

HANDBOOK
AND
SPARE PARTS SPECIFICATIONS
FOR THE

PENTA

Type BB 50

MARINE ENGINE



In all correspondence concerning your engine with AB Penta or their agents and when ordering spare parts, state the type designation and the engine number. The engine type and number are stamped on a plate on the rear edge of the cylinder block.

AKTIEBOLAGET PENTA

GÖTEBORG · SWEDEN

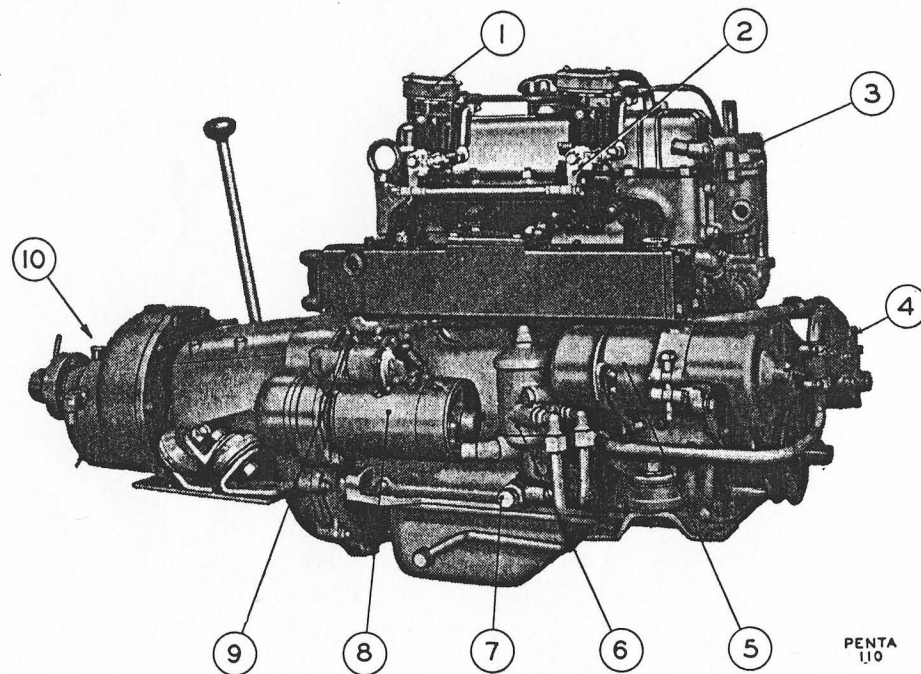
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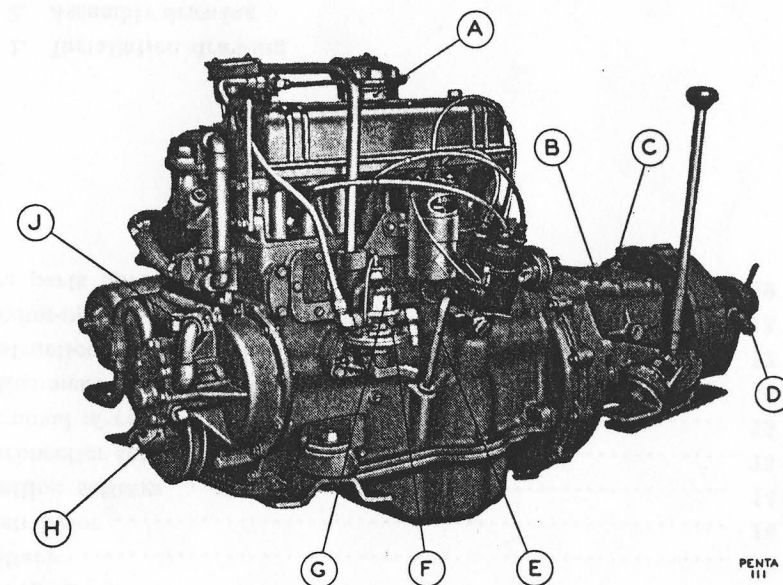
- Fig. 1. Installation drawing
 „ 2. Assembly drawing
 „ 3. Electrical circuits
 „ 4. Angle gear
 „ 5. Reduction gear

BB 50 - starboard side



1. Flash protector
2. Carburettor throttle control
3. Thermostat housing
4. Tachometer connection. Water pump or ball bearing grease. Turn the lubricator two revolutions for every 150 litres of fuel (about 25 hours of operation).
5. Dynamo
6. Oil cooler
7. Reduction valve
8. Starter motor
9. Water drain point for cylinder block
10. Lubricator, thrust bearing. Fill the lubricator every season or if the engine has stood idle for some time. Water pump or ball bearing grease.

BB 50 - port side



- A. Oil filler, engine lubricating oil "Service MS" SAE 20 during the summer and SAE 10 during the winter. Change the oil every season or after every 150 hours operation (1500 litres=330 Imp. gallons of fuel consumption).
- B. Dipstick, reverse gear
- C. Oil filler, reverse gear lubricating oil "Service ML" (regular oil) SAE 30. Change the oil at the same time as in the engine
- D. Coolant connection, reduction gear
- E. Dipstick, engine
- F. Fuel pump
- G. Fuel pump filter
- H. Starter nut
- J. Lubricator, coolant pump. Give this one turn after every 3rd. hour. Water pump grease.

Type BB 50 engine specifications

BB 50 engine, 4-cylinder, 4-stroke petrol engine

Output at 3500 r.p.m.	50 b.h.p.
Max. torque at 3200 r.p.m.	10 kgm (73 lb.ft)
Bore	75 mm
Stroke	80 mm
Displacement	1.42 litres
Compression ratio	7.7:1
Valves	Overhead valves
Valve clearances:	
Inlet valves (warm engine)	0.50 mm (.020")
Exhaust valves (warm engine)	0.50 mm (.020")
Oil pressure (warm engine)	1.5—2.5 kg/cm ² (21.5—35.5 p.s.i.)
Oil capacity	3 litres (5 ¼ Imp. pints)
Electrical system:	
Voltage	6 volts
Order of firing	1-3-4-2
Sparkling plugs	AC 103C or corres- ponding types
Spark plug spark gap	0.6—0.7 mm (.024"—.028")
Contact breaker gap	0.4—0.5 mm (.016"—.020")
Dynamo output	75 watts
Starter motor output	0.6 b.h.p.
Battery capacity	85 amp. hours
Specific weight of battery electrolyte:	
When battery is fully charged	1.275—1.285
When battery needs re-charging	1.230
Weight of engine with reverse gear	180 kg (397 lbs.)
Weight of engine with reverse gear and reduc- tion gear	205 kg (452 lbs.)

Lowest permissible idling speed 1000 r/m.

Installation of the Penta BB 50 marine engine

Engine bed

The engine bed should be as substantial as possible and the foundation bolts should be spaced over as wide an area of the hull as possible.

Before the engine is bolted to the bed make sure that all the engine bearers are in even contact and, if not, add washers between the engine bearers and the engine bed.

The engine must be aligned very carefully to ensure that the engine crankshaft line coincides with the propeller shaft line.

Make sure that there is sufficient clearance between the propeller and the rudder. This clearance should be at least 200 mm (8") so as to allow for the removal of the reverse gear. There must be also sufficient play between the propeller and the outer bearing so that the propeller does not press against this bearing.

N.B. The angle of inclination of the engine may not exceed 10° when the boat is under way. (An inclination of max. 18° is permissible with a special oil sump.)

Engine alignment

After the boat has been launched, check that there is no misalignment between the propeller shaft and the engine due to changes in the shape of the hull. Repeat this control after 2—3 days and later at regular intervals. Incorrect alignment between the engine and the propeller shaft can often cause other defects such as vibrations and stresses in the hull, rapid wear of the propeller shaft and stuffing box and severe damage to the reverse gear. Alignment control is carried out in the following way:

Loosen all the bolts in the coupling flange. Rotate the propeller shaft one complete revolution while the clearance between the flanges is checked with a feeler gauge. This clearance may not exceed 0.05 mm (.002"). If there is no feeler gauge available, strips of paper may be used. Lay a number of strips between the halves of the coupling and then press these together by hand. The alignment is correct when the same force is required to pull out all the strips.

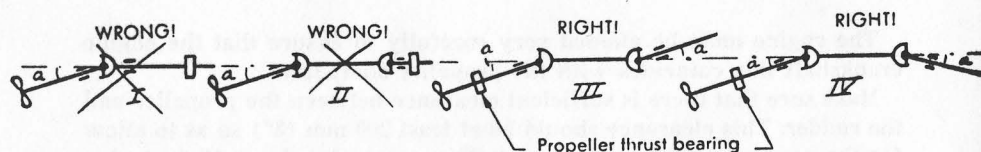
A simple, though not so accurate, method to check the alignment is to put the reverse gear lever into the neutral position and rotate the propeller shaft by hand. If it rotates easily for at least half a turn then the alignment is correct.

Engine with rubber suspension

If the engine is fitted with rubber suspension, the settling of the engine should be measured. This is done by placing the engine on a couple of parallel planks and measuring the distance from the engine propeller shaft flange to this improvised "engine bed". Compare with this measurement when the real bed is constructed.

If the engine has rubber suspension, then the propeller shaft sleeve must also have rubber suspension. Be sure, when carrying out alignment, that there is sufficient clearance between the shaft and the sleeve tube.

Universal joints may also be used in the propeller shaft transmission. Make sure that the angles are the same at both ends, that the ends are fitted with splines for axial motion and that a propeller thrust bearing must always be fitted to the end of the propeller shaft to take up the propeller pressure. See the figure below. If universal joints are used when carrying out installation, the following points must be observed:



I and II are wrong. Vibrations at low speed. II and IV are right. The angles are the same at both ends. The shaft ends must be able to move axially at the joints. Use splines.

Pipe installations

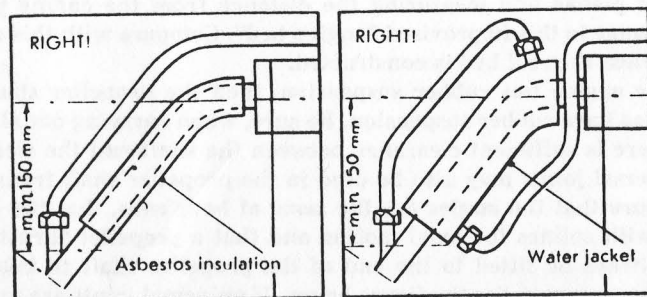
As far as exhaust pipes and cooling system pipes are concerned, see fig. 1 which shows a normal engine installation.

The exhaust pipe is connected directly to the engine and is taken astern with as few and as slight curves as possible. The exhaust pipe should terminate sufficiently high above water level so that there is no risk of water splashing in when the engine is not running.

A drain cock should be fitted at the lowest point in the exhaust pipe. Make sure that no water locks occur in the pipe.

The cooling system pipes are made of copper. The suction pipe between the sea cock and the engine cooling water pump should be arranged as shown in fig. 1. It is fitted with a rubber hose joint. If the cooling water is taken into the exhaust pipe, this should be at a point at least 150 mm (6") lower than the level of the exhaust pipe on the engine. This is to avoid the possibility of water getting into the engine. The section of the exhaust pipe that will not then be cooled can be fitted with a water jacket or else insulated as shown in the illustrations.

Sharp bends should be avoided and drain cocks fitted at points where water locks can occur. There should be a limiting stop on the sea cock and the cock should be constructed so that it cannot close of itself. It should also be drilled for the draining of cooling water in the suction line.



The engine is fitted with a fuel pump so that the fuel tank may be fitted at a lower level than the carburetter. The pump lift has a maximum of 1 metre (39.37").

The fuel line should be as straight as possible. The fuel tank is fitted with a separator for impurities. All pipe joints should be brazed and only cocks fitted with packing boxes used in the fuel lines.

The installation of fuel tanks and fuel lines as well as electrical installations should be carried out very carefully to ensure that neither fuel leaks nor electrical sparking can occur.

Running in the engine

Even though the engine has been thoroughly bench-tested it is essential that it should be run very carefully during the first 20–25 hours of operation. The reason for this is to ensure that the cylinder walls, the pistons, bearing surfaces in the engine as well as bearings and gears in the reverse gear obtain a hard, glazed surface, this being an important factor for a long trouble-free life. Never run the engine at full throttle during the running-in period and never race it when idling.

Valve clearances should be checked after 25 hours operation otherwise there is a certain risk that one or more of the valves may become burned.

Before the engine left the factory, all clearances were carefully checked and found to be satisfactory. We cannot, therefore, accept responsibility for seizures of pistons or bearings. Our guarantee does not apply in cases where the engine has been carelessly operated.

Starting the engine

Check that the oil level in the engine is between the two notches on the dipstick. Top up with oil if necessary. Fill the water pump lubricator with special water pump grease and fill with as much grease as corresponds to 3–4 turns of the lubricator.

Add lubricating oil to the reverse gear through the filler hole until the level is up to the mark on the dipstick.

Fill the reverse gear thrust bearing lubricator with water pump grease or ball bearing grease and press in thoroughly until it is full before starting the engine for the first time or when the engine has been idle for some considerable time.

Lubricate the propeller sleeve with water pump grease.

Check that there is plenty of fuel.

Open the petrol cock.

If there is no fuel in the fuel filter glass bowl, operate the hand pump until the bowl is full and fuel arrives at the carburettors.

Stopping the engine

When the engine is to be stopped, move the throttle control to the idling position, move the reverse gear lever to the neutral position and then switch off the ignition by means of the ignition key. In cold weather do not forget to drain off the water from the engine block and other places where it might collect. Close the sea cock if the engine is not to be used again for some time.

MAINTENANCE INSTRUCTIONS

The cooling system

It is extremely important that the cooling system functions properly and it is, therefore, essential to check that this is the case by examination now and then.

If the temperature on the cooling water temperature gauge exceeds 95° C (203° F) then the cooling system should be carefully examined for faults. It is probable that the water strainer outside the water intake is blocked. If this is the case, the rubber hose between the sea cock and the pump will show a tendency to collapse (the same will occur if the sea cock is closed). The strainer must be cleaned and the pump and water lines rinsed out.

An abnormally high engine temperature can also depend on the fact that seaweed, seagrass etc has been sucked into the oil cooler and blocked the water circulation. Dismantle the oil cooler. Remove the nut on the cap and rinse out the cooler by pushing steel wire through the tubes.

The cooling water pump is fitted with a rubber coupling. This is designed so that it will break if impurities come into the pump. There is an extra pump coupling in the tool kit. (Make sure that there is always a spare coupling on board.)

For the best engine output, fuel economy, even operation and long length of life then a suitable engine temperature should be maintained constantly. The engine cooling water temperature is controlled automatically by means of a thermostat. If the cooling water temperature is less than 70–80° C (158–176° F) then the thermostat remains closed and the cooling water circulates in the engine. The water delivered by the pump pass through the cooling channels in the engine block and cylinder head and leave the engine through the cooling water outlet. When the most suitable temperature has been attained, the thermostat opens and a balanced quantity of water passes through the engine so as to maintain this temperature.

Maintain the oil level
between these marks



Oil dipstick

See that the sea cock is open and that the water drain cock on the cylinder block is closed.

Move the reverse gear lever to the neutral position.

Open the carburettor throttles a little (about 1/6). The throttles open when the lever is moved in a clockwise direction.

If the engine is cold, starting is facilitated if the choke shutter is closed. This is done by means of a control connected to the choke button on the instrument panel. When this button is pulled out, the shutter is closed.

Turn the ignition key to the starting position. The charging control lamp should then light up.

Start the engine by pressing in the starter button. Release the button as soon as the engine fires and close the choke shutter (completely or partly). When the engine has started, warm it up by rapid idling while the following points are checked:

1. That the cooling water pump is operating properly and that the water jacket is full of water before the engine is loaded (see also under cooling).
2. That the oil pressure gauge shows a pressure of at least 1.5 kg/cm².
3. The engine is then ready for loading and the propeller can then be coupled in by moving the reverse gear lever slowly forwards as far it will go.
4. When the engine is warm open the choke shutter entirely by pushing in the choke button.

Lubricating system

Lubricating oil with the quality designation "Service MS" is used with a viscosity of SAE 20 at temperatures exceeding 0° C (32° F) and SAE 10 at temperatures below 0° C (32° F). This oil is marketed by the large oil companies.

With a new engine, the lubricating oil is changed for the first time after the first 200 litres (44 Imp. gallons) of fuel consumption or about 20 hours of operation. All oil in the engine crankcase must be sucked up. Use the oil scavenge pump that is included in the tool kit. Scavenging should be carried out while the engine is warm.

The oil should be changed every season or after a maximum of 150 hours of operation (about 1500 litres = 330 Imp. gallons) on condition that lubricating oil of the above-named quality is used.

The oil capacity of the engine is about 3 litres (5¼ Imp. pints).

For the reverse gear, oil with the quality designation "Service ML" (regular oil) is used with a viscosity of SAE 30. The oil is changed at the same time as the engine oil is changed.

N. B. The oil levels in the engine and the reverse gear should be checked every day so that they remain between the two marks on the dipsticks and never below the lower mark. While the engine is running make sure now and then that the oil pressure gauge on the instrument panel shows a pressure of at least 1.5 kg/cm². If the pressure should suddenly decrease or the needle should start swing backwards and forwards then there is too little oil in the engine and topping-up should take place immediately.

The lubricator on the rear edge of the reverse gear is used to lubricate the seal ring when the engine has not been run for some time. Water pump grease (or ball bearing grease) are suitable for this purpose.

Lubricate the water pump by giving the lubricator one turn after every third hour. Use only water pump grease.

The angle gear for the tachometer connection is lubricated by giving the lubricator two turns after every 150 litres (33 Imp. gallons) of fuel consumption or about 10 hours operation. Use water pump grease (or ball bearing grease).

The starter motor and the dynamo should only be lubricated in connection with overhaul. This overhaul should only be carried out by specialised electrical mechanics.

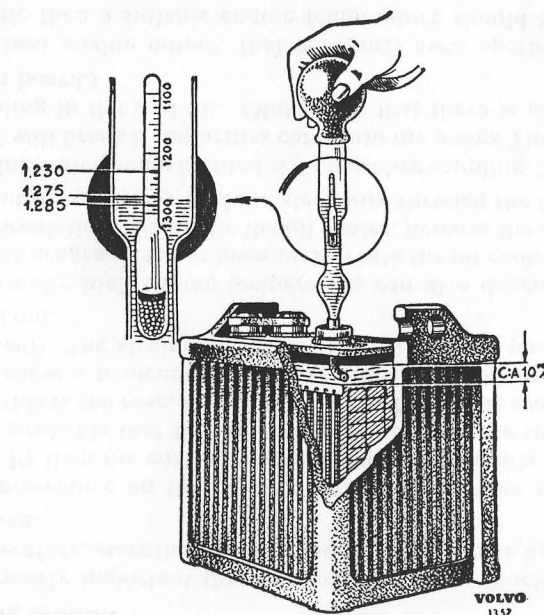
Charging control lamp

The charging control lamp should be out while the engine is operating at speeds exceeding idling, this showing that the battery is being charged. If the lamp should light up during normal operation this means that the battery is discharging. If the lamp remains on at high engine speed, there, must be some fault in the electrical system. Check that the dynamo pulley

belt is not slipping. The belt is stretched by loosening the tension iron on the dynamo and turning this outwards until the desired tension is attained.

Battery

The unit in the electrical system that exerts the greatest load on the battery is the starter motor. For this reason, never keep the starter button depressed for more than 5–10 seconds at a time. If the engine does not start at the first attempt, wait for a few seconds to give the battery time to recover. Heavy, continuous loading will shorten the lifetime of the battery. The battery should be serviced properly. Make sure that the level of the electrolyte is always at least about 10 mm (½") above the level of the top of the plates in the cells.



Use only distilled water for topping-up. A check should be carried out twice a month or rather more often during the warm season when the rate of evaporation is greater. Make sure that terminals and terminal bolts are well tightened and smeared with vaseline.

During the winter the loading on the battery is always greater due to starting difficulties and increased current consumption. Since the risk of damage by freezing increases the more discharged the battery is, the state of charge of the battery should be checked more often during the winter. Under extremely cold conditions, the battery should be stored in a warm place partly as a protection against freezing and partly because the battery

output is always higher at room temperature. The state of charge of the battery can be determined with the help of a hydrometer that shows the specific weight of the electrolyte. With a fully charged battery this should be 1.275–1.285. When the specific weight of the battery has gone down to 1.230 then the battery should be re-charged immediately.

Distributor

The distributor contact breaker points tend to become burned so that contact becomes very bad and sometimes ceases entirely. Slightly burned contact breaker points can be polished and adjusted. The contact breaker holder must be replaced when the contact breakers are so burned that the contact surface of the moving contact or its bearing have become so worn that effective adjustment cannot be carried out.

Ignition settings

The principle of setting the ignition is that the crankshaft is turned until the piston in cylinder number 1 is in the firing position after which the distributor is turned so that the contact breaker is in the open position.

Settings are carried out in the following way:

1. Loosen the clamps that hold the upper part of the distributor in position on the housing and lift the upper part straight up without turning it. Follow the cable for cylinder number 1 (the forward cylinder) and check that the distributor arm points toward the contact in the distributor head that is connected to this cable. If this is not the case turn the engine with the starting handle until the position is right.
2. Remove the rubber plug from the top of the flywheel housing. Turn the engine until the mark on the flywheel is in line with the groove on the hole in the flywheel casing.
3. Use the adjuster screw on the distributor graduated scale and set at zero.
4. Loosen the clamp screw under the distributor and turn the whole distributor in a clockwise direction.
5. Loosen the cable on the side of the distributor housing and connect a control lamp (about 3 watts) between the end of the cable and the clamp screw that the cable was connected to.
- 6a. Switch on the ignition (ignition key).
- 6b. Turn the distributor slowly in an anti-clockwise direction until the lamp just goes out. Lock the distributor in this position by means of the clamp screw mentioned under point 4.
7. Set the distributor to 5° advance ignition by means of the adjuster screw. The indicator on the scale should then be in line with the mark between 0 and 10 on the part of the scale that is marked H.

Carburettor settings

When these settings are carried out, the connector rod between the carburettors should be adjusted so that the carburettors are operating in an identical manner. Remove both the flash protectors and check that both the throttles are in exactly the same position when fully open. If this should not be the case, adjust by lengthening or shortening the connecting rod. **Do not forget to re-fit the flash protectors.** To adjust the engine idling use the air screws on the top of the carburettors. The idling speed is regulated by means of the screws on the throttle limiting stops. Idling settings must be carried out on both carburettors at the same time.

REVERSE GEAR

Removal

In the reverse gear, most wear takes place on the friction discs and the brake band. They must, therefore, be adjusted when worn to such an extent that the reverse gear starts slipping. Finally, wear becomes so great that the friction discs and brake band must be replaced.

The reverse gear is dismantled and re-assembled in the following way:

1. Remove the propeller shaft flange from the reverse gear flange and push the propeller shaft towards the stern.
2. Loosen the engine from the engine bed and block it up so that the screws (point 3) are accessible.
3. Loosen the screws that hold the reverse gear casing in position on the flywheel casing and pull the reverse gear carefully towards the stern so that it is free from the engine.
4. Remove the cover on the top of the casing. Remove the nut from the bolt that goes through to the brake band.
5. Remove the sealing cover on the forward edge of the casing.
6. Force out the conical pin that connects the reverse gear flange to the reverse gear shaft.
7. The reverse gear shaft together with the planetary gear housing is now driven out forwards from the reverse gear flange. Use a brass drift and hammer carefully. If the shaft is very tight, it should be pressed out. Use a press consisting of a 20 mm ($13/16$ ") iron plate, which is bolted in position on the flange, in which a 100 mm (4") long $3/4$ " bolt has been threaded.
8. Loosen the two bolts holding the brake band, one of which is on the side of the reverse gear casing and the other "support bolt" which goes through the bottom of the casing.
9. Loosen the brake arm (the wedge-shaped steel plate) from the operating fork and lift the brake band out of the casing.

10. Clean the reverse gear parts thoroughly. Inspect all parts very carefully and replace if worn. Fit new washers and gaskets.
11. The reverse gear is re-fitted in the opposite order to that adopted when removing. There are, however, a couple of points that need clarifying.
12. In point 8 above, the "support bolt" should not be replaced before the new brake band has been adjusted as described below.
13. When the reverse gear shaft is to be driven into position into the reverse gear flange (see point 7), the sleeve and ball bearing are placed in position in the operating fork groove after which the end of the shaft is pushed through the sleeve into the reverse gear flange. Align the shaft carefully in the flange so that the key-ways are exactly opposite one another. Use a brass drift and apply this to the end of the shaft. Mind the ball bearing! Drive in the shaft until the end of it is flush with the reverse gear flange. Drive in the key and the conical pin when the shaft is in position.
14. After the cover and the oil seal ring have been tightened in position, the reverse gear is re-fitted on the engine. Re-mount the engine on the engine bed. Connect up the shaft, pipe lines etc. As far as reverse gear settings are concerned, see below.

Adjustment

Forward (concerns the adjustment of the reverse gear or carrying out settings on a renovated gear).

15. If slipping occurs in forward gear, the friction plates must be adjusted. Move the gear lever to the reverse position so that the brake band is applied to the planet housing. Loosen both the clamp screws and turn the setting ring in a clockwise direction with the hexagonal spanner that is included in the tool kit. Do not tighten the friction plates more than is necessary to avoid slipping. Lock the setting ring with the bolts.

Reverse (concerns only the fitting of a new brake band or renovation of the reverse gear).

16. Tighten the nut (point 4) so much that the brake arm (wedge) moves 10–15 mm ($\frac{2}{8}$ "– $\frac{3}{8}$ ") from the neutral to the reverse position when the gear lever is moved. Then move the lever to the neutral position and screw in the "support bolt" so that the brake band has 5 mm ($\frac{1}{8}$ ") lateral play.
N.B. The support bolt may not be loosened or re-adjusted except when the brake band replacement has been carried out or the reverse gear has been dismantled.

Reverse If the gear slips in reverse it should be adjusted according to "Idling". Spec. adjustment of reverse is not necessary.

Idling

If the propeller rotates when the gear lever is in the neutral position, the brake band is applied through the nut on the bolt mentioned in point 4. The lock plate on this nut may not be disturbed. When the nut is rotated, the lock plate moves over one corner of the hexagon and then locks again. When carrying out this adjustment, make sure that the gear lever is in the neutral position (i.e. the ball that presses against the brake arm wedge is in the notch that corresponds to the neutral position).

Instructions for the engine with a reduction gear

If the BB 50 engine is fitted with a reduction gear, there are special instructions concerning the installation of the cooling system pipe lines and the lubrication of the reverse gear and reduction gear. (The instructions already given in this handbook are applied with the following modifications).

The reduction gear for the BB 50 engine is fitted with a gear ratio of 2:1 i.e. the speed of rotation of the propeller shaft is half the speed of the engine. The direction of rotation of the propeller shaft is the same as that of the engine. The gear can be fitted with the propeller shaft 34 mm (1 $\frac{1}{8}$ ") above the centre line of the engine drive shaft or the same distance below it.

The reduction gear is lubricated with the same oil as the reverse gear "Service ML" (regular oil) with a viscosity of SAE 30. The oil is changed at the same time as the engine oil.

Oil is added through the filler hole on the top of the gear housing when the gear is newly installed. The reverse gear cover should be removed. Add oil until it runs over into the reverse gear casing through the connecting hole in the rear end of the casing. Then replace the reverse gear cover. The reverse gear is then filled through the filler opening in the cover to the same level as the mark on the dipstick.

The common level of the oil in the reverse gear and the reduction gear should be controlled daily by means of the dipstick. If topping-up is required, this is done through the oil filler opening in the reverse gear cover. The lubricator on the reduction gear thrust bearing should be filled with grease every season or more often if the engine has not been in use for some time.

There is an oil drain plug on the rear end of the gear housing.

The reduction gear is connected to the cooling system. The cooling water line from the sea cock goes to the 90° nipple. The gear cooling outlet is connected to the oil cooler intake. Ensure that the pipe line has a uniform inclination to avoid the formation of locks.

During cold weather, the cooling water in the gear is drained off by means of the drain cock on the gear housing rear end.

Laying-up the engine for the winter

1. Run the engine warm in the usual way.
2. Stop the engine and drain off the lubricating oil. Turn the engine over several times so that all the oil runs out.
3. Fill with preservative oil* to the lower mark on the dipstick.
4. Run the engine until the normal operating temperature has been attained.
5. Drain off the preservative oil.
6. Remove all the sparking plugs and add 5 centrilitres ($\frac{1}{10}$ Imp. pint) of preserving oil to each cylinder after which the engine is turned over several times.
7. Remove the valve cover, clean the valve mechanism until it is dry and oil with preserving oil.
8. Remove the electrical equipment, clean and store in a dry place. Send the battery to a charging station for maintenance charging to keep it in good condition.
9. Drain off the cooling system and rinse out with fresh water.
10. Wash the engine with a suitable solvent and paint it if necessary.

*) Preservative oils: e.g.

ESSO RUST BAN 603 or CALTEX PRESERVATIVE OIL 30 w

SPARE PARTS SPECIFICATIONS

for the

PENTA

Type BB 50

MARINE ENGINE



When ordering spare parts for a certain engine, always state the type of engine, the Part no. and the engine number.

AKTIEBOLAGET PENTA

GÖTEBORG · SWEDEN

Cylinder block		Part No.	Description	Qty
T200BB53	Cylinder block, complete	82744	Drain cocks	1
	consisting of:	100207	Screws 8×22 for 202BB	2
	3 Bearing caps S.E.S.	150104	Nuts for 17041	6
	3 16318 Plugs	180002	Reducer nipple for 16325	1
	6 17041 Stud bolts	301718	Guide sleeves for bearing caps	3
	1 17873 Plug, oil channel	403110	Bushing for forward camshaft bearing	1
	3 17889 Sealing plugs, D=50	403111	Bushing for second camshaft bearing	1
	3 18665 Gaskets	403112	Bushing for rear camshaft bearing	1
	1 54644 Set of pistons, standard	403141	Washers for oil channel	2
	3 70415 Guide sleeves	403194	Washer for camshaft ..	1
	6 150104 Nuts			
	3 301718 Guide sleeves			
	1 403110 Bushing			
	1 403111 "			
	1 403112 "			
	2 403141 Washers			
	1 403194 "			
202BIB	Sealing flange with water hole			
7602	Number plate			
10604	Spring washers for 100207			
14109	Guide pins 6×70 for sealing flange			
14949	Drive bolts for 7602V ..			
15241	Lock blocks for 150104			
16318	Plugs (with heads) for oil channel			
16325	Plugs ⅜" for oil channel			
17041	Stud bolts for bearing caps			
17125	Guide pins 10×19 for flywheel housing			
17873	Plug for oil channel ...			
17889	Belt plugs in block, D=50			
18665	Washers for 16318			
70415	Guide sleeves for bearing caps			
54644	Set of pistons, standard			

		Part No.	Description	Qty
T199BB56	Cylinder head, complete			
	consisting of:			
	1 17889 Plug			
	8 403390 Valve guides			
	1 403411 Water distribution pipe			
	8 403497 Tappets (early prod. brass)			
	403577 Tappets (late prod. tubular steel)			
	Lifting iron			
	Lifting eyelet			
	Nuts for cylinder head bolts			
	Spring washers for 100205			
	Screw connection for oil pressure gauge			
	Cone for 10916			
	Nut for 10891			
	Plug ⅜"			
	Plug			
	Cylinder head bolts, Ø 11 mm			
	Bolts 8×19 for 1463BB			
	Guide sleeves			
	Water distribution pipe			