

F&S 4016:7

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## TECHNICAL DATA

Engine type:	SACHS Wankel engine
Cooling:	Blower cooled
Direction of rotation of the engine:	Anti-clockwise, seen on power take-off side of the eccentric shaft
Chamber displacement:	294 c.c. (17.939 cu. in.)
Compression ratio:	8.5 : 1
Output:	23 HP (DIN) at 6000 1/min
Eccentric shaft bearing:	2 anti-friction bearings
Engine lubrication:	Mixture lubrication 1 : 50 (appropriate oils see page 6 and 15)
Ignition:	BOSCH magneto-generator 12 Volt 100/23 Watt (with voltage governor)
Spark advance:	16° before TDC
Contact breaker gap:	0.4 ± 0.05 mm (0.016 ± 0.002 in.)
Pole shoe gap:	8 . . . 12 mm (0.315 . . . 0.472 in.)
Spark plug:	BOSCH W 260 T 1 electrode gap 0.5 mm (0.020 in.)
Carburettor:	Fitted and tuned by the original equipment manufacturer. Observe the instructions issued by the manufacturer of the equipment.
Starting method:	Recoil starter

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## PARING THE ENGINE FOR OPERATION

Putting the engine in service, always carry out the following checks, observing the starting and servicing chart.

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**Fill tank with engine running! Take care of utmost cleanliness!**

ly mixture: oil/petrol in 1.50 ratio.

rye the instruction label on the fuel tank.)

le fuel: any branded petrol

le lubricating oil: Any branded oil listed on page 15, preferably special SACHS oil for rotary piston engines, F & S part number 2769 008 000 or all Super outboard engine oils (with synthetic components).

le:

ughly mix 200 cm<sup>3</sup> (7.0 fl oz) of the listed branded oils with 10 litres (2.461 US gal) of branded petrol in a clean receptacle (mixing can) or use a can of special, self-mixing S oil for rotary piston engines (contents 250 cm<sup>3</sup>, pre-mixed).

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## STARTING DEVICE

### Recoil starter

Grip the starter handle and pull out the starter cable until the starter engages and the compression point is felt.

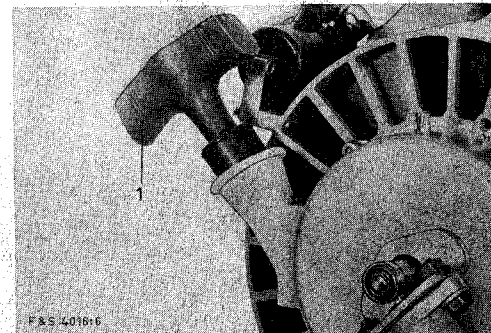
Let the cable gently recoil, then start the engine by pulling again with force.

### Note:

Pull the cable out only in the direction of the cable outlet and up to the red colour mark.

Do not release the cable and let snap back, but let it gently recoil in the housing.

▲ Fig. 1



## RUNNING-IN PERIOD

Even the most finely machined surfaces of the rotor sealing elements, of the end shields and of the rotor housing are rougher than parts which have been sliding on each other for a longer period of time. That is why the sealing elements of the rotor have to run in during the initial period of operation.

But this does not require any special precaution. The engine should not give its maximum output during the first 5 running hours, but should run in at half throttle under medium revs.

Do not overspeed the engine, as this may cause bearing troubles, power loss and starting troubles.

There is no need of a special mixture or additional oils during the running-in period.

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# ITION

ing the ignition system requires special knowledge and should therefore be done at HS engine service station, if possible.

rvicing the ignition system see the lubricating and maintenance chart.

ve recoil starter.

## Ignition adjustment

Firing point:  $16^\circ$  before TDC

Contact breaker gap:  $0.4 \pm 0.05$  mm ( $0.016 \pm 0.002$  in.)

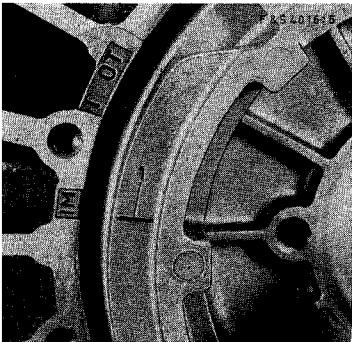
Pole gap:  $0 \dots 12$  mm ( $0.315 \dots 0.472$  in.)

On the starter drum and at the fan housing are cast-in marks.

The mark (1) on the starter drum coincides with the mark "OT" when the rotor is at top dead center.

The mark (1) on the starter drum coincides with the mark "M" at the firing position.

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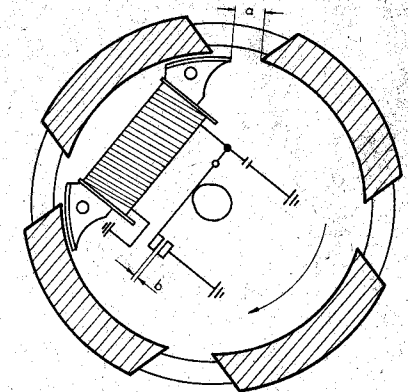


## The ignition setting is carried out as follows:

1. When the cam is at its highest position, adjust contact breaker gap (b) to  $0.4 \pm 0.05$  mm ( $0.016 \pm 0.002$  in.).
2. Turn the magneto flywheel against its direction of rotation until the marks for the firing point coincide (Fig. 2).
3. Turn the magneto flywheel slightly in direction of rotation; the contact breaker should now begin to open. If not, the firing point can be corrected by turning the armature plate. This can be done by means of the longitudinal slots. Turning the armature plate against its direction of rotation advances the ignition, turning in direction of rotation retards the ignition.
4. The screws of the armature plate must be tightened after all such corrections.
5. If the ignition setting is carried out correctly, the pole shoe gap (a) must be  $8 \dots 12$  mm ( $0.315 \dots 0.472$  in.).

The pole gap is measured at the point where the magneto in the flywheel leaves the edges of the armature shoe of the ignition armature in the direction of rotation of the magneto flywheel.

Should this gap not be correct, it can be put right by adjusting lightly the contact breaker points within the range of  $0.4 \pm 0.05$  mm ( $0.016 \pm 0.002$  in.).



▲ Fig. 3

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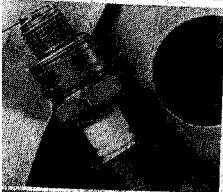
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# LUBRICATING AND MAINTENANCE CHART

Maintenance or lubrication point

Lubricant, quantity of lubricant, and maintenance operations

Service ▼  
100 run. hrs.  
200 run. hrs.  
as required



**Spark plug**  
A quick cleaning of the spark plug from carbon deposit can be made at the insulator and between the electrodes. A correct cleaning can only be achieved with a sand blower.

**Checking**  
Remove the spark plug. Connect it to the ignition cable, hold the plug thread in contact with earth and work the starter. If the plug is in perfect condition, a strong spark must appear at the electrodes. Gap at the electrodes 0.5 mm (0.02 in.). See arrow.



**Recoil starter**  
As soon as rewinding troubles develop at the recoil starter, introduce 0.5 c.c. (0.02 cu. in.) of the oil Anticorit 5 (of Messrs. FUCHS, D-6800 Mannheim) at the grease nipple (1).



**Fuel pump**  
Unscrew cover (1) (taking care of the gasket). Remove fuel strainer and clean it in petrol.

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# LUBRICATING AND MAINTENANCE CHART

Maintenance or lubrication point

Lubricant, quantity of lubricant, and maintenance operations

Service ▼  
100 run. hrs.  
200 run. hrs.  
as required

<b>Fuel strainer</b>	If there is one, clean the fuel strainer or replace the filter element.			X
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We recommend to have the following operations carried out by an expert

<b>Ignition system</b>	Check the contact breaker and adjust if necessary.	X		
	Apply BOSCH St 1 v 4 special grease to the lubricating felt pad for the contact breaker cam.		X	

<b>Decarbonizing (see page 12)</b>	Check exhaust port and spark plug for carbon deposit and clean if necessary.		X	
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<b>Carburettor</b>	Clean and adjust.			X
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## CARBONIZING THE EXHAUST PORT AND THE SPARK PLUG HOLE

When the engine output drops or, at the latest, after 200 running hours the exhaust port and the spark plug hole must be checked for carbon deposit and, if necessary, cleaned as follows:

1. Remove the engine from the machine.

2. Unscrew the muffler and the spark plug.

3. Rotate the piston so that a long side of the rotor faces the aperture which is to be cleaned; use a torch.

4. Make sure that no sealing strip of the rotor is in front of the aperture.

5. Point the engine so that the exhaust port or the spark plug hole points for cleaning downwards.

6. By means of a scraper or screwdriver remove carefully the carbon. Make sure that no metal is being scraped off and no carbon gets into the inside of the engine. This might lead to engine troubles.

**Therefore, we recommend to have these operations done by an expert.**

## LAYING-UP THE ENGINE

If the engine is laid up for some considerable length of time, there arises danger of rust. For such cases the following instructions are given for protecting the engine:

1. Squirt approx. 20 c.c. (1.22 cu. in.) of SAE 30 oil (e.g. ENSIS oil 30 of SHELL) into the carburettor inlet, while the choke and the butterfly valve are open. Then, crank the engine 5 ... 6 times.

The sliding course of the housing center section, the bearings and the piston are thus sufficiently protected against corrosion.

2. To protect the outside of the engine, we recommend anti-corrosion oils of well-known oil companies, such as:

Anticorit 5 of Messrs. FUCHS D-6800 Mannheim, Germany,  
Lubrication-Oil MIL-L-644 B of MOBIL-OIL  
Shell ENSIS FLUID 260 of SHELL  
RUST BAN 395 of ESSO

### Attention!

If the engine is laid-up for some considerable length of time with fuel in the tank, segregation of the oil/petrol mixture may occur. In such cases we strongly recommend, before starting the engine again, to mix the oil/petrol mixture anew by stirring or shaking, or to replace it.

Resinificated (gummed) fuel feed and carburettor systems as well as damages by oxydation (rust) inside and/or outside of the engine are not covered by our warranty.

## ENGINE TROUBLES

Following is a list of possible engine troubles which may occur.

### Engine will not start

#### There is no ignition spark because

Spark plug is oiled-up, wet, fouled or damaged,  
 Spark plug is wet (outside),  
 Ignition cable loose or fractured,  
 Contact-breaker points oiled-up, wet or burnt,  
 Short-circuit switch jammed,  
 Ignition armature or condenser defective.

#### Engine does not get any fuel because

Fuel tank empty,  
 Fuel tap is closed,  
 Strainer in fuel tap clogged with dirt,  
 Fuel line clogged,

Reversing must be avoided even for short periods.

5. Strainer in fuel pump dirty,
6. Fuel pump defective.

#### Engine does not get suitable explosive mixture because

1. Water in carburettor,
2. False air infiltrating through loose carburettor.

### B. Drop in engine power

#### because of dirt

1. Fuel tank gets no air (filler cap).

#### Engine has been subjected to overspeed

## APPROPRIATE LUBRICATING OILS FOR SACHS-WANKEL ENGINES

All branded oils listed in the chart, preferably special SACHS oil for rotary piston Wankel engines F & S part number 2769 008 000, or all Super-Outboard-Motor-Oils (with synthetic components).

	Australia	Belgium	Denmark	Germany	England	Finland	France	Italy	Netherlands	Austria	Sweden	USA
AGIP-F-1-MARINEMIX				x								
BP Super Outboard Motor-Oil	x	x	x	x	x	x	x	x	x	x	x	x
CALTEX Outboard-Motor-Oil	x											
ESSOLUB HD 30		x	x	x	x	x	x	x	x	x	x	x
ESSO-Outboard-Extra-Motor-Oil				x								
EVINRUDE 50 To 1 SAE 40												x
MOBILMIX TT		x	x	x	x	x	x	x	x	x	x	x
MOBILOIL TT		x	x	x	x	x	x	x	x	x	x	x
SHELL-Oil (1763) 0236 PAE 4884				x								
SHELL-Premium Outboard Motor-Oil	x											
SHELL-Rotella SAE 30		x	x	x	x	x	x	x	x	x	x	x
VALVOLINE-Super Outboard Motor-Oil	x											