INSTRUCTION MANUAL
PARTS LIST

MINI-10

INTRODUCTION

We thank you for having selected our MINI-10 Diesel engine for your use.

BEFORE SETTING THE ENGINE RUNNING, it is important to read the operation and maintainance instructions contained in this booklet closely to follow them strictly.
If you have any doubt or query on your engine or in case of breakdown, please contact the nearest dealer where you will receive due attention.

ATTENTION

So that spare parts deliveries may be exact and immediate, it is extremely important to give the details listed below in your order:

a) Type of engine (given on the nameplate).
b) Engine number (given on the top of the block, alternator side).
c) Number and description of the required part.

OBSERVATIONS: The descriptions and illustrations given in this instruction booklet are not binding. Therefore, whilst maintaining the main features of the engine described and illustrated here, SOLE, S.A. reserves all rights to make modifications in parts, details and accessories as may be required for any technical or commercial reasons.

CONTENTS

1 - PRECAUTION WHEN USING THE ENGINE

* Always use an appropriate oil and check the oil pressure while the engine is running.
* Use clean fuel, free from impurities and water.
* Prevent water and air from entering into the fuel circuit.
* If the starter motor pinion does not mesh with the crown gear on starting up, turn the key again after the motor has stopped running.
* Pay attention to the coluor of the exhaust gases.
* Clean or periodically change the fuel and oil filters.
* Change the oil as specified.
* Check that the cooling water circulates correctly through the engine.

Safety precautions

* Do not touch any moving parts of the engine while this is running.
* Do not touch hot parts, such as the exhaust pipe, and keep any inflammable materials away from them.
* Inspect and adjust engine parts only when stopped.
* Check engine oil and fuel levels and refill only when the engine is stopped.
* Use always tools of an appropriate size and work with care when effecting any service operation.

2 - SPECIFICATIONS

Type:	Vertical water cooled 4 stroke
N.° of cylinders:	Two.
Bore:	65 mm. (2,56")
Stroke:	68 mm. (2,68")
Capacity:	451 c. c. (27,52")
Compression ratio:	23:1
Power (DIN6270-B):	9 Hp (6,62 KW)
Maximum r. p. m.	3.000
Gear box:	Mechanical RONIM III type Ratio 1,9:1
Maximun intallation angle:	20°
Lubricatio: :	Forced, by rotary pump.
Oil capacity:	Engine 1,8 l. Gear box, 0,4 l.
Type of oil:	HD 20° or above SAE-30) 5° to 20° SAE-20) - SAE-10W-30 5° or bellow SAE-10)
Cooling:	Fresh water, whit heat exchanger
Cooling water capacity:	litres
Injection system:	Bosch M. type. Cintrifugal regulator Injector pressure $160 \begin{smallmatrix}+10\\0\end{smallmatrix}$
Electrical system:	See wiring diagrams, pages 25, 26 and 27 Starter 12 V. 0,9 KW. Alternator 12 V. 35 A. Glow plugs, sheated type. 40 A. Fuse.

3 - USE

3.1 - BEFORE STARTING UP

Your new engine requires a 50 HOUR running-in period for setting all moving parts and obtaining a high performance.
Carry out this running-in carefully, bearing in mind the following points:

WARNING

* Run the motor at slow-running speed and warm up for at least 5 minutes.
* Avoid hasty acceleration.

3.2 - PREPARATIONS FOR STARTING UP

1) Filling of engine and reverse gear with oil

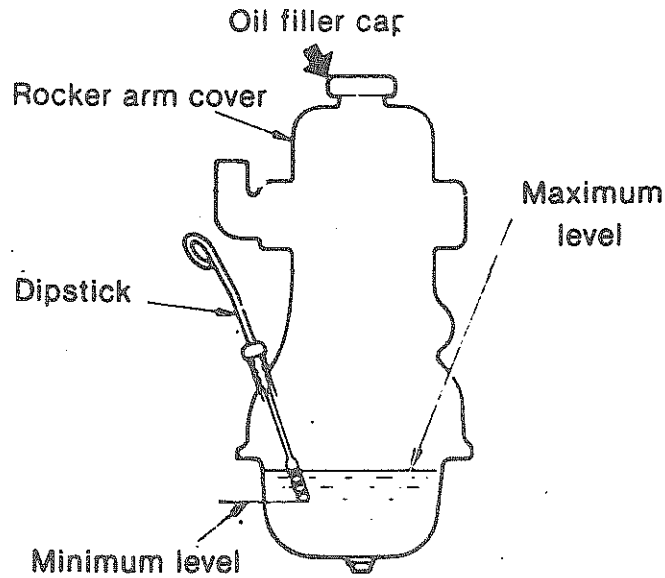


Fig. 1

Fill the engine with the recommended oil up to the upper mark on the dipstick (Fig. 1) through the oil filler hole. Fill the the reverse gear with oil up to the level mark on the dipstick through the hole (Fig. 2).
Use the same type of oil as for the engine.

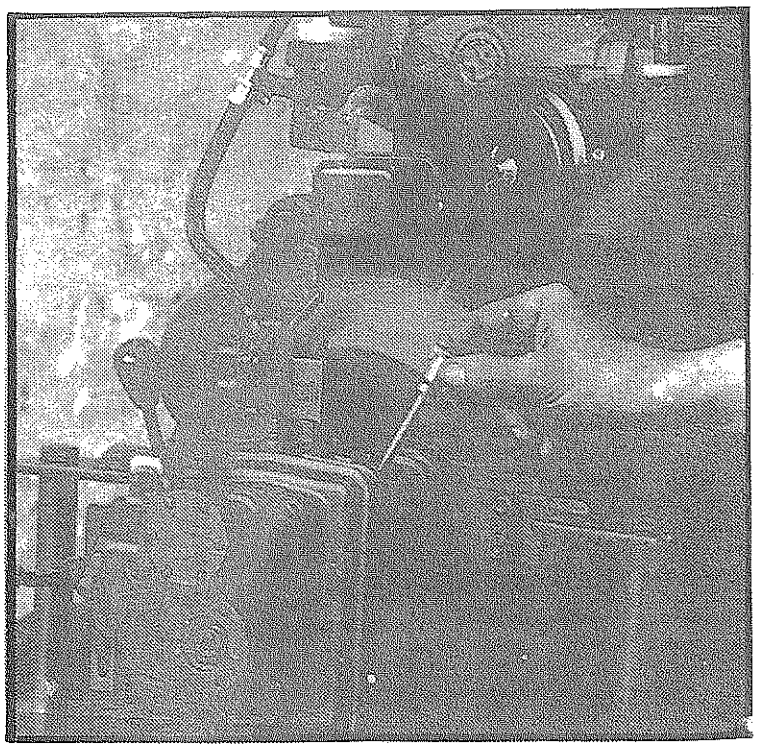


Fig. 2

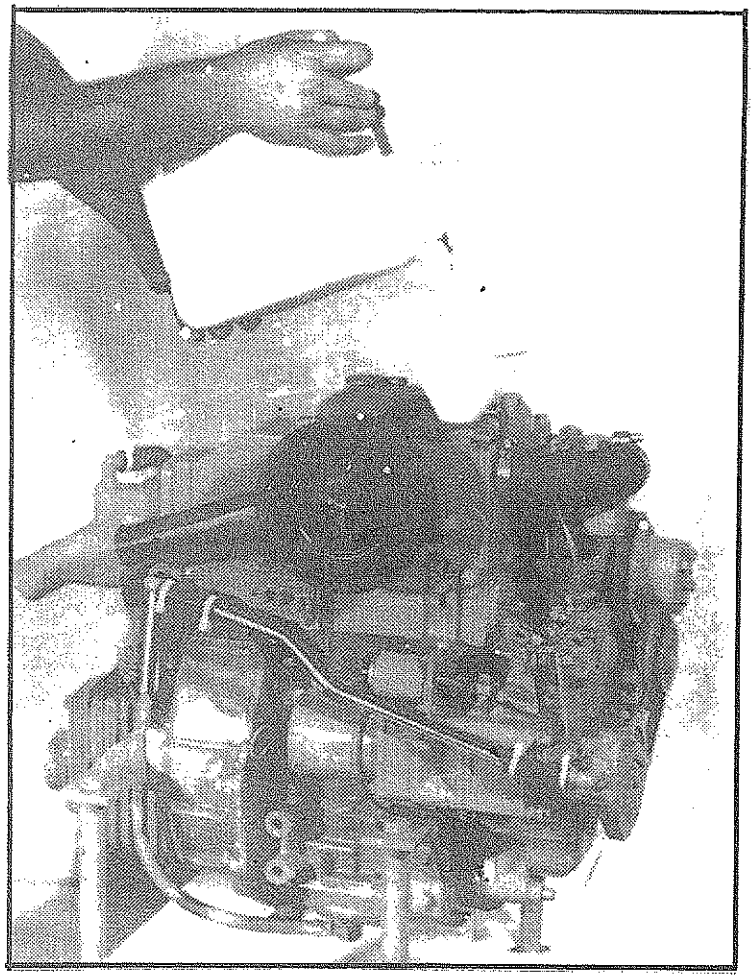
2) Filling of fuel tank

Fill the fuel tank with clean, filtered gasoil.

Check taht the tank is quite clean and free from iron or polyester particles.

Open thel fuel valve.

Fig. 3



3) Filling water system

Fill the system with clean water up to the filler opening. In winter, add antifreeze (Fig. 3)

4) Open the water inlet valve

5) Purging of fuel circuit

First purge the fuel filter and then the injection pump.

(For further details check «Fuel circuit purge» in Chapter (4.2).

6) Connection of battery disconnector

Connect the battery disconnector.

3.3 - STARTING UP

1) Reverse gear neutral position

Set the clutch to neutral and open the throttle half way.

2) Setting of ignition key in position «1»

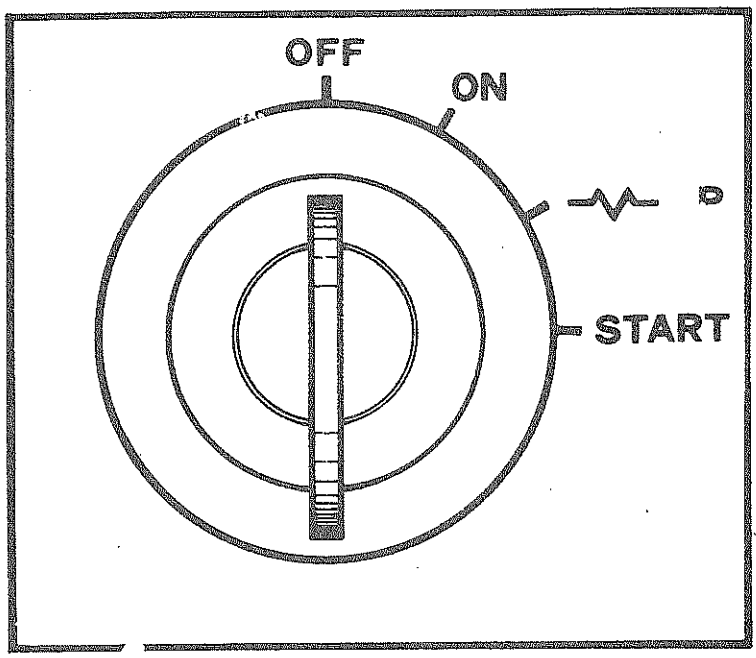


Fig. 4

Set the ignition key in position «1» and check that the pilot lights are illuminated and the alarm sounds (Fig. 4)

3) Pre-heating of glow plugs.

Turn the ignition key to position «P» (warming-up) until the glow plug indicator becomes sufficiently red hot.
The normal warm-up time is 20 seconds. In cold weather, follow the table as below:

Temperature	Warm-up time
+ 5° or above	Approx. 20 seconds
+ 5°C to —5°C	Approx. 30 seconds
— 5°C or below	Approx. 60 seconds

Notwithstanding, the warm-up period should not last more than 2 minutes to avoid shortening the plug life.
If the plug indicator does not become red hot, it should be checked by a SOLE Service Centre.

4) Starting up

Turn the ignition key to position «START» and hold it there until the engine fires. If the engine does not fire, although the key is held is position «START» for 10 seconds, release the key for 30 seconds and thereafter try to start the engine up again, after allowing for a sufficient warm-up of the plug. The starter motor must never be operated for more than 30 seconds at a time.
Once the engine has fired, turn the key to position ON and leave it there while running.
After starting, check that the oil pressure and battery charge pilot lights are extinguished.

5) Warm-up

Warm up the engine for about 5 minute, allowing it to run light at half throttle.

IMPORTANT:

While the engine is running, do not turn the key to position «START», since in this case the starter motor would be damaged.

If the engine is warm, the warm-up operations are not required in this case, turn the key to position «START» and hold it there until the engine fires. Once the engine has fired, return the key to position ON.

3.4 - WITH ENGINE RUNNING

* Check that the cooling water is flowing.
* Check that there are no water or oil leaks.
* Check that the oil pressure pilot light is extinguished.
* Check that the exhaust fumes are as follows:

— While the engine is cold:	White smoke
— As the engine warms up:	Almost smokeless
— When the engine is overloaded:	A slight amount if black smoke

IMPORTANT:

Always change gear with the engine at slow running speed.

3.5. - STOPPAGE

1) Set the engine to slow running and the clutch to neutral.
2) Push the Stop button until the engine has completely stopped.
3) With the engine stopped, set the ignition key to position OF. The battery will be discharged if the key is left in position ON.

To prevent this, remove the key after stopping the engine.

If the engine is not going to be used for a long period of time, it is advisable to close the water and fuel valves and to disconnect the battery.

IMPORTANT:

The Stop button does not operate if the key is not in position ON.

4.4 - MAINTAINANCE

4.1 - LUBRICATION SYSTEM

1 - Correct viscosity of oil

Use an oil having a viscosity appropriate to the local ambient temperature. The use an all-season SAE-10W-30 multigrade oil is recommended since this affords a minimum viscosity variation at different temperatures (see Specifications Section).

2 - Oil pressure

To help you monitor the oil pressure while the engine is running there is an oil pressure warning light and an alarm horn.

- During normal running:

The oil pressure is normal if the light is extinguished.

- When starting:

The light should be illuminated and the horn sounding.

The light will become illuminated during normal running if the oil pressure drops below 0.2-0.4 kg/cm² and in such case you shoulc consult your nearest SOLE Service Centre.

NOTE:
If the oil pressure drops or the cooling water excessively overheats, the alarm

3 - Oil change

a) Engine

Change the engine oil after the first 50 hours running and thereafter at intervals of 100 hours.

To change the oil, drain the old oil with the aid of the drain pump through the dipstick hole (Fig. 5).

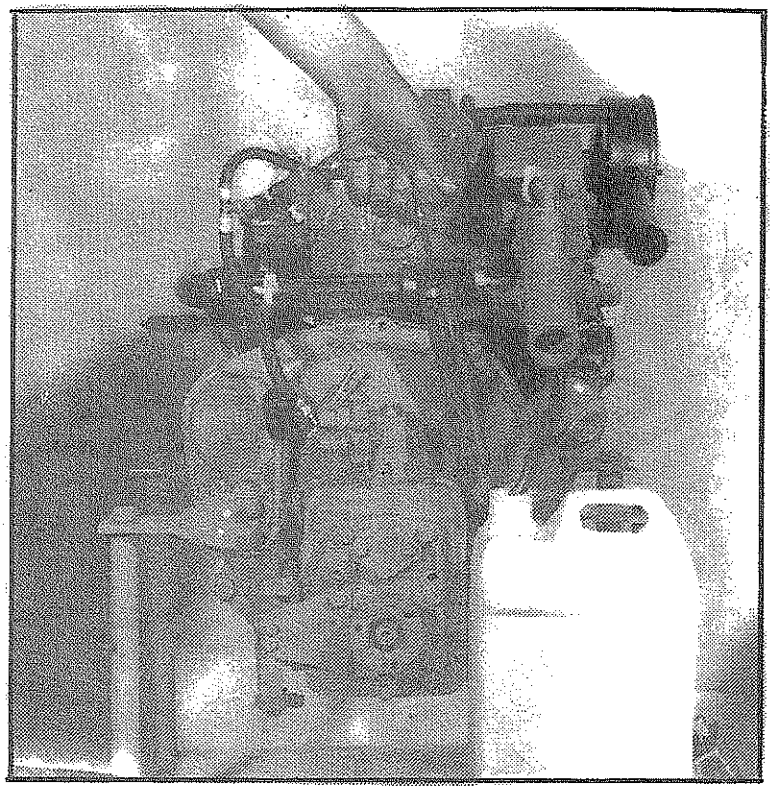


Fig. 5

After the old oil has been removed, pour in new oil through the filler opening in the rocker arm cover (Fig. 7). Next idle the engine for several minutes. Then stop it and check the oil level by taking out the dipstick, cleaning it with a rag, putting it back and pressing it home. Now take it out again to check the level.

Fig. 5 bis

NOTE:

Remember that the dipstick gives a correct level when the engine is horizontal, therefore the degree of engine rake should be taken into account when checking the level.

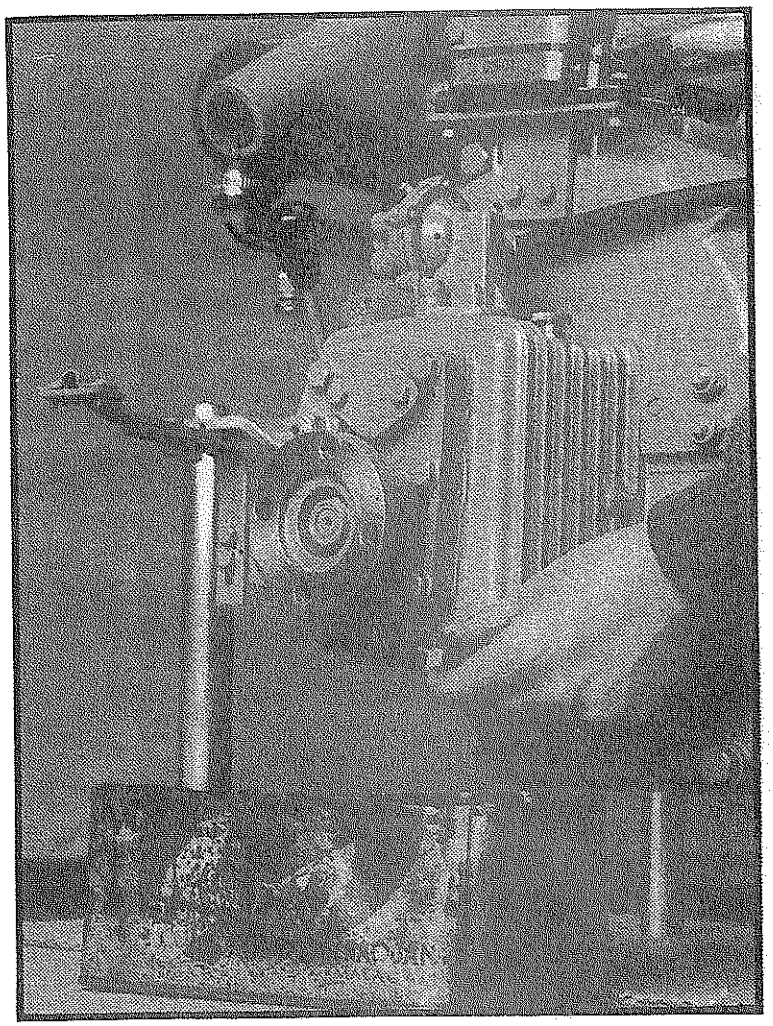


Fig. 6

b) Reverse gear

The reverse gear has its own lubrication independent from that of the engine.

To change the oil, drain the old oil with the aid of the drain pump through the dipstick hole or removing the plug underneath the reverse gear. (Fig. 6).

4 - Oil filter change

Change the oil filter after the first 50 hours running and thereafter at intervals of 100 hours.

The oil filter is an easy-to-handle cartridge type not requiring internal cleaning.

On fitting the new oil filter, rub a little engine oil on the seal and screw up hand-tight.

After replacing the filter, set the engine running and check for leaks (Fig. 7).

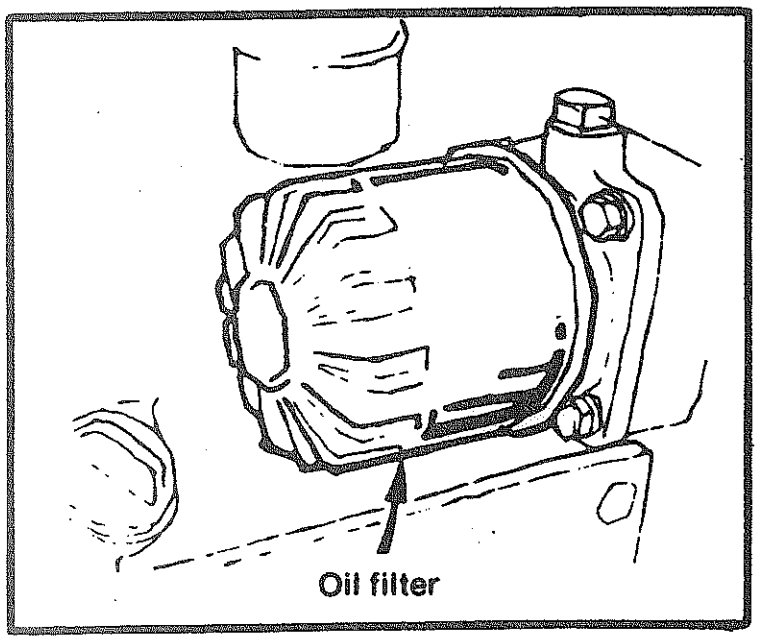


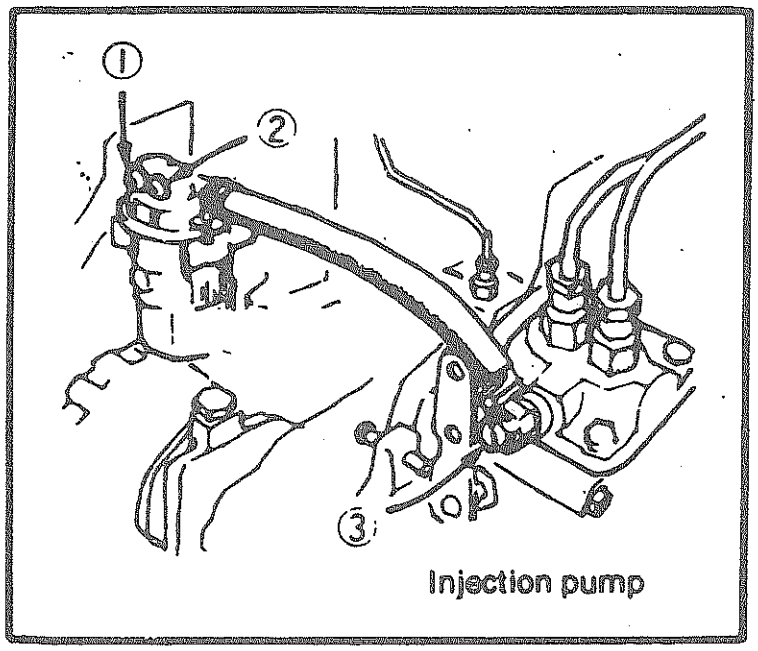
Fig. 7

4.2 - FUEL SYSTEM

1 - Gasoil

Always use clean, filtered gasoil. Never use kerosene or heavy oils.
Fill with fuel beforehand. In cold weather, a lot of water vapour is produced when there is a lot of air in the fuel tank. Therefore the tank should be kept as full as possible.
When filling the tank, try to avoid impurities and water, always using clean plastic containers and filter the fuel whenever possible.
Also make sure that the tank is free from water and dirt.

2 - Fuel system purge



Injection pump

The presence of air in the fuel system will prevent the engine from starting up. Therefore it is absolutely necessary to inspect and pay due attention to the fuel system to check for air leaks.

To purge the air from the fuel system, first loosen the fuel filter ventilation screw (1) and re-tighten the screw after bubbling ceases. Thereafter purge the air by loosening the fuel filter and injection pump ventilation screws (2) and (3), in this order, and then re-tighten the screws (Fig. 8).

Thereafter turn the engine over for a few seconds with the starter motor, with the lever in the «fully open» position so that the air may be removed from the piston, the fuel injection tubes and the nozzles.

This operation may also be effected by operating the supply pump lever located at the top of the reverse gear (Fig. 9) until the air is purged.

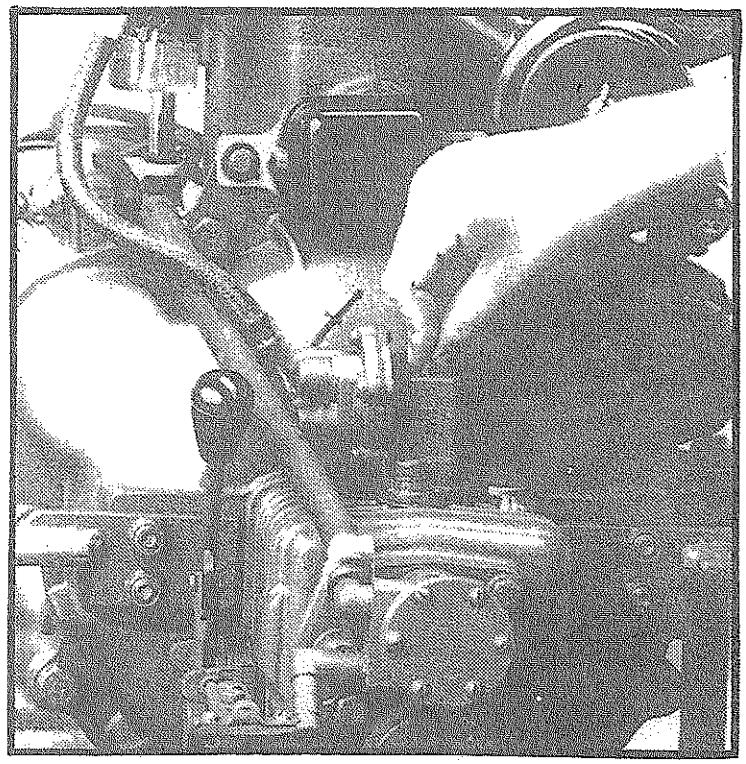


Fig. 9

The engine may be started up by following the above listed sequence of operations. If the engine does not start up easily, remove the injection screws from the nozzle side, setting the fuel lever in the «fully open» position, operate the starter motor or the fuel pump lever and then firmly tighten up the nuts.

3 - Cleaning and replacement of fuel filter

The fuel filter is of the easy-to-handle cartridge type. The accumulation of dirt and water in the filter causes operating difficulties. Remove the engine filter every 100 running hours, clean the outside and remove the two ventilation screws. Purge any water that has collected inside and thereafter rinse the filter in clean gasoil (Fig. 10).

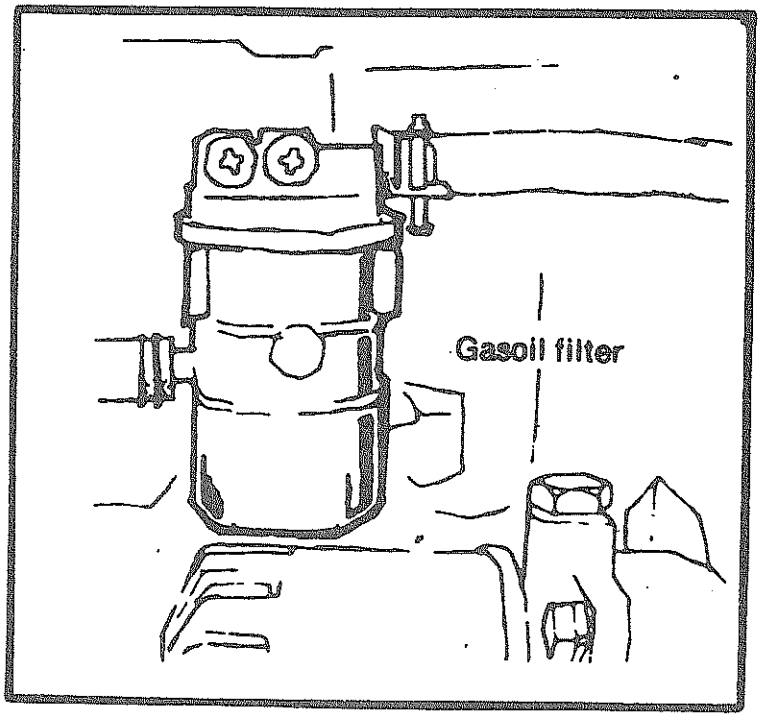


Fig. 10

The filter should be replaced after every 200 hours running. If a fuel decanter filter is fitted apart from the engine, drain it every 100 hours and replace the cartridge every 200 hours.

4 - Fuel injection pump

The fuel injection pump is one of the most important parts of a Diesel engine and, therefore, great care is required when handling it. Moreover, the injection pump has been very carefully adjusted at the works and should never be handled carelessly. When any adjustment is required, it should be effected by an authorized SOLE Service Centre, since a precision pump tester and specialized knowledge are needed.
The requirements for handling fuel injection pumps are as follows:

- Always use fuels free from impurities.
- Clean and replace the fuel filters periodically.

5 - Setting of slow running speed

Slacken off the locknut of the screw in front of the gas lever and tighten up or slacken off the nut according to whether it is wanted to increase or reduce the slow running speed (Fig. 11). Then re-tighten the locknut.

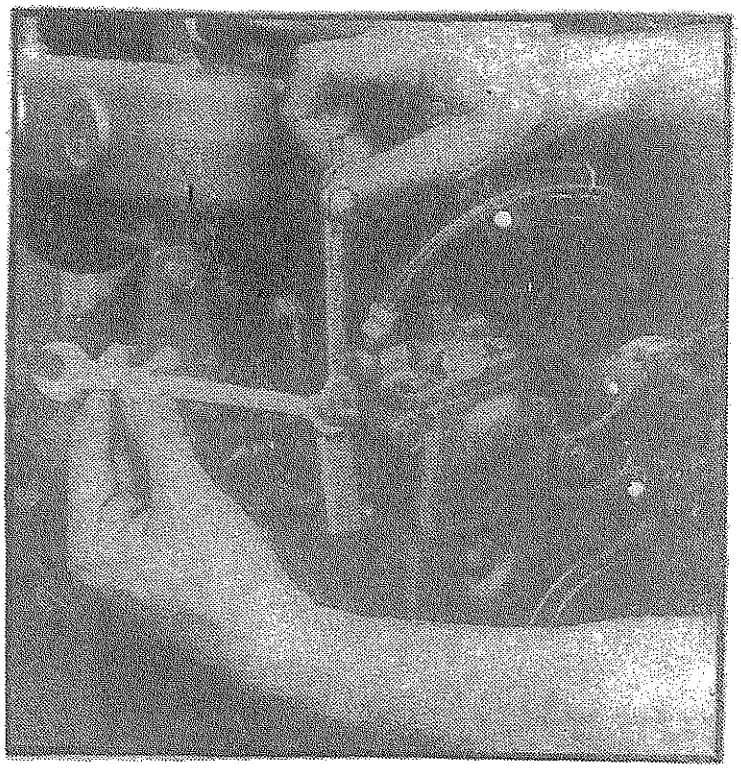


Fig. 11

IMPORTANT:

Never touch the sealed screw located behind the gas lever.

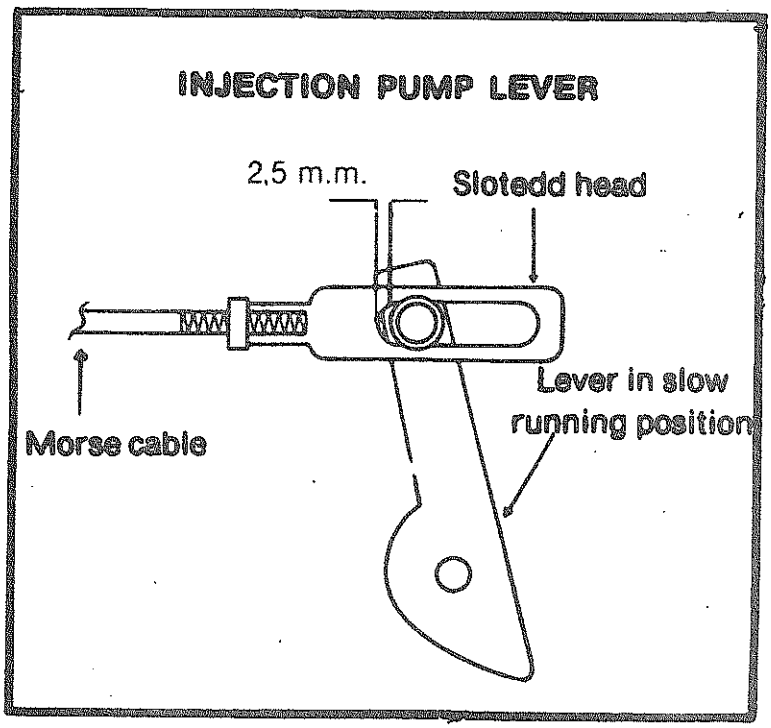


Fig. 12

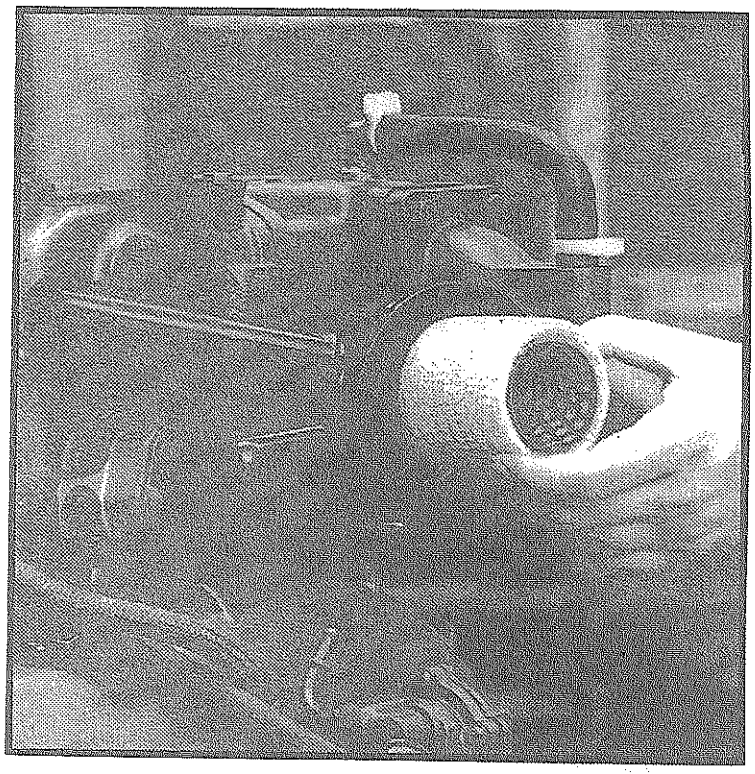
6 · Fitting of remote control to engine

The engine fuel system comprises a single lever for accelerating and stopping the engine. Therefore, the gas lever slotted head has to be fitted as shown in Fig. 12.

4.3 - INLET SYSTEM

1 - Replacement of inlet air filter element

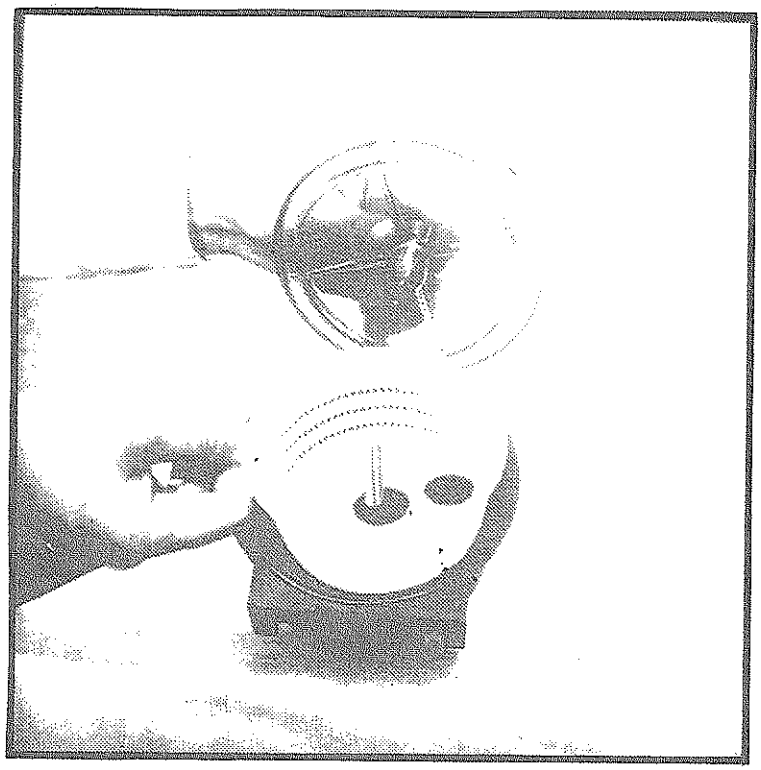
Change the air filter element every 400 hours.



To replace the filter, slacken off the filter centre nut, remove the cover and pull out the filter element. Insert a new element (Fig. 12 bis).
The element MAY NOT be cleaned.

Fig. 12 (bis)

Fig. 13



It is important to install a filter between the engine and the bottom cock to prevent the impurities contained in the sea water from obstructing the cooling pipes and seizing the thermostat.
Clean the filter every 50 hours by slackening off the wing nut and removing the filter element. Clean out and replace, making sure that the cover is properly seated on the O-ring. (Fig. 13).
Then set the engine running to check for water leaks from the cover.

4.4 - COOLING SYSTEM

1 - Fres water system

The engine is cooled by fresh water, contaminated as little as possible, such as tap water or rainwater. Using hard or dirty water will cause formation of scale inside the system, which will considerably reduce the cooling effect.

If low temperatures, i.e. below 0°C, are a hazard, antifreeze must be added to the cooling water.

The proportion of antifreeze depends on the anticipated temperatures. The antifreeze makers give guidance for this on the package labels of their products. In any case, the following table shows the proportions appropriate for the expected temperatures.

Concentration of antifreeze (%)		13	23	30	35	45	50	60
Temperature	in °C	—5	—10	—15	—20	—30	—40	—50
	in °F	(23)	(14)	(5)	(—4)	(—22)	(—40)	(—58)

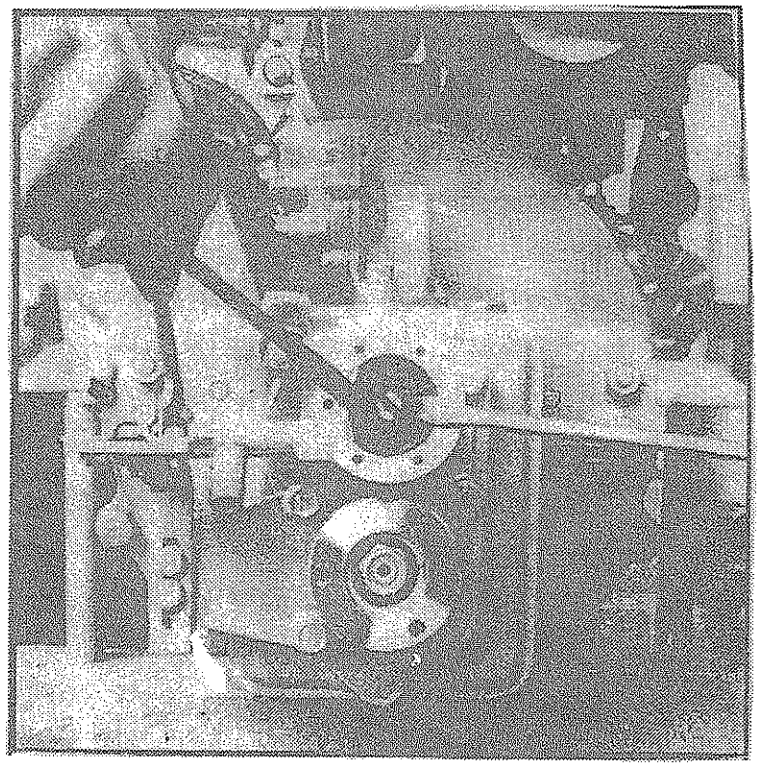
Be sure to clean the cooling system before adding antifreeze.

NOTE

It is advisible to choose an antifreeze concentration corresponding to a temperature about 5°C lower than the actual atmospheric temperature.

Cooling system capacity: 3'25 litres.

Fig. 14



2 - Sea water system

a) Water pump

The water pump is located on the right hand side of the engine at the front, underneath the alternator. The rotor is made of neoprene and must not be allowed to run dry. If it without water it can break. It is therefore important always to carry a spare.

To replace the rotor, turn off the water inlet cock, take off the pump cover and remove the rotor from its shaft, using two screwdrivers for leverage. Clean the seat and fit a new rotor. Replace the cover with a new gasket (Fig. 14).

Open the bottom cock.

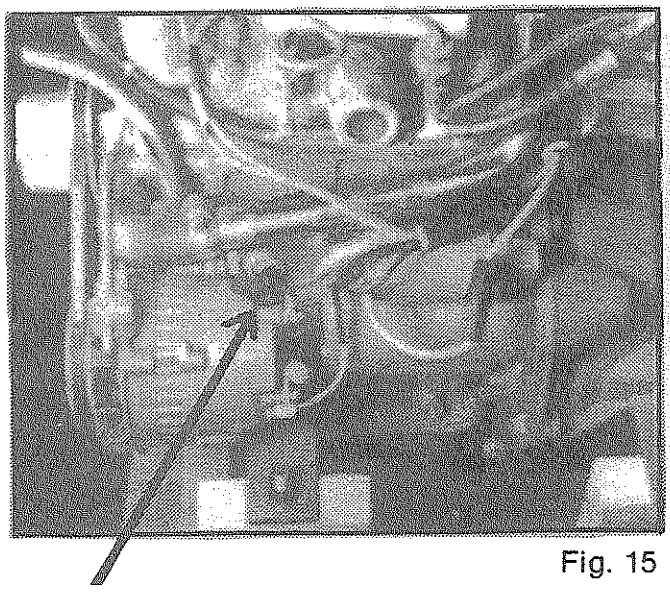


Fig. 15

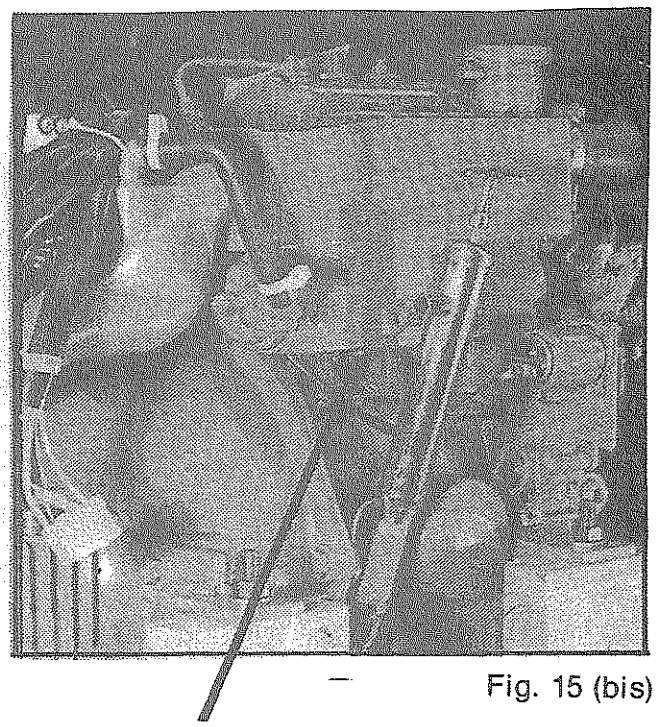


Fig. 15 (bis)

3 - Drainage

The engine two drain cocks, for fresh water (Figs. 15 and 15 bis).

4.5 · ELECTRICAL SYSTEM

1 · The engine is equipped with a 12 V system and the electrical circuit is shown in the following diagrams (Figs. 20 and 21).
To install electrical equipment, connect it correctly, following the diagram and, at the same time, check for any damaged cable sheathing and whether the earth connection is correct.

2 · Alternator belt tension

The alternator belt is properly tensioned if it moves from 10 to 12 mm when pressed with your finger.
Too much tension may cause rapid wearing of the and the alternator bearings.

On the other hand, if it is too slack or is oily, there may be an insufficient charge due to slipping of the belt.

Never try to adjust the belt tension with engine running.
To tension the alternator belt, loosen the two alternator holding bolts, one located underneath and the other on the tension device, tension up the belt by levering with the alternator until the appropriate tension is obtained. Then retighten the two boits. (Fig. 16).

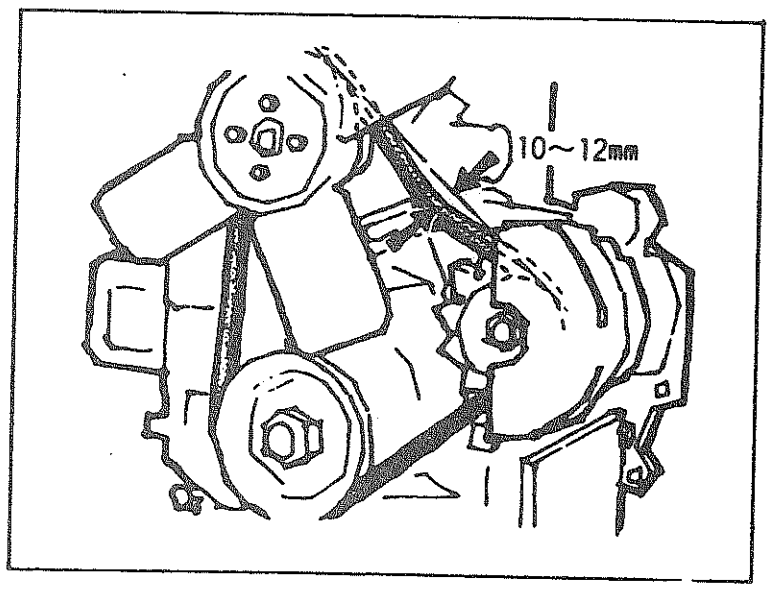


Fig. 16

3 · Fuse

The electrical system is protected by a 40 A fuse, fitted alongside the starter motor on the lead running from the latter to the control panel (see diagram on page 25).
If no power reached the panel, make sure that the fuse is not burnt out. If it is, install a new one.

4.6 - REVERSING REDUCTION GEAR

The ronim mechanically operated reversing gear is made from aluminium alloy having hihg mechanical strength and resistance to sea water.

1) Operation

With the engine running at tick-over speed, gently push the reverse gear lever forwards (ahead) or backwards (astern) as desired.

2) Remote control connection

Connect the control cable to the lever with the ball joint provided and attach the cable with the clamp.
Once the control is mounted, adjust it so that it moves the same distance forwards as backwards and do not open the accelerator until the gear has properly entered. (Fig. 17) To check that the assembly is correct, proceed as follows:

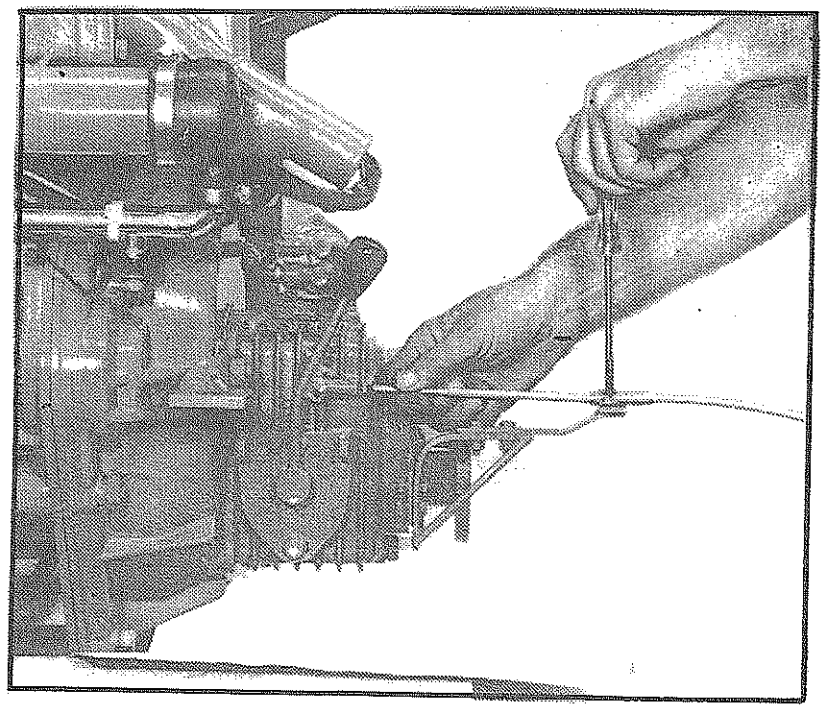
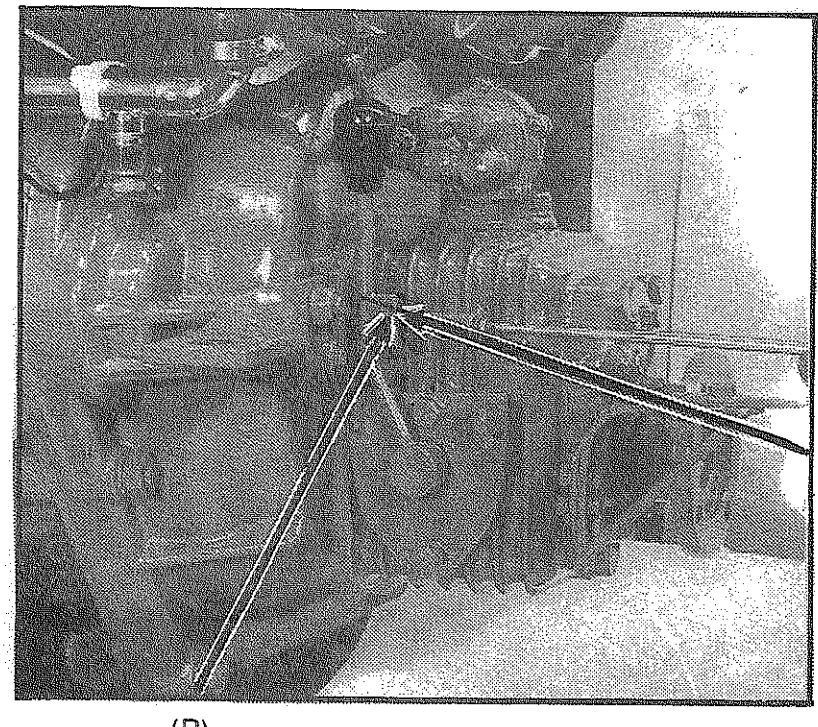


Fig. 17

Push the reverse gear lever and the remote control lever to 'ahead'.
At this stage, line up the bores of the ball join (A) and lever (B) (Fig. 18).

Fig. 18



Any adjusment is made with the reverse gear lever bores and with the elongate holes of the cable attachment support.

3) Adjustment of control

Slacken off the control attachment screwus and move it sideways to the right or the left until the same stroke is obtained both 'ahead' and 'astern'. Then retighten the screws (Fig. 19)

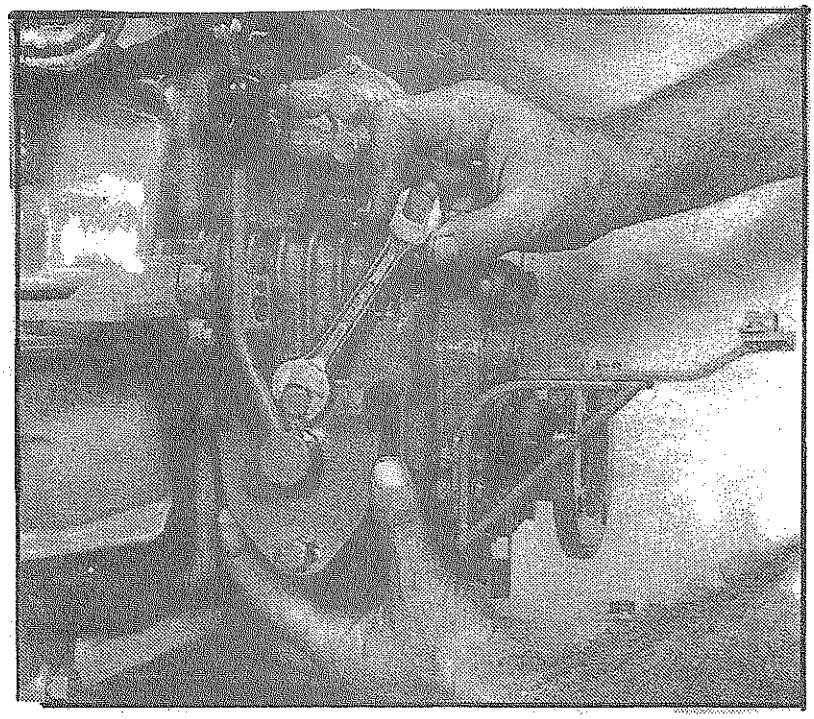


Fig. 19

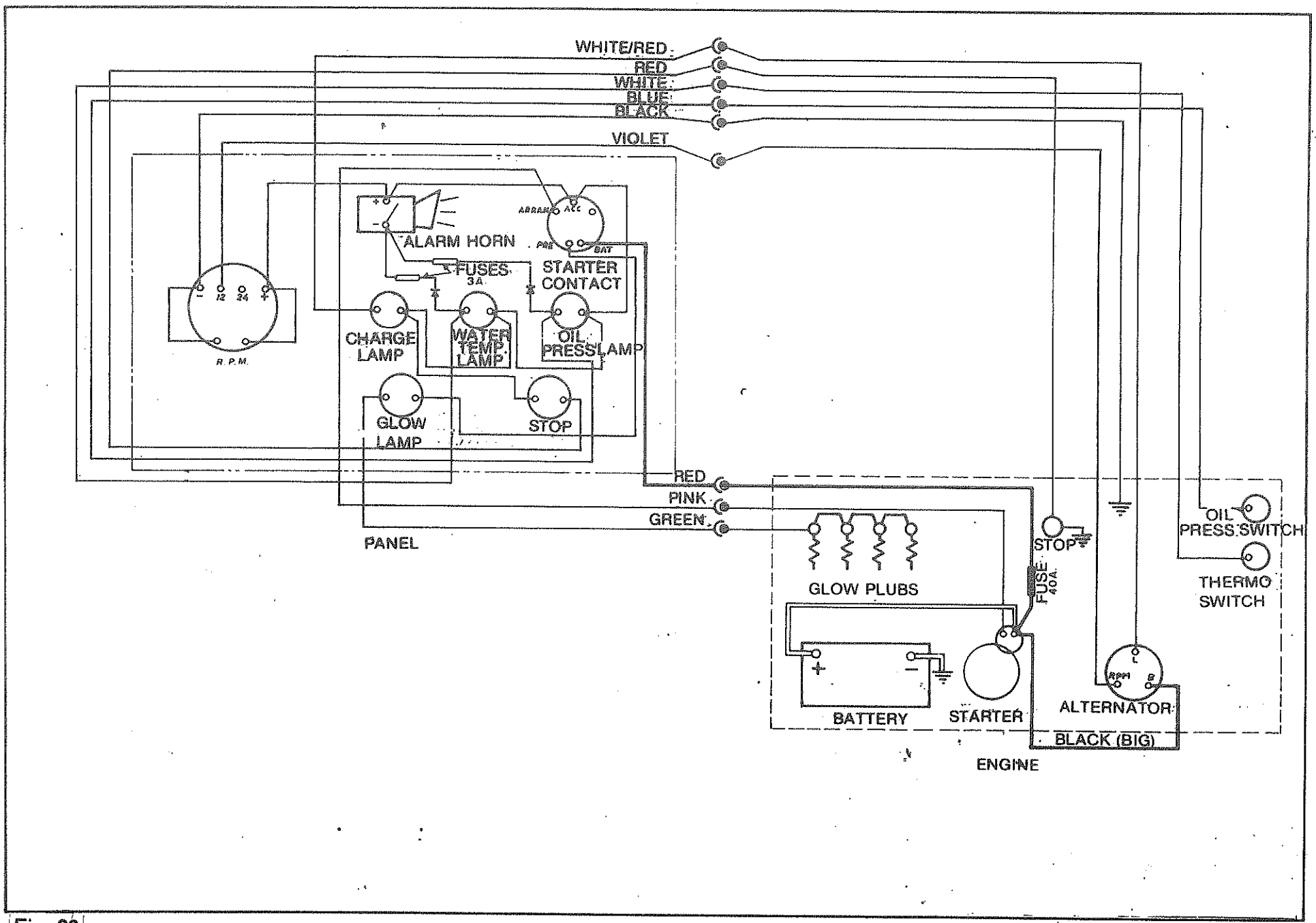
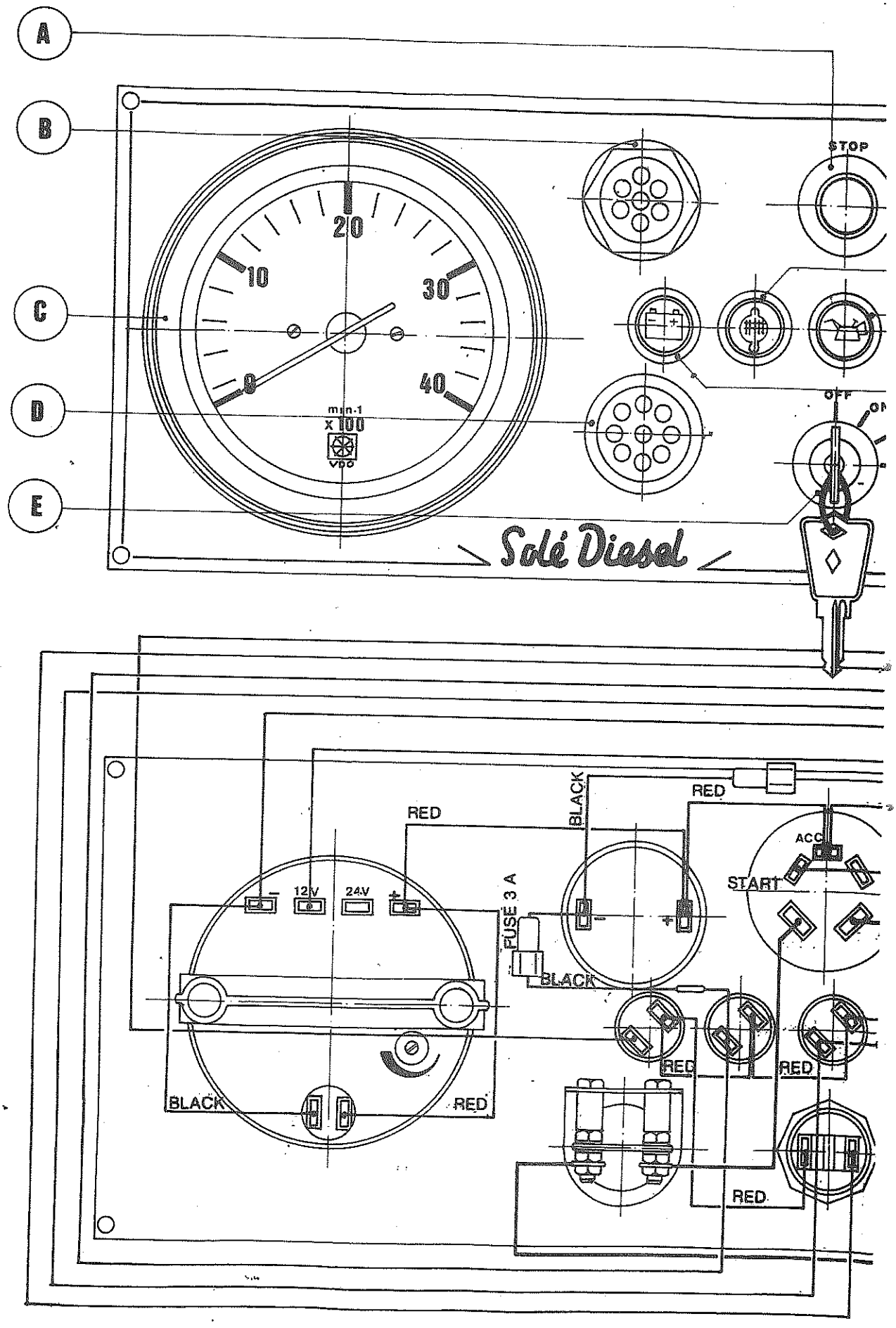
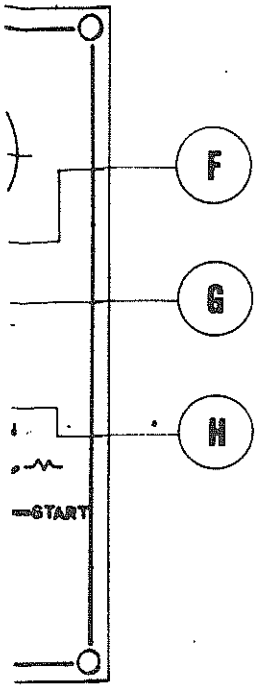

WHITE/RED
RED
WHITE
BLUE
BLACK
VIOLET
ALARM HORN
ACC
BAT
FUSES 3A
STARTER CONTACT
CHARGE LAMP
WATER TEMP. LAMP
OIL PRESS. LAMP
GLOW LAMP
STOP
R. P. M.
PANEL
RED
PINK
GREEN
GLOW PLUGS
STOP
FUSE 40A.
OIL PRESS. SWITCH
THERMO SWITCH
BATTERY
STARTER
ALTERNATOR
BLACK (BIG)
ENGINE

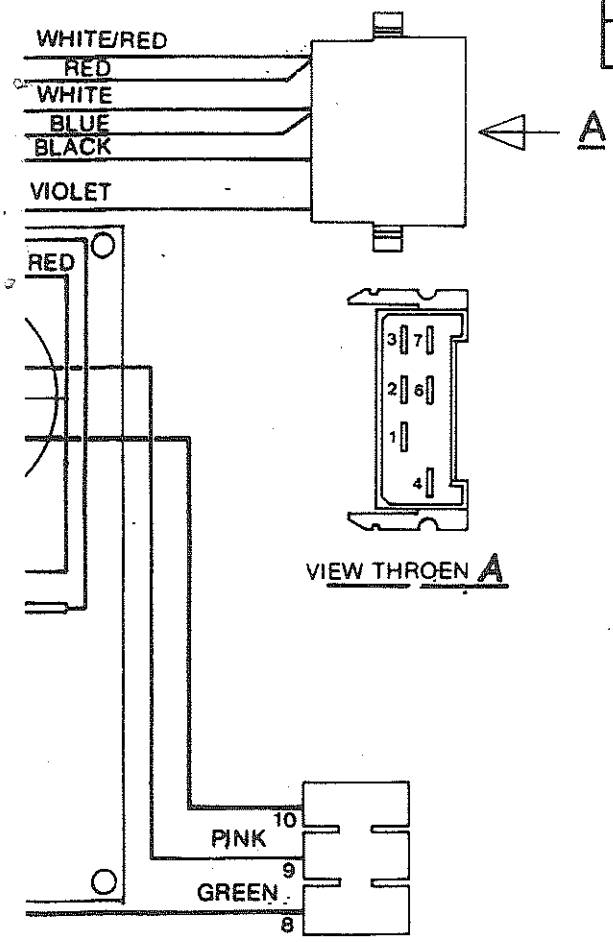
Fig. 20


A
B
C
D
E
STOP
20
10
30
0
40
min-1
x 100
vdo
OFF
Sole Diesel
12V
24V
FUSE 3 A
RED
BLACK
RED
BLACK
ACC
START
BLACK
RED
RED
RED
RED



Nº	CABLE FUNCTION	COLOUR
1	NEGATIF	BLACK
2	WATER ALARM	WHITE
3	BATTERY CHARGE	WHITE/RED
4	TACHOMETER	VIOLET
6	OIL ALARM	BLUE
7	ENGINE STOP	RED

8	GLOW PLUES	GREEN
9	STARTER	PINK
10	COURRONT TAP +	RED



H	CHARGE LAMP
G	OIL PRESS. LAMP
F	WATER TEMP. LAMP
E	STARTER SWITCH
D	ALARM HORN
C	TACHOMETER
B	GLOW LAMP
A	STOP SWITCH
PUNTO	DESCRIPTION

Fig. 21

○ Inspection, adjustment of filling □ Cleaning ● Change △ Drain

	Item to inspect \ Intervals	Daily	First 50 hours	Every 100 hours	Every 200 hours	Every 400 hours	Every 800 hours	Long term
Engine body	Tighten setscrews		○			○		
	Valve clearance		○			○		
	Engine slow running speed		○	○				
	Engine compression ratio						○	
Lubrication system	Engine oil	○	●	●				
	Reverse gear oil	○	●	●				
	Oil filter		●	●				
Fuel system	Fuel	○						△
	Fuel tank							□
	Fuel filter			□	●			
	Fuel Filter with water trap (if any)		○	△	●			
	Nozzle				○			
	Injection pump						○	
	Air filter					●		
Cooling system	Cooling water	○					●	
	Water filter		□					
	Bottom cock	○						
	Water pump impeller					○		
Electrical system	Each instrument	○						
	Glow plug					○		
	Starter motor, alternator and regulator						○	
	Alternator belt tension		○		○			
	Battery water level				○			

5 - PERIODICAL INSPECTIONS

5.1 - DAILY CHECKS BEFORE USING THE ENGINE

1 - Check engine and reverse gear oil level. Top up. No topping up required if oil level is close to upper level on dipstick.

2 - Check fuel level and open tank outlet valve.

3 - Open water inlet valve.

4 - Check pilot lights.

After starting, check oil pressure, water temperature and battery charge. The three pilot lamps should be extinguished and the horn should not sound.

5 - Check that the cooling water is flowing and for any irregularities in the exhaust gases, noise and vibrations.

6 - Check cooling water level.

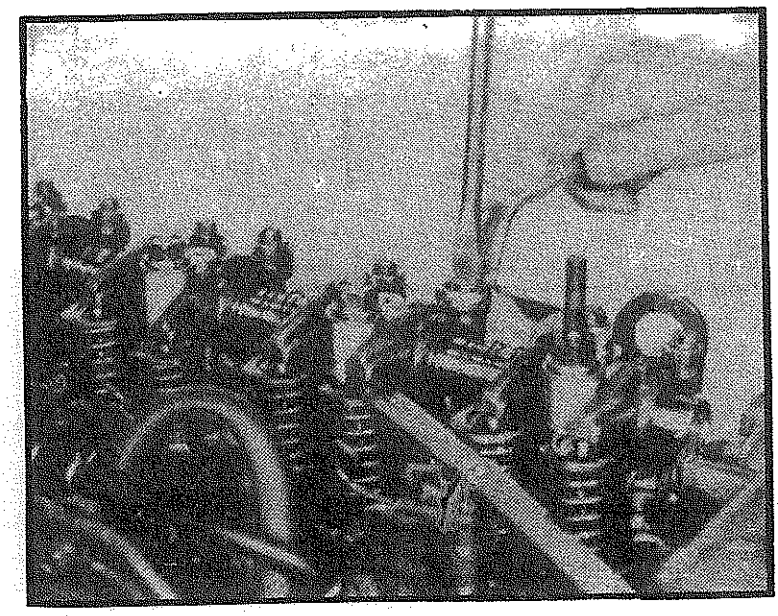
5.2 - MAINTAINANCE AFTER FIRST 50 HOURS RUNNING

1 - Change engine and reverse gear oil. Proceed as indicated on pages 13 and 14.

2 - Change oil filter. Change as specified on page 14.

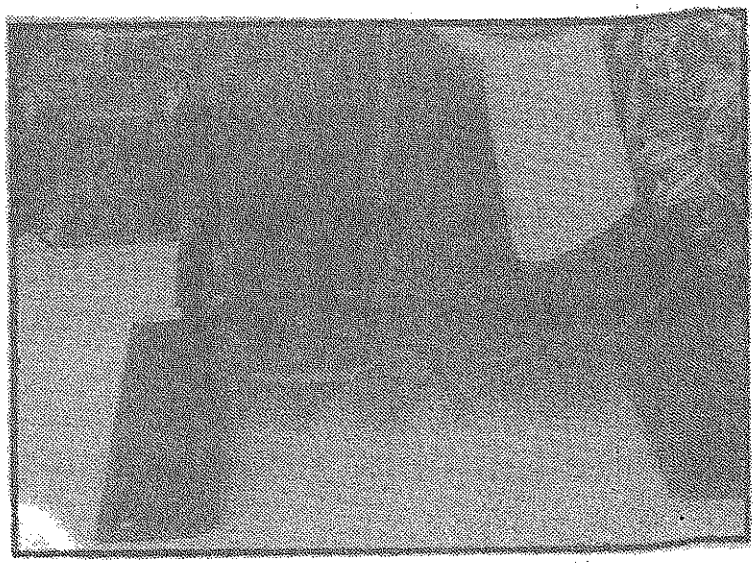
3 - Setting valve clearance. Carry out this operation when the engine is cold, as follows:
a) Remove the rocker arm cover, slacken off the rocker arm nut and while the adjusting screw is being turned, check the valve clearance with a gauge (Fig. 22).

Fig. 22



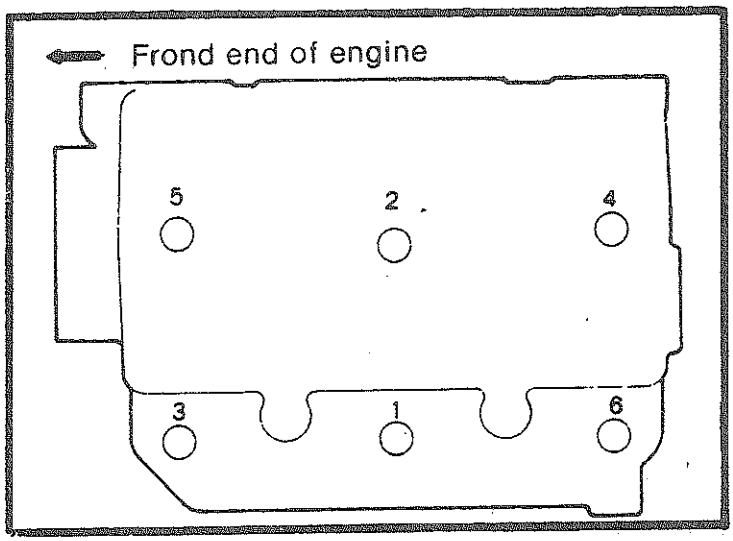
b) With the no. 1 cylinder (box) piston at top dead centre on the compression stroke, set the clearance of the no. 1 cylinder inlet and exhaust valves. Likewise, with no. 2 cylinder piston at top dead centre, set the clearance pf no. 2 cylinder inlet and exhaust valves.

Fig. 23



c) The positioning of no. 1 cylinder piston at top dead centre may be checked by mating marks on the distribution cover and the crank pulley (Fig. 23).

d) After adjusting, tighten the rocker arm nut well, whilst the adjusting screw is held against rotation.



NOTE:
The valve clearance must be adjusted after re-tightening the cylinder head holding screws (order of tightening illustrated in Fig. 24).

Fig. 24

Valve clearance (inlet-exhaust: 0,25 mm (0,0098 pulg)

Cylinder head torque: 4,2-4,7 Kgm (with washer).

4 - Alternator belt adjustment. Proceed as indicated on page 22.

5 - Re-tightening nuts and bolts.
Check the tightness of the engine and propeller shaft mounting bolts.

6 - Adjust engine slow running speed.
Check the engine slow running speed and adjust as indicated on page 17.

5.3 - MAINTAINANCE AFTER EVERY 100 HOURS RUNNING

1 - Change engine oil (see page 13).

2 - Change oil filter (see page 14).

3 - Clean fuel filter (see page 16).

4 - Drain fuel decanter filter.
Slacken off the wing nut located at the bottom of the glass bowl and allow all the accumulated water to run out. Re-tighten the wing nut and check for dripping.

5 - Clean water filter (see page 19).

6 - Adjust engine slow running speed (see page 18).

5.4 - MAINTAINANCE AFTER EVERY 200 HOURS RUNNING

1 - Change fuel filter. Proceed as indicated on page 16.

2 - Change decanter filter element.
Replace filter element together with gaskets.
Check that there is no fuel leak.

3 - Adjust alternator belt. (See page 22).

4 - Nozzle check.
Set the nozzle pressure to 160^{+10}_{-0} Kg/cm² and remove any undesirable

injection conditions, including «after-dripping» (This operation should be effected by an Official SOLE Service Centre.

5 - Check battery water level.
Check this level, topping up with DISTILLED WATER, whenever required.

5.5 - MAINTAINANCE AFTER EVERY 400 HOURS RUNNING

1 - Change air filter element. Proceed as indicated on page 14.

2 - Tighten up engine and propeller shaft mounting screws.

3 - Adjust valve clearance (see page 29).

4 - Check glow plugs.
Check whether glow plugs are burned out.

5.6 - MAINTAINANCE AFTER EVERY 800 HOURS RUNNING

1 - Check compression.

- Remove glow plugs (or nozzles) and measure the pressure using a compression gauge.
Adjust as required if the pressure difference between cylinders is more than 2.5 kg/cm² or the pressure of each cylinder is below 26 kg/cm² (at 280 r.p.m.).

2 - Adjust fuel injection.
Have this operation done by a SOLE Service Centre.

3 - Check alternator and regulator.

- Regulate the voltage and the current using a circuit tester.

4 - Check starter motor pinion and engine flywheel ring gear.
Touch up any damaged bevel area with a file and replace if the part is completely damaged.

5 - Check water pump impeller.
Check that the impeller has no broken arm. If it has, proceed as indicated on page 21.

6 - Change the cooling system water.
Drain by opening the fresh water system drain cock (Fig. 15). After all the water has drained out, close the cock and refill with fresh, clean water up to the filler cap opening (Fig. 3).

6 - TROUBLESHOOTING

It is essencial to detect and repair any breakdown or fault as soon as possible. Check and act in accordance with the instructions given below. If any repair requires a technical capacity beyond your reach, have it done by a SOLE, S. A. Authorized Service Centre.

1. Engine does no start

Starter switch faulty.	Check connections and contacts.
Low starter motor torque.	The battery is exhausted, the starter motor is faulty or the wiring is dirty or has a loose connection.
Inappropiate engine oil viscosity.	Check viscosity and change oil as required.
Moving parts seized.	Correct
Still air inside. No fuel in tank. Fuel filter clogged.	Thoroughly purge. Fill up. Clean or replace.

2. Engine stops while running

Fuel tank empty.	Fill up.
Fuel filter clogged.	Clean or replace.
Air in fuel system.	Retighten fuel pipe connections.

3. Poor engine performance

Fuel filter clogged.	Clean or replace.
Air in fuel system.	Retighten fuel pipe connections.

4. Inadequate oil pressure

Insufficient amount of oil.	Top up.
Oil leaks from connections.	Repair.
Oil pressure switch faulty.	Replace.

5. Engine overheats

Insufficient cooling water.	Check water pump impeller and replace. Check bottom cock.
Dirty water filter.	Clean.
Cooling circuit clogged.	Clean.
Faulty thermocontact.	Replace.

6. Battery charges poorly

Incorrect belt tension.	Adjust.
Wiring faults.	Repair.
Incorrect ammeter. (if fitted)	Replace.
Faulty battery.	Replace.
Faulty regulator.	Repair or replace.

7. Gears do not engage smoothly

Remote control poorly adjusted.	Adjust.
Reverse gear control maladjusted.	Adjust.
Clutch cone worn.	Replace.

7. SERVICE DETAILS

7.1 - SERVICE STANDARDS

* Valve clearance:	0.25 mm. (0.010'') with cold engine (both inlet and exhaust valves)
* Compression:	32 kg/cm² (454.4 psi) (320 R.P.M.)
* Oil capacity:	Engine 1.8 litres Reverse gear 0.4 litres
* Injection order:	1 - 2
* Injection timing:	25° BTDC
* Nozzle pressure:	$160\ ^{+10}_{-0}$ kg/cm²

7.2 - TABLE OF TIGHTENING TORQUES

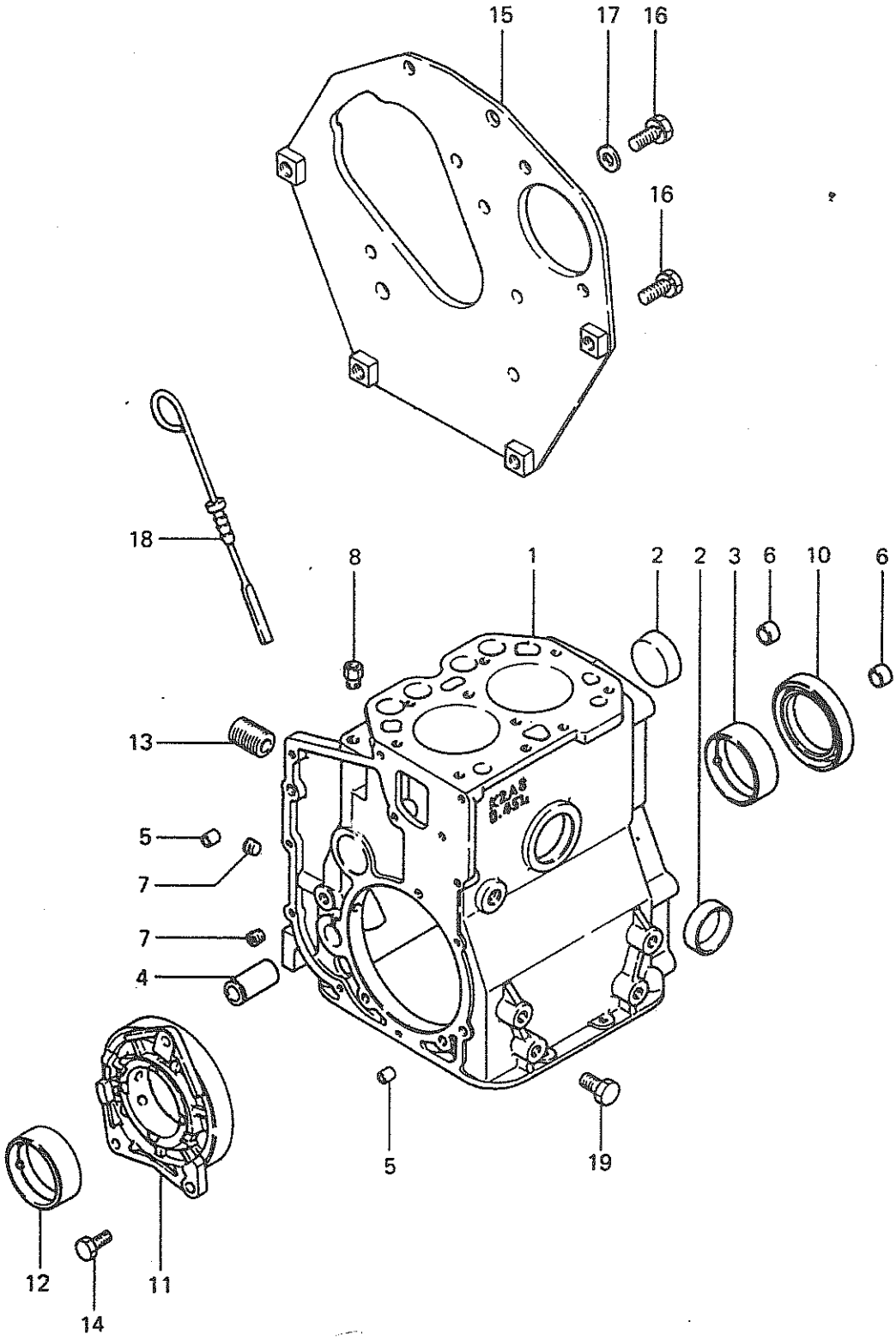
	kg-m
* Cylinder head bolts (M.8)	4,2-4,7
* Crank pulley nut:	15-20
* Conrod big end cap nut (M.8)	3.2-3.5
* Flywheel bolt (M.10)	6.5-7.0
* Oil drain plug:	5.0-6.0
* Oil filter:	1.1-1.3
* Nozzle holder (against engine)	5-6
* Nozzle holder retaining nut (M.22)	6-8
* Nozzle holder ring nut (M.12)	4-5
* Glow plug:	1.5-2.0
* Reverse gear inlet clamp nut:	
* Reverse gear outlet clamp nut:	
* Starter "B" terminal nut (copper stud) (M.8)	1.0-1.2

General bolts and nuts Diameter of screw	4 (Head Mark)	7 (Head Mark)
M 6	0.3-0.5	0.8-1
M 8	1.0-1.3	1.5-2.2
M 10	1.8-2.5	3.0-4.2
M 12	3.0-4.2	5.5-7.5

CRANK CASE

Item	Part no.	Description	Quantity
1-3	137 20 001	BLOCK SUB ASSY, cylinder	1
2	135 20	PLUG, expansion (40)	2
3	137 20 003	BEARING, crankshaft STD	1
—	137 20 004	BEARING, crankshaft 0.25 US	1
—	137 20 005	BEARING, crankshaft 0.50 US	1
—	137 20 006	BEARING, crankshaft 0.75 US	1
4	137 20 008	SHAFT, governor gear	1
5	137 20 009	BUSHING, knock (6X9)	2
6	135 20 010	BUSHING, knock (10X9)	2
7	131 20 011	PLUG, taper (1/8)	2
8	131 20 014	CONNECTOR	1
10	137 20 019	OIL SEAL	1
11	137 20 020	HOUSING, bearing	1
12	137 20 003	BEARING, crankshaft STD	1
—	137 20 004	BEARING, crankshaft 0.25 US	1
—	137 20 005	BEARING, crankshaft 0.50 US	1
—	137 20 006	BEARING, crankshaft 0.75 US	1
13	131 24 047	SHAFT, oil filter	1
14	131 20 026	BOLT (4T:8X20)	3
15	137 20 024	PLATE, rear	1
16	132 27 002	BOLT, with washer (4T:10X25)	6
17	137 20 025	WASHER, plain (10)	1
18	137 20 029	GAUGE, oil level	1
19	137 20 028	BOLT (4T:10X20)	4

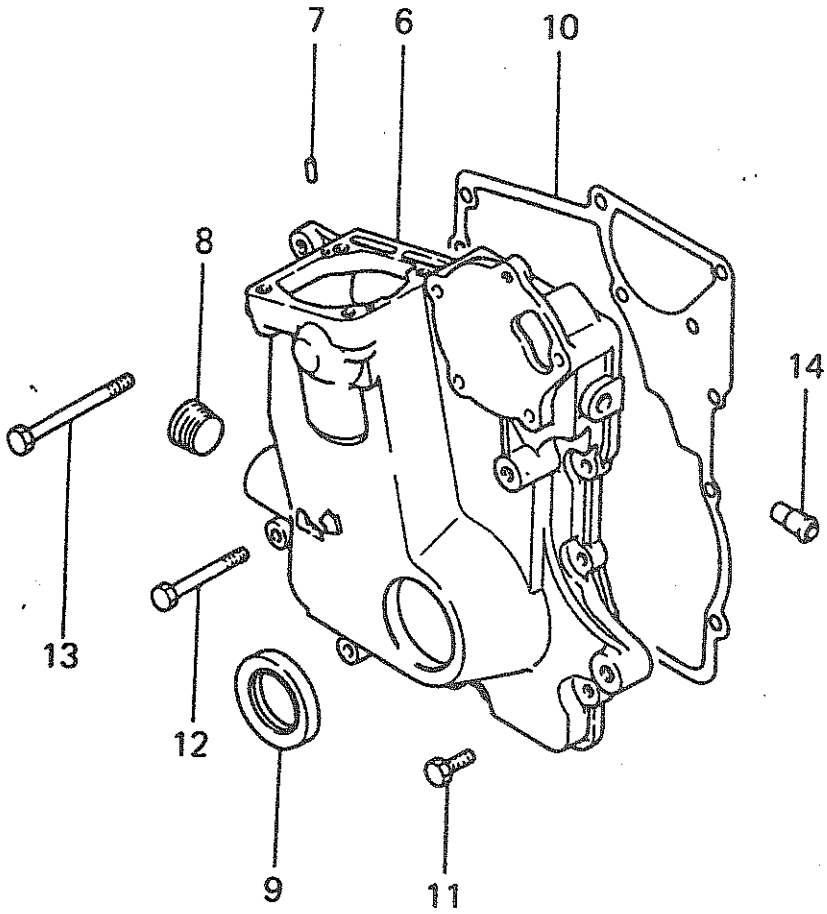
CRANK CASE

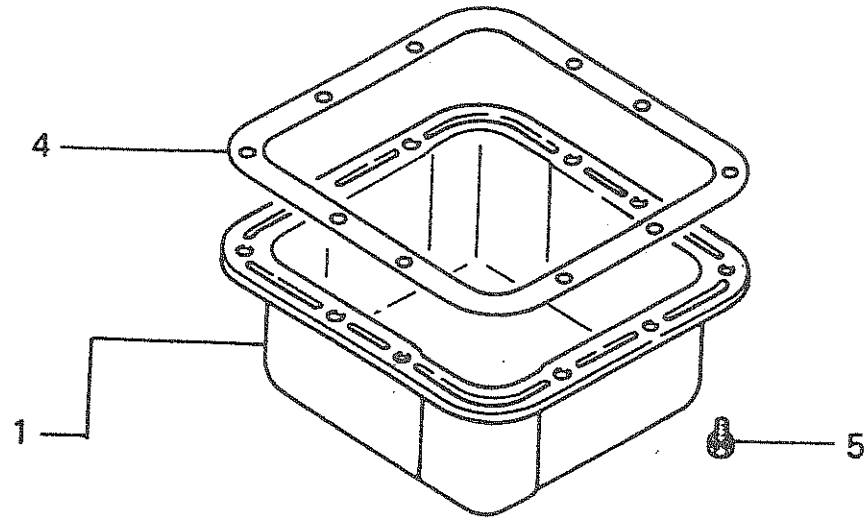


OIL PAN & GEAR CASE

Item	Part no.	Description	Quantity
1-3	137 20 030	PAN ASSY, oil	1
4	137 20 033	GASKET, oil pan	1
5	131 23 005	BOLT, with washer (7T:6X12)	10
6	137 20 035	CASE, gear	1
7	137 20 036	PIN, dowel	2
—	131 20 036	PIN, dowel	2
8	131 20 037	PLUG, taper (1/2)	1
9	132 20 039	OIL SEAL	1
10	137 20 040	GASKET, gear case	1
11	137 20 042	BOLT (7T:6X20)	4
12	137 20 038	BOLT (7T:6X55)	4
13	137 20 041	BOLT (7T:6X75)	1
14	132 21 017	PIPE	1

OIL PAN & GEAR CASE

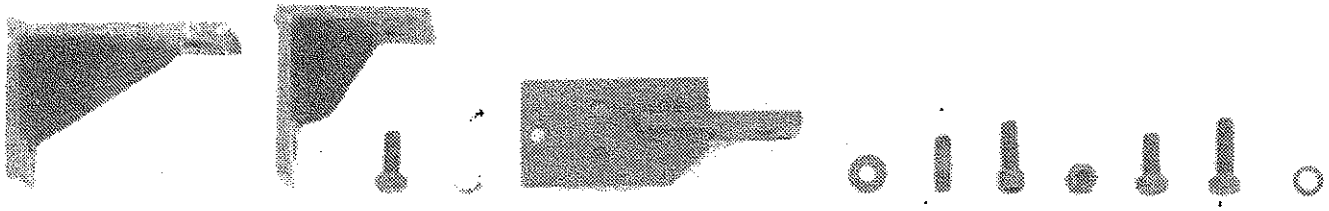




BLOCK

Item	Part no.	Description	Quantity
1	137 10 002	BRACKET FRONT, right	1
2	137 10 003	BRACKET FRONT, left	1
3	522 02 308	SCREW	4
4	530 33 010	WASHER, spring Ø 10	4
5	131 10 010	BRACKET, rear	2
6	131 10 017	WASHER, plain	6
7	137 10 009	STUD, bracker rear	2
8	521 03 309	SCREW	4
9	511 23 010	NUT	6
10	522 02 308	SCREW	5
11	522 02 310	SCREW	1
12	530 38 010	WASHER	6
13	137 10 013	BRACKET, transport rear	1
14	137 10 011	INLET, manifold	1
15	521 01 269	SCREW	1
16	137 10 012	CLEANER ASSY, air	1
17	132 11 013	ELEMENT, air cleane	1
18	131 11 037	PIPE, rubber	1
19	131 14 001	FUEL PUMP, supply	1
20	131 14 002	GASKET	2
21	521 03 258	SCREW	2
22	530 38 008	WASHER	2
23	131 14 003	BEND, inlet	1
24	137 14 007	PIPE, fuel pump to nozzle	1
25	137 14 008	PIPE, fuel filter to pump	1
26	510 80 012	CLAMP	2
27	137 14 012	BRACKET, fuel filter	1
28	511 20 006	NUT	1
29	147 14 001	PUMP, oil extraction	1
30	137 14 002	BRACKET, OIL PUMP	1
31	522 02 307	SCREW	2
32	530 33 010	WASHER, spring Ø 10	2
33	560 00 067	WASHER, plain Ø 13 (copper)	3
34	132 14 021	PIPE ASSY, oil pump	1
35	132 14 024	COUPLING, oil pump	1
36	560 00 077	WASHER, plain Ø 18 (copper)	2
37	131 11 039	DRAIN COCK, block	1
38	137 10 010	COUPLING PLATE, gear box	1
39	521 02 156	SCREW	8
40	530 33 006	WASHER, spring Ø 6	8

BLOCK



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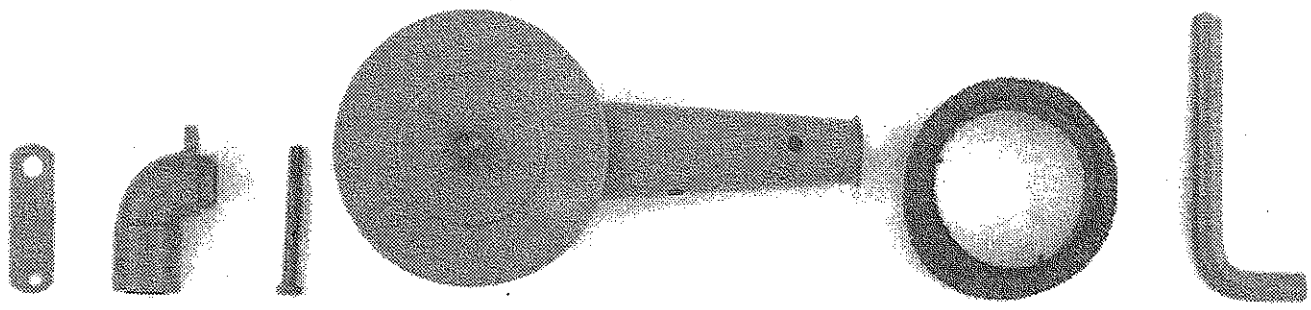

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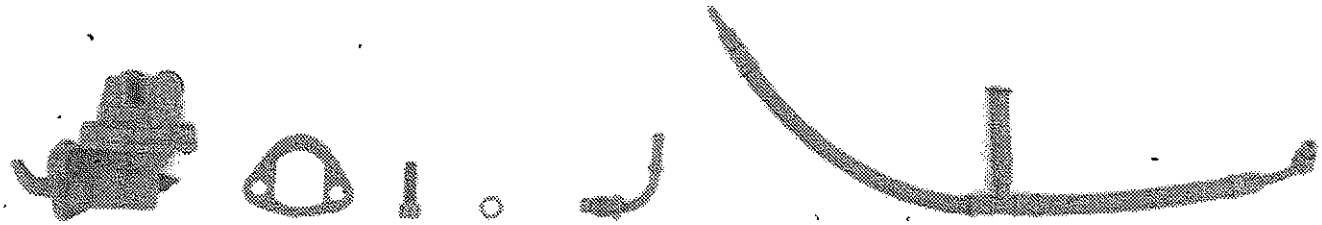

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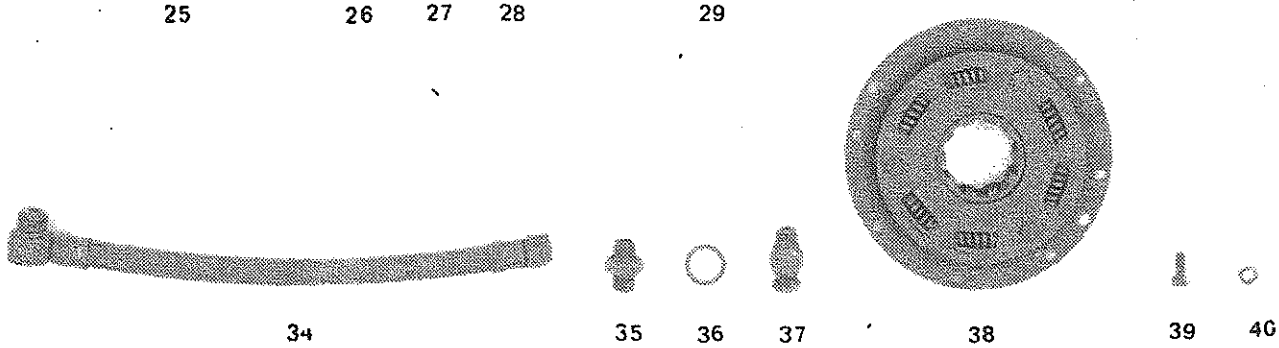

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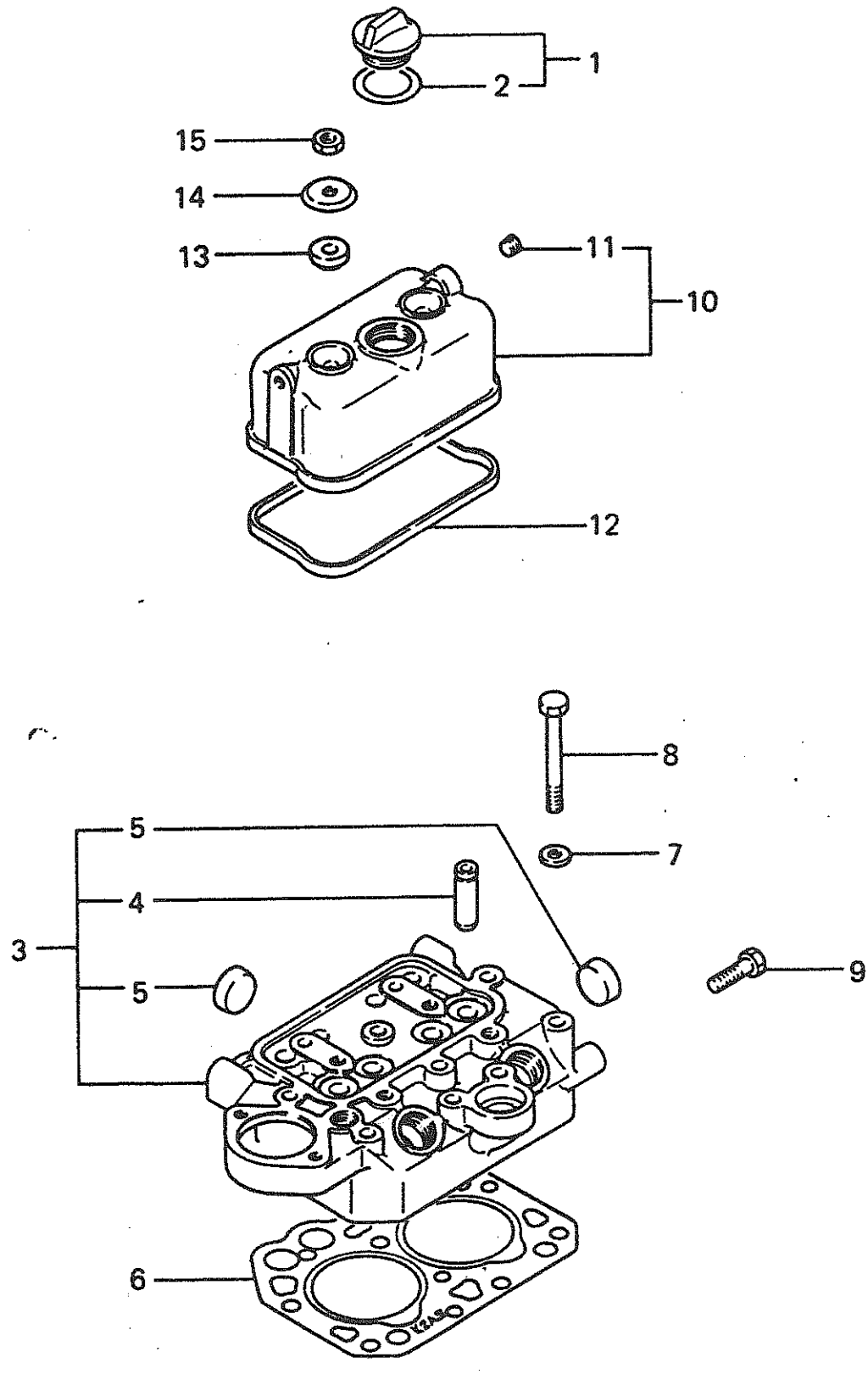
CYLINDER HEAD

Item	Part no.	Description	Quantity
1	135 21 003	CAP ASSY, oil filler	1
2	137 21 007	O-RING	1
3	137 21 001	CYLINDER HEAD ASSY	1
4	137 21 002	GUIDE, valve	4
5	132 20 012	CAP, sealing (25)	2
6	137 21 004	GASKET, cylinder head	1
7	137 21 005	WASHER, head bolt	10
8	137 21 006	BOLT, cylinder head	10
9	137 21 012	BOLT (7T:8X30)	1
10	137 21 009	COVER ASSY, rocker	1
11	137 21 017	PLUG, taper	1
12	137 21 010	GASKET, rocker cover	1
13	132 21 016	OIL SEAL	2
14	132 21 015	WASHER	2
15	131 20 050	NUT (7T:8)	2

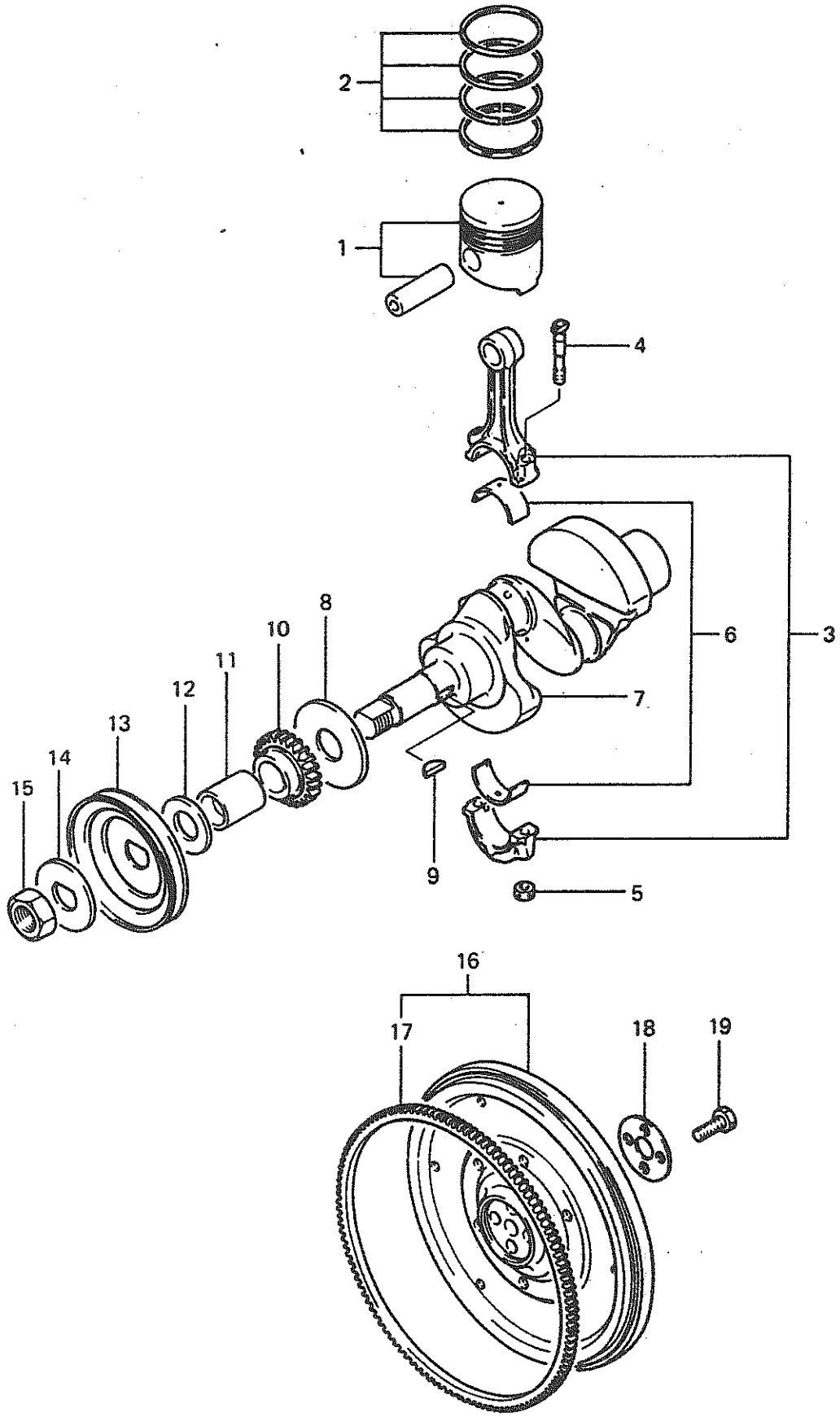
CYLINDER HEAD



MAIN MOVING PARTS

Item	Part no.	Description	Quantity
1	137 22 001	PISTON & PIN ASSY STD	2
—	137 22 002	PISTON & PIN ASSY 0.25 OS	2
—	137 22 003	PISTON & PIN ASSY 0.50 OS	2
—	137 22 004	PISTON & PIN ASTY 0.75 OS	2
2	137 22 006	RING SET, piston STD	2
—	137 22 007	RING SET, piston 0.25 OS	2
—	137 22 008	RING SET, piston 0.50 OS	2
—	137 22 009	RING SET, piston 0.75 OS	2
3-5	137 22 012	ROD ASSY, connecting	2
4	132 22 013	BOLT, connecting rod	4
5	132 22 011	NUT, connecting rod	4
6	137 22 014	BEARING SET, connecting rod STD	2
—	137 22 015	BEARING SET, connecting rod 0.25 US	2
—	137 22 016	BEARING SET, connecting rod 0.50 US	2
—	137 22 017	BEARING SET, connecting rod 0.75 US	2
7	137 22 018	CRANKSHAFT	1
8	137 22 019	PLATE, crankshaft	1
9	132 22 020	KEY, woodruff (5X9)	1
10	137 22 021	GEAR, crankshaft	1
11	137 22 022	PIECE DISTANCE	1
12	137 22 023	WASHER, plain (24)	1
13	137 22 024	PULLEY, crankshaft	1
14	137 22 025	WASHER, plain (24)	1
15	131 22 026	NUT (4T:24)	1
16	137 22 027	FLYWHEEL ASSY	1
17	137 22 029	GEAR, ring	1
18	137 22 030	WASHER, tongued	1
19	137 22 031	BOLT, especial	4

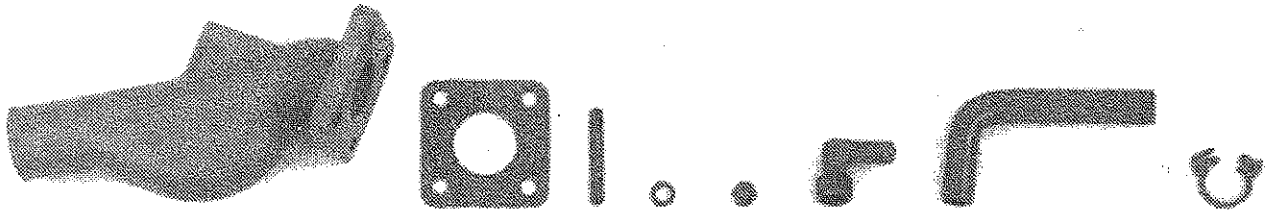
MAIN MOVING PARTS



COOLING SYSTEM

Item	Part no.	Description	Quantity
1	131 11 023	WED EXHAUST BEND	1
2	151 13 043	GASKET	1
3	135 13 016	STUD	4
4	530 33 008	WASHER, spring Ø 8	4
5	541 20 008	NUT	4
6	128 11 056	PIPE	1
7	131 11 037	PIPE, rubber	1
8	580 86 017	CLAMP	2
9	137 11 001	WATER COOLER	1
10	135 11 002	CAP FRONT, cooler	1
11	135 11 003	CAP REAR, cooler	1
12	137 11 004	PIPE, cooler	1
13	135 11 008	O'RING, Ø 45x54x4, 5	1
14	135 11 010	O'RING Ø 45x51x3	1
15	252 10 417	O'RING Ø 47x52x2, 5	1
16	137 21 035	GASKET, exhaust manifold	2
17	137 11 009	STUD	4
18	530 33 008	WASHER, spring Ø 8	4
19	541 20 008	NUT	4
20	560 00 057	WASHER, plain (copper)	4
21	132 11 016	NUT	2
22	131 11 038	DRAIN COCK, water cooler	1
23	560 00 062	WASHER, plain (copper)	1
24	147 11 011	NUT	1
25	151 11 002	FILLER CAP PIPE	1
26	147 11 003	FILLER CAP	1
27	137 11 020	FITTING, thermostat	1
28	132 11 054	GASKET	2
29	135 11 021	FITTING, water outlet	1
30	521 01 263	SCREW	2
31	530 38 008	WASHER	2
32	137 11 022	PIPE	1
33	540 82 025	HOSE, clamp	2
34	137 11 025	PIPE, water pump to cooler	1
35	137 11 017	PIPE, rubber	1
36	540 82 025	HOSE, clamp	4
37	137 11 026	ELBOW, water pump inlet	1
38	128 11 056	ELBOW, water pump outlet	2

COOLING SYSTEM



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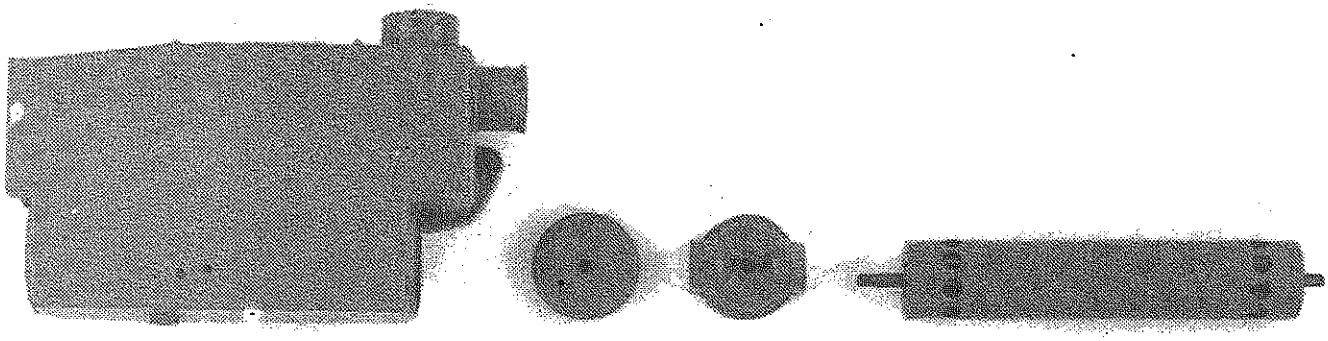

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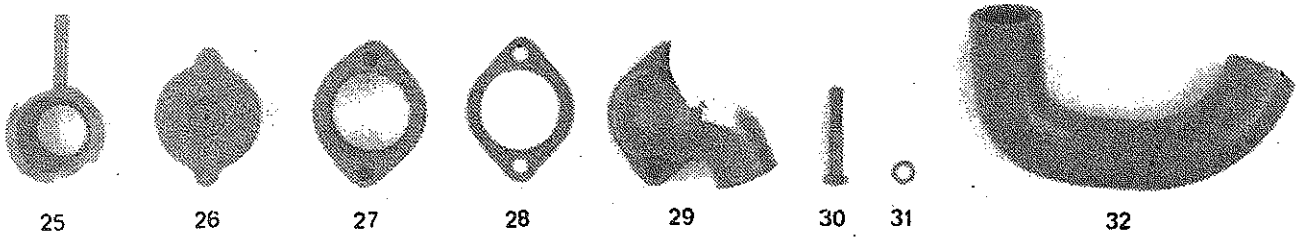

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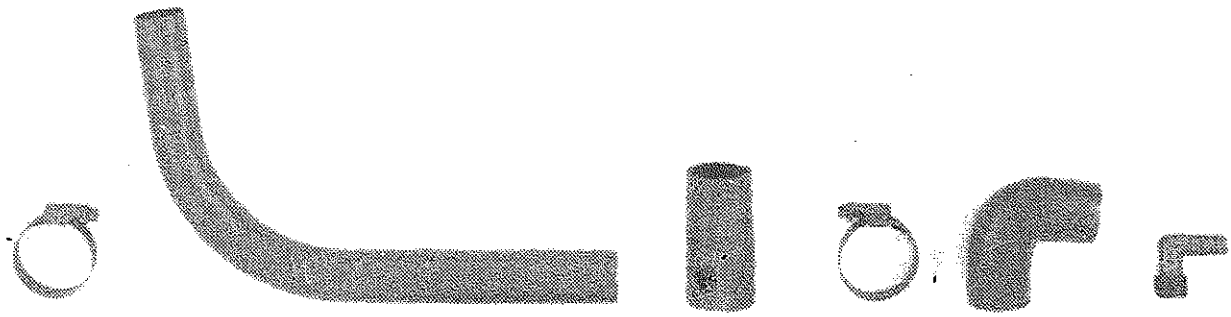

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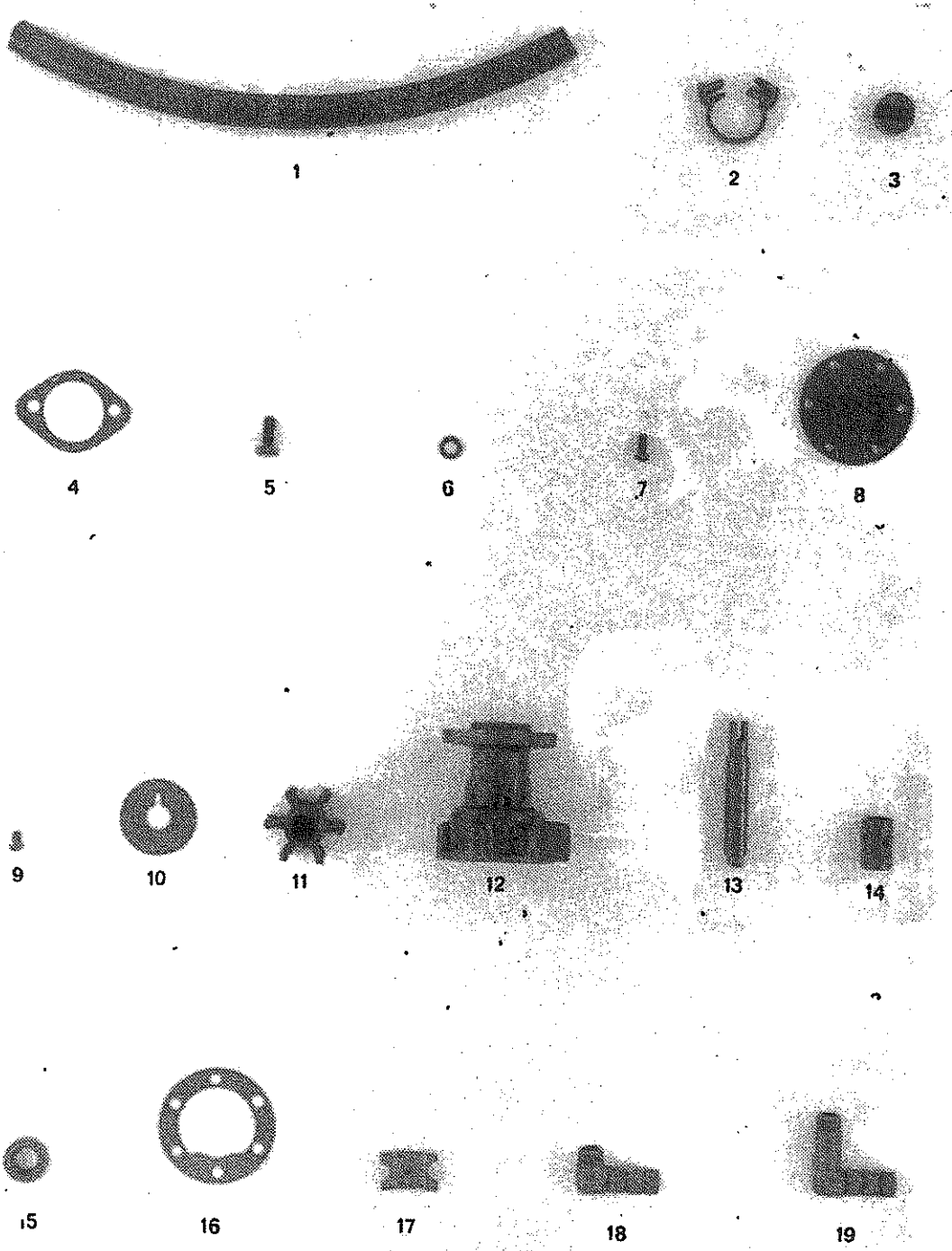
SEA COOLING SYSTEM

Item	Part no.	Description	Quantity
1	137 11 028	PIPE, water pump to cooler	1
2	580 86 017	HOSE, rubber	2
3	121 11 026	MAINTANANCE, water pump	1
4	321 11 023	GASKET, sea water pump	1
5	511 02 156	SCREW	2
6	570 00 353	WASHER, aluminium	2
—	321 11 000	SEA WATER PUMP ASSY	1
7	553 07 104	SCREW	6
8	321 11 002	COVER, water pump	1
9	553 07 102	SCREW	1
10	321 11 026	DISC, seal holdind	1
11	321 11 008	IMPELLER ASSY	1
12	321 11 001	BODY, sea water pump	1
13	321 11 010	SHAFT, pump	1
14	312 11 016	BEARING, ball	1
15	321 11 020	SEAL, lip	2
16	321 11 003	GASKET	1
17	321 11 005	CAM	1
18	121 11 078	ELBOW, water inlet	1
19	121 11 082	ELBOW, water outlet	1

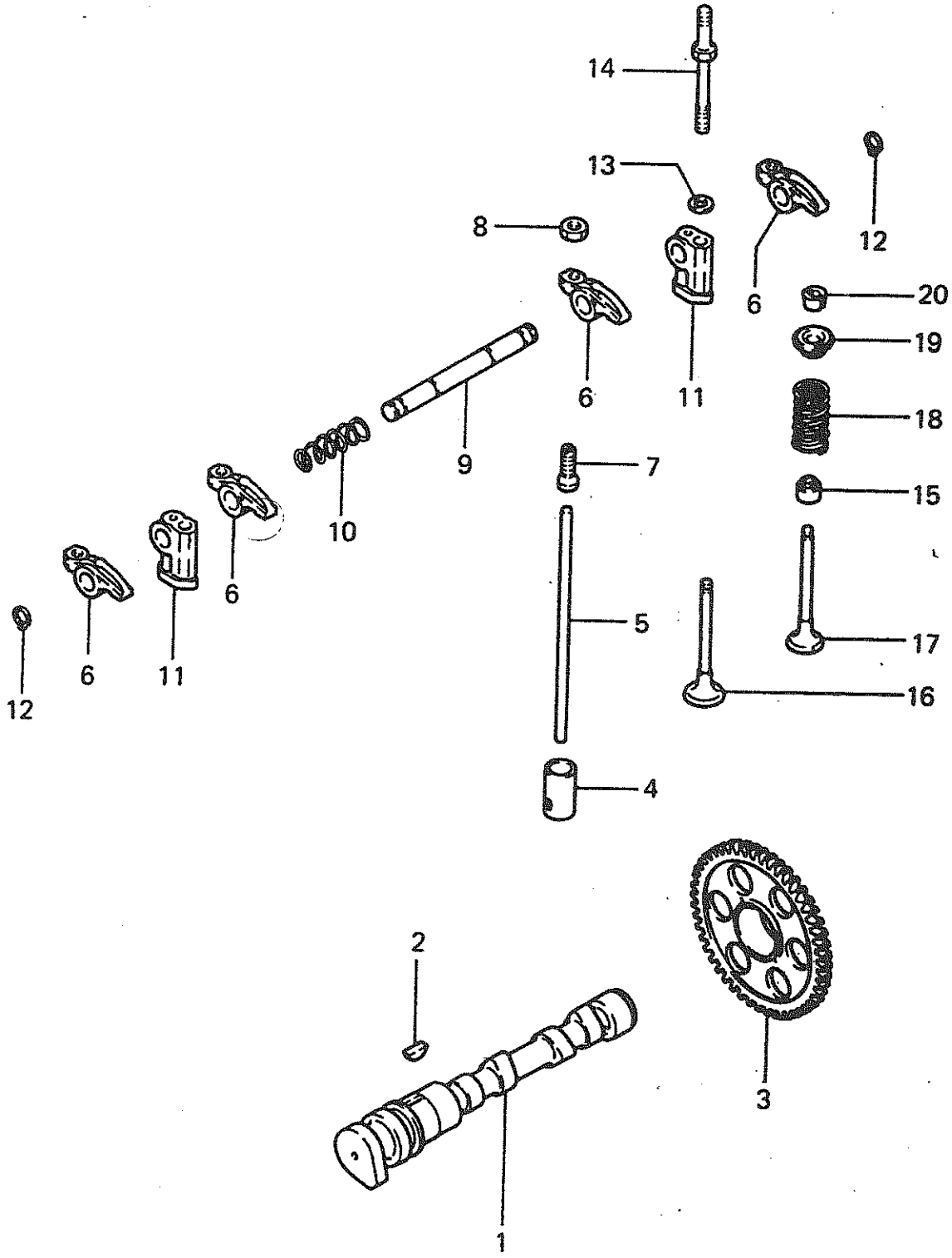
SEA COOLING SYSTEM



TIMMING PARTS

Item	Part no.	Description	Quantity
1	137 22 035	CAMSHAFT	1
2	131 22 036	KEY, woodruff (5X16)	1
3	137 22 037	GEAR, camshaft	1
4	137 22 040	TAPPET	4
5	137 22 041	ROD, push	4
—	137 22 061	ROD, push	4
6	137 22 042	ARM, rocker	4
7	137 22 044	SCREW, adjusting	4
8	137 22 045	NUT, jam (10)	4
9	137 22 046	SHAFT ASSY, rocker	1
10	137 22 047	SPRING, rocker shaft	1
11	137 22 048	STAY, rocker	2
12	137 22 051	SNAP RING, (12)	2
13	131 21 025	WASHER, plain (8)	2
14	137 22 053	BOLT, rocker stay	2
15	132 22 054	SEAL, valve stem	4
16	137 22 055	VALVE, inlet	2
17	137 22 056	VALVE, exhaust	2
18	137 22 057	SPRING, valve	4
19	137 22 058	RETAINER, valve spring	4
20	132 22 059	LOCK, valve spring retainer	8

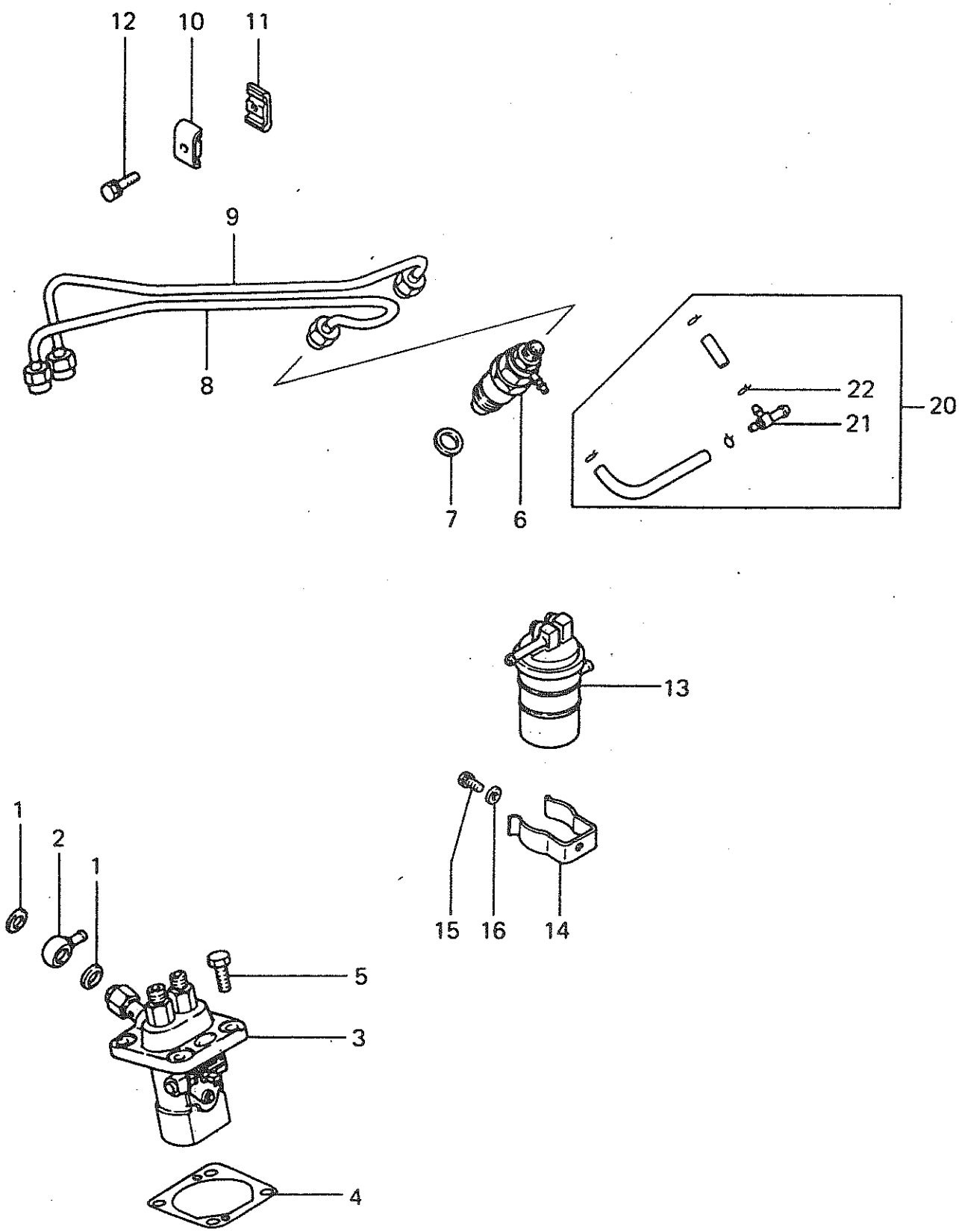
TIMMING PARTS



FUEL SUPPLY PARTS

Item	Part no.	Description	Quantity
1	131 24 001	WASHER, seal	2
2	131 24 002	COLLAR, union	1
3	137 25 001	PUMP ASSY, fuel injection	1
4	131 24 003	SHIM, adjusting 0.2t	C
—	131 24 004	SHIM, adjunting 0.3t	C
—	131 24 005	SHIM, adjusting 0.4t	C
—	131 24 006	SHIM, adjusting 0.5t	C
—	131 24 007	SHIM, adjusting 0.6t	C
—	131 24 008	SHIM, adjusting 0.7t	C
—	131 24 009	SHIM, adjusting 0.8t	C
—	131 24 010	SHIM, adjusting 0.9t	C
—	131 24 011	SHIM, adjusting 1.0t	C
5	131 24 012	BOLT (4T:8X20)	4
6	137 26 001	NOZZLE & HOLDER ASSY	2
7	131 24 013	GASKET	2
8	137 24 015	PIPE ASSY, fuel injection (No.1)	1
9	137 24 016	PIPE ASSY, fuel injection (No.2)	1
10	131 24 018	CLAMP (A)	1
11	131 24 017	CLAMP (B)	1
12	132 24 024	BOLT, with washer (4T:6X25)	1
13	131 24 020	FILTER ASSY, fuel	1
14	131 24 021	CLAMP. filter	1
15	131 23 005	BOLT, with washer (7T:6X12)	1
16	131 24 023	WASHER, plain (6)	1
20	137 24 025	PIPE ASSY, fuel return	1
21	137 24 026	JOINT	1
22	137 24 027	CLAMP, hose	4

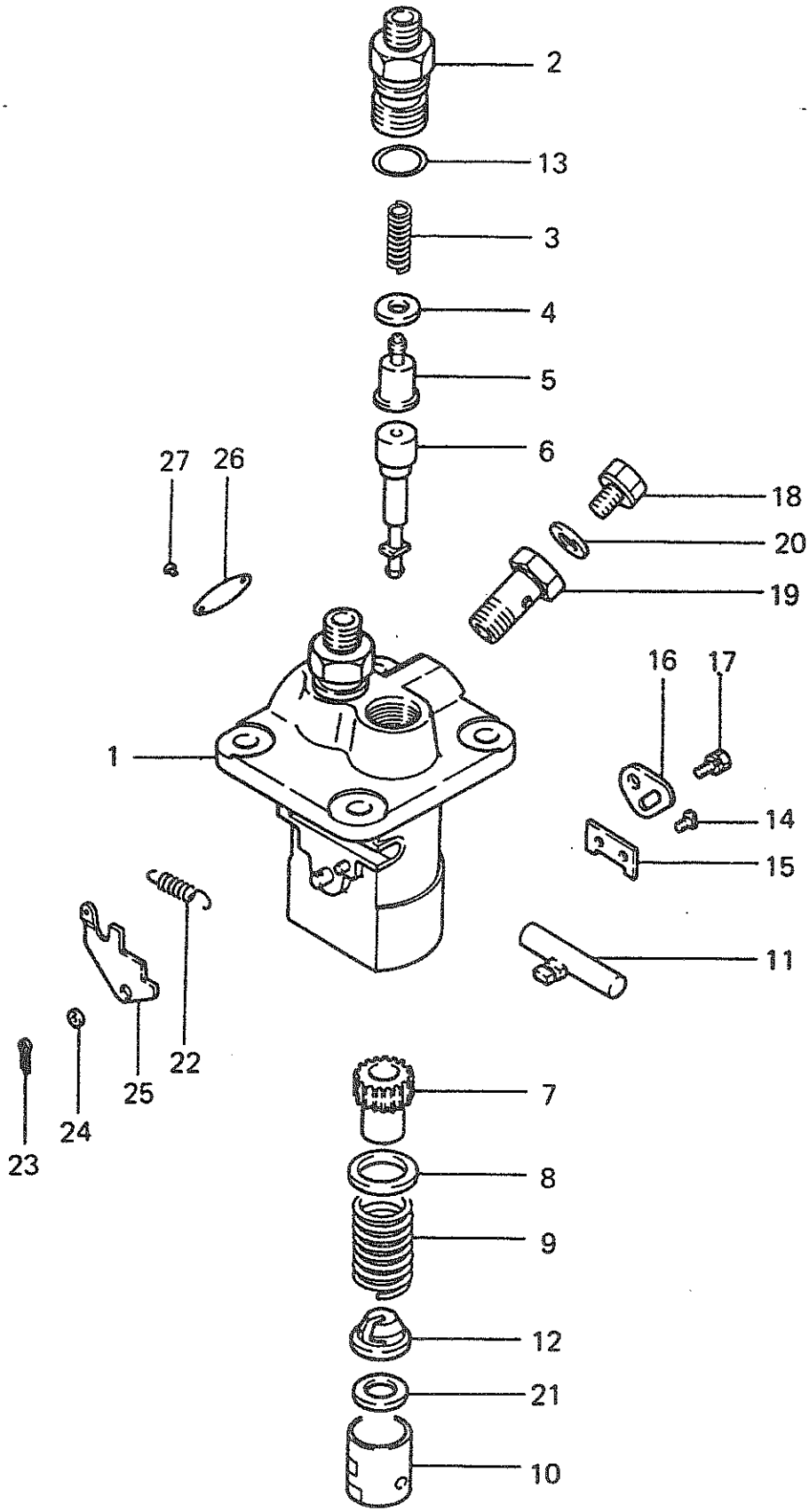
FUEL SUPPLY PARTS



FUEL INJECTION PUMP

Item	Part no.	Description	Quantity
1-27	137 25 001	PUM ASSY, fuel injection	1
1	131 25 005	HOUSING SUB ASSY	1
2	137 25 004	HOLDER, delivery valve	2
3	131 25 006	SPRING, delivery valve	2
4	131 25 007	GASKET, delivery valve	2
5	131 25 008	VALVE SUB ASSY	2
6	137 25 009	ELMENT SUB ASSY	2
7	131 25 010	SLEEVE, control	2
8	131 25 011	SEAT, spring upper	2
9	131 25 012	SPRING, plunger	2
10	131 25 021	TAPPET SUB ASSY	2
11	137 25 006	RACK ASSY, control	1
12	131 25 013	SEAT, spring	2
13	131 25 033	O-RING	2
14	131 25 022	PIN, tappet guide	2
15	131 25 023	PLATE	1
16	131 25 030	PLATE ASSY, adjusting	1
17	131 25 028	BOLT, with washer	1
18	131 25 026	SCREW, air breather	1
19	137 25 027	SCREW, follow	1
20	131 25 025	WASHER	1
21	131 25 014	SHIM, adjusting t = 0.6	C
—	131 25 015	SHIM, adjusting t = 0.2	C
—	131 25 016	SHIM, adjusting t = 0.3	C
—	131 25 017	SHIM, adjusting t = 0.4	C
—	131 25 018	SHIM, adjusting t = 0.5	C
—	131 25 019	SHIM, adjusting t = 0.25	C
—	131 25 020	SHIM, adjusting t = 0.35	C
—	137 25 021	SHIM, adjusting t = 0.45	C

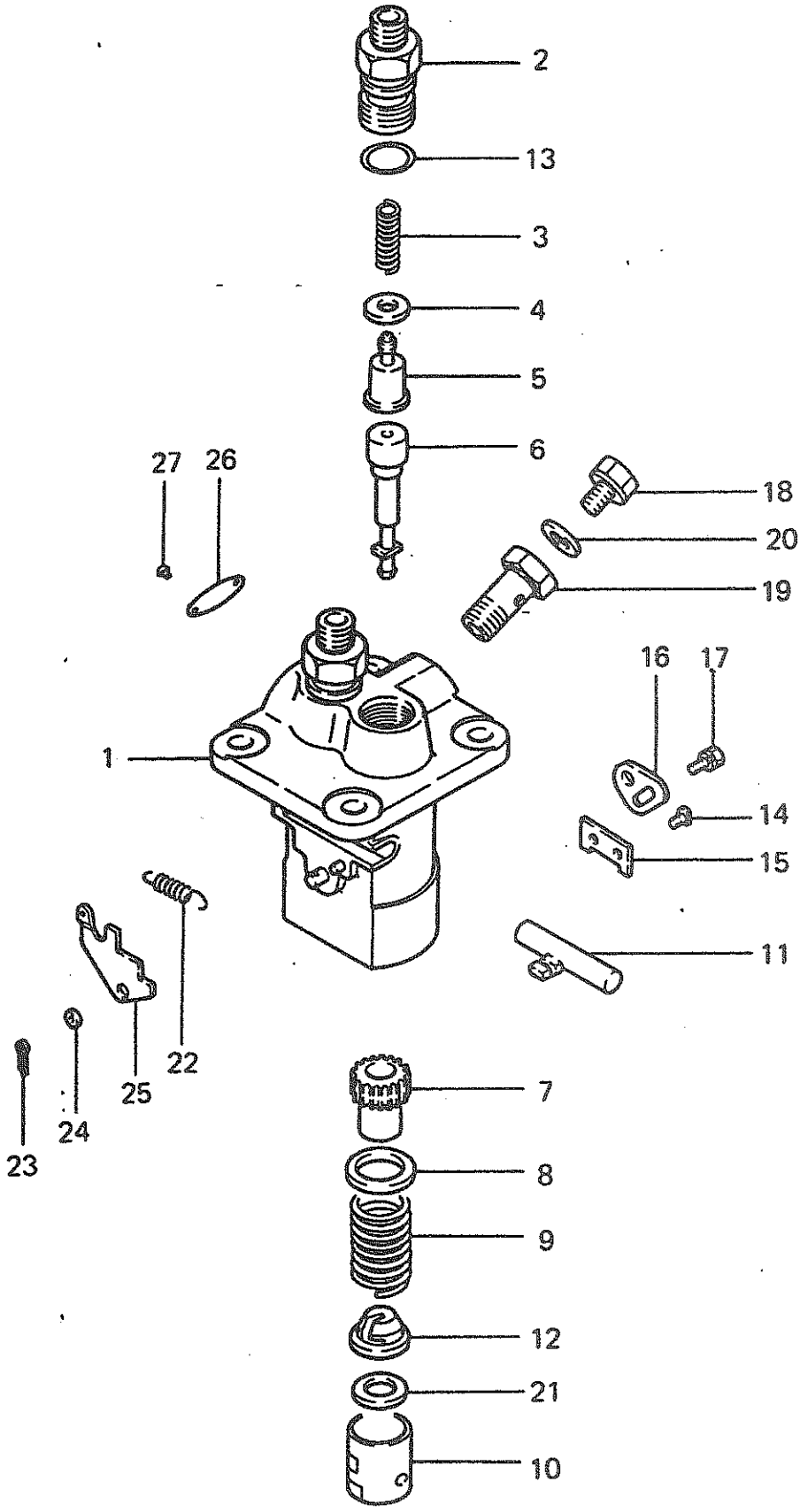
FUEL INJECTION PUMP



FUEL INJECTION PUMP

Item	Part no.	Description	Quantity
—	137 25 022	SHIM, adjusting t = 0.55	C
—	137 25 023	SHIM, adjusting t = 0.65	C
22	135 25 031	SPRING, return	1
23	131 25 032	PIN, split	1
24	131 25 034	WASHER, plate t = 0.1	C
—	131 25 037	WASHER, plate t = 0.2	C
—	131 25 035	WASHER, plate t = 0.25	C
—	131 25 036	WASHER, plate t = 0.5	C
25	137 25 043	STOPPER	C
—	137 25 044	STOPPER	C
—	135 25 045	STOPPER	C
—	137 25 045	STOPPER	C
—	135 25 046	STOPPER	C
—	137 25 046	STOPPER	C
—	131 25 038	STOPPER	C
—	137 25 038	STOPPER	C
—	131 25 039	STOPPER	C
—	137 25 039	STOPPER	C
—	131 25 040	STOPPER	C
—	137 25 040	STOPPER	C
—	131 25 041	STOPPER	C
—	137 25 041	STOPPER	C
—	131 25 042	STOPPER	C
26	137 25 002	PLATE, name	1
27	131 25 003	RIVET	2

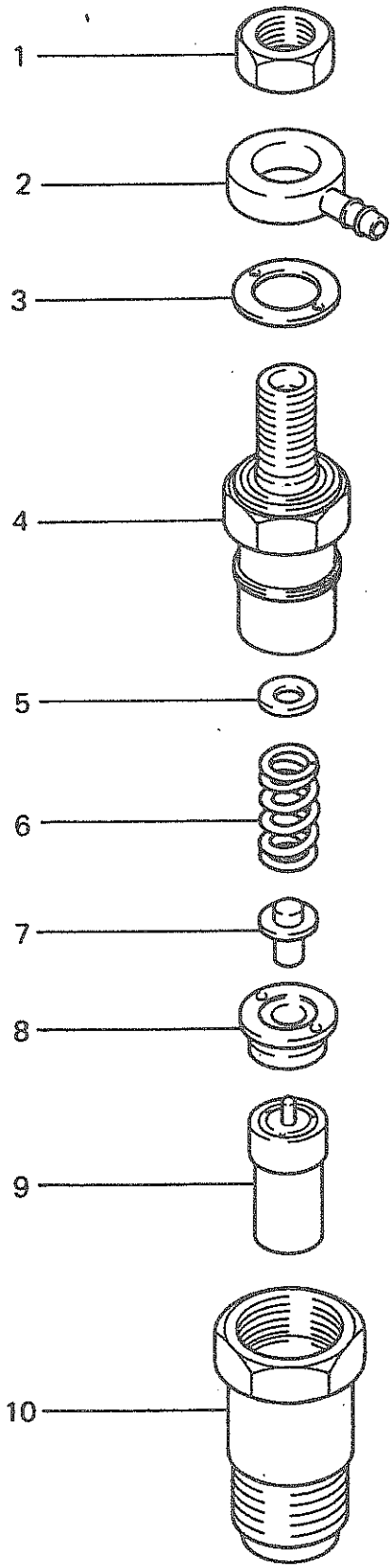
FUEL INJECTION PUMP



NOZZLE & NOZZLE HOLDER

Item	Part no.	Description	Quantity
1-10	137 26 001	NOZZLE & HOLDER ASSY	2
1	137 26 009	NUT, hexagon	2
2	137 26 005	RING SUB ASSY	2
3	137 26 008	WASHER	2
4	137 26 002	BODY SUB ASSY	2
5	137 26 010	WASHER 1.0t	C
—	137 26 011	WASHER 1.05t	C
—	137 26 012	WASHER 1.1t	C
—	137 26 013	WASHER 1.15t	C
—	137 26 014	WASHER 1.2t	C
—	137 26 015	WASHER 1.25t	C
—	137 26 016	WASHER 1.3t	C
—	137 26 017	WASHER 1.35t	C
—	137 26 018	WASHER 1.4t	C
—	137 26 019	WASHER 1.45t	C
—	137 26 020	WASHER 1.5t	C
—	137 26 021	WASHER 1.55t	C
—	137 26 022	WASHER 1.6t	C
—	137 26 023	WASHER 1.65t	C
—	137 26 024	WASHER 1.7t	C
—	137 26 025	WASHER 1.75t	C
—	137 26 026	WASHER 1.8t	C
—	137 26 027	WASHER 1.85t	C
—	137 26 028	WASHER 1.9t	C
—	137 26 029	WASHER 1.95t	C
6	137 26 004	SPRING, pressure	2
7	131 26 003	PIN, pressure	2
8	131 26 007	PIECE, distance	2
9	131 26 018	NOZZLE ASSY	2
10	137 26 006	NUT, retaining	2

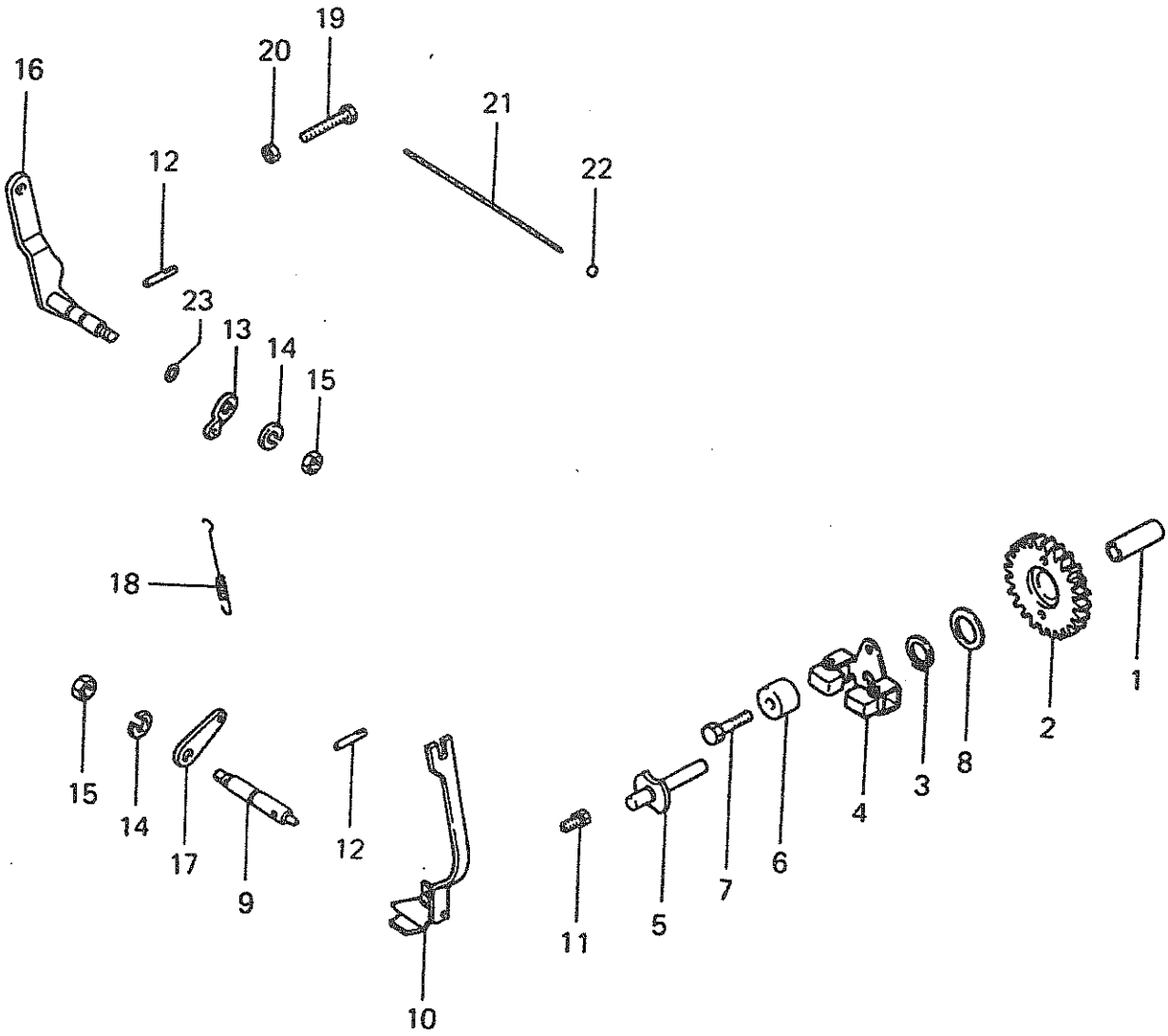
NOZZLE & NOZZLE HOLDER



GOVERNOR PARTS

Item	Part no.	Description	Quantity
1	137 23 004	SLEEVE	1
2	137 23 001	GEAR ASSY, governor	1
3	137 23 002	SNAP RING (18)	1
4	137 23 003	WEIGHT ASSY, governor	1
5	137 23 006	SHAFT ASSY, sliding	1
6	137 23 005	STOPPER	2
7	137 23 008	BOLT, with washer (7T:6X25)	1
8	137 23 011	WASHER	1
9	131 23 016	SHAFT, governor	1
10	137 23 007	LEVER, fork	1
11	131 23 008	BOLT, with washer (7T:6X14)	1
12	131 23 009	PIN, grooved	2
13	131 23 015	LEVER, governor spring	1
14	131 20 049	WASHER, spring (8)	2
15	131 23 013	NUT, jam (4T:8)	2
16	137 23 014	LEVER ASSY, speed control	1
17	137 23 015	LEVER (C), governor	1
18	137 23 016	SPRING, governor	1
19	131 23 017	BOLT, high speed set	1
20	131 23 018	NUT (4T:6)	1
21	131 23 020	WIRE	1
22	131 23 019	METAL, sealing	1
23	131 23 021	O-RING (7)	1

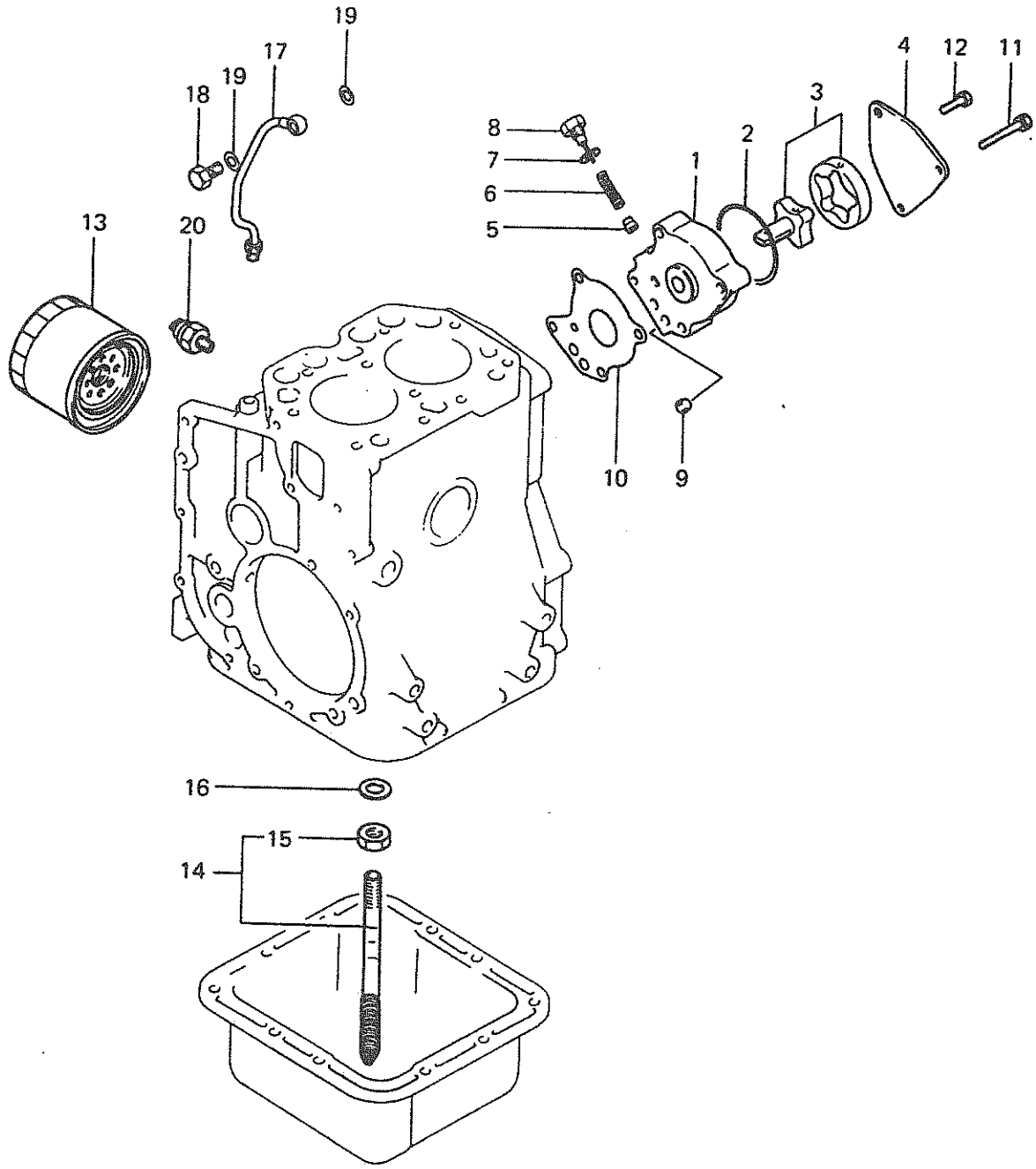
GOVERNOR PARTS



LUBRICATING PARTS

Item	Part no.	Description	Quantity
1-9	137 24 040	OIL PUMP ASSY	1
1	137 24 046	BODY, oil pump	1
2	137 24 049	O-RING	1
3	137 24 042	ROTOR ASSY	1
4	137 24 061	COVER, OIL PUMP	1
5	137 24 043	VALVE, relief	1
6	137 24 044	SPRING, oil relief	1
7	131 24 046	GASKET (10)	1
8	137 24 045	PLUG, relief valve	1
9	131 20 011	PLUG, taper (PT-1/8)	2
10	137 24 041	GASKET, pump body	1
11	137 24 050	BOLT, with washer (7T:6X40)	3
12	137 20 042	BOLT (7T:6X20)	1
13	131 24 051	FILTER ASSY, oil	1
14	137 24 052	SCREEN ASSY, oil	1
15	131 24 053	NUT, jam (4T:12)	1
16	131 24 001	WASHER, seal (12)	1
17	137 24 057	PIPE ASSY, oil	1
18	131 24 058	BOLT, eye (8)	1
19	131 24 059	GASKET (8)	2
20	131 24 060	SWITCH ASSY, oil pressure	1

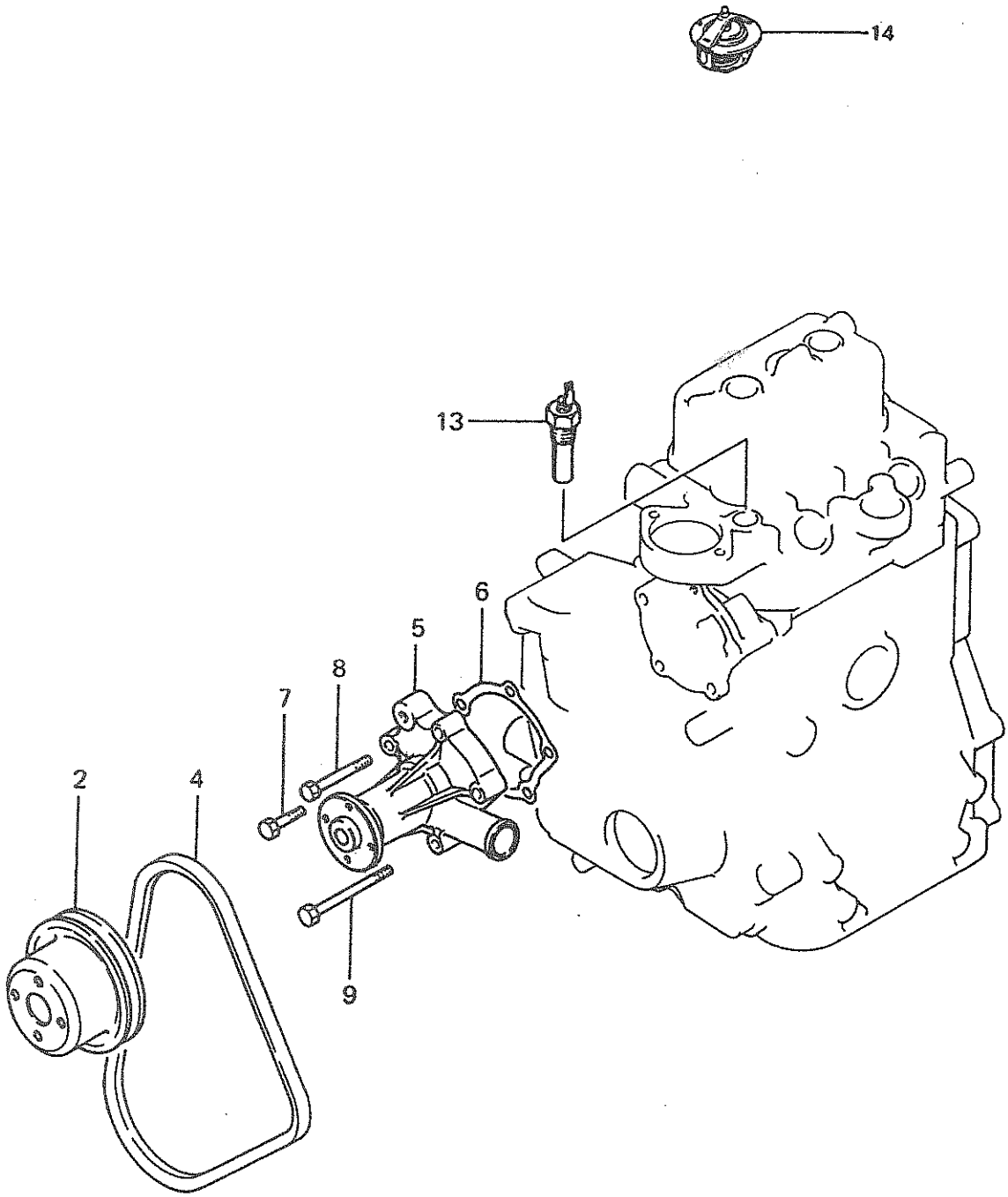
LUBRICATING PARTS



COOLING PARTS

Item	Part no.	Description	Quantity
2	132 21 021	PULLEY, water pump	1
3	131 23 005	BOLT, with washer (7T:6X12)	4
4	137 21 028	BELT, fan (HM POC = 710)	1
5	137 21 020	PUMP ASSY, water	1
6	137 21 022	GASKET, water pump	1
7	137 21 023	BOLT (7T:6X30)	1
8	137 21 024	BOLT (7T:6X65)	3
9	137 21 025	BOLT (7T:6X80)	1
13	131 27 080	SWITCH, thermo (111°C)	1
14	132 21 027	THERMOSTAT (71)	1

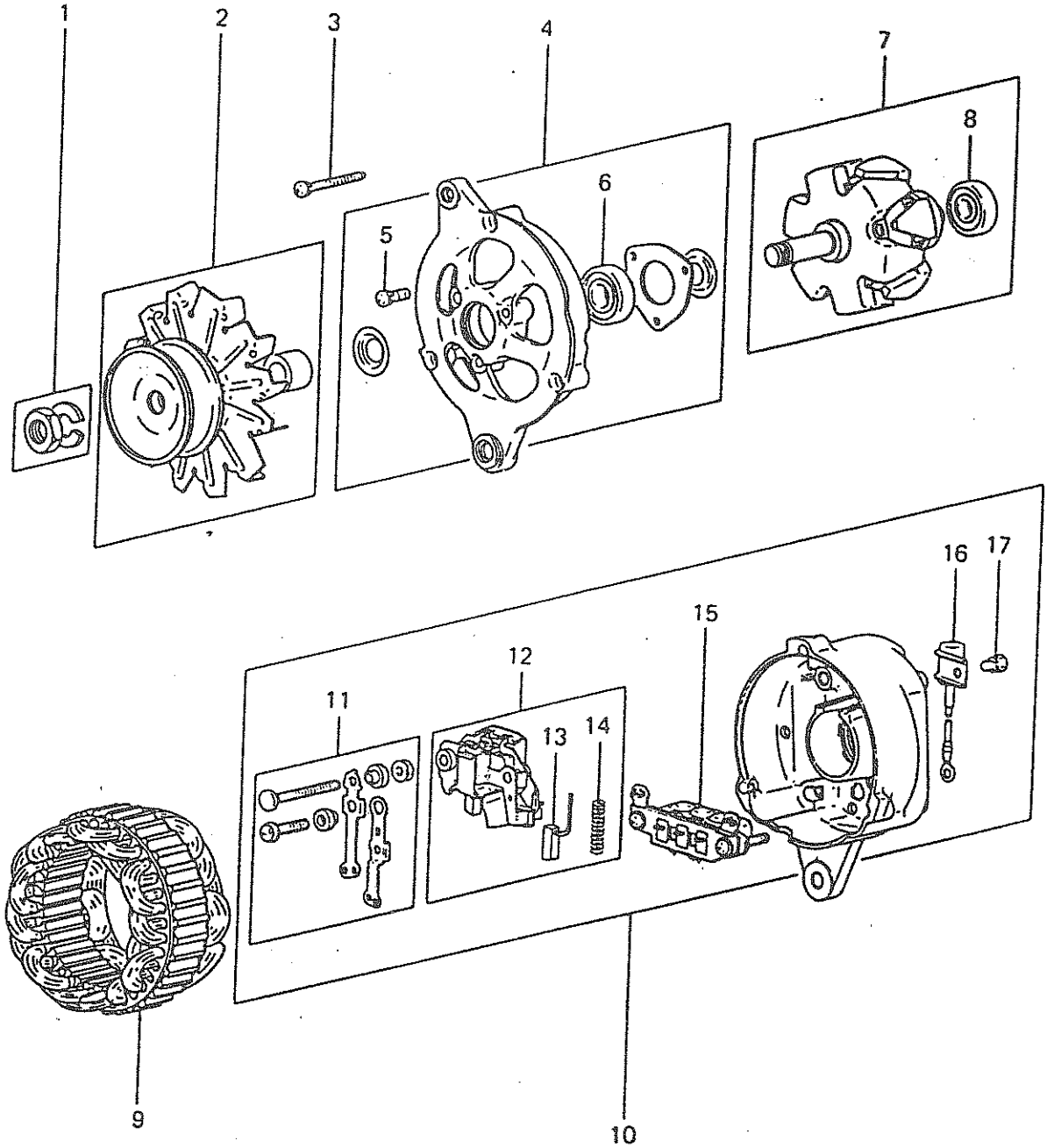
COOLING PARTS



ALTERNATOR

Item	Part no.	Description	Quantity
1-17	136 27 010	ALTERNATOR ASSY	1
†	132 27 051	NUT, set	1
2	136 27 052	PULLEY ASSY	1
3	136 27 053	BOLT SET, through	1
4	136 27 054	BRACKET ASSY, front	1
5	132 27 055	SCREW SET	1
6	136 27 056	BEARING, front	1
7	132 27 057	ROTOR ASSY	1
8	132 27 058	BEARING, rear	1
9	136 27 059	STATOR ASSY	1
10	136 27 060	BRACKET ASSY, rear	1
11	136 27 061	TERMINAL SET	1
12	136 27 016	REGULATOR ASSY	1
13	134 27 065	BRUSH	2
14	132 27 066	SPRING BRUSH	2
15	136 27 067	RECTIFIER	1
16	136 27 068	CONDENSER ASSY	1
17	136 27 069	BOLT, with washer	1

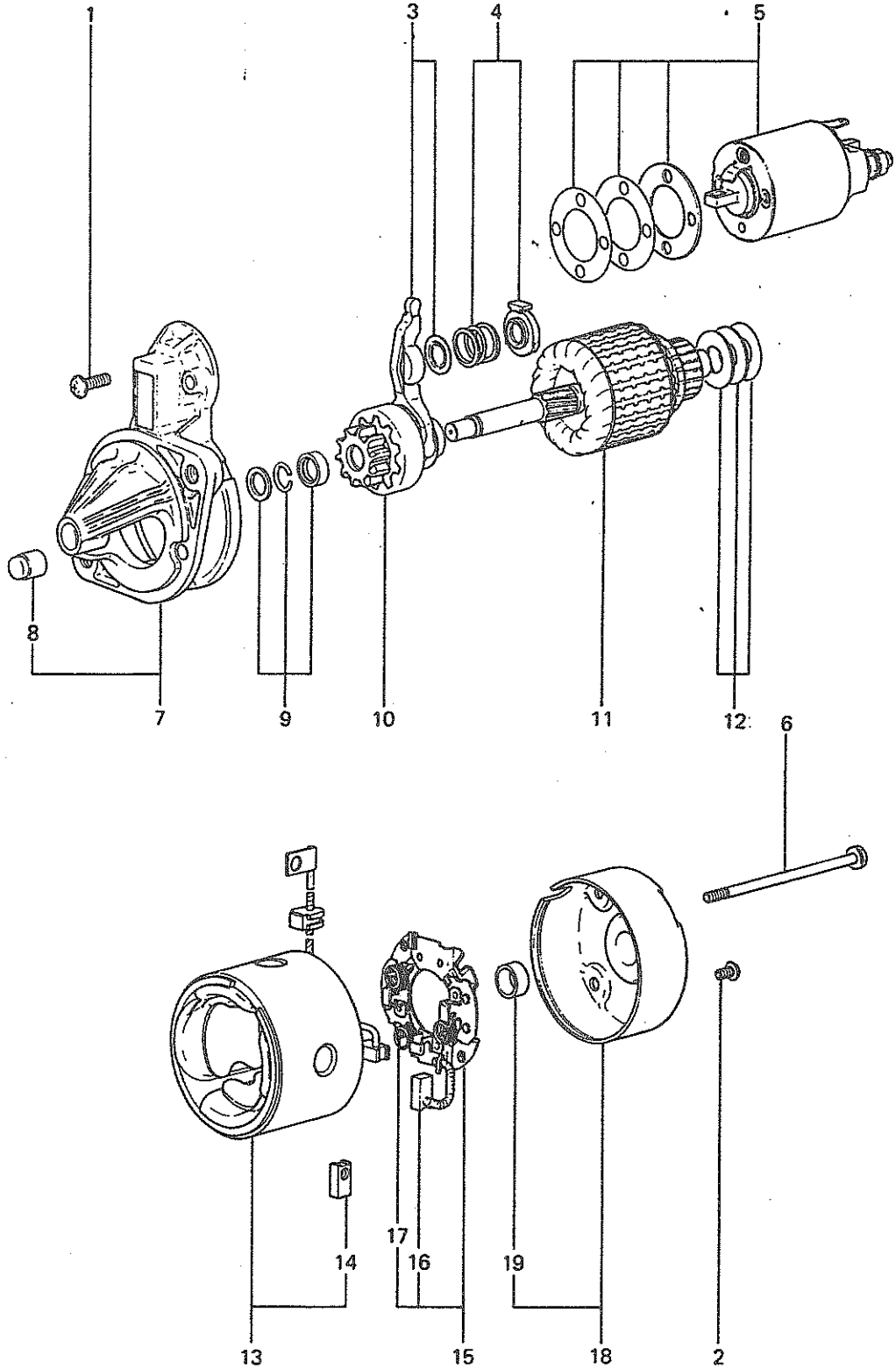
ALTERNATOR



STARTER

Item	Part no.	Description	Quantity
1-19	137 27 001	STARTER ASSY (M003T32481:0.9KW)	1
1,2	137 27 101	SCREW SET	1
3	137 27 102	LEVER ASSY	1
4	131 27 103	SPRING SET	1
5	131 27 104	SWITCH ASSY	1
6	137 27 114	BOLT SET	1
7	137 27 106	BRACKET ASSY, front	1
8	137 27 107	BEARING, front	1
9	131 27 108	STOPPER SET	1
10	137 27 109	CLUTCH, over running	1
11	137 27 111	ARMATURE	1
12	135 27 112	WASHER SET	1
13	137 27 113	YOKE ASSY	1
14	137 27 116	BRUSH	2
15	137 27 117	HOLDER ASSY, brush	1
16	137 27 119	BRUSH	1
17	131 27 118	SPRING, brush	3
18	135 27 120	BRACKET ASSY, rear	1
19	131 27 121	BEARING, rear	1

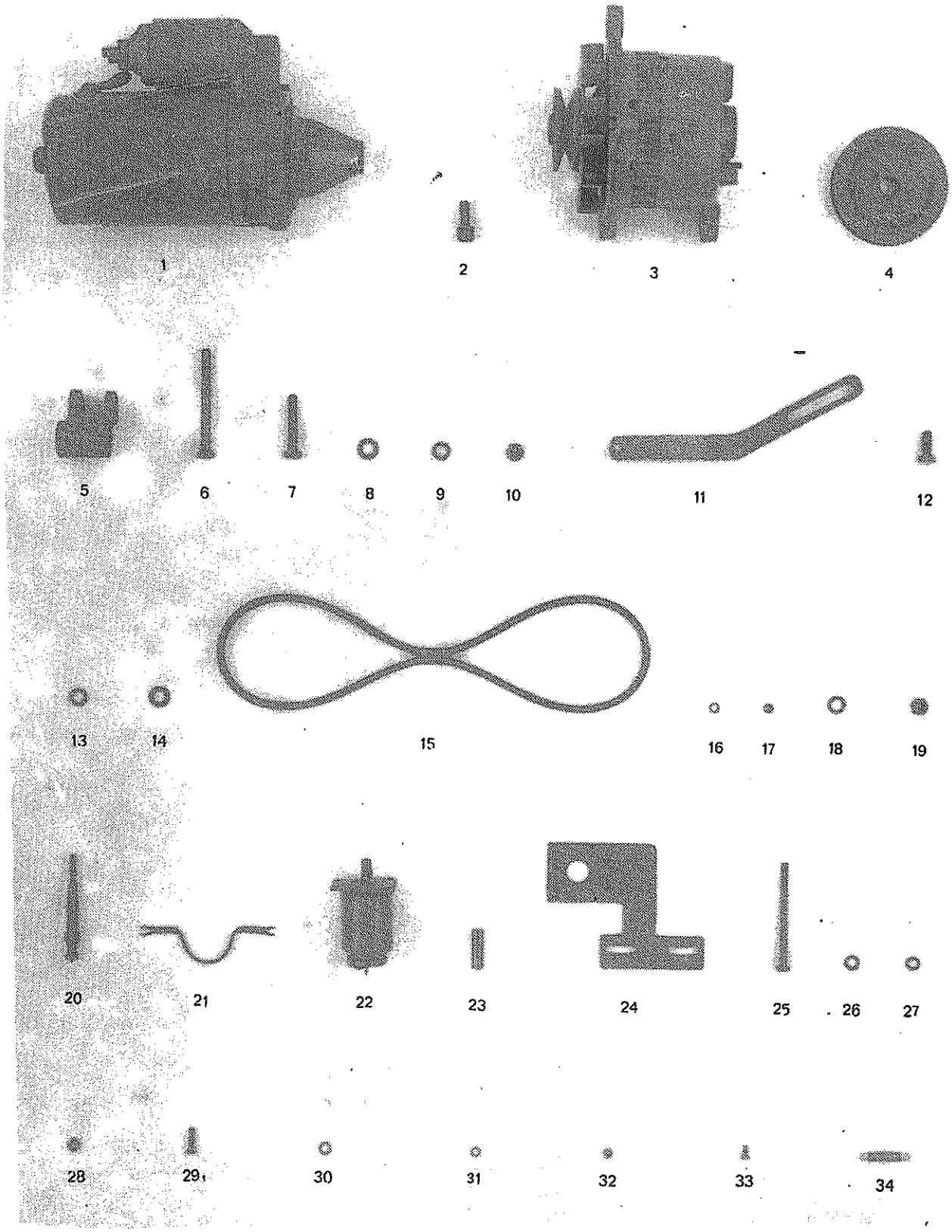
STARTER



ELECTRICAL EQUIPMENT

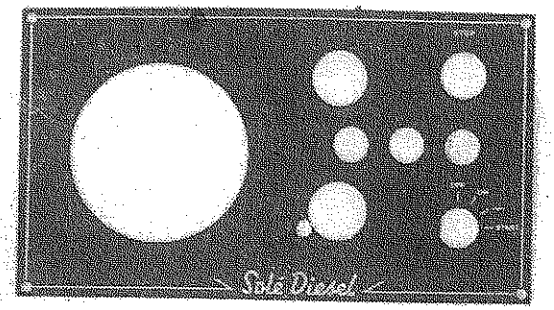
Item	Part no.	Description	Quantity
1	137 27 001	STARTER ASSY	1
2	131 27 012	SCREW	2
3	136 27 010	ALTERNADOR, ASSY	1
4	137 17 010	PULLEY, alternator	1
5	137 17 011	BRACKET, alternator	1
6	137 27 008	SCREW	1
7	521 01 262	SCREW	1
8	510 30 008	WASHER, plain Ø 8	2
9	530 33 008	WASHER, SPRING Ø 8	2
10	521 20 008	NUT	2
11	137 17 012	BRACE, alternator	1
12	521 02 257	SCREW	1
13	530 33 008	WASHER, spring Ø 8	1
14	510 30 008	WASHER, plain Ø 8	1
15	137 17 013	V BELT, alternator	1
16	530 33 005	WASHER, spring Ø 5	1
17	511 20 005	NUT	1
18	530 33 008	WASHER, spring Ø 5	1
19	521 20 008	NUT	1
20	137 27 017	GLOW, plug	2
21	137 27 018	WIRE, glow plug lead	1
22	131 17 001	STOP, selenoid	1
23	137 17 002	STUD, selenoid	1
24	137 17 003	BRACKET, selenoid	1
25	521 01 169	SCREW	2
26	510 30 006	WASHER, plain Ø 6	2
27	530 33 006	WASHER, spring Ø 6	2
28	521 20 006	NUT	2
29	511 02 106	SCREW	4
30	510 30 005	WASHER, plain Ø 5	4
31	530 33 005	WASHER, spring Ø 5	4
32	511 20 005	NUT	4
33	511 08 052	SCREW	1
34	146 19 040	SPRING, return selenoid	1

ELECTRICAL EQUIPMENT



ELECTRICAL EQUIPMENT

Item	Part no.	Description	Quantity
—	609 37 000	ELECTRICAL PANEL ASSY	1
1	609 31 001	PANEL	1
2	609 34 010	TACHOMETTER	1
3	609 00 031	SWITCH, starting	1
4	609 00 040	SWITCH, stop	1
5	609 00 045	BULB, 12 V.	3
6	609 00 050	LAMP, oil press	1
7	609 00 051	LAMP, battery charge	1
8	609 00 052	LAMP, water temp.	1
9	609 00 060	ALARM, switch	1
10	609 37 095	LAMP, glow	1
11	609 00 110	DIODE	1
—	609 00 115	FUSE 3 A.	2
12	609 37 200	CABLES, electrical	1
13	609 00 116	FUSE 40 A.	1
14	580 88 272	CLAMP	1
15	580 88 271	CLAMP	2



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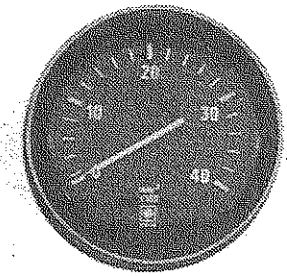

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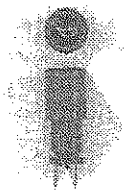

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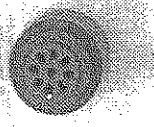

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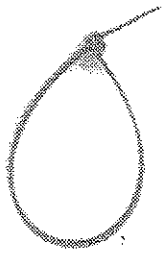

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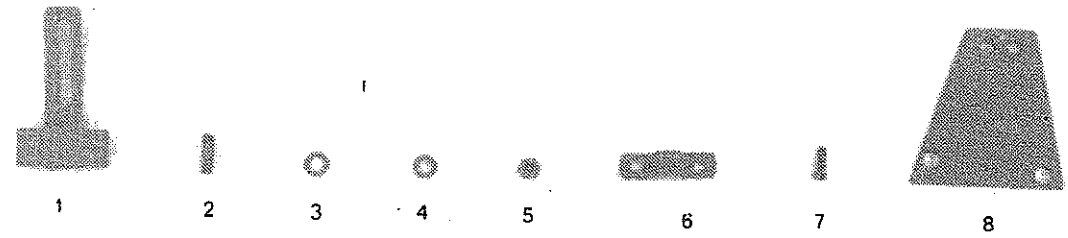
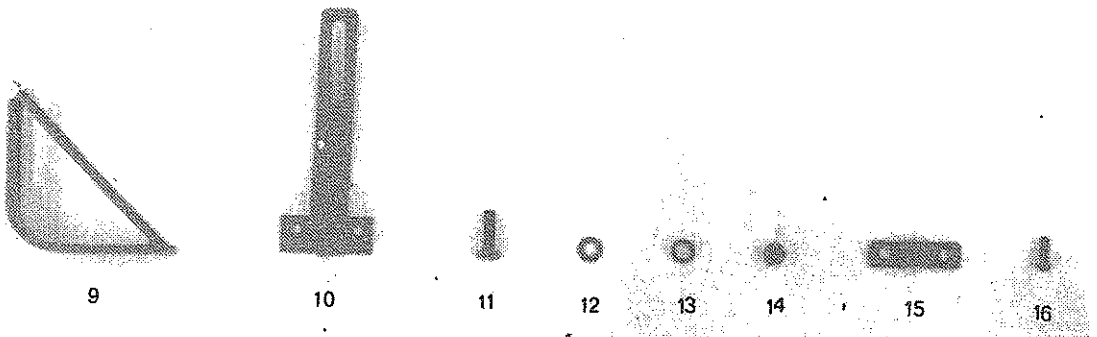
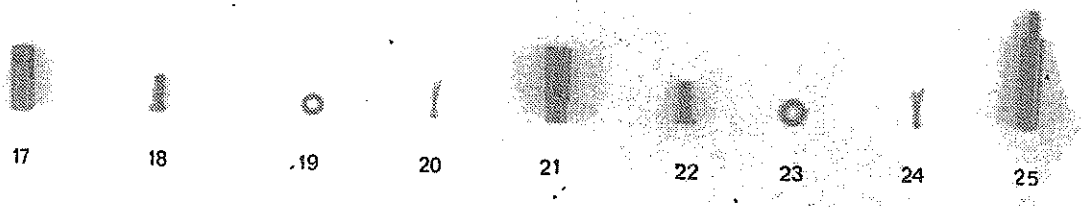
REMOTE CONTROL

Item	Part no.	Description	Quantity
1	137 19 004	BRACKET, engine control	1
2	135 17 003	STUD	2
3	510 30 006	WASHER, plain Ø 6	2
4	530 33 006	WASHER, spring Ø 6	2
5	511 20 006	NUT	2
6	147 19 013	CLAMP, cable	1
7	553 07 105	SCREW	2
8	131 19 015	BRACKET, gear box control	1
9	121 19 020	BRACKET, gear box control	1
10	121 19 021	BRACKET, clamp	1
11	511 02 157	SCREW	4
12	510 30 006	WASHER, plain Ø 6	4
13	530 33 006	WASHER, spring Ø 6	4
14	511 20 006	NUT	4
15	147 19 013	CLAMP, cables	1
16	553 07 105	SCREW	2
17	147 19 026	YOKE, gear control	1
18	147 19 027	PIN	1
19	510 30 005	WASHER, plain Ø 5	2
20	510 51 107	PIN	1
21	131 19 003	YOKE, gas control	1
22	147 19 034	PIN	1
23	510 30 063	WASHER, plain Ø 6	2
24	510 51 107	PIN	1
25	131 17 006	TOP, stop	1
26	530 33 006	WASHER, spring	1
27	511 20 006	NUT	1
28	137 19 006	BRACKET, low speed	1
29	131 19 005	SPRING, control	1
30	511 02 160	SCREW	1
31	510 31 006	WASHER, plain Ø 6	1
32	511 20 006	NUT	2

REMOTE CONTROL



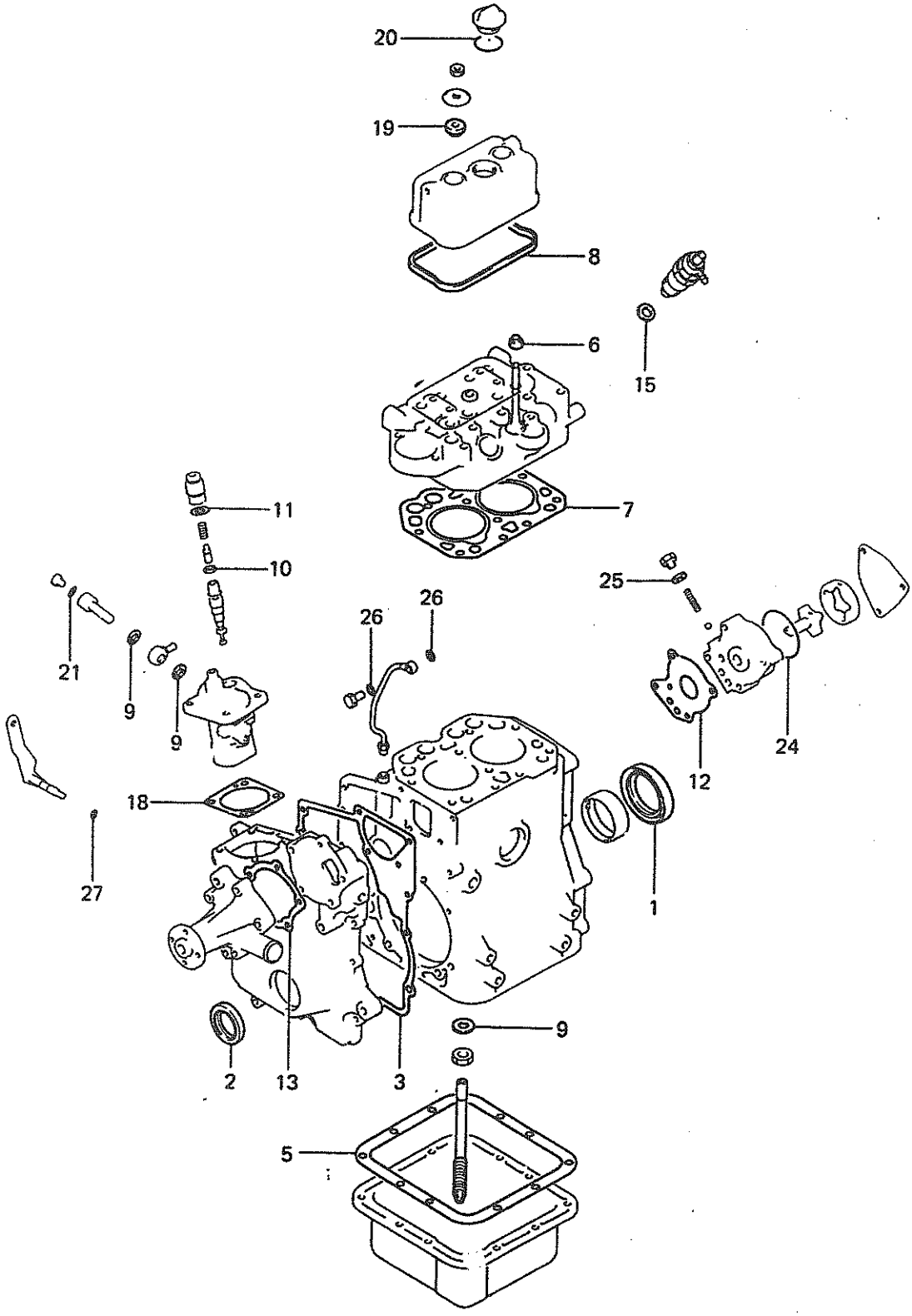




REPAIR GASKET KIT

Item	Part no.	Description	Quantity
1-27	137 20 101	GASKET KIT	1
1	137 20 019	OIL SEAL, crank shaft rear	1
2	132 20 039	OIL SEAL	1
3	137 20 040	GASKET, gear case	1
5	137 20 033	GASKET, oil pan	1
6	132 22 054	SEAL, valve stem	4
7	137 21 004	GASKET, cylinder head	1
8	137 21 010	GASKET, rocker cover	1
9	131 24 001	WASHER, seal	3
10	131 25 007	GASKET, delivery valve	2
11	131 25 033	O-RING	2
12	137 24 041	GASKET, oil pump	1
13	137 21 022	GASKET, water pump	1
15	131 24 013	GASKET, nazzle holder	2
16	137 21 035	GASKET, exhaust manifold	2
18	131 24 003	SHIM, adjusting t = 0.2	1
—	131 24 004	SHIM, adjusting t = 0.3	1
—	131 24 005	SHIM, adjusting t = 0.4	1
—	131 24 009	SHIM, adjusting t = 0.8	1
19	132 21 016	OIL SEAL	2
20	137 21 007	O-RING (30)	1
21	131 25 025	WASHER	1
22		GASKET (10)	2
23		GASKET (12)	1
24	137 24 049	O-RING	1
25	131 24 046	GASKET	1
26	137 24 059	GASKET	2
27	131 23 021	O-RING	1

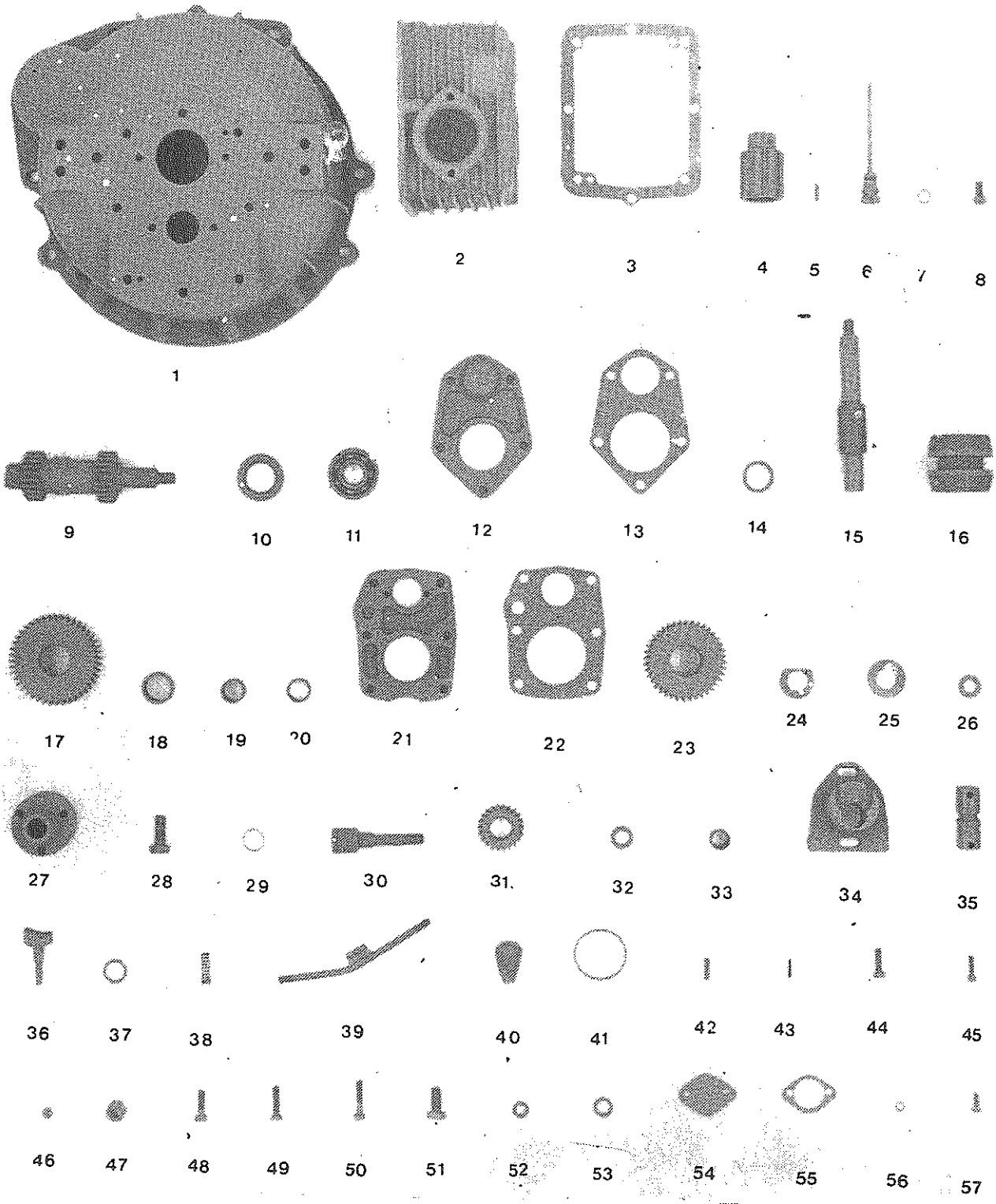
REPAIR GASKET KIT



GEAR-BOX

Item	Part no.	Description	Quantity	
			2:1	3:1
1/53	223 13 000	RONIM III GEAR BOX 2:1 RED	1	—
1/53	223 15 000	RONIM III GEAR BOX 3:1 RED	—	1
1	223 10 021	HOUSING, front	1	—
1	223 15 021	HOUSING, front	—	1
2	223 13 002	HOUSING, rear	1	—
2	223 15 002	HOUSING, rear	—	1
3	223 10 003	GASKET, housing	1	1
4	223 10 035	FLANGE, input	1	1
5	222 10 007	PIN	2	2
6	223 10 008	PLUG, oil level	1	1
7	252 10 010	O'RING, plug	1	1
8	223 10 011	PLUG, drain	1	1
9	223 13 101	SHAFT, input.	1	—
9	223 15 101	SHAFT, input.	—	1
10	222 10 103	OIL SEAL	2	1
10	224 10 223	OIL SEAL	—	1
11	222 10 104	BALL BEARING, front	2	1
11	224 10 224	BALL BEARING, front	—	1
12	223 10 102	COVER, front	1	1
13	223 10 105	GASKET, front cover	1	1
14	223 10 106	NEEDLE BEARING, rear	2	2
15	223 10 201	SHAFT, output	1	—
15	224 15 201	SHAFT, output	—	1
16	222 10 202	CLUTCH CONE	1	1
17	223 13 203	GEAR, front	1	—
17	223 15 203	GEAR, front	—	1
18	222 10 204	NEEDLE BEARING	2	1
18	224 10 204	NEEDLE BEARING	—	1
19	222 10 205	RING, bearing IR20x25x17	2	1
19	224 10 205	RING, bearing IR20x25x7	—	1
20	223 10 207	RING, bearing LR20x25x12,5	1	1
21	223 10 208	COVER, rear	1	—
21	223 15 208	COVER, rear	—	1
22	223 10 209	GASKET, cove rear	1	1
23	223 10 210	GEAR, rear	1	—
23	224 15 210	GEAR, rear	—	1
24	223 10 217	SPACER, gear rear	2	1
24	224 10 217	SPACER, gear rear	—	1
25	223 10 218	SPACER, bearing rear	2	1
25	224 10 218	SPACER, bearing rear	—	1
26	222 10 219	WASHER	4	4
27	223 10 224	FLANGE, output	1	—
27	223 15 224	FLANGE, output	—	1
28	252 10 222	SCREW	1	1
29	222 10 225	FLANGE, output	2	2
30	223 10 301	SHAFT, intermediate	1	1
31	223 10 302	GEAR, intermediate	1	—
31	224 15 302	GEAR, intermediate	—	1
32	223 10 304	FRICTION WASHER	1	1

GEAR-BOX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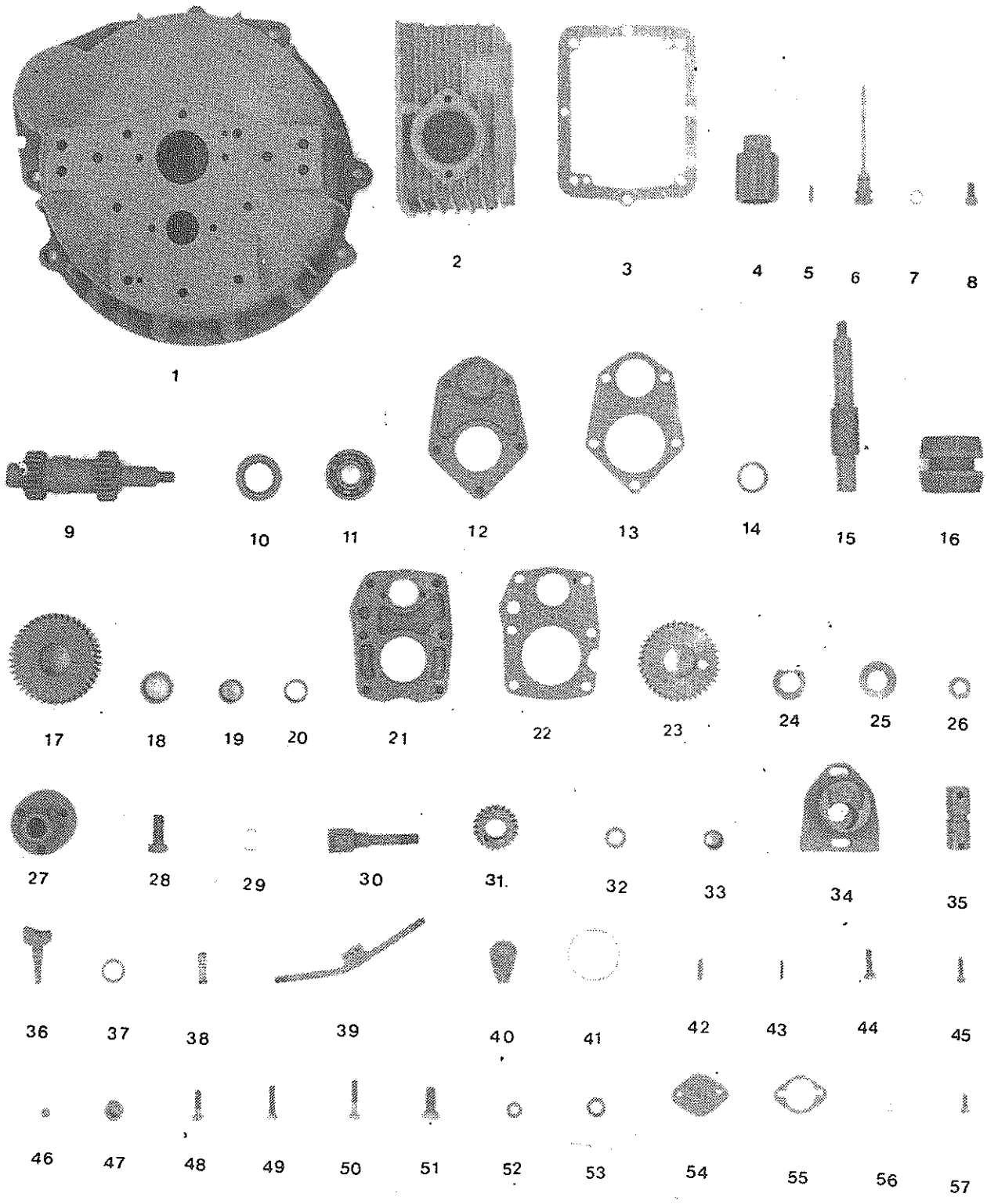
GEAR-BOX

Item	Part no.	Description	Quantity	
			2:1	3:1
33	222 10 206	NEEDLE BEARING, intermediate	1	1
34	223 10 401	CONTROL, housing	1	1
35	223 10 402	CONTROL, excentric	1	1
36	222 10 403	ARM, control	1	1
37	252 10 408	O'RING, excentric	1	1
38	252 10 411	SPRING, control	1	1
39	222 10 413	CONTROL, level	1	1
40	221 10 416	BALL	1	1
41	223 10 417	O'RING, housing	1	1
42	252 10 418	PIN, excentric	1	1
43	252 10 419	PIN	1	1
44	511 02 258	SCREW, 933 M9x25	2	2
45	521 03 157	SCREW, 912 M6x20	2	2
46	521 20 006	NUT, 934 M6	2	2
47	511 23 012	NUT, 985 M12	3	3
48	521 01 258	SCREW, 931 M8x25	11	11
49	521 01 259	SCREW, 931 M8x30	2	2
50	521 01 260	SCREW, 931 M8x35	5	5
51	531 02 358	SCREW, 933 M12x25 12 K.	1	1
52	510 30 008	WASHER, plain 0 8	20	20
53	560 00 116	WASHER, plain (copper)	1	1

GEAR-BOX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