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GENERAL INFORMATION

1

SPECIFICATIONS

SUBJECT/MODEL		ENDURO	MOTOCROSS	ELDURO	DESERT
Engine type		Liquid-cooled 4-stroke single cylinder, SOHC-4 valves			
Displacements		400-models: 399cc / Bore 92,0 mm x Stroke 60,2 mm 501-models: 501cc / Bore 95,0 mm x Stroke 70,7 mm 600-models: 595cc / Bore 95,0 mm x Stroke 84,0 mm			
Compression ratio		400-models: 11,6:1 501-models: 11,5:1 600-models: 11,2:1			
Start system		Kick starter		Electrical- and kick starter	
Decompression system		Fully automatic system activated by the camshaft plus an additional system activated by the kick starter		Fully automatic system activated by the camshaft	
Decomp. cable clearance		2 mm ± 1 mm		Not available	
Valve clearance		Intake: 0,10 mm Exhaust: 0,10 mm			
Lubrication		Orbit oilpump and reedvalve controlled lubrication Oil-cooled piston and connecting rod Replaceable micro filter and washable oil screen			
Engine oil		1.0 litre Synthetic SAE 5W-50 API SG/CF (minimum SAE 15W-50)			
Ignition		SEM, CDI, DFC™, Dynamic Force Control			
Spark plug		NGK CBE			
Spark plug gap		0,7 mm			
Alternator		12 V / 70 + 70 W	Not available	12 V / 70 + 70 W	12 V / 70 + 70 W
Coolant		1,3 litre of 50% Anti-freeze, with corrosion inhibitor, and 50% water			
Clutch		7 friction- and 8 mating plates in oil bath			
Clutch cable clearance		1-2 mm			
Gearbox		6-speed WR	4 or (6)-speed CR	6-speed WR	6-speed S-WR*
Ratios	1st gear	13/34 - 2,615	15/32 - 2,133	13/34 - 2,615	15/32 - 2,133
	2nd gear	17/30 - 1,765	18/28 - 1,555	17/30 - 1,765	18/28 - 1,555
	3rd gear	20/27 - 1,350	20/25 - 1,250	20/27 - 1,350	20/25 - 1,250
	4th gear	23/24 - 1,043	23/24 - 1,043	23/24 - 1,043	23/24 - 1,043
	5th gear	25/22 - 0,880	(24/22 - 0,917)	25/22 - 0,880	25/22 - 0,880
	6th gear	27/20 - 0,741	(25/21 - 0,840)	27/20 - 0,741	27/20 - 0,741
*Including Enduro II					
Primary transmission		Spur gears			
Ratio		29/78 - 2,690			
Secondary transmission		520 O-ring chain			
Ratios	501/4-speed	15/42 - 2,800			
	600/4-speed	15/42 - 2,800			
	400/6-speed	13/48 - 3,692	(13/48 - 3,692)	13/48 - 3,692	13/48 - 3,692
	501/6-speed	15/48 - 3,200	(15/48 - 3,200)	15/48 - 3,200	15/48 - 3,200
	600/6-speed	15/48 - 3,200	(15/42 - 2,800)	15/48 - 3,200	15/48 - 3,200
Carburettor		400-models: Dellorto PHM 38 501- & 600-models: Dellorto PHM 40 Dual Sport USA - FS 600: Edelbrock Qwiksilver 38			
Istd. jetting see next page					
Air filtration		Double foam filters	Single foam filter	Double foam filters	Double foam filters
Including Enduro II					
Fuel		RON 98 (octane)			
Exhaust system		Stainless steel pipes, 2 into 1 collector, aluminium/stainless steel silencer US-versions of Enduro, Enduro II, Elduro and Desert equipped with spark arrester			

GENERAL INFORMATION

CARBURETTOR STD. JETTINGS

1

MODEL/SUBJECT		Main jet	Needle jet	Needle	Needle clip	Pilot jet	Throttle	Float valve	Start jet	Mixture screw
ENDURO	FE 400	210	DR 272	K 35	#3	55	50	300	45	2 turns
	FE 501	195	DR 270	K 51	#3	45	40	300	45	1½ turns
	FE 600	195	DR 268	K 51	#3	35	40	300	45	1½ turns
ENDURO USA	FE 400	195	DR 270	K 51	#3	55	50	300	45	1½ turns
	FE 501	195	DR 270	K 51	#3	40	40	300	45	1½ turns
	FE 600	195	DR 270	K 51	#3	40	40	300	45	1½ turns
ENDURO II	FE 400 S	175	DR 268	K 51	#3	55	50	300	45	1½ turns
	FE 501 S	172	DR 270	K 51	#2	45	40	300	45	2 turns
	FE 600 S	172	DR 272	K 51	#3	45	50	300	45	1½ turns
ENDURO II USA	FE 400 S	190	DR 270	K 35	#2	52	50	300	45	2 turns
	FE 501 S	172	DR 272	K 51	#3	35	40	300	45	1½ turns
	FE 600 S	172	DR 270	K 51	#3	35	40	300	45	1½ turns
MOTOCROSS	FC 400	175	DR 268	K 51	#3	55	50	300	45	1½ turns
	FC 501	172	DR 270	K 51	#2	45	40	300	45	2 turns
	FC 600	172	DR 272	K 51	#3	45	50	300	45	1½ turns
ELDURO	FE 400 E	195	DR 268	K 35	#3	52	50	300	45	1½ turns
	FE 501 E	195	DR 270	K 51	#3	45	40	300	45	1½ turns
	FE 600 E	195	DR 268	K 51	#3	35	40	300	45	1½ turns
ELDURO USA	FE 400 E	195	DR 270	K 51	#3	55	50	300	45	1½ turns
	FE 501 E	195	DR 270	K 51	#3	40	40	300	45	1½ turns
	FE 600 E	195	DR 270	K 51	#3	40	40	300	45	1½ turns
DESERT USA	FX 400 E	195	DR 270	K 51	#3	55	50	300	45	1½ turns
	FX 501 E	195	DR 270	K 51	#3	40	40	300	45	1½ turns
	FX 600 E	195	DR 270	K 51	#3	40	40	300	45	1½ turns
DUAL SPORT	FS 600 E	-	-	K 6	19 out	-	-	-	-	-

TORQUE VALUES

SUBJECT	TORQUE	NOTE				
Intake manifold screws	3 Nm					
Oil filter cover / Water pump cover screws	5 Nm					
Oil pump cover / Reed valve screws	5 Nm	Apply a threadlock liquid				
Valve inspection cover screws	5 Nm					
Stator screws	8 Nm	Apply a threadlock liquid				
Crankcase / Transmission cover screws	10 Nm					
Cylinder head (M6) screws	10 Nm					
Exhaust pipe screws	10 Nm					
Gearshift lever screw	10 Nm					
Kick start lever screw	10 Nm	Apply a threadlock liquid				
Valve cover screws	10 Nm					
Oil drain plug / Spark plug	12 Nm					
Valve adjustment lock nuts	12 Nm					
Upper timing sprocket screws	25 Nm	Apply a threadlock liquid				
Cylinderstud nuts	44 Nm					
Flywheel nut	50 Nm	Left-hand thread				
Primary gear wheel nut	80 Nm					
Standard torque values						
	M4	M5	M6	M8	M16	
		6 Nm	8 Nm	10 Nm	25 Nm	125 Nm

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.

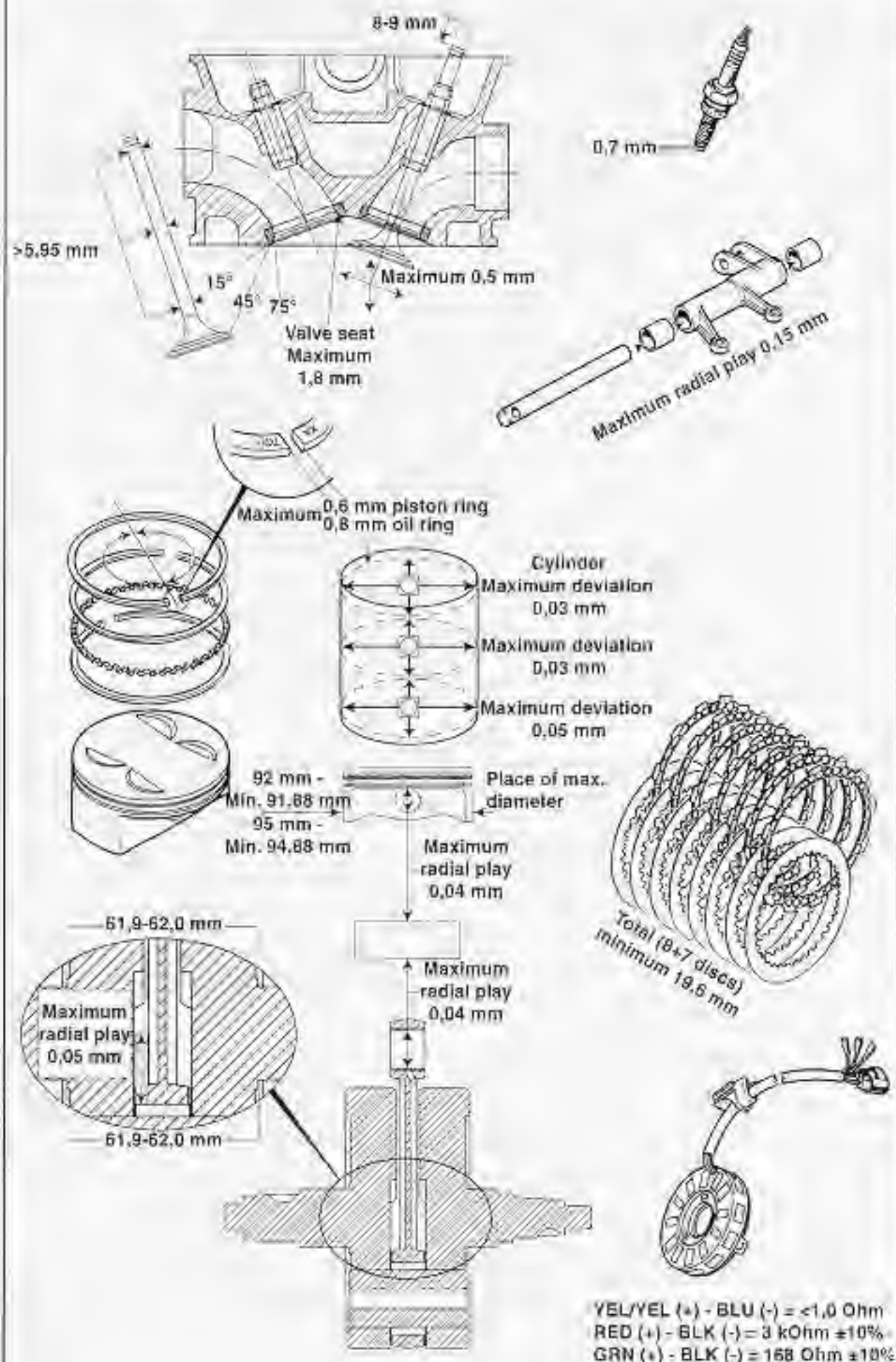
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MAINTENANCE SCHEDULES

Enduro and Elduro 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 microliter				R					R					R						R
Oil pump incl. reed valve									VC											VC
Coolant liquid *																				R
Spark plug (incl. cap)				I					R					I						R
Alternator/ignition **									I											I
Valve clearance	I		I		I		I		I		I		I		I		I			I
Valves incl. guides & sealings																				I
Timing chain incl. tensioner																				I
Piston incl. rings & pin																				I
Cylinder																				I
Connecting rod																				I
Crankshaft pin																				I
Clutch mechanism incl. discs									I											I
Carburettor ***				VC					VC					VC						VC
Diaphragm fuel pump									VC											VC
Kickstart mechanism																				I
Gearshift mechanism																				I
EL: Freewheel mechanism																				I

BEARINGS

Connecting rod																				R
Crankshaft																				I
Gearbox main shaft																				I
Gearbox secondary shaft																				I
Shift drum																				I
Camshaft																				I
Clutch pressure plate																				I
Kickstart mechanism																				I
Intermediate gear wheel																				I
EL: Intermediate shaft																				I
EL: Counter balancer																				I

BUSHINGS

Connecting rod																				R
Rocker arms																				I
Kickstart shaft																				I
Clutch shaft																				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

Motocross and Desert 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
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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
Oil pump incl. reed valve										I/C										I/C
Coolant liquid *																				R
Spark plug (incl. cap)					I					R					I					R
Alternator/ignition **										I										I
Valve clearance		I		I		I		I		I		I		I		I		I		I
Valves incl. guides & sealings																				I
Timing chain incl. tensioner																				I
Piston incl. rings & pin																				I
Cylinder																				I
Connecting rod																				I
Crankshaft pin																				I
Clutch mechanism incl. discs										I										I
Carburettor ***					I/C					I/C					I/C					I/C
Diaphragm fuel pump										I/C										I/C
Kickstart mechanism																				I
Gearshift mechanism																				I
EL: Freewheel mechanism																				I

BEARINGS

Connecting rod																				R
Crankshaft																				I
Gearbox main shaft																				I
Gearbox secondary shaft																				I
Shift drum																				I
Camshaft																				I
Clutch pressure plate																				I
Kickstart mechanism																				I
Intermediate gear wheel																				I
EL: Intermediate shaft																				I
EL: Counter balancer																				I

BUSHINGS

Connecting rod																				R
Rockerarms																				I
Kickstart shaft																				I
Clutch shaft																				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.

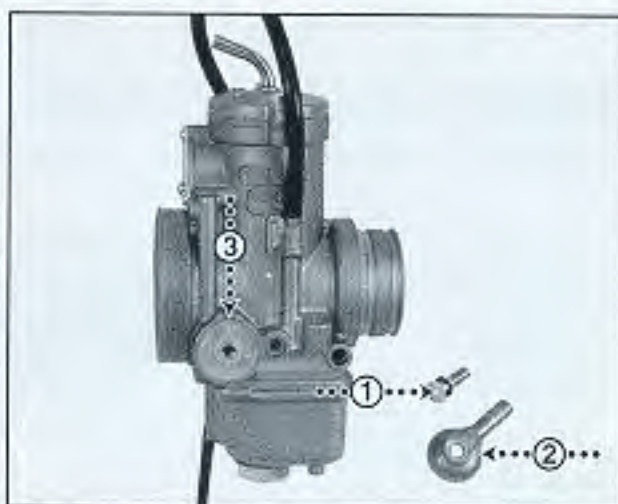


Fig.
4A

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.

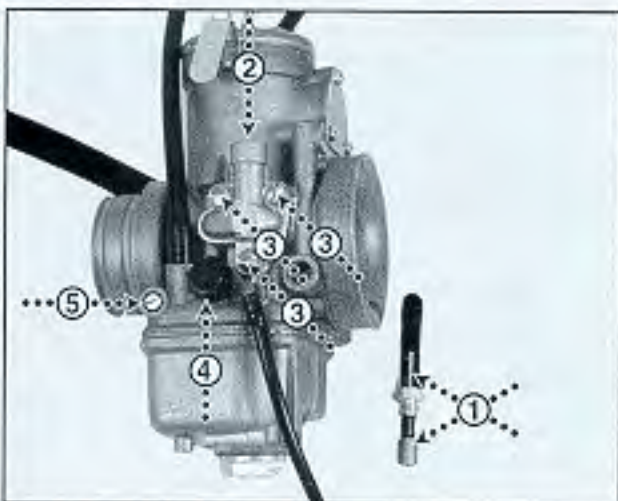


Fig.
4B

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).

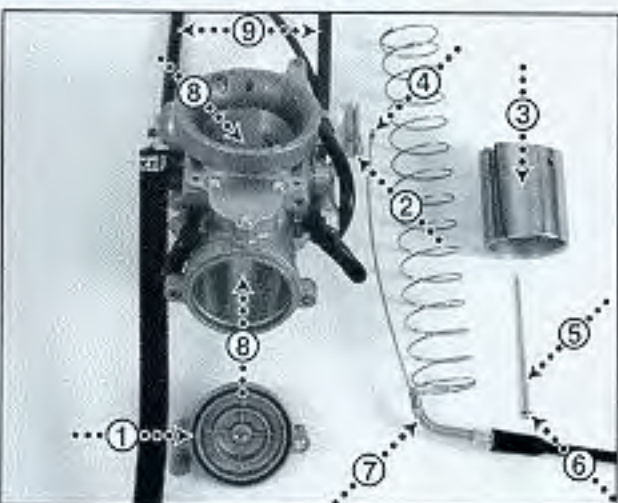


Fig.
4C

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).

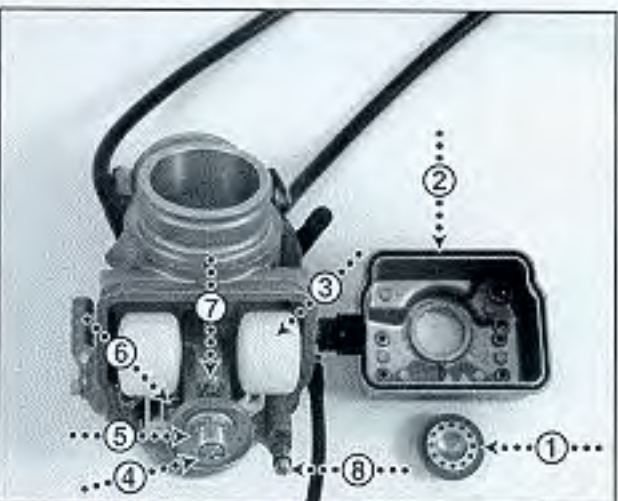


Fig.
4D



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.

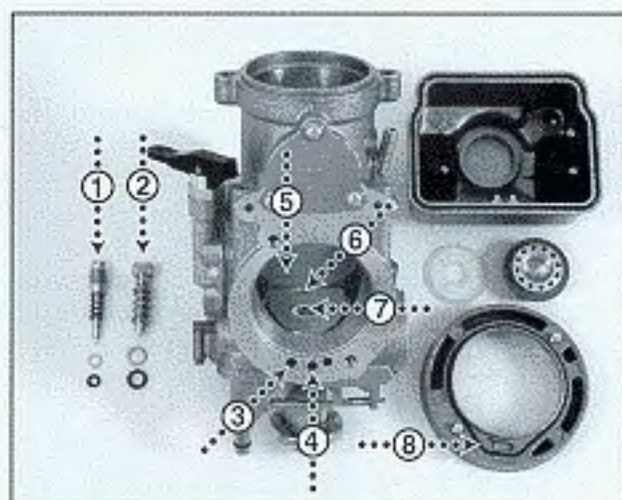


Fig.
4E

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.

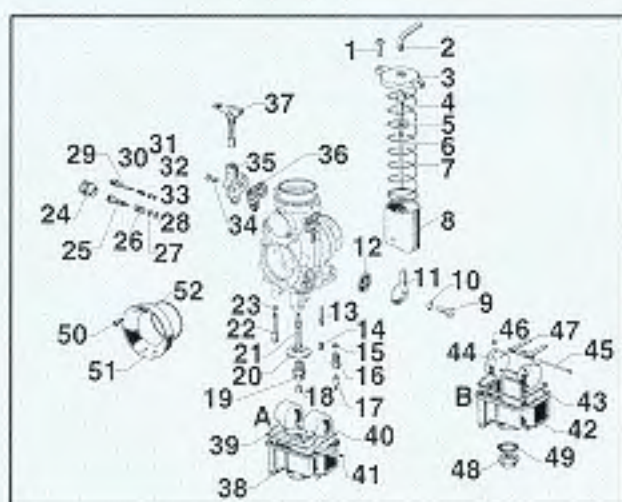


Fig.
4F

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

Check the airfilter tube (Fig. 4G-2) for any cracks or deterioration.

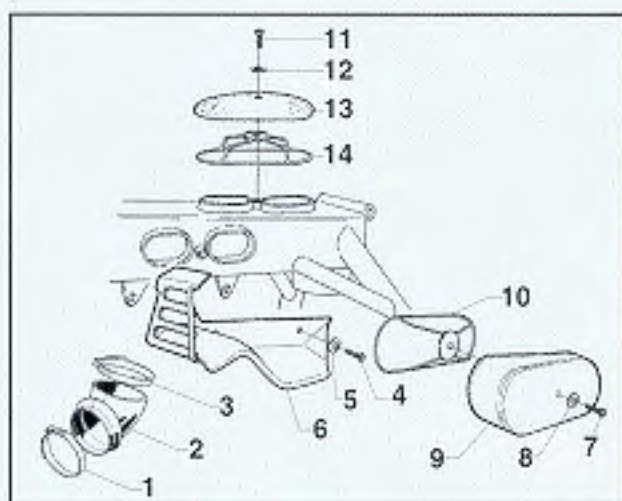


Fig.
4G

Check and clean the inner of the diaphragm pump. Check and clean the upper rubber segment (Fig. 4H-1), the lower (Fig. 4H-2) and the plastic diaphragm (Fig. 4H-3).

Check especially the surfaces of the two reeds (Fig. 4H-4) for any contraries.

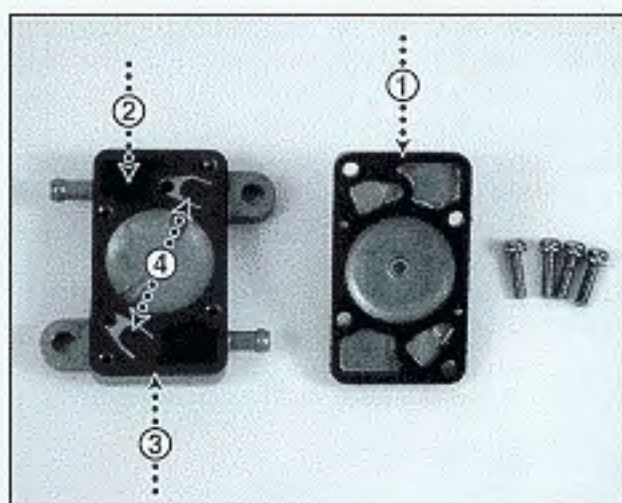


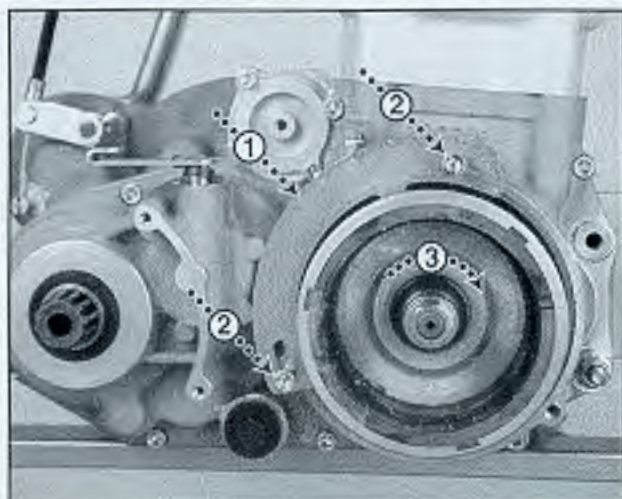
Fig.
4H



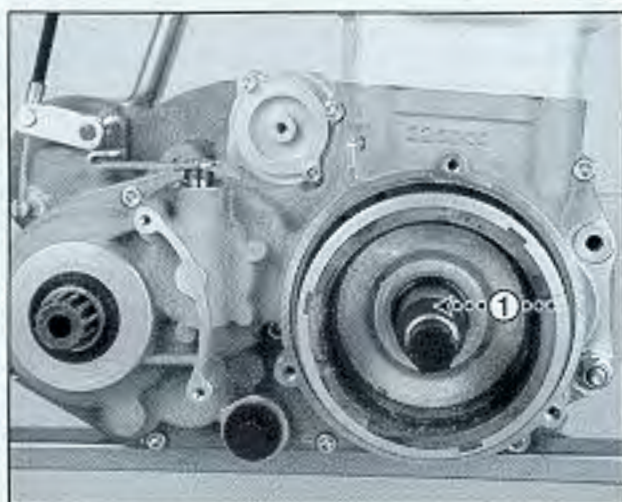
DISASSEMBLY OF ALTERNATOR/IGNITION

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 key (Fig. 5D-3).

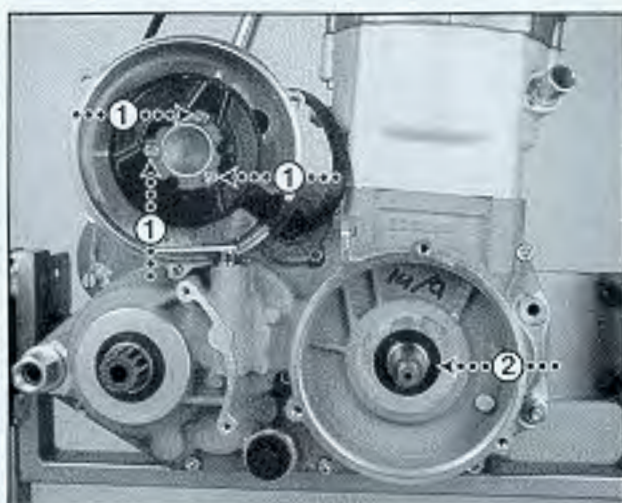
Fig.
5B

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

Fig.
5C

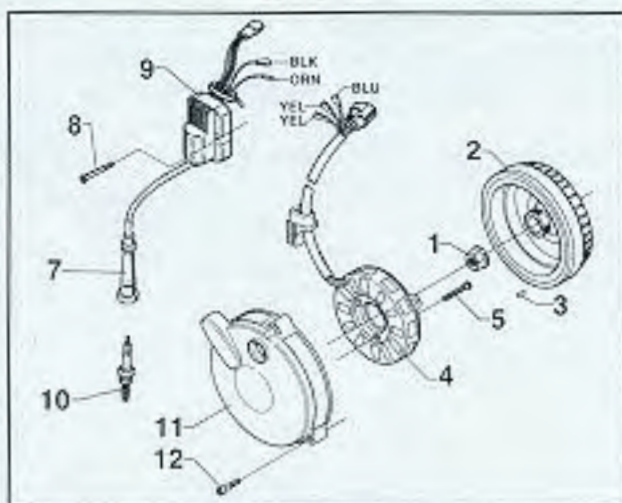
Check the inside of the flywheel (Fig. 5D-2), the woodruff key (Fig. 5D-3), the stator (Fig. 5D-4) and the oil seal of the crankshaft (Fig. 5C-2) for any damages or deterioration.

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

Check the condition of the spark plug (Fig. 5D-10) and set the gap to 0,7mm.

Check the condition of the spark plug cap (Fig. 5D-7), look especially for any cracks.

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

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.

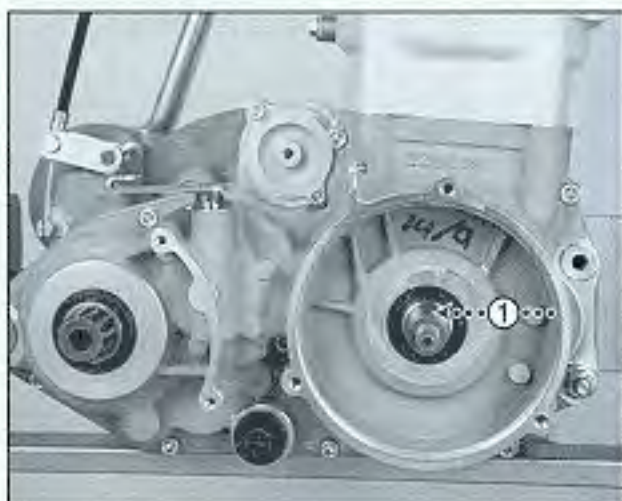


Fig.
5E

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.

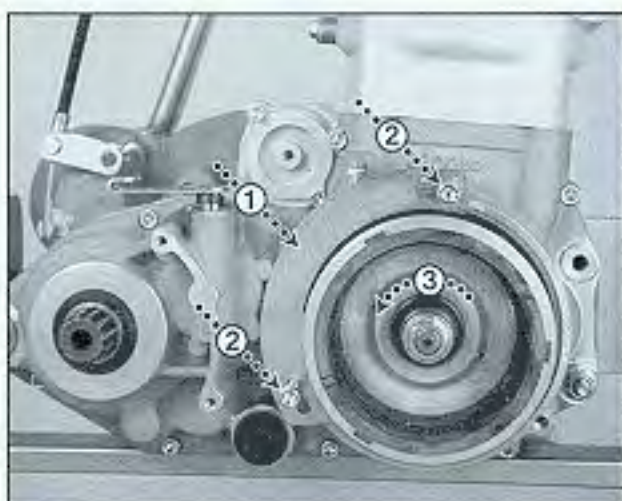


Fig.
5F

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).

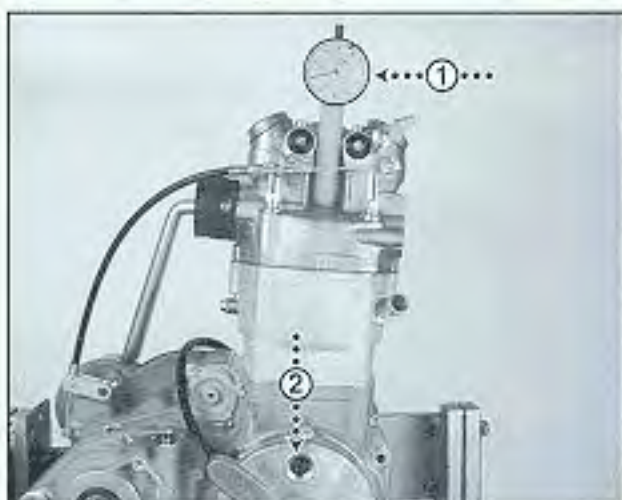


Fig.
5G

The ignition is properly set if:

Non-electrical starter models:

The left mark on the flywheel (Fig. 5H-2) is aligned with the mark on the stator (Fig. 5H-1).

Electrical starter models:

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

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).

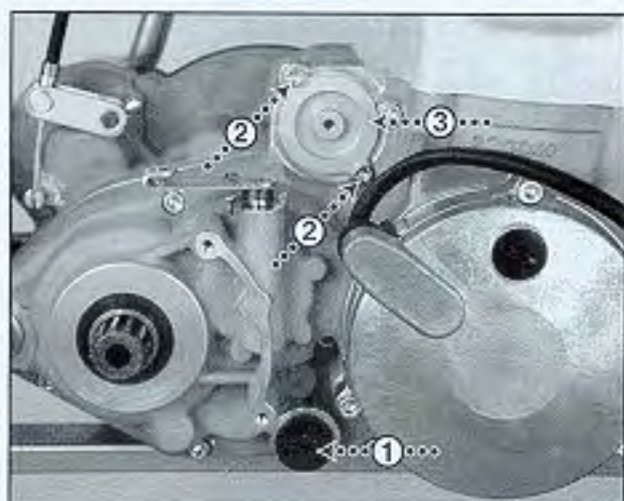


Fig.
6A

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.

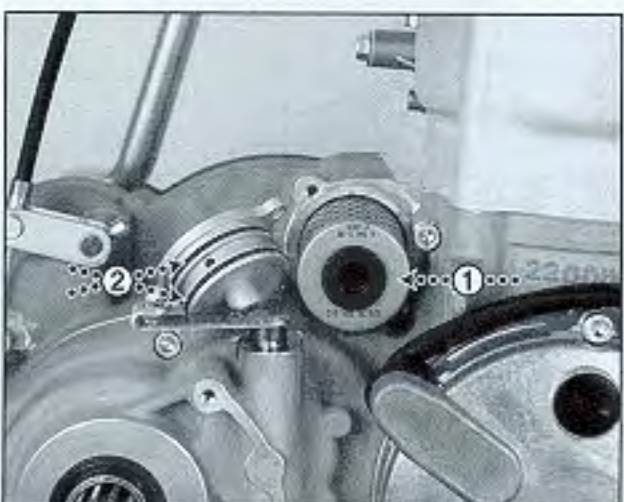


Fig.
6C

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).

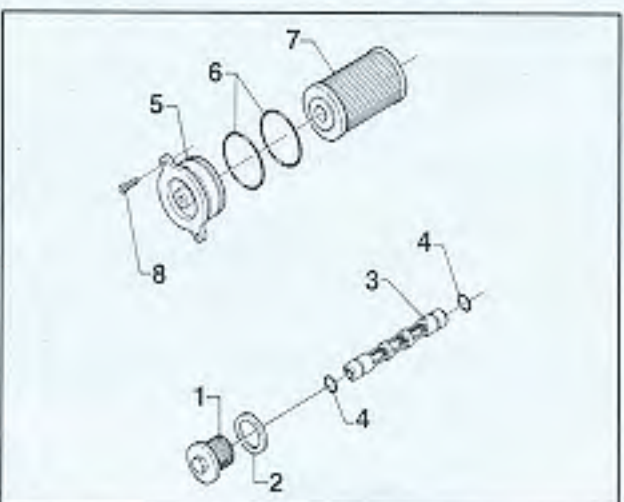


Fig.
6D

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.

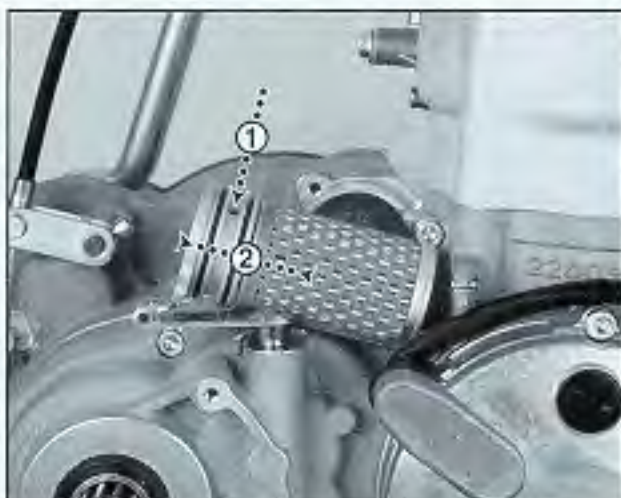


Fig.
6E

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

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.

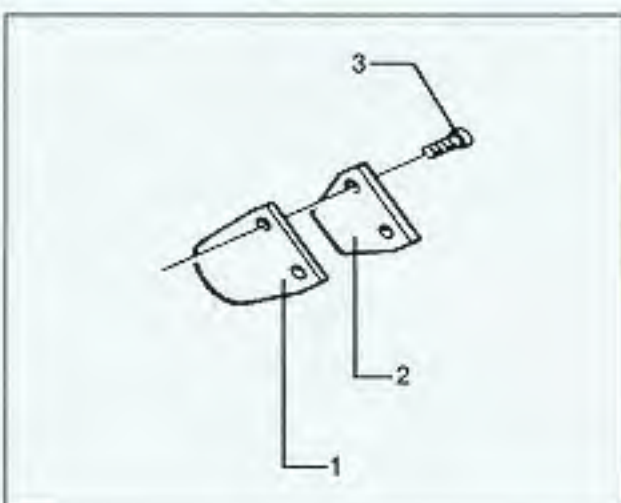


Fig.
6H

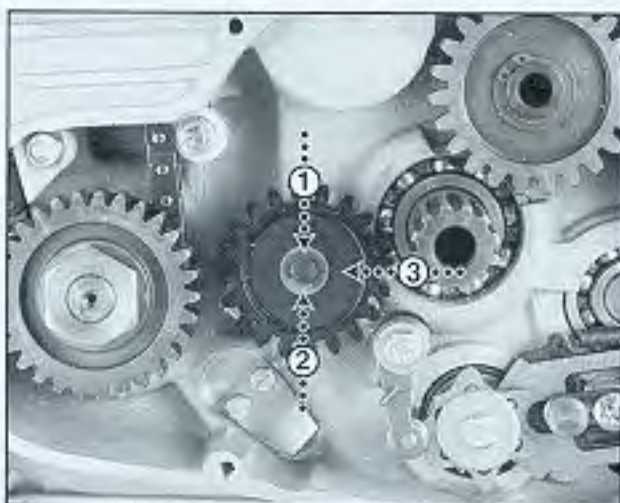


DISASSEMBLY OF OIL PUMP

Drain the engine oil.

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

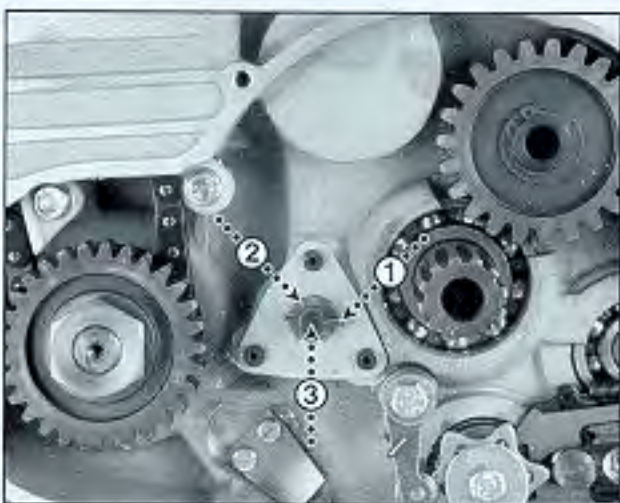
Remove the circlip (Fig. 6I-1) and the washer (Fig. 6I-2) in order to release the drive gear of the oil pump (Fig. 6I-3). Be careful not to lose the lock pin underneath the drive gear (Fig. 6J-1).

Fig.
6I

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

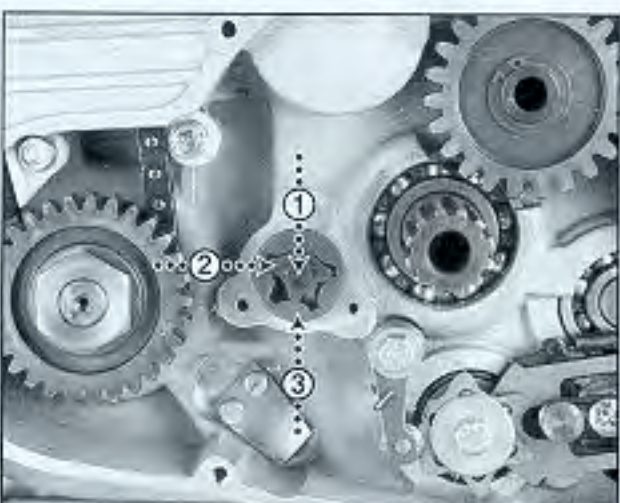
Unscrew the three screws holding the oil pump cover and remove the cover. Be careful not to damage the screws though they are secured with a threadlock liquid.

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).

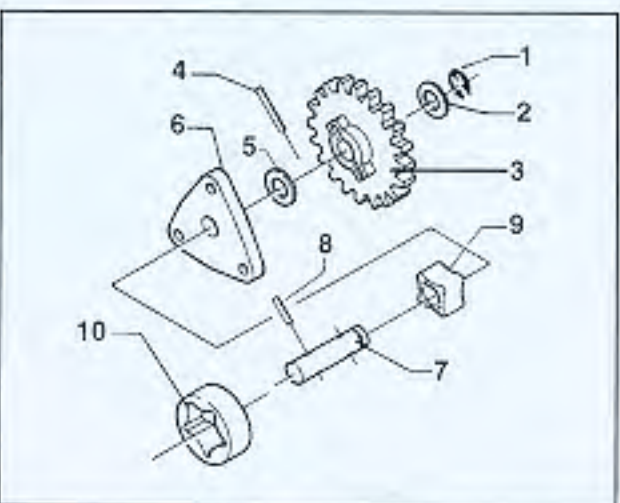
Remove the outer rotor (Fig. 6K-3).

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



ASSEMBLY OF OIL PUMP

Insert the outer rotor into the oil pump housing, the marks on the rotor facing outwards (Fig. 6M-1). Position the inner rotor onto the oil pump shaft with the lock pin (Fig. 6L-8), the marks on the inner rotor (Fig. 6M-2) and the lock ring spline on the shaft (Fig. 6M-3) facing outwards.

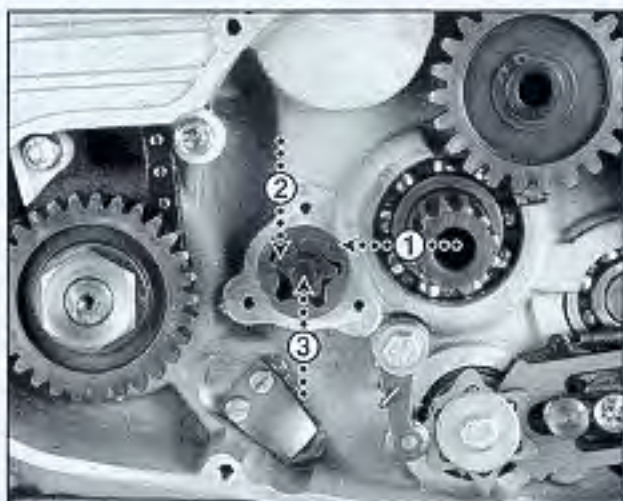


Fig.
6M

Thoroughly clean the inner surface of the oil pump cover and the sealing surface around the oil pump rotors.

Add a thin layer of silicone onto the sealing surface around the rotors.

Put on the oil pump cover onto the shaft, the mark on the cover and the crankcase half should align (Fig. 6N-1).

Screw on the three screws, using a threadlock liquid, torque 5 Nm.

Put one washer (Fig. 6N-2) onto the shaft and then insert the lock pin (Fig. 6N-3) into the shaft.

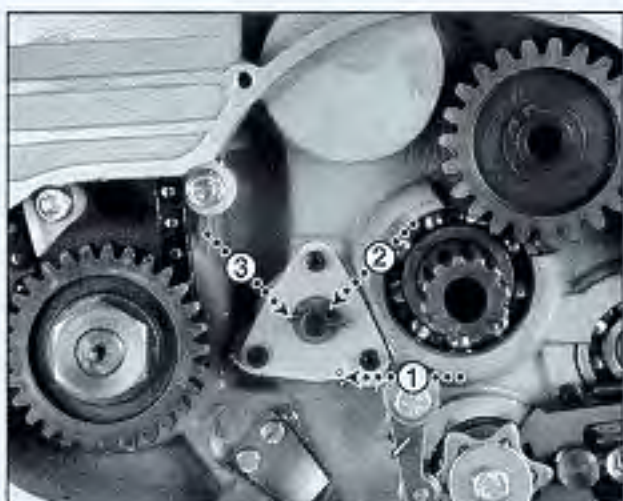


Fig.
6N

Put the drive gear (Fig. 6O-1) onto the shaft, be careful to align the spline on the backside of the drive gear with the lock pin on the shaft.

Place one washer (Fig. 6O-2) onto the shaft and then lock the whole device with a new circlip (Fig. 6O-3). Install the clutch, the transmission cover, the kick-start and the gearshift lever (see Section 7A).

Fill the engine with the adequate quantity of oil.



Fig.
6O



DISASSEMBLY OF CLUTCH

Drain the engine oil.

Remove the kickstart lever and the gearshift lever. Unscrew the six screws of the transmission cover. Please note that the two screws in the front and the rear (Fig. 7A-1) are slightly longer than the other four ones (Fig. 7A-2).

Gently remove the cover without making any damages to the sealing surfaces of the cover and the crankcase half.

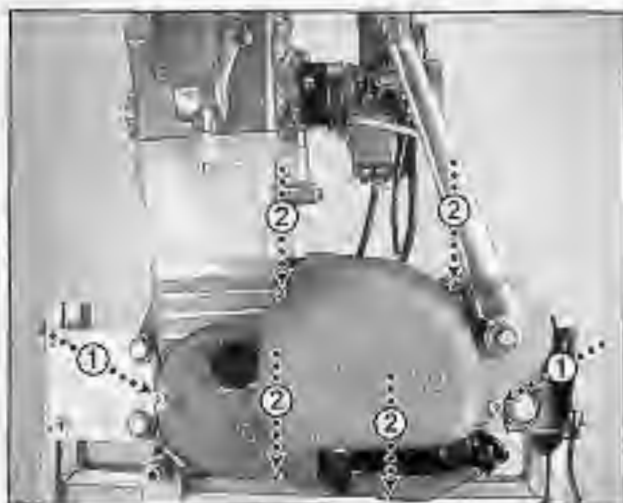


Fig.
7A

Unscrew the six screws (Fig. 7B-1) holding the clutch pressure plate crosswise in order to prevent the friction- and mating plates to either jam or warp. Remove these six screws including retainers and springs.

Remove the pressure plate - be careful not to lose the adjustment washer (Fig.No. 7D-2) placed in between the bottom of the pressure sleeve (Fig. 7D-14) and the push rod (Fig. 7D-1).

Remove the clutch discs and the push rod.

Remove the circlip (Fig. 7D-7) on the main gear shaft, holding the clutch hub (Fig. 7D-6) and the clutch outer (Fig. 7D-5).

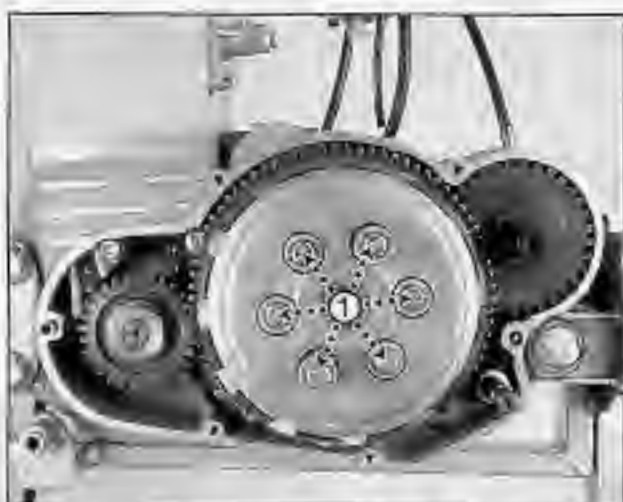


Fig.
7B

Place a suitable bolt (M10x20 mm for instance) in the pushrod channel of the main gear shaft. Attach the clutch hub puller (Fig. 7C-1 Art.No. 270005-01) to the clutch hub with three of the previously removed screws. Screw on the center bolt of the puller towards the bolt-head of the previously placed bolt.

Use the clutch holder (Fig. 7C-2, Art.No. 270007-01) while screwing on the center bolt of the puller until the clutch hub is released from the main gear shaft. Remove the washer in between the clutch hub and the clutch outer. Remove the clutch center including the bushing and the washer underneath the clutch center.

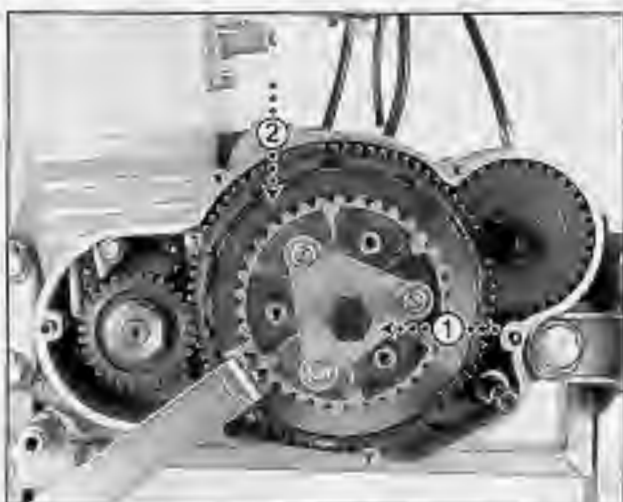


Fig.
7C

Check the friction-discs (Fig. 7D-11) and mating plates (Fig. 7D-12) in regards to any damages or skewness. The friction discs have to be replaced if the whole package of friction- and mating plates measures below 19.6 mm, provided that the mating plates show no signs of skewness.

Check the bushing (Fig. 7D-4) and the two washers (Fig. 7D-3) for any damages or deterioration.

Check the function and any possible wear of the bearing (Fig. 7D-13) and the pressure sleeve (Fig. 7D-14).

Check the splines on the main gear shaft.

Check the main shaft bearing (Fig. 7E-1) for any deterioration or damages.

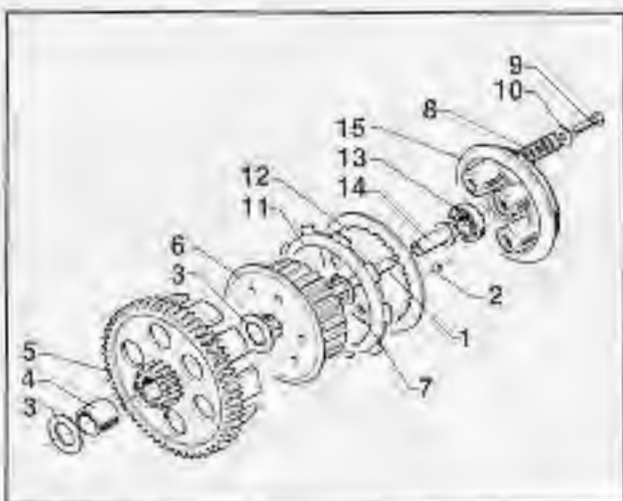


Fig.
7D



ASSEMBLY OF CLUTCH

Place one of the two washers (Fig. 7E-2) and the bushing (Fig. 7E-3) on the main shaft.

While aligning the clutch lever, placed on top of the right side of the engine, 90° (the lever pointing towards the left side of the engine) push in the push rod (Fig. 8A-4) into the main shaft.

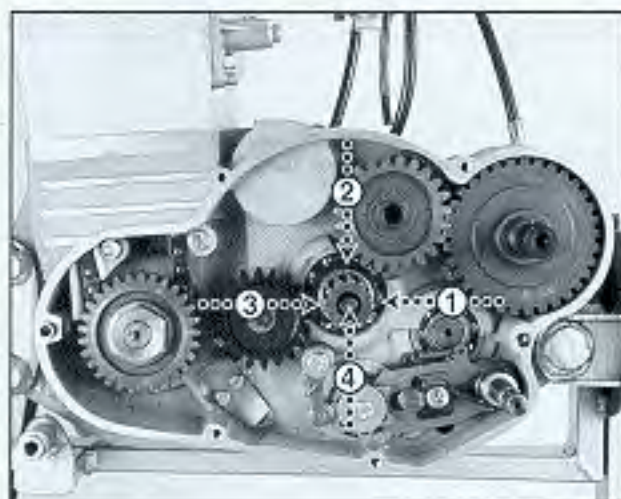


Fig.
7E

Put the clutch outer onto the main shaft.

Put the second washer (Fig. 7F-1) onto the main shaft and the clutch outer.



Fig.
7F

Warm the clutch hub (Fig. 7G-1) in an oven or likewise to 200°C in order to be able to slide the hub onto the main shaft.

Put on the clutch hub onto the main shaft using a suitable sleeve/socket on top of the center of the hub and a mallet. Secure the kickstart mechanism before tapping onto the clutch hub in order to prevent any damages to the kickstart mechanism.

Lock the clutch hub onto the main shaft with a new circlip (Fig. 7G-2).

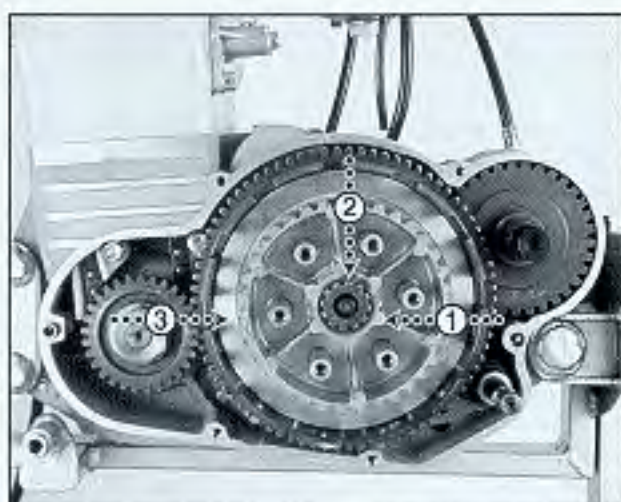


Fig.
7G

Place the friction discs and the mating plates into the clutch, starting with one mating plate (Fig. 7G-3), followed by one friction disc, then a mating plate and so on. The 8th mating plate being the last one.

Add a dab of grease onto the push rod top and place the clutch adjustment shim on this dab. Slide on the pressure plate and be careful not to lose the adjustment washer during the procedure.

Put the springs (Fig. 7D-8), the spring retainers (Fig. 7D-10) and the screws (Fig. 7D-9) into the slots of the pressure plate.

Screw on the pressure plate crosswise (Fig. 7B), torque 10 Nm.

The clutch lever on top of the engine should engage at 90° - if not, change the adjustment shim.

Make sure that both of the guide bushings are in straight and fixed positions. Put a new gasket onto the crankcase half. Check the sealings in the transmission cover; kickstart shaft and gearshift shaft, for any damages or weariness.

Slide the cover over the shafts and the guide bushings towards the crankcase half. Screw on the six screws, torque 10 Nm.

Attach the gearshift lever in preferred position. Slide the kickstart lever onto the shaft in a position, the lever facing outwards, just slightly touching the kick starter stop knob (Fig. 7G-1). Add some threadlock liquid to the screws of the levers and tighten the screws using a torque of 10 Nm.

Fill the engine with the adequate quantity of oil.

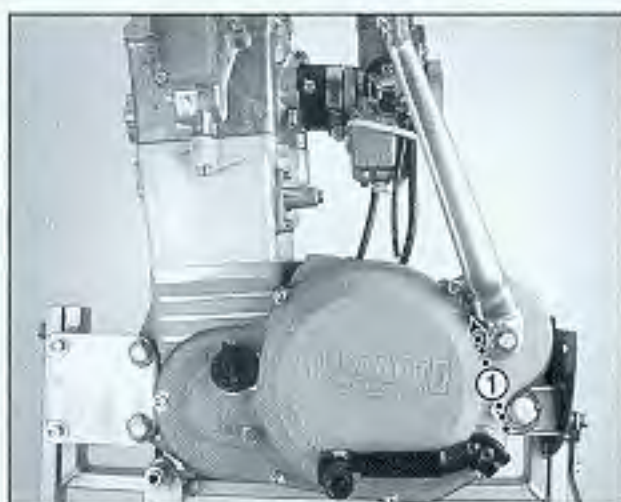


Fig.
7H



DISASSEMBLY OF GEARSHIFT MECHANISM

Drain the engine oil.

Dismantle the kickstart lever, the gearshift lever, the transmission cover and the clutch according to Section 7A.

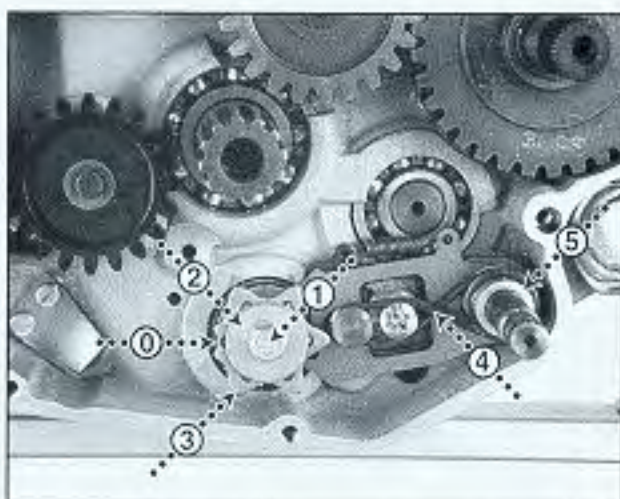
Unscrew the bolt holding the gearshift location lever (Fig. 7I-1) and remove the bolt, the washer (Fig. 7I-2), the lever (Fig. 7I-3), the spring (7I-4) and the sleeve (Fig. 7I-5) attached to the lever.

Fig.
7I

Unscrew the bolt holding the gear position star (Fig. 7J-1). Remove the bolt, the washer (Fig. 7J-2) and the position star (Fig. 7J-3).

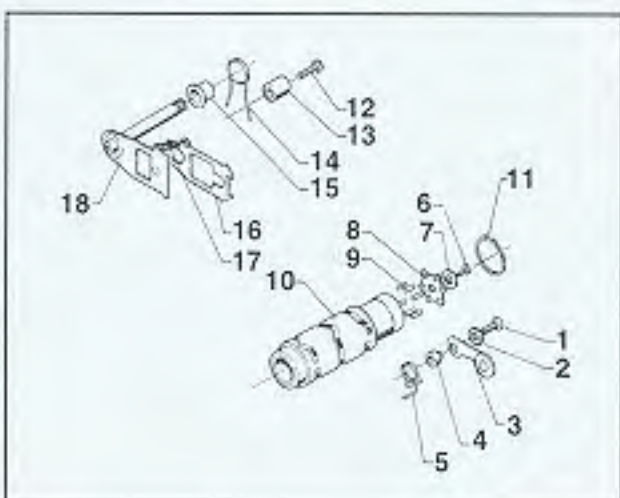
Detach and remove the hair pin spring (Fig. 7J-4) including the sleeve (Fig. 7J-5).

Lift off the gearshift shaft including the gear selection plates from the crankcase half.

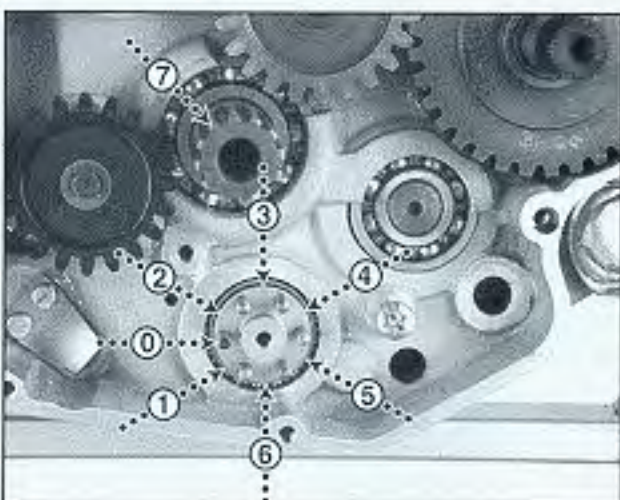
Fig.
7J

Check the gearshift location lever (Fig. 7K-3), position star (Fig. 7K-8) and the pins (Fig. 7K-9) for any damages or deterioration.

Carefully check the surfaces of the both the upper gearshift selection plate (Fig. 7K-16) and the lower one (Fig. 7K-18). Grind off any sharp edges and check that both plates are totally even and in alignment with each other. The upper selection plate should, without any friction, easily slide across the lower selection plate.

Fig.
7K

Each gear position as shown in Figure 7K, 0-6. The figure 0 representing the position of the neutral, the figure 1 = 1st gear and so on. Please notice that the pin with a flat surface (Fig. 7L-0) is the position of the neutral position in the position star (Fig. 7J-0).

Fig.
7L



ASSEMBLY OF GEARSHIFT MECHANISM

Install the gearshift shaft including the selection plates and the attachment spring.

Slide the sleeve and the spring onto the shaft and install the hair pin spring into its position. Please note that the bent part of this spring should be in the position as shown (Fig. 7M-1).

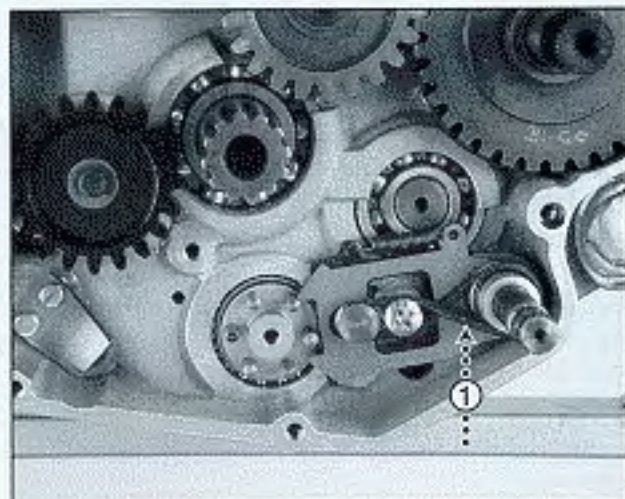


Fig.
7M

Install the gear position star (Fig. 7N-1). Install the gearshift location lever including sleeve and spring (Fig. 7N-2) by positioning the straight part of the spring into its position in the crankcase half, screw the bolt in a few turns, slide the lever, clockwise, over the position star and place the wheel of the lever into its final position in the star. Please observe that the chamfered edge of the sleeve should be facing outwards and towards the lever (Fig. 7K-4).

Check that the play, equal to none, and the resistance of the hair pin spring (Fig. 7N-3) is exactly the same in both directions. If an adjustment is needed, turn the gearshift shaft as shown (Fig. 7N-A), use a plier, gripping both ends of the spring, adjust the part of the spring needing an adjustment towards the other.

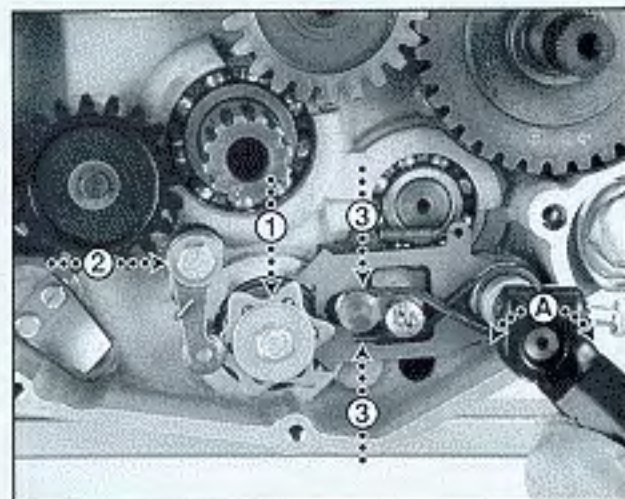


Fig.
7N

Install the clutch, transmission cover, kickstart and gearshift lever according to section 7A.

Fill the engine with the adequate quantity of oil.

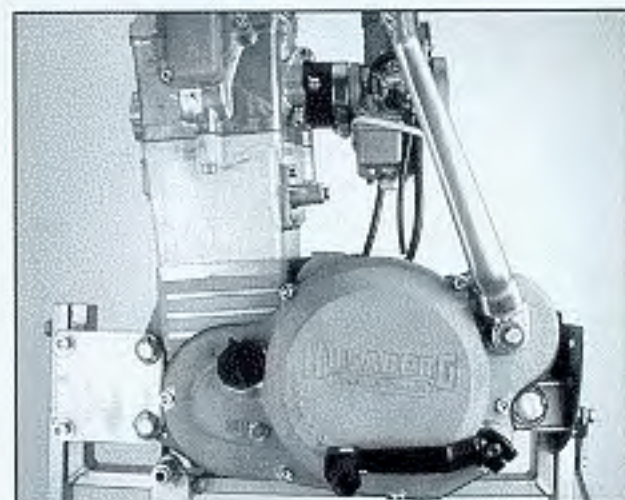


Fig.
7O



DISASSEMBLY OF KICKSTART MECHANISM

Drain the engine oil.

Dismantle the kickstart lever, the gearshift lever, the transmission cover and the clutch according to Section 7A.

Remove the kickstart shaft (Fig. 7P-1) including the attached kickstart gear wheel (Fig. 7P-2) by just pulling the shaft straight out from the crankcase half. Most likely is also the spring on the inside of the gear wheel accompanying the shaft and the gear wheel when pulled out.

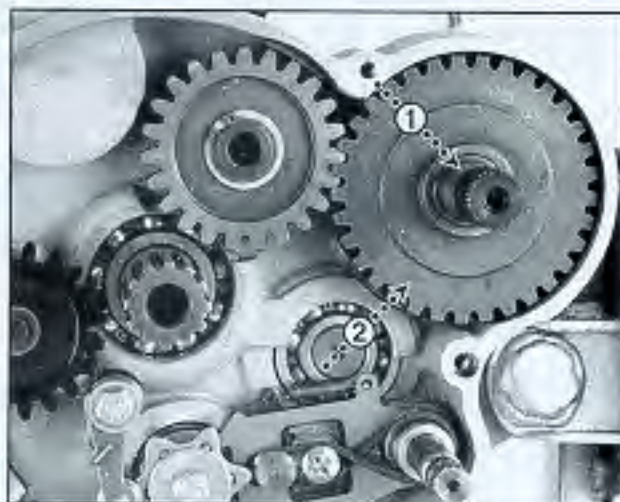


Fig.
7P

The function of the kickstart mechanism:

When the kickstart lever is activated the kickstart engagement key (Fig. 7Q-1) is engaged into the gear ring of the kickstart gear wheel (Fig. 7Q-2) and thus the gear wheel turning the intermediate gear wheel (Fig. 7Q-3). The kickstart mechanism is brought back to its home position, when released, by the spring (Fig. 7Q-6). The engagement key is when resting towards the engagement sledge (Fig. 7Q-8) which is acting as both a stop and a device de-activating the engagement key from the gear ring of the kickstart gear wheel.

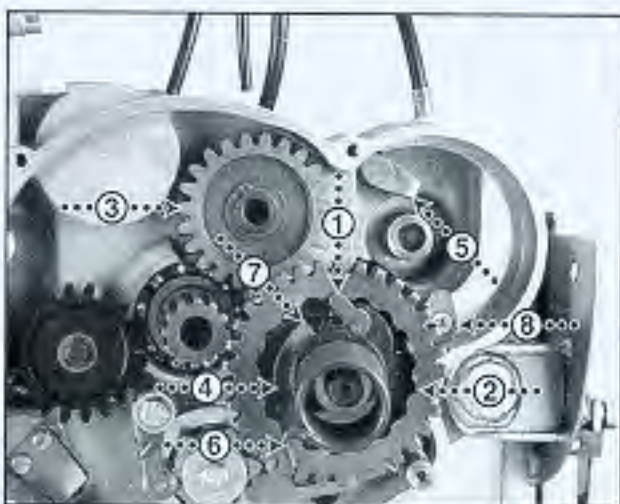


Fig.
7Q

Products equipped with a decompression device activated by the kickstart:

When the kickstart lever is activated from the very top of the orbital path the decompression device (Fig. 7R-4) lifts the decompression lever (Fig. 7R-5). When the kickstart mechanism is brought back the chamfered edge of the decompression device (Fig. 7R-7) pushes the decompression lever back towards the crankcase half thus letting the kickstart mechanism return to its home position.

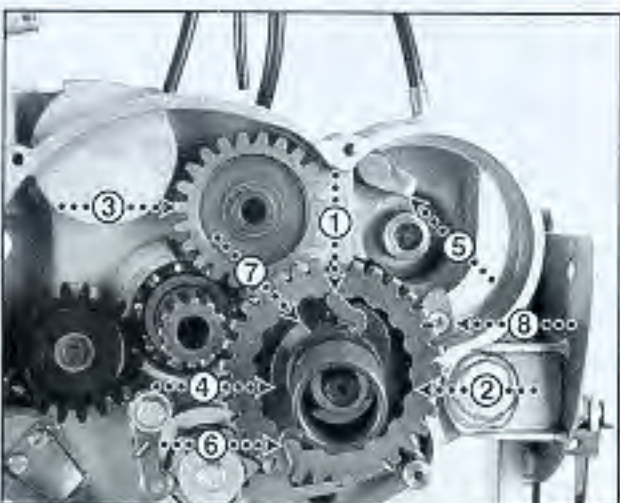


Fig.
7R

Check the bushing in the transmission cover (Fig. 7S-1), the kickstart gear wheel (Fig. 7S-2), the bearing (Fig. 7S-3) and the kickstart shaft (Fig. 7S-4) for any damages or deterioration. Especially the surface and edge on the decompression device (Fig. 7R-4, 7) and the surface of the decompression lever (Fig. 7R-5). Grind off any rough scratches on the lever's front edge and the surface on the bottom of the lever.

The engagement key (Fig. 7S-6) should be replaced if it shows significant wear on the surface facing towards the gear ring on the kick start gear wheel. Check the engagement sledge (Fig. 7S-8) for any deterioration or damages.

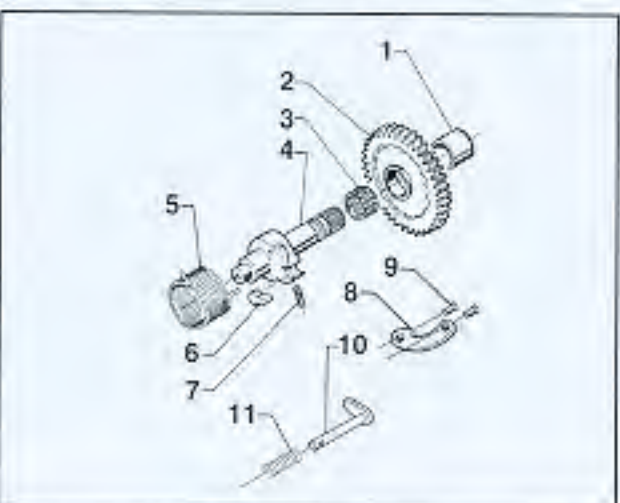


Fig.
7S



ASSEMBLY OF KICKSTART MECHANISM

Install the spring as shown (Fig. 7T-1). The bent part of the spring gripping into the slot of the crankcase and the straight part of the spring facing outwards from the crankcase half.

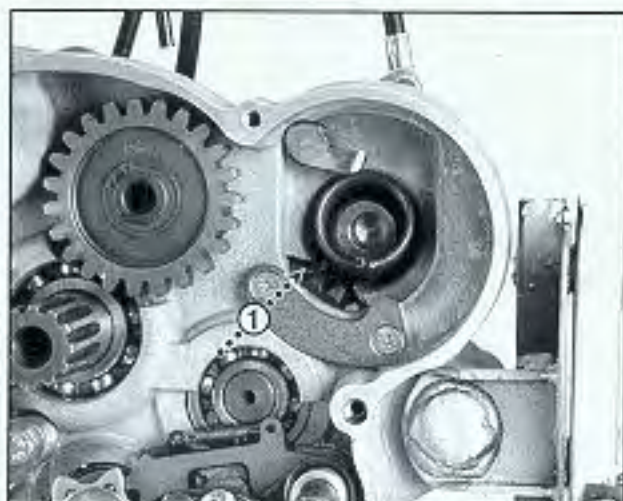


Fig.
7T

Install the kickstart shaft into the spring and into the machined hole of the crankcase half as shown (Fig. 7U-1).

The spring attached to the shaft as shown (Fig. 7U-2).



Fig.
7U

Turn the kickstart shaft, with the help of the kickstart lever, clockwise and by pushing the shaft towards the crankcase half, until the engagement key (Fig. 7V-1) hooks up on the the engagement sledge (Fig. 7V-2).

Install the kickstart gear wheel onto the shaft and within the cogs of the intermediate gear wheel. Install the clutch, the transmission cover, the kickstart and gearshift lever according to section 7A. Fill the engine with the adequate quantity of oil.

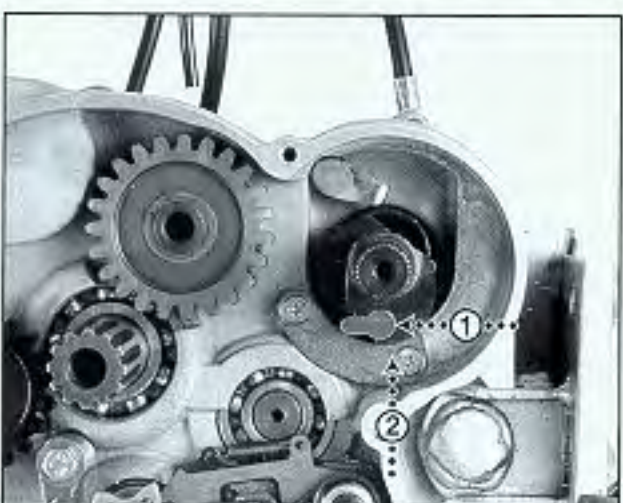


Fig.
7V



VALVE ADJUSTMENT

Put the engine in TDC position on compression stroke (see Section 5). Unscrew the two screws of each valve adjustment cover (Fig. 8A-1) and remove the covers including the gaskets.

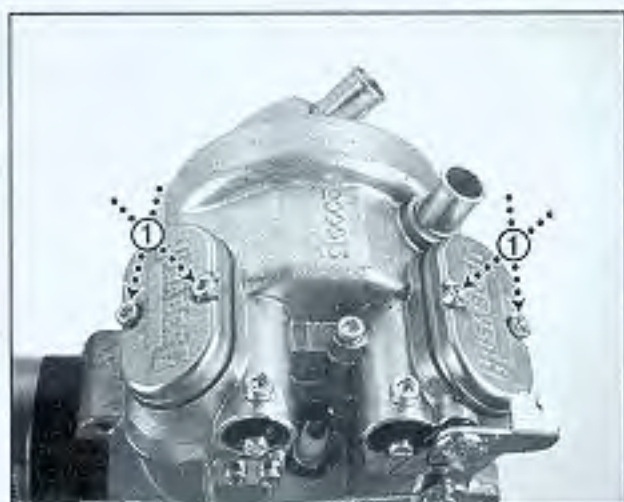


Fig.
8A

With the use of a feeler gauge check the play of each four valves in between the feet of the adjustment screws and the top of the valve stems (Fig. 8B-3). Valve clearance should be 0,10 mm.

If an adjustment is needed release the lock nut (Fig. 8B-1) and adjust by turning the adjustment screw (Fig. 8B-2).

With the adequate play obtained hold the adjustment screw while tightening the lock nut, torque 12 Nm.

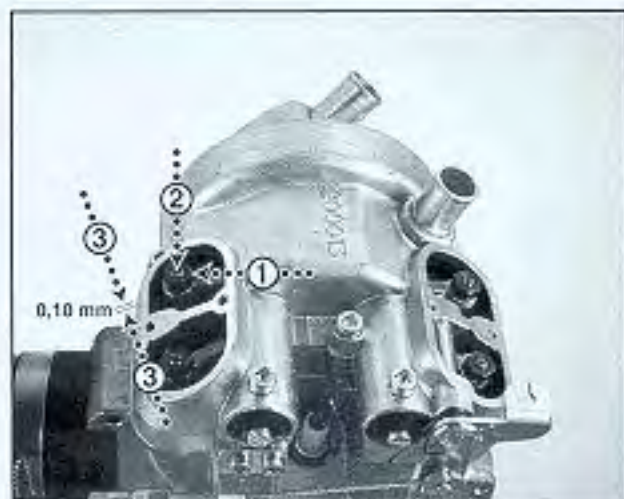


Fig.
8B

Check the axial play (Fig. 8C-1) of the rocker arms. Adequate play should be 0,05 +0,05 mm.

If an adjustment is needed release the screw of the rocker arm in question (Fig. 8C-2), push onto the end cap/screw of the rocker arm (Fig. 8C-3) as shown (Fig. 8C-4) and tighten the rockerarm screw, torque 10 Nm.

Check the gaskets and the valve adjustment covers for any damages or deterioration.

Refit the covers and gaskets and screw on the four screws, torque 5 Nm.

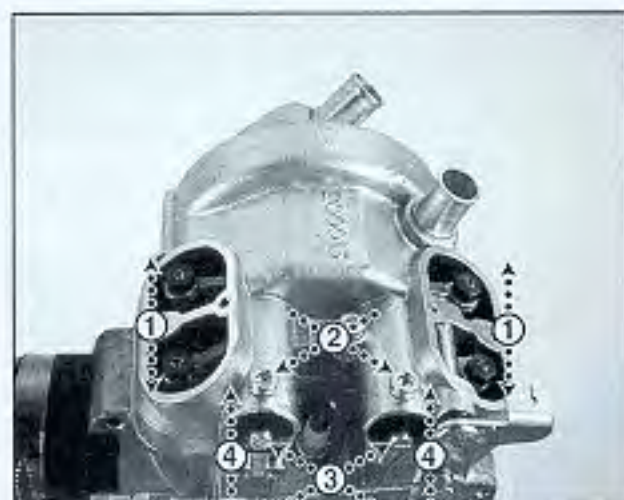


Fig.
8C

DECOMPRESSION ADJUSTMENT

Put the engine in the TDC position on compression stroke (see Section 5).

Check that the decompression cable is well lubricated and runs smoothly.

Check the play of the valve decompression lever (Fig. 8D-1) which should be 2 ± 1 mm (Fig. 8D-2).

If an adjustment is needed release the lock nut and turn the adjustment screw (Fig. 8D-3).

Tighten the lock nut when the adequate play is obtained.

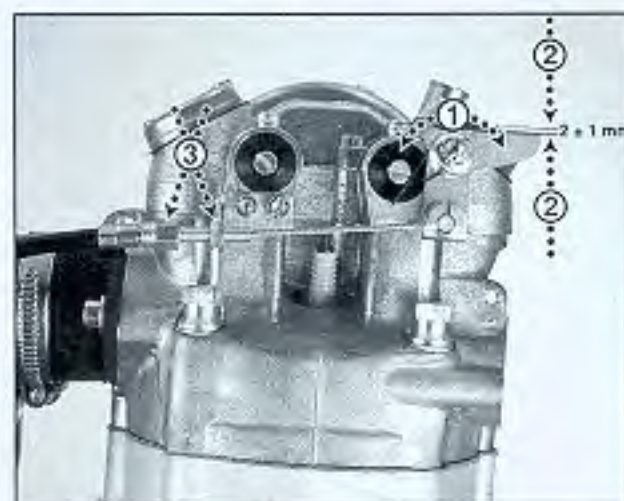
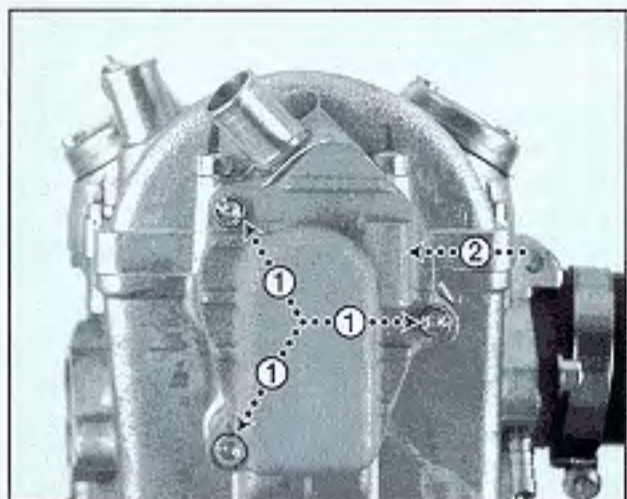


Fig.
8D

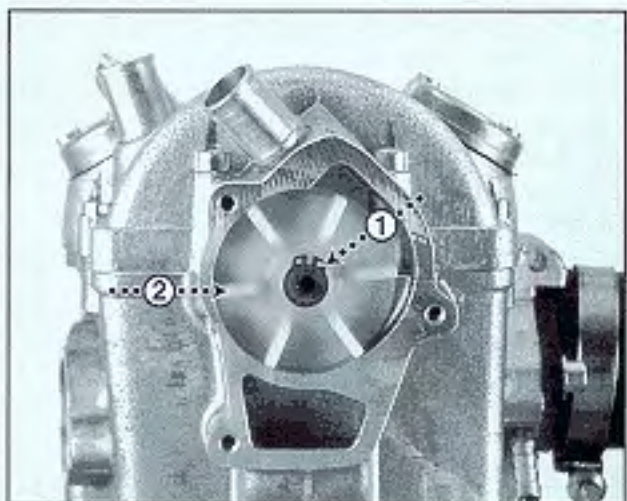


DISASSEMBLY OF WATER PUMP

Drain the coolant liquid from the cooling system. Unscrew the three screws (Fig. 8E-1) of the water pump cover (Fig. 8E-2) and remove the cover.

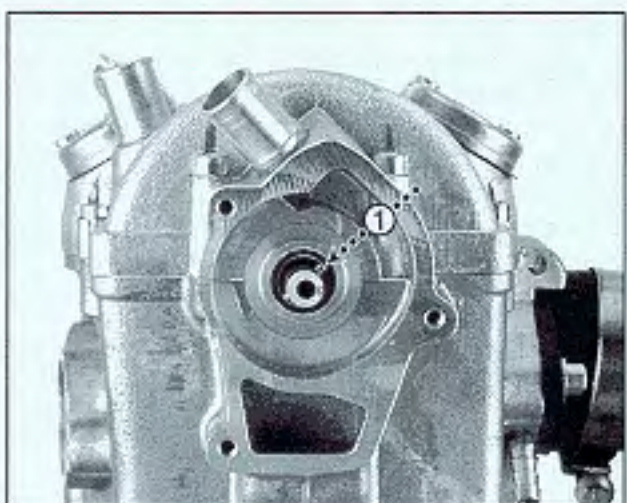
Fig.
8E

Remove the circlip (Fig. 8F-1) holding the water pump impeller (Fig. 8F-2) and gently remove the impeller. Be careful not to lose the impeller pin (Fig. 8G-1). Inspect the surfaces of the camshaft end and the inner of the water pump housing.

Fig.
8F

ASSEMBLY OF WATER PUMP

Install the impeller pin (Fig. 8G-1). Align the spline on the backside of the impeller with the pin and gently push the impeller onto the shaft and the pin. Secure the impeller with a new circlip. Put on a new gasket and the cover and screw on the three screws, torque 5 Nm. Fill the cooling system with the adequate level of coolant liquid.

Fig.
8G



DISASSEMBLY OF CYLINDER HEAD

Drain the engine oil and the coolant liquid from the engine. If the engine is within the frame dismantle the carburettor, the spark plug cap and the exhaust pipes (see Section 10A).

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

Remove the water pump cover (see Section 8C).

Unscrew the two screws (Fig. 8H-1) holding the attachment bracket of the decompression cable.

Lift the cable out of the valve decompression lever (Fig. 8H-2) and remove the cable and the bracket from the cylinder head.

Unscrew, cross-wise, the seven screws (Fig. 8I-1, 2, 3) holding the valve cover.

Please observe the different lengths of the screws:

Two screws 50 mm (Fig. 8I-1)

Two screws 20 mm (Fig. 8I-2)

Three screws 45 mm (Fig. 8I-3)

Remove the cover.

Unscrew the center bolt of the timing chain tensioner (Fig. 8J-1) and remove the bolt including the washer and the spring.

Unscrew the two screws of the tensioner (Fig. 8J-2) and remove the tensioner incl. the gasket.

Check the position of the tensioner push rod and if it is within the outer positions make a check of the timing chain and the timing sprockets regarding wear.

Though the camshaft is rotating as shown (Fig. 8K-1) the chain lock of the timing chain is mounted with the closed part facing in the same direction.

Remove the chain lock by pushing the clip in the direction as shown (Fig. 8K-2) and remove the chain lock. Be careful not to lose the three parts of the lock into the engine.

Remove the timing chain from the sprocket. Secure the two ends of the timing chain (Fig. 8M-2) in order to prevent either ends to fall into the cylinder head, the cylinder or the crankcase.

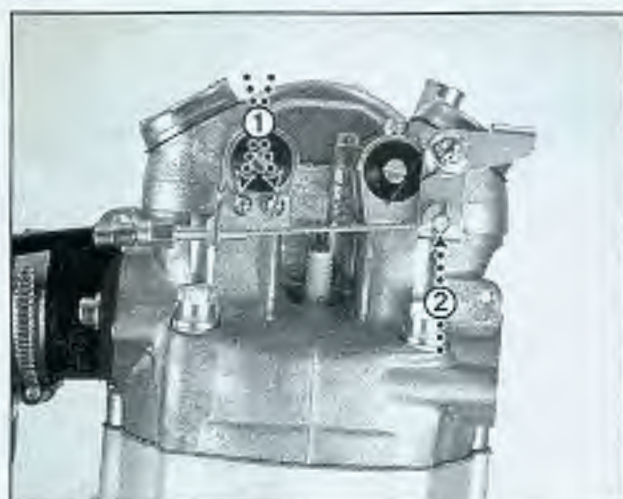


Fig.
8H

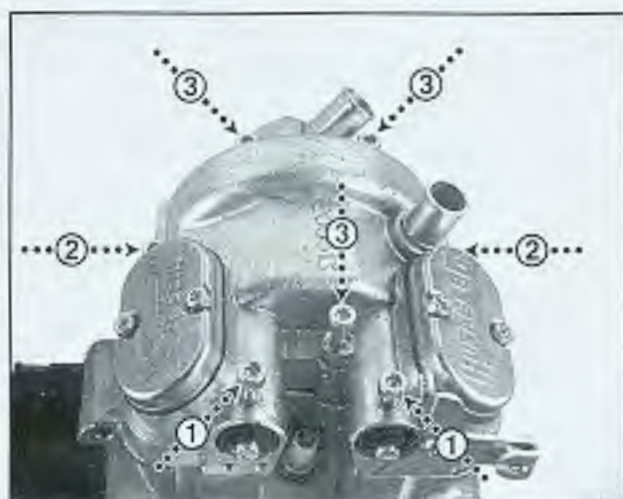


Fig.
8I



Fig.
8J



Fig.
8K



Unscrew and remove the three screws as shown (Fig. 8L-1)



Fig.
8L

Unscrew, cross-wise, and remove the four cylinder stud nuts (Fig. 8M-1).
Lift off the complete cylinderhead. Be careful not to drop the ends of the timing chain (Fig. 8M-2) down into the cylinder or crankcase.

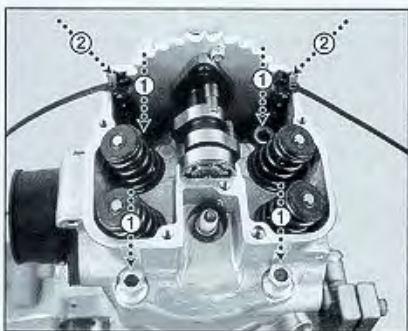


Fig.
8M

Lift off the camshaft from the cylinder head.

Check the two o-rings (Fig. 8N-1) and the two bearings (Fig. 8N-2) for any damages or deterioration. Check the intake cam lobe (Fig. 8N-3) and the outlet cam lobe (Fig. 8N-4). Both should have smooth and flat surfaces without any signs of deterioration or rough areas.

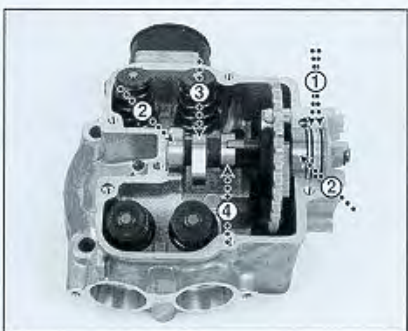


Fig.
8N

By using a suitable valve spring compressor, remove the two valve spring cotters of each valve (Fig. 8O-1), from the valve stems (Fig. 8O-2) and the valve spring retainers (Fig. 8O-3). Mark each valve and the corresponding valve seat.

Lift off the valve springs Fig. 8O-4) and the valve spring washers (Fig. 8O-5) from the cylinder head. Remove the valve guide seals (Fig. 8O-6). Check the overflow duct (Fig. 8O-7) for any sharp edges; might cause damages to the o-rings of the camshaft (Fig. 8N-1), or obstacles preventing any leakage of water to be visible.

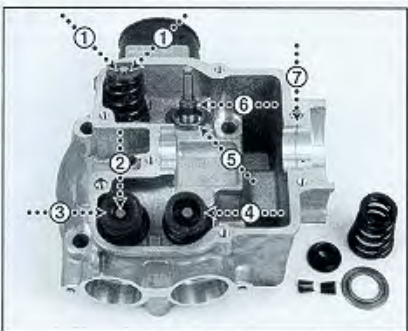


Fig.
8O



Carefully check the surfaces of the valve faces (Fig. 8P-1) and the corresponding surfaces of the valve seats for any damages or deterioration. Check the valve stems (Fig. 8P-3) and the valve guides (Fig. 8P-4) for any damages or deterioration.

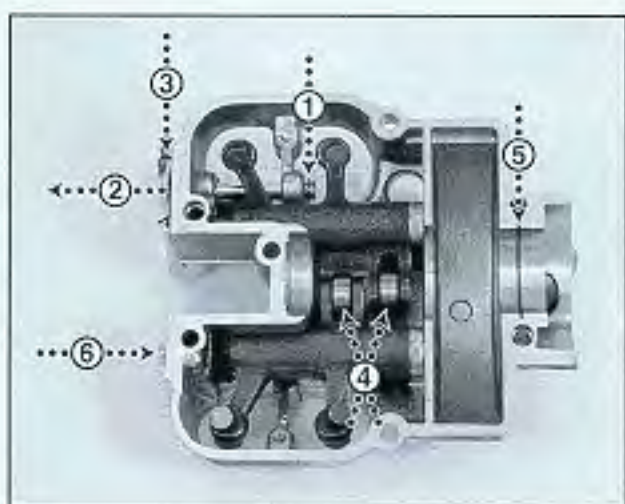
Fig.
8P

Remove the circlip (Fig. 8Q-1) and pull out the decompression lever (Fig. 8Q-2) including the spring (Fig. 8Q-3).

Check the two rockerarm bearings (Fig. 8Q-4) for any damages or deterioration.

Check the overflow duct (Fig. 8Q-5) for any sharp edges; might cause damages to the o-rings of the camshaft (Fig. 8N-1), or obstacles preventing any leakage of water to be visible.

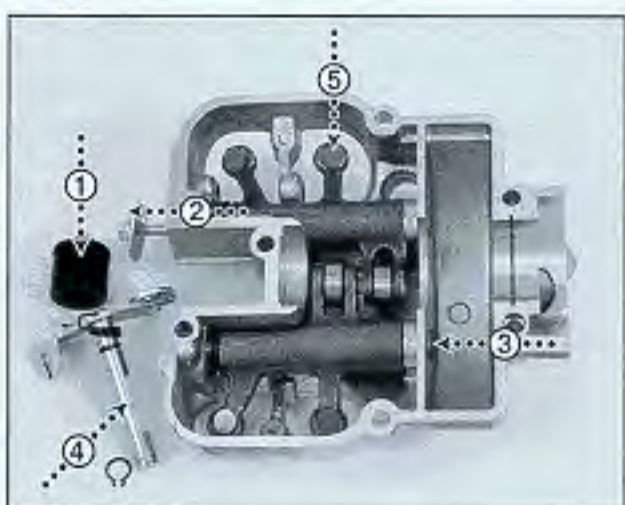
Unscrew and remove the screws of the rockerarm cap ends (Fig. 8Q-6).

Fig.
8Q

Pull out the rockerarm cap ends (Fig. 8R-1), for instance by using a washer and a M5 screw (Fig. 8R-2).

Pull out the rockerarm shafts (Fig. 8R-3).

Check the decompression lever (Fig. 8R-4) and the adjustment screws (Fig. 8R-5) for any damages or deterioration.

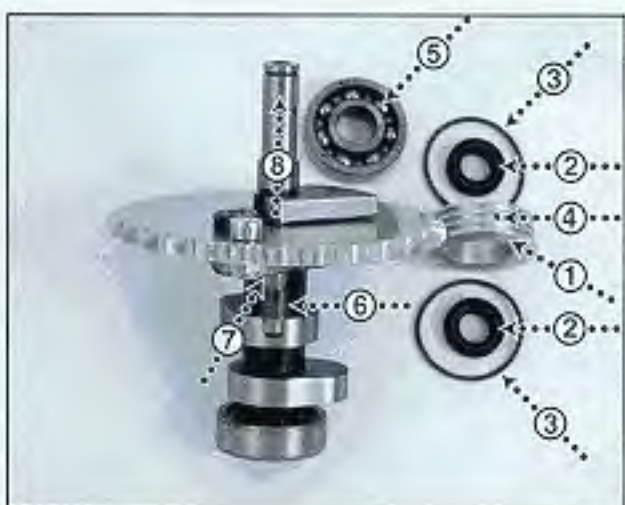
Fig.
8R

Dismantle the water pump impeller (see Section 8C). Pull off the sealing ring (Fig. 8S-1) and dismantle the two radial sealings (Fig. 8S-2) and the two o-rings (Fig. 8S-3).

Clean the overflow duct (Fig. 8S-4) and the o-ring ridges and the interior of the sealing ring.

Pull off the bearing (Fig. 8S-5) with a suitable spanner.

Release the spring (Fig. 8S-6) of the automatic decompression device from the spline on the device (Fig. 8S-7) and pull out the device (Fig. 8S-8).

Fig.
8S



Replace the o-ring of the decompression lever (Fig. 8T-10) before installation.

Check the intake rockerarm (Fig. 8T-16) and the outlet rockerarm (Fig. 8T-17) for any signs of damage or deterioration.

Check the four bushings (Fig. 8T-18), one in each end of the rockerarms and the rockerarm shafts (Fig. 8T-19) for any damages or deterioration.

Replace the o-rings (Fig. 8T-21) of the cap ends (Fig. 8T-20) before installation.

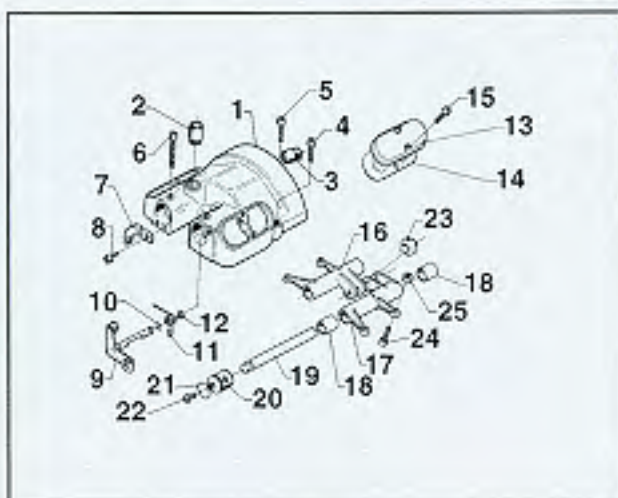


Fig.
8T

Replace the valve guide sealings (Fig. 18U-6) before installation.

Check the intake manifold (Fig. 8U-14) for any cracks or deterioration.

Replace the cylinder head gasket (Fig. 8U-19) before installation.

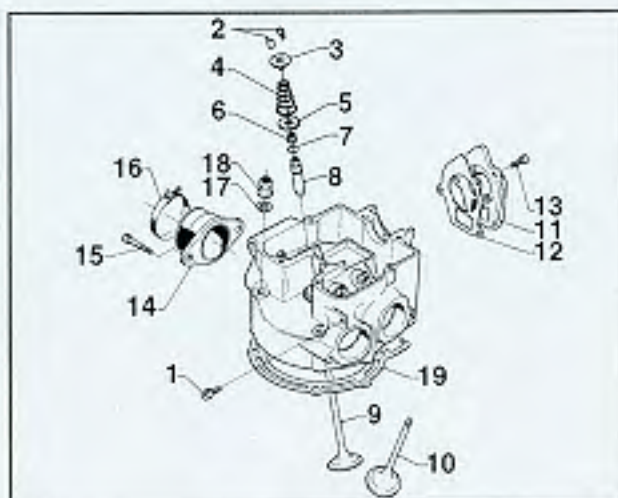


Fig.
8U

Replace the two o-rings (Fig. 8V-4) and, if showing any signs of damages or deterioration, the two radial sealings (Fig. 8V-5).

Check the decompression device (Fig. 8V-6) for any damages or deterioration and replace the spring (Fig. 8V-7) before installation.

Check that the stop screw (Fig. 8V-8) is properly secured with the lock nut (Fig. 8V-9).

Check the upper timing sprocket (Fig. 8V-10) and the timing chain (Fig. 8V-15), including the lock (Fig. 8V-16), for any damages or deterioration.

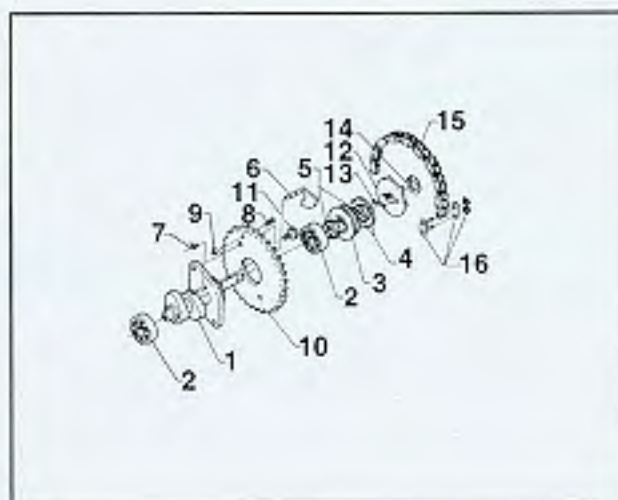


Fig.
8V



ASSEMBLY OF CYLINDER HEAD

Insert the decompression device (Fig. 8X-1) into the slot of the camshaft and upper timing sprocket, slide the spring over the shaft of the device. With the straight end of the spring resting towards the camshaft (Fig. 8X-2) just twist the spring, counter clockwise, and slide the end of the spring onto the shaft of the device. Secure the device with the spring positioned into the groove of the device shaft.

Fig.
8X

Install the bearing (Fig. 8Y-1) onto the camshaft with the help of a press. The bearing should be mounted as far as possible onto the camshaft but the decompression device has to move freely (Fig. 8Y-2). Put on the sealing ring onto the camshaft (Fig. 8Y-3). The two radial sealings inside the sealing ring should both be facing outwards from the sealing ring (Fig. 8Y-4).

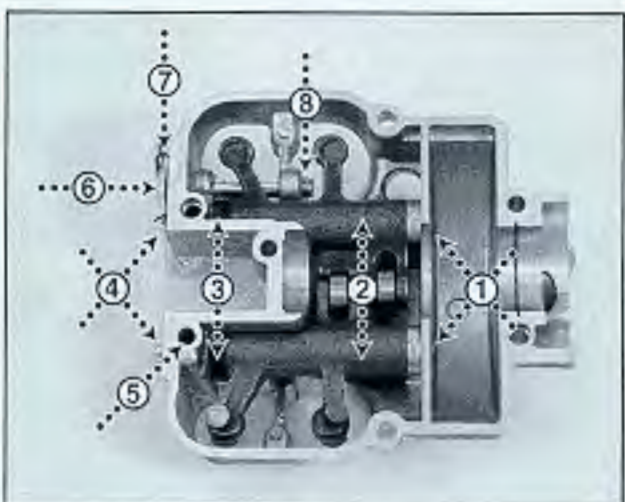
Follow the instructions in Section 8C regarding installation of the waterpump impeller.

Fig.
8Y

Lubricate and insert the two rockerarm shafts (Fig. 8Z-1) into the valve cover and through the two, lubricated, rockerarms (Fig. 8Z-2).

Push in the two cap ends (Fig. 8Z-3) and screw on the two screws (Fig. 8Z-4). Make sure that the screw holes of the cap ends are in alignment with the holes of the cover (Fig. 8Z-5).

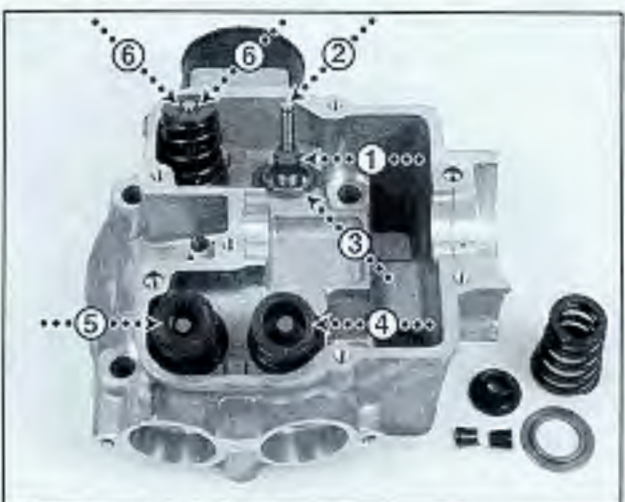
Lubricate and insert the decompression lever (Fig. 8Z-6), including the spring (Fig. 8Z-7) into the cover and secure it with a new circlip (Fig. 8Z-8).

Fig.
8Z

Install the four valve guide seals (Fig. 8AA-1).

Lubricate the inner of the valve guide seals and slide the valves through the valve guide seals and the valve guides.

Install the valves (Fig. 8AA-2) by putting on the valve spring washers (Fig. 8AA-3) and the valve springs (Fig. 8AA-4) onto the cylinder head and the valves, and by using a suitable valve spring compressor, secure the valves with the spring retainers (Fig. 8AA-5) and the two valve spring cotters of each valve (Fig. 8AA-6).

Fig.
8AA



Put the complete camshaft into the cylinder head, be careful not to damage the, lubricated, two o-rings (Fig. 8AB-1).



Fig.
8AB

Put a new cylinder head gasket (Fig. 8AC-1) onto the cylinder.

Make sure that both of the guide dowls (Fig. 8AC-2) on the top of the cylinder are in the accurate positions. Put the cylinder head onto the cylinder and pull the two ends of the timing chain through the cylinder head (Fig. 8AD-1).

Check that the timing chain is in an accurate position onto the lower timing sprocket.

Attach the cylinderhead to the cylinder with the three screws (Fig. 8AC-3), torque 10 Nm.

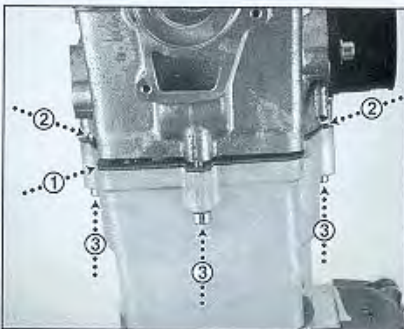


Fig.
8AC

Put on the washers onto the cylinder studs and screw on the four nuts (Fig. 8AD-1), torque 44 Nm.

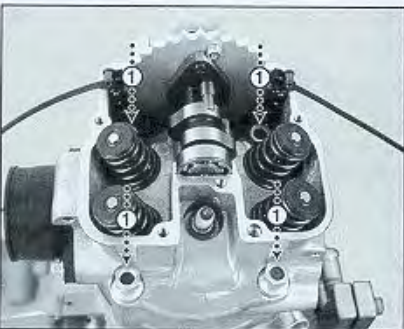


Fig.
8AD

Turn the engine/crankshaft into TDC position (see Section 5).

Position the camshaft with the cam lobes facing downwards and the attachment screws of the upper timing sprocket in 90° in comparison to the parting line of the valve cover and cylinder head (Fig. 8AE-1). Put on the timing chain onto the timing sprocket and install the timing chain lock; the open end of the lock facing backwards (Fig. 8AE2). Secure the lock by adding a dab of silicone.

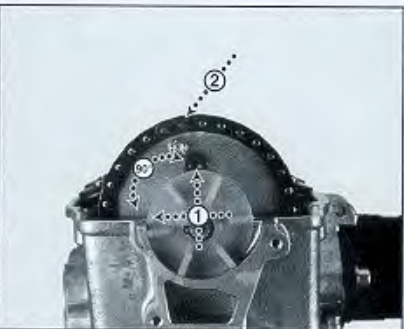


Fig.
8AE



Install the timing chain tensioner (Fig. 8AF-1) and a new gasket.

Before installation; release the tensioner push rod and push it into the bottom position towards the rear part of the tensioner (Fig. 8AF-2).

Push the spring into the tensioner and towards the push rod (Fig. 8AF-3), put on the washer and the screw and tighten the screw.

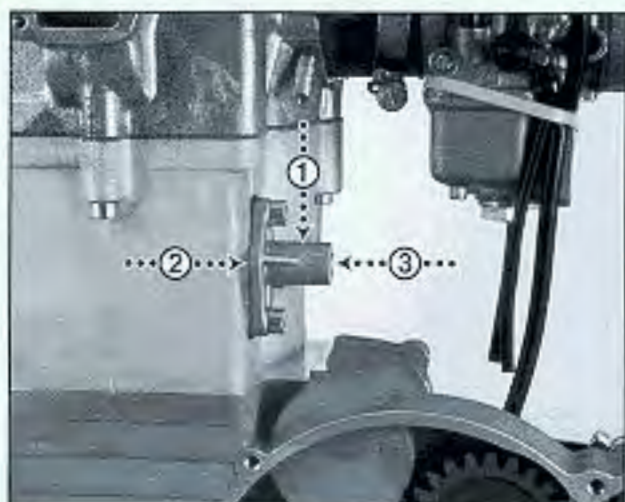


Fig.
8AF

Thoroughly clean the sealing surfaces of the cylinder head and add a thin layer of silicone.

Thoroughly clean the valve cover and put it onto the cylinder head. The decompression lever has to be turned into a 90° position in comparison to the parting line of the valve cover and the cylinder head (Fig. 8AG-1).

Attach the valve cover with the seven screws.

Please observe the different lengths of the screws:

Two screws 20 mm (Fig. 8AG-2)

Three screws 45 mm (Fig. 8AG-3)

Two screws 50 mm (Fig. 8AG-4).

Torque 10 Nm.

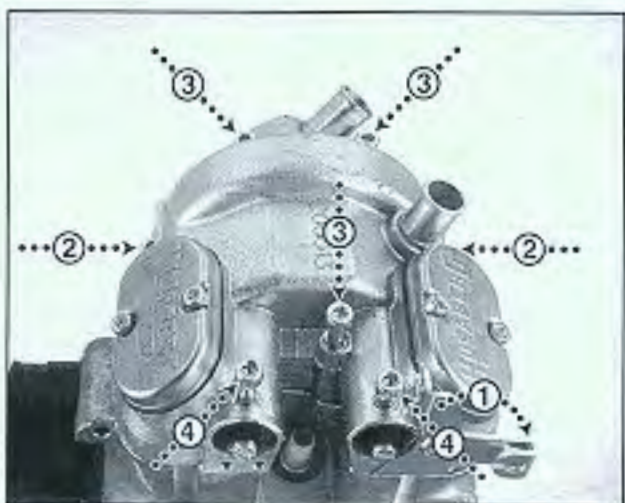


Fig.
8AG

Attach the decompression cable to the lever (Fig. 8AH-1) and screw on the bracket (Fig. 8AH-2).

Adjust the decompression lever (see Section 8B).

Adjust the valves (see Section 8A).

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

Install the carburettor, the exhaust pipes and the spark plug cap (see Section 10C).

Fill the engine with the adequate quantity of oil and the cooling system with the adequate quantity of coolant liquid.

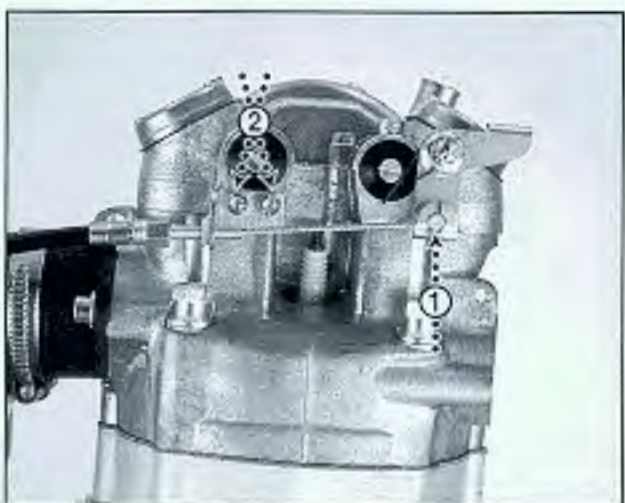
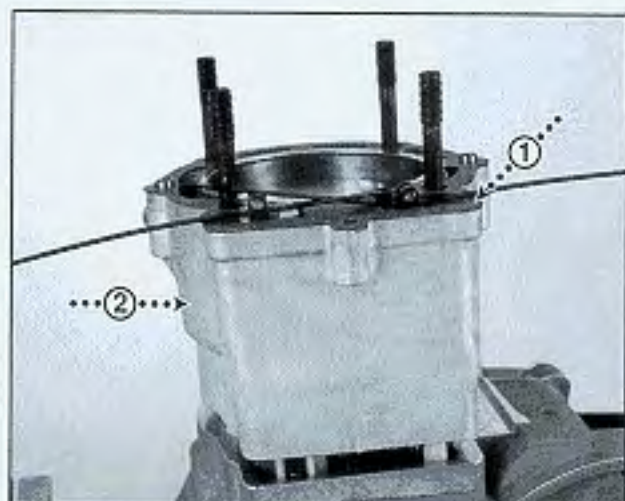


Fig.
8AH



DISASSEMBLY OF CYLINDER & PISTON

Drain the engine oil and the coolant from the engine. Remove the cylinder head (see Section 8C). Remove the cylinder head gasket (Fig. 9A-1) and pull up the cylinder (Fig. 9A-2) from the cylinder studs.

Fig.
9A

Remove one of the gudgeon pin circlips (Fig. 9B-1) and push the gudgeon pin (Fig. 9B-2) out of the piston.

Remove the piston from the connecting rod (Fig. 9B-3).

Fig.
9B

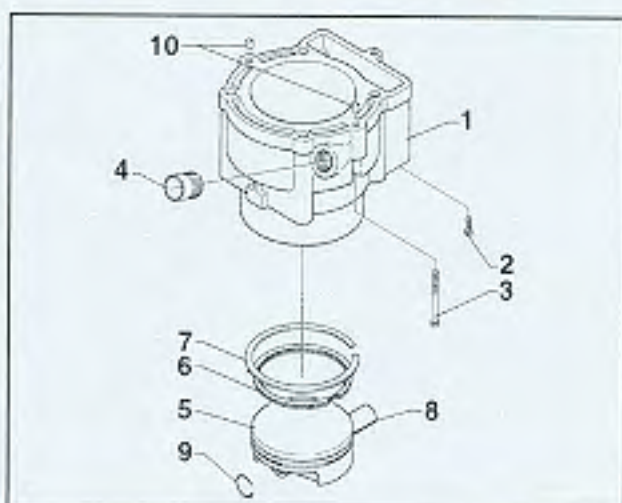
Check the cylinder barrel for any signs of damages or deterioration.

Check the outer surfaces of the piston and especially the areas front and rear.

Check the gudgeon pin and the corresponding inner surfaces of the piston. The piston pin has to be totally flat without any edges or level differences.

Put in the gudgeon pin into the connecting rod for a rough check of the play in between the pin and the bushing. Put in the pin into the piston for a rough check of the play in between the pin and the piston. Check the play of the piston and oil rings.

Change into new gudgeon pin circlips.

Fig.
9C



ASSEMBLY OF CYLINDER & PISTON

Install one of the gudgeon pin circlips into the piston. The piston is to be installed with the arrow, stamped on top of the piston, facing towards the front of the engine (Fig. 9D-1).

Put the gudgeon pin (Fig. 9D-2) into the piston and push it through the piston and the connecting rod until it reaches the circlip on the other side. Put in the second gudgeon pin circlip.

Check the position of the two cylinder guide pins (Fig. 9D-3), clean the sealing surface on top of the crankcase and add a thin layer of high temperature silicone onto the surface.

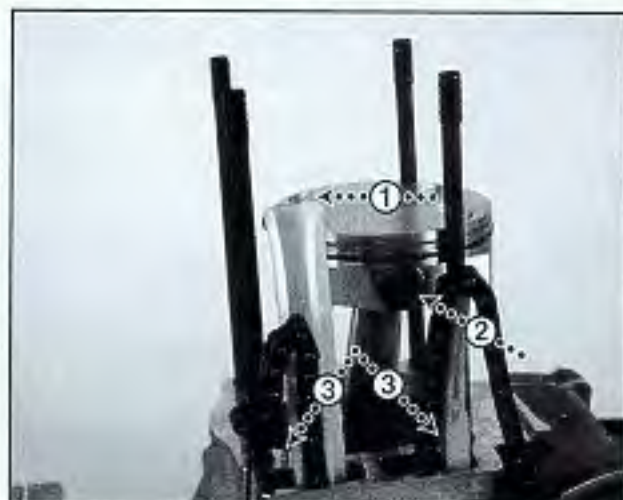


Fig.
9D

Put a piston ring compressor (Fig. 9E-1) onto the piston. Be careful not to damage the rings.

Place the piston in TDC position.

Clean the sealing surfaces of the cylinder and the cylinder stud channels.

Push the cylinder onto the cylinder studs and pass the top of the piston and the rings.

Pull the two ends of the timing chain through the cylinder.



Fig.
9E

Remove the compressor and slide the cylinder all the way down onto the cylinder guide pins and the sealing surface of the crankcase (Fig. 9F-1).

Make sure that the guide dowels are in the accurate positions (Fig. 9F-2).

Put on a new cylinder head gasket (Fig. 9F-3).

Install the cylinder head (see Section 8D).

Fill the engine with the adequate quantity of oil and the cooling system with the adequate quantity of coolant liquid.



Fig.
9F

10-A CRANKSHAFT & GEARBOX

REMOVAL OF ENGINE

Drain the engine oil (see Section 6A).
Remove the seat (Fig. 10A-1) and the fuel tank (Fig. 10A-2) according to the Owner's Manual.
Remove the left side panel (Fig. 10A-3) for easy access of the silencer.



Fig.
10A

Unscrew the two clamps holding the carburettor (Fig. 10B-1) and remove the carburettor.
Detach the two springs from the exhaust system (Fig. 10B-2).
Unscrew the four screws of the exhaust pipes (Fig. 10B-3) and remove the left (Fig. 10B-4) and the right pipe (Fig. 10B-5).
Remove the silencer (Fig. 10B-6) from the subframe, two bolts, and remove the silencer from the frame/subframe.

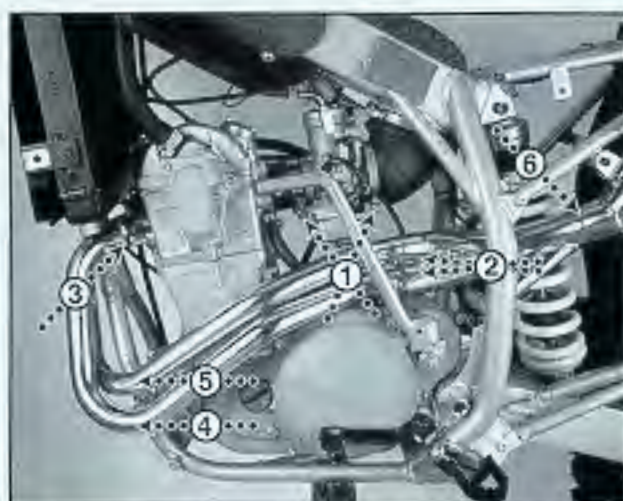


Fig.
10B

Detach the spark plug cap from the spark plug (Fig. 10C-1) and the wiring of the alternator/ignition from the ignition coil and the wiring harness (Fig. 10C-2).
Unscrew the two clamps holding the crankcase breather tube and remove the tube (Fig. 10C-3).
Detach the clutch cable from the engine (Fig. 10C-4).
Unscrew the two screws of the sprocket cover and remove the cover (Fig. 10C-5).
Slacken the drive chain, detach the chain from the front sprocket, remove the lock ring of the sprocket and remove the sprocket from the output shaft (Fig. 10C-6).
Unscrew the bolt holding the rear brake lever (Fig. 10C-7) and remove the lever from the frame and the rear brake cylinder.

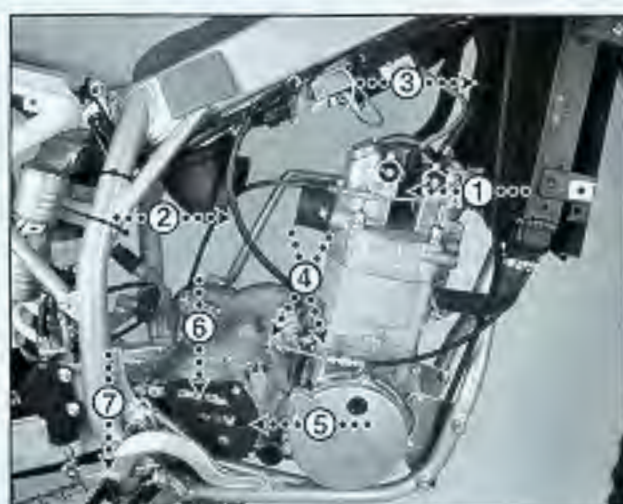


Fig.
10C

Unscrew the lower clamp of the lower radiator hose (Fig. 10D-1) and drain the coolant liquid. Unscrew the remaining clamp of the hose and the two clamps of the upper hose (Fig. 10D-2) and remove the two hoses.
Remove the two radiator protectors and the radiator (Fig. 10D-3).
Unscrew the bolts and nuts holding the engine in the front (Fig. 10D-4, number of bolts and nuts varies in between the models) and remove these and the engine brackets.
Unscrew the swingarm shaft (Fig. 10D-5).

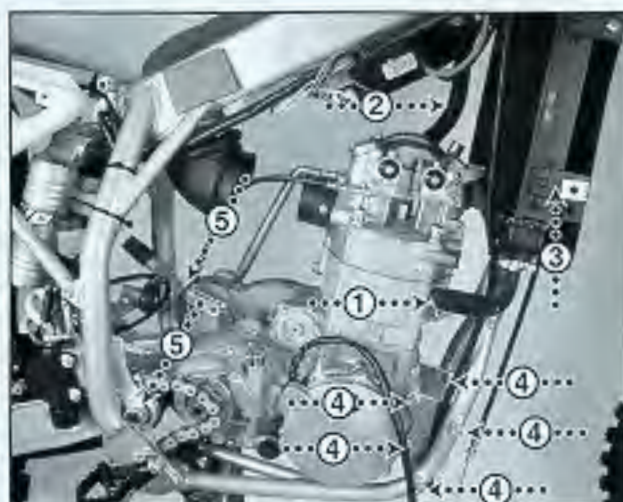


Fig.
10D

10-A CRANKSHAFT & GEARBOX

Pull out the swingarm shaft out of the right side of the frame and the engine (Fig. 10E-1). Lift the engine out of the frame.

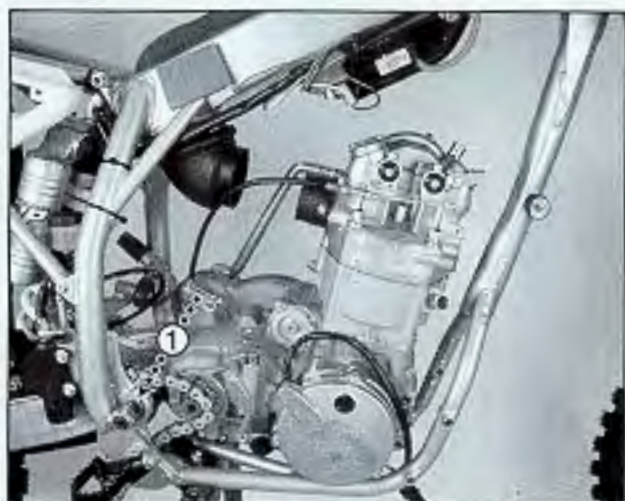


Fig.
10E

Avoid pulling the swingarm shaft completely out of the frame if not necessary for an inspection and/or maintenance of the swingarm bushings (Fig. 10F-8, 2 pcs) and bearings (Fig. 10F-9, 4 pcs). Follow the instructions in the Owner's Manual if such a procedure is to be performed.

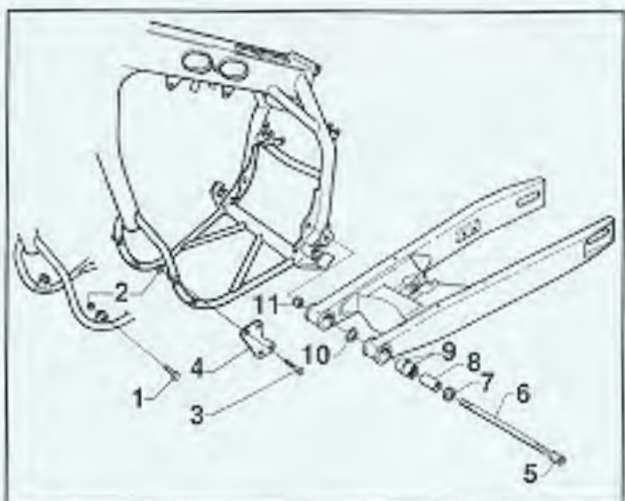


Fig.
10F

Check the front rubber attachment tube (Fig. 10G-11) and the rear rubber bushing (Fig. 10G-14) of the silencer for any damage or deterioration.

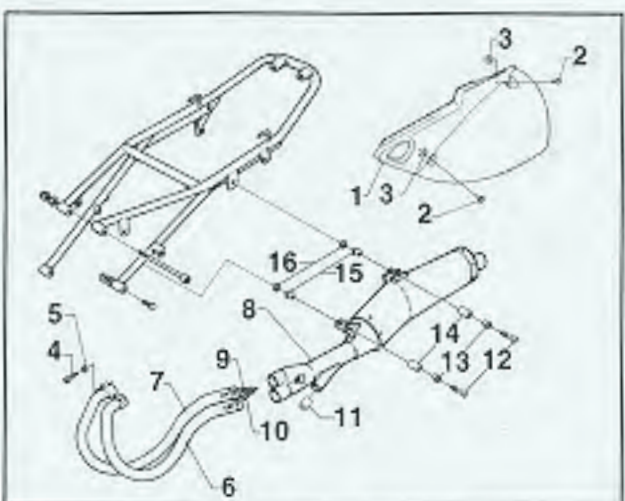


Fig.
10G

Check the lower (Fig. 10H-2) and the upper (Fig. 10H-4) radiator hoses, including the connections of the radiator, for any damages or deterioration. Clean and check the radiator fins.

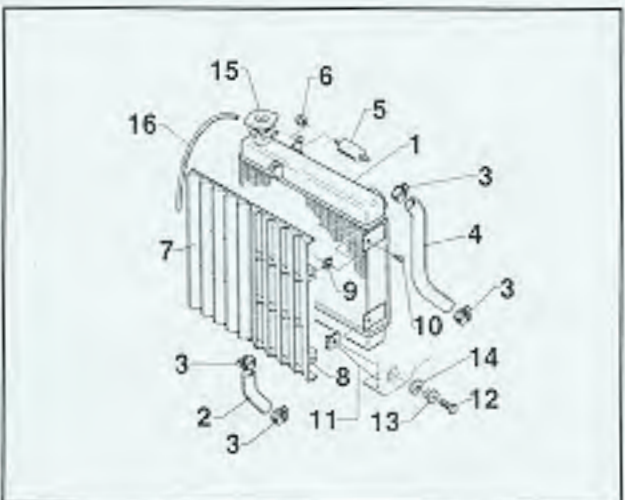


Fig.
10H

10-B CRANKSHAFT & GEARBOX

DISASSEMBLY OF CRANKCASE

Dismount the engine from the frame (see Section 10A).

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

Use either another primary gear wheel (Fig. 10I-2) or the clutch holder (see Section 7A, Fig. 7C-2, Article No. 270007-01) in order to block the crankshaft while unscrewing the nut of the primary gear wheel (Fig. 10I-1).

Dismantle the clutch (see Section 7A).

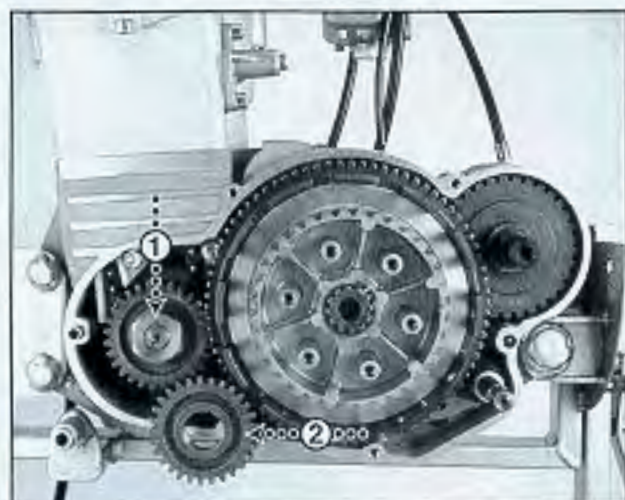


Fig.
10I

Dismantle the cylinder head (see Section 8D), the cylinder and the piston (see Section 9).

Remove the primary gear wheel (Fig. 10J-1) by using a suitable puller (Fig. 10J-2).

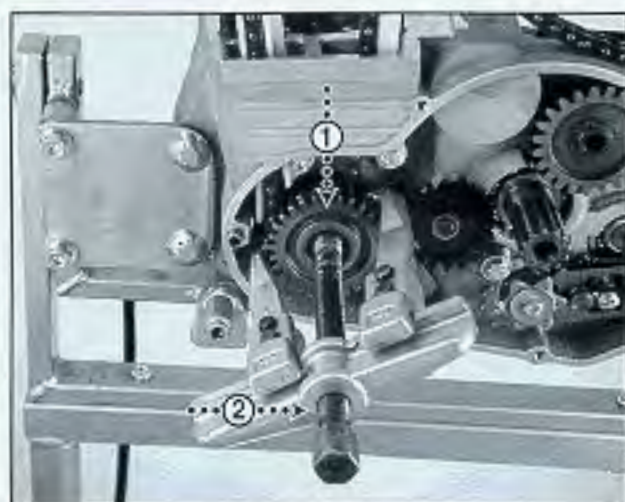


Fig.
10J

Remove the lower timing sprocket (Fig. 10K-1) by using a suitable spanner (Fig. 10K-2).

Dismantle the gear shift mechanism (see Section 7B), the kickstart mechanism (see Section 7C) and the alternator/ignition (see Section 5).

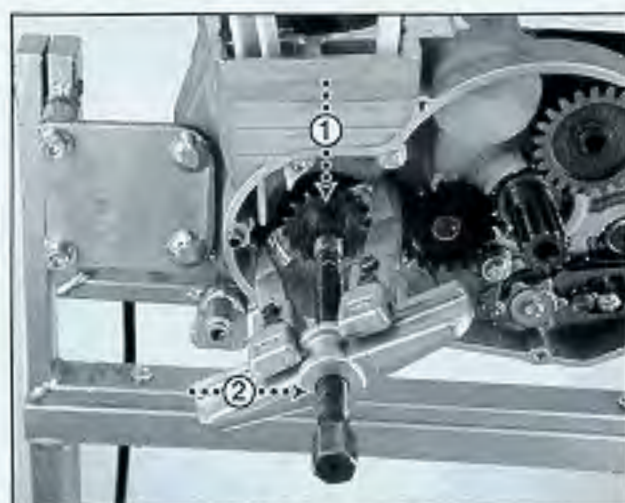


Fig.
10K

Lift the clutch lever (Fig. 10L-1) straight up and out of the crankcase.

Unscrew the eight screws of the right crankcase half (Fig. 10L-2) and any screw or bolt holding the crankcase halves within any engine stand (Fig. 10L-3).

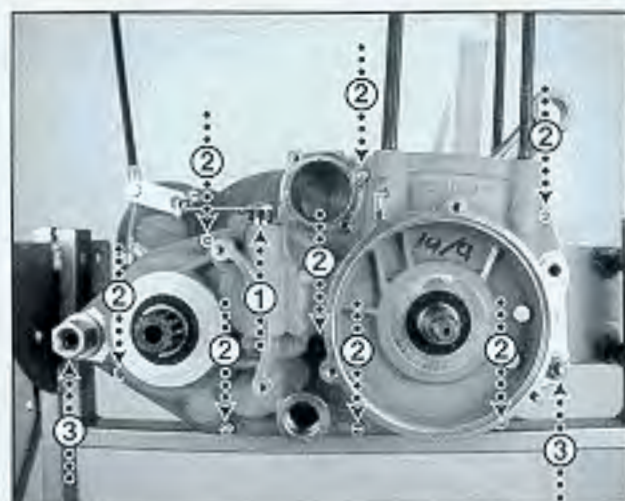


Fig.
10L

10-B CRANKSHAFT & GEARBOX

Attach a crankcase puller (Fig. 10M-1, Article No. 270011-01) to the crankcase by using three M5x20 screws (Fig. 10M-2).

Put a clean cloth, or likewise, around the connecting rod in order to prevent any damages onto either the connecting rod or the crankcase while operating the crankshaft puller.

While screwing in the center bolt of the crankshaft puller; gently tap on the secondary shaft and, if any engine stand is used, also tap on the attachment tube of the stand (Fig. 10M-3). Be careful to have the two crankcase halves aligned all time during the operation.

Lift off the right crankcase.

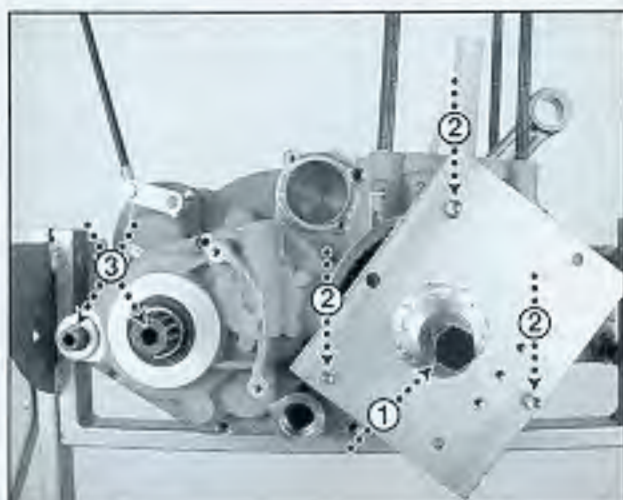


Fig.
10M

6-speed gearbox: Pull the two shift fork shafts (Fig. 10N-1) out of the left crankcase half and the three shift forks (Fig. 10N-2).

4-speed gearbox: Pull out the single shift fork shaft (Fig. 10N-1) out of the left crankcase half and the two shift forks.

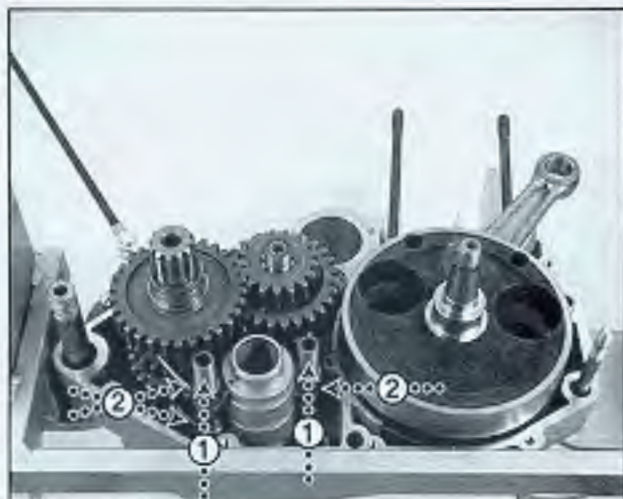


Fig.
10N

Lift out the shift drum (Fig. 10O-1). The shift drum might need to be gently knocked out from the transmission side of the crankcase half in order to release it from the crankcase.

Lift out the three (4-speed: two pcs) shift forks (Fig. 10O-2).

The shift forks may also be lifted out together with the complete gear shafts, the main shaft (Fig. 10O-3) and the secondary shaft (Fig. 10O-4). Both shafts, including all gear wheels, are to be lifted out at the same time. The main shaft might need to be knocked out from the transmission side of the crankcase half.

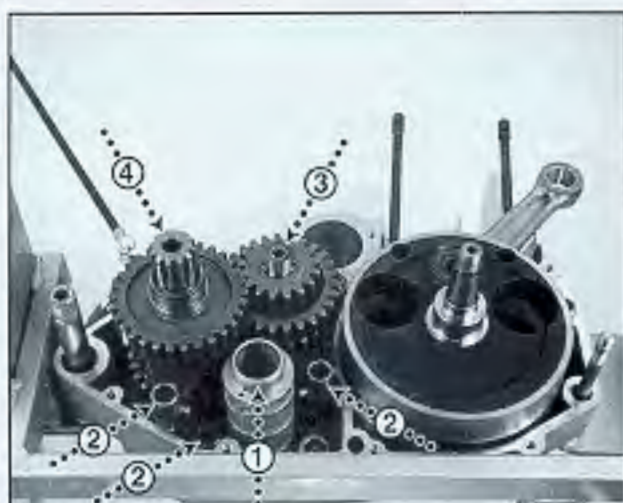


Fig.
10O

Thoroughly clean and check all machined surfaces for any damages or deterioration.

The pressure relief valve is normally not any subject to either cleaning or dismantling but if needed; remove the circlip (Fig. 10P-1) out of the housing (Fig. 10P-2) in order to remove the washer (Fig. 10T-17), the spring (Fig. 10T-18) and the steel ball (Fig. 10T-19). Install all pieces in the exact and adequate position within the housing and by using a new circlip.

If the housing has been removed use a threadlock liquid in order to secure it into the crankcase half.

By using compressed air; thoroughly clean the oil duct from the oil pump to the oil filter housing (Fig. 10P-3) and the duct from the oil screen housing (Fig. 10P-4) to the pump in both directions.

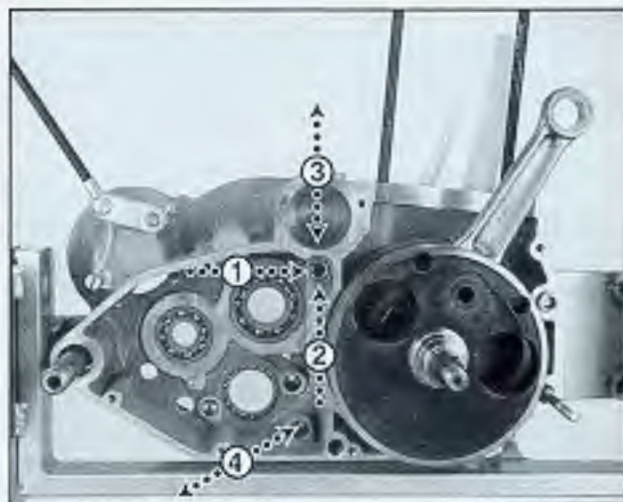


Fig.
10P

10-B CRANKSHAFT & GEARBOX

Attach a crankcase puller (Fig. 10Q-1, Article No.270011-01) to the crankcase by using three M6x25 screws (Fig. 10Q-2).

Put a clean cloth (Fig. 10Q-3), or likewise, around the connecting rod in order to prevent any damages onto either the connecting rod or the crankcase while operating the crankshaft puller.

While screwing in the center bolt of the crankshaft puller hold the crankshaft firmly during the operation. Lift out the crankshaft when it is released from the bearing within the crankcase half.

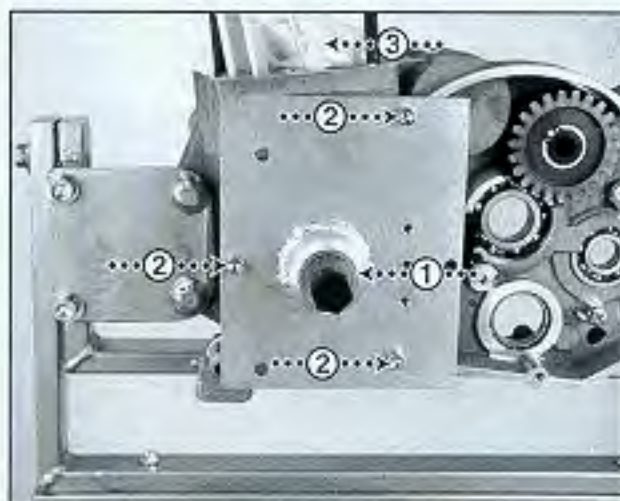


Fig.
10Q

Check the three flange bushings (Fig. 10R-2, 3) and the three bearings (Fig. 10R-4, 5, 6) in the right crankcase half for any signs of damage or deterioration. If a replacement is needed; heat up the crankcase half to 200°C and space out the bearings by tapping gently on the backside of the bearings and the crankcase half. The new bearings should be installed while the crankcase half still is hot and thus easy to fit into the adequate bottom positions.

Check the two sealings (Fig. 10R-7, 8) for any damages or deterioration.

Check the clutch lever (Fig. 10R-9), the sealing (Fig. 10R-10) and only if they are assumed to have been damaged; the bearings (Fig. 10R-12) for any signs of damages or deterioration.

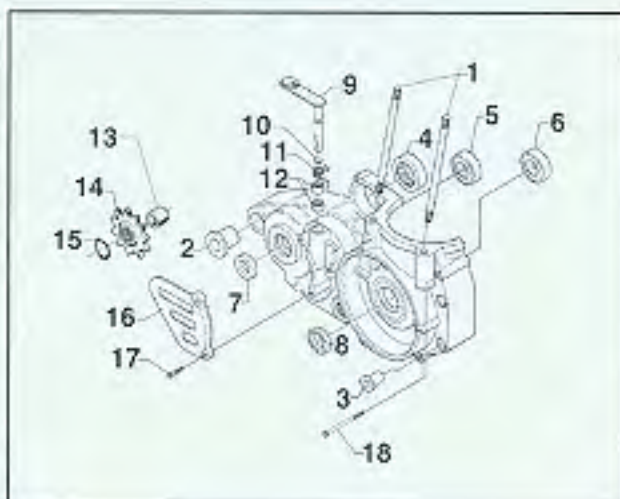


Fig.
10R

Thoroughly check and clean the oil duct from the oil filter to the crankshaft housing (Fig. 10S-1). Preferably by using compressed air from the crankshaft end towards the filter end though the duct is more narrow at the crankshaft end.



Fig.
10S

Check the two flange bushings (Fig. 10T-2, 4) and the four bearings (Fig. 10T-6, 7, 8, 9) in the left crankcase half for any signs of damage or deterioration. If a replacement is needed; follow the procedure above.

Check the sealing (Fig. 10T-10) for any damages or deterioration.

Check that all four cylinder studs (Fig. 10R-1, 10T-1) are screwed into their bottom position within the crankcase halves.

Check the radial play of the connecting rod bearing (Fig. 10T-28) which should be equal to none.

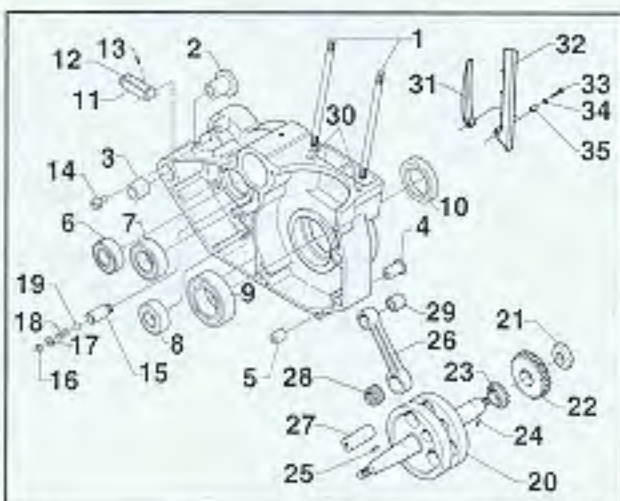


Fig.
10T

10-B CRANKSHAFT & GEARBOX

ASSEMBLY OF CRANKCASE

Lubricate the crankshaft bearing including the surface of the inner ring and the bearing surfaces of the transmission/left end of the crankshaft

Put the crankshaft into the left crankcase half and attach a crankshaft mounting tool (Fig. 10Z-1, Article No. 270010-01) to the transmission end of the crankshaft.

Hold the crankshaft and while screwing the handle of the tool counterclockwise (Fig. 10Z-2) in order to pull the crankshaft into the bearing and crankcase half make sure that the crankshaft slides into a straight and accurate position within the bearing.

Lubricate the bearings of the main shaft (Fig. 10AA-1) of the secondary shaft (Fig. 10AA-2) and of the shift drum (Fig. 10AA-3).

Lubricate the two machined positions of the shift shafts (Fig. 10AA-4).

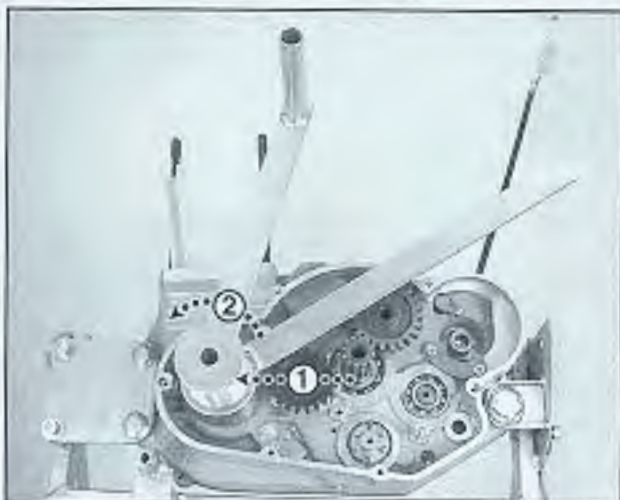


Fig.
10Z

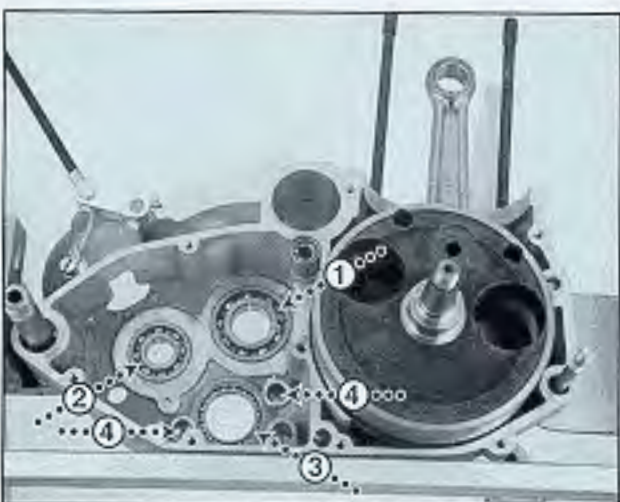


Fig.
10AA

While holding the shafts, aligned (Fig. 10AB-1), put in the main shaft and the secondary shaft into their positions in the crankcase half. Gently tap, alternately, onto the shafts until the accurate position is reached.

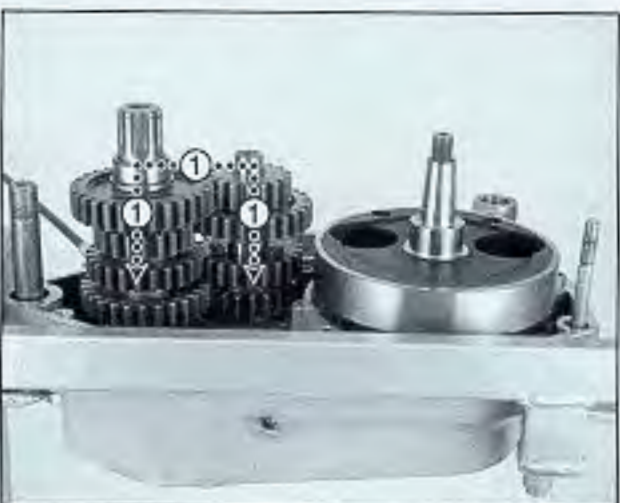


Fig.
10AB

6-speed gearbox: Slide the shift fork of the main shaft (Fig. 10AC-1) into the spline of the double/3-4th gear wheel.

4 & 6-speed gearboxes: Slide the lower shift fork of the secondary shaft (Fig. 10AC-2) into the spline of the second gearwheel from the bottom and the upper shift fork into the spline of the second gear wheel from the top.

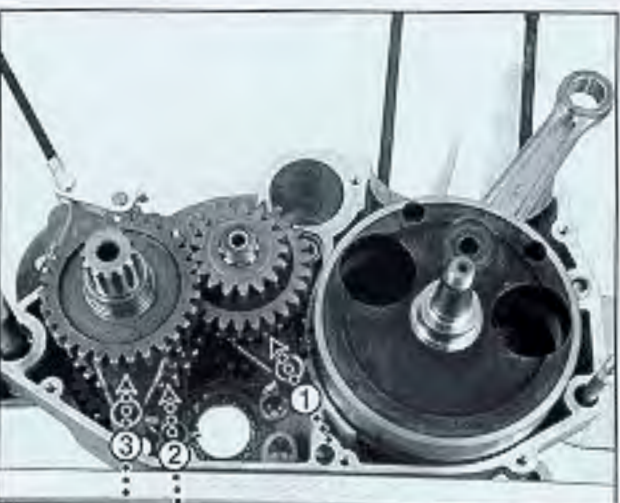


Fig.
10AC

Slide the shift drum (Fig. 10AD-1) into the bearing and gently tap it into position towards the bearing.

10-B CRANKSHAFT & GEARBOX

Slide the shift fork shaft of the secondary shaft (Fig. 10AD-2) into the shift forks and by turning the shift drum (Fig. 10AD-A) and by lifting the gear wheels in question (Fig. 10AD-B) position the two shift forks into the splines of the shift drum and the shift shaft into the crankcase. 6-speed gearbox: Repeat the operation with the shift fork shaft and the shift fork of the main shaft (Fig. 10AD-3).

Lubricate the o-ring of the oil screen and push it into position in the crankcase half (Fig. 10AD-4).

Thoroughly clean the sealing surfaces of the crankcase half (Fig. 10AD-5) and add a thin layer of silicone. Make sure that both the rear dowel (Fig. 10AE-1) and the front dowel (Fig. 10AE-2) are in a firm and straight position into the left crankcase half.

Thoroughly clean the sealing surfaces of the right crankcase half.

Lubricate all bearings and positions of shafts in the right crankcase half.

In order to prevent any damages to either the bearing or the sealing of the secondary shaft; a thin tube, or likewise, could be placed into the bearing and the sealing (Fig. 10AE-3) before putting the right crankcase half onto the left one.

Attach a crankshaft mounting tool (Fig. 10AE-4) onto the ignition/right end of the crankshaft.

While screwing the handle of the mounting tool, counterclockwise, gently tap onto the right crankcase half (Fig. 10AE-5) in order to keep it fully aligned during the whole installation.

When the crankcase halves are fully installed towards each other; put the o-ring of the secondary shaft (Fig. 10AF-1) onto the shaft, place the spacer of the sprocket (Fig. 10AF-2), the groove towards the o-ring, onto the shaft and slide the spacer onto the o-ring and fully towards the bearing of the secondary shaft.

Attach the eight screws (Fig. 10AG-1) into the crankcase half and, crosswise, tighten the screws, torque 10 Nm.

Lubricate the bearings and the sealing of the clutch lever and install the lever (Fig. 10AG-2).

Install the alternator/ignition (see Section 5) and the oil drain plug (see Section 6A).

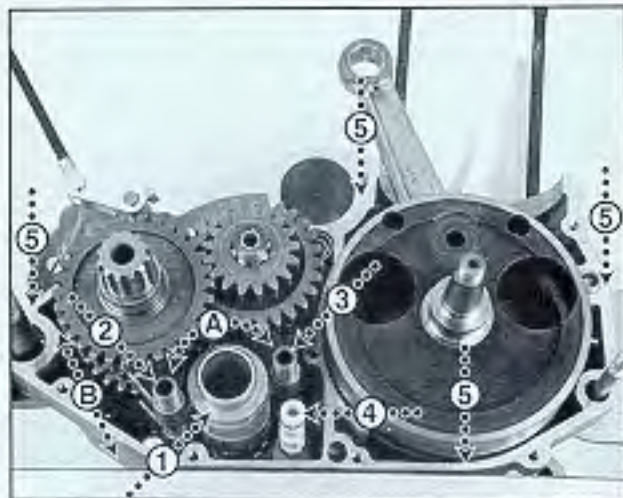


Fig.
10AD

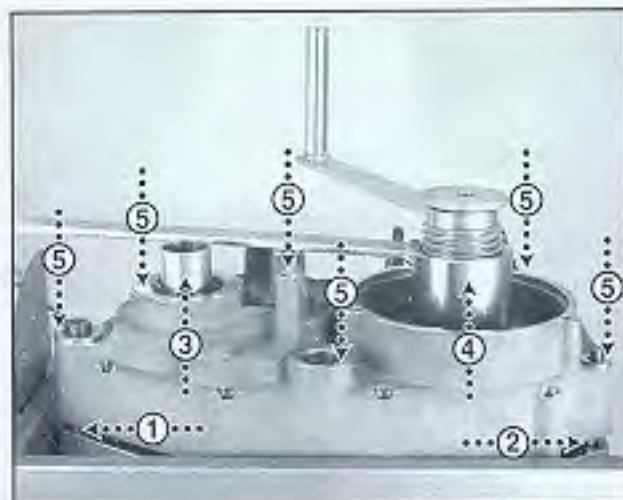


Fig.
10AE

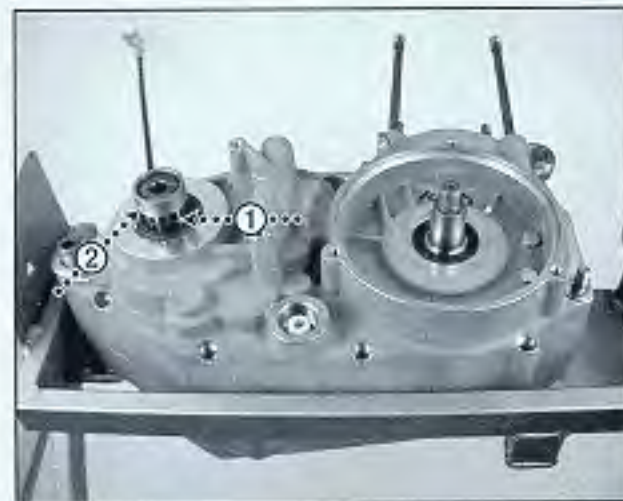


Fig.
10AF

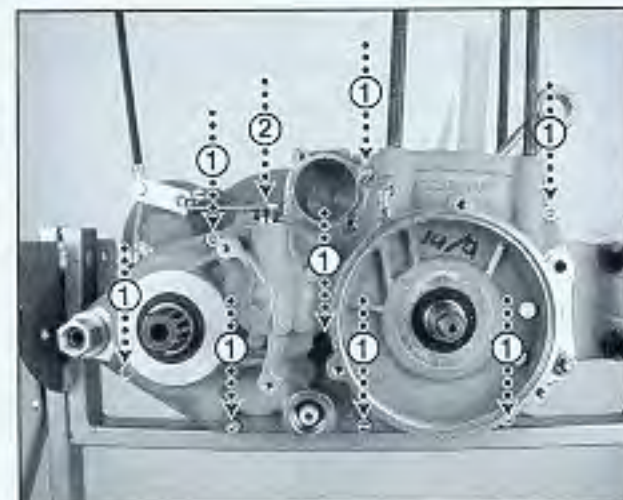


Fig.
10AG

10-B CRANKSHAFT & GEARBOX

Warm the lower timing sprocket (Fig. 10AH-1) to 200°C and slide it onto the crankshaft (Fig. 10AH-2). Use a socket, or likewise, with a center hole just wider than the crankshaft and the woodruff key and an outer diameter fit to the center of the sprocket, and a suitable rubber mallet in order to position the sprocket onto and towards the crankshaft.

Place the timing chain onto the sprocket and into the channels of the crankcase half, the chain guide and the tensioner (Fig. 10AH-3).

Install the piston and the cylinder (see Section 9), the cylinder head (see Section 8D), the kickstart mechanism (see Section 7C), the gearshift mechanism (see Section 7B) and the clutch (see Section 7A).

Put the primary gear wheel (Fig. 10AI-1) onto the crankshaft, screw on the nut (Fig. 10AI-2) and by the help of another primary gear wheel (Fig. 10AI-3) screw on the nut and thus pushing the primary gear wheel onto the crankshaft and into position, torque 80 Nm.

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

Install the engine into the frame (see section 10C).

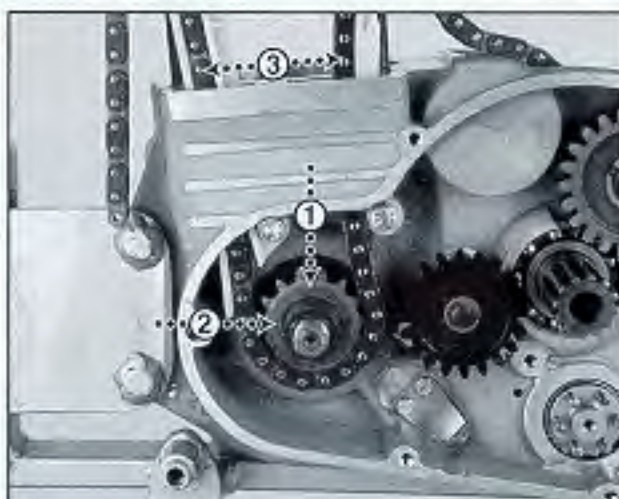


Fig.
10AH

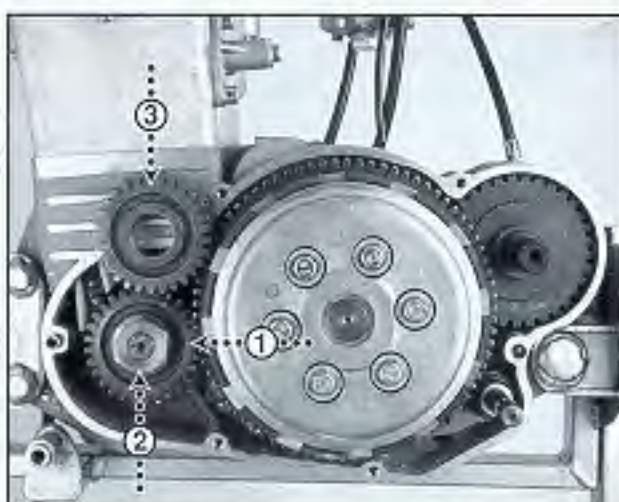


Fig.
10AI

GEARBOX	PRIMARY SHAFT (FROM LEFT: A, TO RIGHT: B, C ..)	
CR 4 (X)	A3, S2, G2, S3, G11, S1	
CR 6 (Y)	A3, B1, G12, W1, L1, G2, W2, B2, G13, G11, S1	
WR 6 (Y)	A1, B1, G3, W1, L1, G2, W2, B2, G4, G1, S1	
S-WR 6 (Y)	A3, B1, G3, W1, L1, G2, W2, B2, G4, G11, S1	
GEARBOX	SECONDARY SHAFT (FROM LEFT: A, TO RIGHT: B, C ..)	
CR 4 (Z)	G15, A2, B1, W1, L1, G17, L1, W1, G8, G16, W1, L1, G9, W2, B3, G14	
CR 6 (Z)	G15, A2, B1, W1, L1, G17, L1, W1, G8, G16, W1, L1, G9, W2, B3, G14	
WR 6 (Z)	G6, A2, B1, W1, L1, G10, L1, W1, G8, G7, W1, L1, G9, W2, B3, G5	
S-WR (Z)	G15, A2, B1, W1, L1, G10, L1, W1, G8, G16, W1, L1, G9, W2, B3, G14	

CODE	ART. No.	DESCRIPTION
A1	240001-01	Primary shaft WR
A2	240042-01	Secondary shaft WR, CR & S-WR
A3	240071-01	Primary shaft CR & S-WR
B1	360007-01	Needle bearing 22x26x13
B2	360009-01	Needle bearing 20x24x13
B3	360010-01	Needle bearing 20x24x10
G1	240002-01	Gear wheel, primary shaft, 17 teeth
G2	240003-01	Gear wheel, primary shaft, 20/23 teeth
G3	240005-01	Gear wheel, primary shaft, 25 teeth
G4	240006-01	Gear wheel, primary shaft, 27 teeth
G5	240061-01	Gear wheel, secondary shaft, 34 teeth
G6	240062-01	Gear wheel, secondary shaft, 30 teeth
G7	240063-01	Gear wheel, secondary shaft, 27 teeth
G8	240064-01	Gear wheel, secondary shaft, 24 teeth
G9	240065-01	Gear wheel, secondary shaft, 22 teeth

CODE	ART. No.	DESCRIPTION
G10	240066-01	Gear wheel, secondary shaft, 20 teeth
G11	240072-01	Gear wheel, primary shaft, 18 teeth
G12	240075-01	Gear wheel, primary shaft, 24 teeth
G13	240076-01	Gear wheel, primary shaft, 25 teeth
G14	240081-01	Gear wheel, secondary shaft, 32 teeth
G15	240082-01	Gear wheel, secondary shaft, 28 teeth
G16	240083-01	Gear wheel, secondary shaft, 25 teeth
G17	240086-01	Gear wheel, secondary shaft, 21 teeth
L1	330036-01	Lock ring
S1	240026-01	Bushing
S2	240036-01	Spacer 21.5 mm
S3	240037-01	Spacer 23 mm
W1	240017-01	Washer 30 mm
W2	240018-01	Washer 28 mm

10-C CRANKSHAFT & GEARBOX

INSTALLATION OF ENGINE

Position the engine in between the swingarm and the frame and slide the swingarm shaft into the engine, the swingarm and the frame (Fig. 10AK-1). Attach the front of the engine into the frame (Fig. 10AK-2) and tighten both these bolts and nuts, torque 25 Nm, and the swingarm shaft (Fig. 10AK-3), torque 125 Nm.

Install the radiator onto the frame (Fig. 10AK-4), including the radiator protectors, and attach the radiator hoses (Fig. 10AK-5, 6) to the engine and the radiator.

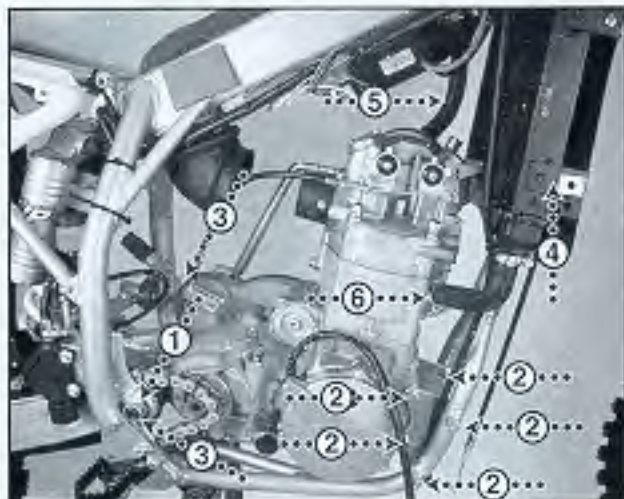


Fig.
10AK

Slide the front sprocket onto the secondary shaft, put the lock ring onto the shaft and the drive chain onto the front sprocket (Fig. 10AL-1).

Put on the sprocket cover (Fig. 10AL-2).

Install the rear brake lever into the rear brake cylinder and onto the frame (Fig. 10AL-3).

Attach the clutch cable to the engine (Fig. 10AL-4) and adjust the play according to the Owner's Manual; free play 1-2 mm.

Attach the wiring of the alternator/ignition to the wiring harness and the ignition coil (Fig. 10AL-5).

Install the crankcase breather tube onto the connections on the valve cover and the frame (Fig. 10AL-6).

Put the spark plug cap onto the spark plug (Fig. 10AL-7).



Fig.
10AL

Install the silencer (Fig. 10AM-1) onto the subframe/frame but do not tighten it.

Add some silicone onto the sealing surfaces of the exhaust pipes. Insert the right exhaust pipe into the silencer and the cylinder head (Fig. 10AM-2) followed by the left one (Fig. 10AM-3). Screw on the 4 screws of the exhaust tubes, including washers, (Fig. 10AM-4), torque 10 Nm.

Attach the springs onto the pipes and the silencer (Fig. 10AM-5) and tighten the silencer, torque 10 Nm. Install the carburettor onto the intake manifold, followed by the airfilter tube and tighten the two clamps (Fig. 10AM-6).

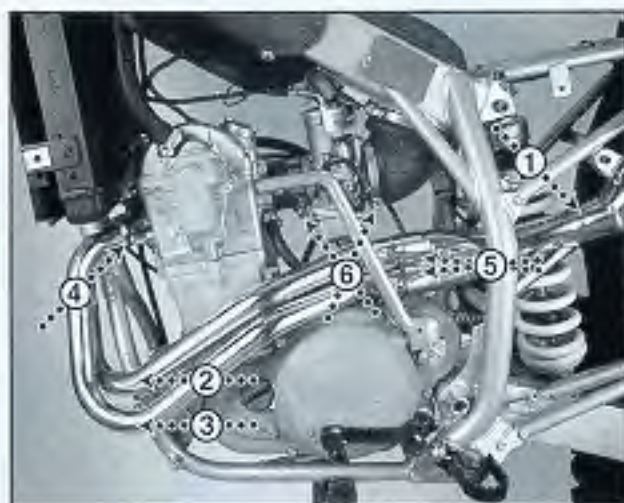


Fig.
10AM

Put on the fuel tank (Fig. 10AN-1) and the seat (Fig. 10AN-2). Make sure that the fuel line, including the diaphragm fuel pump tubing, is correctly installed and secured.

Install the left side panel (Fig. 10AN-3).

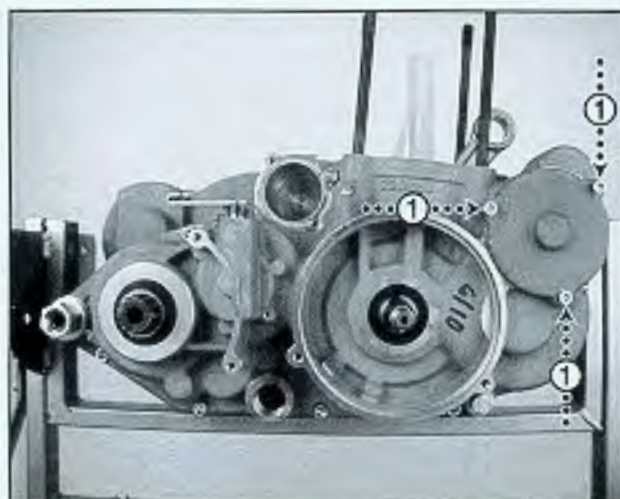
Fill the engine with the adequate level of oil and the cooling system with the adequate level of coolant liquid.



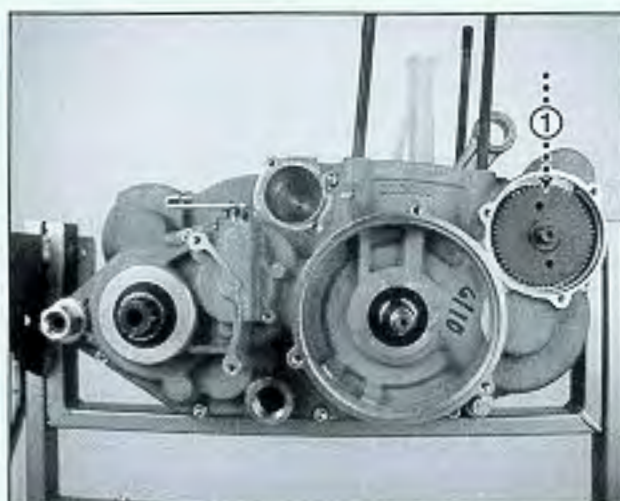
Fig.
10AN

DISASSEMBLY OF CRANKCASE

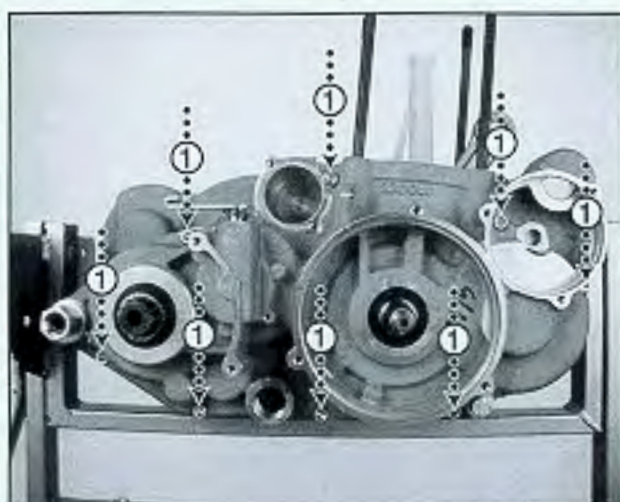
Disconnect the ground wire from the battery. Disconnect the wire from the electric starter. Dismount the electrical starter from the engine. Follow the instructions regarding removal of a non-electrical starter engine (see Section 10). Unscrew the three screws (Fig. 11A-1) of the electrical starter intermediate cover and remove the cover.

Fig.
11A

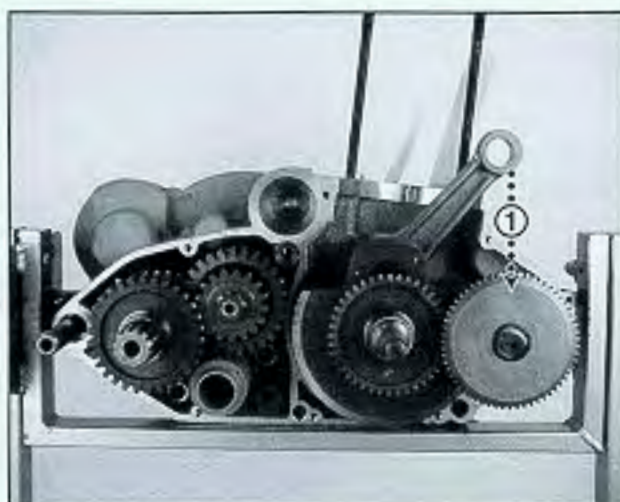
Pull the electrical starter intermediate shaft/gear wheel (Fig. 11B-1) out of the crankcase half.

Fig.
11B

Unscrew the eight screws of the crankcase half (Fig. 11C-1) and by using a crankcase puller, see Section 10 B, remove the right crankcase half from the left one.

Fig.
11C

Lift off the counter balancer intermediate gear wheel (Fig. 11D-1) from the counter balancer and the freewheel mechanism.

Fig.
11D

Remove the lockring (Fig. 11E-2) of the freewheel mechanism (Fig. 11E-1) and lift out the freewheel mechanism.

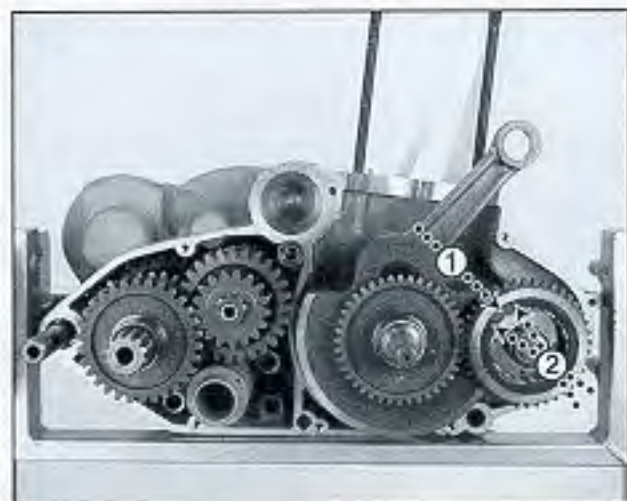


Fig.
11E

Pull out the bearing (Fig. 11F-1) and the counter balancer (Fig. 11F-2).
Further disassembly; proceed according to Section 10B.

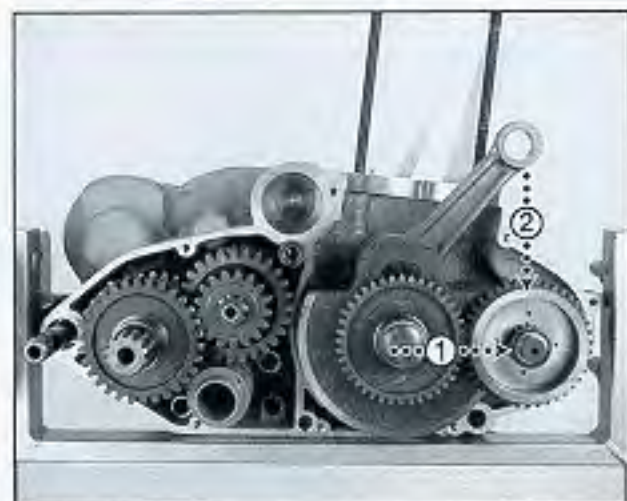


Fig.
11F

Check the three flange bushings (Fig. 11G-2, 3) and the four bearings (Fig. 11G-4, 5, 6, 7) in the right crankcase half for any signs of damage or deterioration. If a replacement is needed; see Section 10B. Check the two sealings (Fig. 11G-8, 9) for any damages or deterioration.

Check the clutch lever (Fig. 11G-10), the sealing (Fig. 11G-11) and only if they are assumed to have been damaged; the bearings (Fig. 11G-13) for any signs of damages or deterioration.

Check the o-ring of the electrical starter intermediate shaft/gear wheel cover (Fig. 11G-21) and the o-ring of the electrical starter (Fig. 11G-25) for any damages or deterioration.

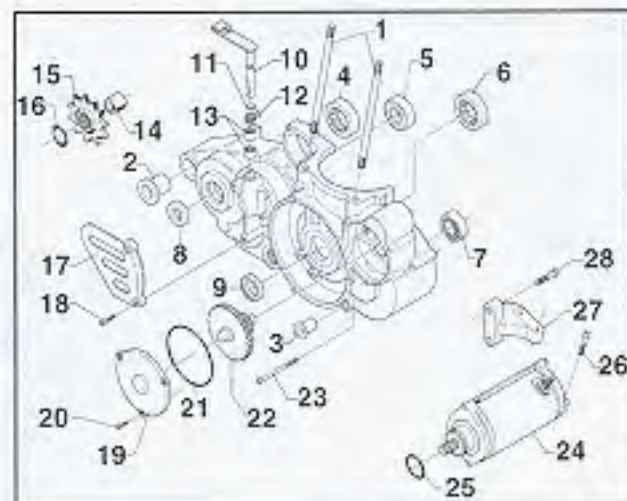


Fig.
11G

Check the two flange bushings (Fig. 11H-2, 4) and the six bearings (Fig. 11H-6, 7, 8, 9, 10, 28) in the left crankcase half for any signs of damage or deterioration. If a replacement is needed; follow the procedure above.

Check the sealing (Fig. 11H-11) for any damages or deterioration.

Check the inner surfaces of the counter balancer (Fig. 11H-27) including the intermediate gear wheel (Fig. 11H-30) and the function of the freewheel mechanism (Fig. 11H-29).

Check the teeth of the three gear wheels (Fig. 11H-21, 27, 30) for any signs of damages or deterioration.

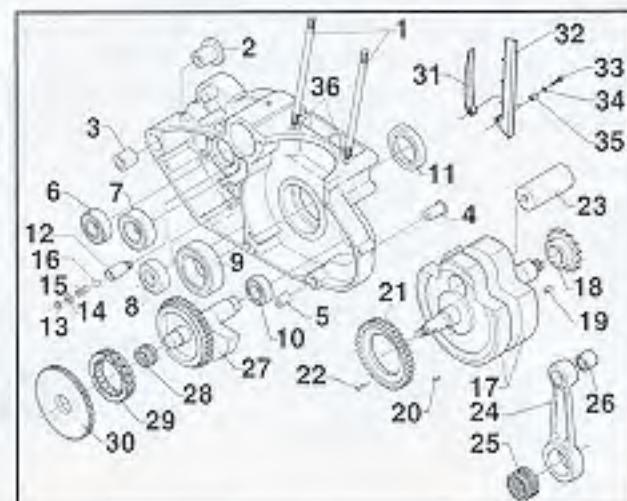
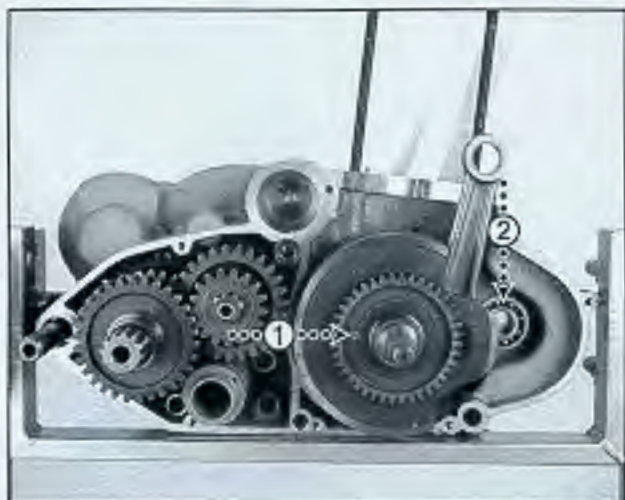


Fig.
11H

ASSEMBLY OF CRANKCASE

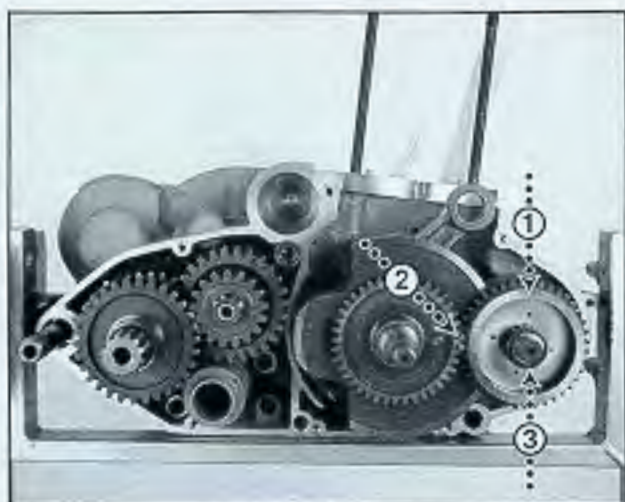
Install the crankshaft according to section 10B.
Lubricate the bearing of the counter balancer (Fig. 11I-2).
Position the crankshaft as shown; the screw of the crankshaft gear wheel facing to the back of the engine.

Fig.
11I

Install the counter balancer (Fig. 11J-1) opposite to the crankshaft meaning that the weights of the balancer should be facing towards the front of the engine.

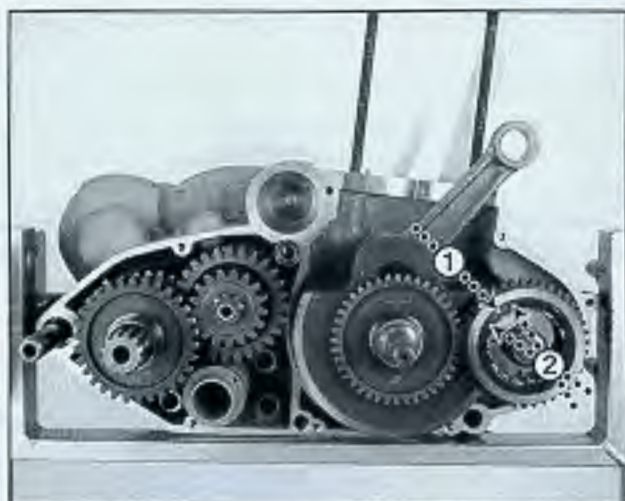
In order to check that the counter balancer is in a correct position in relation to the crankshaft; turn the crankshaft/counter balancer and check that the mark on the crankshaft gear wheel is in between the two marks on the gear wheel of the counter balancer (Fig. 11J-2).

Place the bearing onto the shaft of the counter balancer (Fig. 11J-3) and lubricate both the bearing as well as the inner surfaces of the counter balancer.

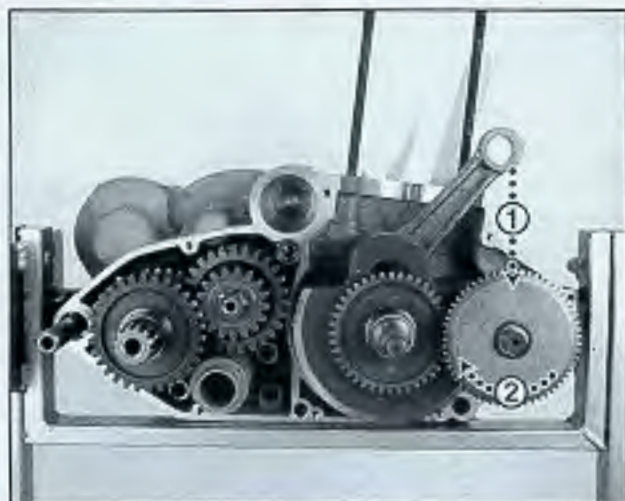
Fig.
11J

Install the freewheel mechanism (Fig. 11K-1) into the counter balancer.

Lock the freewheel mechanism into the counter balancer with the lockring (Fig. 11K-2). Make sure that all the knobs of the lockring are positioned within the freewheel mechanism.

Fig.
11K

Lubricate the inner surfaces of the counter balancer intermediate gear wheel (Fig. 11L-1) and put it onto the counter balancer. Make sure that it moves easily clockwise (Fig. 11L-2) and locks counterclockwise.

Fig.
11L

Follow the instructions in Section 10B regarding installation of the right crankcase half. Attach the eight screws (Fig. 11M-1) into the crankcase half and, crosswise, tighten the screws, torque 10 Nm.

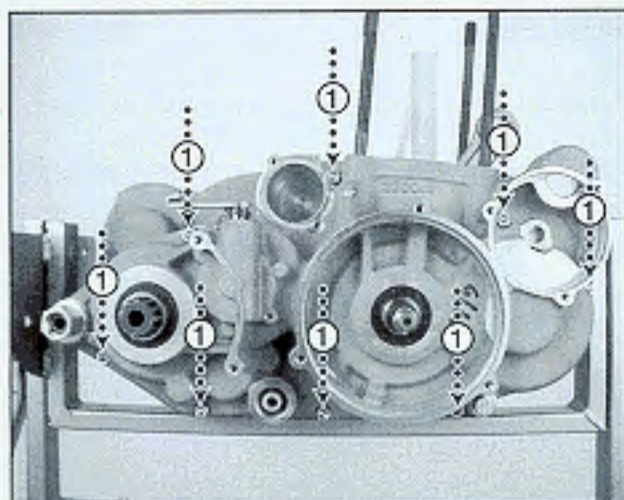


Fig.
11M

Lubricate the bearing and install the electrical starter intermediate shaft/gear wheel (Fig. 11N-1).

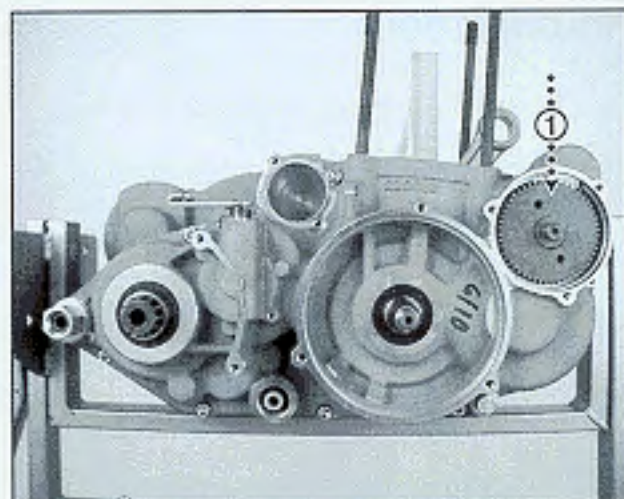


Fig.
11N

Lubricate the o-ring of the cover and install the cover including the o-ring onto the crankcase half and onto the electrical starter intermediate shaft/gear wheel (Fig. 11O-1). Follow the procedure in Section 10B.

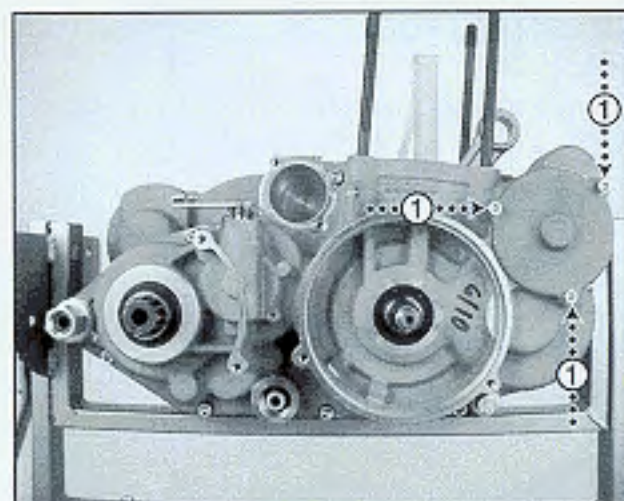


Fig.
11O

PULLERS

Flywheel puller - Article No. 270028-01 (Fig. A-1)

Clutch puller - Article No. 270005-01 (Fig. A-2)

Crankcase puller - Article No. 270011-01 (Fig. A-3)

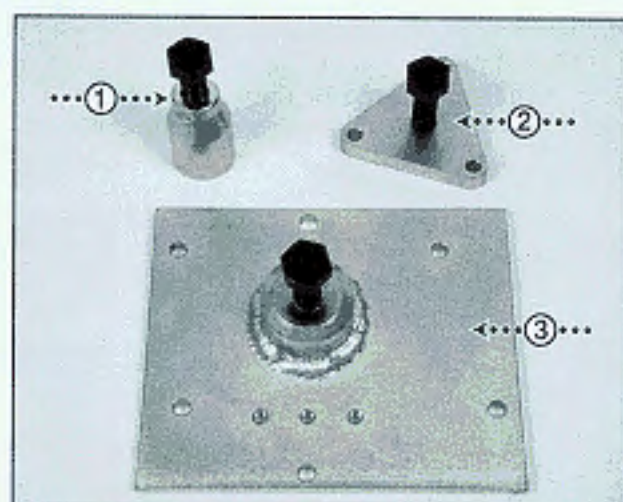


Fig.
12A

HOLDING TOOLS

Clutch holder - Article No. 270007-01 (Fig. B-4)

Flywheel holder - Article No. 270030-01 (Fig. B-5)

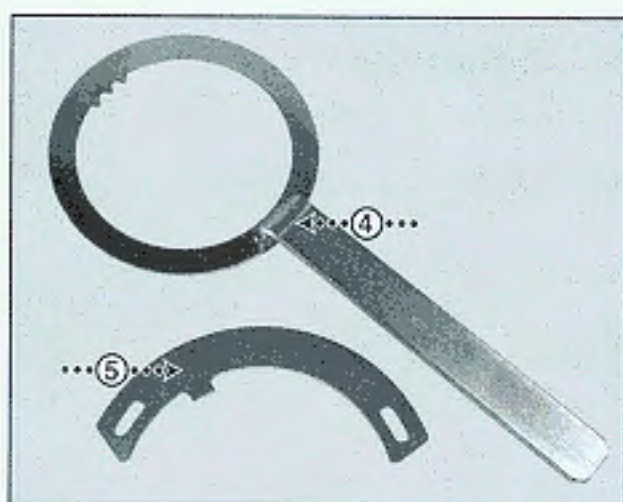


Fig.
12B

MOUNTING TOOL

Crankshaft tool - Article No. 270010-01 (Fig. C-6)

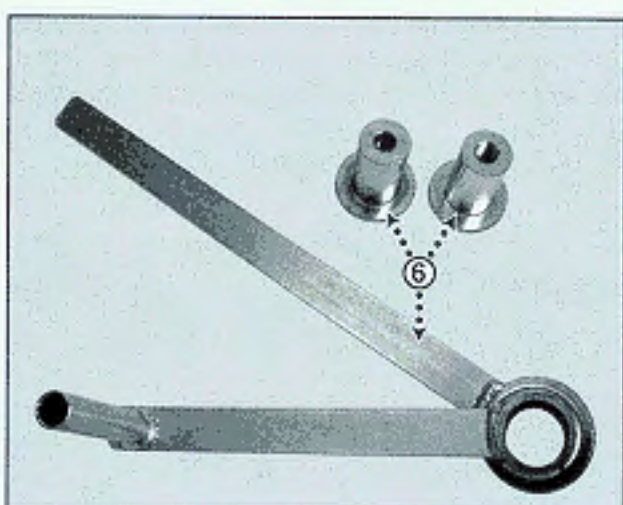


Fig.
12C

ENGINE STAND

Engine stand - Article No. 270029-01 (Fig. D-7)

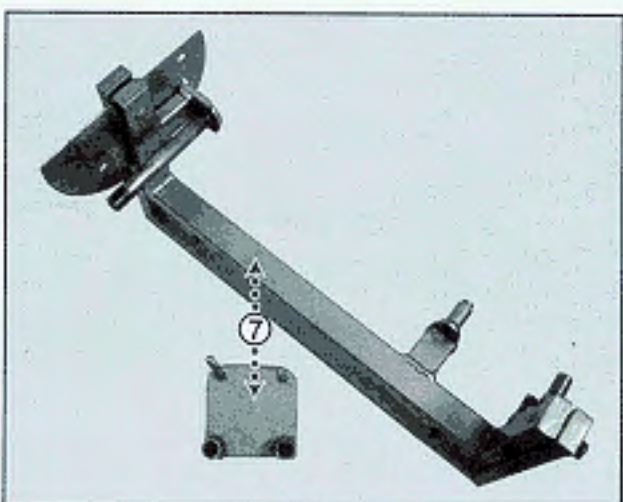


Fig.
12D