusting.
10. Remove the fixture and the threaded sleeve, if fitted. Fit the Allen plug together with the copper washer. Fit the fuel and the lubricating oil lines. Vent the fuel system.

**VOLVO
PENTA**

service bulletin

GROUP

24
241

NO

1003

CONCERNING

Injection pump

PRODUCT

TD100AG

DISTRIBUTION

I

DATE

7-1982

The pre-injection angle for TD100AG has been changed to 22°

B.T.D.C. (earlier 24° B.T.D.C.).

Please change the value in the workshop manual, publ. no. 7739270-2.

PART

2

engine unit

GROUP	DESCRIPTION	SECTION
25	Inlet and exhaust system Intake and exhaust manifolds Silencer with exhaust pipe Charge air cooler Air pre-heater Air cleaner, intake silencer	250 251 252 253 254 255

**VOLVO
PENTA**

service bulletin

GROUP
25
251

NO
1201

CONCERNING
EXHAUST MANIFOLD

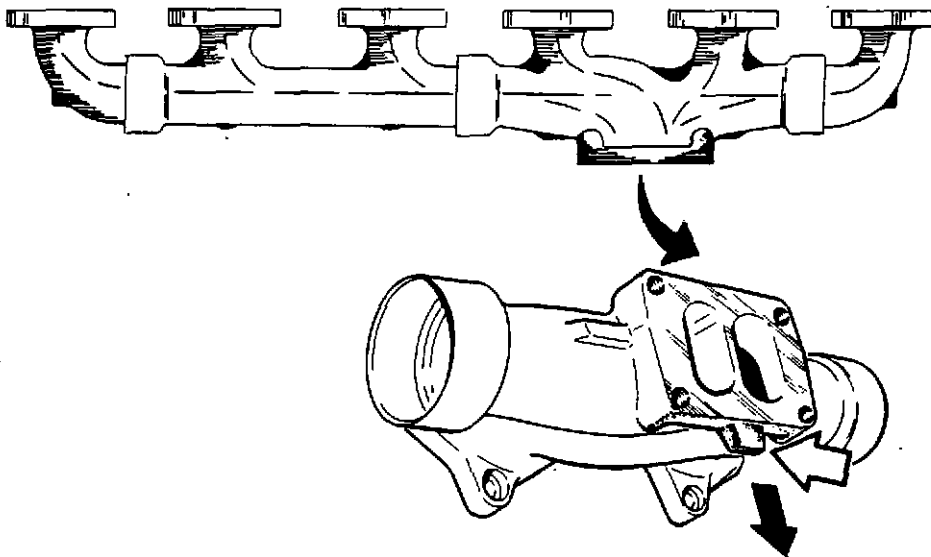
PRODUCT
TD121G, TID121FG,
TD120HPP, TID120HPP

DISTRIBUTION
I

DATE
9-1984

Fitting the part with the turbo connection

On engines with a 4-part exhaust manifold, the flange for the turbocharger must be fitted with the tab facing downwards according to the figure.



**VOLVO
PENTA**

service bulletin

replaces earlier SB, Group 23/232 no. 1201 7-1982

GROUP
25
255

NO

1201

CONCERNING

Air filter

PRODUCT

TID120FG

DISTRIBUTION

I

DATE

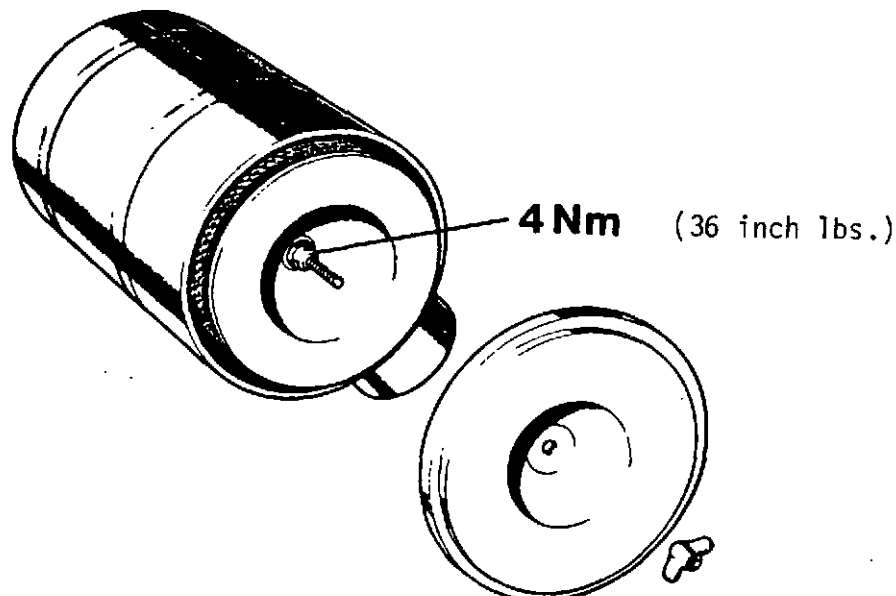
1-1983

Several cases have been encountered of incorrectly mounted air filters, on which the filter insert has been held in place only by the end cover. When the filter is assembled in this way there will be air leakage past the filter as the latter will not be tight in the filter housing.

The components should be assembled as follows:

Fit the filter insert into the housing. Fit washer (part no. 0960143-6) and locking nut (part no. 0963107-8). Tighten with a torque of 4 Nm. (36 inch lbs.) Fit the cover and tighten the winged nut.

N.B. Check engines already delivered. Cases of incorrect mounting should be rectified.



PART

2

engine unit

GROUP

DESCRIPTION

SECTION

26

Cooling system

260

Radiator with connections

261

Circulation pump, fan and thermostat

262

Heat exchanger with connections

263

Filter

265

Miscellaneous

266

CONCERNING

Cleaning plug

PRODUCT

Diesel engines
60, 70, 100 och 120

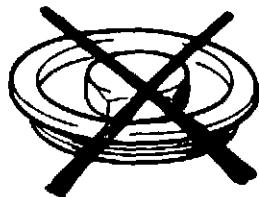
DISTRIBUTION

M I

DATE

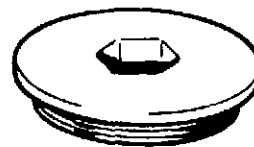
10-1982

Due to the poor maintenance of the cooling system it has occurred that any of the cleaning plugs (part no. 467714-2 or 467649-0) in the cylinder head or in the engine block have been destroyed by corrosion. Should this happen, install plug with part no. 467365-3 in the cylinder head of the 100 and 120 series engines or plug with part no. 467367-9 in the cylinder head of the 60 and 70 series engines or in the engine block on all series engines. These plugs are a solid type of plug and therefore better designed to withstand corrosion. On the water-cooled marine exhaust manifolds, a solid type of plug should always be installed.



0467714-2

0467649-0



0467365-3

0467367-9

CONCERNING

Cleaning of radiator

PRODUCT

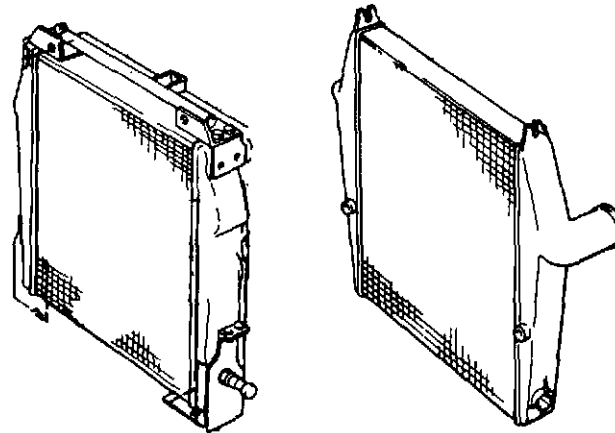
TID120FG

DISTRIBUTION

I

DATE

11-1981

High engine temperature

If the temperature gauge shows a higher coolant temperature than normal, the air passage through the radiator and intercooler should always be checked as follows:

1. Disconnect the hoses which connect the radiator and intercooler to the engine.
2. Unscrew and remove the complete radiator unit from the engine.
3. Detach the intercooler from the radiator.

Clean with a mild grease-dissolving agent and water. Water at high pressure or compressed air must not be used. Flush the radiator and intercooler separately from the rear.

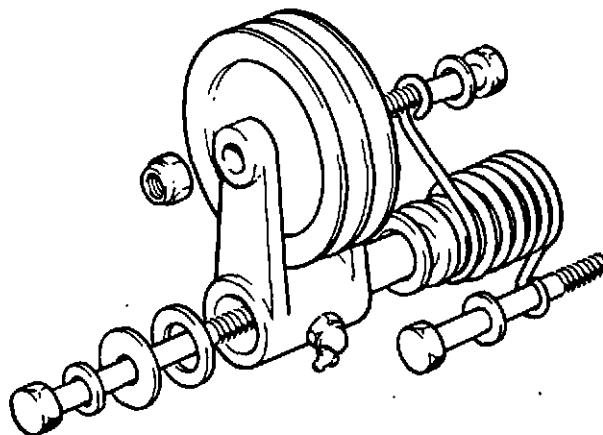
CONCERNING	PRODUCT	DISTRIBUTION	DATE
AUTOMATIC BELT TENSIONER	TD100, TD120	I	9-1984

In those cases where complaints have been received regarding damaged or broken guide spring on earlier versions of belt tensioners, we recommend that these are replaced by the new type of automatic belt tensioner (with torsion spring).

Two replacement kits are available, part no 876019-1 for the 100 series and 876020-9 for the 120 series.

The kits contain the following parts:

DESCRIPTION	QUANTITY	PART NUMBER
Spring, TD100	1	847507-1
Spring, TD120	1	845215-3
Washer	1	18702-1
Wear washer	2	843927-5
Sleeve	1	845208-8
Spring washer	1	941908-6
Spring washer	1	941911-0
Spring washer	1	942336-9
Bolt	1	955328-0
Bolt	1	955542-6
Bolt	1	959821-0
Nut	1	963107-8



PART

2

engine unit

GROUP	DESCRIPTION	SECTION
29	Boosting system Turbo-compressor with connecting parts	290 291

Replaces earlier Service Bulletin

CONCERNING Pressure-testing of intermediate cooler	PRODUCT TID120FG, TID120FPP	DISTRIBUTION I	DATE 6-1986
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For pressure-testing the intermediate cooler and the air lines, new tools have been developed as follows.

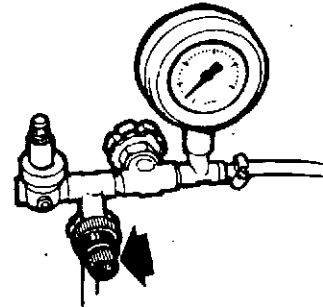
Pressure-testing device	part no. 9996662-4	Utilization code = 3
Connection washer	9996652-5	"
Grommet	9996653-3	"

Testing of pressure-testing device 6662

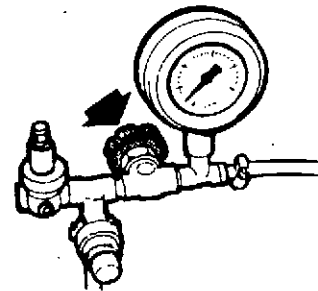
Before the pressure-testing device is used, it should itself be tested.

1. Connect it to the compressed-air system and set the gauge to 100 kPa with the reducing valve.

NOTE. The knob of the reducer valve can be locked with a ring which is moved in an axial direction.

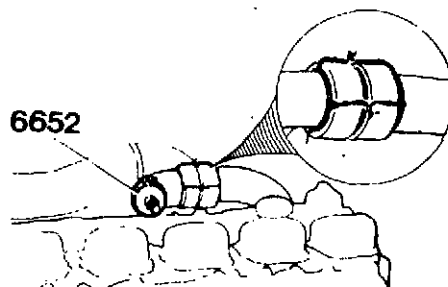


2. Then close the shut-off valve. The testing device may be regarded as reliable if the gauge reading is maintained for two minutes without a drop in pressure.

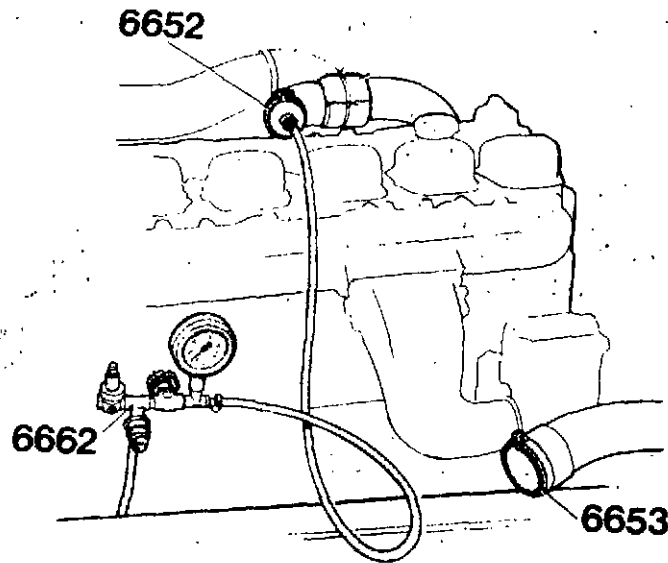


Pressure-testing

1. Remove the air pipe from the delivery side of the turbocompressor and attach connection washer 6652.
2. Draw the pipe joints together with the aid of steel wire so that they do not separate during pressure-testing.



3. Unscrew the hose from the intake pipe and fit grommet 6653 on the hose.
4. Connect the pressure-testing device 6662 to the compressed-air supply and slacken the screw of the reducer valve to make sure that the pressure set is not too high.
5. Connect 6662 to the connection washer 6652. Open the shut-off valve and set the pressure gauge to 70 kPa with the reducer valve.



6. Close the shut-off valve. For the charging-air system to be considered satisfactory, the pressure must not fall by more than 20 kPa in one minute.
7. In the event of leakage, repeat the test several times. The leak will be most easily detected with soap suds. Make sure to check the hoses and couplings of the testing device.
8. Remove the testing device and the steel wires and tighten pipes and hoses.

CONCERNING

K.K.K. Turbo, new nut for
compressor rotor, changed
tightening method

PRODUCT

See below

DISTRIBUTION

M. I

DATE

4-1985

K.K.K. turbos are fitted to the following engine types:

Marine engines: 30 and 40 series, TAMD 60C, TMD 70C,
TAMD 70D,E, TMD 100C

Industrial engines: TD 70 CHC/CRC, TD 100 CHC/CRC

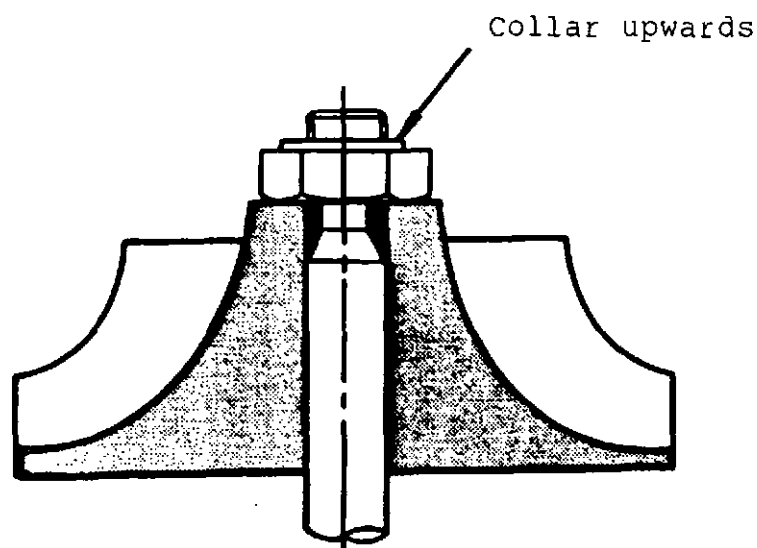
A new nut for the compressor rotor has been introduced to the K.K.K turbo fitted on the above engine types. The new nut (part No. 848711-8) is also introduced in overhaul kits for these turbos.

The method of tightening has at the same time been changed as follows:

1. Heat the compressor rotor to max. 130°C (266°F) and fit it against the stop on the shaft. Check that the markings on both the rotor and the shaft coincide.
2. Allow the parts to cool to room temperature.
3. Apply Loctite 640 to the shaft journal's threads. Fit the new nut as per figure and tighten it to 10 Nm (100kpcm/7 lbf.ft).

Thereafter, angle tighten the nut 60°.

Use a T-bar and socket to prevent the shaft from being loaded obliquely.



CONCERNING

Action in event of turbo failure

PRODUCT

TID120FG, TID120FPP

DISTRIBUTION

DATE

10-1982

In the event of turbo failure on these engines it is important to check the intercooler. If it is suspected that there has been serious oil leakage, or that foreign objects such as parts of a broken compressor rotor have been forced into the intercooler, the following corrective action must be taken.

1. Check the air channels leading to the intercooler. If there are oil traces at the intercooler, the intercooler must be removed and cleaned internally in suitable solvent (white spirit or similar). The air channels should also be cleaned.

If the black air hose has become oily it should be changed, as oil can affect the rubber.

2. If the turbo failure has resulted in a broken compressor rotor, the intercooler should be pressure-tested to check whether it has been damaged by foreign objects.

PART

3

electrical system and instruments

GROUP	DESCRIPTION	SECTION
30	General	301
31	Battery	311
32	Alternator Charging regulator	321 322
33	Starter motor	331
34	Ignition coil Distributor Ignition magneto Spark plugs and glow plugs Ignition cables Suppressor devices	341 342 343 344 345 346
35	Cables and fuses	351
36	Instruments Senders Switches Stopping devices	361 362 363 364
37	Electric equipment Air pre-heater Engine heater	371 372 373
38	Electric governor	381

PART

3

electrical system and instruments

GROUP

DESCRIPTION

SECTION

30

General

301

30

**VOLVO
PENTA**

service bulletin

GROUP
30
301

NO
104-1204

CONCERNING

VOLVO DIGITAL MULTIMETER

PRODUCT

All engines

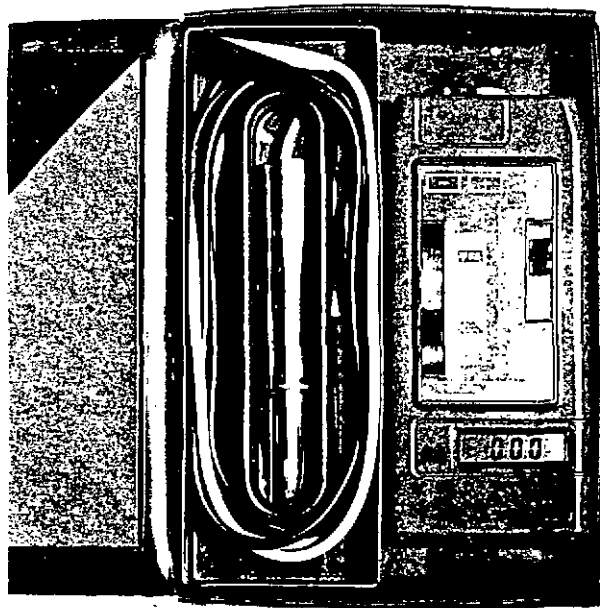
DISTRIBUTION

NI

DATE

6-1984

VOLVO DIGITAL MULTIMETER



Part no 9996525-3

Volvo Multimeter is a digital Multimeter produced by Volvo for use in connection with service and repair work.

It has several features which makes it particularly suitable for the particular work for which it is intended.

The Multimeter measures the following:

direct voltage..... 0 - 199.9 volts
alternating voltage..... 1 - 500 volts
resistance..... 0 - 199.9 kOhms

The Multimeter has:

a built-in buzzer function with two different buzzer tones:
- - - 1.8 - 20 Ohms
..... below 1.8 Ohms
tolerance..... $\pm 2\%$
built in diode tester which measures voltage
drop across diode..... 0 - 1999 milli volts

The Multimeter is:

simple to use, only two switches operate all functions.
designed in accordance with safety specification:
..... IEC 348

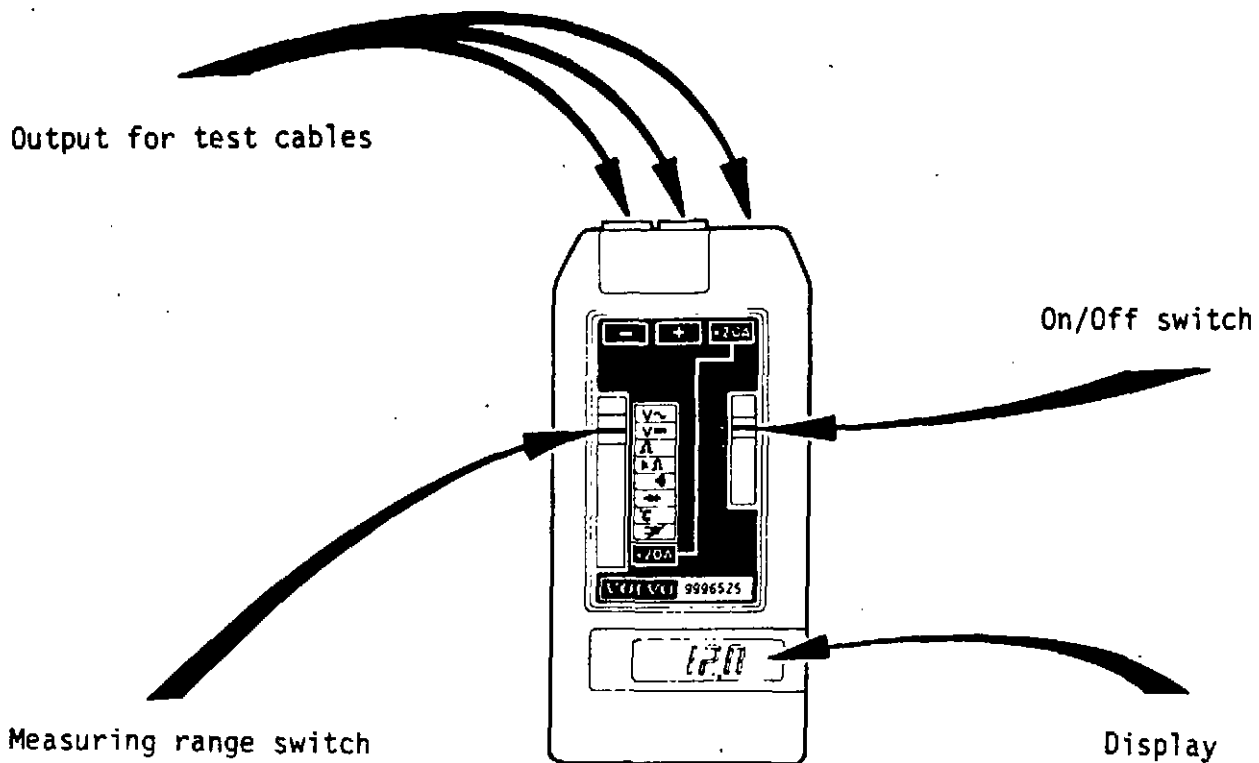


Fig. 2. Different parts of multimeter

In the future the Multimeter will be used in Volvo Penta's literature.

An example of this is the service manual for alternators which is under preparation. An excerpt from one page of this manual shows how the Multimeter can be used.

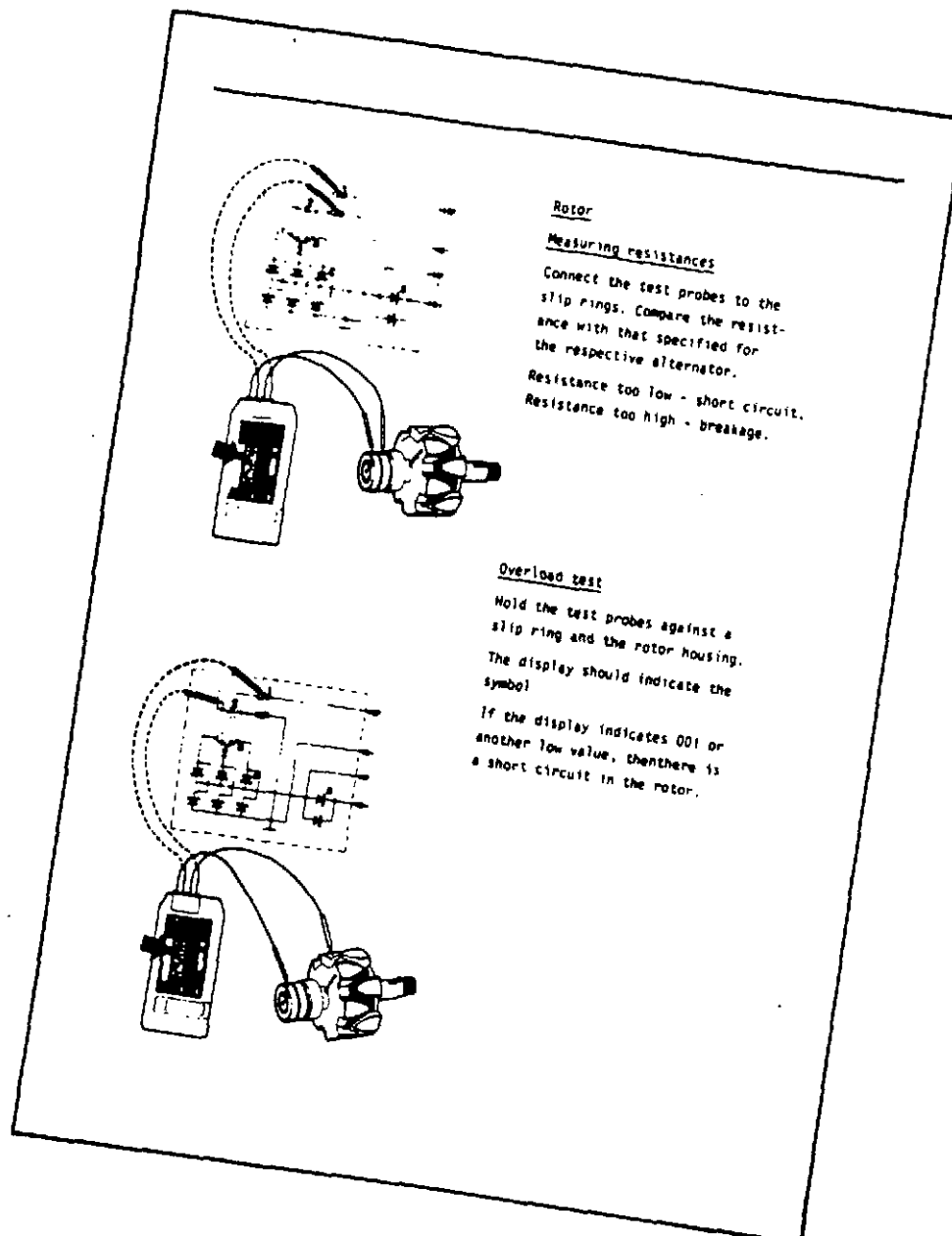
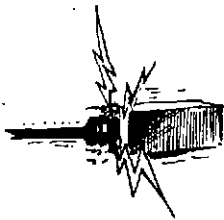


Fig. 3. Excerpt from service manual on alternators.

CHECK LIST FOR THE CHARGING SYSTEMSYMPTOMS AND POSSIBLE CAUSESBattery completely or partly discharged

- Alternator belt faulty, see point no. 1
- Battery, see point no. 2-5.



- Too large or too much power consuming equipment connected or short circuit in the electrical system, see point no 6.



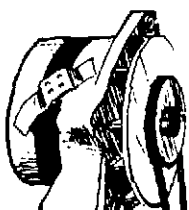
- Voltage drop, poor contact or incorrect cable area, see point no 7.
- Faulty generator, see point no 8.

Excessive fluid loss in the battery's cells

- Faulty generator, see point no 8.

Charging light does not light with stopped engine when ignition is on

- Lamp faulty.
- D+/61 cable is damaged or loose, see point no 7.
- Faulty generator, see point no 8.

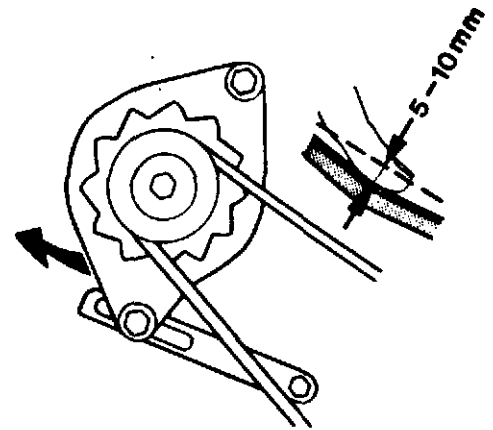
Charging light flashes, lights or is on when the engine is running

- Alternator drive belt too loose, see point no 1.
- Voltage drop in cables, see point no 7.
- Faulty generator, see point no 8.

CHECK POINTS

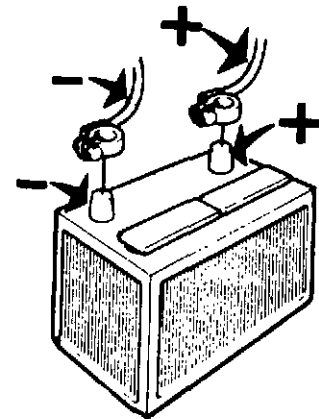
1. Checking the alternator V-belt.

Check the belt tension, adjust if necessary. Cracked, worn or oily belts must be replaced.



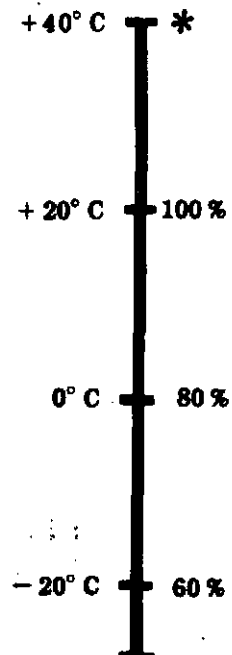
2. Checking the battery.

Check that the battery cable's connectors are clean and properly fastened on the poles. Smear the poles with Vaseline. Do not knock the connector shoes. The pole bolts and cell plates can easily be loosened. If the cables are to be removed, remove the negative cable first to avoid sparks and the risk for explosions.



The battery's capacity is affected by the temperature. The colder it is, the lower the battery capacity. Generally, one can say that a drop in temperature of 1°C reduces the battery's capacity by abt. 1%. When the temperature rises again the battery regains it's original capacity.

* At high temperatures, abt 40°C (104°F) and above, there is a risk of gas formation during charging.



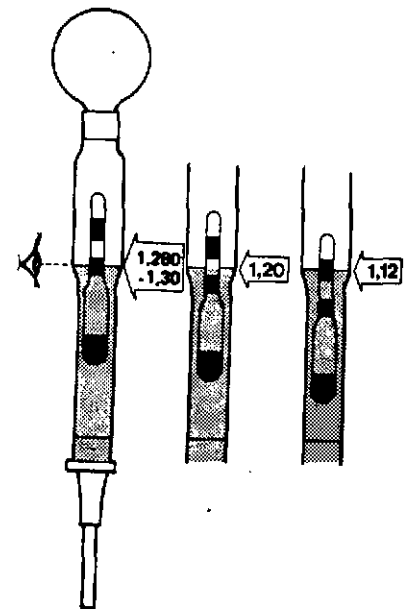
3a. CHECKING THE BATTERY CHARGING CONDITION USING A HYDROMETER

Measure the acid weight in all the battery cells (not immediately after charging or if distilled water has been added).

Acid weight at abt. +20°C (+68°F) in a fully charged battery = 1,28-1,30

The acid's specific weight also varies with temperature. If the weight is measured at any temperature other than 20°C (68°F) then the value must be corrected according to the table below.

Electrolyte temp.		Acid specific weight with fully charged battery
°C	°F	
40	104	1.266
30	86	1.273
20	68	1.280
10	50	1.287
0	32	1.294
-10	14	1.301
-20	- 4	1.308
-30	-22	1.315



One or more cells have an acid weight of 1,28 or lower.

Load test,
see point 5

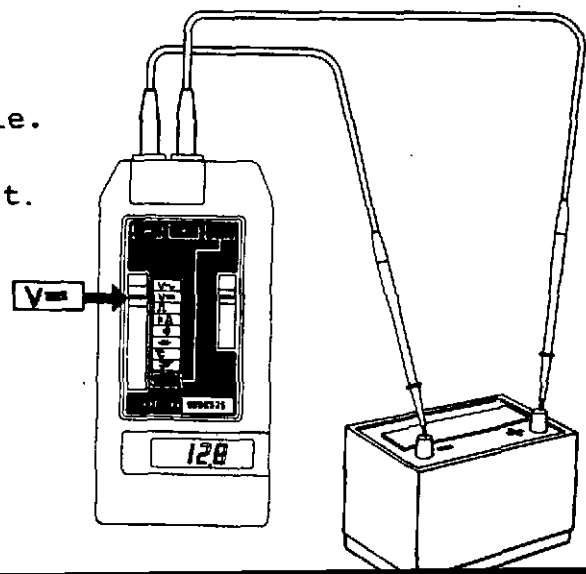
Acid weight in all the cells is lower than 1,24

Charge battery,
see point 4

3b. CHECKING THE BATTERY CHARGING CONDITION USING THE MULTIMETER.

- Disconnect the negative battery cable.
- Battery rest potential (min 2 h after charging) must be min 12,4 volt.
- Note! Charge the battery if the voltage is lower, see point 4.

Charging condition	Battery rest potential
100%	12,70V
85%	12,60V
70%	12,50V
55%	12,40V
40%	12,25V
25%	12,10V

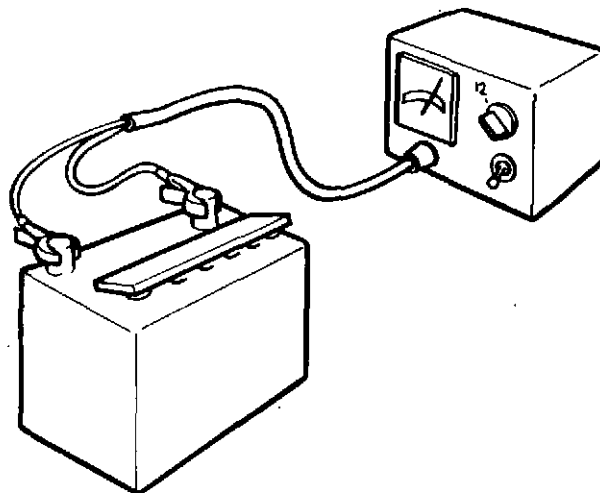


4. Separate charging the battery

Warning! An explosive gas is formed during charging and even afterwards. Make sure that the charging area is well ventilated.

Remove the battery's filling caps.

Check the acid level, top up with distilled water if necessary.



Charging the battery: Follow the makers instructions for the charger. Recommended charging current rate = $0.1 \times$ the battery capacity.

Example: If the capacity is 60 Ah the recommended charging current is $0.1 \times 60 = \text{max. } 6.0\text{A}$.

After charging, measure the acid weight in each cell (not directly after).

The acid weight in a fully charged battery should be min. 1.28 at abt. $+20^{\circ}\text{C}$ ($+68^{\circ}\text{F}$).

If the difference between the highest and lowest value is more than 0,04

Replace with a new battery.

The same acid weight in all cells, but the battery is not yet fully charged.

Charge the battery for a longer period*

* If the battery is still not fully charged replace it with a new one.

5. Checking the battery on load.

Note! Volvo Penta do not supply an instrument for loading the battery. The instrument in the figure is an example of a battery loader. For use, refer to each manufacturer.

Load test should be carried out when the density (acid weight) in the battery is uneven. The acid weight must be min. 1.22 at abt. + 20°C(+68°F). Charge the battery before the test if necessary (point 4). Load according to instructions from the respective manufacturer.

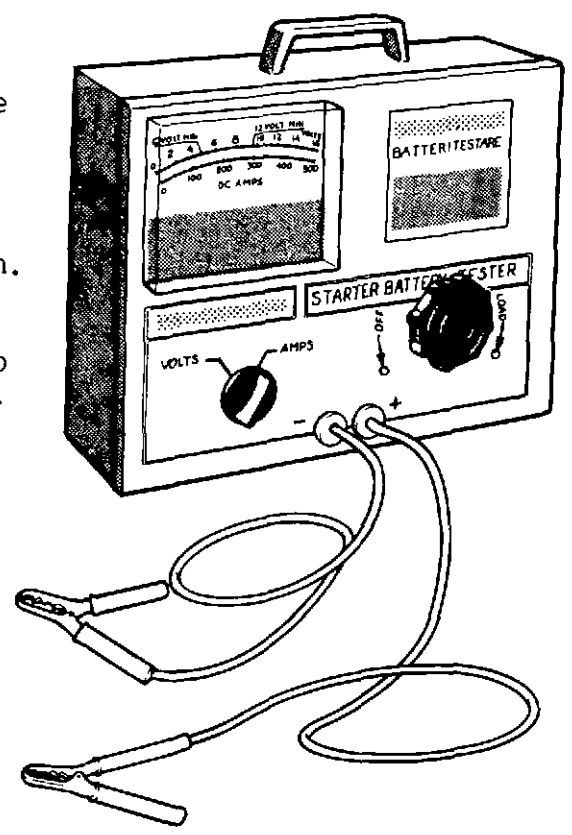
Replace with a new battery:

- If the battery voltage rapidly drops towards 0V (open circuit in the battery).
- If the battery "boils" in one or more cells (short circuit).

The battery is in good condition:

- If the battery voltage drops very little and holds a steady and even value:

The battery should be charged before use (point 4).



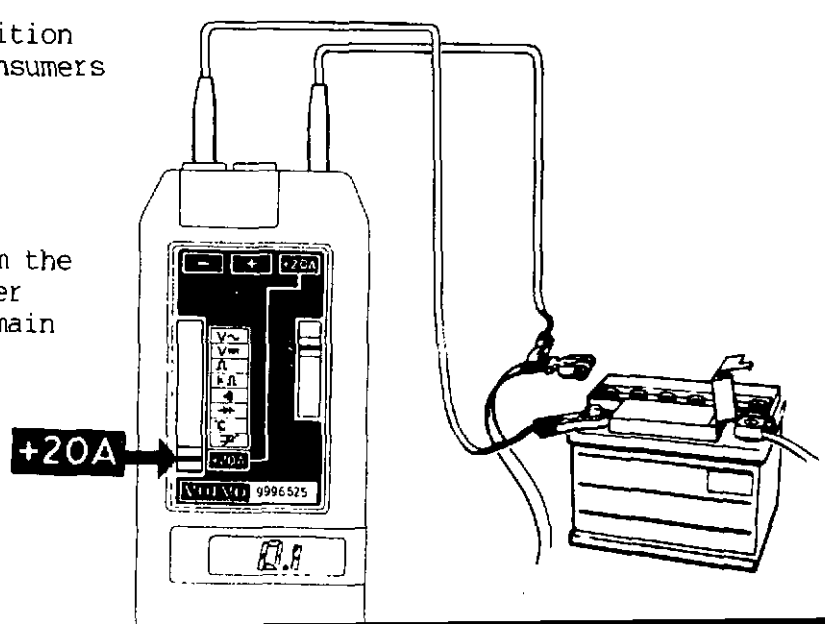
6. Current loss control

The current loss with the ignition disconnected and all power consumers off must not exceed 0.1A.

Test method:

Loosen the main cable (-) from the battery. Connect the Multimeter between the battery pole and main cable.

If the current loss is greater than 0,1A, this is due to a short in the electrical system.



7. Checking the battery cables

Loose or corroded cable connections on battery, alternator or engine can result in a voltage drop.

Test method:

A. Connect the Multimeter between the battery's plus and minus poles.

Run the engine at 33.3 r.p.s. (2000 r.p.m.).

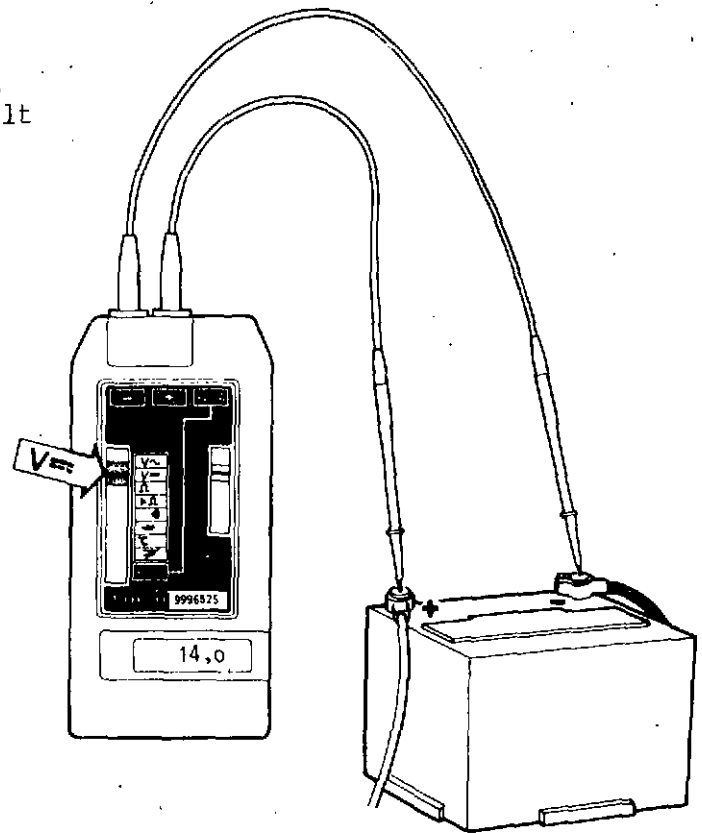
Read off and note the value obtained.

The alternator gives approx. 14.0V

Carry out test B

The alternator gives more than 14.4V

See point 8



B. Connect the Multimeter between the alternator's B+ and D-.

Run the engine at 33.3 r.p.s (2000 r.p.m.).

The alternator shall give 14.0-14.4V.

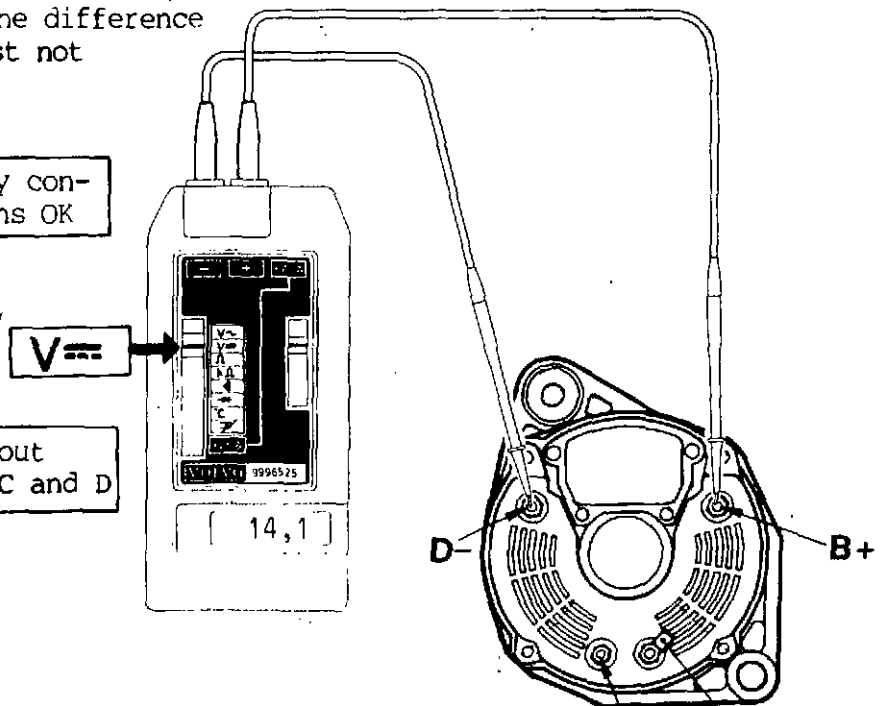
Permitted voltage drop - the difference between test A and B - must not exceed 0.4V totally.

Voltage drop less than 0.2V

Battery connections OK

Voltage drop more than 0.3V

Carry out tests C and D



C. Checking the positive battery cable.

- Connect the Multimeter between the alternator's B+ and the battery's plus pole.

Run the engine at 33.3 r.p.s. (2000 r.p.m.).

The voltage drop must not exceed 0.2V.

Thereafter carry out test "D".

If the voltage drop exceeds 0.2V the cable connections must be attended to according to "Corrective measures" below.

D. Checking the negative battery cable

Connect the Multimeter between the alternator's minus (D-) and the battery's minus pole.

Run the engine at 33.3 r.p.s. (2000 r.p.m.).

The voltage drop must not exceed 0.2V.

If the voltage drop exceeds 0.2V the cable connections must be attended to according to "Corrective measures" below.

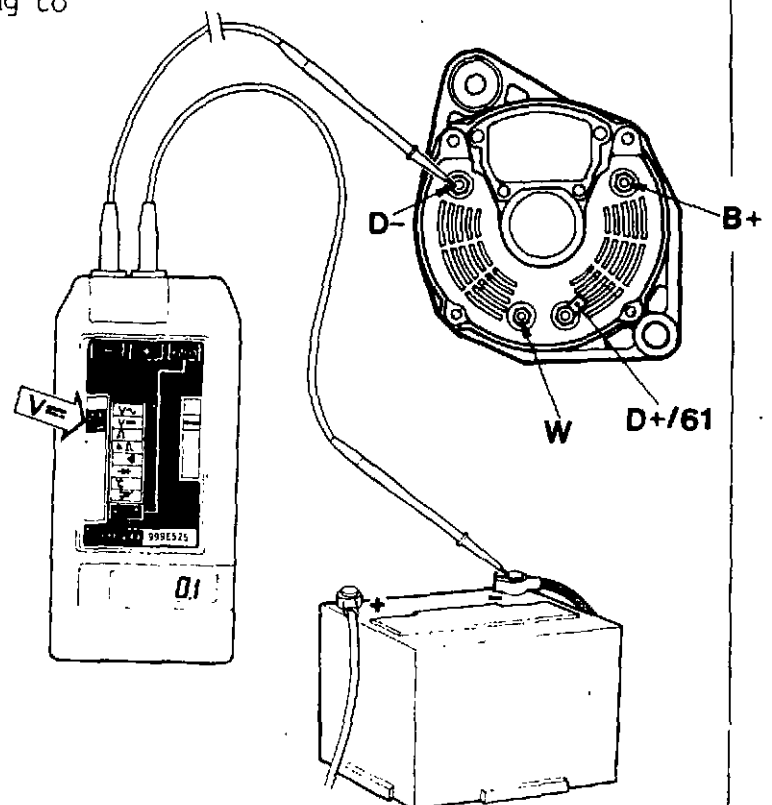
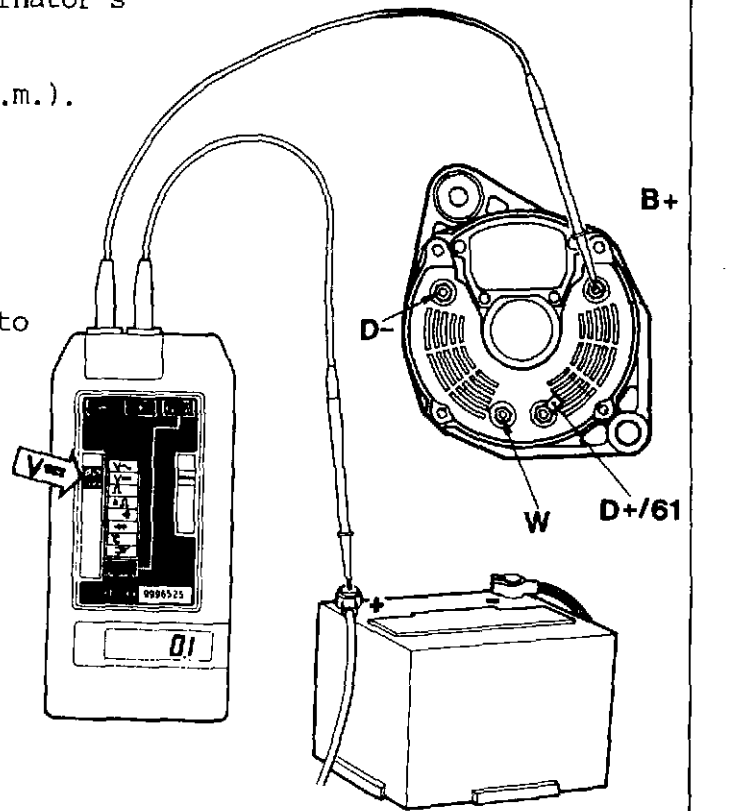
Corrective measures

If the voltage drop during any of the tests C or D exceeds 0.2V, the cable connections must be cleaned and/or tightened.

Check the connections at the battery, main switch, alternator and starter motor (also main cables), see Wiring Diagram for each particular engine type. Loose contacts at these connections can result in poor battery charging.

The battery must never be disconnected while the engine is running.

When necessary, check the cable area, see Wiring Diagram for each particular engine type.



8. Fault tracing in the charging circuit

Alternator: Paris-Rhône A 13N M
Charging regulator: Paris-Rhône YL 135

Conditions: the test must be carried out with "hot" alternator and charging regulator (run the engine for abt. 3 minutes at 33.3 r.p.s. (2000 r.p.m.)).

The checks, points 1 - 5, must have been carried out first and attended to if necessary.

A. Measuring the charging voltage, unloaded

No power consumers must be connected.

Connect the Multimeter between the battery's plus and minus poles.

Run the engine for abt. 10 seconds at 25 r.p.s. (1500 r.p.m.).

Voltage higher than 14.4V

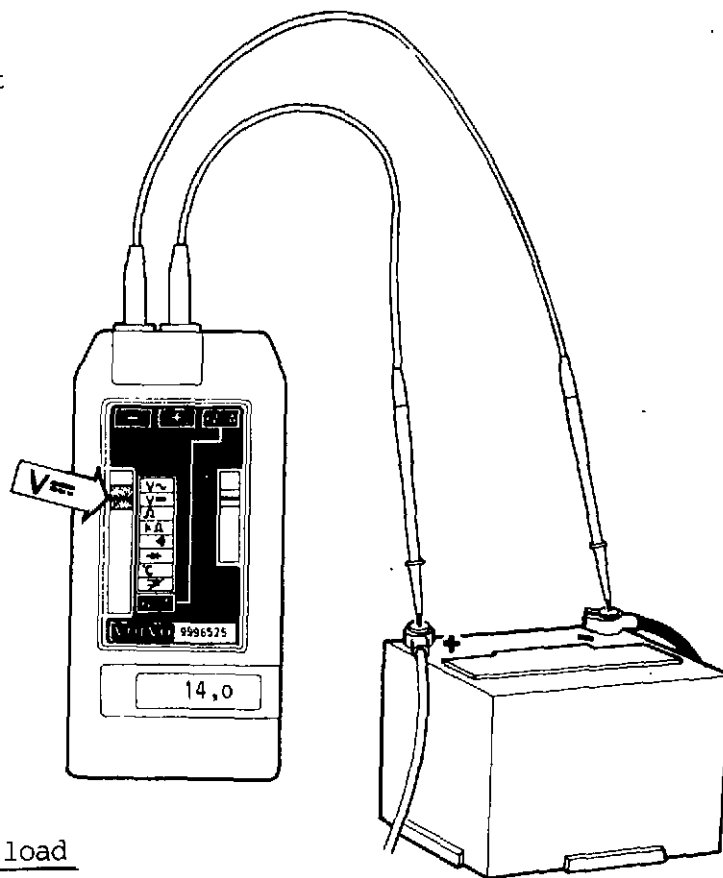
Check the charging regulator, see SB 30-301-105-605*
Repeat check A

Voltage lower than 13.8V

Check the charging regulator, see SB 30-301-105-605*
Repeat check A

Voltage between 13.8V and 14.4V

Carry out check B



* If the regulator is in order, the alternator is faulty.

B. Measuring the charging voltage under load

Connect the Multimeter between the battery's plus and minus poles.

Run the engine at 25 r.p.s. (1500 r.p.m.). Load by connecting several power consumers (abt. 30A).

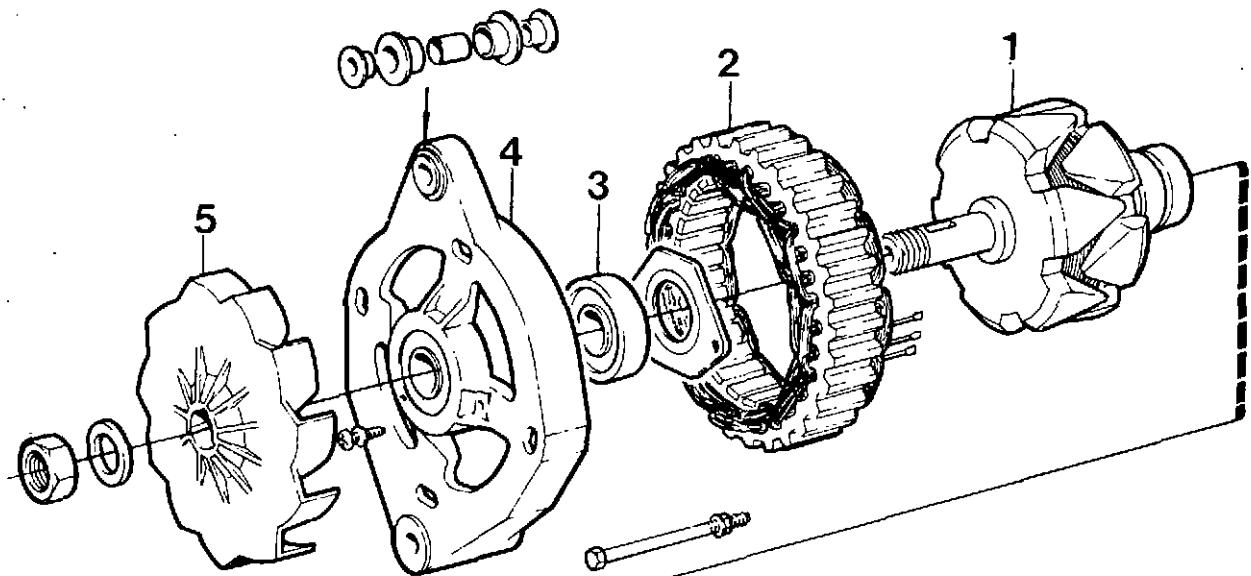
Voltage lower than 13.8V

Fault in the alternator

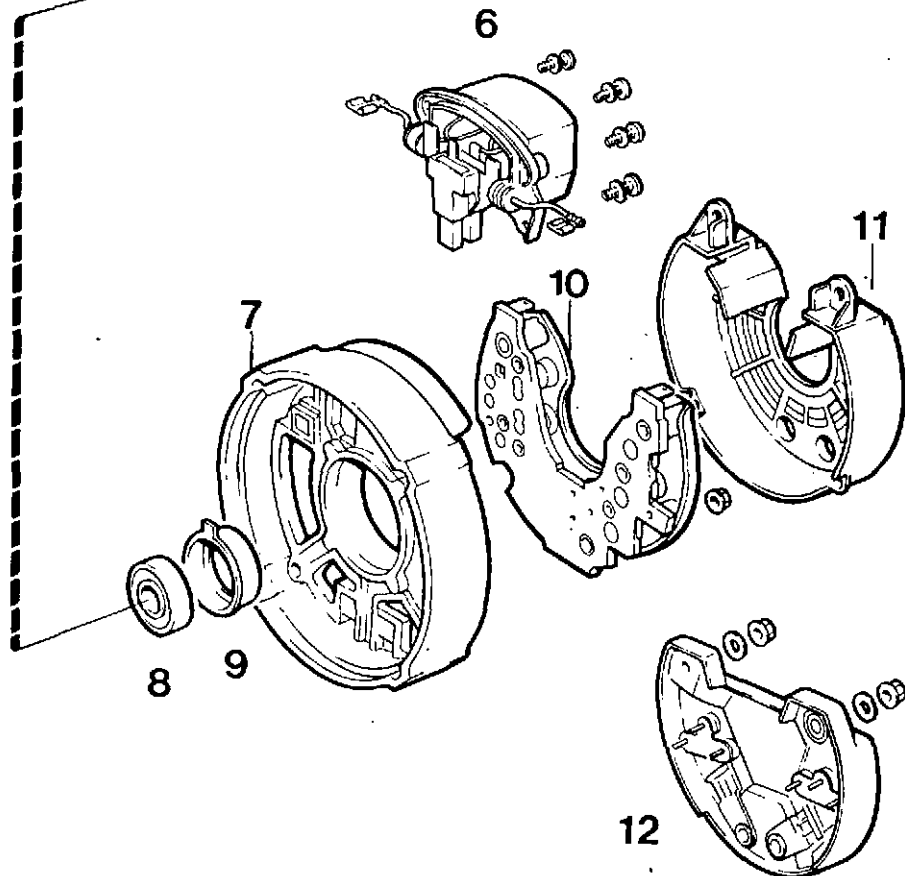
Voltage between 13.8V and 14.4V

Charging circuit OK

FAULT TRACING AND REPAIR OF PARIS-RHONE ALTERNATOR A13NM 14V 50A (35A)



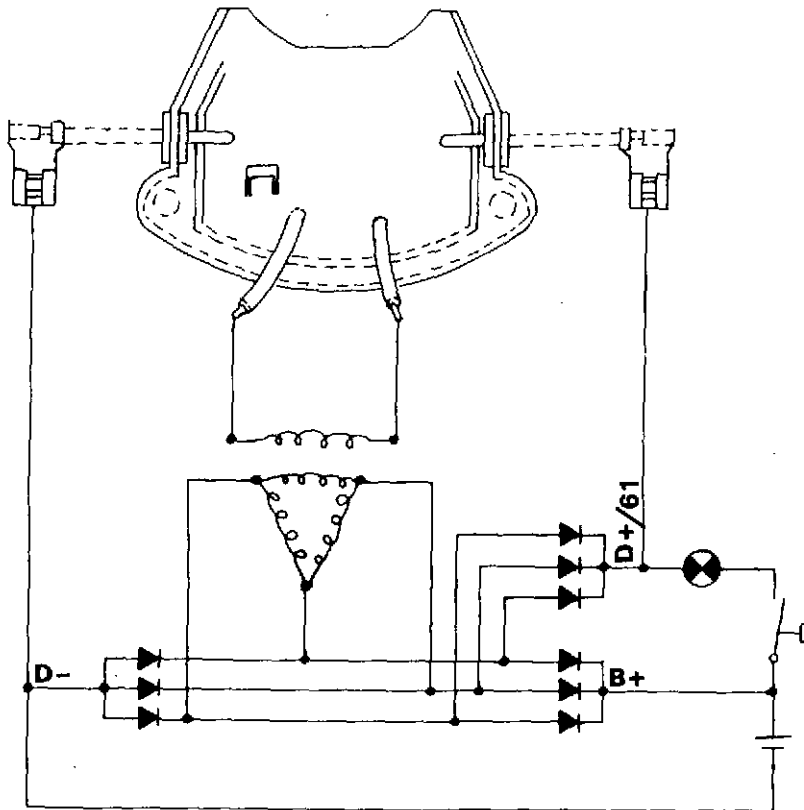
NO	DESIGNATION
1	Rotor
2	Stator Ring
3	Ball Bearing
4	Gable, front
5	Fan
6	Regulator
7	Gable, rear
8	Ball bearing
9	Bearing Cage
10	Diode Plate (Rectifier Bridge)
11	Plastic Shield
12	Charge Distributor



General Description

The alternator is three-phase and delta-connected. The diode plate (rectifier bridge)/regulator are mounted on the back of the alternator.

The alternator is supplied initially suppressed with a 2.2 μ F capacitor mounted on the rectifier bridge. It can be fitted with a charging distributor to allow charging of two batteries independently.



Specifications:

Type	Paris-Rhône A 13 NM
Max. Current	50 Amp
Voltage	14.0 - 14.4 V
Connections	
D-	M5
B+	M6
D+61 for charging indicator	Flat pin 6.3 x 0.8 mm

Test Values at +20°C:

Type	Volt/Amp	R Rotor in Ohm	R Stator (between phases) in Ohm
A 13 N1M	12/50	4.0 - 6.0	0.11 - 0.15
A 13 N2M	12/50	4.0 - 6.0	0.11 - 0.15
A 13 N35M	12/35	6.0 - 8.0	0.18 - 0.24
		6.0 - 8.0	0.18 - 0.24

Repairing the Alternator

It is important to complete trouble shooting, with the engine running, before removing the alternator, in order to eliminate other possible defects such as faulty battery, wiring, V-belt etc. Please see point 8 in "Trouble Shooting, Charging System", SB 30-301-104-1204 at page 12.

Once the alternator has been removed from the engine it must be dismantled in order that the electrical components can be checked.

Possible faults can be divided into three main groups:

1. FAULTS IN THE GOVERNOR (page 16)

Faulty or loose contacts in the regulator. Use the regulator tester.
Worn brushes, soot on the slip rings, faulty cable connections.

NOTE: The regulator also acts as a spark protector. The regulator must always be fitted when the alternator is in use.

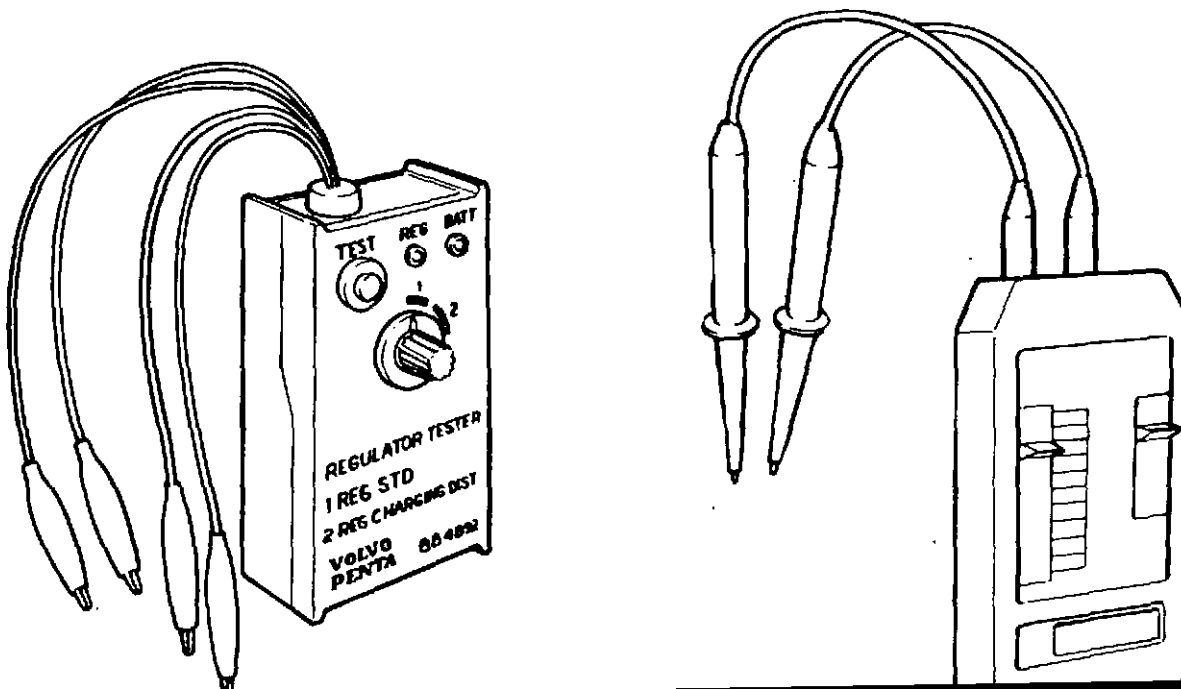
2. ELECTRICAL FAULTS IN THE ALTERNATOR (page 16)

Open circuits, burnt or short-circuited stator/rotor windings.
Earth fault in the stator/rotor windings.
Fault in rectifier bridge.
Fault in winding or cable connections.

3. MECHANICAL FAULTS IN THE ALTERNATOR (page 20)

Worn bearings, broken stator/rotor.

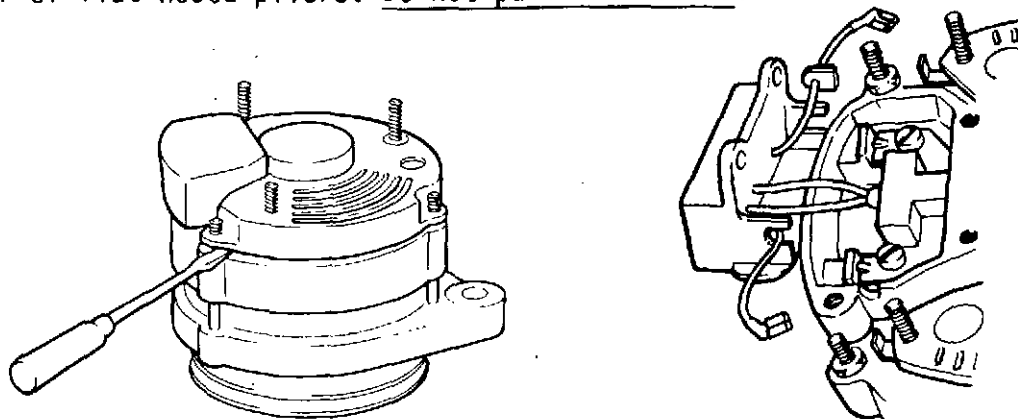
SUITABLE INSTRUMENTS FOR FAULT TRACING IN THE ALTERNATOR



1. FAULTS IN THE REGULATOR

DISMANTLING THE REGULATOR

Loosen the plastic shield by bending the fixing lugs alternately, until it can be removed from the alternator. Then disconnect the two cables with a pair of flat-nosed pliers. Do not pull the cables.



Then remove the four screws which hold the regulator in position, and lastly the two screws which hold the carbon brushes.

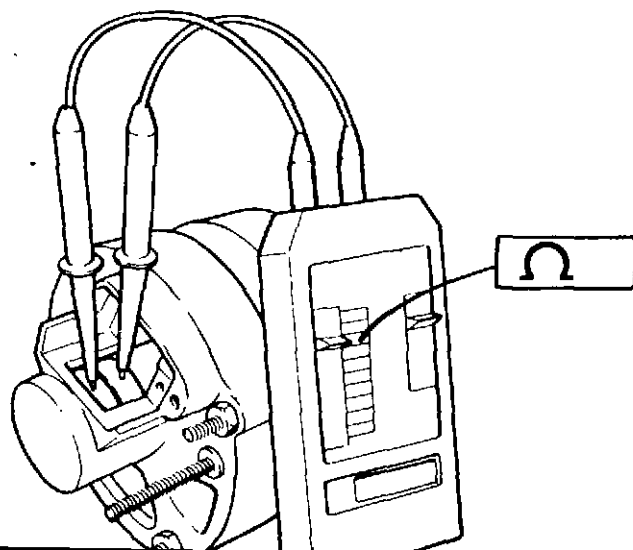
Once the regulator has been disconnected, check it using the Volvo Penta regulator tester, Order No. 884892 (12 V). It is sometimes possible to detect a loose connection inside the regulator by pressing in the silicon mass with your thumb. Check the length of the carbon brushes. Replace them if they are shorter than 8 mm (0.32").

ase 1

2. ELECTRICAL FAULTS IN THE ALTERNATOR

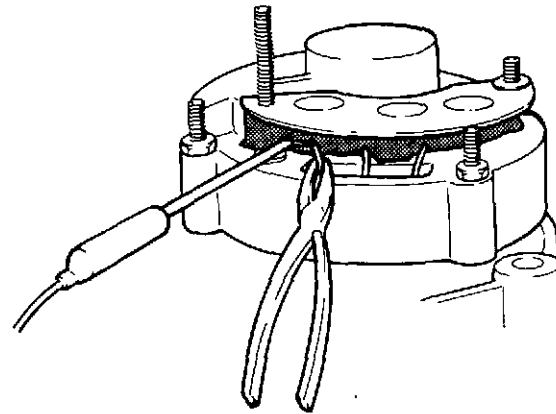
CHECKING THE ROTOR WINDING

Once the regulator and the carbon brushes have been removed it is possible to measure the rotor's resistance. Set the alternator tester to Ω . Make sure that the measuring probes make proper contact. The measured values should be as shown in the table on page 14. You should also make sure that there is no earth fault by taking a measurement between the slip ring and the earth.




DISMANTLING THE DIODE PLATE (REGULATOR BRIDGE)

The diode plate should be dismantled in order that both the plate and the stator windings can be checked. Unsolder the three stator windings. Be careful not to use too much heat, as otherwise the diodes may be damaged. Remove the bolts, and make a note of the way in which the nuts and washers were fitted.



CHECKING THE DIODE PLATE

Set the Volvo Penta Multimeter to the diode testing position 

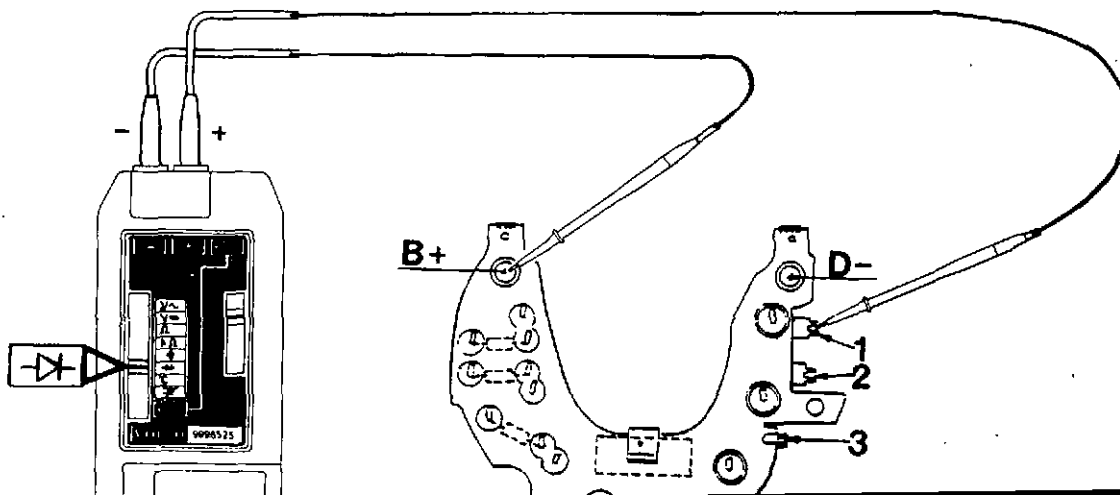
When taking test measurements it is very important to make sure that the measuring probes make proper contact.

A. Checking the B+ Diodes

Connect the positive probe to one of the connections for the stator windings (1-2-3). Then connect the negative probe to the B+ connection on the diode plate, and read off the measurement. Normal value should be between 450 mV and 650 mV, the voltage drop across the diode. If the value is not in this range diode is faulty. Check the other B+ diodes by connecting the positive probe to each of the other two connections for the stator windings in turn.

Then check the B+ diodes for the opposite current using the positive probe instead of the negative one, and following the procedure already described. The reading on the Multimeter should now be a "1" on the far left of the display. Any other value indicates that the diode is faulty.

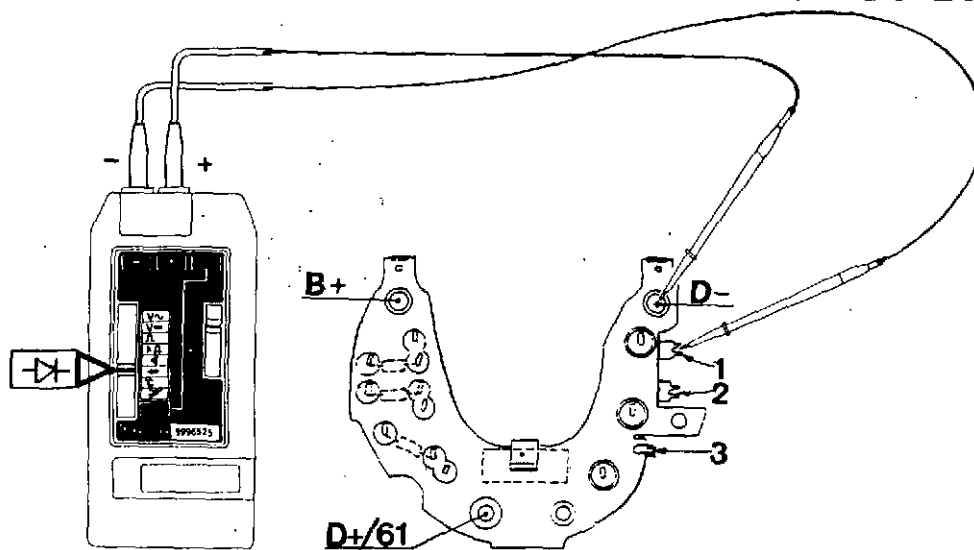
If any of the diodes is faulty, the whole diode plate must be replaced.



B. Checking the D- Diodes

Next, check the D- diodes by connecting the Multimeter's positive probe to the D- connection on the diode plate and the negative probe to the connections for each of the three stator windings (1-2-3) in turn. Read off the measurements as before. Normal value should be between 450 mV and 650 mV. If the value is not in this range the diode is faulty. Then check the D- diodes for the opposite current using the negative probe instead of the positive one, and following the procedure already described. The reading on the Multimeter should now be a "1" on the far left of the display. Any other value indicates that the diode is faulty.

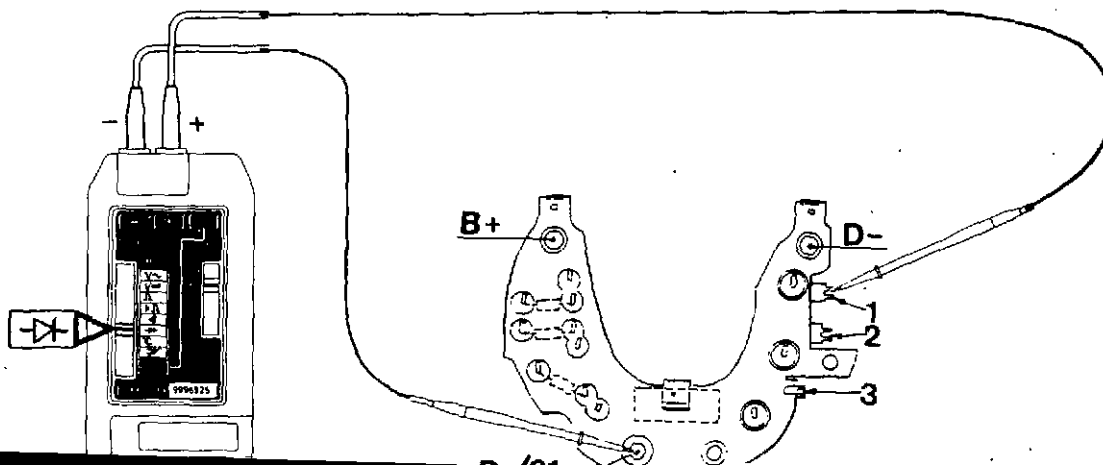
If any of the diodes is faulty; the whole diode plate must be replaced.



C. Checking the D+ Diodes

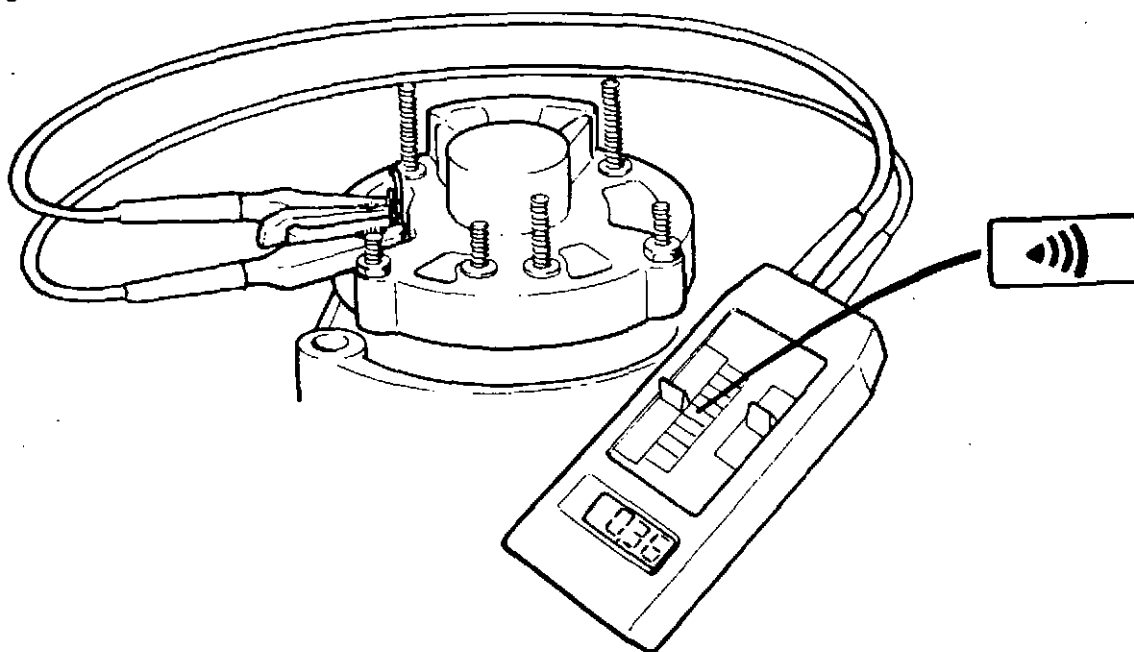
The diode plate's three magnetizing diodes can be checked in the same way. To check them, connect the Multimeter's positive probe to each of the connections for the stator windings (1-2-3) in turn, and the negative probe to D+/61. The voltage drop across each diode should be between 450 mV and 650 mV. Then check the D+ diodes for the opposite current using the negative probe instead of the positive one, and repeating the procedure. The reading on the Multimeter should now be a "1" on the far left of the display. Any other value indicates that the diode is faulty.

If any of the diodes is faulty, the whole diode plate must be replaced.

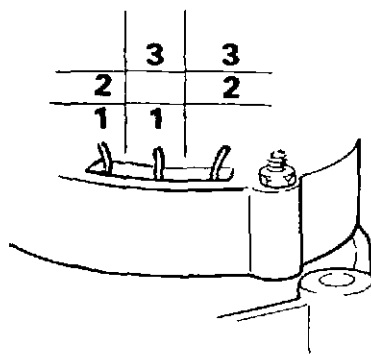


CHECKING THE STATOR WINDINGS

With the diode plate removed it is also possible to check the stator windings by setting the Volvo Penta Multimeter to Ω . Measure the resistance between the respective windings. NOTE: Check the resistance in the measuring probes by touching them together, before you start to check the windings, and make a note of the value displayed, e.g. 0.10Ω . When reading off the resistance values between the respective windings, the value of the probes' internal resistance (in our example 0.10Ω) must be deducted in order to arrive at the true value being measured.



Take measurements between all three connections for the windings.



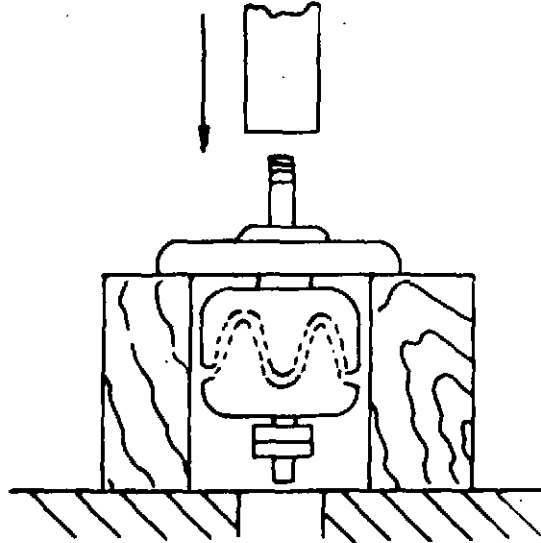
Check that the value of the resistance (Ω) is within the range of values given in the table on page 14.

You should also measure against the body of the alternator by setting the Multimeter at Ω , and then measuring between each of the windings and the body. The reading on the Multimeter should now be a "1" (= infinity). Any other value indicates that the stator winding is faulty.

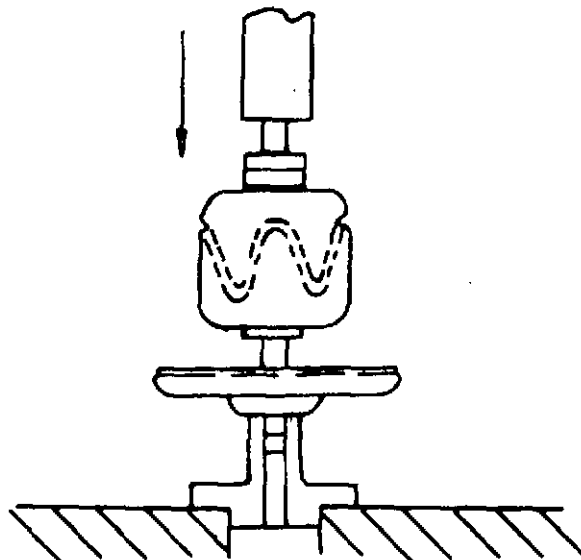
3. MECHANICAL FAULTS IN THE ALTERNATOR

DISMANTLING THE STATOR AND ROTOR

Make line-up marks on the stator and the gables to assist you when reassembling them. Remove the four retaining screws which hold the alternator and then remove the gable on the slip ring side by tapping it carefully with a plastic mallet. Loosen the stator from the gable and pulley. Use a 24 mm spanner to remove the pulley and an 8 mm allen key to hold the shaft.



Press the rotor out of the front gable, using two wooden blocks as support. Once the rotor has been removed it is easy to replace the bearing. If the slip rings are burnt it is possible to remove some of the carbon deposits on a lathe. Short circuited rotors must be replaced.



REASSEMBLY

When reassembling the stator and rotor, use a pipe to press the rotor down. Make sure that the alignment is correct, and press, do not use a hammer. Reassemble the stator housing and the gables with the help of your line-up marks.

Use a pair of flat-nosed pliers or similar tool to lead off the heat when soldering the diode plate, and make sure that all electrical connections are

**VOLVO
PENTA**

service bulletin

GROUP
30
301

NO
107-1207

CONCERNING

See below

PRODUCT

See below

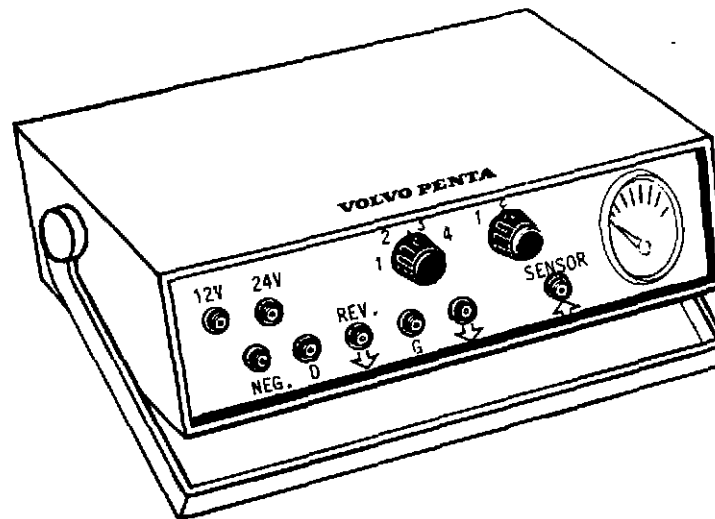
DISTRIBUTION

MI

DATE

1-1985

TEST EQUIPMENT FOR INSTRUMENTS AND SENDERS OF MAKE VDO AND REV-COUNTERS OF MAKE SW (Stewart Warner)



The test equipment has been specially designed for Volvo Penta's needs. The equipment is primarily intended for use as a reference instrument.

The electronic part of the test equipment is contained in a strong protective plastic holder. The instrument case has an adjustable support which also acts as a carrying handle.

The instrument requires a 110V or a 220V supply. Always quote required voltage when ordering. When testing, the instrument and sender must be removed from the installation. The tester can be used to test the following instruments and senders.

VDO instruments

Engine speed, pressure, temperature, levels (fuel/water), rudder trim, volt and hour-counter.

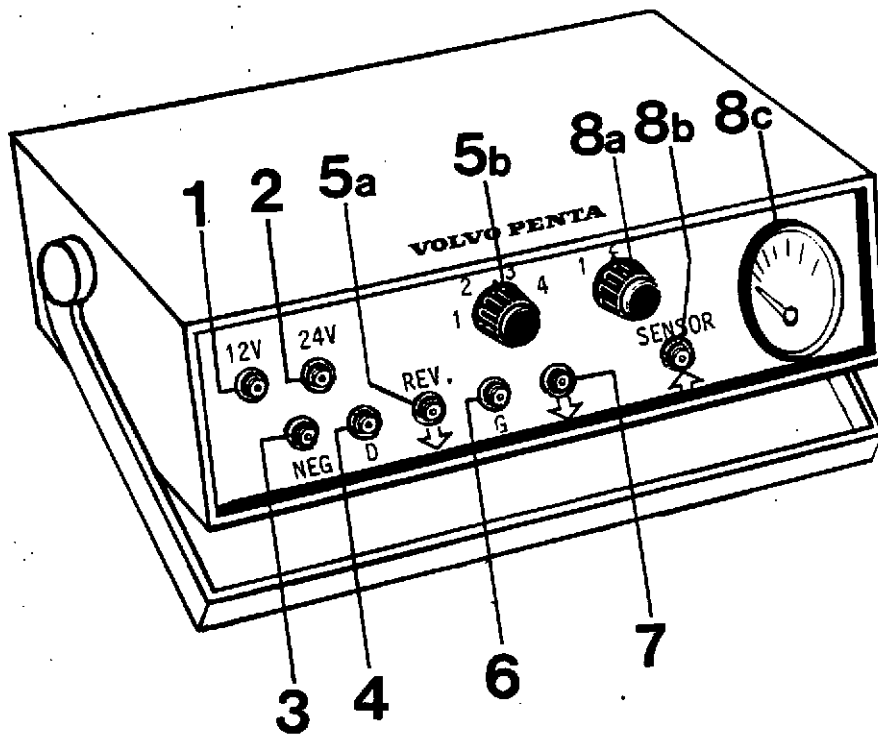
VDO senders

Pressure, temperature, level, rudder, trim. Note! Volvo's Digital Multimeter is recommended for testing the engine speed sender.

SW instruments engine speed.

The test equipment,
884909-3 (110V)

has part No. 884908-5 (220V) and

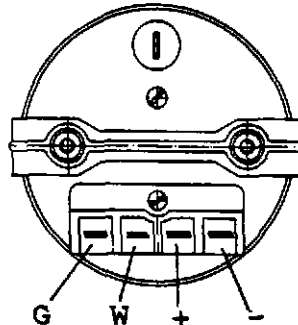


- | | |
|---|--|
| <p>1. + Output 12 V</p> <p>2. + Output 24 V</p> <p>3. - Output</p> <p>4. Fixed output for rev-counter, diesel engines.</p> <p>5a. Variable output for all rev-counters.</p> <p>5b. Variable tester for all rev-counters.</p> <p>6. Fixed output for rev-counters, gas (petrol) engines.</p> | <p>7. Fixed output for instruments, temp. pressure, rudder, level.</p> <p>8a. Position 1 = Temp. senders
Position 2 = Pressure, rudder, trim, level senders</p> <p>8b. Input for all senders.</p> <p>8c. Indicator instrument for all senders.</p> |
|---|--|

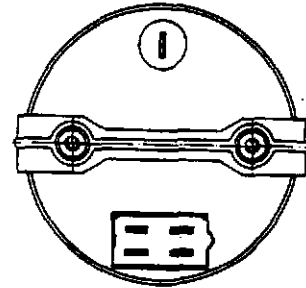
TEST INSTRUCTION

1. Checking of VDO and SW (Stewart Warner) rev counters.

Diesel: VDO-instrument

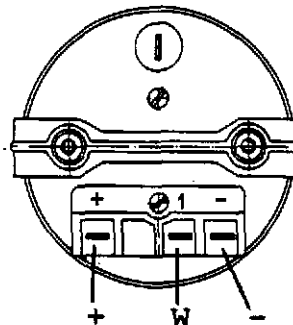


Earlier version
instr. stamped
1972 and later



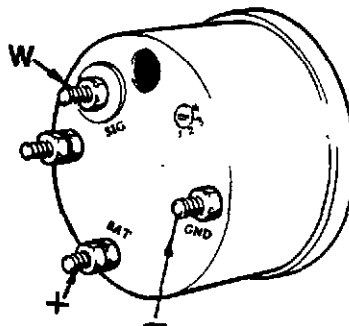
Late version
all instr.
with 4-pole
connector
(plug in)

Gas: (Petrol) VDO-instrument

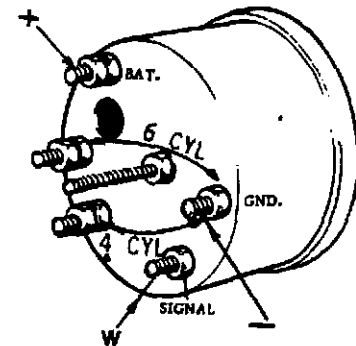


Instrument
Stamped 1977
and later.

SW-instrument



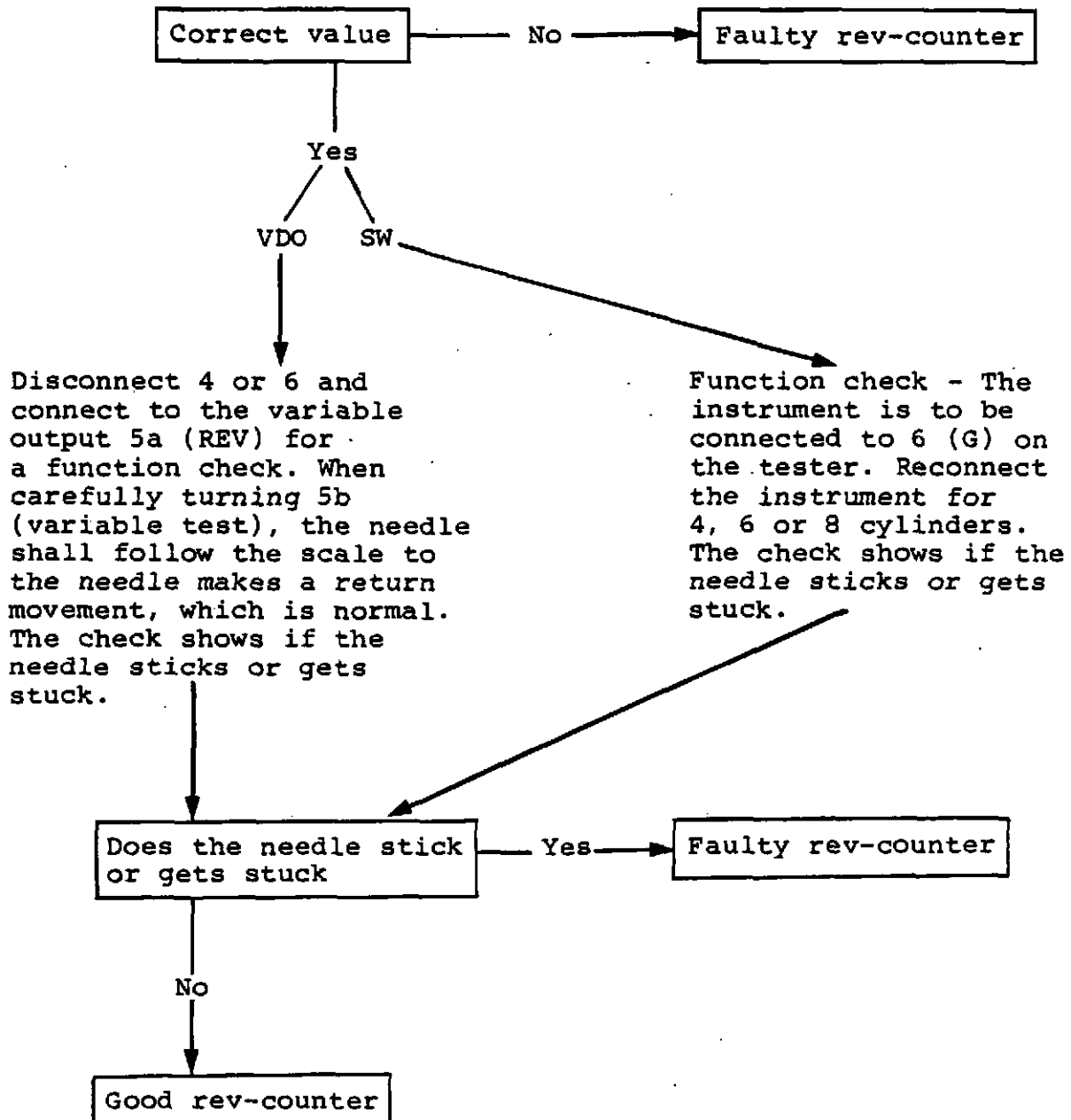
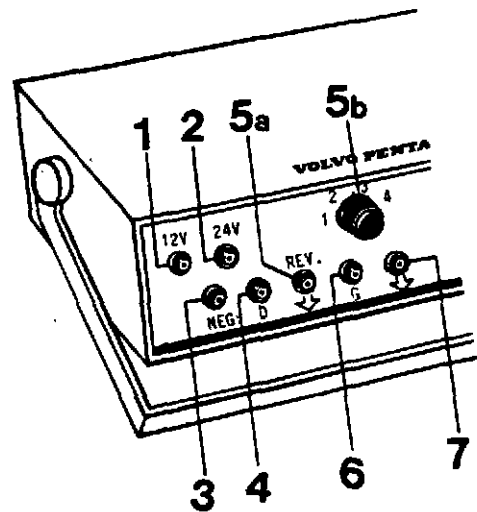
Late version



Earlier
version

- Connect the cable to the Instrument as per marking. → page 4

- Connect the cable to the tester, output 1 (+12V) red alt. 2 (+24V) red and 3 (-neg) black.
- Connect to the fixed output 4 (D = diesel) green, alt. 6 (G = gas/petrol) green.
- Read off the result on the rev-counter instrument.
- Compare with the correct value for each instrument as per the table on page 5.



REV COUNTER FOR DIESEL ENGINES VDO STAMPED 1972 AND LATER.

Engine type	Part No.	Stamped on the rev counter case		Correct value r.p.m <u>+5%</u>
		V	Pulse/min	
MD				
5 A+B	833900	12	108 000	1610
5 C	840518	12	144 000	1610
6+7 A	833494	12	63 000	2700
7 B	840519	12	84 000	2700
11+17 C+D	828596	12	112 000	2040
2000	828602	12	172 000	1380
21+32	836470	12	100 000	2950
40	842872	12	165 000	1800
30+40	828601	12	165 000	1800
30+40	838941	24	165 000	1800
60+70	828598	24	84 000	2075
60+70	828597	12	84 000	2075
60+70	837775	24	84 000	2075
100+120+121	828600	24	90 000	1950
100+120+121	842563	24	90 000	1950

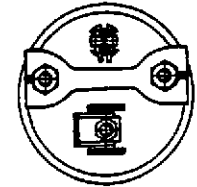
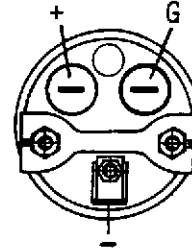
REV COUNTER FOR GAS (PETROL) ENGINES: VDO STAMPED 1977 AND LATER
SW EARLIER AND LATE VERSION

4-cyl 4 stroke		12		4000
6-cyl "		12		2670
8-cyl "		12		2000

2. Checking VDO instrument

Temperature gauge, rudder indicator, pressure gauge,
level meter for fuel/water and trim indicator

- Connect the cables to the instrument:
Late version = have a 3 pole connection.
Earlier versions = connect according to
markings on each
instrument.

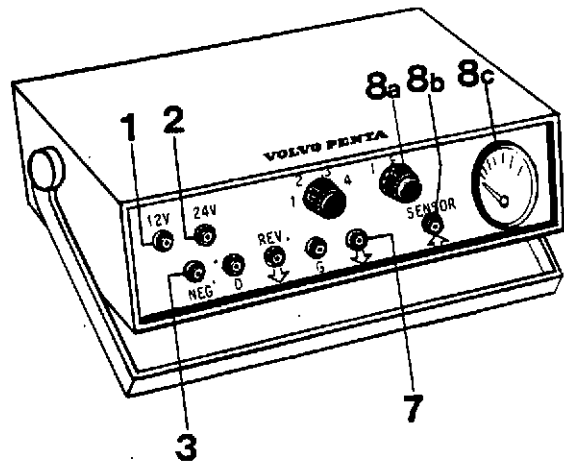


Late version

Earlier version

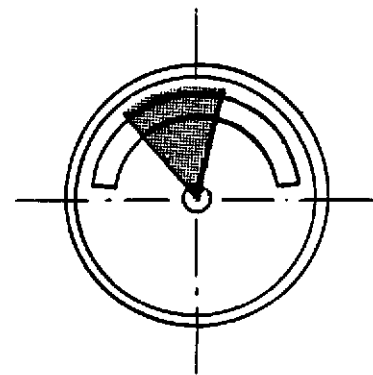
- Connect the cable to the tester
output 1 (+12V) red or 2 (+24V)
red and 3 (-neg) black.
- Connect to output 7 yellow, and set
the position switch 8a to
position;

- 1 = temp
- 2 = pressure, level, rudder,
trim.



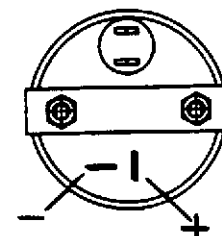
- Correct value in the shaded area.

The test resistor (see SB 36-361-107-1207) is recommended when testing in the boat.



Voltmeter, hour counter

- Connect the cable according to the
instrument's markings.
- Connect the cables to the tester,
output 1 (+12V) red or output 2
(+24V) red and output 3 (-neg)
black.



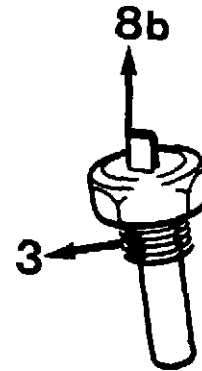
Hour counter: Function check
Voltmeter: Correct value $12 \pm 0.2V$
 $24 \pm 0.5V$

3. Checking VDO senders

Temperature, pressure, level (fuel/water), trim senders and the rudder indicator.

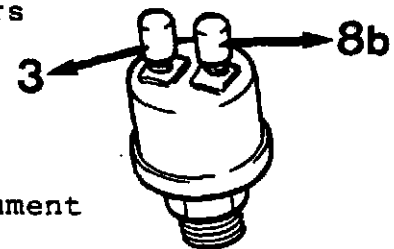
A. Single pole system

- Connect between the sender body and the tester's output 3 (-neg) black.
- Connect between the sender's connector tab and the tester's input 8b (sensor) green.



B. Double pole system

- Connect between one of the sender's connectors and the tester's output 3 (-neg) black.
- Connect between the sender's other connector and the tester's input 8b (sensor) green.



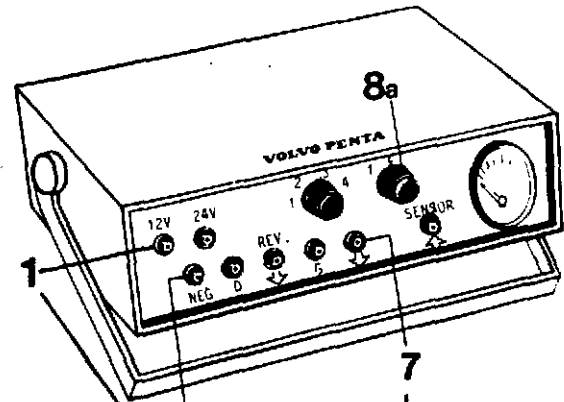
The correct value shown on the indicator instrument as in the table below.

Sender	Value/reading
Temp	Heat: Open flame - function check Water - 100°C (212°F) boiling, between 11-12.
Alarm	Heat: Water - check at the stamped switching temperature.
Pressure	Function check - blow carefully in the sender using compressed air - full scale reading from 15-5.
Level	Function check - from 15 (empty tank) to 6.5 (full tank) with the float fitted.
Trim	Function check - from 15 (not activated) to 6.5 (5 completely drawn out).
Rudder	Function check - from 6.5 (BB) to 15 (SB).

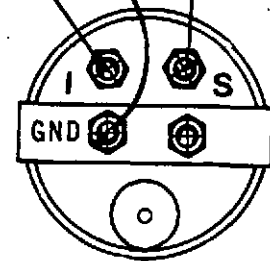
**4. CHECKING OF INSTRUMENTS FOR VOLVO PENTA PETROL (GAS) ENGINES
(Make Stewart Warner)**

Temperature gauge, pressure gauge, fuel/water level meters
and trim indicator

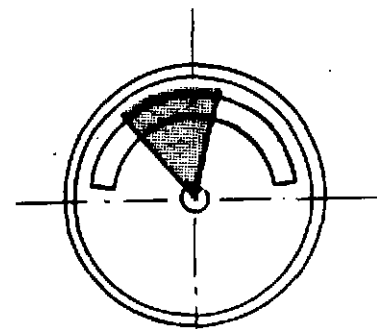
- Connect the cables to the test box:
Output 1 (+12V) red and 3 (-neg) black.
- Connect to output 7 yellow and put
the position switch 8a in
position:
1 = temp
2 = pressure, level, trim



- Connect the cables to the instrument:
- 1 (+12V) red to conn. marked I.
- 3 (-neg) black to conn. marked GND
- 7 (sender signal) yellow to conn. marked S
- Correct value within the shaded field.

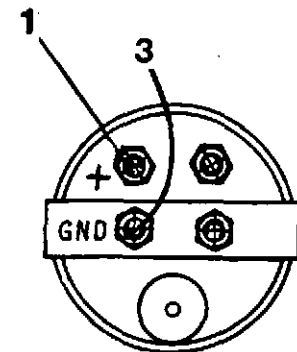


Test resistor (SB36-361-107-1207) is recommended for testing in the boat.



Volt meter, hour meter

- Connect the cables to the test box
output 1 (+12V) red and output 3
(-neg) black.
- Connect the cables to the instrument.
- 1 (+12V) red to conn. marked +
- 3 (-neg) black to conn. marked GND.

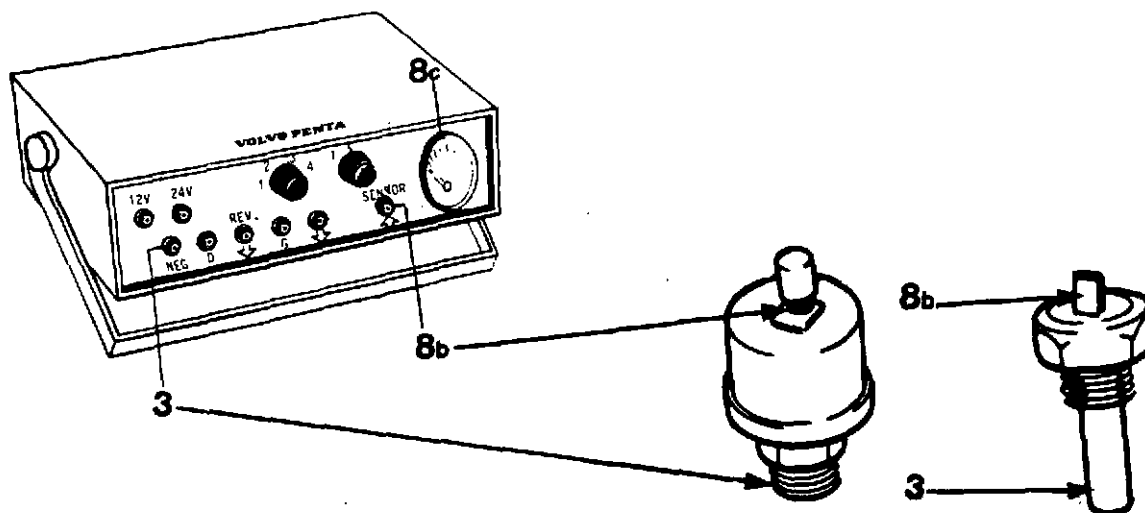


Hour counter: Function check
Volt meter: Correct value $12 \pm 0.2V$

5. CHECKING OF SENDERS FOR VOLVO PENTA'S PETROL (GAS) ENGINES (Make Stewart Warner)

Temperature sender, pressure sender and trim sender

- Connect between the sender's body and the test box's output 3 (-neg) black.
- Connect between the sender's connector and the test box's input 8b (sensor) blue.



Correct value on the visual instrument 8c according to the table.

Sender	Value
Temp	Heat: Open flame - function check Water - 100°C (212°F) Boiling point - measured values: Sender for single instrument between 10.5- 11.5 Sender for twin instrument between 11.5 - 13.5
Pressure	Function check - blow carefully in the sender with compressed air - measured values: Sender for single instrument from 5.5 to 11-12 Sender for twin instrument from 7.5 to 15
Trim	Function check - from 15 (not activated) to 6.5 (5 completely pulled out)

**VOLVO
PENTA**

service bulletin

GROUP
30
301

NO
108-1208

CONCERNING

Digital test instrument

PRODUCT

All engines

DISTRIBUTION

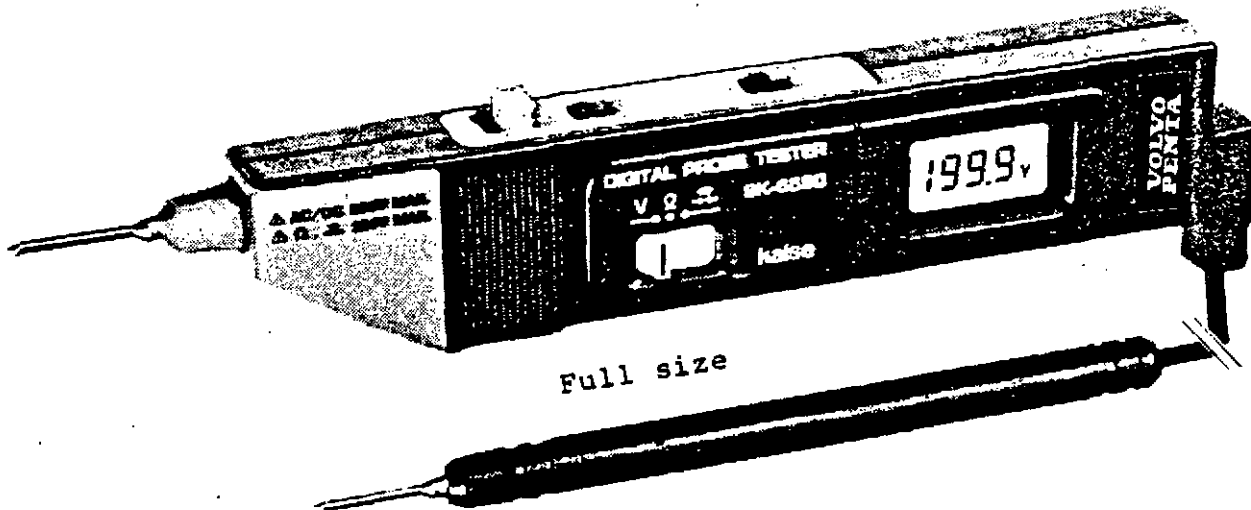
MI

DATE

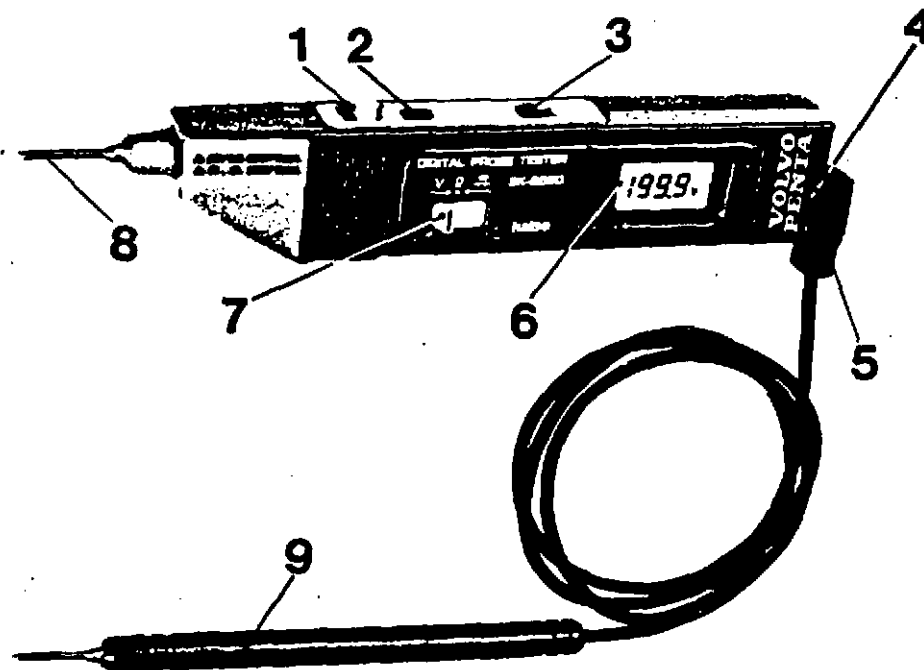
1-1985

VOLVO PENTA DIGITAL PROBE TESTER

884894-7



Another step in our aim to make fault-finding easier is the production of a small handy test instrument. The instrument is housed in a plastic case with a display for a digital read-out and is equipped with two test probes, one of which is fixed and the other is on a 90cm (36") long cable. The instrument is pocket size 163x19x28mm (6.5 x 0.7 x 1.1") and is suitable for fault-finding even outside the workshop. This new instrument is to be regarded as a complement to the Volvo Digital Multimeter.



1. Read-out lock switch (DH), keeps the measured value in the tester's memory.
2. Switch for mains or battery operation (AC/DC)
3. On/off switch.
4. Connector for test probe cable.
5. Battery storage, 2 pcs 1.5V type LR-44 or SR-44.
6. Display.
7. Switch for Volt/ohm/buzzer.
8. Fixed test probe.
9. Test probe on 90 cm (36") cable.

The tester's measuring ranges.

Direct current (DC)	0-500 Volt
Alternating current (AC)	0-500 Volt
Resistance (ohm)	0-2000 k Ω
Continuity	(buzzer)

The tester has automatic zeroing and an indicator for overloading, polarity and low batteries. Complete

**VOLVO
PENTA**

service bulletin

GROUP

30
301

NO

409-1209

Replaces earlier bulletin

CONCERNING

Test instrument for removed
charging regulator

PRODUCT

Charging regulator 28V
55A alternator

DISTRIBUTION

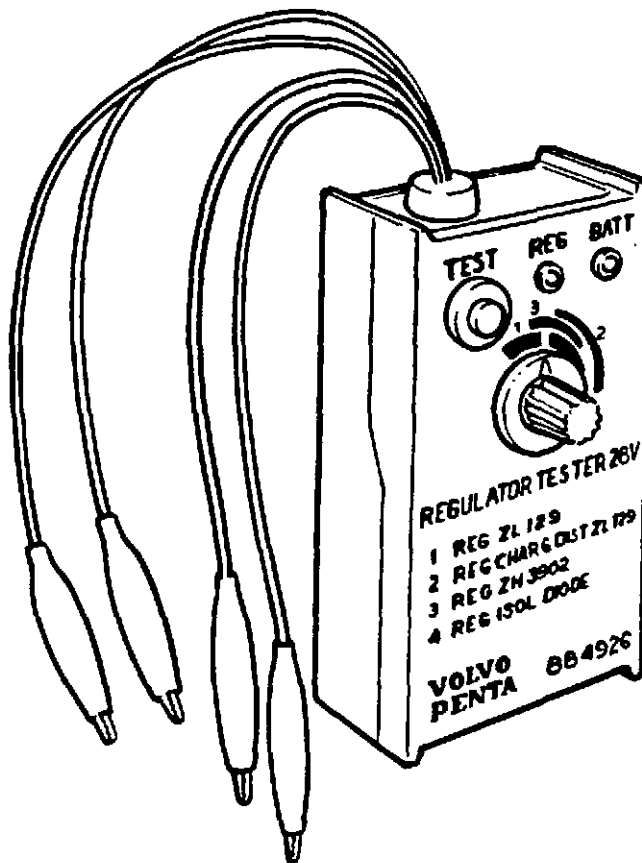
MI

DATE

6-1986

CHARGING REGULATOR TESTER

28V (55A), Part No. 884926-7



A new test instrument for checking of removed charging regulator 28V (55A) is now available.

The new instrument is simple to use and is of the same robust construction as the test instrument for 14V (50A).

The instrument is specially designed for charging regulator 28V Paris-Rhône ZL 129 and ZH 3902, and the separately fitted regulator of the previous version (with three cable connections).

WHEN CHECKING THE REGULATOR IT MUST BE REMOVED FROM THE ALTERNATOR.

1. First check the instrument batteries' condition. Press the "Test" button. Green light "Batt" should come on. If the light is not on the batteries must be replaced (4 pvs 9V alkalic). The batteries are contained in a compartment underneath the instrument.

2. The instrument has 4 measurement fields.

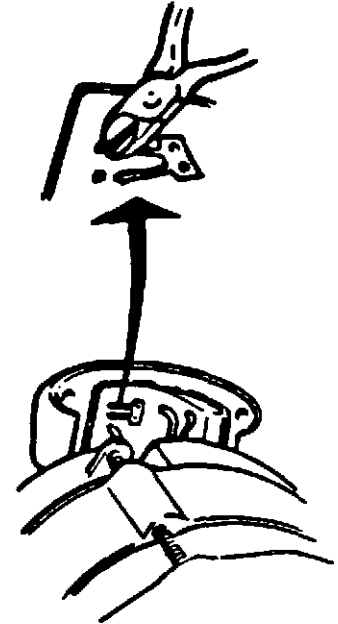
MEASUREMENT FIELD 1 = Regulator ZL 129 with the connector plate unbroken.

MEASUREMENT FIELD 2 = Regulator ZL 129 with the connector plate disconnected, together with charging distributor fitted.

MEASUREMENT FIELD 3 = Regulator ZH 3902

MEASUREMENT FIELD 4 = Separately fitted regulator (earlier version) 3 cable connections.

NOTE! The measurement fields show theoretical values and therefore a value some mm above/below the marking is an approved value.



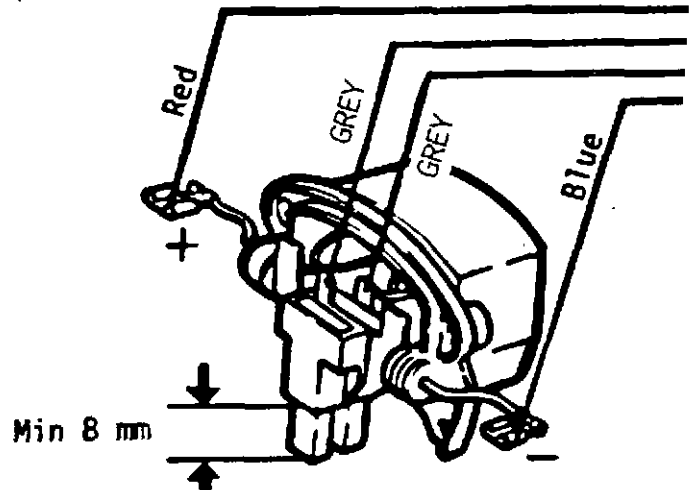
3. ZL 129 AND ZH3902

Connect the instrument cables to the respective regulator according to the table.

NOTE! The grey cables can be swapped.

FITTED SEPARATELY (earlier version)

Instrument cables	Regulator with:	
	Plug-in	Sep. cable
Red	D+	Red
Blue	D	Black
Grey	DF	Green
Grey		



4. Press the "Test" button and turn the "Rheostat" from pos. 0 while pressing the "Test" button.

GOOD REGULATOR

Red and green light should be on from 0, and during turning the red light should go out within the chosen limits, see point 2.

FAULTY REGULATOR

If the red light stays on during the whole turn of the rheostat, or goes out before or after the respective limits, or does not light at all, then the regulator should be replaced.

PART

3

electrical system and instruments

GROUP

DESCRIPTION

SECTION

31

Battery

311

31

**VOLVO
PENTA**

service bulletin

GROUP
31
311

NO
101-1201

Replaces earlier Service Bulletin

CONCERNING

Low battery capacity

PRODUCT

All engines

DISTRIBUTION

MIB

DATE

6-1986

When trying to locate in the electrical system the reason for low charged or completely discharged batteries, the following checks are to be carried out.

1. Cable connectors

Even if the alternator is charging, the battery (ies) will not be charged if the terminals are oxidised or loose. Clean the connectors and make sure that there are no loose connections. Spray the poles with rust protection oil after checking.

2. Alternator charging capacity

For a 24V system the charging voltage must be 27.6 V as a minimum, and for a 12V system 13.8V.

Measure the voltage over the + and - poles of the battery (ies) at engine revs 1500-1800 r/min.

3. Batteries

The battery (ies) must be maintained correctly and kept clean, otherwise the capacity will be lower. The battery (ies) must be topped-up with distilled water when necessary, "dry" batteries will be damaged and must be replaced.

Dirt on top of the battery (ies) can cause shorting and discharge.

PART

3

electrical system and instruments

GROUP	DESCRIPTION	SECTION
32	Alternator Charging regulator	321 322

**VOLVO
PENTA**

service bulletin

Replaces earlier SB

GROUP
32
321

NO
105-1205

CONCERNING

Pulley for alternator 50A and 55A

PRODUCT

All engines

DISTRIBUTION

MI

DATE

3-1984

When mounting this alternator it is important for the pulley to be tightened with the correct torque. The correct torque is 75 Nm (7,5 kpm) 55.4 ftlb. Note! A key must not be used.

If the pulley is tightened with less torque, there is a risk of it slipping.

Use an 8 mm allen (hexagonal) key in the centre of the alternator for applying torque and hold the nut with a 24 mm box wrench.

CONCERNING

Alternator brackets

PRODUCT

Industrial engines 60-120

DISTRIBUTION

I

DATE

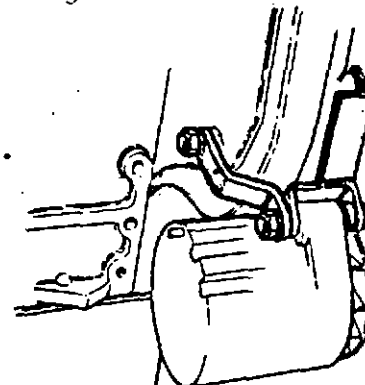
4-1986

To get a firmer fixing of the alternator the following alternator brackets have been reinforced.

60 - 70

The alternator located low on the right hand side.

A support bracket is introduced.
For TD60, use kit No. 849613-5.
For TD70, use kit No. 849614-3.

100

The alternator located on the right hand side. A new reinforced bracket with 3 attachment points is introduced. Part No. 849519-3. Spacer sleeve 847000-7 is not required when the new bracket is used.

The alternator located low on the left hand side. A new reinforced bracket is introduced. Part No. 849494-0. Spacer sleeve 847000-7 is not required when the new bracket is used.

120

The alternator located low on the right hand side. A new bracket with 3 attachment points, part No. 849510-3 is introduced, the same as for 100 engine. Spacer sleeve 847000-7 is not required when the new bracket is used.

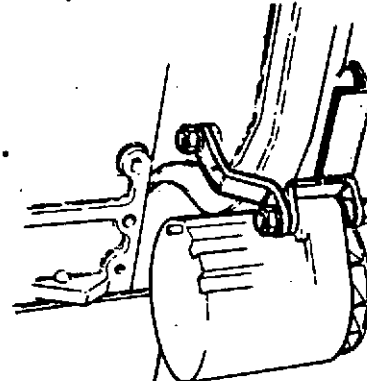
CONCERNING	PRODUCT	DISTRIBUTION	DATE
Alternator brackets	Industrial engines 60-120	I	4-1986

To get a firmer fixing of the alternator the following alternator brackets have been reinforced.

60 - 70

The alternator located low on the right hand side.

A support bracket is introduced.
For TD60, use kit No. 849613-5.
For TD70, use kit No. 849614-3.



100

The alternator located on the right hand side. A new reinforced bracket with 3 attachment points is introduced. Part No. 849519-3. Spacer sleeve 847000-7 is not required when the new bracket is used.

The alternator located low on the left hand side. A new reinforced bracket is introduced. Part No. 849494-0. Spacer sleeve 847000-7 is not required when the new bracket is used.

120

The alternator located low on the right hand side. A new bracket with 3 attachment points, part No. 849510-3 is introduced, the same as for 100 engine. Spacer sleeve 847000-7 is not required when the new bracket is used.

PART

3

electrical system and instruments

GROUP	DESCRIPTION	SECTION
33	Starter motor	331

33

PART

3

electrical system and instruments

GROUP	DESCRIPTION	SECTION
34	Ignition coil Distributor Ignition magneto Spark plugs and glow plugs Ignition cables Suppressor devices	341 342 343 344 345 346

CONCERNING

Radio interference suppressor

PRODUCT

See below

DISTRIBUTION

MIB

DATE

10-1986

THE FOLLOWING RECOMMENDATIONS APPLY FOR 14V 50A and 28V 55A ALTERNATORS, BOTH 1-POLE AND 2-POLE SYSTEMS

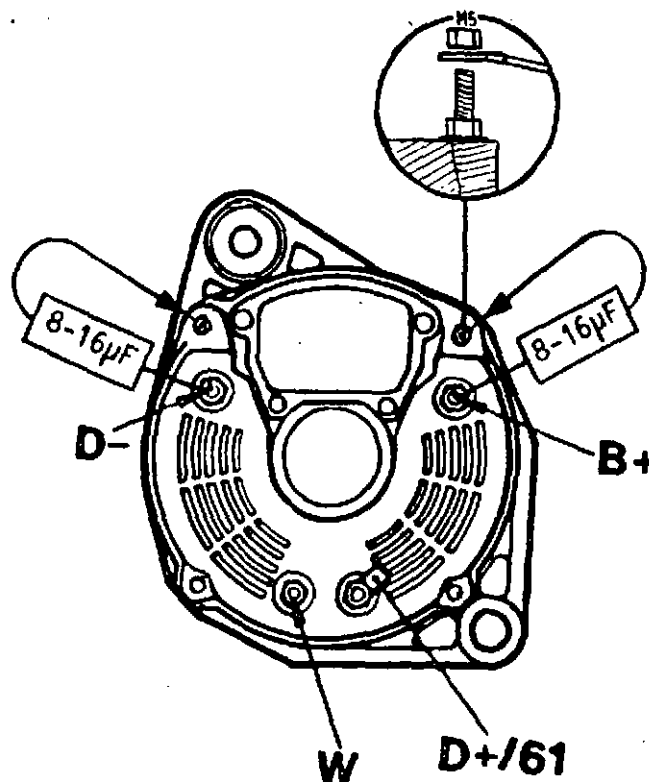
As standard, the alternator is fitted with radio interference suppression down to 150 kHz.

In cases where equipment working within a frequency range lower than 150 kHz is being used, the alternator's built-in interference suppression must be increased. We recommend 2 pcs interference suppressor capacitors between 8 and 16 μF depending upon the equipment's sensitivity to interference.

FITTING

The capacitors should be fitted between the alternator's B+ and the alternator's body, and the alternator's D- and the alternator's body. NOTE! The connection cables should be as short as possible and ensure a good contact is obtained at all connection points.

This type of connection applies even if the alternator is fitted with a charging distributor. NOTE! The charging distributor does not need interference suppression.



PART

3

electrical system and instruments

GROUP	DESCRIPTION	SECTION
35	Cables and fuses	351

CONCERNING	PRODUCT	DISTRIBUTION	DATE
Cable cross-section for cables between starter motor and battery	All engines	M I B	12-1982

Introduction

To avoid an abnormal voltage drop in the cables, it is important that the cables which are selected for use between the starter motor and battery have sufficient cross-sectional area. Cables which are too thin cause a high voltage drop, with subsequent poor starter motor output. Our recommendations are given below.

For 60 and 70 engines (24V) with Bosch KB or JD starter motor.

Battery capacity 110 Ah.

100-120 engines (24V).

Battery capacity 152 Ah (max. 180 Ah).

Max. cable length:	feet	6.6	10	13	15	20	23
	metres	2	3	4	4.5	6	7
Min. cable cross-sectional area in:	AWG	2/0	4/0	5/0	2x2/0	2x4/0	2x5/0
	mm ²	70	95	120	2x70	2x95	2x120

The starter motor is two-pole for all 60, 70, 100 and 120 marine engines and certain industrial engines. Positive and negative leads are of the same length and thus have equal areas. In the case of cable lengths of 4.5, 6 and 7 metres, twin cables can be suitably fitted, as shown in the table, for both positive and negative leads, since it is difficult to handle conductors of large cross-sectional areas.

For other industrial engines and smaller marine engines where a single-pole starter motor is in use, the negative cable, dependent on the version, can be earthed on the frame and is thus shorter than the positive cable. The area is selected depending on the actual length of each cable.

For 40-engines (12V 140 Ah battery max.)

Max. cable length:	feet	3.3	5	6.6	8.2	10
	metres	1	1.5	2	2.5	3
Min. cable cross-sectional area in:	AWG	2	1/0	2/0	4/0	5/0
	mm ²	35	50	70	95	120

Battery cables small marine diesel engines and carburettor engines

For MD5, 7, 11 and (basic engines) B21, B23, V8 (12V 70 Ah battery max.)

Max. cable length:	feet	5	6.6	8.2	11.5	16.5	20
	metres	1.5	2	2.5	3.5	5	6
Min. cable cross-sectional area in:	AWG	3	2	1/0	2/0	4/0	5/0
	mm ²	25	35	50	70	95	120

For MD17 (12V 80 Ah battery max.)

For MD21 (12V 112 Ah battery max.)

Max cable length:	feet	3.3	5	6.6	10	13
	metres	1	1.5	2	3	4
Min. cable cross-sectional area in:	AWG	2	1/0	2/0	4/0	5/0
	mm ²	35	50	70	95	120

CONCERNING

New printed circuit

PRODUCT

Industrial engines, 61,
71, 100, 120, 121 series

DISTRIBUTION

I

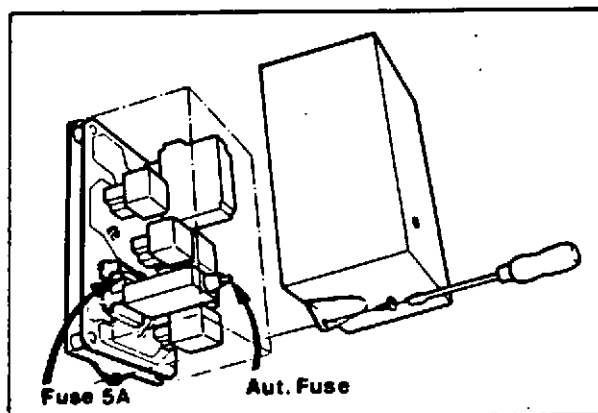
DATE

11-1985

A new improved version of printed circuit has been introduced in production. Engines with the new printed circuit will have a label on the electrical connection box, see Figure. A new wiring diagram applies for engines with the new printed circuit, see next page.

The following alterations have been made:

1. New printed circuit with altered conductor tracks.
2. The control currents are protected with a 5A fuse located above the automatic fuse. The 25A fuse used previously, that also functioned as a jumper connector, is now removed.
3. The stop solenoid and the signal horn are fused using an 8A automatic fuse.
4. There is a jumper wire between terminal 31 and 31b by the time relay connection. This replaces the jumper that was between terminals 4 and 16 on the engine's CPC connector.
5. The connection between terminal 9 on the engine's CPC connector and terminal 85 on the stop relay is removed.
6. The connection between terminal 8 on the engine's and instrument panel's CPC contacts is removed.



Label, stuck to the electrical connection box.

Parts:

The old printed circuit 846913 is cancelled and replaced by parts kit No. 849192, which consists of:

Printed circuit

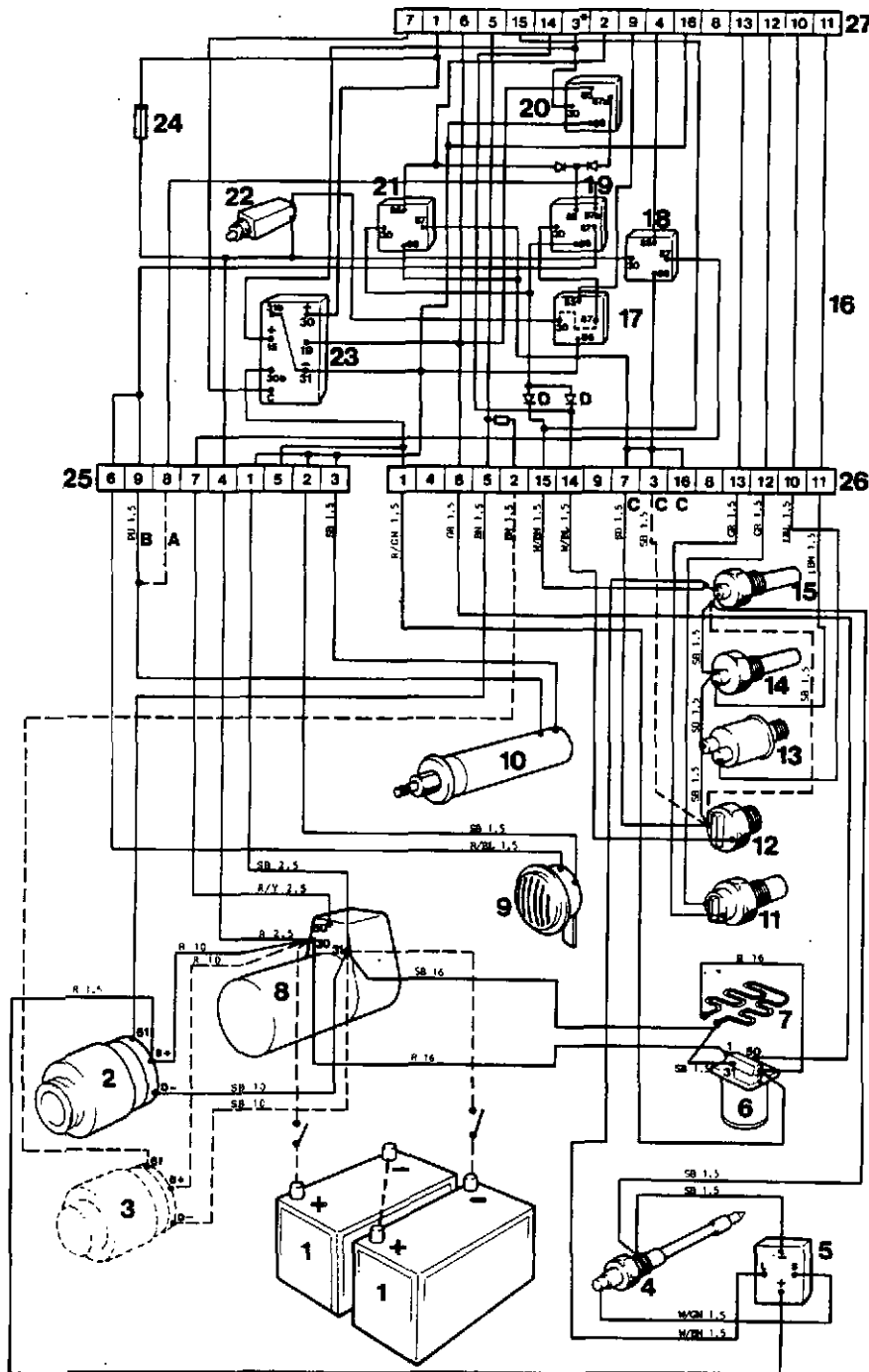
Label

Fuses, 5 pcs

Only fuses can be purchased separately (part No. 942545).

P.T.O.

ELECTRICAL WIRING DIAGRAMS



ENGINE

1. Battery
2. Alternator
3. Optional alternator
4. Coolant level switch
5. Relay
6. Relay, starting element
7. Starting element
8. Starter motor
9. Horn
10. Stop solenoid
11. Tachometer sender
12. Oil pressure switch
13. Oil pressure sender
14. Coolant temperature sender
15. Coolant temperature switch
16. Circuit card
17. Stop relay** (installed only when the stop solenoid is live during operation. When the stop solenoid is to be live when stopping, a cut-over is made between 30 and 87 - the dotted line)
18. Start relay**
19. Stop relay**
20. Interlocking relay (-P exec.)**
21. Ground relay**
22. Automatic fuse, 8 A** (Horn and stop solenoid)
23. Time relay**
24. Fuse, 5 A (controlling currents)**
25. 9-pole connector**
26. 16-pole connector**
27. 16-pole connector** (for instrument panel harness)

* Must be dead during starting.
 ** Located in the connector box.

- A. Connected when the stop solenoid is live during operation
- B. Connected when the stop solenoid is live at stopping
- C. Minus-connections
- D. Diodes (available only on engines with automatic stop)

Wire colours

BL = Blue	OR = Orange
LBL = Light blue	PU = Purple
BN = Brown	R = Red
LBN = Light brown	SB = Black
GN = Green	W = White
GR = Grey	Y = Yellow

Relation mm²/AWG*

* American Wiring Gauge

Wire areas in mm²

mm ²	1.0	1.5	2.5	10	16
AWG	16 (17)	15 (16)	13	7	5

PART

3

electrical system and instruments

GROUP	DESCRIPTION	SECTION
36	Instruments Senders Switches Stopping devices	361 362 363 364

CONCERNING

Fault finding/test resistor

PRODUCT

VDO instruments
and senders

DISTRIBUTION

MI

DATE

7-1984

As a help when tracing faults in instruments and senders (temperature, pressure, levels and rudder) a new piece of test equipment, a test resistor, has been produced.

A correct and careful investigation of the fault must be carried out before replacing an instrument or a sender.

1. Check the battery supply at the instrument (min. 11 volts).
2. Check the contacts to the battery, instruments, and senders.
3. Remove the sender cable(s) from the sender.

Connect the test resistor (A) according to fig. 1 (single pole system) or fig 2 (for double pole system).

NOTE! When testing temperature senders, use the black (S/B) and red (R) cables.

When testing pressure, level, and rudder instruments use black (S/B) and blue (B1) cables.

Turn the ignition key to the running position and read off the instruments. If the needle is within the shaded area as in fig. 3, then the fault is not in the instrument and cables.

THE SENDER IS FAULTY.

4. If the instrument shows no reading - connect the test resistor directly to the back of the instrument as in fig. 4.

If the instrument still shows no reading - **THE INSTRUMENT IS FAULTY.**

If the instrument shows a correct reading - **THE FAULT IS IN THE CABLES OR CONNECTORS.**

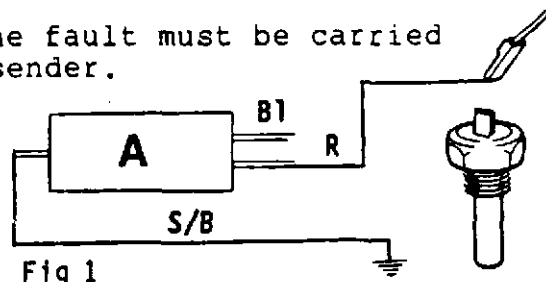


Fig 1

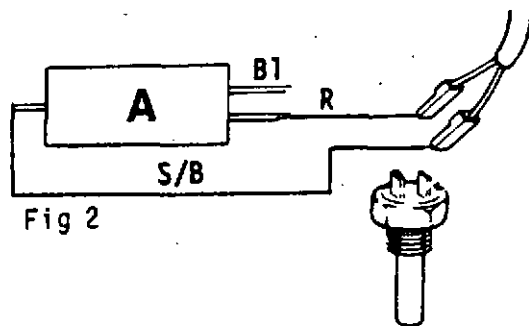


Fig 2

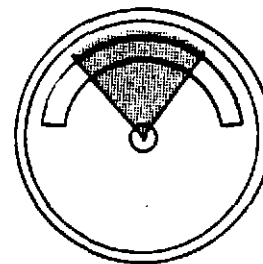


Fig 3

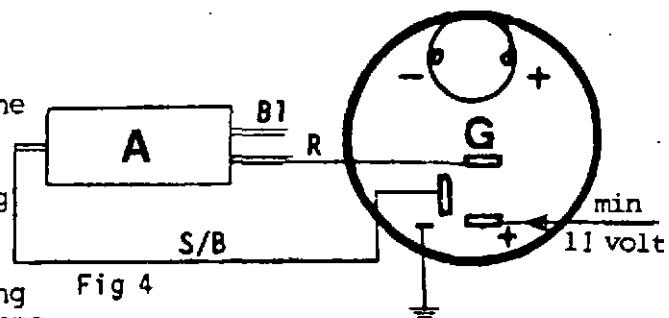


Fig 4

CONCERNING

Checking the overspeed
monitor

PRODUCT

Engines with electronic
governor

DISTRIBUTION

I

DATE

12-1984

In connection with work on the electronic speed regulator, a check of the overspeed monitor should be carried out after finishing the work.

Checking/setting of the overspeed monitor is carried out as follows:

Start the engine and increase the speed to the overspeed monitor's speed range. See table. Carefully turn the monitor's adjuster screw until the stop solenoid is engaged and the engine stops. Check the overspeed monitor speed by starting the engine. Reset the operational speed, then gradually increase the speed until the engine stops.

If the engine stops within the recommended speed range for the overspeed monitor as given in the table, the setting is correct.

Otherwise, adjust the setting.

Generating set operating speed	Overspeed monitor speed range
1500 rpm (50 Hz)	1700-1800 rpm
1800 rpm (60 Hz)	2000-2100 rpm

PART

3

electrical system and instruments

GROUP	DESCRIPTION	SECTION
37	Electric equipment <i>Air pre-heater</i> Engine heater	371 372 373

PART

3

electrical system and instruments

GROUP

DESCRIPTION

SECTION

38

Electric governor

381

**VOLVO
PENTA**

service bulletin

GROUP
38
381

NO
1201

CONCERNING
Electronic regulator

PRODUCT
TID 121

DISTRIBUTION
I

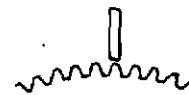
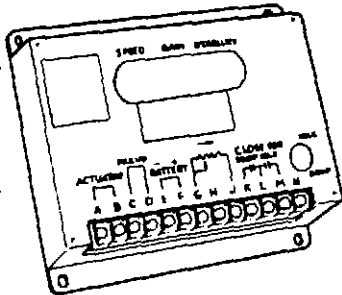
DATE
5-1986

FAULT TRACING, ELECTRONIC REGULATOR UT (PREVIOUSLY AMBAC)

=====

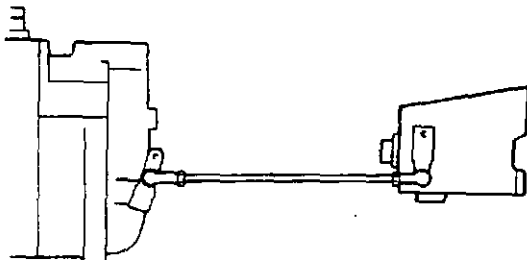
Instructions for electronic regulator can be ordered from VP, Publications Dept., order No. 3810004.

1. The equipment consists of:

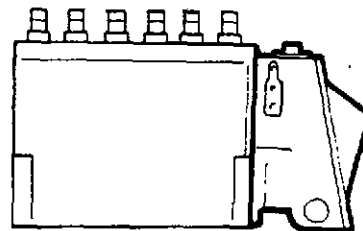


Pick-up fitted in the flywheel cover, part No. 834551-4

Control unit ECD 67-5111, 67-5116
Part No. 846378 -8



Actuator AGB 200 A (only TID 121 LG)
Part No. 834550 -6



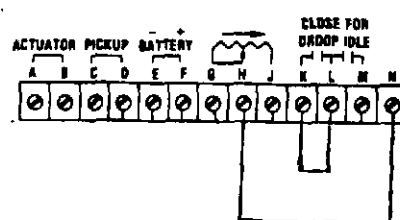
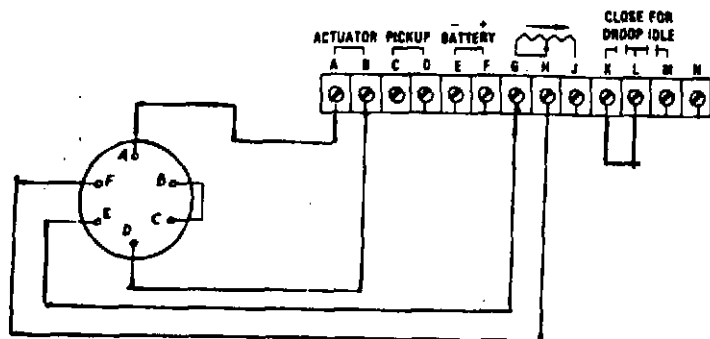
Actuator AGB 250 A
Part No. 846377 -0

2. Changes to the electronic regulator

A) A major change was carried out on control boxes after serial number 2L 23000 to give better transient response and stability. The temperature probe in the actuator is not used after No. 23000 where H-N must be strapped when using droop.

up to 2L 230000

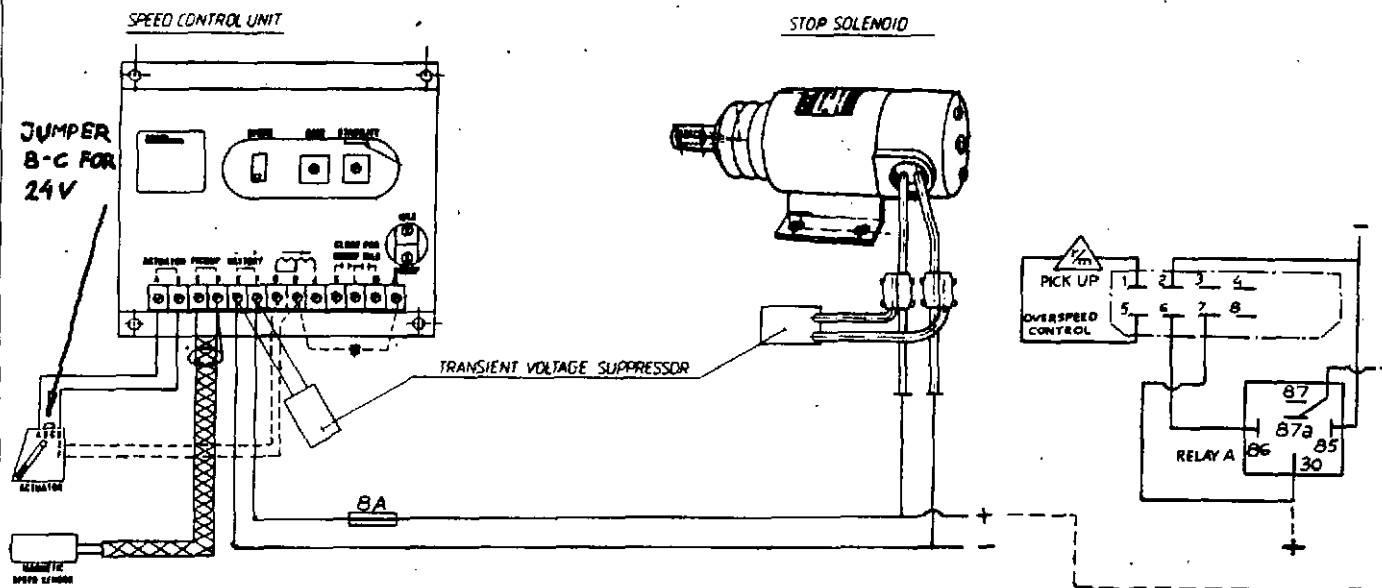
over 2L 230000



Only applicable if the engine is run with droop.

B) An oil drain from the AGB 250 actuator was introduced in 1983. The bellow between the injection pump and the actuator was then discontinued. This alteration will eliminate the engine lubricating oil from dampening the actuator's movements.

C) 2 voltage suppressors have been introduced to give the control box a better protection against transient voltages. One is to be fitted across the voltage feeder E-F on the control unit and one across the +/- on the stop solenoid. See wiring diagram below. The voltage suppressors can be ordered from VP Parts Div - kit part No. 862007-2. They are fitted in production as from engine No. TID121-107064.

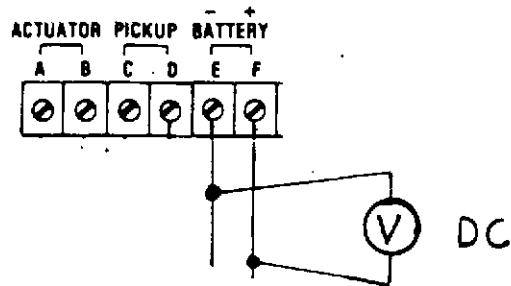


3) Suggested wiring diagram for the electronic regulator with the stop solenoid live during operation

4. The engine does not start

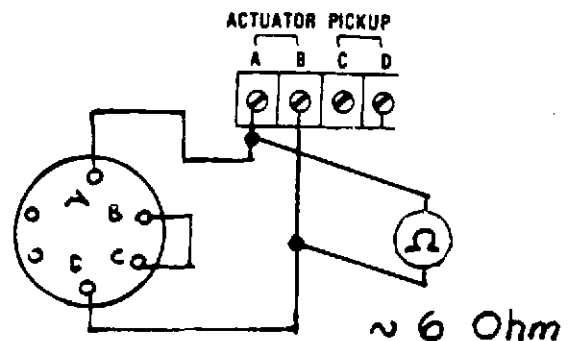
A) Battery voltage.

Check the battery voltage at the terminals E(-) and F(+).
Lowest voltage: 17 Volt during starting
20 Volt during running



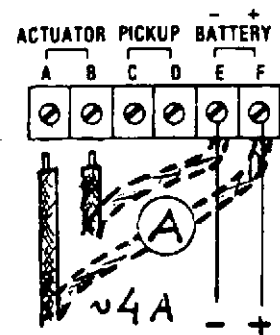
B) Actuator

Check the actuator by loosening the cables from the terminals A-B on the control unit. Measure the resistance in the actuator with an Ohm-meter. The resistance should be appr. 4-6 Ohm.



Connect the battery. Make a temporary jumper from cable A to F and cable B to E. One should hear the actuator pulling the control rod to full feed position. If necessary, remove the actuator cover to check the movement. Measure the current, it should be appr. 4A.

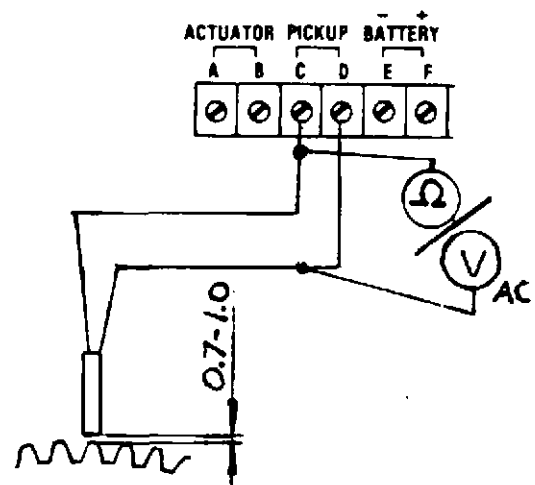
If the current is OK, but the actuator only moves slowly, the cause for the seizure should be established. (Possibly the control rod.) If the actuator does not move at all, check the cable connections. If these are OK, but the actuator still does not move, the actuator must be replaced. See also point 2B.



C) Pick-up

Connect a voltmeter across C and D. Run the engine at starter motor speed. The voltage should be min. 1.0 Volt (working range 1-30 VAC). If there is no voltage, the cables should be removed from C and D and the engine rotated again. If there is voltage then from the pick-up, then the control unit is faulty.

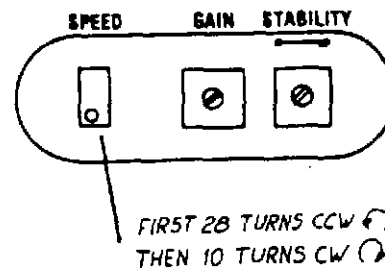
If there is no signal, measure the resistance over the cables, which should be between 50 and 500 Ohm. Otherwise check the cables and connections. If these are OK, check the distance between the pick-up and the gear ring. It should be 0.7-1.0 mm (0.028-0.039") (3/4 turn from the screwed-in position).



D) Control unit

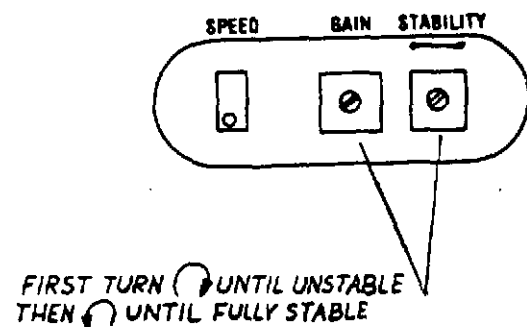
Check that the speed is not set too low. Turn the speed pot. 28 turns anti-clockwise. Then 10 turns clockwise. Start the engine and fine adjust.

If nothing happens - replace the control unit. See also point 2C.

5) The engine runs unstable

Adjust "gain" and "stability" with the engine off load. Turn "gain" clockwise until instability is reached. Then turn back until there is stability + about another 30°. Do likewise with "stability".

Should the speed still be unstable, remove the actuator cover, check that the control rod moves freely. Press the actuator forwards and release. It should then spring back rapidly. Check that the link arm does not have too much clearance or seizes. If the speed is still unstable, then the fault is in the engine.

6) The engine races

- The speed is set too high. Adjust the speed potentiometer according to 4D.
- The actuator's link arm or injection pump's control rod seizes. Remove the actuator cover to check the motion. Check that there is no abnormal clearance. Adjust if necessary.
- Incorrect electrical wiring of actuator, see point 3.
- Faulty control unit. Replace the unit. See also point 2C.

7) The engine does not give full output

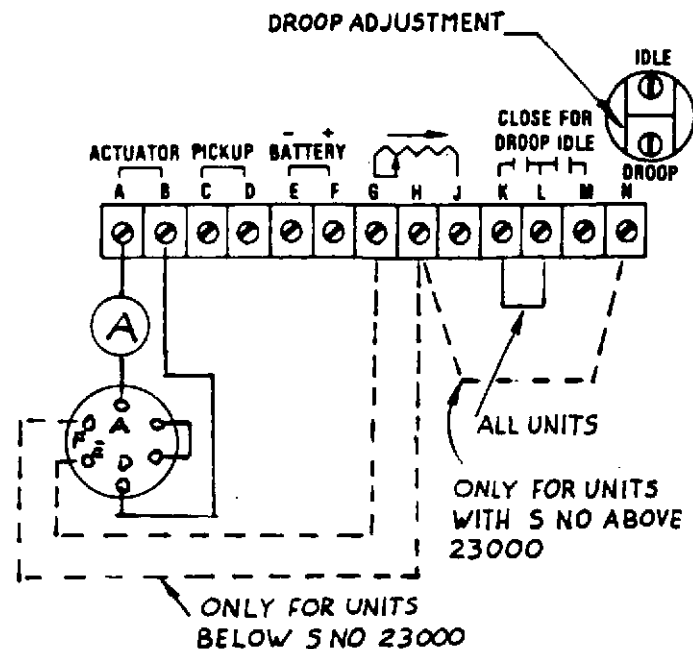
- Check the battery voltage according to 4A.
- Bad response due to the engine oil pressure dampening the bellow between pump and actuator. See point 2B.
- If everything is OK, then the loss of output is an engine problem and not a regulator problem.

8) The engine does not stop

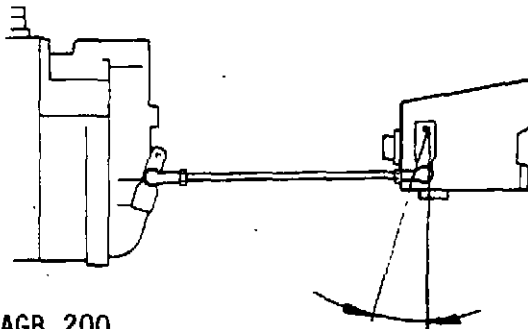
- Re-wire the current feed to the control unit as per wiring diagram point 3.

9) Droop (parallel operation).

- Check that the external connection is carried out according the figure below.
- Sudden speed changes(15-30 r/m) could be due to a fault in the surface on the printed circuit board for the control unit. The fault is possibly between serial Nos. 2L 24373 and 2L 28499. Control units already checked are marked with a colour marking outside on the unit's front or rear side.
- The droop is set to 4% from the factory. If necessary, it can be adjusted as per figure.
- Adjust the actuator so that a difference of min. 0.8 Amp is reached for the actuator current between unloaded - max loaded engine (connect A on control unit). Adjustment is done by altering the length of the actuator's return spring using e.g. shims.
- If there are great demands on the load distribution, the control unit should be replaced by CU 673C and a load distribution system LS 671A or LS 672A, which gives a more accurate load distribution for parallell operation.

10) Overspeed protection

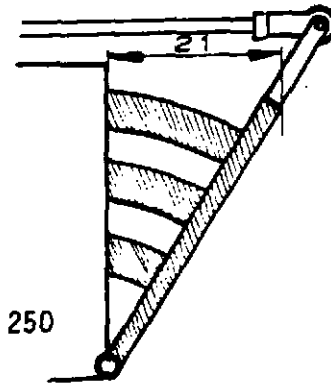
- An extra overspeed protection must be fitted for warranty reasons. This does not apply for TID 121 LG which has mechanical overspeed protection as standard (set for 1950 r.p.m. for full load and 2200 r.p.m. for high idling).
- To check the VP electronic overspeed protection 843910. Increase the engine speed approx. 15% (unloaded). Turn the overspeed protection's adjustment screws so that the engine stops at this speed. Re-check.

11) Setting the actuator

AGB 200

LESS THAN 15°

Max. angle travel of the actuator = 15°. Adjust the link arm so that the actuator does not go to its end position at full throttle. Finely adjust as described for AGB 250.



AGB 250

Roughly adjust the control so that the measurement 21 mm (...") is obtained in the stop position (rough adjustment). Thereafter fine adjust so that 1A is reached between 0-load and full load. Check that the electro magnet does not bottom.

PART

4

power train

GROUP	DESCRIPTION	SECTION
40	General	401
41	Clutch, mechanical (including reduction gear), clutch casing	411
	Controls	412
	Power take-off (incl. reduction gear)	413
42	Clutch, hydraulic (incl. reduction gear), clutch casing	421
43	Gearbox	431
	Controls	432
47	Hydraulic pumps	471
	Hydraulic cylinders	472
	Hydraulic motors	473
	Air compressors	474
48	Axles. Brakes	481

PART

4

power train

GROUP

DESCRIPTION

SECTION

40

General

401

40

PART

4

power train

GROUP	DESCRIPTION	SECTION
41	Clutch, mechanical (including reduction gear), clutch casing Controls Power take-off (incl. reduction gear)	411 412 413

41

PART

4

power train

GROUP

DESCRIPTION

SECTION

42

Clutch, hydraulic (incl. reduction gear), clutch casing

421

PART

4

power train

GROUP	DESCRIPTION	SECTION
42	Clutch, hydraulic (incl. reduction gear), clutch casing	421

PART

4

power train

GROUP	DESCRIPTION	SECTION
43	Gearbox Controls	431 432

PART

4

power train

GROUP	DESCRIPTION	SECTION
47	Hydraulic pumps Hydraulic cylinders Hydraulic motors Air compressors	471 472 473 474

PART

4

power train

GROUP	DESCRIPTION	SECTION
48	Axles, Brakes	481

PART

5

operating controls and steering

GROUP	DESCRIPTION	SECTION
50	General	501
51	Gear and speed controls	511
	Controls on engine	512
	Other controls	513
	Control cables and similar	514
52	Steering devices in general	521
	Power steering	522

PART

5

operating controls and steering

GROUP	DESCRIPTION	SECTION
50	General	501

PART

5

operating controls and steering

GROUP	DESCRIPTION	SECTION
51	Gear and speed controls Controls on engine Other controls Control cables and similar	511 512 513 514

PART

5

operating control and steering

GROUP	DESCRIPTION	SECTION
52	Steering devices in general Power steering	521 522