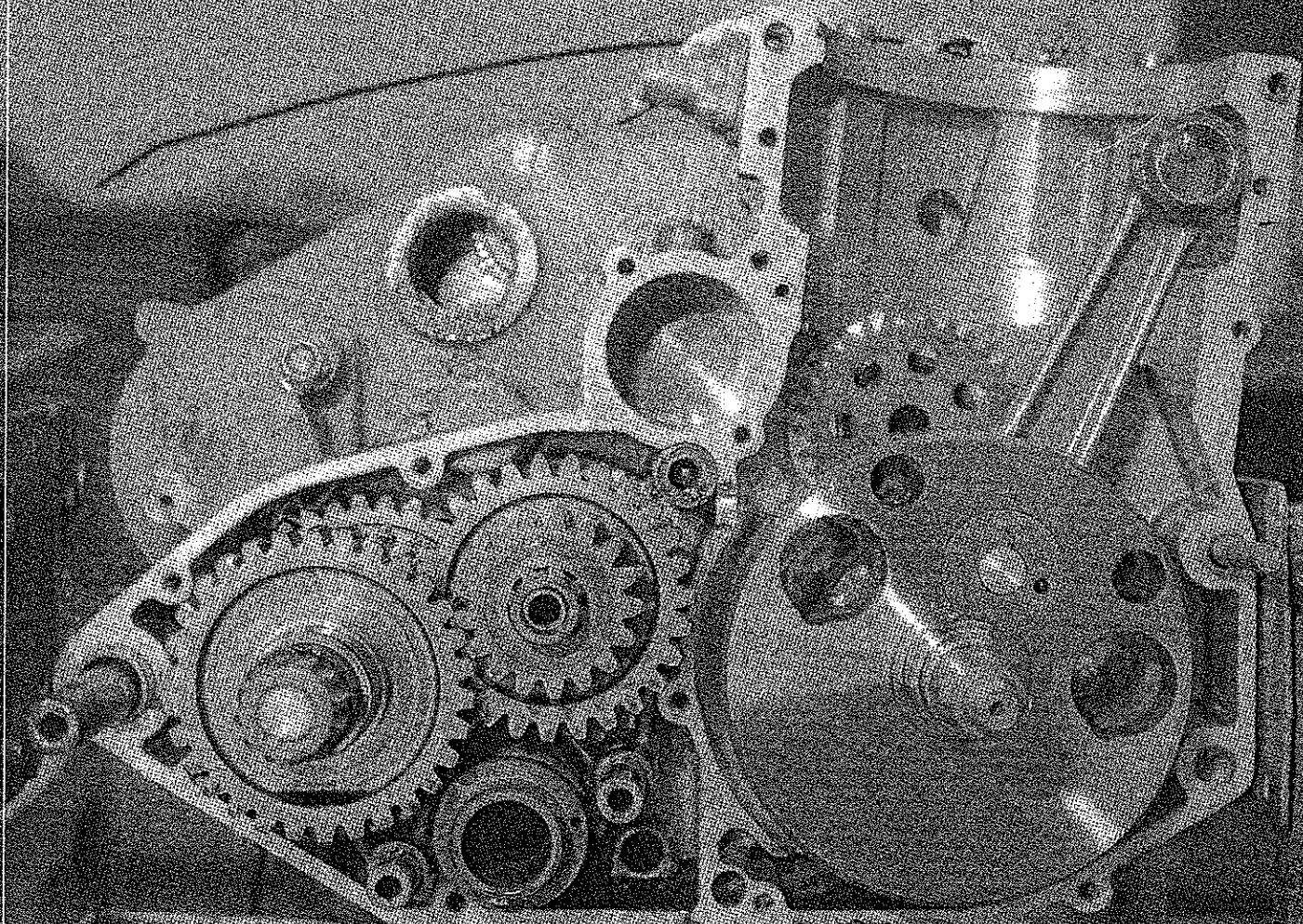


## #06

## WORKSHOP

*Engine Service 2001-2003***HUSABERG**  
4 STROKE FORCE

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# GENERAL INFORMATION

SUBJECT/MODEL	FE 400 e	FE 501 e	FE 650 e	FS 400 e	FS 650 e	FS 450 c	FS 650 c	FC 450/6	FC 550/4	FC 550/6	FC 450 e	FX 450 e	FX 650 e
Displacement	399cc	501cc	644cc	399cc	644cc	449cc	644cc	449cc	550cc	550cc	449cc	449cc	644cc
Bore x Stroke (mm)	92 x 60,1	95 x 70,7	100 x 82,0	92 x 60,1	100 x 82,0	100 x 57,2	100 x 82,0	100 x 57,2	100 x 70,7	100 x 70,7	100 x 57,2	100 x 57,2	100 x 82,0
Compression ratio	12,5:1	11,8:1	11,0:1	12,5:1	11,0:1	-	11,0:1	-	12,7:1	12,7:1	-	-	11,0:1
Start system	Electrical and kick-starter				Kick-starter				Electrical and kick-starter				
Decompression system	Three separate ones; one activated by the kickstart lever, one activated by the camshaft and one activated by a lever on the handlebar												
Decomp. cable clearance	2mm ± 1mm / 0,08 in ± 0,04 in.												
Engine	Liquid cooled single cylinder 4-stroke, SOHC-4 valves, counter balancer												
Valve clearance	Intake and Exhaust: 0,10mm / 0,004 in.												
Lubrication system	Orbit oil pump and reed valve controlled. High pressure jet spray of piston and connecting rod, pressure lubrication of connecting rod bearing and rocker arms. Oil screen and micro filter												
Engine oil	1,0 Litre Synthetic SAE 5W-50 API SG/CF (minimum SAE 10W-50)												
Ignition system	SEM Dynamic Force Control, DFC™, Dual Ignition Curves; High & Low. A load sensitive digital system with six sensors												
Spark plug - Spark plug gap	NGK DCPR8E - 0,6 mm / 0,025 in.												
Alternator	12 V 70 + 70 W				Not available				12 V 70 + 70 W				
Air intake system	Single foam filter												
Carburettor (DELLORTO)	PHM38	PHM40	PHM40	PHM38	PHM40	-	PHM40	-	PHM40	PHM40	-	-	PHM40
Fuel	RON 98 (octane), unleaded												
Exhaust system	Chrome plated steel pipes, 2 into 1 collector, Aluminium/steel silencer. USA versions, except FC and FSc models, equipped with spark arresters												
Coolant	1,3 Litre of 50% Anti-freeze, with corrosion inhibitor, and 50% water												
Clutch	Hydraulic, 7 friction- and 8 mating plates in oil bath												
Clutch hydraulic oil	Mineral oil SAE 2-7W												
Wear limit clutch discs	19,6 mm / 0,772 in.												
Primary transmission	Spur gears, ratio 29/78 - 2,990												
Gearbox	6-speed	6-speed	6-speed	6-speed	6-speed	6-speed	6-speed	6-speed CR	4-speed	6-speed CR	6-speed CR	6-speed	6-speed
Ratios	1st: 14/33 - 2,357 2nd: 17/30 - 1,765 3rd: 19/26 - 1,368 4th: 23/25 - 1,087 5th: 24/22 - 0,917 6th: 27/20 - 0,741 (6th CR: 25/21-0,840)												
Secondary transmission	D.I.D. 520 O-ring chain												
Sprockets front/rear	13/48	15/48	15/42	15/42	15/42	13/48	15/42	13/48	15/42	15/48	13/48	13/48	15/42
Wear limit drive chain	272 mm - 18 chain reels (tensioned, center distance between reels)												
Frame	Heat treated BTR / 25CrMo4 steel												
Caster	28,5°												
Weight (dry)	109,8 kg	110,1 kg	110,9 kg	111,9 kg	113,1 kg	-	106,8 kg	-	103,5 kg	103,9 kg	-	-	110,4 kg
	242 lb.	243 lb.	244 lb.	247 lb.	249 lb.	-	235 lb.	-	228 lb.	229 lb.	-	-	243 lb.

# GENERAL INFORMATION

1

MODEL/SUBJECT		Main jet	Needle jet	Needle	Needle clippos.	Pilot jet	Throttle	Float valve	Start jet	Mixture screw
Exploded view number		# 6	# 4	# 3	# 26	# 7	# 2	# 9	# 8	# 33
Enduro	FE 400 e	185	DR270	K 51	#2	33	40	300	45	2 turns
	FE 501 e	185	DR272	K 51	#3	35	40	300	45	1½ turns
	FE 650 e	190	DR272	K 51	#3	40	40	300	45	1½ turns
Enduro ECE	FE 400 e	110	DR266	K 51	#2	48	40	300	45	½ turn
	FE 501 e	110	DR264	K 35	#4	33	40	300	45	½ turn
	FE 650 e	100	DR266	K 51	#3	33	40	300	45	½ turn
Enduro USA	FE 400 e	190	DR270	K 51	#3	38	40	300	45	2 turns
	FE 501 e	195	DR268	K 35	#3	33	40	300	45	1½ turns
	FE 650 e	195	DR270	K 35	#3	33	40	300	45	1½ turns
Super Motard Street	FS 400 e	185	DR270	K 51	#2	33	40	300	45	2 turns
	FS 650 e	190	DR272	K 51	#3	40	40	300	45	1½ turns
Super Motard Street ECE	FS 400 e	110	DR266	K 51	#2	48	40	300	45	½ turn
	FS 650 e	100	DR266	K 51	#3	33	40	300	45	½ turn
Super Motard Street USA	FS 400 e	190	DR270	K 51	#3	38	40	300	45	2 turns
	FS 650 e	195	DR270	K 35	#3	33	40	300	45	1½ turns
Super Motard Competition	FS 450 c	-	-	-	-	-	-	-	-	-
	FS 650 c	190	DR272	K 51	#3	40	40	300	45	1½ turns
Cross Country	FX 450 e	-	-	-	-	-	-	-	-	-
	FX 650 e	190	DR270	K 51	#3	33	40	300	45	1½ turns
Motocross	FC 450	-	-	-	-	-	-	-	-	-
	FC 550	190	DR272	K 51	#3	33	40	300	45	1½ turns
	FC 450 e	-	-	-	-	-	-	-	-	-

# GENERAL INFORMATION

Please read and observe the following:

## Warning

If the engine must be running during any maintenance, make sure that the area is properly ventilated. Never run the engine in a closed area though the exhaust fumes are poisonous and thus hazardous to your health and life if not properly ventilated.

## Warning

Although the battery is of a sealed construction, please take care. The electrolyte contains sulfuric acid and you must protect your eyes, skin and clothing if such fluid is assumed to be leaking or likewise exposed. In case of contact, wash and flush thoroughly with water and contact medical help if needed, especially if your eyes have been exposed to the fluid.

## Warning

Fuel is extremely flammable and explosive under certain conditions. Do not smoke or expose the fuel to open fire or sparks.

## Service conditions:

1. Always use original Husaberg parts.
2. Use the special Husaberg tools when required.
3. Install new gaskets, o-rings, circlips etc whenever possible.
4. Always clean all parts thoroughly before assembly.
5. All screws, nuts and bolts etc. are in the metric system. Do not use incorrect tools.
6. Never warm any aluminium part for more than 30 minutes due to the heat treatment.



This symbol means that it is possible, although not always recommendable, to perform the specific service without removing the engine out of the frame.

The material and information included in this Workshop Manual are all of the latest editions available at the time of the printing.

Husaberg Motor AB reserves the right to make changes regarding the products at any time without prior notice.

This Workshop Manual is subject to corrections without prior notice.

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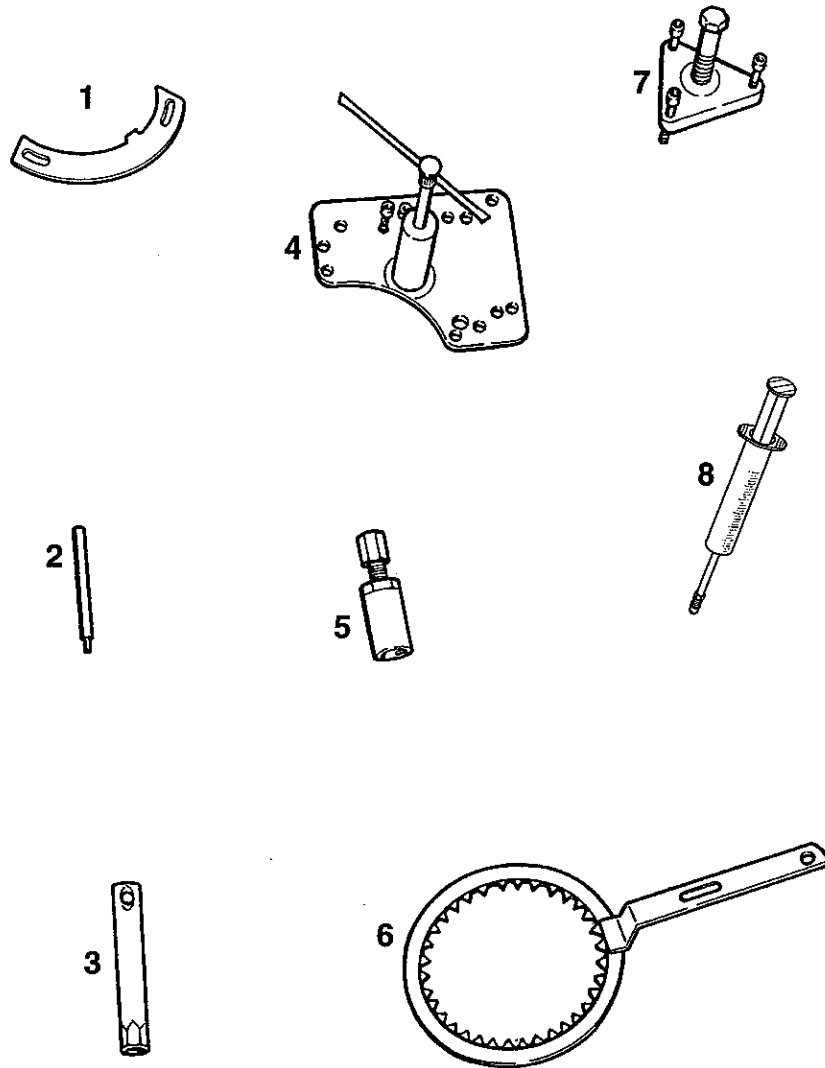
[www.husaberg.se](http://www.husaberg.se)

[force@husaberg.se](mailto:force@husaberg.se)

# GENERAL INFORMATION

## Special tools:

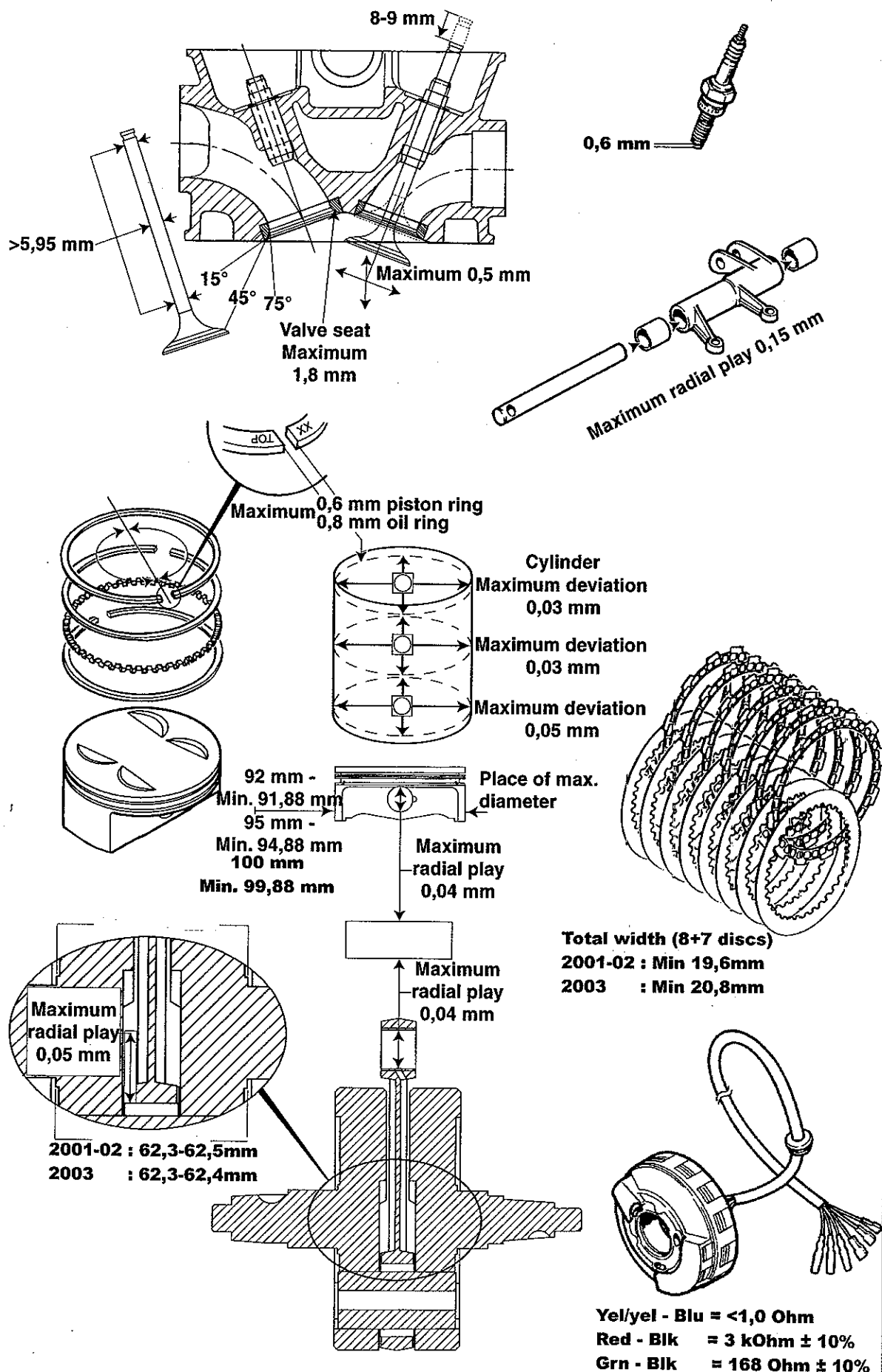
1



- 1 270 030-01
- 2 270 012-01
- 3 270 001-01
- 4 270 011-02
- 5 270 028-01
- 6 270 007-01
- 7 270 005-01
- 8 270 032-01

Holding tool flywheel 99-  
Drift removing valve guide  
Sparkplug wrench  
Puller crankcase  
Puller flywheel 99-  
Holding tool  
Puller clutch  
Air bleed syringe clutch





# MAINTENANCE SCHEDULES

## Engine - FC, FSc and FX models

Please observe: Riding under hard conditions demands more frequent maintenance

SUBJECT / HOURS	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
-----------------	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----

### REGULAR

Engine oil	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Oil screen	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Oil microfilter		R		R		R		R		R		R		R		R		R		R
Reed valve										I/C										I/C
Coolant liquid *																				
Spark plug (incl. cap)					I					R					I					R
Alternator/Ignition **										I										I
Valve clearance					I					I					I					I
Valves incl. guides & sealings										I										I
Valve springs										R										R
Timing chain										I										R
Piston incl. rings & pin										I										R
Cylinder lining										I										I
Connecting rod										I										R
Crankshaft pin										I										R
Clutch mechanism incl. discs					I					I					I					I
Clutch centre					I					I					I					I
Carburettor ** / ***					I/C					I/C					I/C					I/C
Kickstart mechanism					I					I					I					I
Gearshift mechanism					I					I					I					I
EL: Freewheel mechanism					I					I					I					I

### BEARINGS

Connecting rod										R										
Crankshaft										R										R
Gearbox main shaft										I										R
Gearbox secondary shaft										I										R
Shift drum										I										I
Camshaft										R										R
Clutch pressure plate										I										R
Clutch basket					I					I					I					I
Kickstart gear wheel										I										I
Intermediate gear wheel										I										I
Rockerarms										R										R
Intermediate shaft counter bal.										I										R
Counter balancer										R										R

### BUSHINGS

Connecting rod										I										
Kickstart shaft										I										I
Clutch pushrod (In gearshaft)										I										I

C: Clean - I: Inspect - R: Replace

\* Maximum 12 months interval - \*\* Clean whenever the engine has been washed - \*\*\* I(R): Especially needle and needle jet



# MAINTENANCE SCHEDULES

## Engine FEE and FSE models

Please observe: Riding under hard conditions demands more frequent maintenance

SUBJECT / HOURS	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
-----------------	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### REGULAR

Engine oil	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Oil screen	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Oil microfilter	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Reed valve										I/C										I/C
Coolant liquid *																				R
Spark plug (incl. cap)					I					R					I					R
Alternator/Ignition **					I					I					I					I
Valve clearance			I			I				I			I			I				I
Valves incl. guides & sealings										I										I
Valve springs										R										R
Timing chain incl. tensioner										I										R
Piston incl. rings & pin										I										R
Cylinder lining										I										I
Connecting rod										I										R
Crankshaft pin										I										R
Clutch mechanism incl. discs					I					I					I					I
Clutch centre					I					I					I					I
Carburettor ** / ***					I/C					I/C					I/C					I/C
Kickstart mechanism					I					I					I					I
Gearshift mechanism					I					I					I					I
EL: Freewheel mechanism					I					I					I					I

### BEARINGS

Connecting rod										R										
Crankshaft										R										R
Gearbox main shaft										I										R
Gearbox secondary shaft										I										R
Shift drum										I										I
Camshaft										R										R
Clutch pressure plate										I										R
Clutch basket					I					I					I					I
Kickstart gear wheel										I										I
Intermediate gear wheel										I										I
Rockerarms					R					R					R					R
Intermediate shaft counter bal.										I										R
Counter balancer										R										R

### BUSHINGS

Connecting rod										I										
Kickstart shaft										I										I
Clutch pushrod (In gearshaft)					I					I					I					I

C: Clean - I: Inspect - R: Replace

\* Maximum 12 months interval - \*\* Clean whenever the engine has been washed - \*\*\* I(R): Especially needle and needle jet



## CARBURETTOR

Dellorto PHM 38/40

Remove the carburettor from the intake manifold and the airfilter tube.

Unscrew the bolt (Fig. 4A-1) holding the fuel inlet pipe (Fig. 4A-2) and the fuel filter (Fig. 4A-3). Thoroughly clean the filter and the surrounding areas.

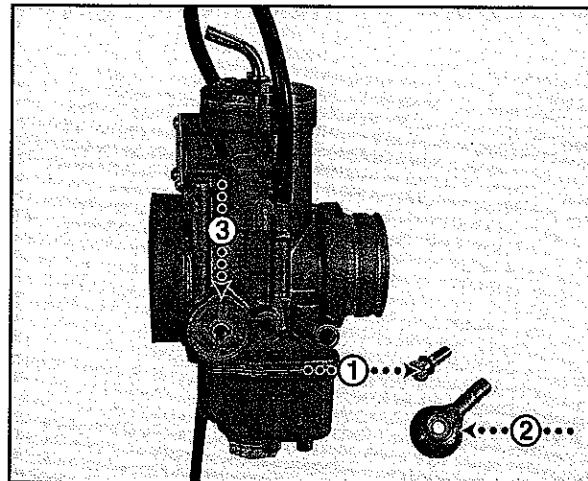


Fig.  
4A

Unscrew the choke lever (Fig. 4B-1) from the choke housing (Fig. 4B-2). Thoroughly clean and lubricate the choke lever; both the lever shaft as well as the piston, and the inside of the housing.

Check that all three screws are fastened (Fig. 4B-3). Check the positions of the idling screw (Fig. 4B-4) and the mixture screw (Fig. 4B-5) according to the instructions in the Owner's Manual. See Section 1 for standard jettings.

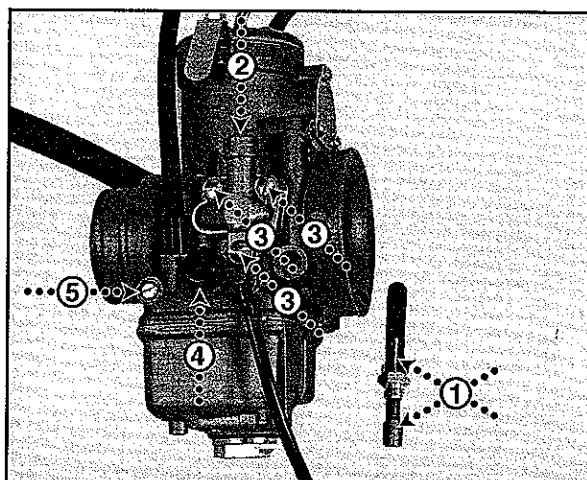


Fig.  
4B

Dismantle the throttle cover and check the o-ring for any damage or deterioration (Fig. 4C-1).

Unscrew the wire nipple (Fig. 4C-2) from the throttle (Fig. 4C-3) and disconnect the wire (Fig. 4C-4) and the spring. Check the throttle for any deterioration. Push out the needle and check the condition of the needle, especially at the surface as shown (Fig. 4C-5) and at the needle clip position (Fig. 4C-6).

Check the inner of the wire tube, especially at the position shown (Fig. 4C-7). The wire might create a rough jag into the inner of the tube and thus causing damages to a wire.

Clean the inside of the carburettor (Fig. 4C-8). Make sure that both of the ventilation tubes are positioned as shown (Fig. 4C-9).

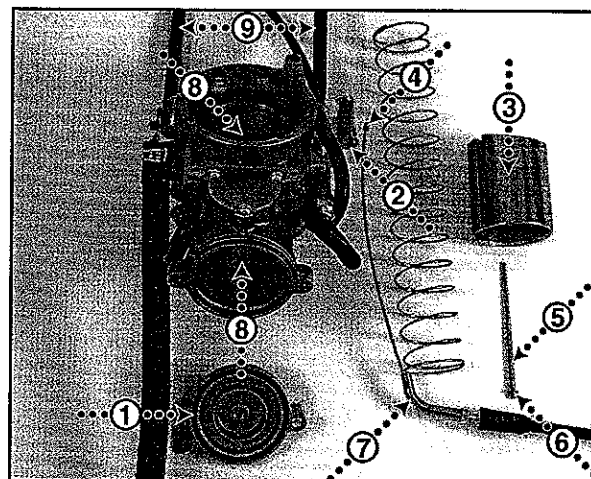


Fig.  
4C

Unscrew the bottom plug (Fig. 4D-1) and remove the float chamber (Fig. 4D-2). Check the sealing of the plug and the o-ring of the chamber for any damages or deterioration.

Check the carburettor floats (Fig. 4D-3) for any leakages.

Check and clean the main jet (Fig. 4D-4), the needle jet (Fig. 4D-5, positioned underneath the main jet seat), the float valve and the float valve seat (Fig. 4D-6), the pilot jet (Fig. 4D-7) and the start jet (Fig. 4D-8).

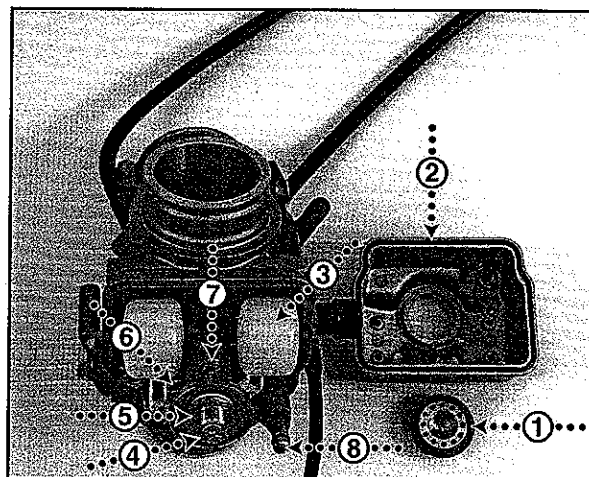


Fig.  
4D



Check and clean the mixture screw (Fig. 4E-1). Check the condition of the o-ring, the washer and the spring. Repeat the check regarding the idling screw (Fig. 4E-2).

Unscrew the two screws of the venturi (Fig. 4E-8) and remove the venturi.

By using compressed air, clean off the air ducts (Fig. 4E-3, 4, 5 and 6). Proceed with the needle jet tube (Fig. 4E-7).

Check the o-ring of the venturi (Fig. 4E-8) for any damage or deterioration.

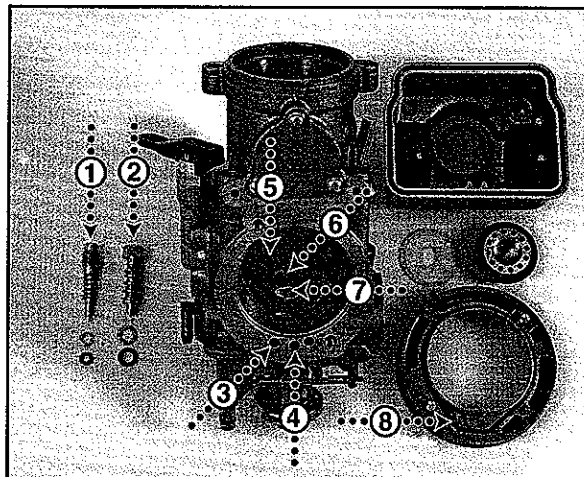


Fig.  
4E

Two versions of float chambers are being used in the production; Type A and Type B. This being the only difference besides the various configurations of the jetting depending on model.

Check and clean the airfilters according to the maintenance schedule or more often if used under hard conditions.

Check the airfilter tube for any cracks or deterioration.

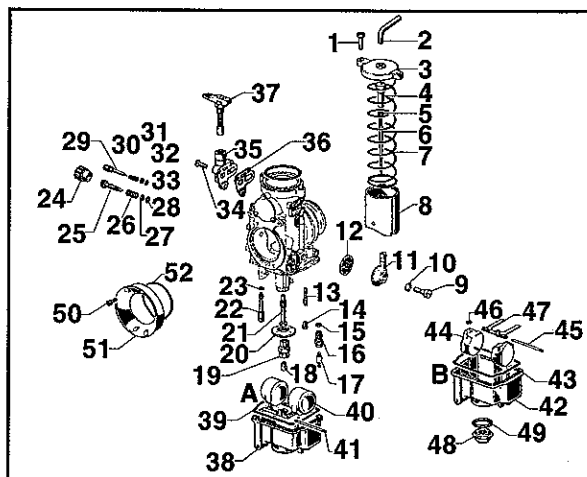


Fig.  
4F



## DISASSEMBLY OF ALTERNATOR/IGNITION

Unscrew the three screws of the flywheel cover and remove the cover including the stator. If the stator is going to be dismantled disconnect the wiring harness of the alternator/ignition from the main wiring harness and the ignition coil.

Attach the flywheel holder (Fig. 5A-1, Article No. 270030-01) into one of the slots in the flywheel and by using two of the flywheel cover screws (Fig. 5A-2). Unscrew the flywheel nut, clockwise (Fig. 5A-3), and remove the nut.

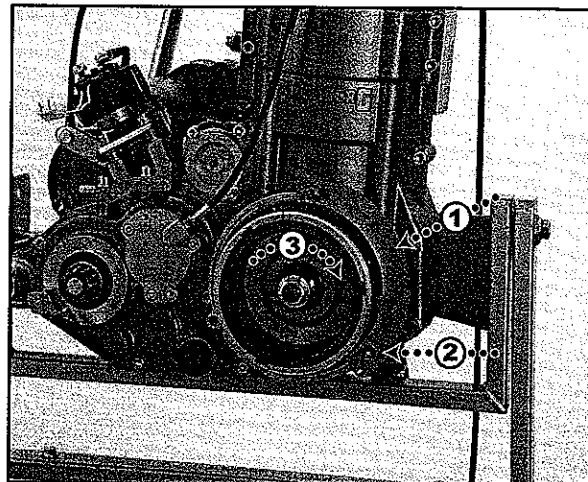


Fig.  
5A

Release the flywheel from the crankshaft by using the flywheel puller (Fig. 5B-1, Article No. 270028-01). Be careful not to lose the woodruff ke.



Fig.  
5B

Unscrew the three screws of the stator (Fig. 5C-1) and remove the stator.

If the stator is presumed to be of malfunction check each wire of the stator with an ohmmeter:

Plus (+)	Minus (-)	Value
Red	Black	3 kOhm $\pm 10\%$
Green	Black	168 Ohm $\pm 10\%$
Yellow/Yellow*	Blue	<1,0 Ohm

\* The two yellow wires to be connected in parallel

Check the inside of the flywheel, the woodruff key, the stator and the oil seal of the crankshaft for any damages or deterioration.

Thoroughly clean the inside of the flywheel and the outer of the stator.

Check the condition of the spark plug and set the gap to 0,7mm.

Check the condition of the spark plug cap, look especially for any cracks.

Each Yellow cable from the alternator provides 70W of output attached to the main electrical system.

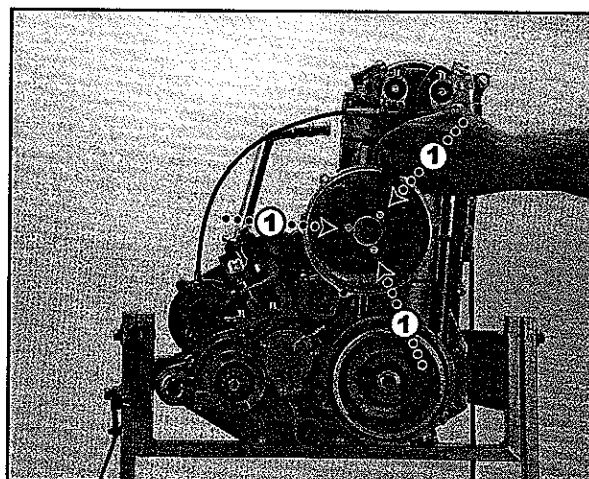


Fig.  
5C

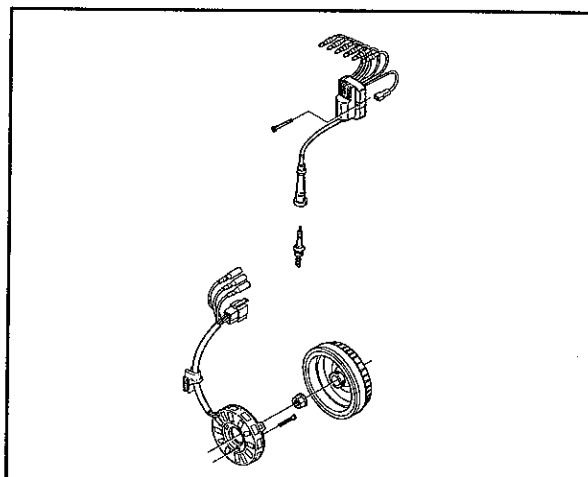


Fig.  
5D



## ASSEMBLY OF ALTERNATOR/IGNITION

Thoroughly clean the inside of the flywheel cover and the stator.

Install the stator into the flywheel cover with the three screws (Fig. 5C-1), use a threadlock liquid, torque 8 Nm.

Install the woodruff key (Fig. 5E-1) with the flat surface of the key in alignment with the crankshaft cone. Install the flywheel onto the crankshaft cone and woodruff key.

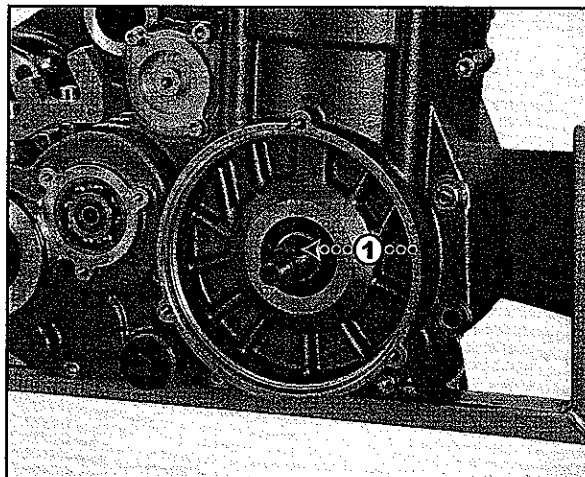


Fig.  
5E

Attach the flywheel holder (Fig. 5F-1) into one of the slots in the flywheel and by using two of the flywheel cover screws (Fig. 5F-2).

Screw on the flywheel nut, counter-clockwise (Fig. 5F-3), torque 50 Nm.

Install the flywheel cover including the stator with the three screws.

Attach the wiring of the stator to the main wiring harness and the ignition coil.

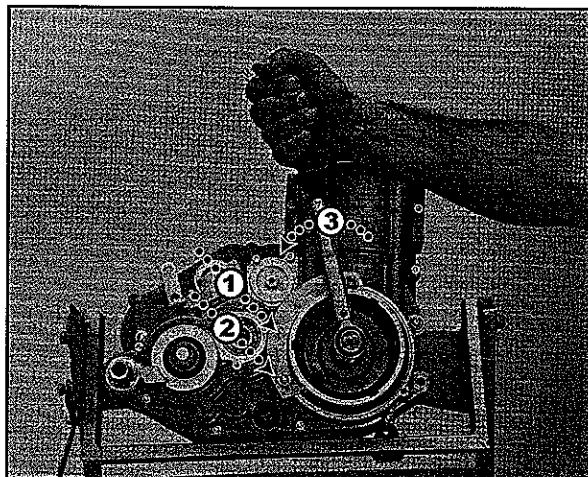


Fig.  
5F

## IGNITION TIMING

Put the engine in TDC (Fig. 5G-1).

Remove the inspection cover and check the position of the marks on the flywheel and the stator (Fig. 5G-2).

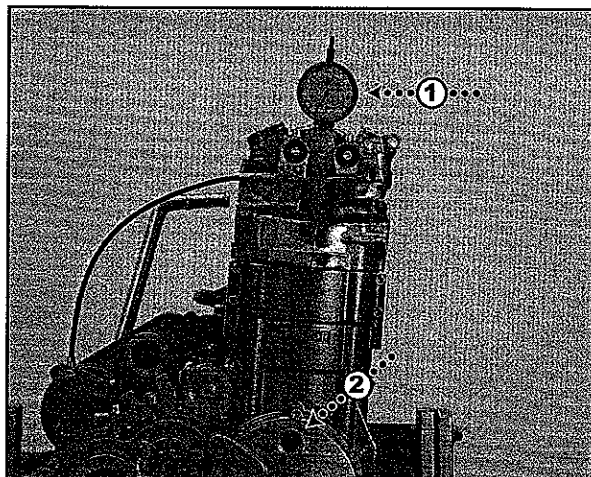


Fig.  
5G

The ignition is properly set if the right mark on the flywheel (Fig. 5H-3) is aligned with the mark on the stator (Fig. 5H-1).

On the older engine different marks were used on e-start and kickstart engines but this is not the case on this engine.

If the ignition needs to be adjusted, remove the cover, slightly undo the three screws of the stator (Fig. 5C-1) and adjust the stator.

Tighten the screws and covers.

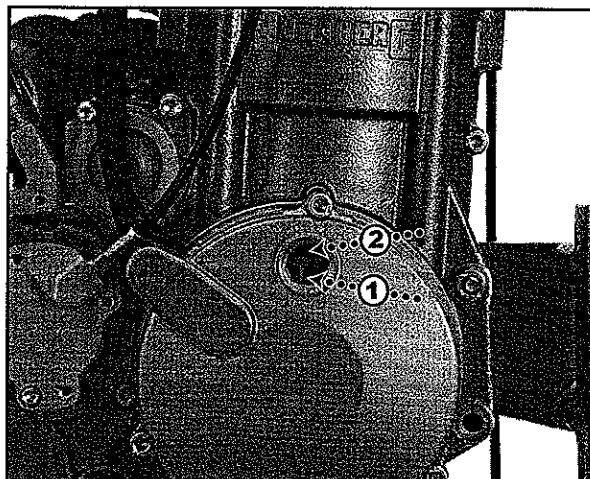


Fig.  
5H



## DISASSEMBLY OF OIL FILTERS

Drain the engine oil by unscrewing the oil drain plug (Fig. 6A-1). The oil screen (Fig. 6B-1) may either follow the oil drain plug or still be positioned within the crankcase when the drain plug is removed. Unscrew the two screws (Fig. 6A-2) of the micro filter cover (Fig. 6A-3).

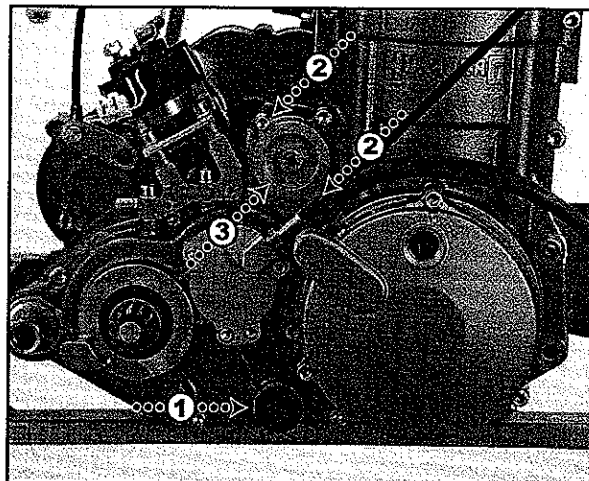


Fig.  
6A

Remove the oil screen (Fig. 6B-1) by just pulling it out of the crankcase.

Remove the micro filter cover by screwing in one M6 screw into the center of the cover and use the screw as a puller (Fig. 6B-2).

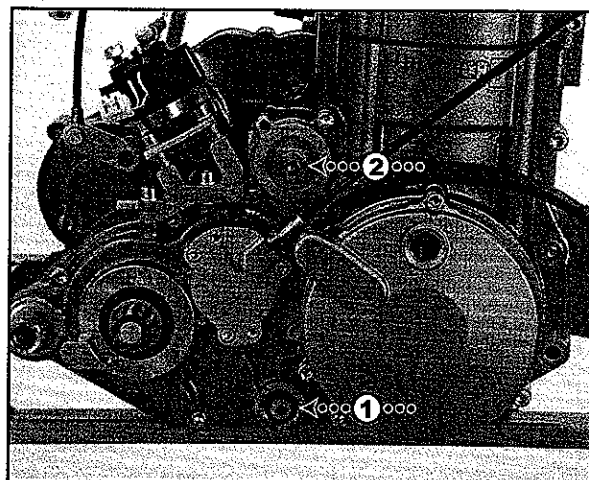


Fig.  
6B

If not accompanied by the filter cover, pull out the filter (Fig. 6C-1).

Check the conditions of the o-rings of the filter cover (Fig. 6C-2) and replace them if they show any signs of deterioration.

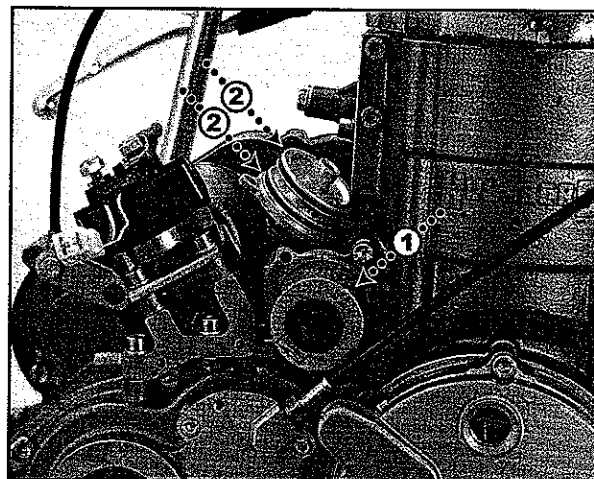


Fig.  
6C

Check the oil drain plug for any damages, especially in regards to the thread. Make the same check regarding the thread within the crankcase half. Check the sealing washer of the drain plug (Fig. 6D-2) and the o-rings on the oil screen (Fig. 6D-4) for any damages or deterioration. Thoroughly clean the oil screen (Fig. 6D-3). Replace the micro filter (fig. 6D-7).

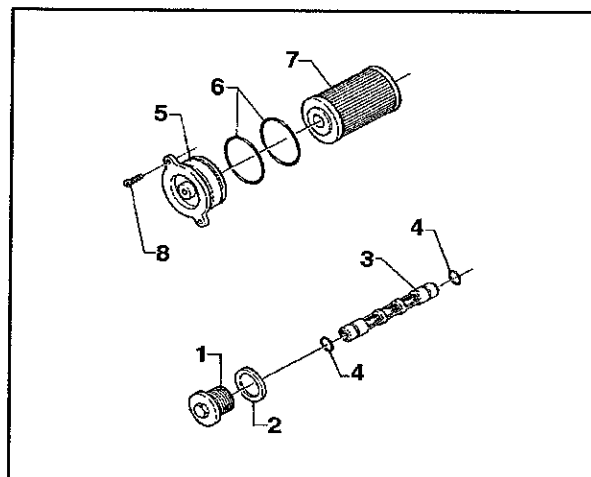


Fig.  
6D





## ASSEMBLY OF OIL FILTERS

Thoroughly clean the inner surfaces of the location of the micro filter within the crankcase.

Clean the filter cover and the oil duct drilled through the filter cover (Fig. 6E-1).

Lubricate the oil sealing within the gable of the filter (Fig. 6C-1) and the two o-rings of the cover (Fig. 6C-2). Gently insert the cover into the filter through the oil sealing (Fig. 6E-2).

Install the filter and cover into the crankcase.

Screw on the two screws, torque 5 Nm.

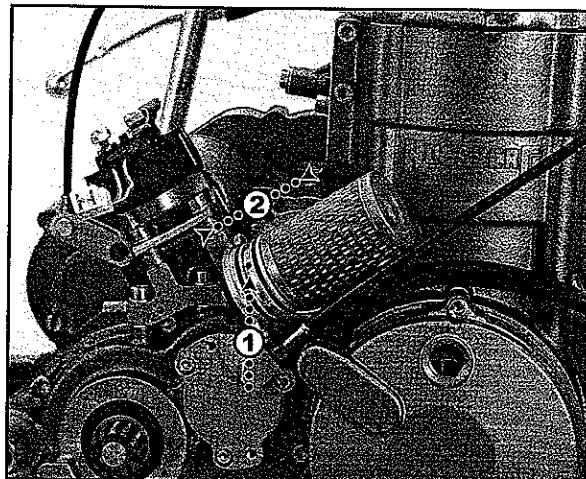


Fig.  
6E

Thoroughly clean the inner surfaces of the location of the oil screen within the crankcase and the oil drain plug.

On engines fitted with magnet plug (Fig. 6A-2), the plug and its seat must be cleaned. Tighten the magnet plug to 12 Nm.

Lubricate the two o-rings at the both ends of the oil screen and insert the oil screen into the oil drain plug (Fig. 6F-1).

Gently push the oil screen and drain plug into the crankcase until the oilscreen fits into the machined position within the crankcase. Screw on these into the bottom position, torque 12 Nm.

Fill the engine with the adequate quantity of oil.

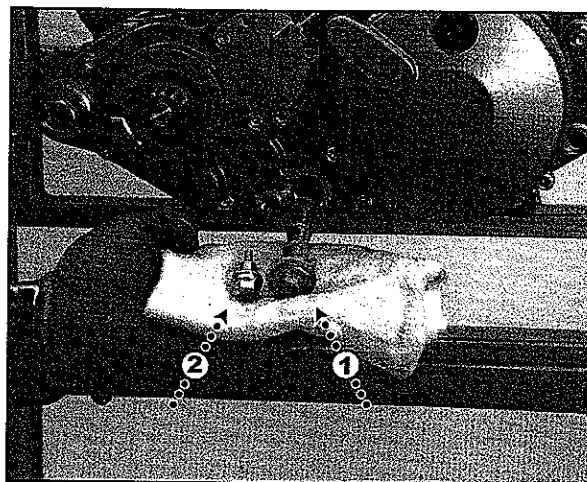


Fig.  
6F

## REED VALVE

The reed valve (Fig. 6G-2) is a subject of inspection and cleaning every 100 hours in order to avoid any disturbances.

Drain the engine oil, remove the kickstart lever, gearshift lever and the transmission cover (see Section 7A).

Unscrew the two screws holding the reed valve support (Fig. 6G-1) and detach the support and the reed valve. Be careful not to damage the screws though they are fastened with a threadlock liquid.

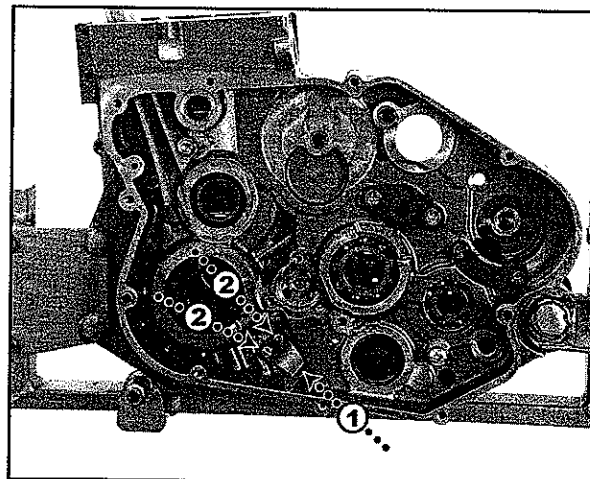


Fig.  
6G

Inspect the reed valve (Fig. 6H-1) and the reed valve support (Fig. 6H-2) for any damages or deterioration. Clean the parts and attach them onto the crankcase, using a threadlock liquid on the screws, torque 5 Nm. Refit the transmission cover, kickstart and gearshift lever (see Section 7A).

Fill the engine with the adequate quantity of oil.

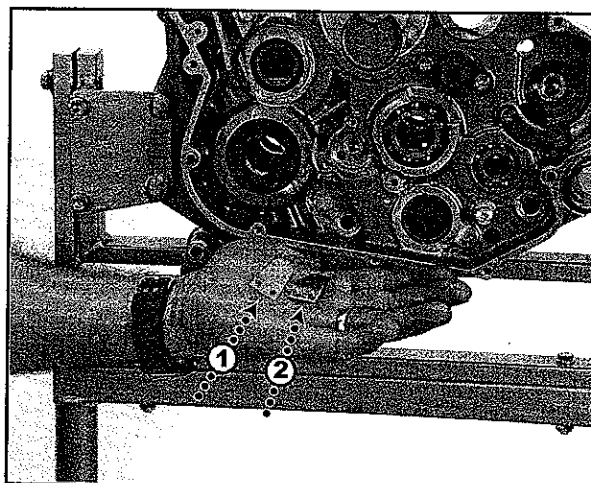


Fig.  
6H





## DISASSEMBLY OF OIL PUMP

Drain the engine oil.

Remove the kickstart lever, gearshift lever, transmission cover and the clutch (see Section 7A).

Remove the circlip (Fig. 6I-1) and the washer (Fig. 6I-2) in order to release the drive gear of the oil pump (Fig. 6I-3). Be careful not to lose the lock pin underneath the drive gear (Fig. 6J-1).

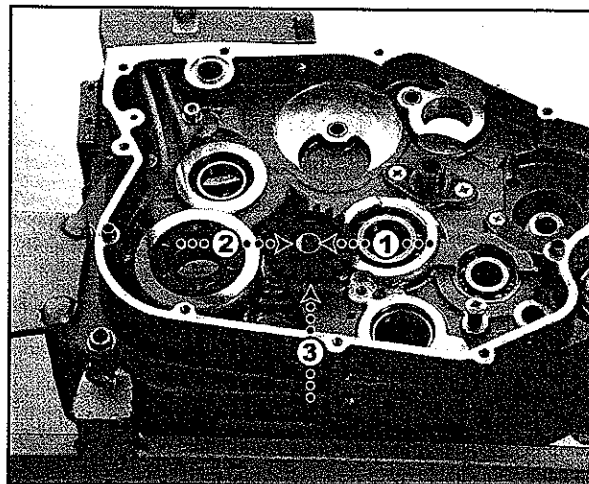


Fig.  
6I

Remove the lock pin (Fig. 6J-1) and the washer (Fig. 6J-2) from the oil pump shaft (Fig. 6J-3).

Unscrew the three screws holding the oil pump cover and remove the cover. Be careful not to damage the screws though they are secured with a threadlock liquid.

The cover is normally followed by the oil pump shaft and the inner rotor (see below).

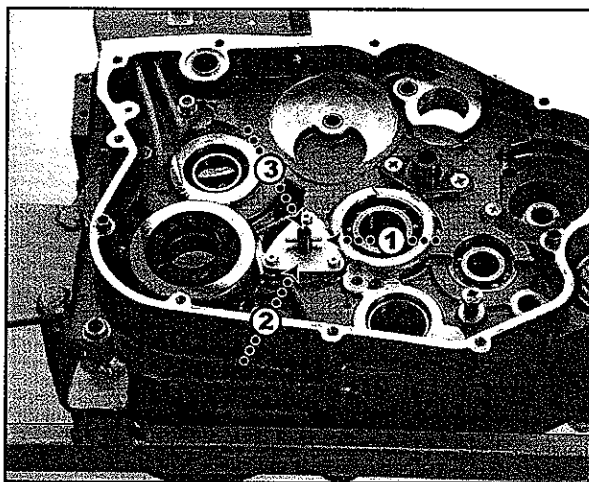


Fig.  
6J

Remove the oil pump shaft (Fig. 6K-1) and the inner rotor (Fig. 6K-2) attached to the shaft by a lock pin (Fig. 6L-8).

Remove the outer rotor (Fig. 6K-3).

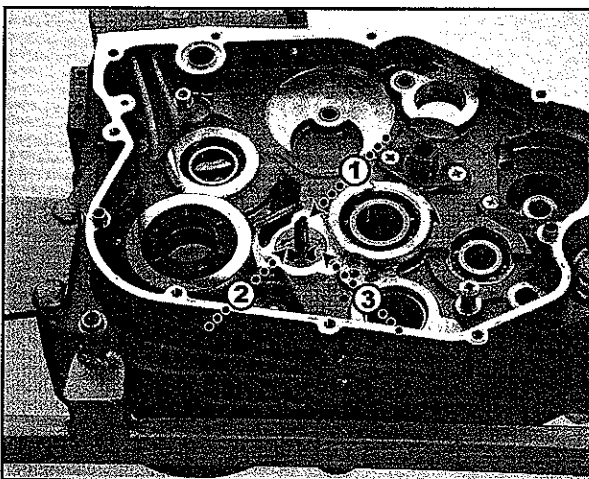


Fig.  
6K

Check the inner and outer surfaces of the oil pump housing for any damages or deterioration.

Check the conditions of the inner and outer rotors for any damages or deterioration.

Check the oil pump shaft for any damages or deterioration especially at the position of the oil pump cover.

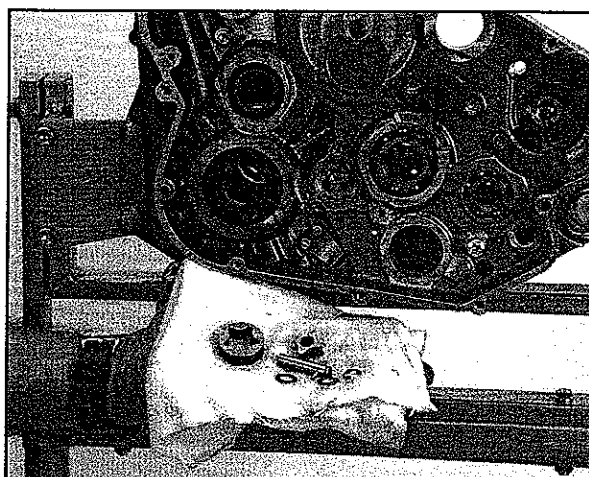


Fig.  
6L