Mario's Manuals



950 ADVENTURE
2003 to 2006

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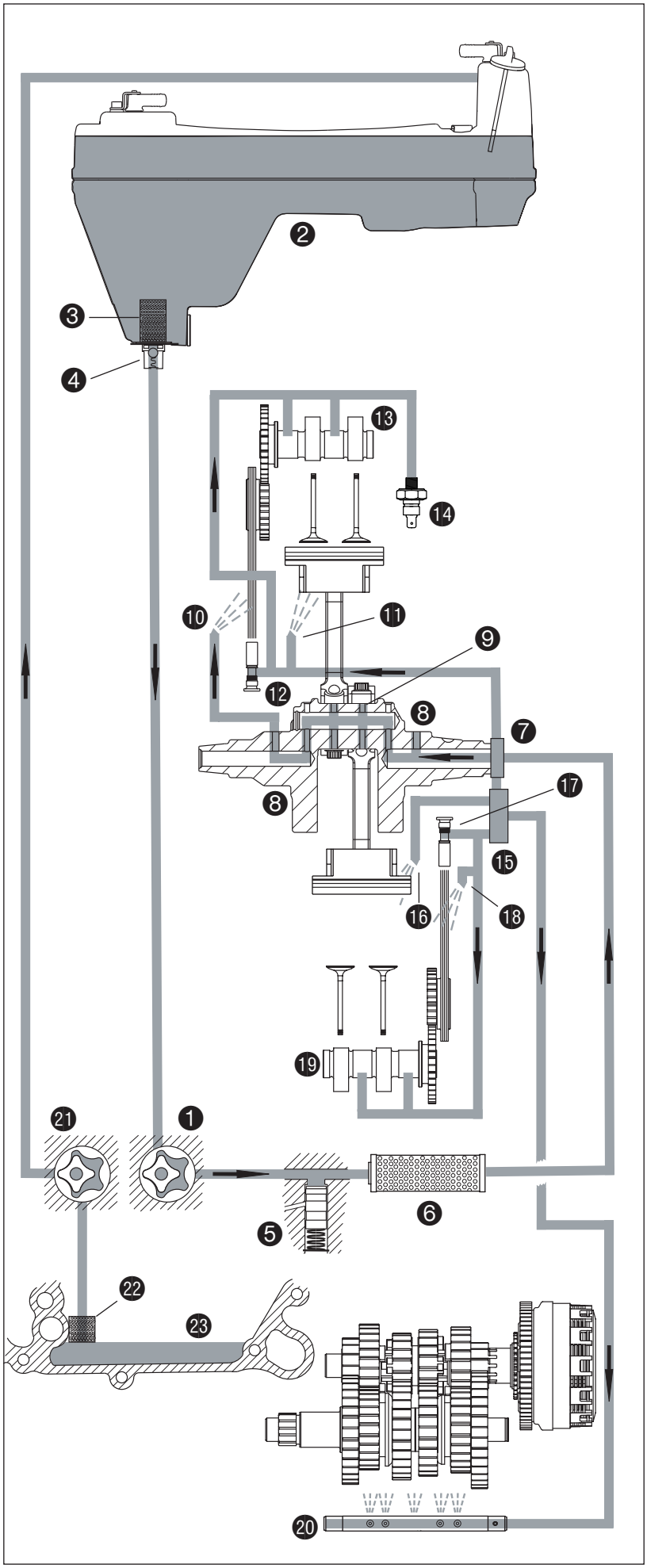
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Oil system

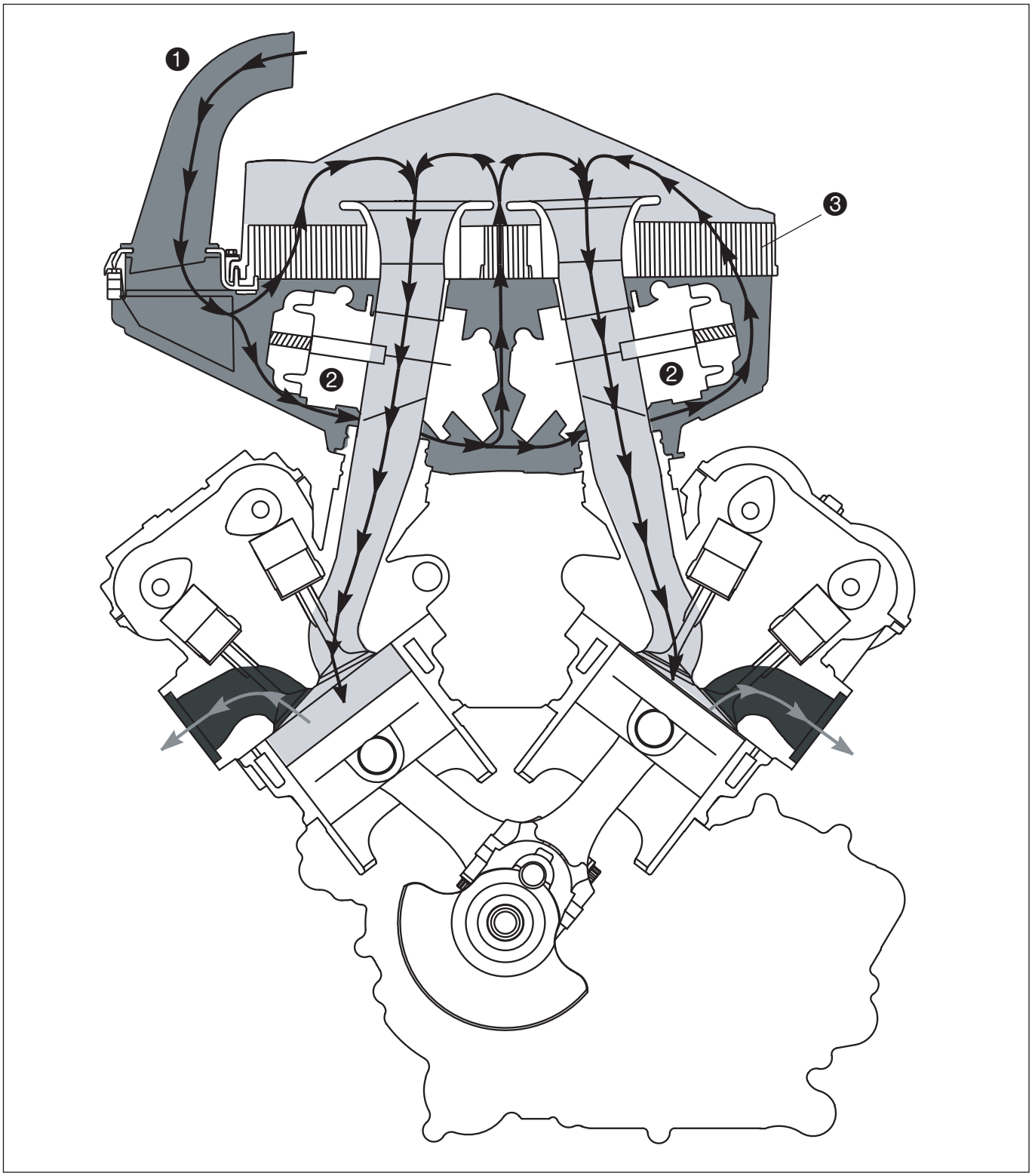
Pressure pump ❶ draws engine oil from oil tank ❷ through oil filter ❸ and the oil return valve ❹ and pumps it past the pressure relief valve ❺ through the oil filter ❻ into the annular groove ❼.

The main bearing ❽, the conrod bearings ❾ and the spraying nozzle ❿ (front timing chain) are supplied with oil through holes in the crankshaft. An oil duct leads to spraying nozzle ⓫ (piston cooling), the timing chain tensioner ⓬, the camshaft ⓭ and the oil pressure switch ⓮ in the front cylinder.

Another oil duct leads from the annular groove to a distributor groove ⓯ in the clutch cover. From there an oil duct leads to the spraying nozzle ⓰ (piston cooling). Another oil duct supplies the timing chain tensioner ⓱, the spraying nozzle ⓲ (timing chain) and the camshaft ⓳ on the rear cylinder with oil. Another oil duct leads to the oil line ⓴ that lubricates the transmission gears. The suction pump ㉑ draws the oil from the oil sump ㉓ through the screen ㉒ into the oil tank ❷.

Intake system

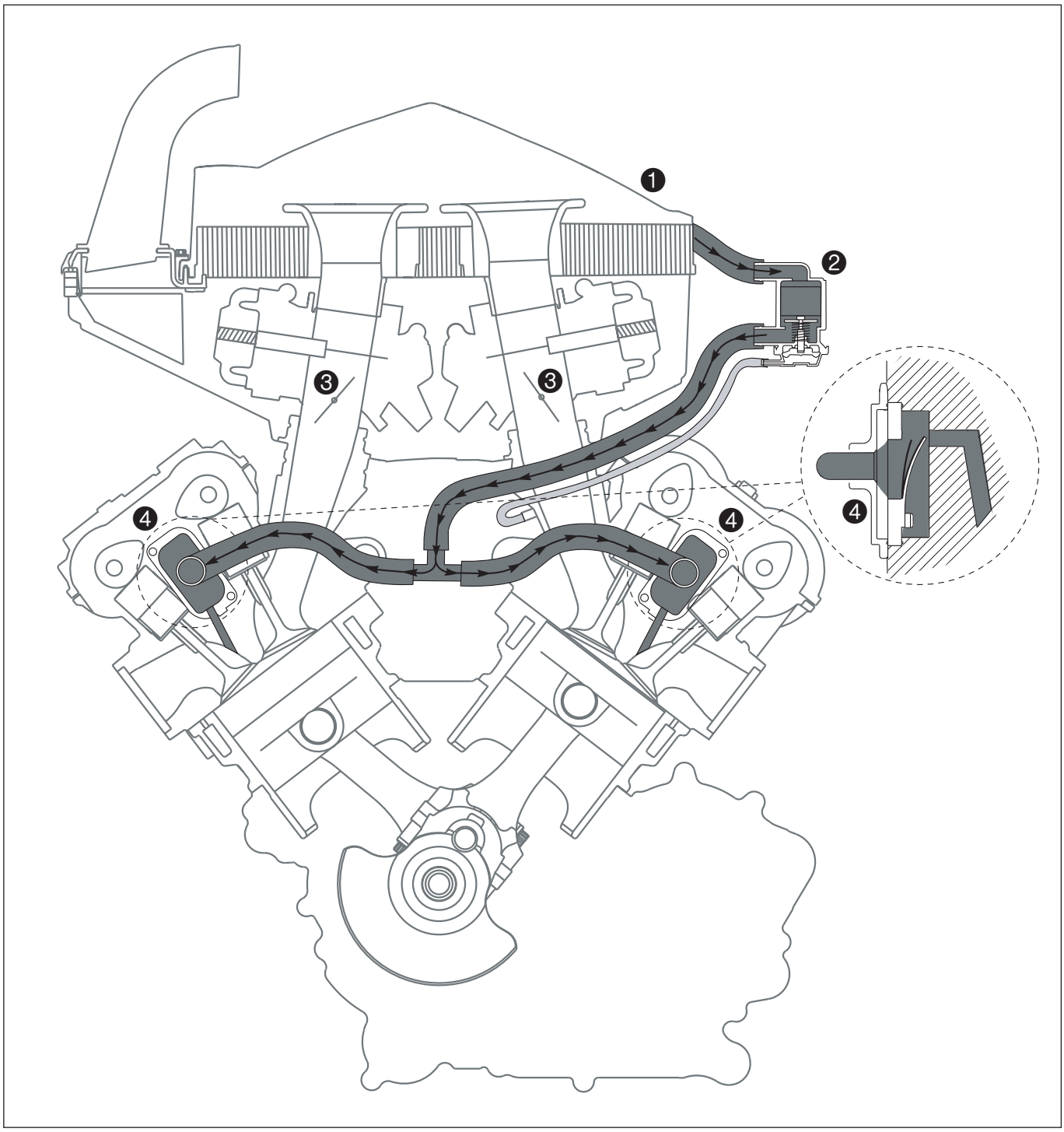
Fresh air is drawn into the filter box through the intake snorkel ❶, past the carburetors ❷ and through the air filter ❸.
The cleaned air is conducted to the combustion chamber through the carburetors and intake ports.



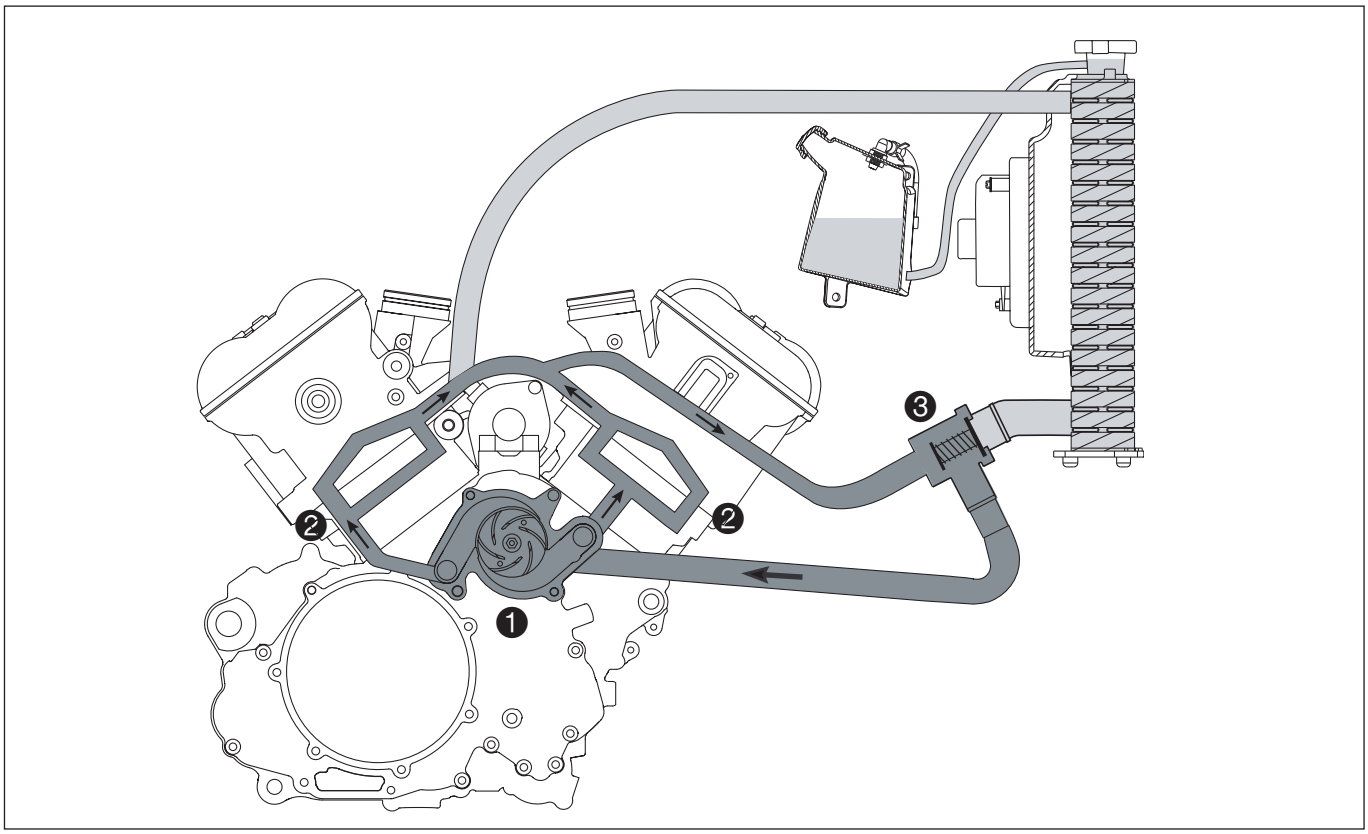
Secondary air system

The secondary air system supplies fresh air to the emissions in the exhaust port, resulting in the afterburning (oxidation) of the emissions. A line leads from the filter box ❶ to the control valve ❷ which opens as soon as the throttle valves ❸ are opened. The line continues to the reed valves ❹ in the cylinder heads which are actuated by the pressure pulsation in the exhaust system. As a result, cleansed fresh air arrives in the exhaust port. The oxygen content in the air and the high exhaust gas temperature cause the emissions to oxidize.

If the throttle valves are closed and the engine goes into an overrun condition, the underpressure in the intake port will rise and the control valve will close. This prevents exhaust backfire (combustion of the unburned fuel/air mixture).

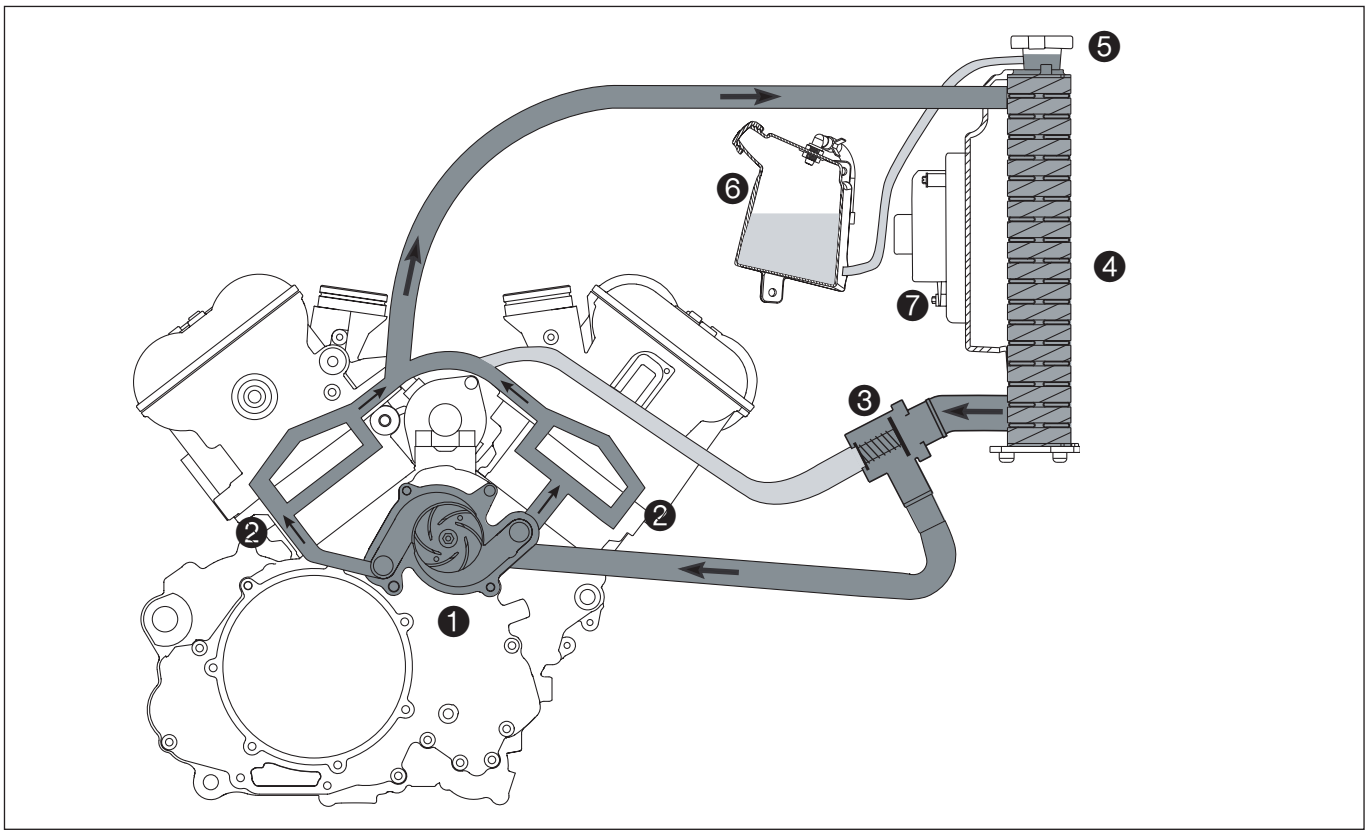


Cooling system



Closed thermostat

The thermostat is closed if the temperature of the cooling liquid drops below 75° C. The water pump ❶ pumps the cooling liquid through the cylinder and cylinder heads ❷ and the thermostat ❷.



Open thermostat

The thermostat ❸ opens at 75° C. The water pump ❶ pumps the cooling liquid through the cylinder and cylinder heads ❷, the aluminum cooler ❹ and the thermostat. The pressure in the cooling system (max. 1.4 bar) is regulated by a valve in the radiator cap ❺. The cooling liquid level in the compensating tank ❻ must be between the MIN and MAX marks when the engine is cold. The fan ❼ switches on at 102° C.

SPECIALTOOLS – CHASSIS

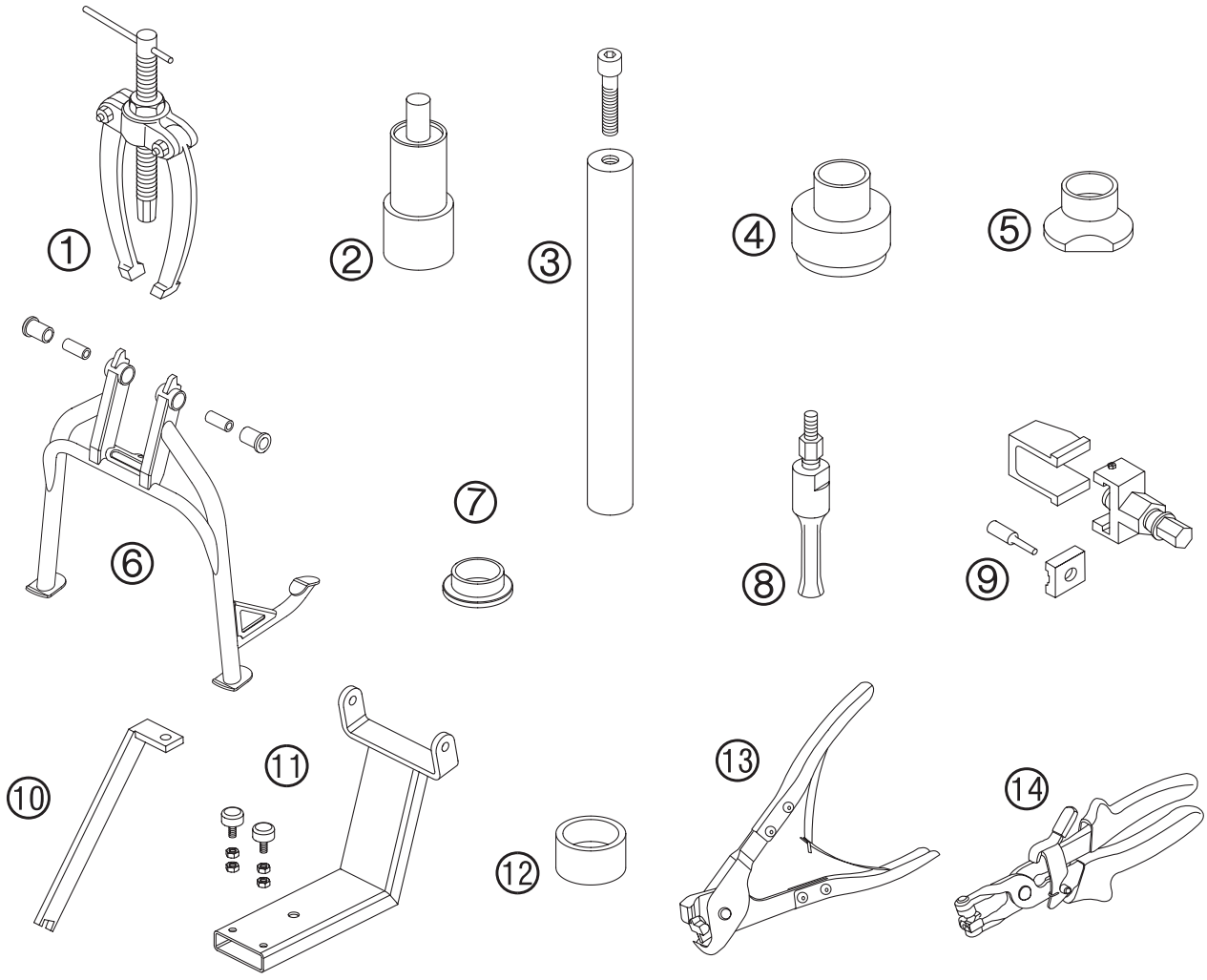
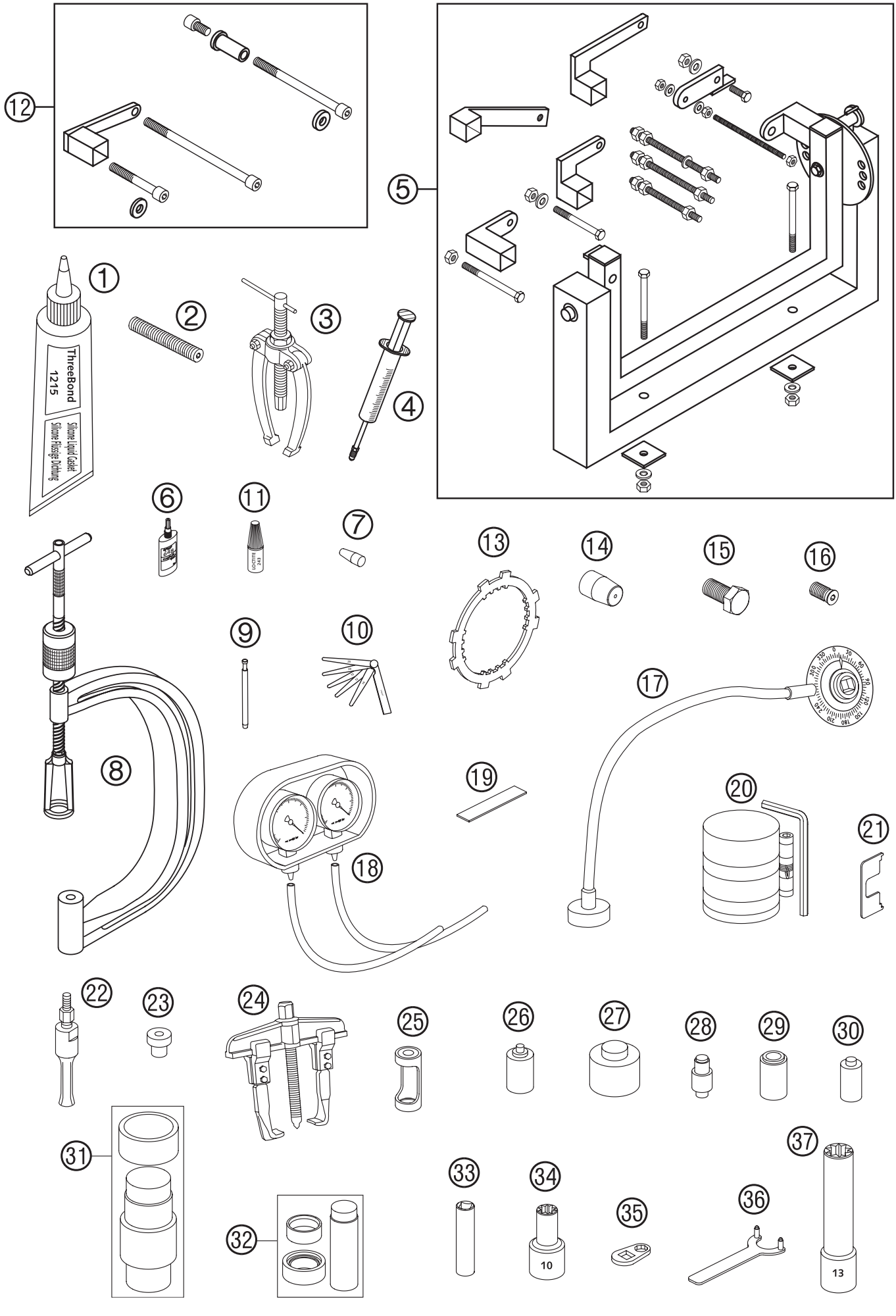


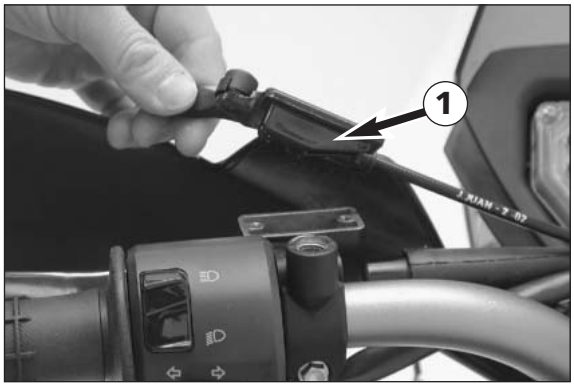
FIG	PART NO	DESCRIPTION
1	151.12.017.000	Gear puller
2	584.29.086.000	Pressing tool for swing arm bearing
3	584.29.089.000	Chassis tool holder
4	584.29.091.000	Press-in tool for bearing seat / rear wheel bearing
5	584.29.092.000	Knock-out tool for bearing seat
6	600.03.022.000	Center stand
7	600.10.013.000	Sleeve for pressing tool for swim arm bearing
8	600.29.018.000	Internal gear puller 28 mm
9	600.29.020.000	Chain rivet tool
10	600.29.055.000	Center stand lock
11	600.29.055.100	Floor jack attachment
12	600.29.056.000	Anvil dolly (for 584.29.086.000)
13	600.29.057.000	Pliers for Öttiker clamps
14	600.29.057.100	Pliers for spring-loaded band-type clamp

Art.-Nr. 3.206.009-E


12
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1
ThreeBond
1215
Silicone Liquid Gasket
Silicone Flüssige Dichtung
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SPECIAL TOOLS – ENGINE

FIG	PART NO	DESCRIPTION
1	309098	Seal Three-Bond
2	0113 080802	Crankshaft locking bolt
3	151.12.017.000	Gear puller
4	503.29.050.000	Bleeding syringe for hydraulic clutch
5	560.12.001.000	Universal-engine work stand
6	584.29.059.000	Loctite 648 green 20 ml
7	585.29.005.000	Protection sleeve for shaft seal ring of water pump
8	590.29.019.000	Valve spring mounter
9	590.29.026.006	Limit plug gauge 6,05 mm
10	590.29.041.000	Feeler gauge for valve clearance
11	6 899 785	Loctite 243 blu 6 cm3
12	600.29.002.000	Engine holder for engine work stand
13	600.29.003.000	Clutch holder
14	600.29.005.000	Protection sleeve for shaft seal ring of output shaft
15	600.29.009.000	Magneto extractor
16	600.29.009.010	Protection bolt for magneto extractor
17	600.29.010.000	Degree wheel
18	600.29.011.000	Carburator synchronisation tool
19	600.29.012.000	Plastigauge-measuring strips
20	600.29.015.000	Piston ring mounting tool
21	600.29.016.000	Setting gauge for float level
22	600.29.018.000	Internal gear puller 28 mm
23	600.29.031.000	Protection sleeve for crankshaft (for pulling of the primary gear)
24	600.29.033.000	Puller for primary gear
25	600.29.041.000	Valve spring mounter insert
26	600.29.043.010	Pressing tool for seal of clutch release shaft
27	600.29.043.020	Pressing tool for seal of output shaft
28	600.29.043.030	Pressing tool for seal and bearing of shifting shaft
29	600.29.043.040	Pressing tool for seal of water pump
30	600.29.043.050	Pressing tool for seal of balancer shaft
31	600.29.044.050	Pressing tool for main bearings (In/out)
32	600.29.046.028	Pressing tool for supporting bearing (In)
33	600.29.073.000	Spark plug wrench 16 mm
34	600.29.075.000	Special nut for conrod
35	600.29.081.000	Special tool for cylinder head nuts
36	600.29.082.000	Holder for water pump wheel
37	600.29.083.000	Special nut for cylinder head nuts

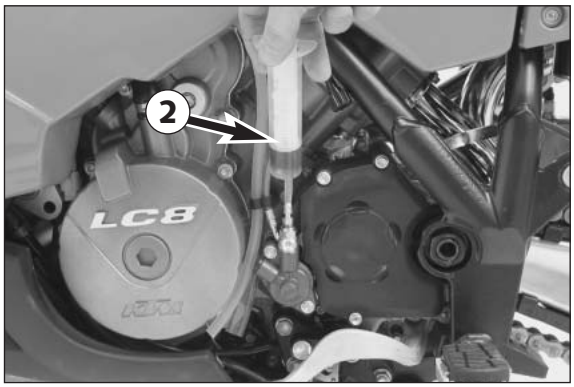


Checking the oil level of the hydraulic clutch

To check the oil level in the master cylinder of the clutch remove the cover. For this purpose, remove bolts and cover together with the rubber boot ❶. The oil level in the horizontal-standing master cylinder should be 4 mm below the upper edge. If necessary add SAE 10 biodegradable hydraulic oil (e.g. Motorex Kupplungs-Fluid 75).

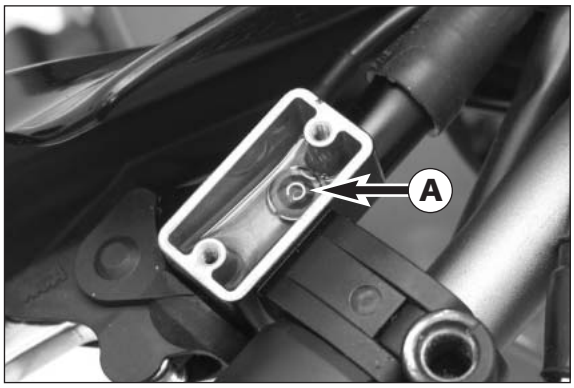
! CAUTION !

ONLY USE SAE 10 BIODEGRADABLE HYDRAULIC OIL TO REFILL THE MASTER CYLINDER. NEVER USE BRAKE FLUID NOR MIX BIODEGRADABLE HYDRAULIC OILS WITH MINERAL OILS!



Bleeding of the hydraulic clutch

For bleeding, the cover of the master cylinder of the clutch needs to be removed. For this purpose, remove bolts and take off cover together with rubber bellows ❶. At the slave cylinder of the clutch, remove the bleeder nipple. At its place, mount the bleeder syringe ❷ which is filled with biodegradable hydraulic oil (e.g. Motorex Kupplungs-Fluid 75).



Refill oil, until oil is discharged from the bore Ⓐ of the master cylinder in a bubble-free state. Make sure that the oil does not overflow.

! CAUTION !

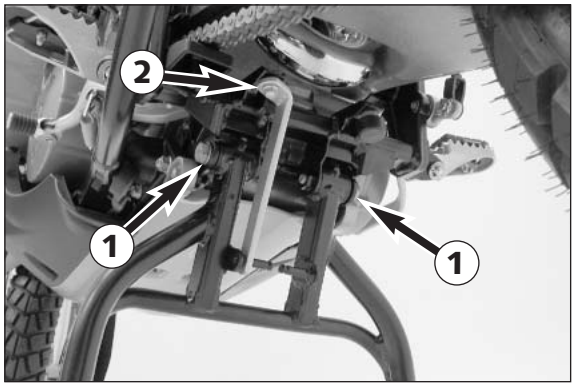
HAVING COMPLETED THE BLEEDING PROCEDURE, YOU HAVE TO VERIFY THAT THE OIL LEVEL IN THE MASTER CYLINDER IS CORRECT. FOR FILLING OF THE MASTER CYLINDER, USE SAE 10 BIODEGRADABLE HYDRAULIC OIL ONLY (EX. MOTOREX KUPPLUNGS-FLUID 75); NEVER USE BRAKE FLUID NOR MIX BIODEGRADABLE HYDRAULIC OILS WITH MINERAL OILS.

REMOVING AND REFITTING ENGINE 3

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REMOVING THE ENGINE 3-2
REFITTING THE ENGINE 3-7

Art.-Nr. 3.206.009-E

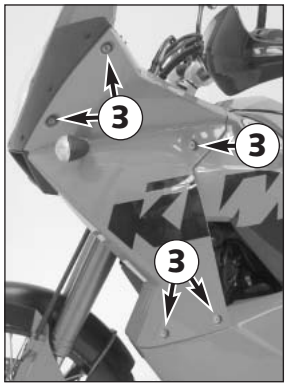


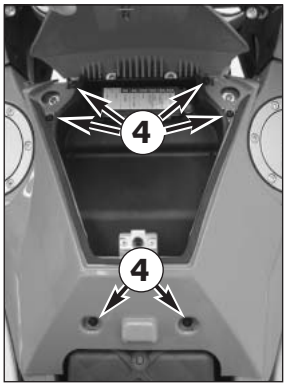
Removing the engine

– Screw the center stand 600.03.022.000 onto the frame ❶ and jack up the motorcycle on a firm, even surface.
– Remove the left bump rubber and lock the center stand with the lock 600.29.055.000 ❷.

NOTE: if available, use the center stand already on the bike.

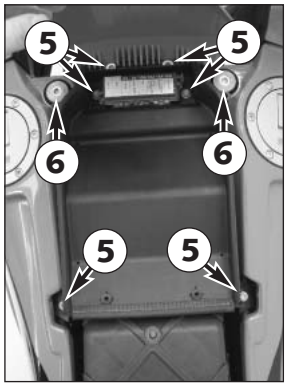
– Unlock the seat lock with the ignition key and remove.

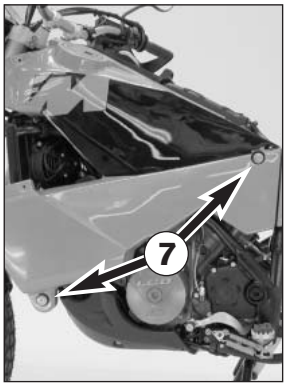




– Remove the bolts ❸ on the left and right of the front side covers, disconnect the front turn signal, pull the tank vent hoses off of the fuel tank and remove the side covers.

– Open the tank cover, unscrew the fixing bolts ❹ and remove the upper tank compartment.

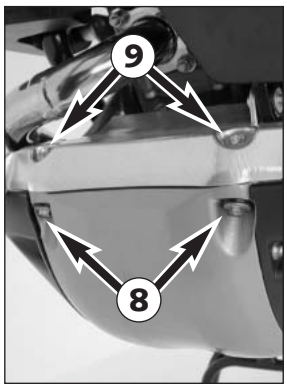


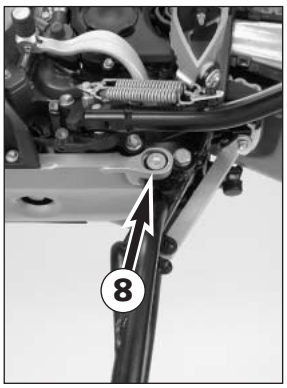


– Remove the bolts ❺ on the lower tank compartment and the fuse box, take the cover off the fuse box and dismount the lower tank compartment.
– Close the fuel cocks, disconnect the gasoline hoses, unscrew the upper ❻ and lower ❼ fixing bolts on both fuel tanks and remove the tanks together with the lower vent hoses.

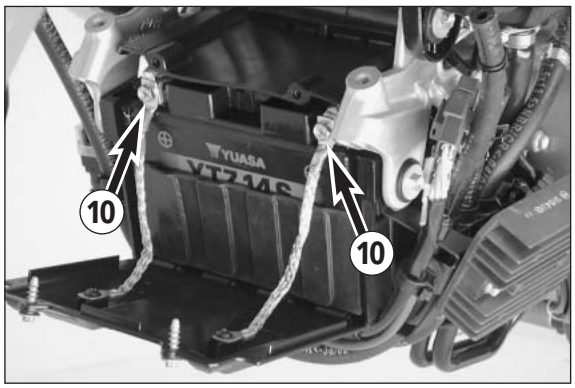
NOTE: it is easier to disconnect the gasoline hoses if you remove the front bolts on the underride protection and fold the engine guard down.

– Drain the engine oil from the oil tank and the engine: see page 12-4.

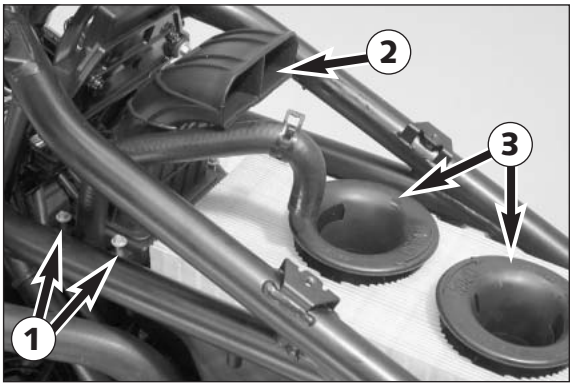




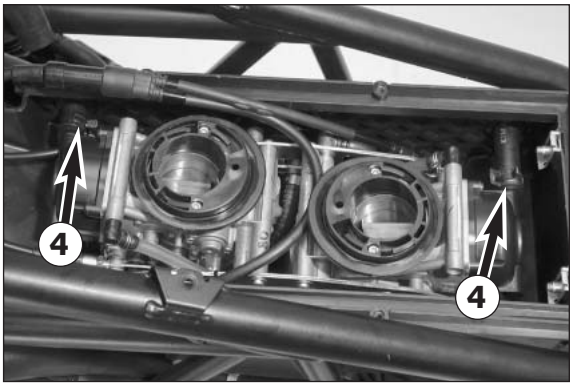
– Remove the 4 bolts ❽ on the underride protection and take off the underride protection.
– Remove both bolts ❾ on the front cover and take off the cover.



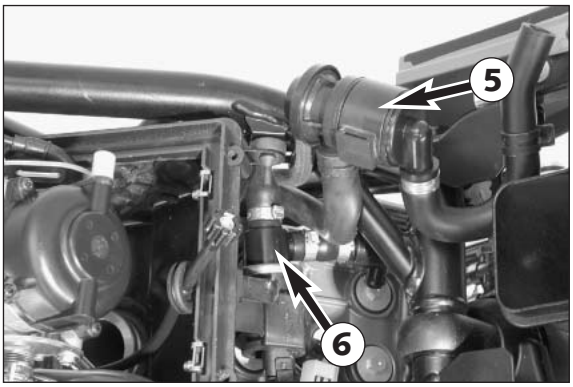
– Open the lid on the battery compartment and disconnect the battery terminals ❿ (starting with the negative pole).
– Take out the battery and remove the upper battery cover.



– Unscrew the bolts ❶ and remove the intake snorkel ❷ together with the frame from the air filter box.
– Disconnect the vent hose and the EPC hose and remove the upper half of the air filter box.
– Turn the intake trumpet ❸ in a clockwise direction and remove. Remove air filter.

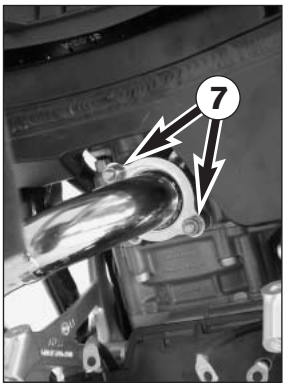


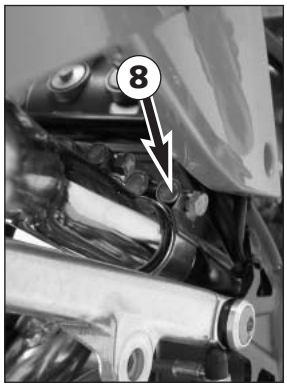
– Unbolt both side covers on the lower air filter box and remove the clamps on the carburetor connection boot.
– Detach the EPC hoses ❹ from both carburetors and pull the hoses out of the lower air filter box.
– Remove both vent hoses from the carburetors.
– Lift both carburetors, carefully draw the cable for the idle speed adjustment and the gasoline hose through the openings in the lower air filter box.
– Detach the fuel hoses from the carburetors.
– Pull the carburetor connection boots off of the intake manifolds.



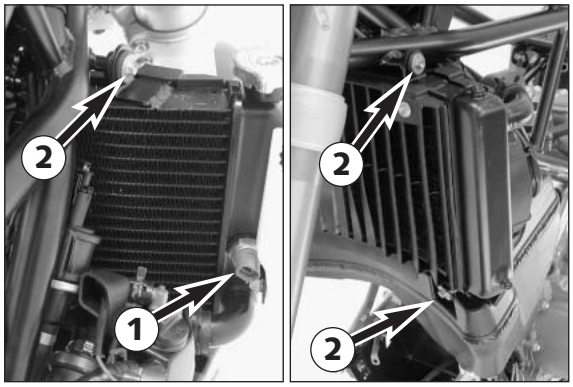
– Detach the SLS valve ❺ from the lower air filter box, pulling the thin hose from the intake manifold and the thick hose from the valve. Remove the valve.
– Remove the EPC valve ❻ from the lower air filter box and disconnect.
– Tilt up the carburetors and fasten to the handlebar with a wire or rubber band. They do not need to be completely dismounted.
– Take the lower air filter box out of the frame.

NOTE: cover the intake ports with a cloth to prevent any parts from falling inside.



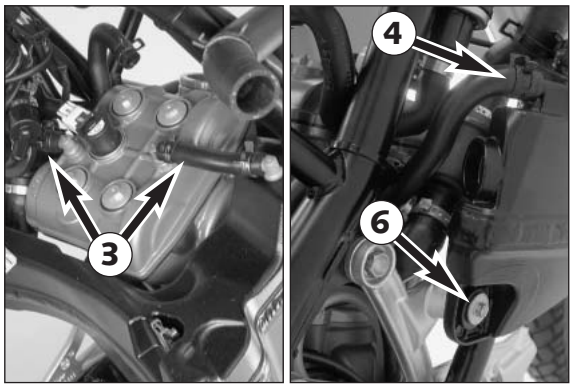


– Unscrew both nuts ❼ on the front exhaust manifold flange on the cylinder head, loosen the exhaust clamp ❽ on the front exhaust manifold, pull the front exhaust manifold out of the rear exhaust pipe and remove.
– Unscrew the rear exhaust manifold from the cylinder head.

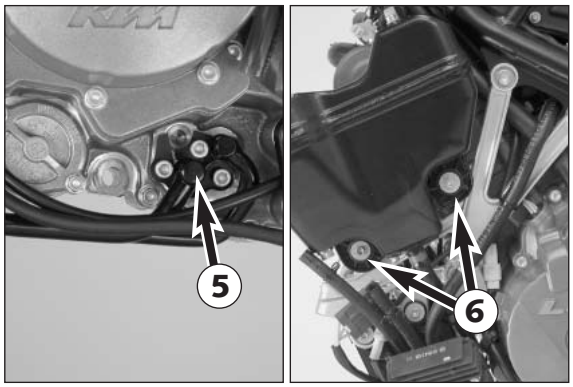


– Disconnect the electric connections from the fan motor and the temperature switch ❶.
– Drain the cooling liquid from the radiator and engine: see page 12-16.
– Detach the water hoses from the radiator (special pliers 600.29.057.100) and unscrew the radiator ❷ .

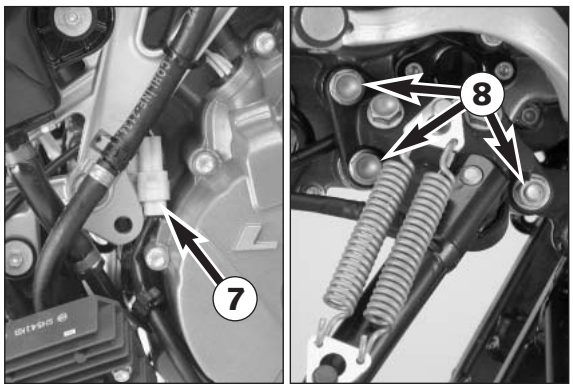
NOTE: fan and radiator shield do not need to be dismounted from the radiator.



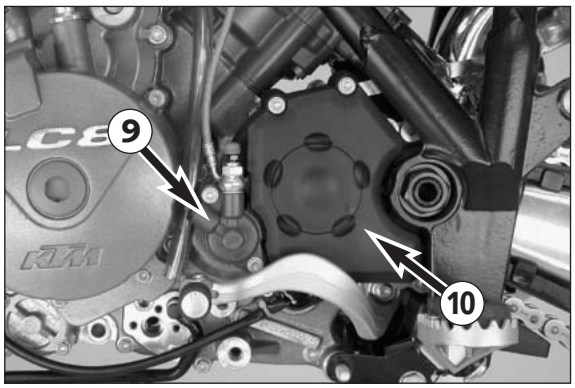
– Pull off the oil lines from the oil tank to the valve covers ❸ and the return line ❹ (special pliers 600.29.57.100), unscrew the oil lines from the oil terminal ❺ and pull out. Remove the O-rings.



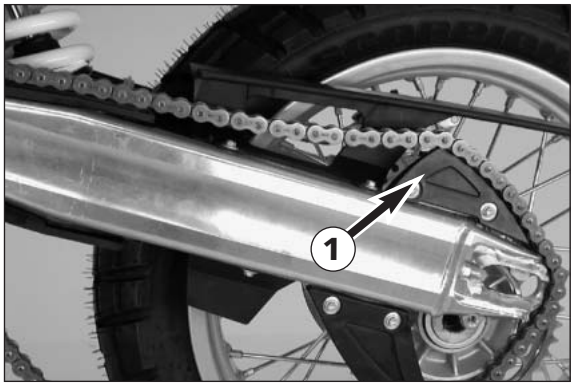
– Loosen the fixing bolts ❻ on the oil tank, remove the oil tank and carefully pull out the oil line.



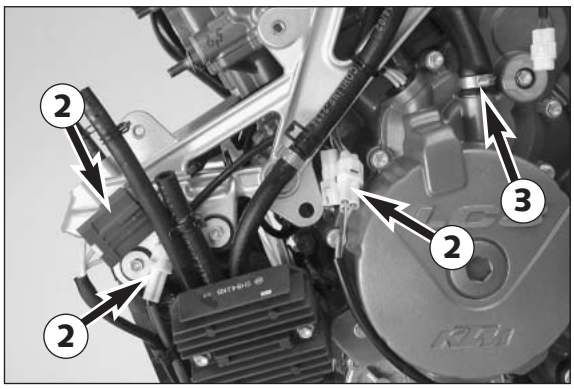
– Disconnect the side stand switch ❼ and take the cable out of the cable clips.
– Loosen the two bolts and the nut ❽ and remove the side stand.



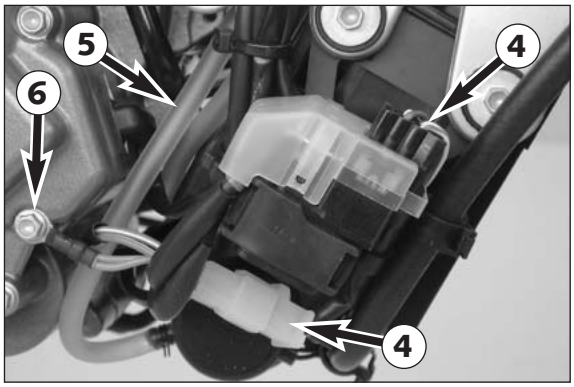
– Unscrew the clutch slave cylinder ❾ and the chainguard ❿ and pull the locking pin out of the pushrod.
– Dismount the chain roller and chain securing guide.



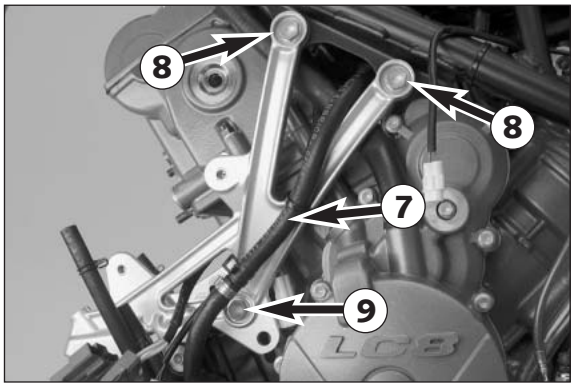
– Unscrew the nut on the wheel spindle, pull out the rear wheel spindle, take the chain off of the rear sprocket and place over the side of the bracket ❶. Remove the chain from the engine sprocket.



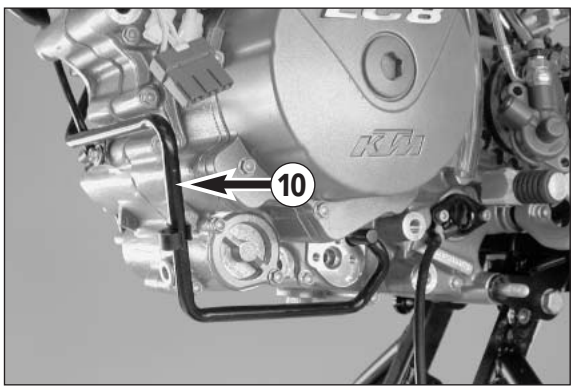
– Detach the connector ❷.
– Remove the engine vent hose ❸, discarding the hose clamp.



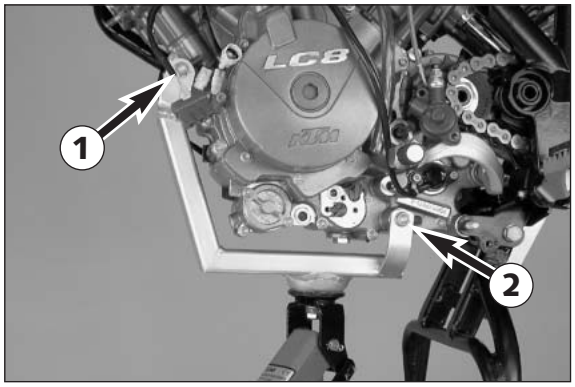
– Unscrew the positive starter engine cable and draw out the wiring harness.
– Detach connector ❹ on the starter relay.
– Pull out the gasoline pump vent hose ❺ towards the bottom.
– Unscrew the ground connection ❻.



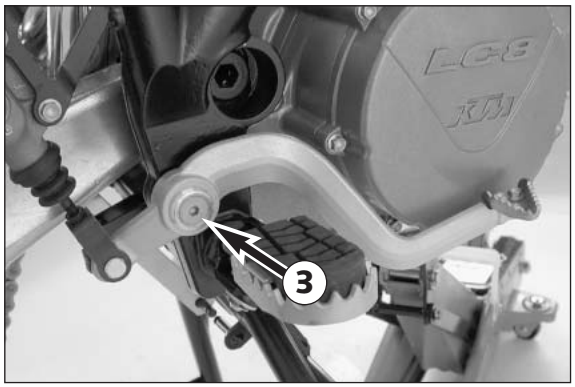
– Disconnect the fuel hose ❼.
– Loosen the bolts on the side support ❽ and the nut on the bolt ❾, pull out the bolt and remove support together with the battery case.



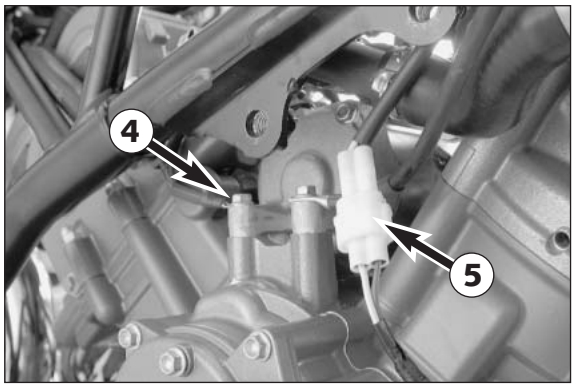
– Unscrew the front oil line ❿.



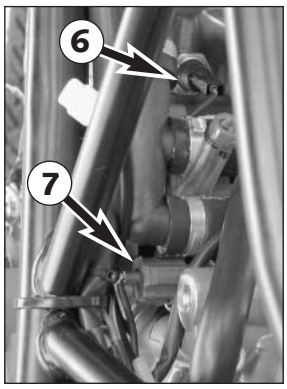
– Use the trolley jack to position the attachment 600.29.055.100 on the engine, insert the bolt ❶ through the front of the engine bracket and fasten with the nut. Screw one of the bolts ❷ on the rear of the side stand fixture and slightly lift the engine.

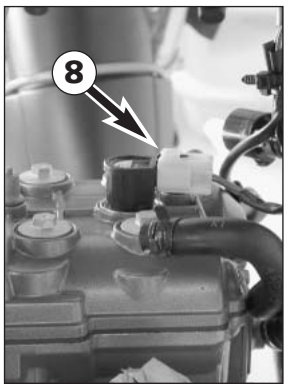


– Remove the bolt ❸ and tilt the foot brake pedal to the side.

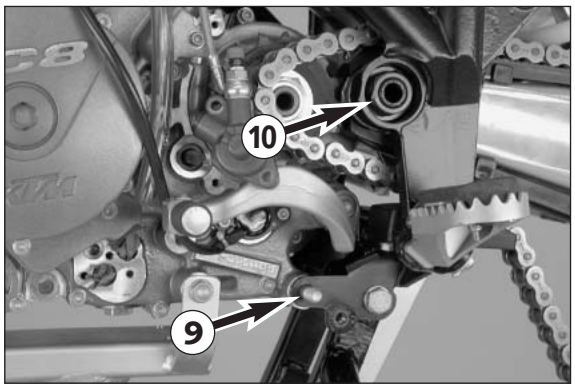


– Unscrew the ground wire connection ❹.
– Detach the connector from the pulse generator ❺.





– Detach the connector from the oil pressure switch ❻, the temperature sensor ❼ and from the front ❽ and rear ignition coil. Remove any cable clips necessary.

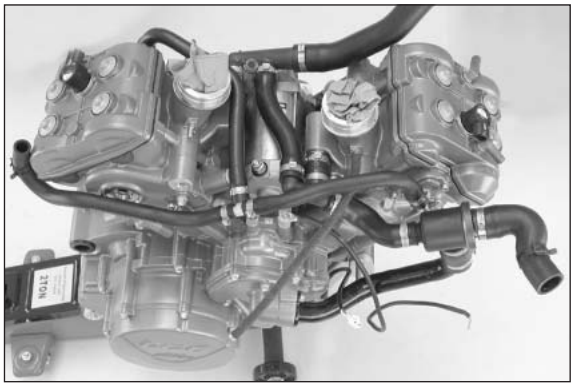


– Pull the bolt ❾ out of the lower support (if necessary, raise or lower the engine slightly).

– Loosen the nut on the swing arm pivot ❿ and knock out the swing arm pivot with a suitable pipe.

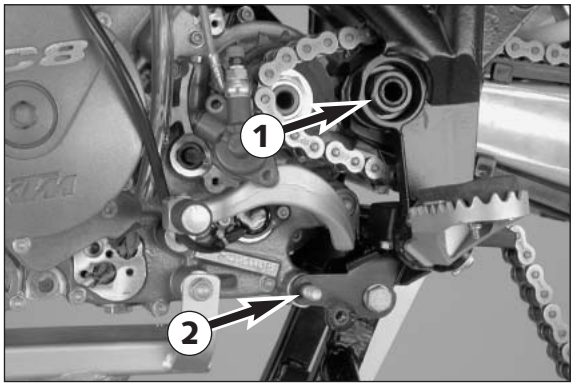
– Pull the engine towards the front with the trolley jack, lower and pull away towards the side.

– Disconnect all hoses and lines from the engine.

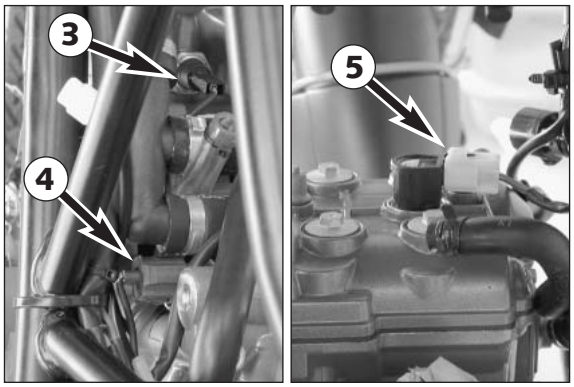


Refitting the engine

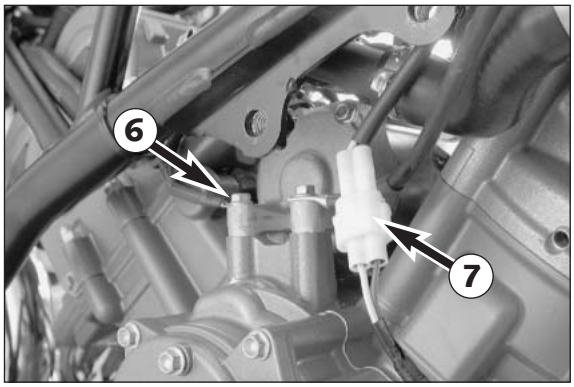
– Before mounting the engine, attach the water, SLS and vacuum hoses (Öttiger clamps - special pliers 600.29.057.000 or spring-loaded band-type clamps - special pliers 600.29.057.100)
– Position the swing arm and fix with the swing arm pivot on the right and a suitable pipe on the left.



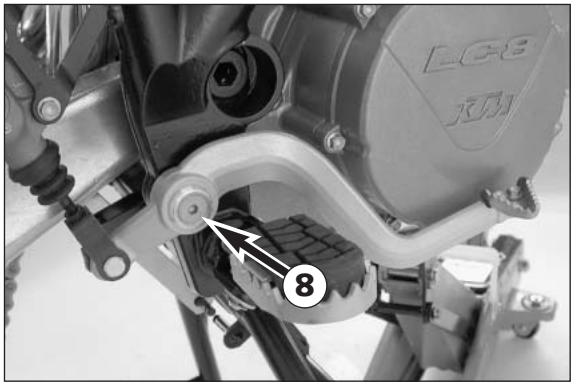
– Lift the engine into the frame with the trolley jack, insert the sealing washer in the rear exhaust flange and secure with copper paste if necessary.
– Guide the chain along the side of the pinion and insert the swing arm pivot ❶, screw on the nut but do not tighten yet.
– Insert the bolt ❷ in the lower support (raise or lower the engine slightly if necessary).
– Remove the trolley jack attachment 600.29.055.100 from the engine.



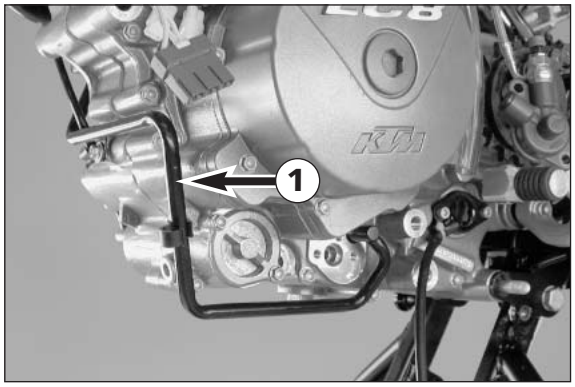
– Plug the connector on the oil pressure switch ❸, the temperature sensor ❹ and the front and rear ignition coil ❺. Use cable clips to fasten the wiring harnesses.



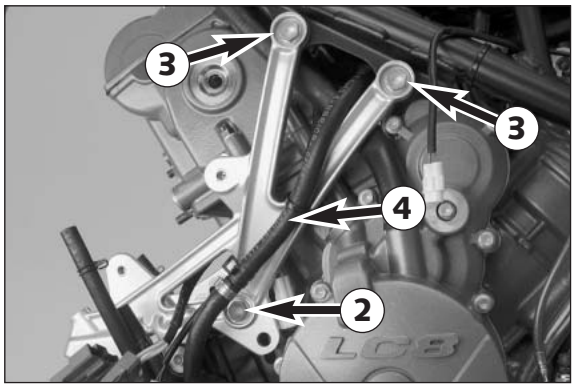
– Screw on the ground wire connection ❻.
– Attach the pulse generator connector ❼.



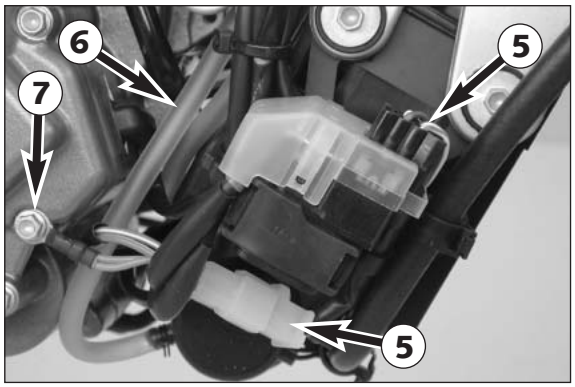
– Position the foot brake pedal, apply Loctite 243 to the bolt ❽ and tighten to 25 Nm.



– Mount the front oil line ❶ inserting new O-rings. Tighten the bolts.



– Align the side supports and battery case against the engine, insert the bolt ❷ and mount the nut.
– Mount the bolts ❸ (M10x23), lifting the engine slightly if necessary. Tighten the nut and bolts to 40 Nm.
– Tighten the nut on the swing arm pivot to 130 Nm.
– Connect the fuel hose ❹ and fasten with a cable clip.

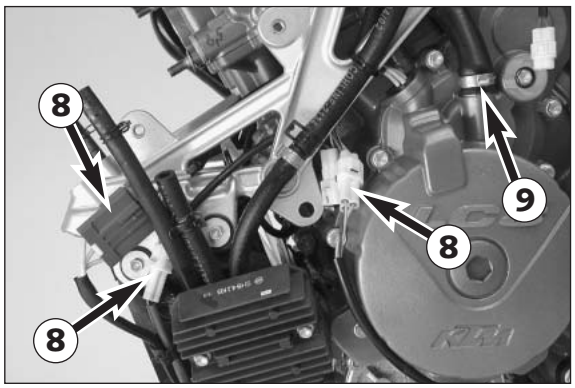


– Run the positive starter cable to the starter and screw on the starter engine. Run the starter ground to the battery case.
– Attach both starter relay connectors ❺.
– Run the gasoline pump vent hose ❻ upwards along the wiring harness to the engine bracket and back down, forming an arch.

! CAUTION !

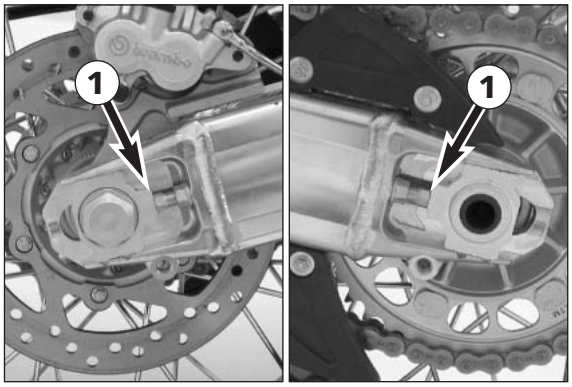
IF YOU RUN THE HOSE STRAIGHT UP WITHOUT AN ARCH, WATER WILL BE ABLE TO PENETRATE, CAUSING THE GASOLINE PUMP TO BE SOILED AND DAMAGED.

– Screw on the ground wire ❼ from the regulator.

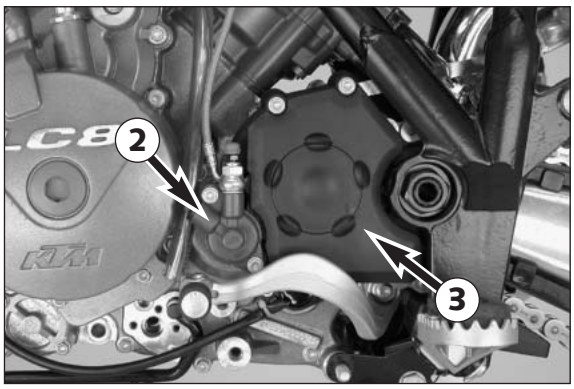


– Attach the connector ❽.

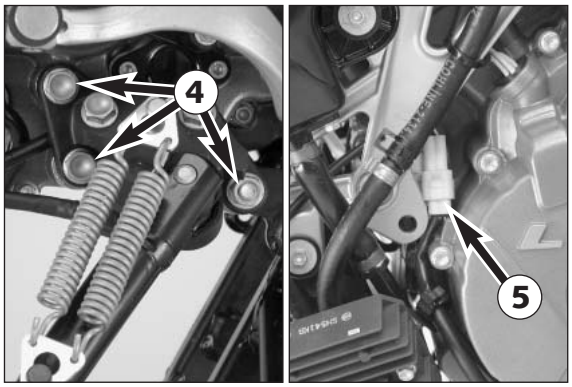
– Slip on the hose from the engine ventilation ❾ and mount the new Öttiker clamp with the special pliers 600.29.057.000.



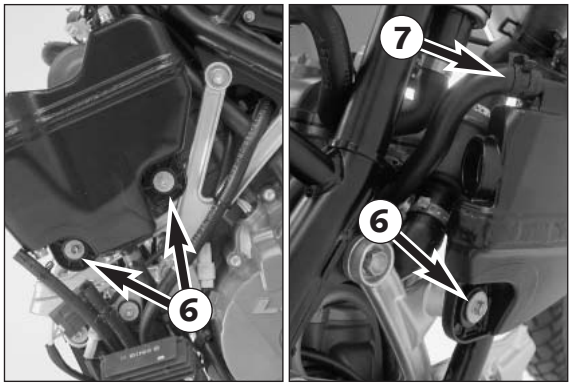
– Place the chain over the pinion and rear sprocket, lift the rear wheel and slide the wheel spindle through.
– Press the rear wheel towards the front to apply the chain tensioner ❶ and tighten the nut on the wheel spindle to 110 Nm.
– Actuate the foot brake pedal to apply the brake shoes against the brake disk.
– Check the chain tension, see owners manual, page 25.



– Mount the chain securing guide and the chain roller.
– Insert the locking pin in the pushrod and mount the clutch slave cylinder ❷. Screw on the chainguard ❸.

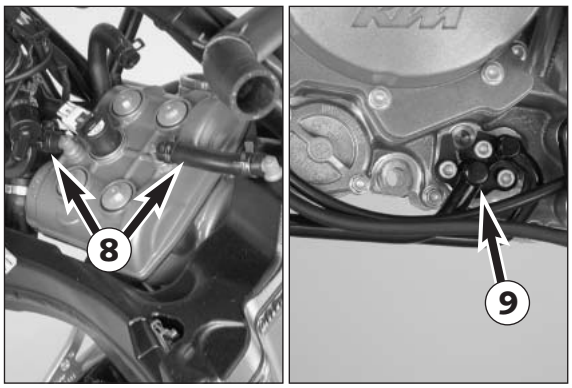


– Position the side stand and tighten the two bolts and the nut ❹ to 45 Nm.
– Mount the side stand switch ❺ and fasten the cable with the cable clips.



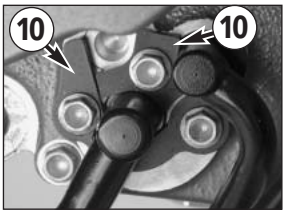
– Carefully install the oil line, mount the oil tank and tighten the fixing bolts ❻.

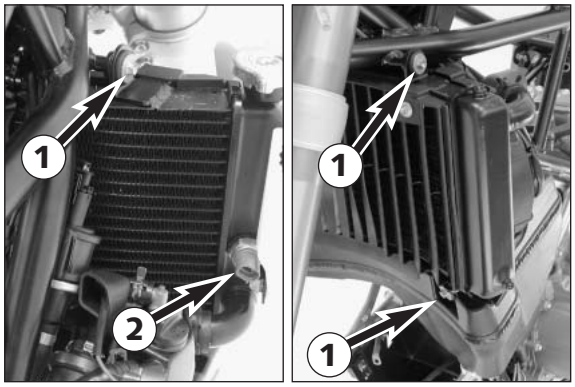
– Connect the return line ❼ to the oil tank and mount the spring-loaded band-type clamp with the special pliers 600.29.057.100.



– Attach the oil lines from the oil tank to the valve covers ❽ (special pliers 600.29.057.100).

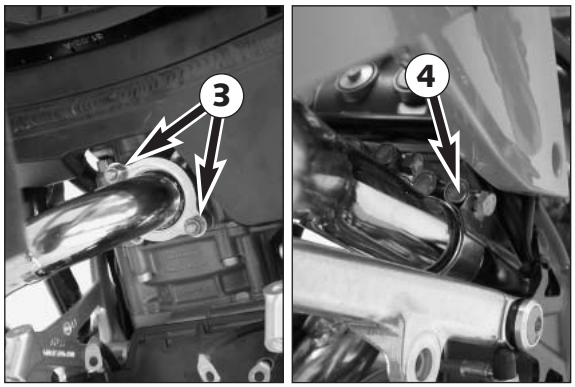
– Mount both oil lines on the oil terminal ❾ with new O-rings, insert the bolts (M6x20) in the retaining brackets ❿ and tighten to 10 Nm.





– Screw on the radiator together with the fan and the radiator shield ❶, tighten the bolts to 10 Nm.
– Connect the water hoses on the radiator (special pliers 600.29.057.100)

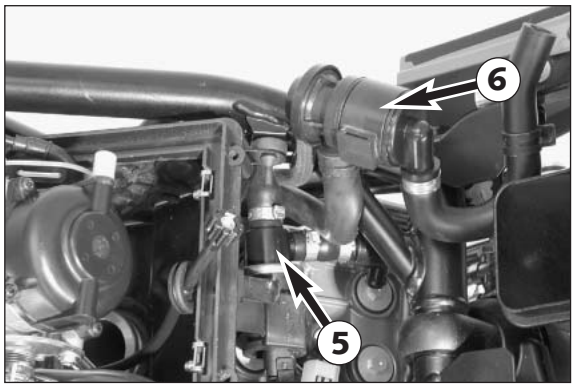
– Attach the electric connections for the fan motor and the temperature switch ❷.



– Screw the rear exhaust manifold on to the cylinder head.
– Insert the front exhaust manifold in the rear exhaust pipe, mount to the front cylinder head together with the sealing washer and tighten the exhaust nuts ❸.

NOTE: the exhaust nuts should be tightened evenly without bending the metal sheet.

– Tighten the exhaust clamp ❹ on the front manifold.



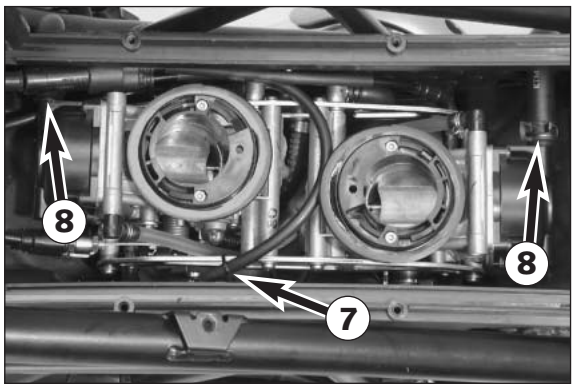
– Mount the lower air filter box on the intake ports, connect the drain hose and push the fuel hose and the cable for the idle speed adjustment down through the opening in the lower air filter box.

! CAUTION !

– MAKE SURE THERE ARE NO KINKS IN THE CARBURETOR VENT HOSES AND RUN THEM DOWN BEHIND THE STARTER ENGINE WITHOUT FORMING AN UPWARD ARCH.
– REMOVE THE CLOTH USED TO COVER THE INTAKE PORTS.

– Mount the EPC valve ❺ on the lower air filter box and connect.
– Mount the secondary air system valve ❻ on the lower air filter box, connecting the thin hose to the intake manifold and the thick hose directly to the valve.

– Attach the carburetor connection boots to the intake manifold.

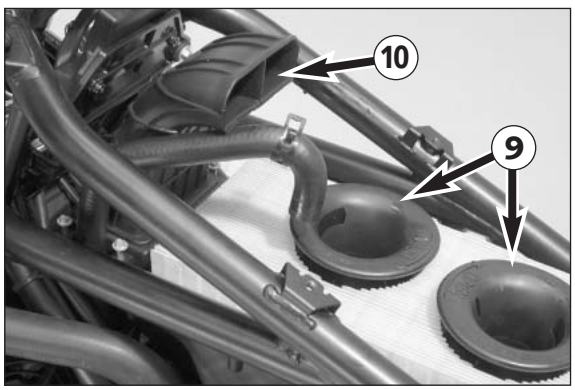


NOTE: the clamps on the carburetor connection boots must be aligned so that they can be tightened through the openings in the side covers.

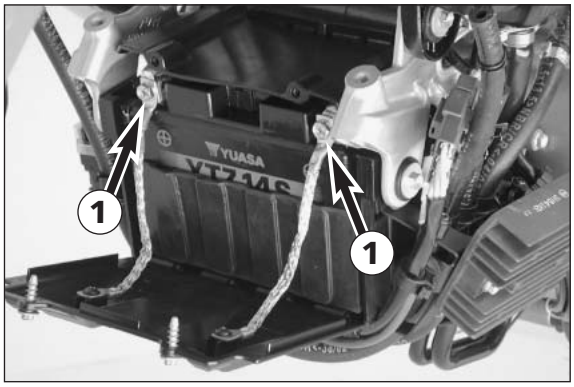
– Connect the fuel hoses to the carburetors.

NOTE: to make it easier to connect the fuel hoses, disconnect the fuel hose from the connecting piece (on the side of the engine brace) and pull the fuel hose up. Reconnect after mounting the carburetor.

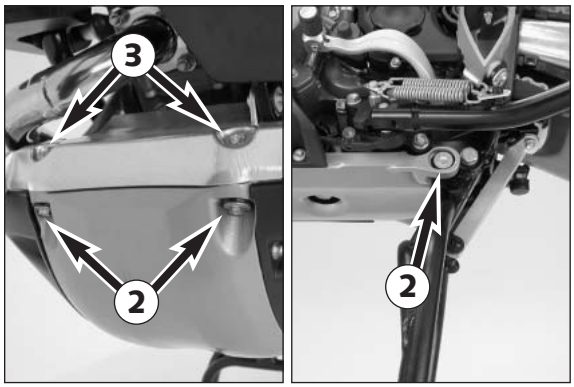
– Insert the carburetor in the carburetor connection boots, tighten the clamps on the carburetor connection boots and screw both side covers on the lower air filter box.
– Connect both vent hoses to the carburetors and fasten the choke cable ❼ with a cable clip (see photo).
– Insert the EPC hoses ❽ in the corresponding openings in the lower air filter box and connect to the carburetors.



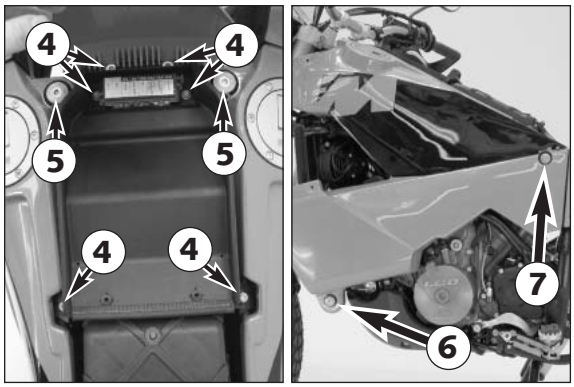
– Mount the air filter, position the intake trumpet ❾ and turn in a counter-clockwise direction.
– Mount the intake snorkel ❿ with the frame to the filter housing.
– Screw on the upper air filter box half. Connect the vent hose and the EPC hose.



– Fit the upper battery cover and place a battery with battery cover into the battery compartment.
– Fit the front battery compartment lid and connect both battery cables ❶ together to the connections on the front lid (start with the positive cable).
– Close the front battery compartment lid.



– Mount the underride protection, apply Loctite 243 to the 4 bolts ❷ (M8x14 collar bolts) and tighten to 25 Nm.
– Mount the front cover, apply Loctite 243 to both bolts ❸ (M8x16) and tighten to 25 Nm.

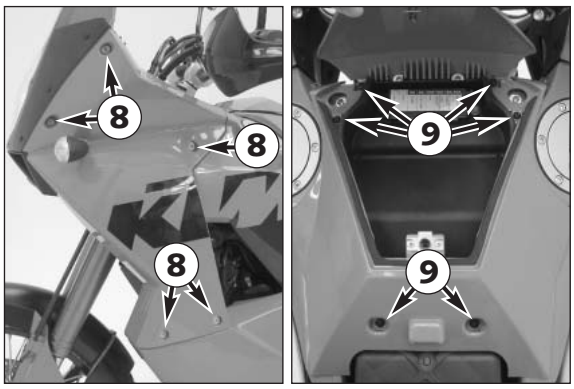


– Mount the lower tank compartment and screw on the fuse box ❹. Mount the fuse box cover.

– Fill cooling liquid into the radiator, compensating tank and engine: see page 12-16.

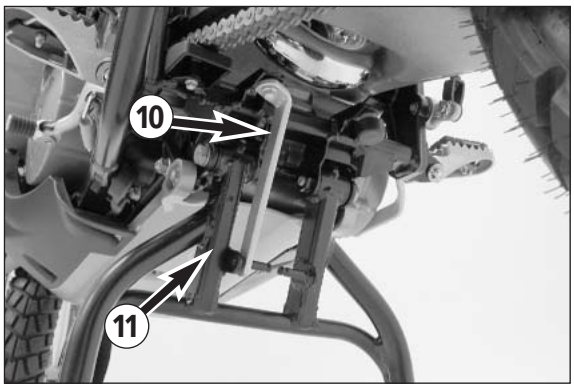
– Add engine oil: see page 12-5.

– Connect the fuel sender to the right tank. Connect the gasoline and vent hoses and mount the tanks.
– Screw in the upper ❺ (M8x40) and lower ❻ (M8x55) or ❼ (M8x50) fixing bolts and open the fuel cocks.



– Connect the front turn signal and attach the vent hoses to the tanks. Fasten both side covers with the bolts ❽ and tighten.

– Mount the upper tank compartment and fasten with the bolts ❾.
– Close the tank compartment lid and mount the seat.



– Remove the center stand lock ❿ 600.29.055.000, remount the left bump rubber and remove the center stand ⓫.

– Check all hose connections for leakage before you take a trial run.

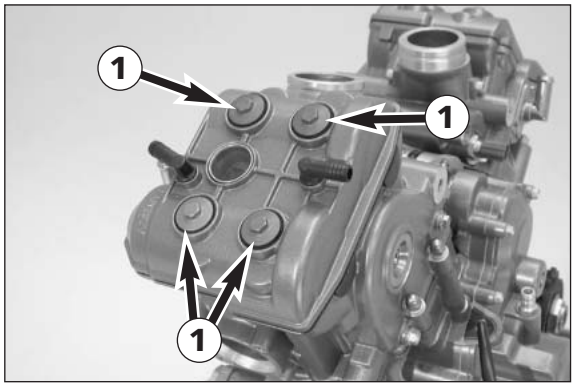
– Check all hoses, lines and cables for a proper fit.

DISASSEMBLING THE ENGINE 4

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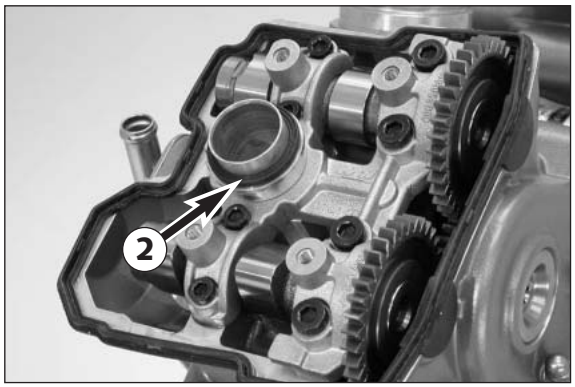
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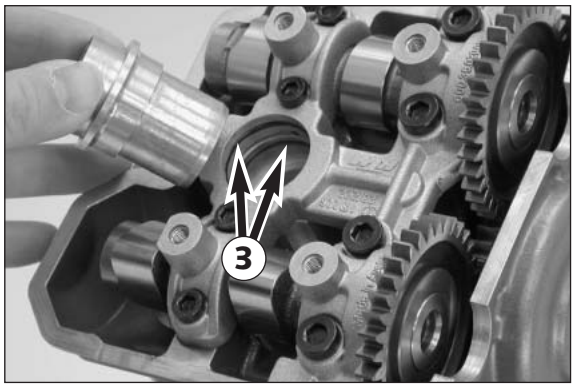
Clean the engine thoroughly on the outside prior to disassembling.
– Clamp the engine in the work stand using the special tool 600.29.002.000.

Valve covers

– Pull out the spark plug connectors.
– Unscrew the spark plugs using the special tool 600.29.073.000.
– Remove the bolts ❶ on the valve covers, remove both valve covers.

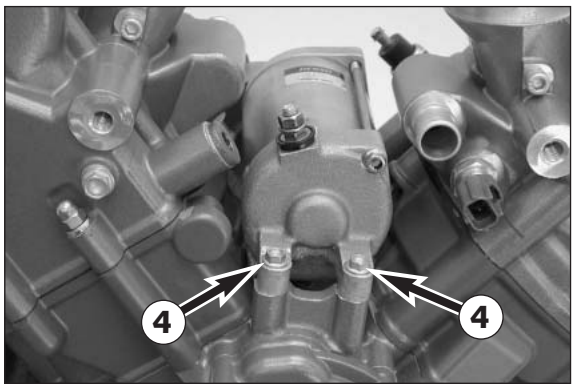


– Dismount the gaskets of the bolts, the valve covers and the spark plug shafts ❷.



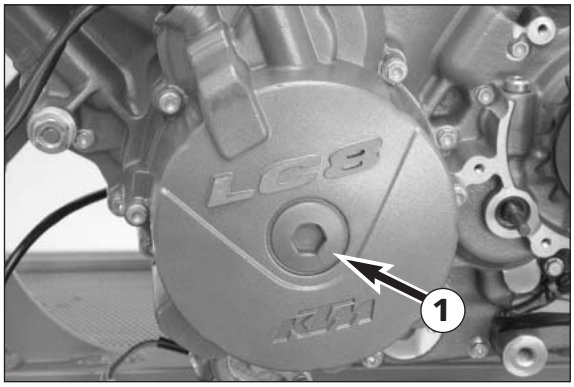
Spark plug shaft inserts

– Pull the spark plug shaft inserts out of the spark plug shafts (pry out carefully with 2 screwdrivers if necessary), remove the O-rings ❸ (2 pieces for each spark plug shaft) and discard.



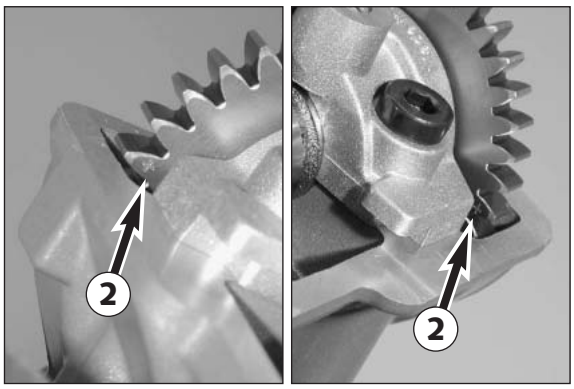
Starter motor

– Remove both bolts ❹ and pull the starter motor out of the case. The starter motor is sealed off with an O-ring on the case side.



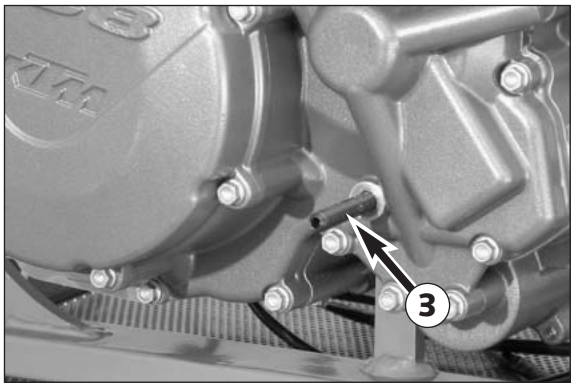
Setting cylinder rear to TDC

– Unscrew the plug ❶ from the generator cover to be able to turn the crankshaft.

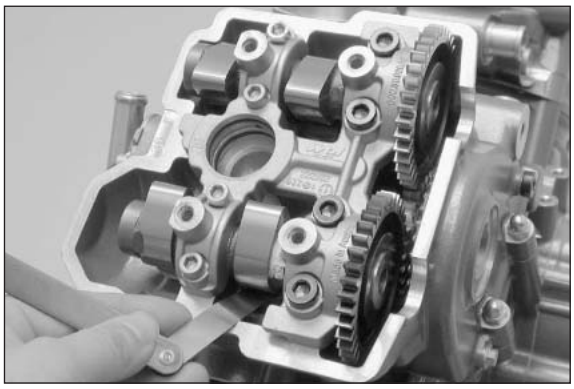


– Turn the crankshaft in a counterclockwise direction until the rear cylinder is in the TDC position. The marks ❷ (crosses) must coincide with the flat outer surface of the cylinder head at the camshaft gears.

NOTE: the camshaft gears are identical for both cylinders but have marks for cylinders rear and front. Match the respective mark to the respective cylinder, i.e. the crosses for cylinder rear and the circles for cylinder front.



– Remove the case bolt and screw in the special tool 0113 080802 ❸ to block the crankshaft.



Camshafts cylinder rear

– Check and note down the valve clearance before you dismount the camshafts.

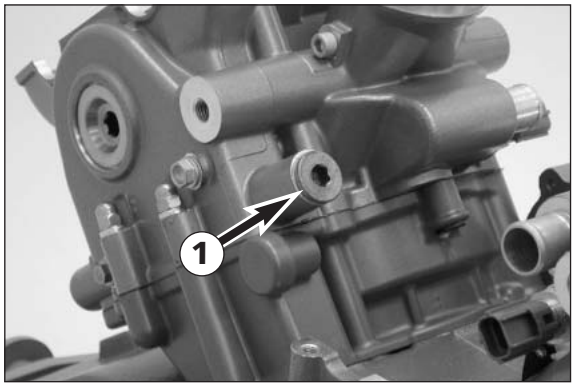
Valve clearance:	intake 0.125 - 0.175 mm
	exhaust 0.225 - 0.275 mm

– Loosen the bolts on the camshaft bearing bridge from the rear cylinder and carefully remove the camshaft bearing bridge.

! CAUTION !

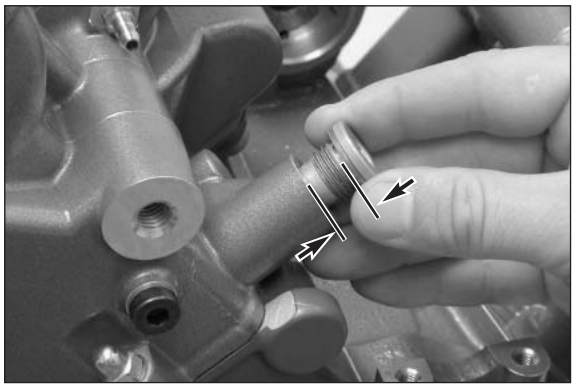
WHEN TIGHTENING THE BOLTS OF THE CAMSHAFT BEARING BRIDGE, MAKE SURE THAT THE VALVES ARE NOT ACTUATED BY THE CAMSHAFT (SEE ILLUSTRATION), OTHERWISE THE BEARING BRIDGE WILL BREAK.

– Remove the camshafts from the cylinder head without tilting.



Chain tensioner cylinder rear

– Remove the bolt from the chain tensioner ❶.

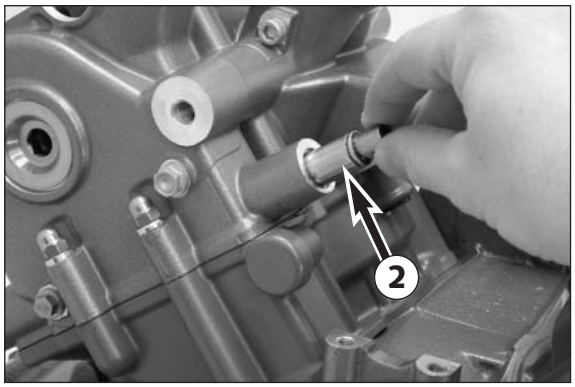


NOTE: measure the preload on the chain tensioner element before dismounting:

– Apply the chain tensioner bolt to the chain tensioner element without compressing the spring.
– Measure the distance between the sealing washer and the cylinder head.

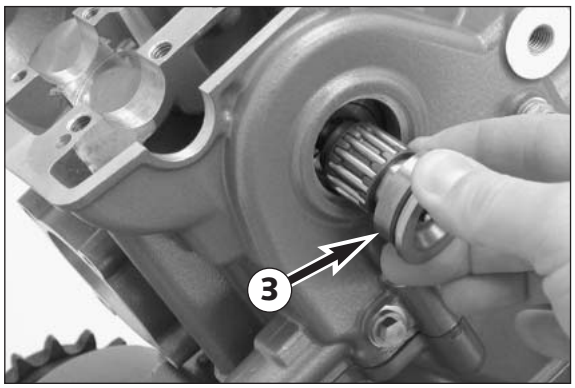
The measured value should be between 6 mm and 11 mm. If the value is lower, the tensioning rail could be worn or the timing chain excessively elongated. If it is higher, the engine was turned to TDC against the running direction.

– Remove the sealing washer.



– Pull out the chain tensioner element ❷.

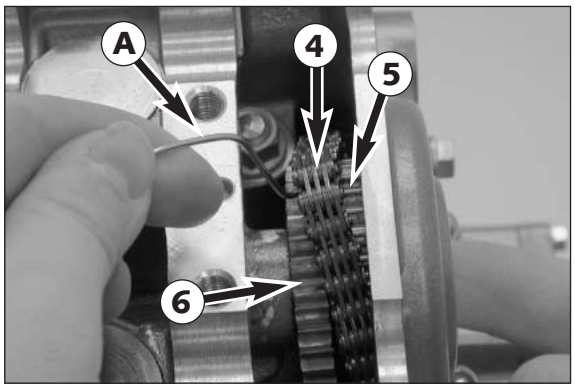
NOTE: the housing and the tensioning piston on the chain tensioner element are compression molded. If they fall apart during disassembly, the chain tensioner element must be replaced.



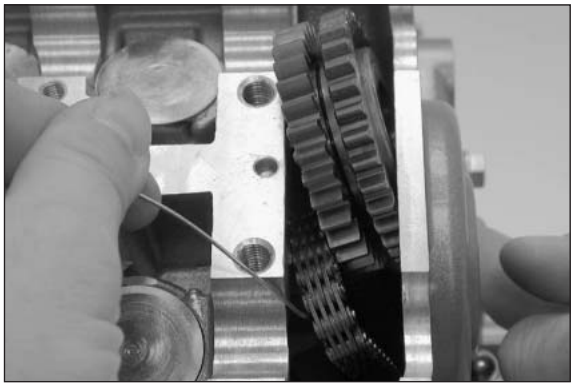
Timing chain cylinder rear

– Loosen the bearing bolt ❸ on the double timing gear and pull out of the cylinder head together with the needle bearing. The double timing gear will slide down slightly, relieving the timing chain.

– Remove the O-ring on the bearing bolt.

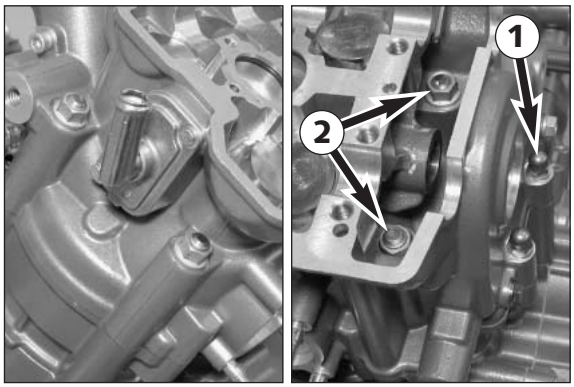


– Use a wire hook Ⓐ which you can bend from a piece of welding wire to lift the side of the chain ❹ towards the inside from the chain teeth ❺ over the gear teeth ❻ of the double timing gear. Hold the double timing gear towards the outside by inserting your finger through the hole in the bearing bolt.



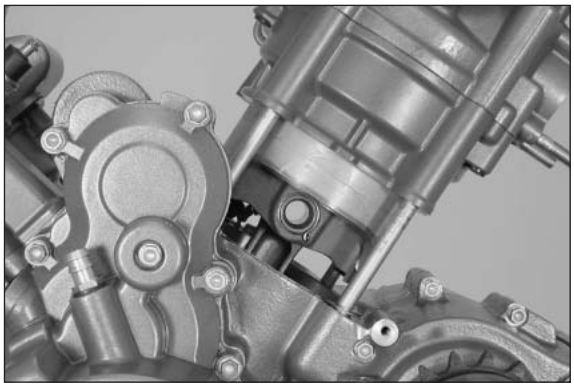
Double timing gear

– Lift the double timing gear out of the cylinder head, letting the chain fall into the slot.



Cylinder head rear with cylinder

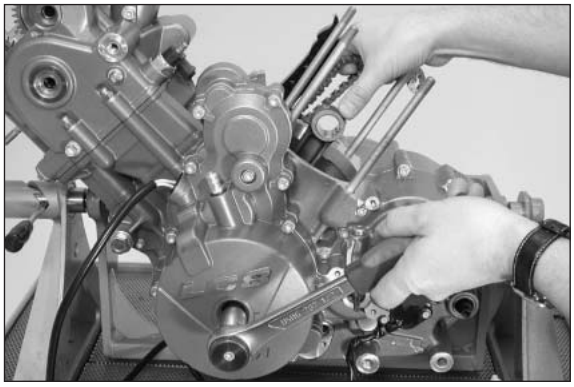
– Remove the outer nut ❶.
– Loosen the cylinder-head nuts crosswise. Special nut 600.29.083.000 is required for the inside nuts ❷.



– Pull the cylinder head and cylinder up until the piston-pin retainer can be lifted out of the groove on the generator side with a suitable screwdriver.

NOTE: the piston-pin retainer can easily be removed if the piston is held in place by the cylinder.

– Press the piston pins out of the piston by hand and remove the cylinder together with the piston.
– Discard the cylinder-base gasket.

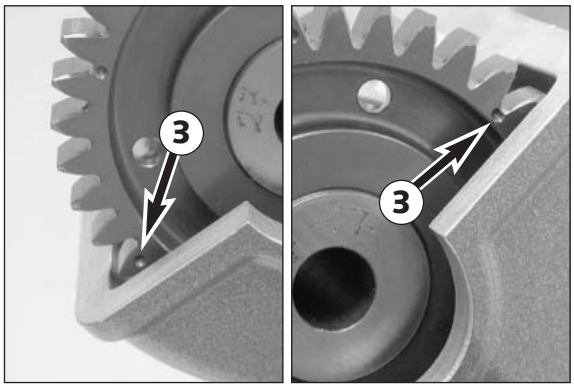


Setting cylinder front to TDC

Loosen the crankshaft locking bolt and continue to turn the engine towards the front cylinder's TDC position, keeping the timing chain on the rear cylinder slightly tensioned and holding the conrod in the center of the opening in the case.

! CAUTION !

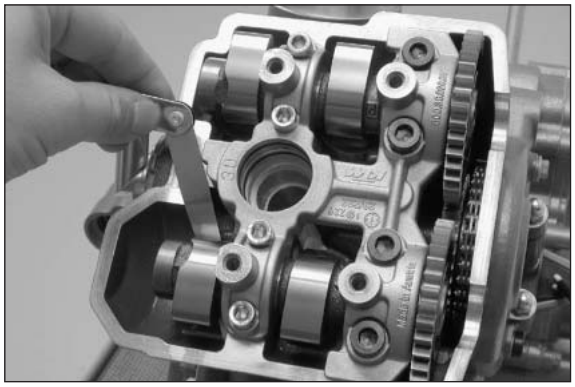
– IF YOU DO NOT HOLD THE CHAIN, IT MAY GET JAMMED BETWEEN THE TIMING GEAR OF THE BALANCER SHAFT AND THE TENSIONING RAIL.
– IF THE CONROD IS NOT POSITIONED IN THE CENTER OF THE OPENING IN THE CASE, THE CONROD BOTTOM WILL BLOCK ON THE BALANCER SHAFT AND PREVENT THE CRANKSHAFT FROM TURNING.



– Turn the crankshaft until the front cylinder is in the TDC position. The marks ❸ (circles) must coincide with the flat outer surface of the cylinder head at the camshaft gears.

– The same camshaft gears are used in both cylinders but they have marks for cylinder rear and front. Use the camshaft gear marked with a cross for cylinder rear and the camshaft gear marked with a circle for cylinder front cylinder.

– Block the crankshaft again.



Camshafts cylinder front

– Check and note down the valve clearance before you dismount the camshafts.

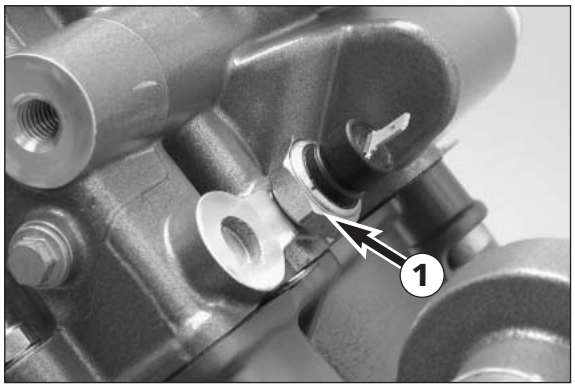
Valve clearance: intake 0.125 - 0.175 mm
exhaust 0.225 - 0.275 mm

– Loosen the bolts on the camshaft bearing bridge from the front cylinder and carefully remove the camshaft bearing bridge.

! CAUTION !

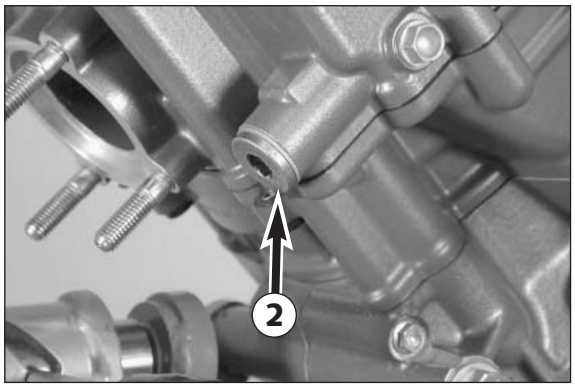
WHEN TIGHTENING THE BOLTS OF THE CAMSHAFT BEARING BRIDGE, MAKE SURE THAT THE VALVES ARE NOT ACTUATED BY THE CAMSHAFT (SEE ILLUSTRATION), OTHERWISE THE BEARING BRIDGE WILL BREAK.

– Remove the camshafts from the cylinder head without tilting.



Oil pressure switch

– Loosen the oil pressure switch ❶ and unscrew. Discard sealing washer.

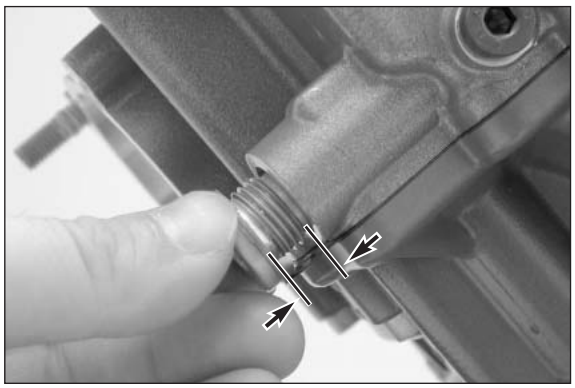


Chain tensioner cylinder front

– Remove the bolt on the chain tensioner ❷.

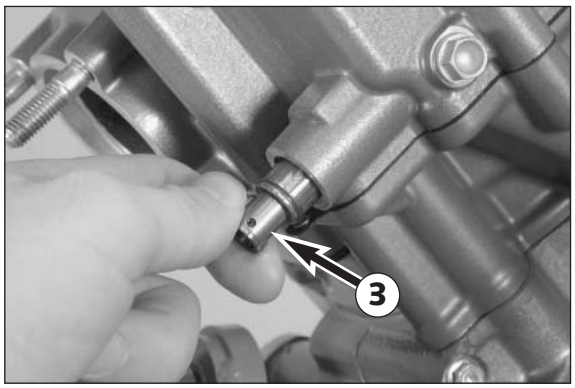
NOTE: measure the preload on the chain tensioner element before dismounting:

– Apply the chain tensioner bolt to the chain tensioner element without compressing the spring.
– Measure the distance between the sealing washer and the cylinder head.



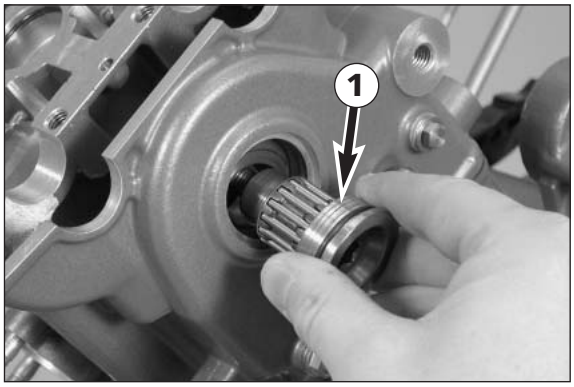
The measured value should be between 6 mm and 11 mm. If the value is lower, the tensioning rail could be worn or the timing chain excessively elongated. If it is higher, the engine was turned to TDC against the running direction.

– Remove the sealing washer.



– Pull out the chain tensioner element ❸.

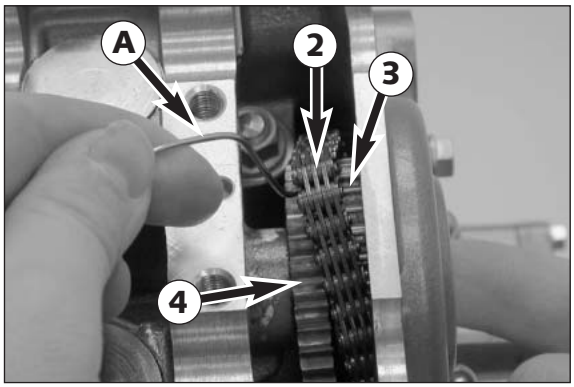
NOTE: the housing and the tensioning piston on the chain tensioner element are compression molded. If they fall apart during disassembly, the chain tensionerelement must be replaced.



Timing chain cylinder front

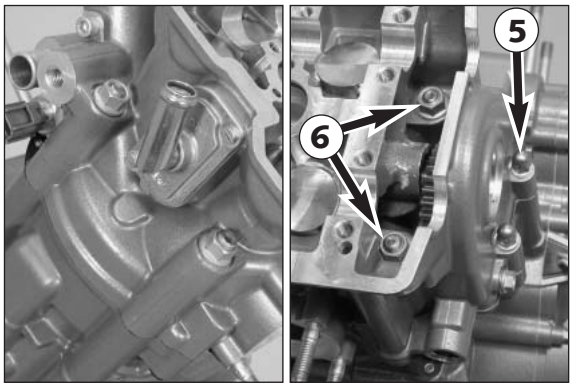
– Loosen the bearing bolt ❶ on the double timing gear and pull out of the cylinder head together with the needle bearing. The double timing gear will slide down slightly, relieving the timing chain.

– Remove the O-ring on the bearing bolt.



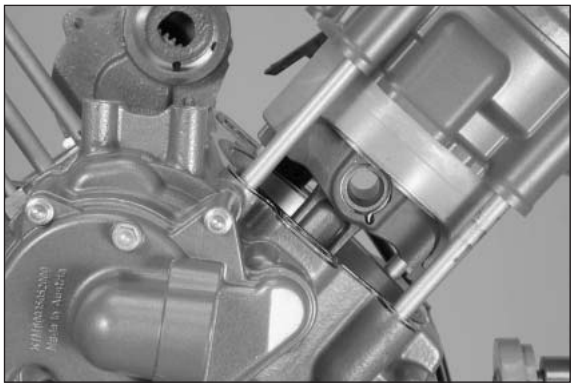
– Use a wire hook Ⓐ which you can bend from a piece of welding wire to lift the side of the chain ❷ towards the inside from the chain teeth ❸ over the gear teeth ❹ of the double timing gear. Hold the double timing gear towards the outside by inserting your finger through the hole in the bearing bolt.

– Lift the double timing gear out of the cylinder head, letting the chain fall into the slot.



Cylinder head front with cylinder

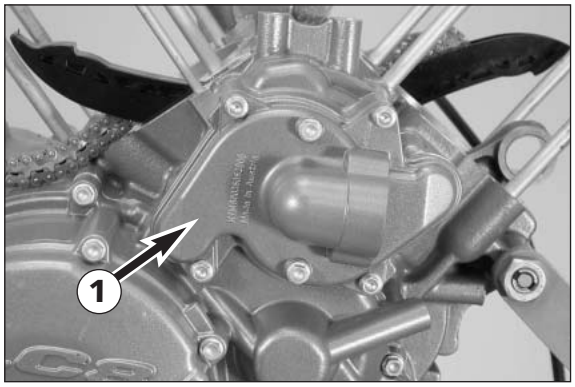
– Remove the outer nut ❺.
– Loosen the cylinder-head nuts crosswise. Special nut 600.29.083.000 is required for the inside nuts ❻.



– Pull the cylinder head and cylinder up until the piston-pin retainer can be lifted out of the groove on the clutch side with a suitable screwdriver.

NOTE: the piston-pin retainer can easily be removed if the piston is held in place by the cylinder.

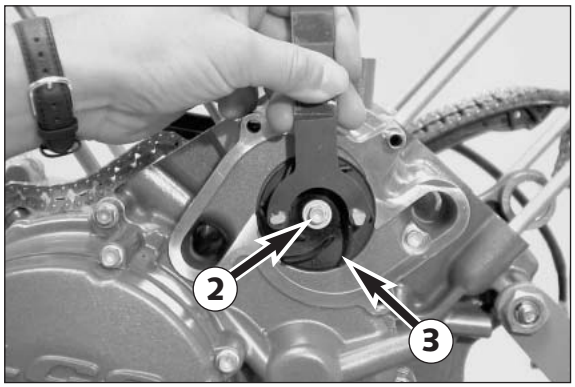
– Press the piston pins out of the piston by hand and remove the cylinder together with the piston.
– Discard the cylinder-base gasket.



Water pump

– Remove the water pump cover ❶, discard the O-ring gasket.

NOTE: also remove the 2 dowel pins used to keep the water pump cover in a central position.

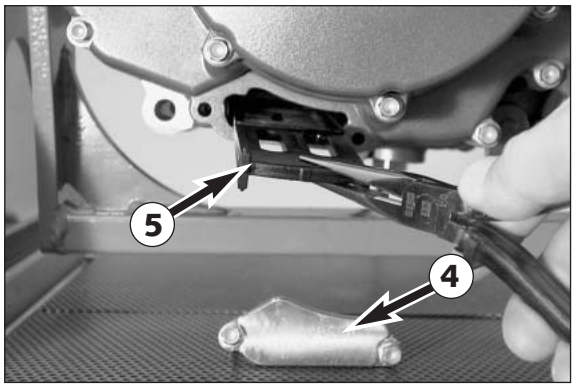


– Hold the water pump wheel with special tool 600.29.082.000, remove the bolt ❷ and pull the water pump wheel ❸ off of the shaft.

NOTE:
– The bolt and the water pump wheel only need to be removed if the water pump will be serviced. They do not need to be removed if you are only dismounting the clutch cover.
– If the water pump wheel cannot be removed because it is being held by residual thread adhesive, the water pump shaft and the water pump wheel can be pressed out from the inside later.

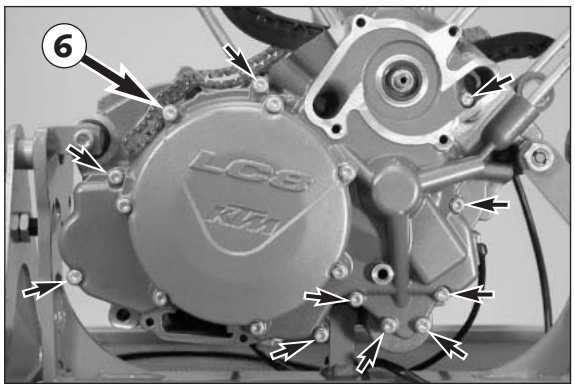
! CAUTION !

IF YOU TRY TO LOOSEN THE BOLT ON THE WATER PUMP WITHOUT USING SPECIAL TOOL 600.29.082.000, YOU MAY BREAK THE DRIVER ON THE BALANCER SHAFT OR WATER PUMP SHAFT.



Oil screen

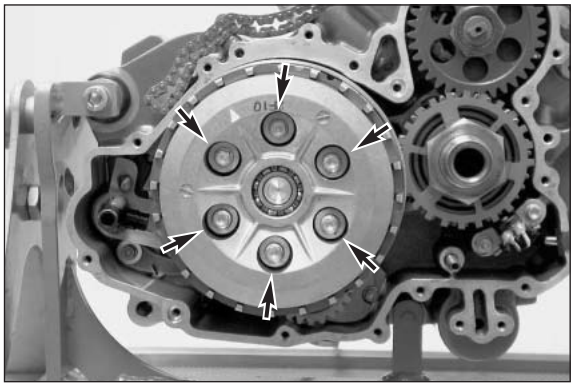
– Remove the oil screen cover ❹.
– Carefully pull the oil screen ❺ out of the clutch cover with a pair of pliers.



Clutch cover

– Remove the bolts and detach the inner clutch cover together with the outer clutch cover. Be careful not to lose the dowel pins.

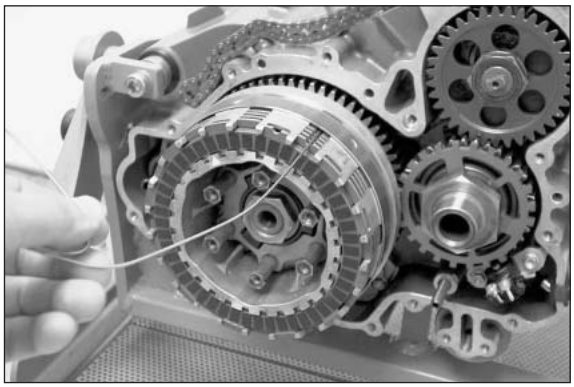
NOTE:
– The outer clutch over can remain on the inner clutch cover if you also remove the bolt ❻ on the outer clutch cover.
– If the case bolt for the blocking hole is still mounted, it must also be removed.



Clutch

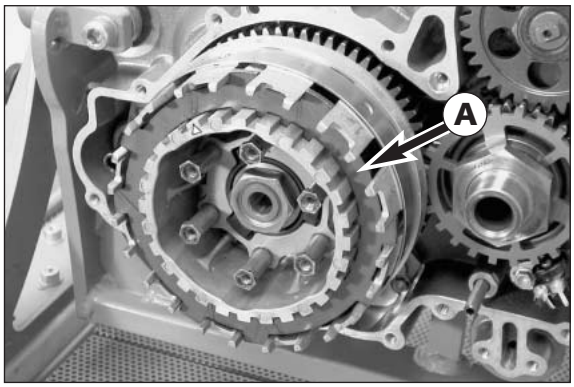
– Remove the bolts on the clutch springs crosswise and lift off the pressure cap.

– Pull out the clutch push rod.

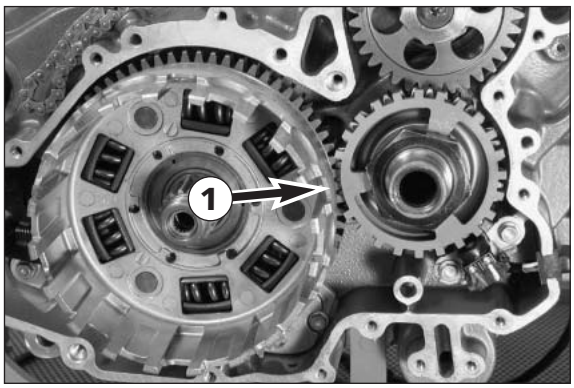


– Insert a wire hook in the recess in the clutch disks and pull all of the clutch disks out of the clutch hub.

NOTE: leave the spring washer and supporting ring in the clutch. They will be detached together with the inner clutch hub, at which time they can be easily removed.

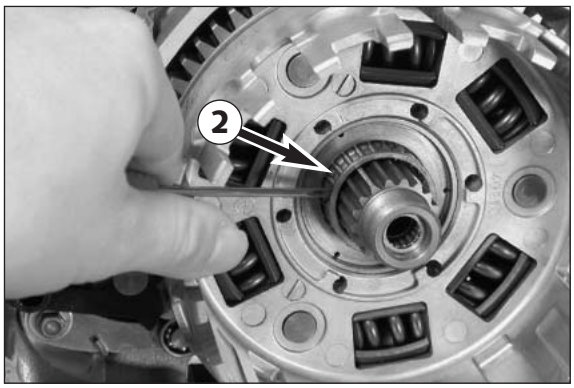


– Slip on the holder for the inner clutch hub Ⓐ 600.29.003.000, counteract the inner clutch hub and loosen the nut.
– Pull off the inner clutch hub together with the clutch pressure booster and the underlying washer, which usually adheres to the inner clutch hub.



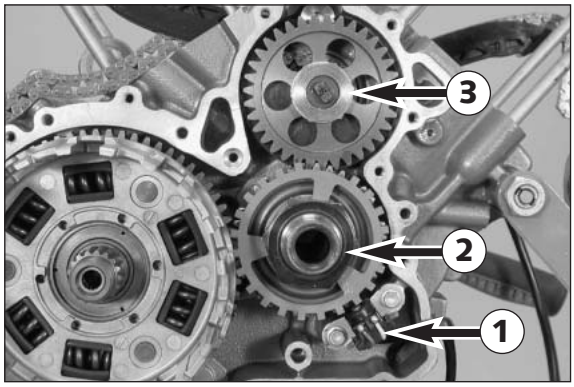
NOTE: you do not need to dismount the primary pinion if you are only replacing the outer clutch hub:

– Remove the engine locking bolt 0113 080802.
– Continue turning the crankshaft until the flat part of the pickup ring ❶ coincides with the teeth on the outer clutch hub.



– Pull the needle bearing ❷ out of the outer clutch hub with a suitable screwdriver, carefully pushing the outer clutch hub back and forth.
– Press the outer clutch hub away from the primary pinion and remove.

NOTE: the gear for the oil pump drive is located on the back of the outer clutch hub and can easily fall down.

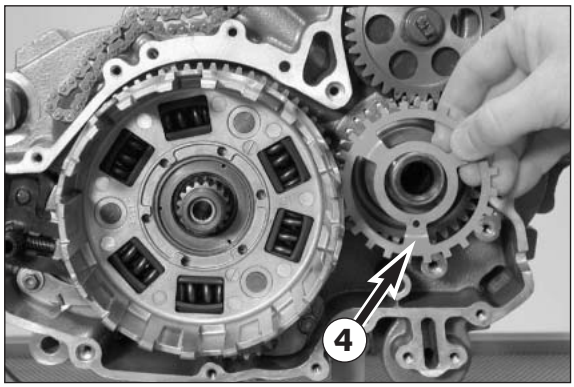


Primary pinion and clutch

If you are completely dismounting the engine, the primary pinion must be detached before you remove the clutch.

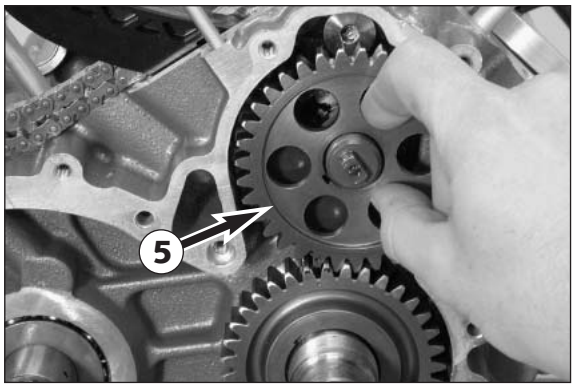
– Mount the special tool 0113 080802 (engine locking bolt) and hold the crankshaft in the rear or front cylinder's TDC position.

– Unscrew the pickup ❶.
– Loosen the nut ❷ of the primary pinion (A/F 46 mm, LH thread) and remove together with the washer.
– Loosen the nut ❸ of the balancer shaft (A/F 30 mm) and remove together with the washer.

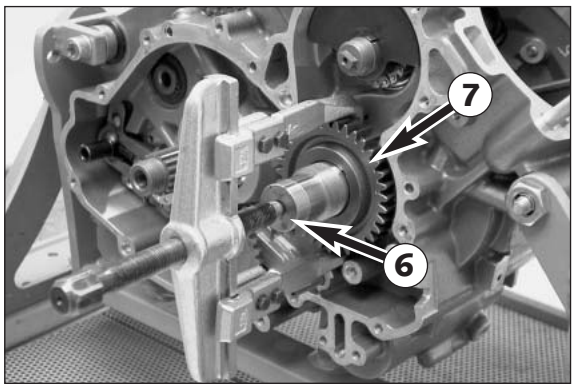


– Pull the outer clutch hub away from the case until the pickup ring ❹ can be removed. It is secured by a pin.
– Completely remove the outer clutch hub together with the needle bearing.

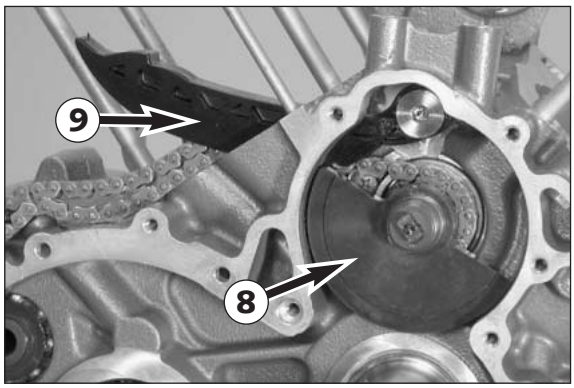
NOTE:
– The gear for the oil pump drive is located on the back of the outer clutch hub and can easily fall down.
– Remove the spacing washer inserted between the gear for the oil pump drive and the bearing which may adhere to the bearing.



– Pull off the gear on the balancer shaft ❺.

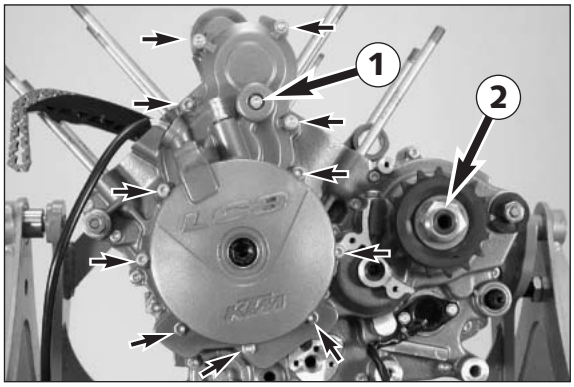


– Insert the pressure tool 600.29.031.000 ❻ in the hole in the crankshaft and pull off the primary gear ❼ from the crankshaft using the puller 600.29.033.000.



– Remove the balance weight ❽ from the balancer shaft; carefully pry the woodruff key out of the shaft groove with a screwdriver.
– Slip off the timing chain and pull the engine sprocket off of the balancer shaft.
– Unscrew the chain tensioning rail ❾.

NOTE: if you intend to reuse the timing chain, engine sprocket and chain tensioning rail, mark the running direction and the cylinder allocation.

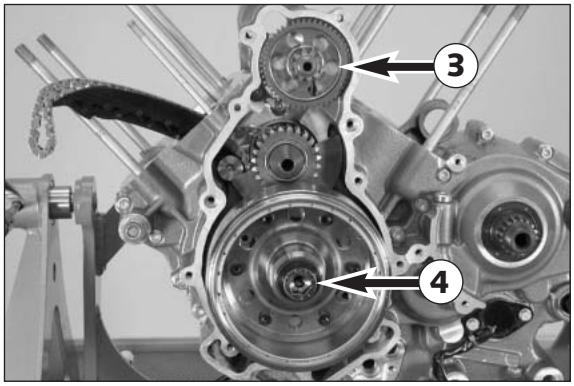


Generator cover

– Loosen all of the bolts on the generator cover except the bolt on the starter idler shaft ❶ and remove the generator cover, being careful not to lose the dowel pins. Discard the gasket.

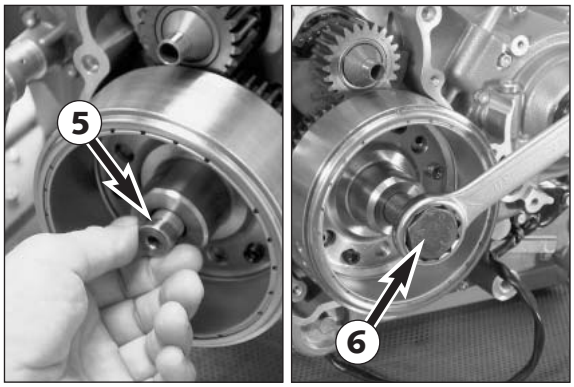
NOTE: the rotor's magnetic retaining force will prevent the cover from being removed easily.

– Unscrew the nut ❷ and remove the engine sprocket together with the lock washer.



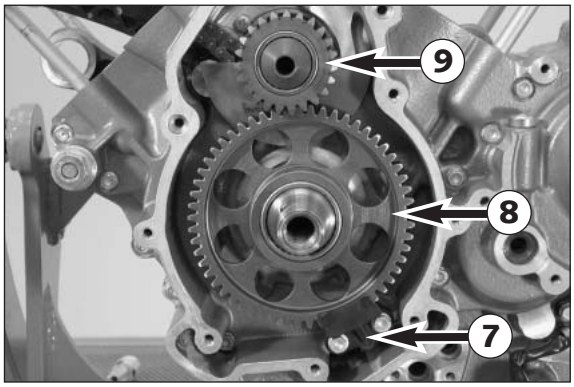
Rotor

– Remove the upper starter idler gear ❸.
– Remove the rotor bolt ❹ and the washer.



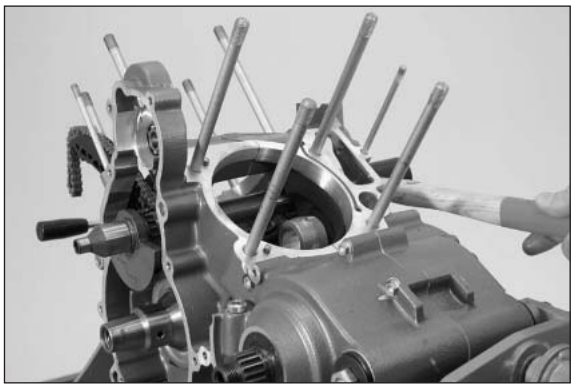
– Screw the pressure bolt 600.29.009.010 ❺ in the crankshaft.

– Pull the rotor off of the crankshaft using the puller 600.29.009.000 ❻; remove the pressure bolt and the engine locking bolt.



Freewheel

– Remove the freewheel lock ❼ and lift the freewheel ❽ of the crankshaft.
– Pull the lower starter idler gear ❾ from the balancer shaft.



Balancer shaft

– Gently tap the balancer shaft off on the clutch side with a rubber hammer.

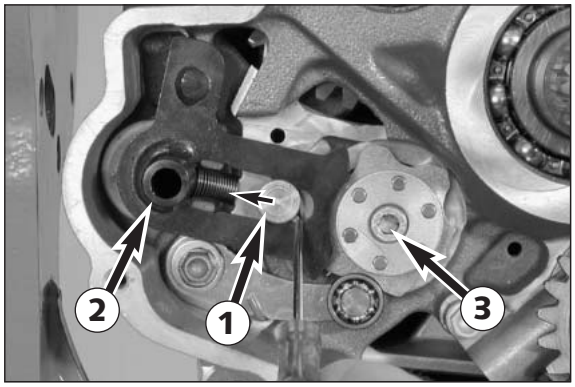
! CAUTION !

– MAKE SURE THE TIMING CHAIN DOES NOT GET CAUGHT.

NOTE: a stop disk is located on the outside of the roller bearing on the balancer shaft (on the clutch side) which should be removed before the balancer shaft is dismounted.

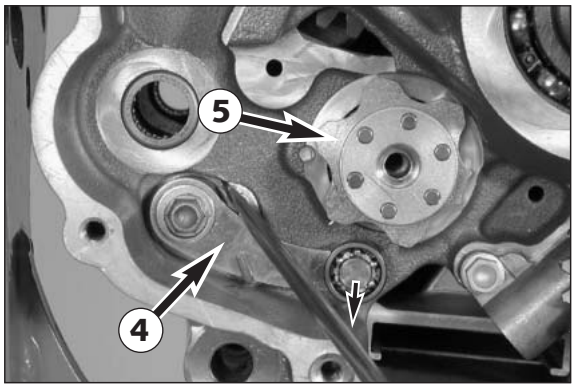
– Remove the timing chain and unscrew the tensioning rail.

NOTE: if you intend to reuse the timing chain and chain tensioning rail, mark the running direction and the cylinder allocation.

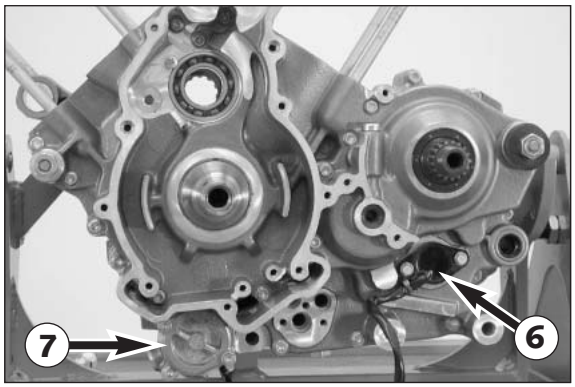


Shift mechanism

– Push the shift rail ❶ away from the shift locating drum and pull out the shift shaft ❷.
– Remove the bolt ❸ from the shift locating drum.

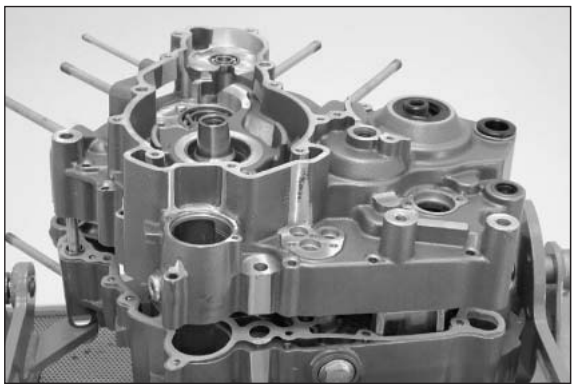


– Press the locking lever ❹ down to relieve the shift locating drum ❺, remove the shift locating drum.
– Loosen the bolt and remove the locking lever ❹ (not required for further engine removal).



Engine case half

– Remove the gear shift sensor ❻ with the pin and spring. Unscrew the oil filter cover ❼, discarding the gasket on the oil filter cover and the oil filter.
– Unscrew all HH bolts accessible from the generator side.

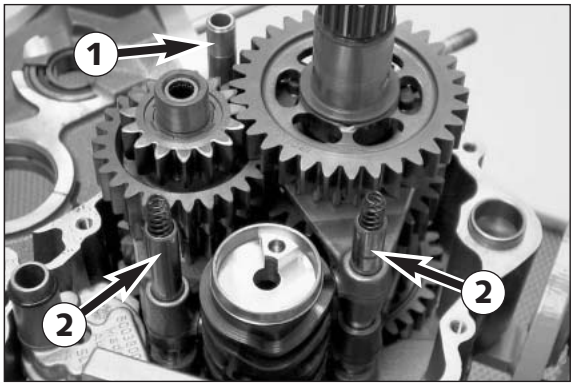


– Tilt the case horizontally with the generator side up.
– Lift the case half of the generator side while lightly tapping the drive shaft with a rubber hammer. If necessary, tap the drive shaft downwards.

! CAUTION !

– DO NOT USE A SCREWDRIVER OR SIMILAR TOOL TO PRY THE CASE HALVES APART SINCE THIS MAY DAMAGE THE SEALING AREAS.

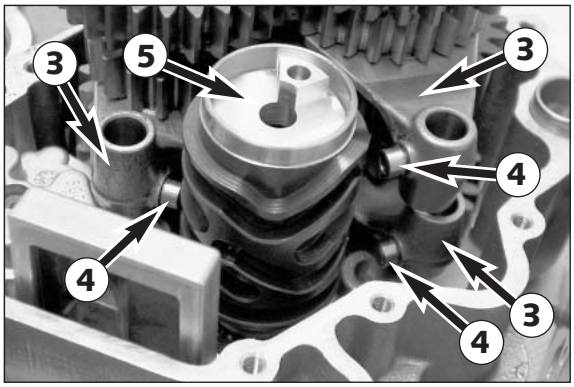
– Discard the case gasket.
– Remove the crankshaft from the case.



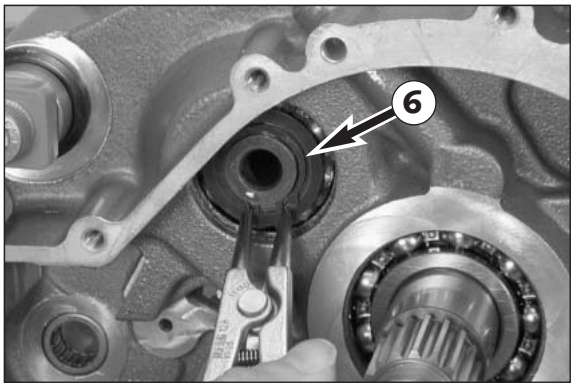
Transmission

– Remove the oil rail ❶ for the transmission lubrication. It is secured at the bottom to keep it from twisting.

– Pull out the shift rails ❷ together with the upper shift rail springs.



– Tilt the shift forks ❸ to the side; watch the shift rollers ❹ while you remove the shift drum ❺.
– Remove the shift forks and the lower springs of the shift rails.

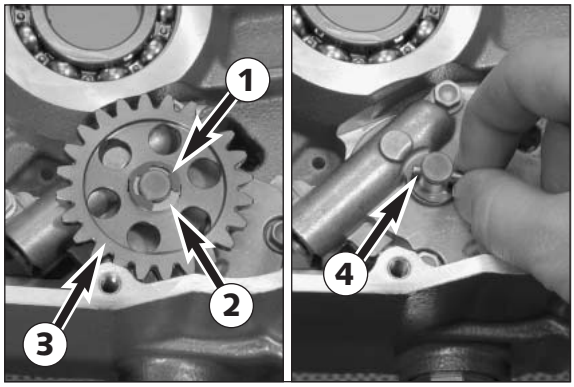


– Bring the engine into a vertical position (mounting position) and remove the lock ring ❻ and washer from the countershaft.



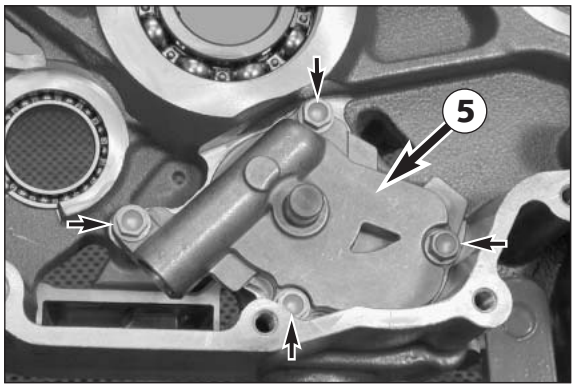
– Simultaneously pull both transmission shafts out of the bearing seats.

NOTE: also remove the spacing washer on the countershaft which often adheres to the bearing.



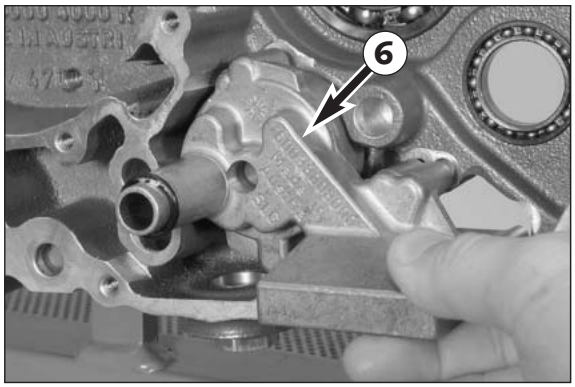
Oil pumps

– Remove the lock ring ❶ from the oil pump shaft; remove the spacing washer ❷ and oil pump gear ❸.
– Pull the needle roller ❹ out of the pump gear and remove the washer underneath.

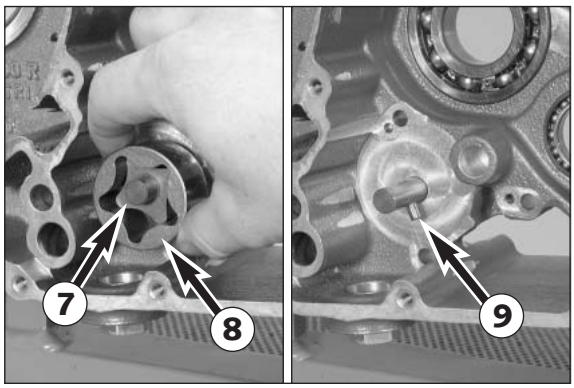


– Loosen the bolts on the outer oil pump ❺ (pressure pump) and remove the oil pump housing.

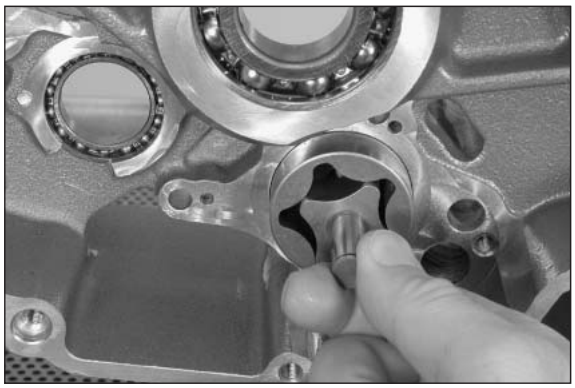
NOTE: the centering pins are usually retained in the oil pump housing; if they are retained, pull them out with pliers.



– Remove the inner oil pump ❻ (suction pump).



– Remove the suction pump's inner and outer rotor (❼ and ❽) from the oil pump shaft.
– Pull the needle roller ❾ out of the oil pump shaft.



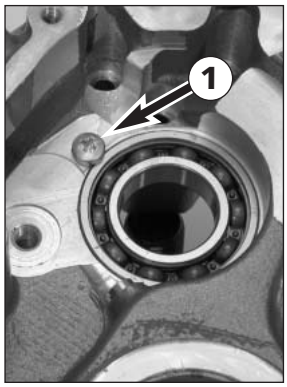
– Pull the oil pump shaft and the two pressure pump rotors out of the engine housing.
– Remove both rotors from the oil pump shaft and pull out the needle roller.

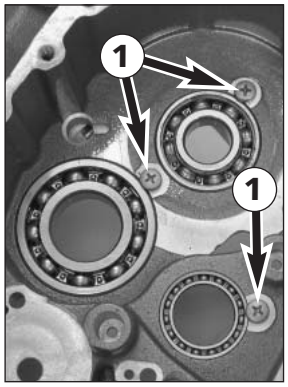
SERVICING INDIVIDUAL COMPONENTS 5

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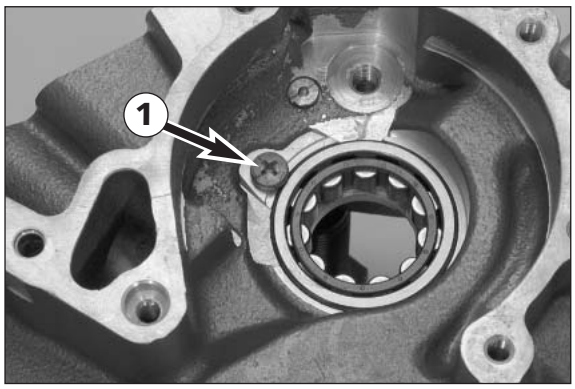
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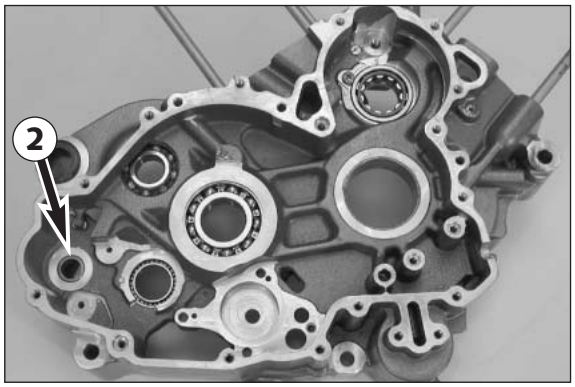




Replacing the roller bearing

– Remove all bearing locking screws ❶ from both case halves.



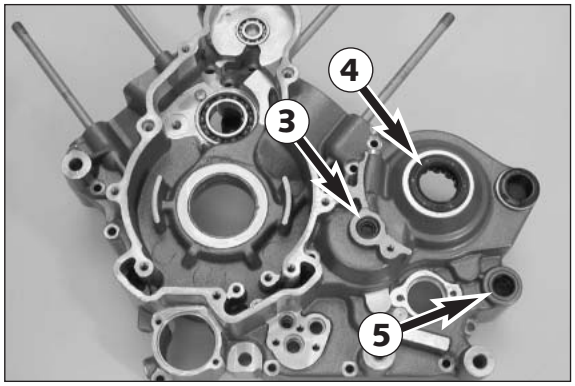


– Remove all shaft seal rings and the dowel pins from the case halves.

Heat both case halves evenly in an oven at 150° C; the roller bearings will fall out of the case by themselves. If any roller bearings should be left in the case, tap the case lightly on a flat wooden surface.

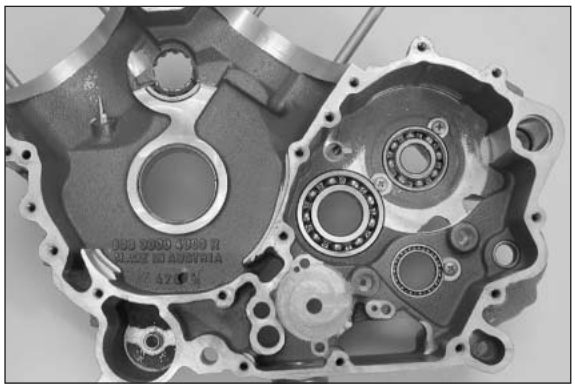
NOTE: the shift shaft bearing ❷ must be pressed out with the pressing tool 600.29.043.030, although this bearing is usually highly resistant to wear.

– Replace all of the roller bearings. The new roller bearings can be inserted by hand until flush as soon as the case temperature has reached approx. 150° C. The roller bearings should fit tightly after cooling down. Use a mandrel to carefully press in any bearings that are not flush with the surface.

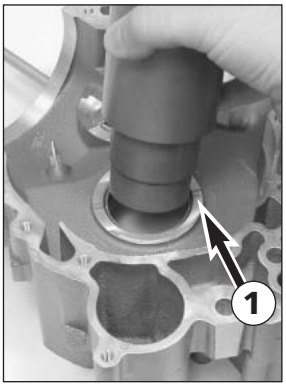


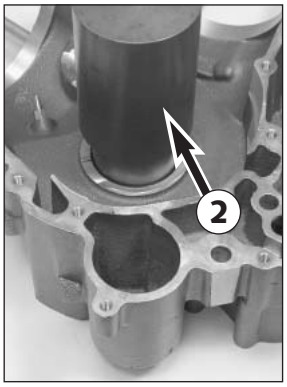
NOTE: the shift shaft bearing ❷ must be pressed in flush with the pressing tool 600.29.043.030.

– Press in the shaft sealing ring ❸ for the push rod until flush using the special tool 600.29.043.010.
– Press in the shaft sealing ring for the countershaft ❹ until flush using the special tool 600.29.043.020.
– Press in the shaft sealing ring for the shift shaft ❺ until flush using the special tool 600.29.043.030.



– Apply Loctite 243 to all bearing locking screws ❶ and tighten to 6 Nm.

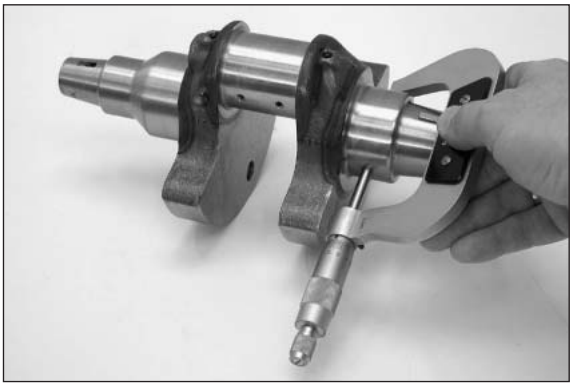




Replacing the main bearings-general information

NOTE:
- The bearing shells for the friction bearings are pressed in and out in a cold state.
- Mark the position of the bearing end gap ❶ on the engine case with a felt-tip pin to facilitate reassembly.

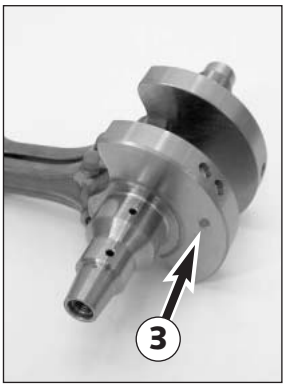
- Press the main bearing shells out of both engine case halves from the inside to the outside using the press mandrel 600.29.044.050 ❷ (smaller diameter).



Before you select the bearing shells you must measure the crankshaft.
- Measure the diameter of the two main bearing pins at 3 points that are 120° apart using a micrometer gauge. This only applies to crankshafts that you will continue to use.

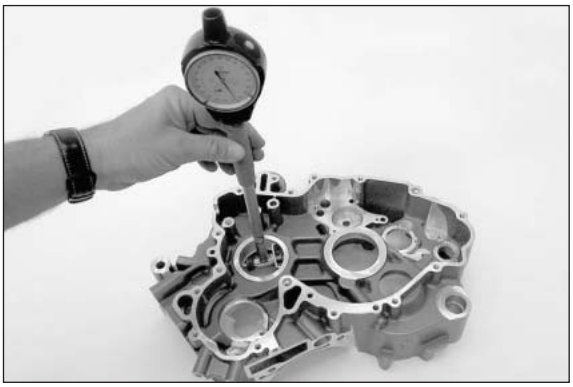
Diameter of main bearing pin: 49.965 mm – 49.975 mm (yellow)
49.976 mm – 49.985 mm (blue)
49.986 mm – 49.995 mm (red)

NOTE:
- Use the bearing color indicated for the respective measurement.
- The crankshaft must be replaced if the measurement falls short of the minimum diameter or if the crankshaft is worn.
- New crankshafts do not need to be measured. Use new bearings according to the colored circles ❸ marked on the crankshaft web of the new crankshaft.





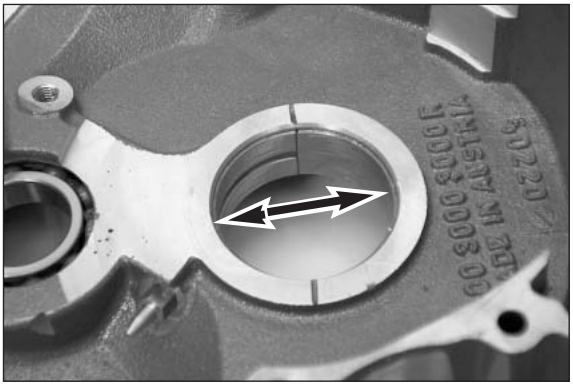
NOTE: there are 2 types of bearings for each bearing color – the grooved bearing shell (with the lubricating groove and oil bore) is pressed into the top of the case half of the generator end and the smooth bearing shells (without lubricating groove) are pressed into the bottom of the case half of the generator end and into the case half of the output end



- Measure the bearing bores with a micrometer to ensure that the bearing shells are seated firmly in the engine case after being pressed in.

Nominal dimension: 54.000 mm – 54.015 mm

NOTE: if the bearing bores are too big, the engine case must be replaced.

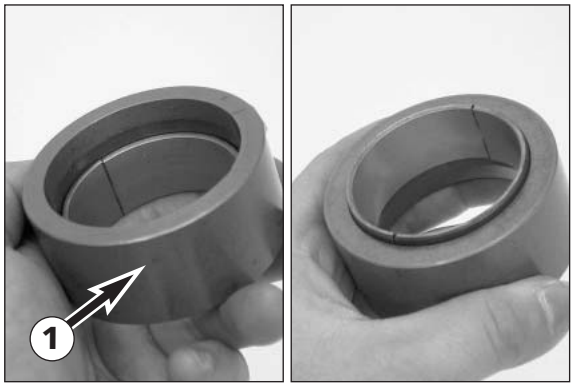


Measure the inner diameter of the bearings after they are pressed in to ensure that the bearing clearance is correct.

NOTE: the inner diameter of the bearings must be measured at a 90° angle to the bearing end gap.
The diameter of the main bearing pin must be deducted from the inner diameters of the bearings, the difference is the radial clearance of the main bearing.

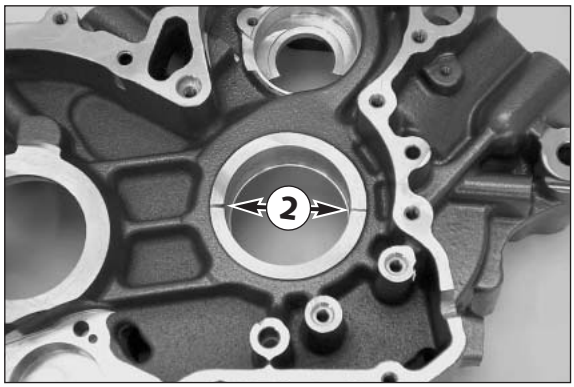
Setpoint value for the radial clearance of the main bearing:
0.025 mm – 0.055 mm
Wear limit: 0.080 mm

Example: Inner bearing diameter measured 50.020 mm
Main bearing pin measured 49.980 mm
50.020 – 49.980 = 0.040 mm radial clearance

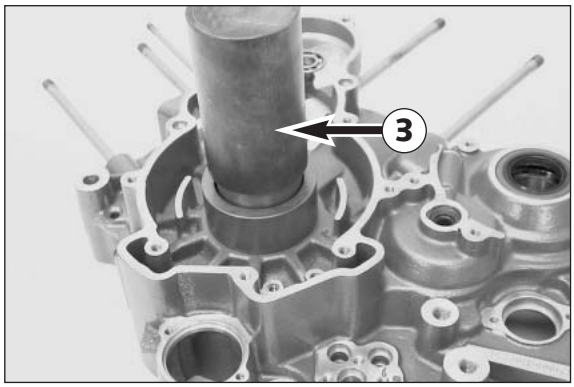


Replacing bearing shells, output end

– Center the new bearing shells (both smooth) with the assembling sleeve 600.29.044.050 ❶. The assembling sleeve is beveled on one side so the bearing shells can be pushed in easily. The bearing shells should protrude 1-2 mm on the other side of the assembling sleeve to make it easier to position them in the engine case.



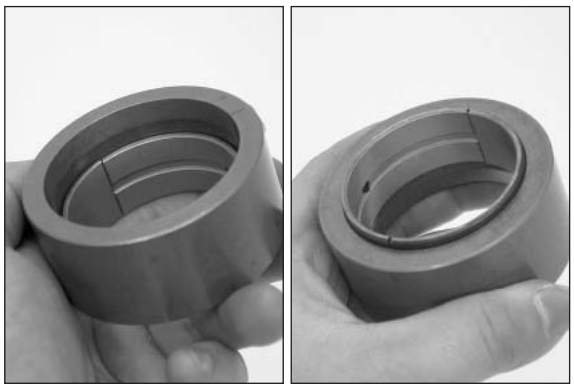
– Position the bearing shells on the output end of the case such that the end gap on the bearing shells points to the marks ❷ made when disassembling.



– Press in the bearings from the outside to the inside through the assembling sleeve up to the stop using the press mandrel 600.29.044.050 ❸.

! CAUTION !

– ALWAYS PRESS IN BEARING SHELLS FROM THE OUTSIDE TO THE INSIDE OTHERWISE THEY WILL NOT BE POSITIONED CORRECTLY AND THE BEARING RADII OF THE CRANKSHAFT WEBS WILL PRESS AGAINST THE BEARING SHELLS. THIS IS WHY THE BEARING SHELLS ARE SEATED 2 MM BELOW THE EDGE OF THE BEARING BORE.
– THE ASSEMBLING SLEEVE SERVES AS A STOP. IT IS NOT REMOVED UNTIL THE BEARING SHELLS ARE SEATED IN THE CORRECT POSITION.

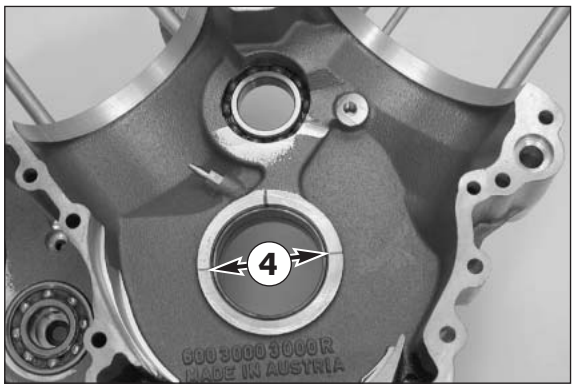


Replacing bearing shells, generator end

– Center the new bearing shells (smooth – on the bottom, grooved – on the top) with the assembling sleeve 600.29.044.050 – same procedure as for the bearing shells, output end (see above).
– Position the bearing sleeves at the generator end of the case with the bearing shell end gap pointing to the marks ❹ made when disassembling. Do not cover the oil bore.
– Press the bearings into the engine case half from the outside to the inside through the assembling sleeve up to the stop using the special tool 600.29.044.050.

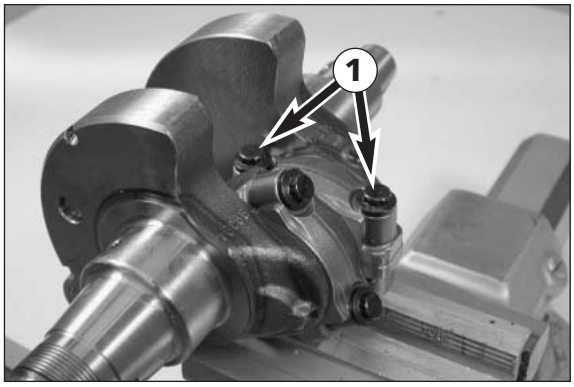
! CAUTION !

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– THE ASSEMBLING SLEEVE SERVES AS A STOP. IT IS NOT REMOVED UNTIL THE BEARING SHELLS ARE SEATED IN THE CORRECT POSITION.
– IF THE BEARING SHELLS ARE INCORRECTLY ALIGNED OR IF SMOOTH BEARING SHELLS ARE PRESSED IN ON TOP, THE OIL SUPPLY TO THE SPRAYING NOZZLES TO COOL THE PISTONS AND LUBRICATE THE TIMING CHAIN WILL BE INTERRUPTED, LEADING TO SERIOUS ENGINE DAMAGE.



NOTE:
– After replacing all friction and roller bearings, dismount the spraying nozzles and oil nozzles and clean the oil ducts with compressed air to make sure they are not clogged.
– Coat the friction bearings with Molycote grease.

Apply Loctite 243 to the spraying nozzles and oil nozzles and tighten to 10 Nm.



Replacing the conrod bearings

– Clamp each conrod in a vise using protective jaws.
– Loosen the bolts ❶ on the conrod bearing covers with the special wrench socket 600.29.075.000 and remove the bearing covers.

NOTE: mark the conrod caps to ensure that each cap is mounted to the same conrod when it is measured and assembled.

– Remove the conrod caps.
– Clean the crankshaft and blow compressed air through the lubrication bores.



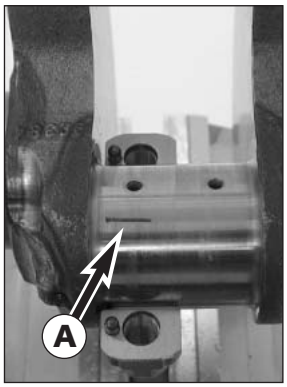
Selecting the bearing shells

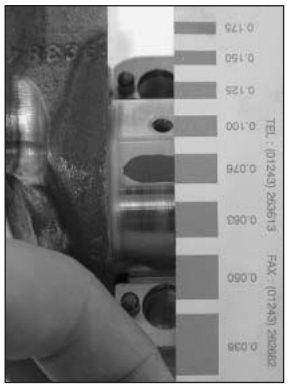
Before you select the new bearing shells you must measure the conrod journal.

– Measure the diameter of the conrod journal at 3 points that are 120° apart using a micrometer gauge.

Diameter of the conrod journal: 41.990 mm – 42.000 mm (blue)
42.001 mm – 42.011 mm (red)

NOTE:
– Use the bearing color indicated for the respective measurement.
– The crankshaft must be replaced if the measurement falls short of the minimum diameter or if the crankshaft is worn.





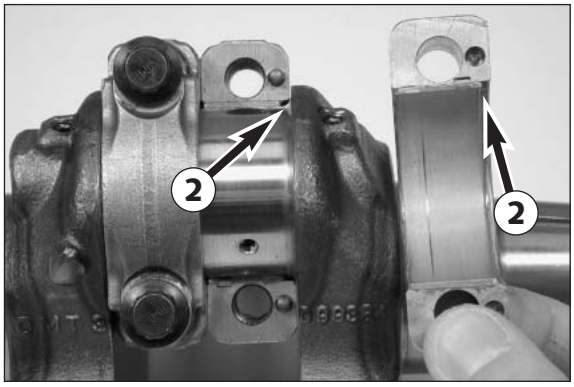
– Clamp each conrod in a vise, insert new bearing shells, position the crankshaft with a plastigauge measuring strip ❹ (600.29.012.000) on top and mount the conrod caps with the old bolts, as described below.

! CAUTION !

– INSERT THE PLASTIGAUGE MEASURING STRIPS AT A 90° ANGLE TO THE BEARING END GAP.
– DO NOT TURN THE CONRODS ON THE CONROD JOURNAL.

– Unclamp the conrods and compare the width of the plastigauge measuring strip with the information on the packing. The width of the plastiguage measuring strip is equivalent to the bearing clearance.

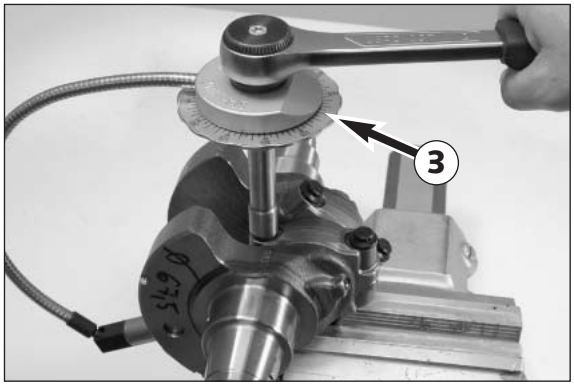
Setpoint value of the conrod bearing clearance:
0.030 mm – 0.060 mm
Wear limit: 0.080 mm



– Clamp each conrod in a vise using protective jaws, apply a thin layer of Molycote grease to the bearing shells, position the crankshaft and mount the conrod caps with new bolts.

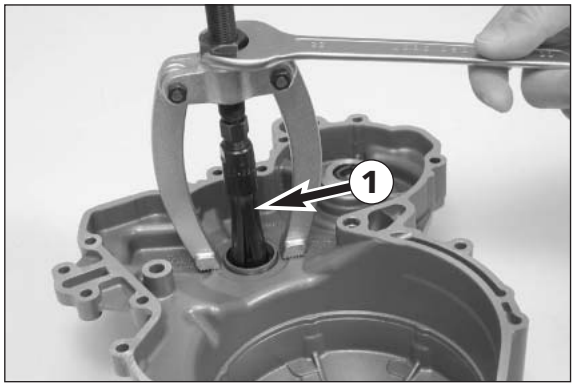
! CAUTION !

THE BEARING SHELLS SHOULD BE MOUNTED IN AN OFFSET POSITION IN THE CONROD TO ALLOW ROOM FOR THE CRANKSHAFT RADIUS ❷. IF THE CONRODS ARE MOUNTED BACKWARDS, THE BEARING SHELLS WILL EXERT PRESSURE ON THE RADIUS AND BLOCK THE CONRODS.



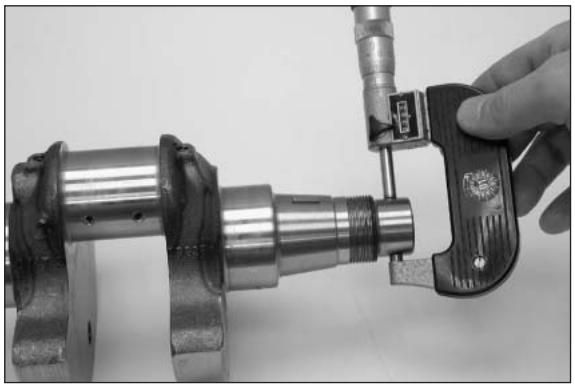
– Tighten the conrod bearing bolts with the special wrench socket 600.29.075.000 to 25 Nm (1st stage). The tighten to 30 Nm (2nd stage) and finally by another 60° (3rd stage).

NOTE: use a degree wheel ❸ (600.29.010.000) to make sure the conrod bearing bolts are tightened correctly.



Replacing the supporting bearings in the clutch cover

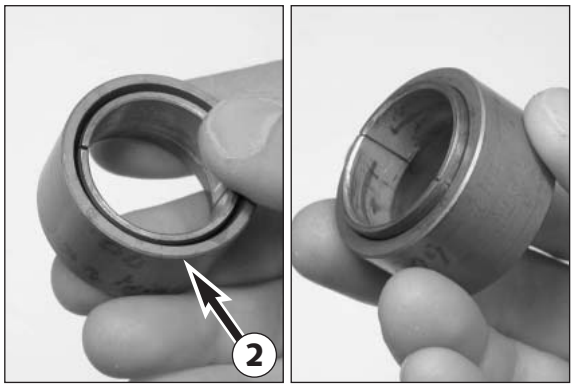
– Pull the bearing shells out of the clutch cover using the puller 151.12.017.000 and the internal extractor 600.29.018.000 ❶.



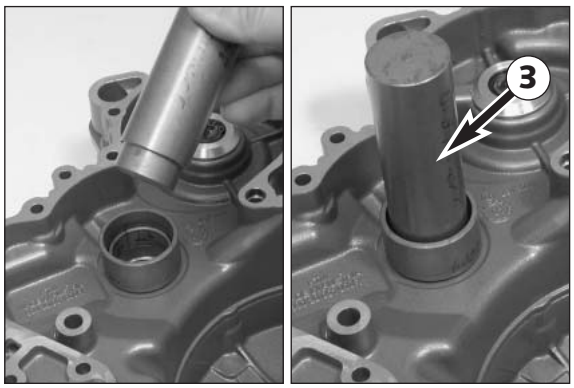
– Measure the diameter of the bearing pin at 3 points that are 120° apart using a micrometer gauge.

Diameter of the supporting bearing pin: 27.985 mm – 28.000 mm

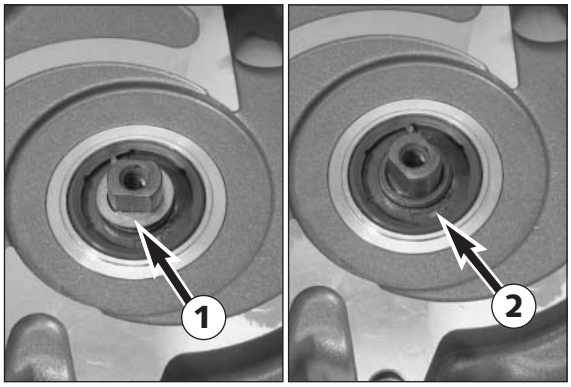
NOTE: The crankshaft must be replaced if the measurement falls short of the minimum diameter or if the crankshaft is worn.



– Center the new bearing shells with the assembling sleeve 600.29.046.028 ❷. The assembling sleeve is beveled on one side so the bearing shells can be pushed in easily. The bearing shells should protrude 1-2 mm on the other side of the assembling sleeve to make it easier to position them in the clutch cover.



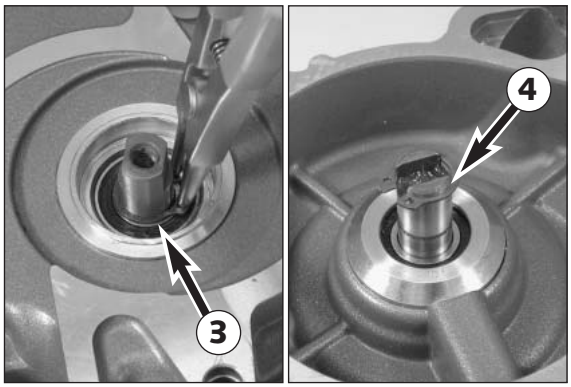
– Place the bearing shells on the clutch cover with the assembling sleeve and press in the bearing shells to the stop using the press mandrel 600.29.046.028 ❸.



Overhauling the water pump

– Remove the washer ❶ from the water pump shaft and pry the shaft sealing ring ❷ out of the case.

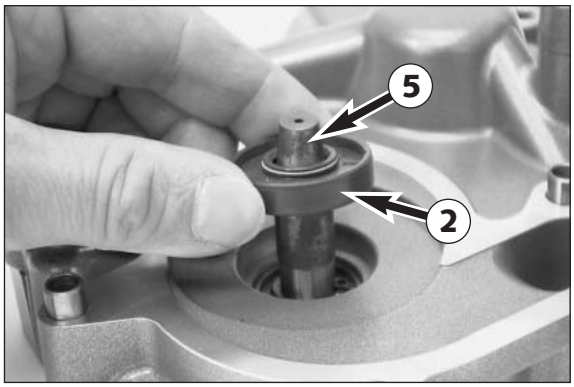
NOTE: if the water pump wheel cannot be removed because it is being held by residual thread adhesive, the water pump shaft and the water pump wheel can be pressed out from the inside after the lock ring ❹ is removed.



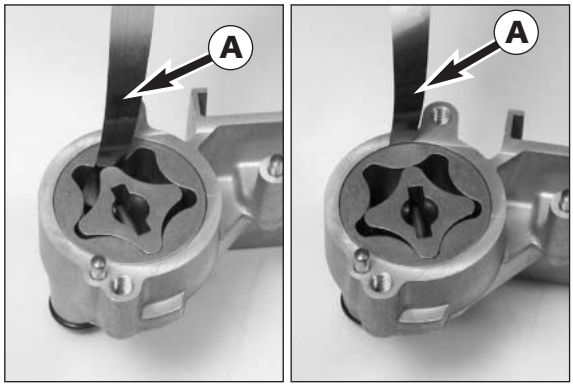
– Remove the outer lock ring ❸ from the water pump shaft using suitable pliers.
– Press the water pump shaft out of the bearing from the outside to the inside. The inner lock ring ❹ does not need to be removed.
– Heat the case evenly in an oven at 150° C; the old bearing will fall out of the bearing seat by itself and the new bearing can easily be pressed into the bearing seat by hand. The bearing should fit flush and tightly after it cools down.
– Insert the water pump shaft in the new bearing from the inside to the outside.

NOTE: the recess in the water pump shaft should point towards the inside.

– Mount the lock ring ❸.



– Place the protective sleeve ❺ 585.29.005.000 on the pump shaft and press in a new shaft sealing ring ❷ until flush using the pressing tool 600.29.043.040. Mount the washer ❶.



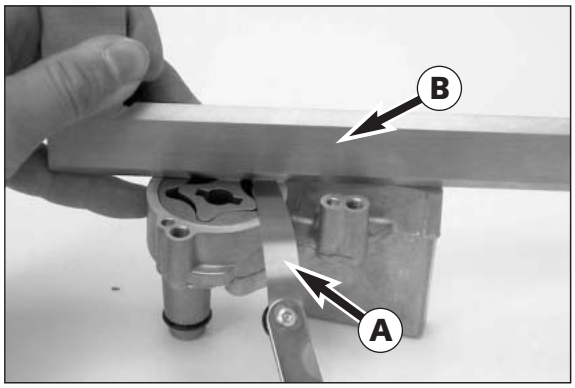
Checking the suction pump for wear

– Insert both suction pump rotors in the housing.
– Use a feeler gauge Ⓐ to check the clearance between the inner and outer rotor:

Setpoint value: 0.1 mm
Wear limit: 0.2 mm

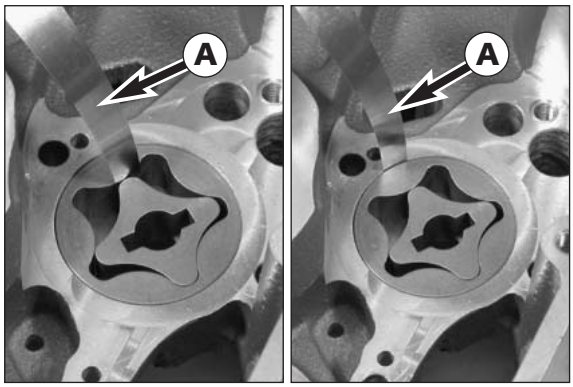
– Use a feeler gauge Ⓐ to check the clearance between the outer rotor and the housing:

Setpoint value: 0.2 mm
Wear limit: 0.4 mm



– Use a feeler gauge Ⓐ and a straight edge Ⓑ to check the axial clearance:

Setpoint value: 0.04 mm – 0.09 mm
Wear limit: 0.25 mm



Checking the pressure pump for wear

– Insert both pressure pump rotors in the case.
– Use a feeler gauge Ⓐ to check the clearance between the inner and outer rotor:

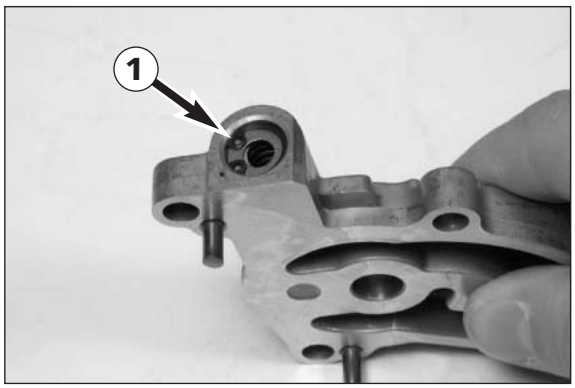
Setpoint value: 0.1 mm
Wear limit: 0.2 mm

– Use a feeler gauge Ⓐ to check the clearance between the outer rotor and the case:

Setpoint value: 0.2 mm
Wear limit: 0.4 mm

– Use a feeler gauge and a straight edge to check the axial clearance:

Setpoint value: 0.04 mm – 0.09 mm
Wear limit: 0.25 mm



Bypass valve

– Remove the lock ring ❶ on the bypass valve using suitable pliers and take the individual bypass valve parts out of the housing.

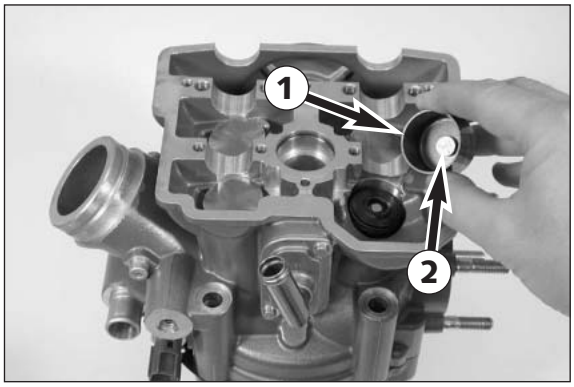
NOTE: the spring is pretensioned.



– Check parts for visible wear and damage.
– Measure the length of the pressure spring:

Minimum length of pressure spring: 42.0 mm

– Clean parts, oil the pistons and insert in the bore. Position the spring, place a washer on the spring and mount the lock ring in the groove using suitable pliers.

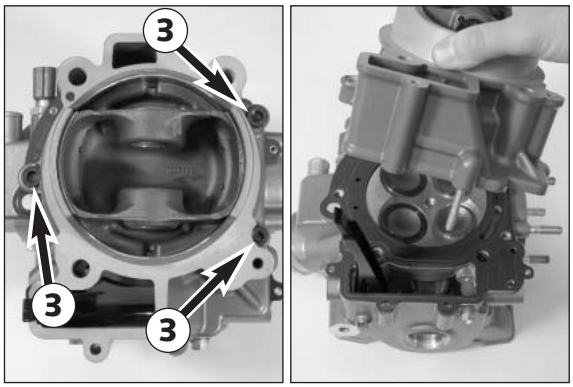


Disassembling the cylinder head and checking parts for wear

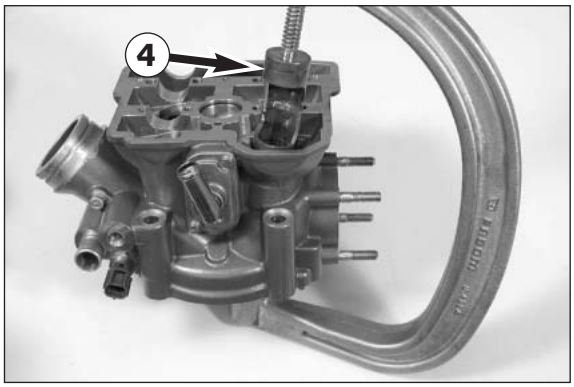
NOTE: the illustration shows the font cylinder. The procedure for the rear cylinder is identical.

– Pull all of the bucket tappets ❶ out of the cylinder head.

NOTE:
– Note down the mounting position to ensure that the same bucket tappet is inserted in the same bore during installation.
– The compensating washers ❷ for the valve clearance (shims) usually adhere to the bottom of the bucket tappets and should be set aside together with the bucket tappets.



– Invert the cylinder and cylinder head and remove the three Allen bolts ❸ and nuts.
– Remove the cylinder and pistons from the cylinder head and discard the cylinder head gasket.
– Unscrew the chain guide.



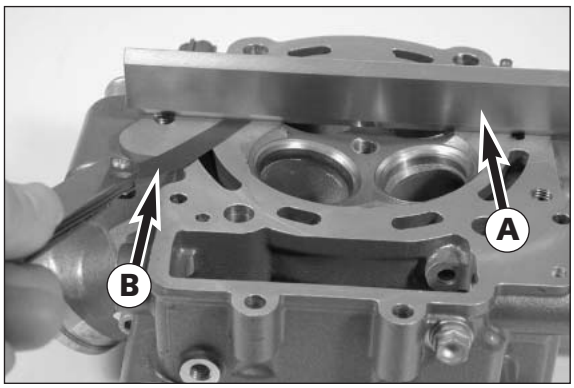
– Press the valve springs together using the valve assembling tool (590.29.019.000 with the attachment 600.29.041.000 ❹) and remove the valve spring key from the valve shaft. Relieve the springs and remove from the cylinder head.

NOTE: note down the mounting position of the valves to ensure that the valves are mounted in the same position during installation.

– Pull the valve shaft seal off the valve shaft with pliers and remove the valve spring washer.

NOTE: a washer (14x30x2) is located under the spring retainers for the exhaust valve springs to increase the spring preload.

– Repeat the above procedure for the other valves.

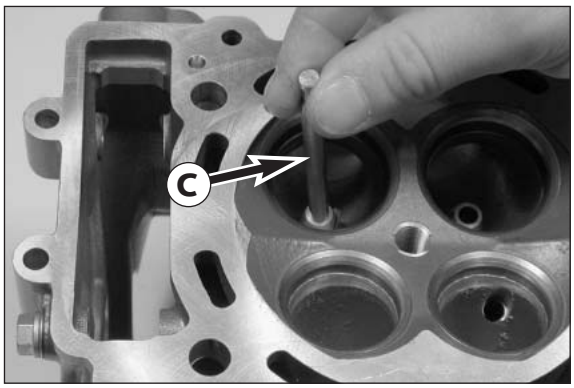


– Clean all parts.

Sealing area
Check the spark plug thread and valve seats for damage or cracks. Use a straight edge Ⓐ and a feeler gauge Ⓑ to check the sealing area to the cylinder for distortion. Max. distortion: 0.05 mm.

Valve seats
The valve seats may not be impacted. Width of sealing seat: intake max. 1.40 mm; outlet max. 1.40 mm. Reseat the valves if necessary.

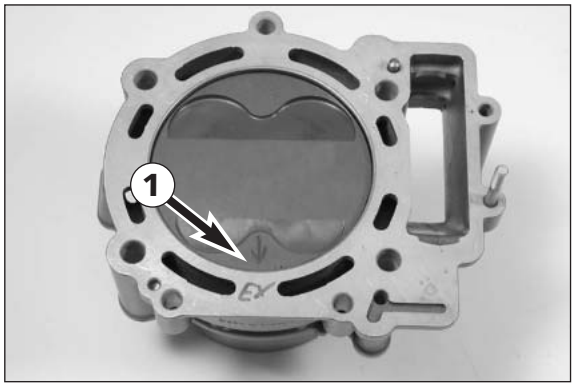
Valves
Check the valve disk for wear and runout. The valve disk runout should not exceed 0.03 mm. The valve seat may not be impacted. The sealing area should be in the middle of the valve seat. The valve shaft is hard-chrome-plated. Wear usually occurs at the valve guide.



Valve guides
The valve guides are checked with the limit plug gauge Ⓒ 590.29.026.006 (Ø 6.05 mm). If the limit plug gauge can easily be pushed into the valve guide, the valve guide needs to be replaced at a special workshop.

Valve springs
Check the valve springs for fractures or other wear. Measure the spring length with a sliding caliper in an unloaded condition:

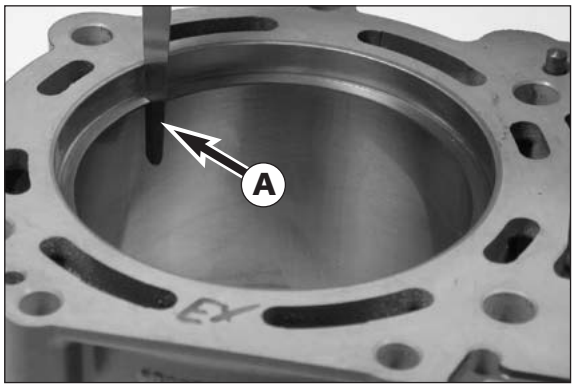
Minimum length of inner spring: 38.0 mm
Maximum length of outer spring: 41.3 mm



Checking the pistons

– Mark the position of the piston arrow in the cylinder to facilitate reassembly and to ensure that the same piston is mounted in the same cylinder again.
– Press the piston up out of the cylinder.
– Replace the piston if oil consumption is high or the piston skirt is excessively grooved.
– If the piston is to be reinstalled:

1. Check the piston bearing surface for damage.
2. Piston ring grooves: the piston rings must move freely in the groove. Use old piston rings or sandpaper (400 grit) to clean the piston ring grooves.
3. Check the piston rings for damage and end gap.
4. The piston pins must move freely in the bolt hole when mounted. Replace piston pins that are badly discolored or have visible running marks. Place the piston pin in the conrod and check for clearance. Maximum clearance in the conrod eye: 0.08 mm.



NOTE: the piston pin may not have any clearance when mounted and should be easy to move when applying slight counterpressure.

Checking the piston ring end gap

– Insert the piston ring in the cylinder and align with the piston (approx. 10 mm under the upper edge of the cylinder).
– Measure the end gap with a feeler gauge Ⓐ.

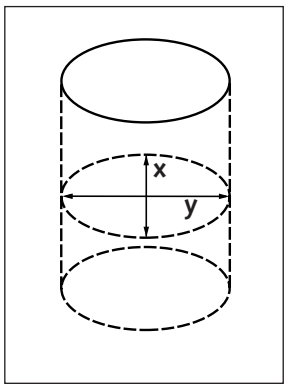
Piston ring end gap: max. 0.50 mm

If the end gap is larger than indicated above, check the cylinder for wear. If the cylinder wear is within the tolerance limits, replace the piston ring.



Assembly instructions for piston rings

– Mount the oil scraper ring in the lower piston ring groove with the mark facing the piston head.
– Mount the compression ring in the middle piston ring groove with the mark facing the piston head.
– Mount the compression ring in the upper piston ring groove with the mark facing the piston head.





Measuring pistons and cylinders, establishing the piston mounting clearance

– To establish cylinder wear, use a micrometer to measure the cylinder in the middle of the bearing surface.
– Measure the X and Y axis of the cylinder diameter to establish any ovality.

NOTE: if the Nicasil coating on the cylinder is worn but not damaged, a replacement cylinder can be ordered from our KTM dealer/importer (new Nicasil coating, used cylinder).

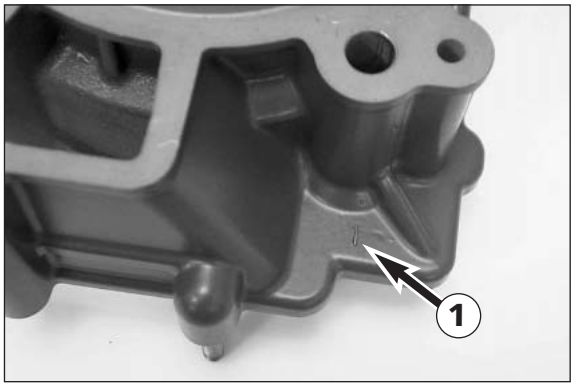


– Measure the piston at the piston skirt across the piston pin, 9 mm from the lower edge.

Piston size I: 99.960 mm – 99.972 mm
Piston size II: 99.973 mm – 99.984 mm
Wear limit: 99.930 mm

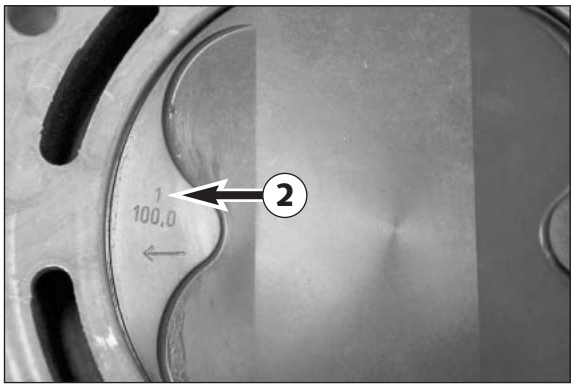
– The piston mounting clearance is the difference between the smallest cylinder diameter and the piston diameter.

Piston mounting clearance: 0.04 mm – 0.06 mm
Wear limit: 0.10 mm

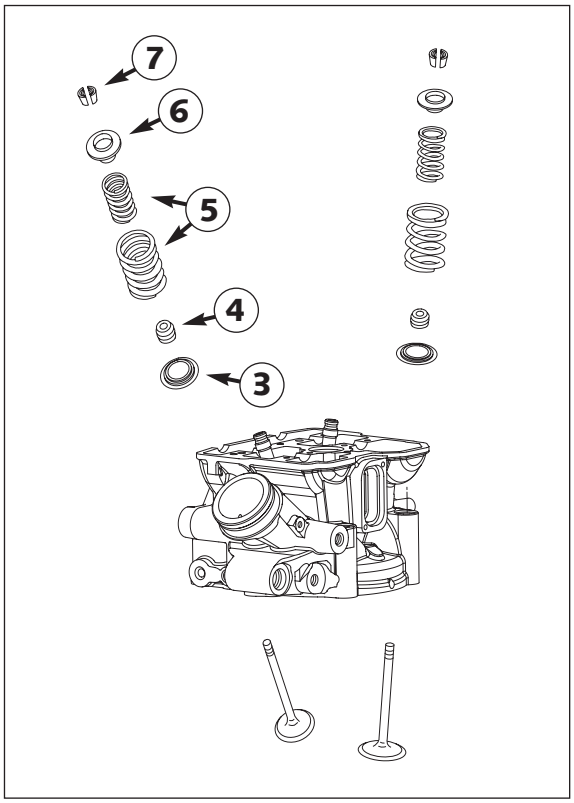


Piston and cylinder identification

The cylinder size ❶ is impressed in the bottom of the cylinder near the chain tunnel; 1 is size I, 2 is size II.



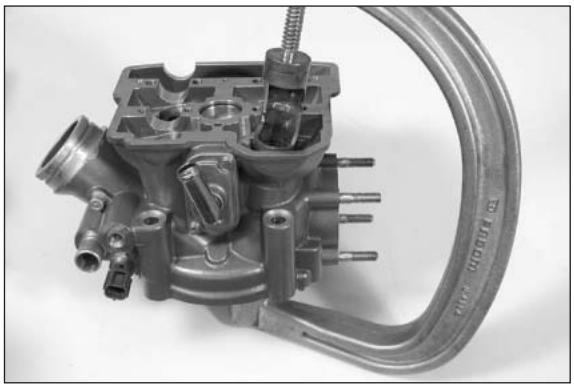
The piston size ❷ is impressed in the top of the piston; 1 is size I, 2 is size II.



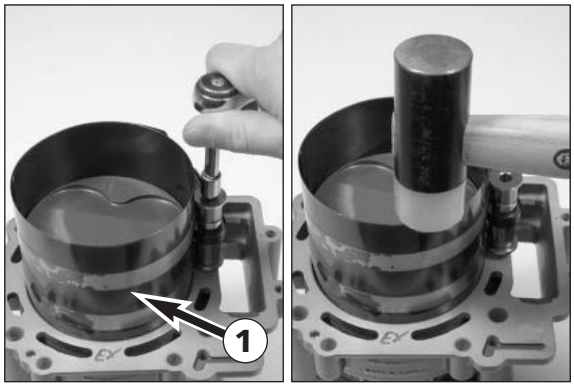
Assembling the cylinder head

– Slide the valve spring washers ❸ over the valve guides and mount new valve shaft seals ❹.
– Lubricate the valve shafts and insert the valves in their original position in the valve guides.

NOTE: a washer (14x30x2) is located under the spring retainers for the exhaust valve springs to increase the spring preload.



– Mount the inner and outer valve springs ❺ with the spring retainers ❻ and compress the springs using the valve assembling tool (590.29.019.000 with the attachment 600.29.041.000).
– Grease the valve spring keys ❼ and position on the valve shafts. Relieve the valve springs.
– Tap the valve spring retainers to set the keys.



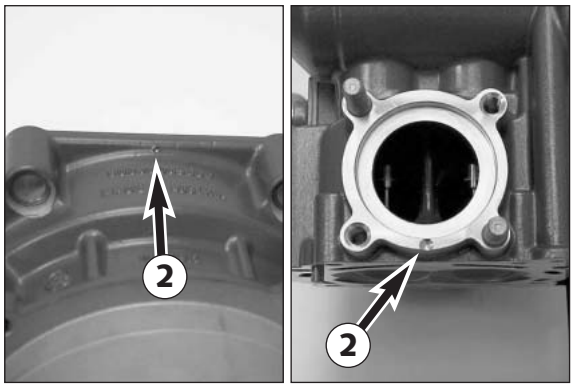
– Place the lubricated piston on the cylinder and clamp the piston rings together with the piston ring clamping band 600.29.015.000 ❶.
– Use a plastic hammer to tap lightly on the top of the piston ring clamping band until it is flush with the cylinder.



– Use the hammer handle to carefully tap the piston into the cylinder, making sure the piston rings do not get caught.

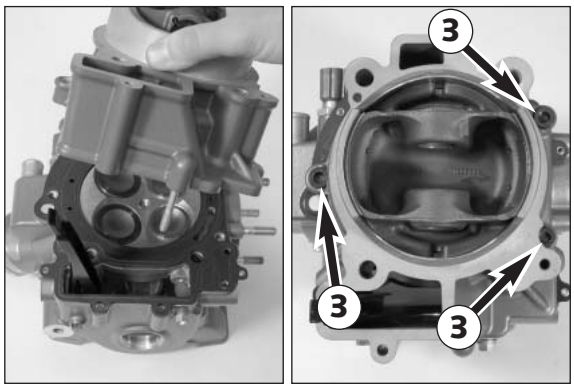
! CAUTION !

IF THE PISTON RINGS ARE PROPERLY CLAMPED BY THE PISTON RING CLAMPING BAND AND THE CLAMPING BAND IS FLUSH WITH THE CYLINDER, IT SHOULD BE EASY TO PUSH THE PISTON INTO THE CYLINDER BY TAPPING LIGHTLY WITH THE HAMMER HANDLE. APPLYING MORE FORCE WILL ONLY DAMAGE THE PISTON RINGS.

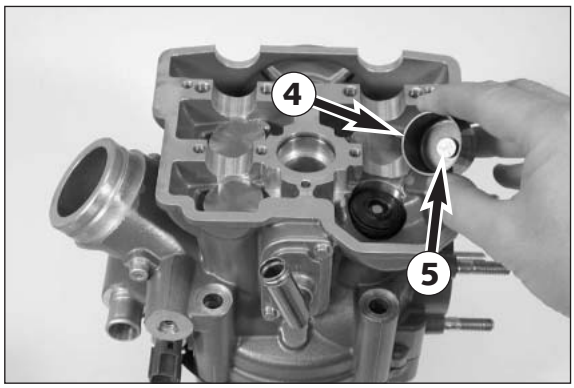


– Invert the cylinder head, mount a new cylinder head gasket and put the cylinder into position.

NOTE: the cylinder and the cylinder head are marked at the exhaust flange ❷. One or two circles are impressed on both parts

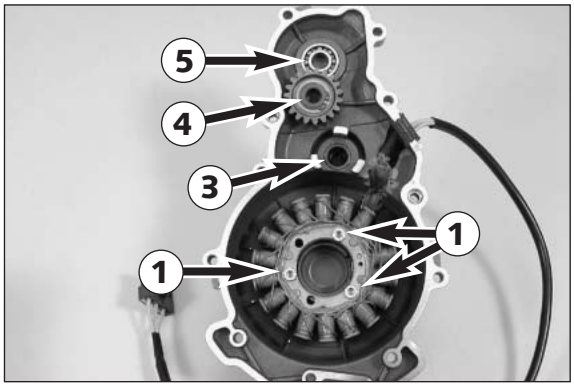


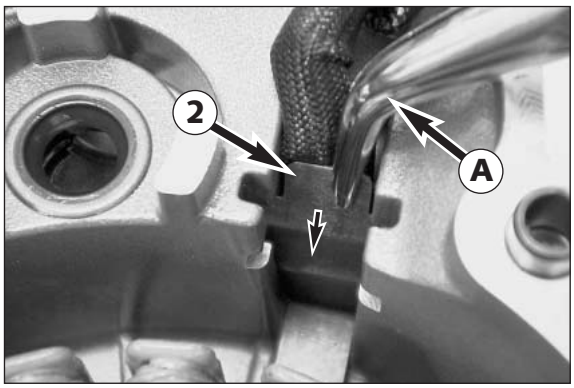
– Tighten the three Allen bolts ❸ to 18 Nm (1st stage) and 23 Nm (2nd stage).
– Mount the chain guide rail, apply Loctite 243 to the bolt and tighten (15 Nm). Check the chain rail guide for mobility.



– Mount the bucket tappets ❹ and the valve shims ❺ in their original positions in the cylinder head.

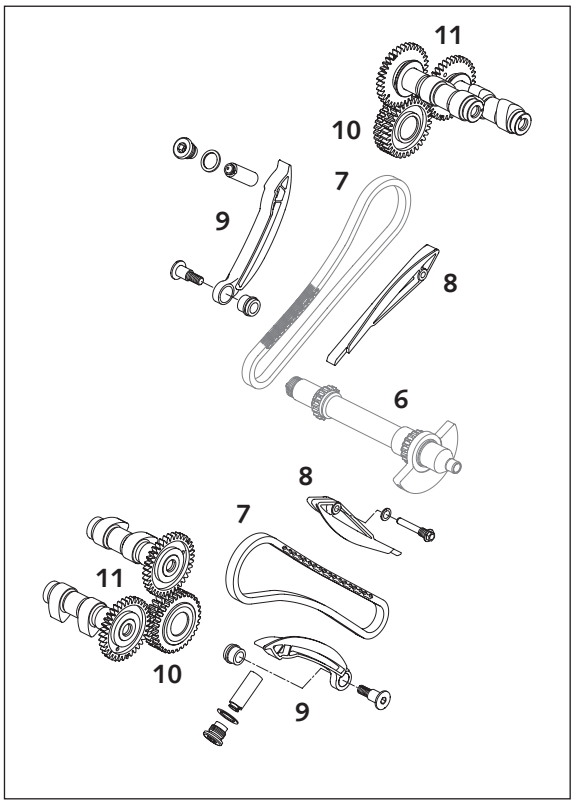
NOTE: if the valve clearance was incorrect when measured or if the valves and valve seats were serviced or parts of the valve gear were replaced, the thickness of the valve shims must be corrected.





Generator cover

– Loosen the three bolts ❶ on the stator.
– Tilt the cable retaining bracket ❷ away from the cable with long nose pliers Ⓐ (see small arrow) and pull out of the housing. Take the cable duct out of the generator cover and remove the stator.
– Pry the shaft sealing ring on the balancer shaft ❸ out of the generator cover and discard.
– Remove the lock ring ❹ and pull the idler with the disk and the bearing from the bearing bolt.
– Heat the housing to 150° C. The bearing ❺ will fall out of the housing by itself.
– Press in a new bearing ❺ until flush. Slide the new bearing on the bearing bolt, slide on the idler and disk and mount the lock ring ❹.
– Use the special tool 600.29.043.050 to press in the new shaft sealing ring on the balancer shaft ❸, open side first.
– Position the stator, press the cable duct in the generator cover.
– Push the retaining bracket in the recess of the housing and fit into place. Apply Loctite 243 to the stator bolts and tighten to 10 Nm.



Valve gear – checking parts for wear

Check the teeth of the balancer shaft ❻ for wear.

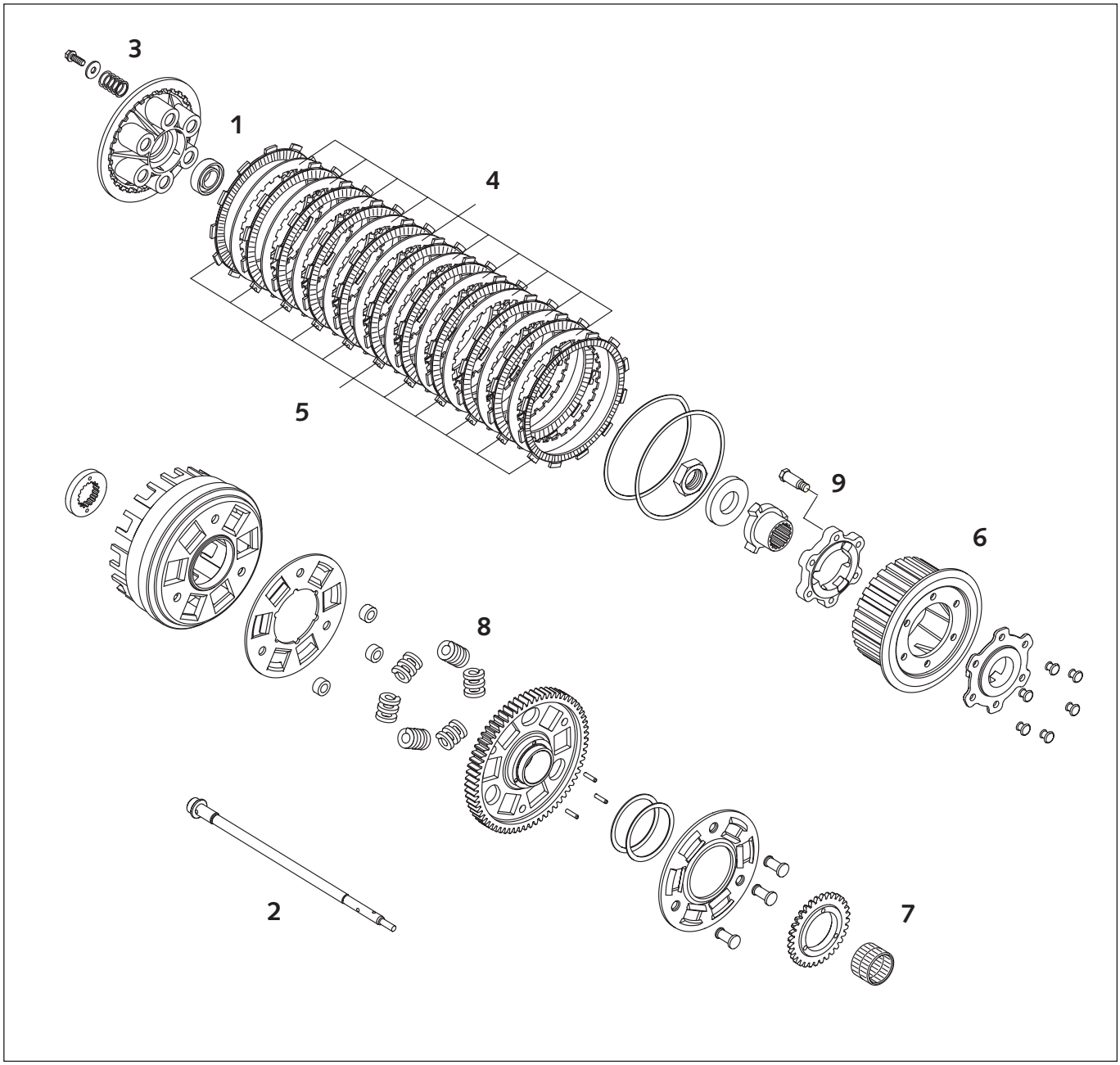
Check the rollers and links of the timing chain ❼ for wear, damage and smooth operation.

Check the timing chain guides ❽ for wear.

Check the timing chain tensioning rails ❾ for wear.

Check the teeth on both double timing gears ❿ and the camshaft gears ⓫ for wear.

Check the camshafts and camshaft bearing positions for wear and seizing marks.



Clutch – checking parts for wear

Check the thrust bearing ❶ for wear.

Check the front end of the pushrod ❷ for wear and blow compressed air through the holes.

Clutch springs ❸ must have a minimum length of 29.0 mm (new 30.77 mm). If necessary, replace all 6 at the same time.

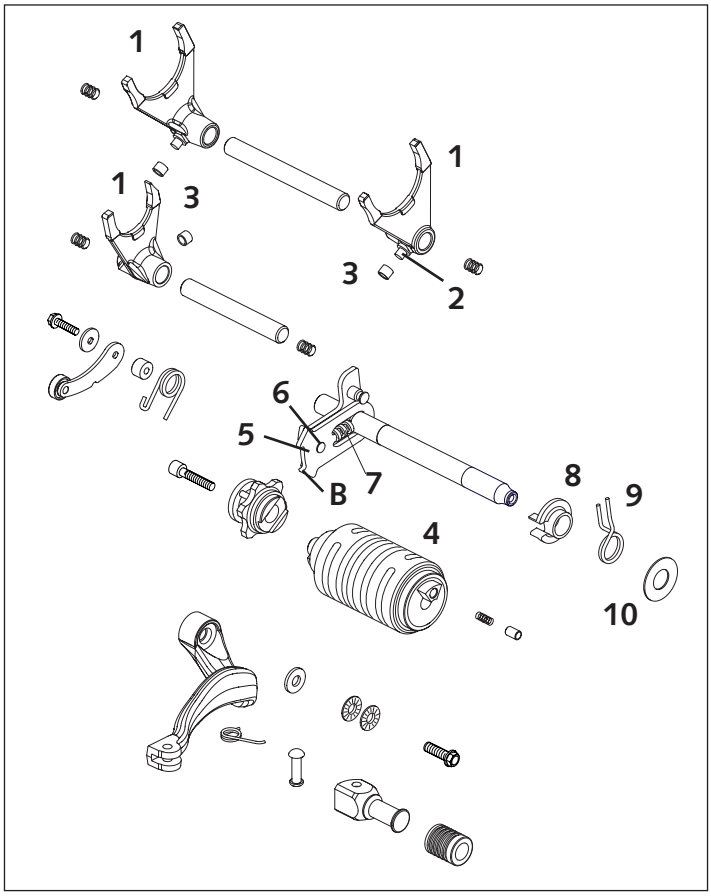
The clutch disks must be even.
10 steel lamella ❹ – may not have any recesses.
11 lining disks ❺, wear limit 2.65 mm

Inner clutch hub ❻ – check the outer and inner teeth for wear.

Needle bearing ❼ – check for wear.

Springs in the outer clutch hub ❽
Springs dampen the drive train from the primary drive to the clutch. Check these springs in addition to performing the regular wear tests. Try to turn the outer clutch hub when the engine is blocked – you should not feel any backlash.

Check the sides of the clutch pressure booster ❾ for wear.



Shift mechanism – checking parts for wear

Shift forks ❶
Check the leaf for wear.
Check the driving bolt ❷ for the shift drum for wear.

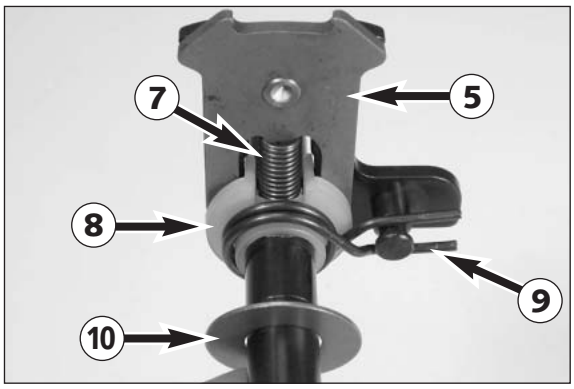
Shift rolls ❸
Check the shift rolls for hair cracks and pressure marks. It should be easy to turn the shift rolls on the driving bolts ❷ of the shift forks.

Shift drum ❹
Check the shift grooves for wear.
Check both grooved ball bearings in the shift drum for wear.

Shift rail ❺
Check for wear at the points of contact.
Check the return surface Ⓑ on the shift rail for wear (replace if excessively grooved).

Guide bolts ❻
Check for a tight fit and wear.

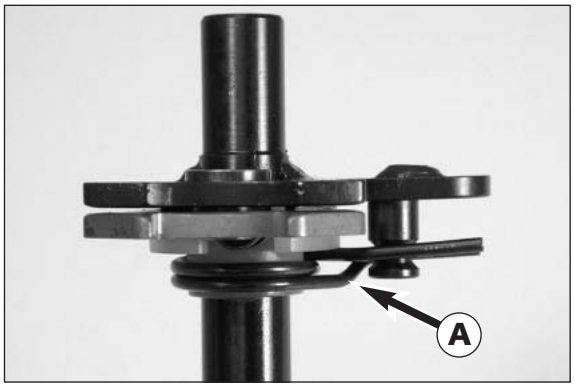
Guidance
Check play (play between guide bolts and slider max. 0.7 mm).



Preassembling the shift shaft

– Mount the shift rail on the shift shaft by engaging the guide bolt ❻.
– Attach the spring ❼ and slide on the plastic sleeve ❽.

NOTE: the noses on the plastic sleeve will engage in the opening in the shift rail and the shift shaft and hold the spring in place.



– Mount the return spring ❾ such that the offset Ⓐ runs towards the shift quadrant.
– Slide the disk ❿ onto the shift shaft.

General information on servicing the transmission

– Clamp the main shaft in the vise (use protective jaws) and remove the gears.
– Clean and check all parts.

Use new lock rings whenever you repair the transmission.

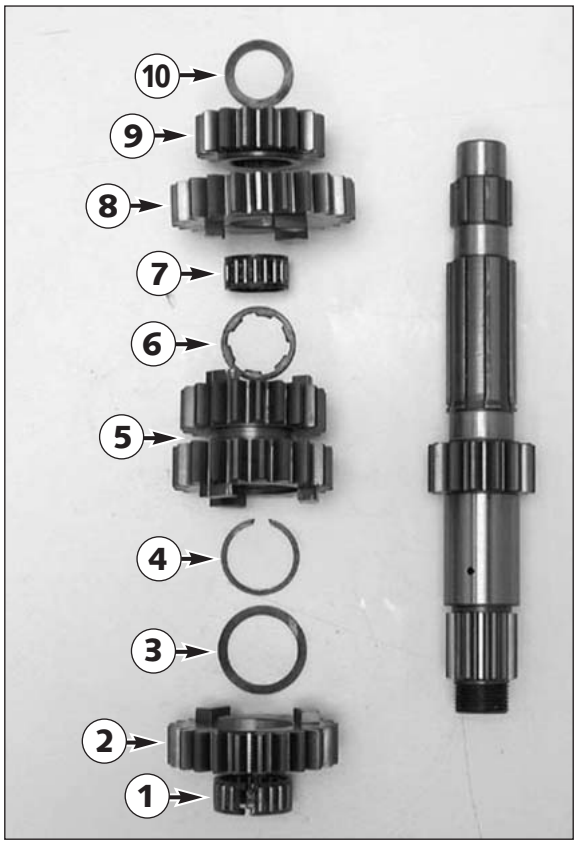
Check the tooth profile on the transmission shafts and sliding gears for wear.

Place the sliding gears on the transmission shafts and check whether they run smoothly on the teeth.

Check the bearing positions on the transmission shafts.

Mount the idler gear with bearings on the transmission shaft and check for clearance.

Check the needle bearings in the idler gears.



Assembling the main shaft

– Clamp the main shaft in the vise (use protective jaws) with the gear facing down.

– Mount the needle bearing ❶ and slide the 5th gear idler ❷ over the needle bearing with the claws pointing up.

– Mount the stop disk ❸ (28.3 x 35.75 x 1.5 mm) and the lock ring ❹ with the sharp edge facing up.

– Mount the 3rd and 4th gear sliding gear ❺ with 4th gear (larger outer diameter) facing down.

– Mount the stop disk ❻ (22.2 x 30,2 x 1.5 mm).

– Slip on the needle bearing ❼ and slide the 6th gear idler ❽ over the needle bearing with the claws pointing down.

– Slip on the 2nd gear fixed gear ❾ with the collar facing down and mount the stop disk ❿ (20.2 x 28 x 1.5 mm).

Check all gear wheels for smooth operation.



General information on servicing the transmission

– Clamp the main shaft or countershaft in the vise (use protective jaws) and remove the gears. Pull off the bearing ring.
– Clean and check all parts.

Use new lock rings whenever you repair the transmission.

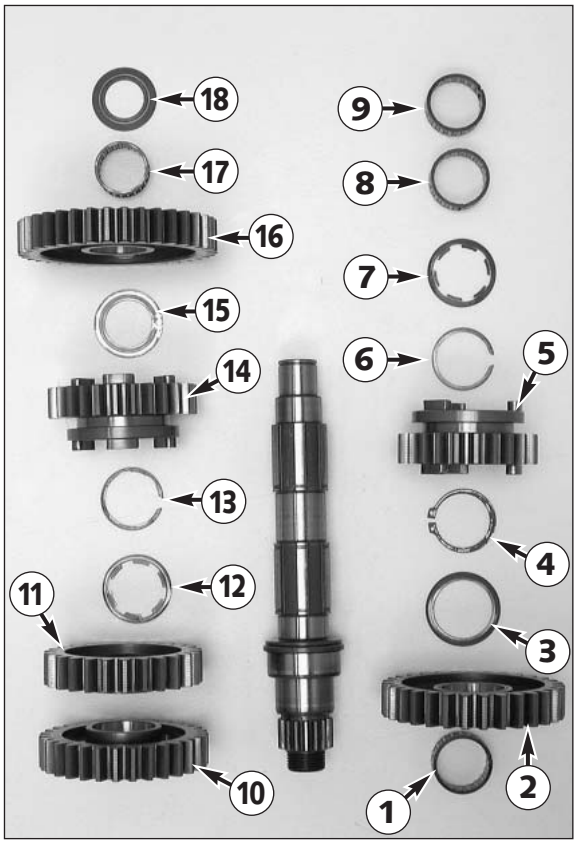
Check the tooth profile on the transmission shafts and sliding gears for wear.

Place the sliding gears on the transmission shafts and check whether they run smoothly on the teeth.

Check the bearing positions on the transmission shafts.

Mount the idler gear with bearings on the transmission shaft and check for clearance.

Check the needle bearings in the idler gears. Mount the bearing ring using a suitable tube.



Assembling the countershaft

– Clamp the countershaft in the vise (use protective jaws) with the collar facing down.

– Oil the needle bearing ❶ and mount.

– Slide the 2nd gear idler ❷ with the groove facing up over the needle bearing.

– Mount the stop disk ❸ (30.2 x 39 x 1.5 mm) and the lock ring ❹ with the sharp edge facing up.

– Mount the 6th gear sliding gear ❺ with the shift groove facing up.

– Mount the lock ring ❻ with the sharp edge facing down and the stop disk ❼ (26.2 x 36 x 1.5 mm).

– Mount the needle bearing ❽ and ❾ and slide the 3rd gear idler ❿ over the needle bearing with the collar facing up.

– Slip on the 4th gear idler ⓫ with the collar facing down.

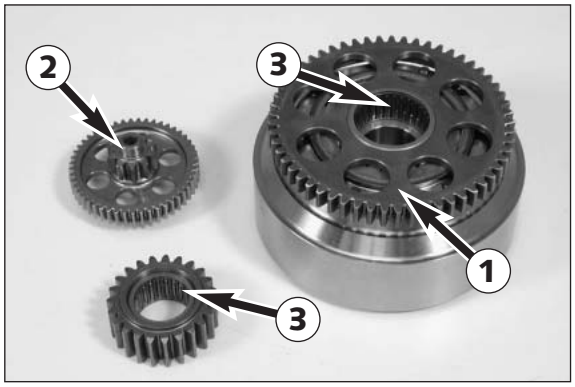
– Mount the stop disk ⓬ (26.2 x 36 x 1.5 mm) and lock ring ⓭ with the sharp edge facing up.

– Mount the 5th gear sliding gear ⓮ with the shift groove facing down and the stop disk ⓯ (24.3 x 35.75 x 1.0 mm).

– Mount the 1st gear idler ⓰ with the groove facing down, the needle bearing ⓱ and the stop disk ⓲ (20.2 x 34 x 1.0 mm).

Check all gear wheels for smooth operation.





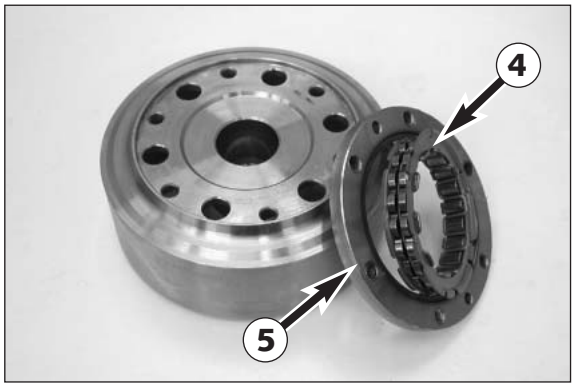
Checking the freewheel

– Insert the freewheel gear ❶ in the freewheel.
– You should be able to turn the freewheel gear in a counterclockwise direction.
– The freewheel gear should block without backlash in a clockwise direction.
– Check the reduction gear ❷ and the needle bearings ❸ for wear, replace if necessary.



Replacing the freewheel hub

– Remove the 6 bolts, tap the side of the freewheel hub with a plastic hammer and remove the freewheel hub.



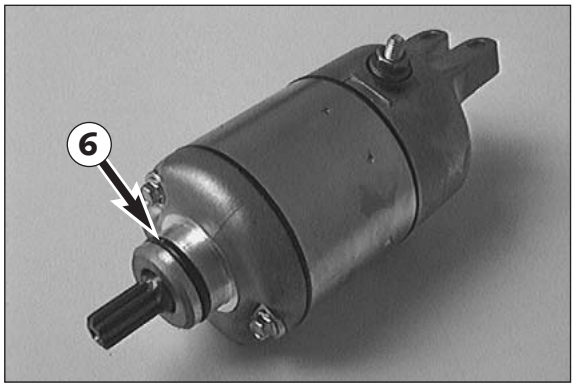
– Hold the components of the freewheel ❹ together.
– Check the segments in the freewheel for wear.
– Check the freewheel hub ❺ at the freewheel running surface for wear.

– Apply Loctite 648 to the flange areas on the rotor and the freewheel hub.
– Mount the freewheel hub on the rotor.
– Apply Loctite 648 to the thread of the bolts and tighten the bolts crosswise to 13 Nm.

! CAUTION !

ALWAYS USE NEW BOLTS (QUALITY GRADE 12.9) AND COAT BOLT THREAD WITH LOCTITE 648.

– Generously oil the freewheel and insert in the freewheel hub.



Starter

– Since the starter will show little wear after 10,000 starts and the replacement of individual parts is uneconomical, these steps will not be described in detail at this point.

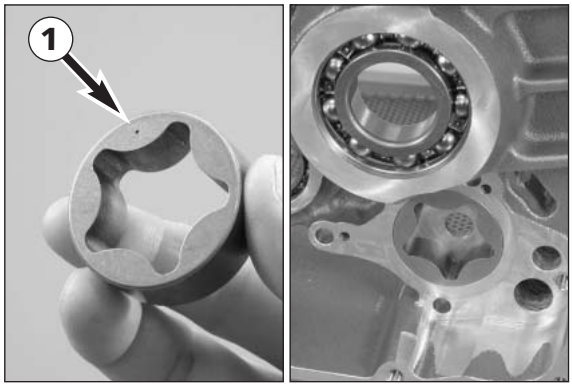
– Replace the O-ring ❻ on the starter flange.

ASSEMBLING THE ENGINE 6

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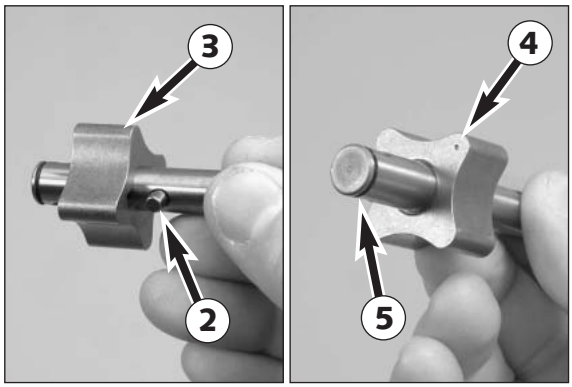
Clean all parts thoroughly before reassembling.

– Clamp the output-end engine case on the engine work stand and move into a vertical position (installation position).

Oil pumps

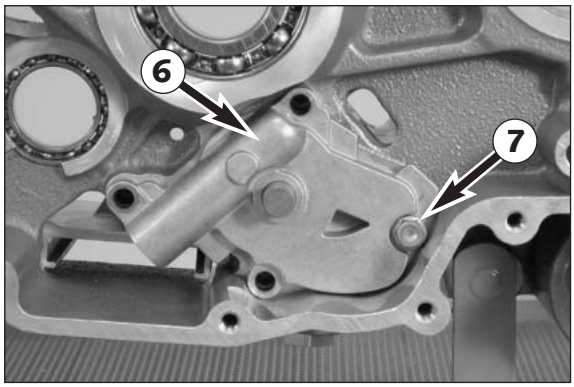
NOTE: lubricate the oil pump rotors and the oil pump shaft prior to installation.

– Slide the outer rotor of the pressure pump into the bore with the mark ❶ facing the engine case.

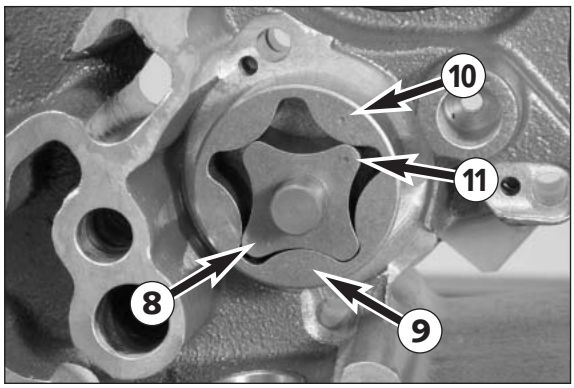


– Insert the needle roller ❷ on the pressure pump in the oil pump shaft and slide on the inner rotor ❸ of the pressure pump. The mark ❹ on the inner rotor of the pressure pump must point to the groove ❺ in the oil pump shaft.
– Insert the oil pump shaft and inner rotor of the pressure pump into the engine case.

NOTE: contrary to common practice, the two marks for the outer and inner rotor of the pressure pump are not on the same side.

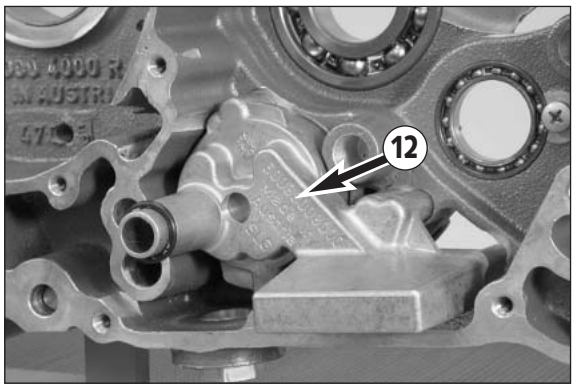


– Mount the pressure pump case ❻ and fix with the short bolt ❼ (M6x25) (apply Loctite 243 to the bolt but do not tighten yet). Do not forget the centering pins on the pressure pump housing.

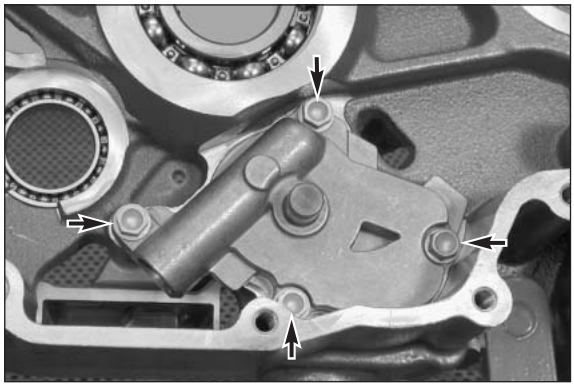


– Insert the needle roller in the oil pump shaft and slide on the inner rotor ❽ of the suction pump. Mount the outer rotor ❾ such that the mark ❿ is visible on the outside.

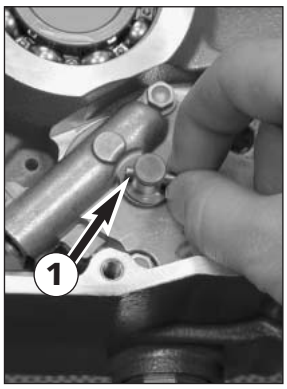
NOTE: the marks for the outer and inner rotors (❿ and ⓫) of the suction pump are on the same side.

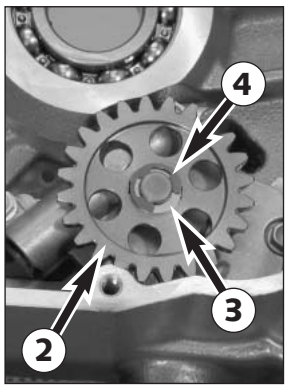


– Hold the outer rotor in place while you slide the suction pump housing ⓬ over the rotor. Do not forget the centering pins.
– Replace the O-ring and lubricate.



– Apply Loctite 243 to the three remaining oil pump bolts (M6x40) and screw in. Tighten bolts to 10 Nm.





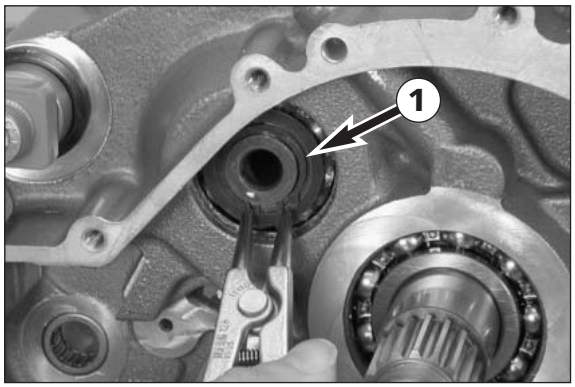
– Slide on the disk, insert the needle roller ❶ and mount the oil pump gear ❷ with the collar facing the rear.
– Slide on the spacer washer ❸ and mount the lock ring ❹ on the oil pump shaft.
– Check the oil pump for smooth operation by turning the oil pump gear.



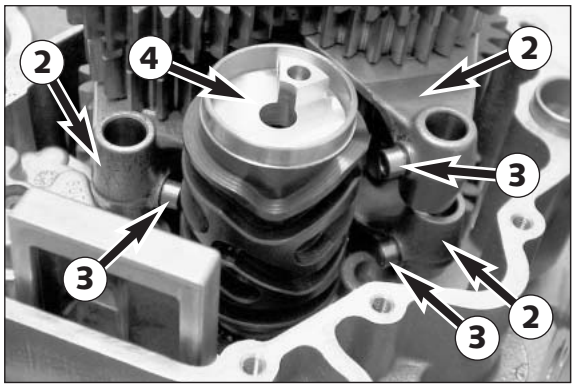
Transmission

– Simultaneously push both transmission shafts into the bearing seats.

NOTE: pay attention to the spacing washer on the countershaft.

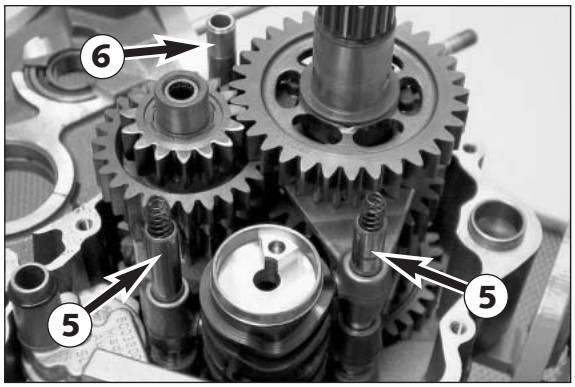


– Slide the washer on the counter shaft and mount the lock ring ❶.
– Move the engine into a horizontal position.



– Insert the lower gearshift rail springs in the bores with the tapered ends down.
– Position the shift forks ❷ in the shift grooves and tilt aside, paying attention to the shift rollers ❸ – fix with grease if necessary. Mount the shift drum ❹ and allow the shift forks to engage in the shift drum.

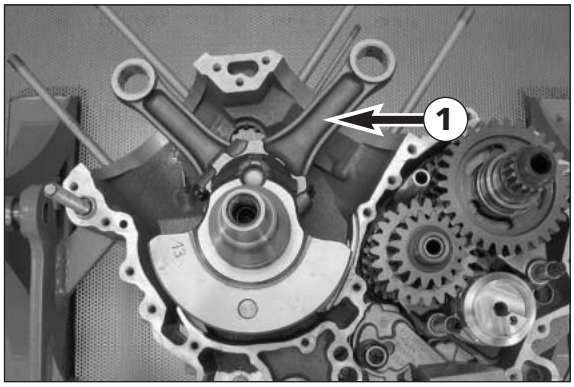
NOTE: since 3 different shift forks are used they cannot be confused with each other.



– Mount the gearshift rails ❺, paying attention to the lower gearshift rail springs. Insert the upper gearshift rail springs in the gearshift rails with the tapered ends up.

NOTE: the longer gearshift rail is used for the countershaft shift forks.

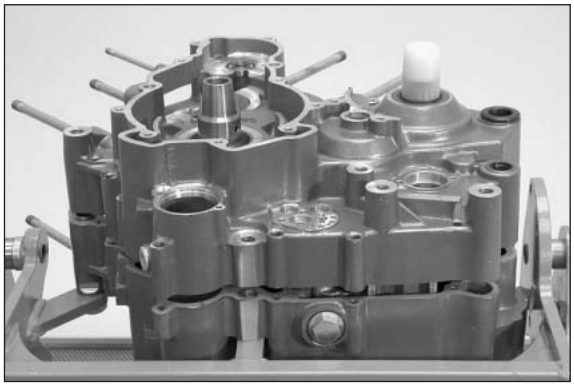
– Insert the oil rail for transmission lubrication ❻ in the bore and turn to engage the locking pin.



– Insert the crankshaft in the friction bearing.

NOTE:

– The crankshaft and the thread for the primary pinion bolt connection must point down.
– The conrod for the rear cylinder ❶ must face up. Both conrods should be in the position shown in the illustration.
– Mount the case dowel pins and put a new case gasket in place.

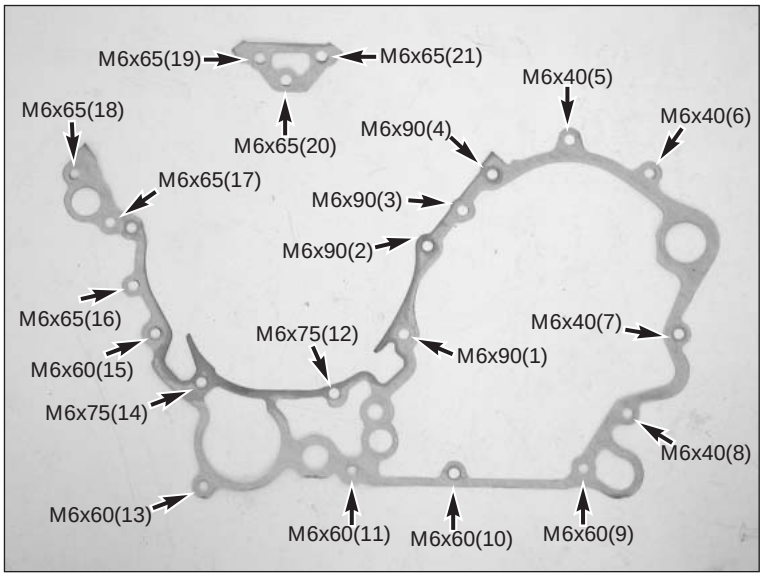


Case half

– Slide the protective sleeve 600.29.005.000 over the countershaft.
– Slip on the generator-end case half. Tap lightly on the countershaft with a rubber hammer if necessary.

! CAUTION !

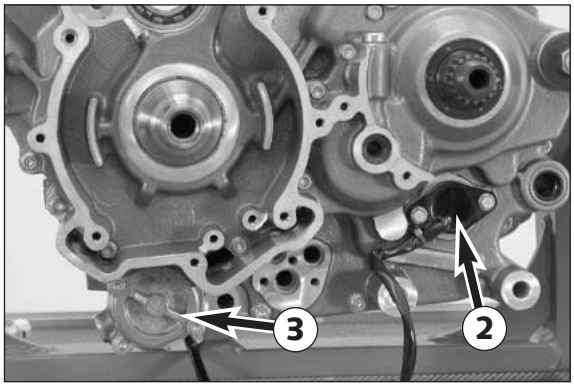
DO NOT TRY TO DRAW THE TWO CASE HALVES TOGETHER WITH THE CASE BOLTS.



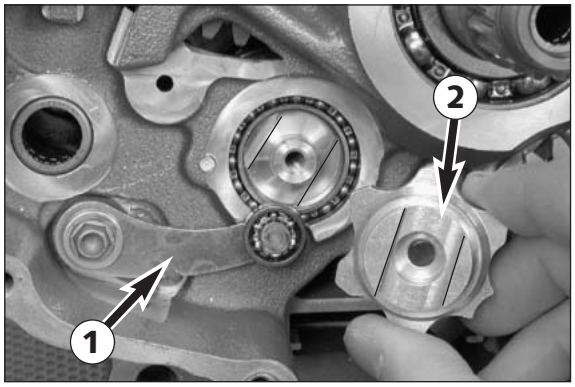
– Screw in all HH case bolts (see illustration for bolt lengths) and tighten to 10 Nm.

NOTE: the bolts should be tightened in the order shown in the illustration (numbers in parentheses).

– Move the case into a horizontal position with the generator side facing up.



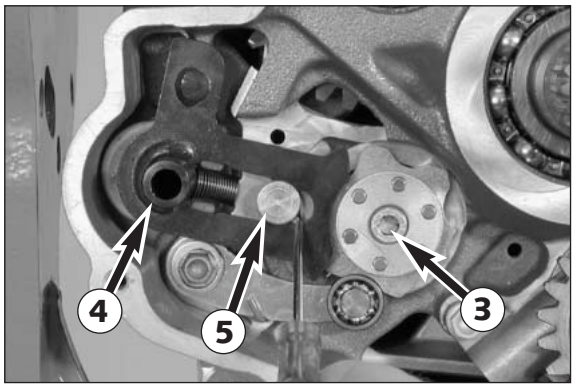
– Position the pin and spring in the shifting drum. Mount the gear sensor ❷ with 2 M5x10 bolts. Tighten bolts to 4 Nm.
– Slide in a new oil filter and mount the oil filter cover ❸ with a new gasket. Tighten M5x16 bolts to 6 Nm.



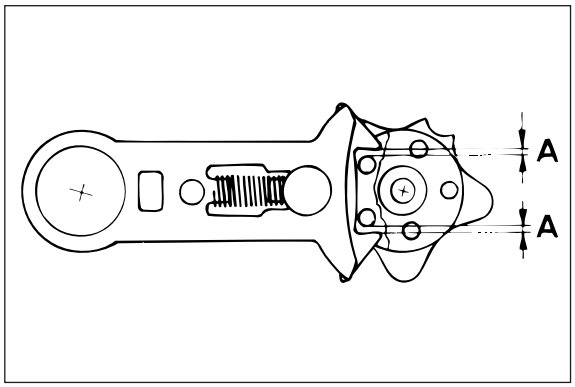
Shift mechanism

– Mount the locking lever ❶ with the spring. Apply Loctite 243 to the M5x20 bolt and tighten to 8 Nm.
– Press the locking lever down and mount the shift locating drum ❷.

NOTE: the flat parts of the shift locating drum are off center.

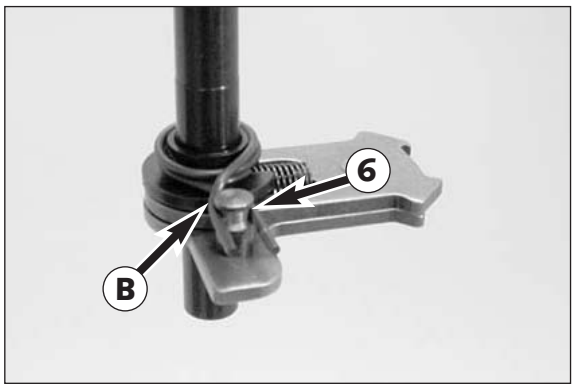


– Apply Loctite 243 to the M6x30 bolt ❸ and tighten to 10 Nm.
– Slide the shift shaft ❹ in the bearings, push the shift rail ❺ away from the shift locating drum and press the shift shaft towards the case to the stop; let go of the shift rail.

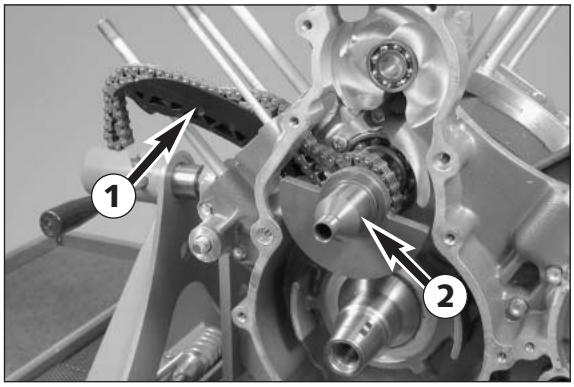


Aligning the return spring

– Engage second or third gear.
– Check the backlash of the shift rail and the clearance of the shift bolt.
– The backlash of the shift rail is the distance the rail travels until the shift shaft begins to move. You should be able to feel the pressure of the return spring. Relative to the basic position, this backlash Ⓐ should be equal towards the top and towards the bottom.
– The backlash can be corrected by aligning the return spring.



– To align, dismount the shift shaft and bend the return spring as needed at the bends Ⓑ using a pair of pliers. Remount the shift shaft. When the shift shaft is installed, the return spring must rest against the shift bolt ❻ and the dolly of the shift mechanism support.
– Bend the return spring again if necessary.



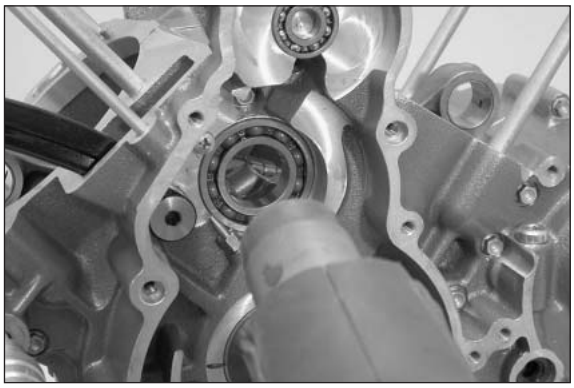
– Screw on the generator-end timing chain tensioning rail ❶. Apply Loctite 243 to the bolt and tighten to 20 Nm.

! CAUTION !

MAKE SURE NO LOCTITE THREAD ADHESIVE IS ON THE PIVOT AREA OF THE BOLT. THIS COULD CAUSE THE TIMING CHAIN TENSIONING RAIL TO BLOCK AND BREAK.

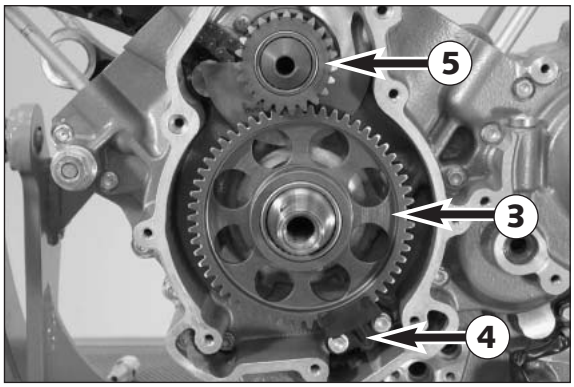
Balancer shaft

– Heat the generator-end bearings of the balancer shaft evenly with a heat gun.
– Fit the timing chain on the generator end (pay attention to the running direction if the chain has already been used) and slide into the balancer shaft ❷. The timing chain must be placed over the rear sprocket.



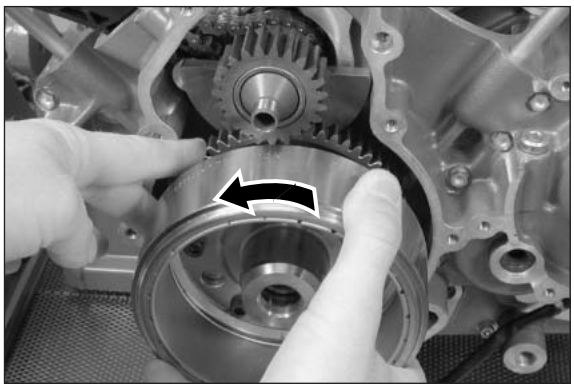
– Attach a stop disk (22 x 29.5 x 2.4 mm) to the balancer shaft

– Check the balancer shaft for smooth operation.



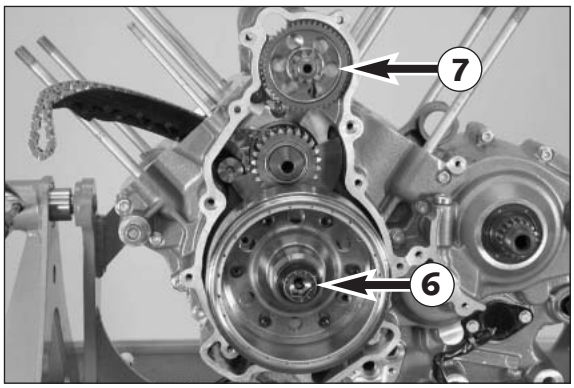
Freewheel

– Slip the freewheel ❸ on the crankshaft and attach the locking device ❹ with 2 M6x16 bolts. Apply Loctite 243 to the bolts and tighten to 10 Nm.
– Attach the lower starter idler gear ❺ to the balancer shaft with the collar on the inside.



Rotor

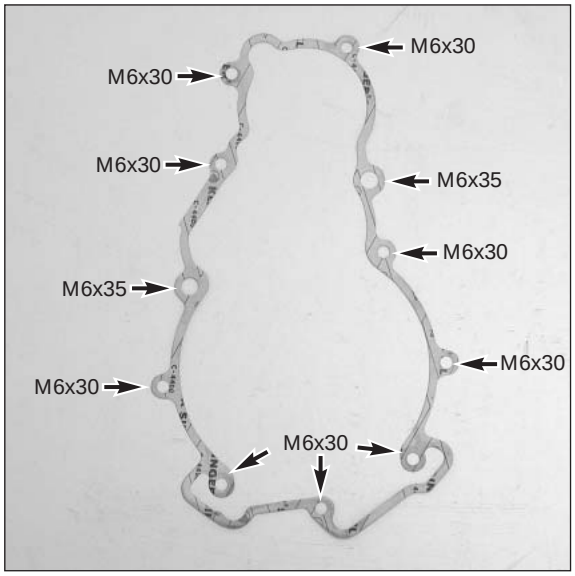
– Hold the freewheel with your finger while mounting the rotor, turning it in a counterclockwise direction.



– Mount the rotor bolt ❻ with disk, apply Loctite 243 to the bolt and tighten to 150 Nm.

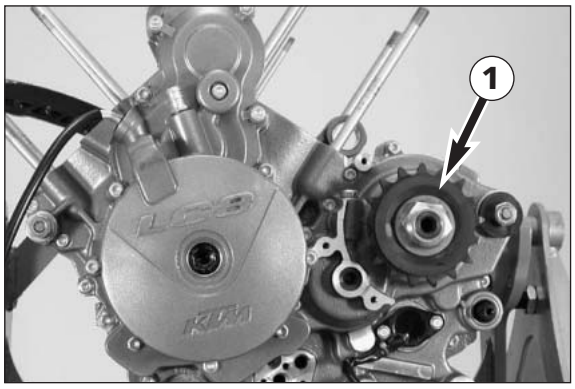
NOTE: to prevent the crankshaft from turning, block it with the engine lock bolt.

– Mount the upper starter idler gear ❼ on the journal.

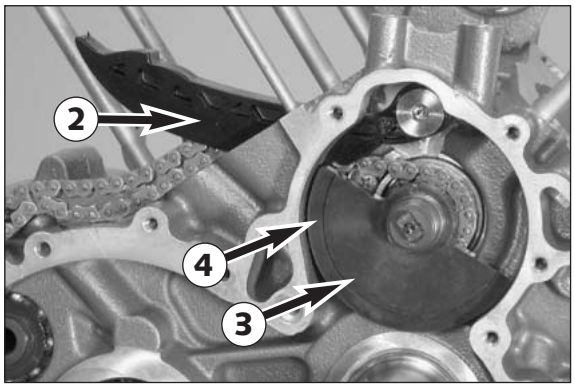


Generator cover

– Mount dowel pins on the engine case and put a new gasket in place. Position the generator cover and tighten the generator cover bolts to 10 Nm (see illustration for bolt lengths).



– Mount the chain sprocket with the lock washer and tighten the nut ❶ to 60 Nm.



Timing chain and balancing weight

– Screw the output-end timing chain tensioning rail ❷. Apply Loctite 243 to the bolt and tighten to 20 Nm.

! CAUTION !

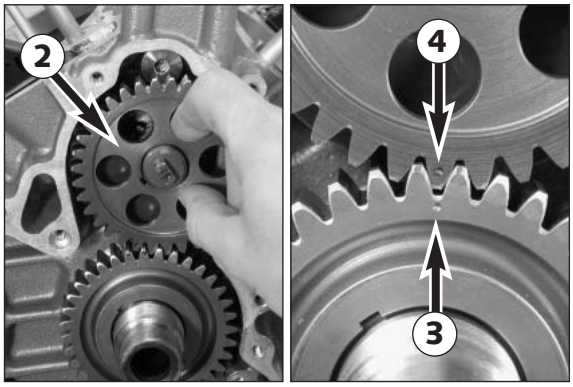
MAKE SURE NO LOCTITE THREAD ADHESIVE IS ON THE PIVOT AREA OF THE BOLT. THIS COULD CAUSE THE TIMING CHAIN TENSIONING RAIL TO BLOCK AND BREAK.

– Insert the woodruff key for the chain sprocket in the shaft groove and push the chain sprocket onto the balancer shaft. Fit the timing chain (pay attention to the running direction if the chain has already been used).
– Insert the woodruff key for the balancing weight in the shaft groove and mount the balancing weight ❸ with the aperture ❹ towards the front.



Primary pinion

– Mount the woodruff key for the primary pinion in the shaft groove (if dismounted).
– Mount the primary pinion ❶ with the longer collar facing the back. The pin for the ring gear must face outside.

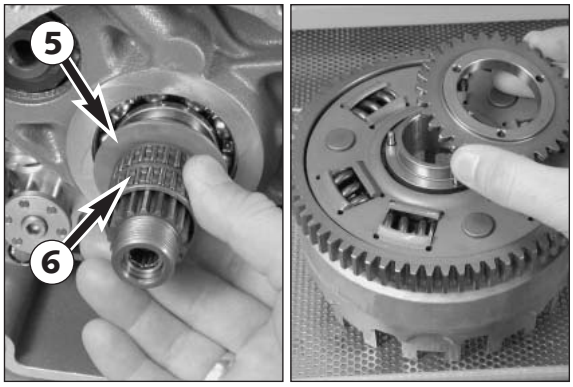


– Mount the gear wheel of the balancer shaft ❷ with the collar facing the back.

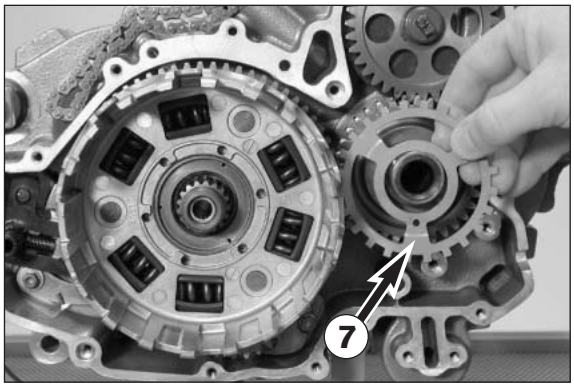
! CAUTION !

TURN THE BALANCER SHAFT UNTIL THE MARKS ON GEARS FOR THE CRANKSHAFT ❸ AND BALANCER SHAFT ❹ COINCIDE AS SHOWN IN THE ILLUSTRATION. MAKE SURE THE TIMING CHAINS DO NOT GET CAUGHT.

NOTE: when the marks coincide the first cylinder of the engine is in the TDC position.



– Slide a 30.3 x 50 x 2 mm spacer washer ❺ and a needle bearing ❻ on the clutch shaft.
– Mount the gear for the oil pump drive on the back of the outer clutch hub. The gear is secured by 3 needle rollers.



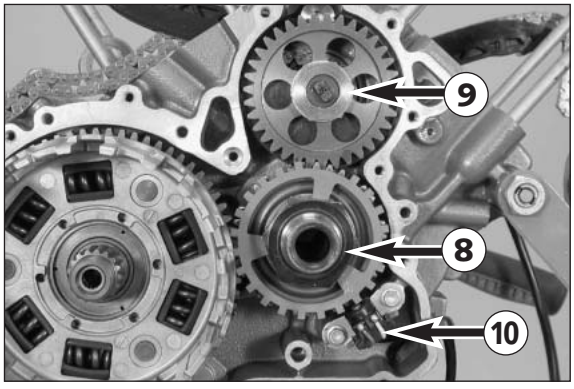
Outer clutch hub

– Slide the outer clutch hub onto the shaft, leaving enough room for the ring gear ❼, which is positioned by a pin.

! CAUTION !

THE RING GEAR HAS A MARK A WHICH FACES THE OUTSIDE.

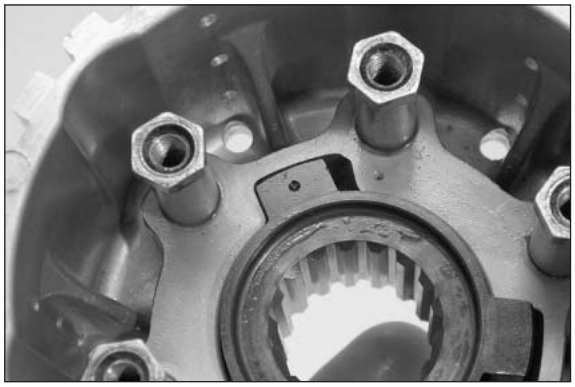
– After mounting the ring gear on the crankshaft, push the outer clutch hub up to the stop, moving the oil pump wheel back and forth to make the procedure easier.



– Mount a 33.2 x 46 x 2 disk and nut ❽ (A/F 46 mm) on the primary pinion (LH thread). Apply Loctite 243 to the nut and tighten to 130 Nm.
– Mount a 20.2 x 33 x 1.5 mm disk and nut ❾ on the balancer shaft. Apply Loctite 243 to the nut and tighten to 150 Nm.

– Screw on the pickup ❿. Apply Loctite 243 to the bolts (M6x16) and tighten to 10 Nm. Press the cable duct into the recess in the case.

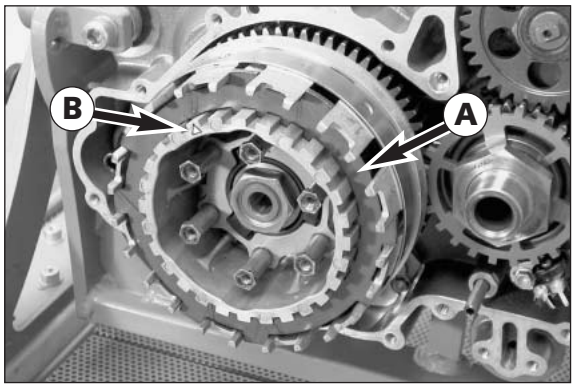
NOTE: the distance between the pickup and the ring gear must be between 0.6 mm and 1.0 mm.

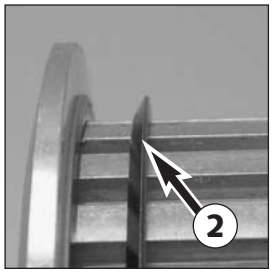


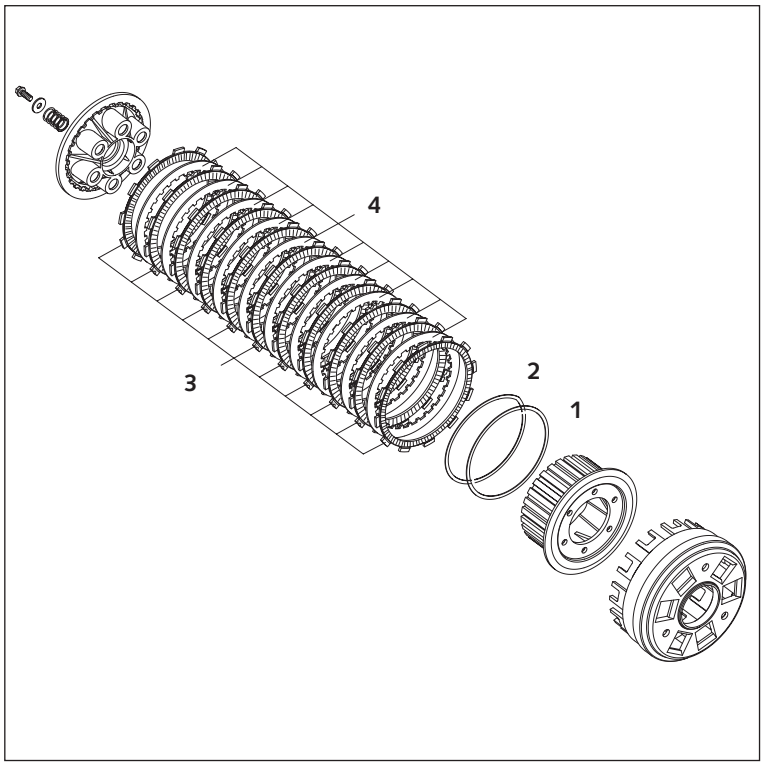
– Slide the 25 x 48 x 6.5 mm disk and inner clutch hub together with the clutch pressure booster onto the main shaft teeth.

NOTE: the two clutch pressure booster parts are marked with coinciding circles.

– Attach the holder for the inner clutch hub Ⓐ 600.29.003.000. Mount the 22 x 37 x 3 mm disk. Apply Loctite 243 to the nut (A/F 32 mm) and tighten to 130 Nm. Remove support.
– Turn the inner clutch hub to check for smooth operation.



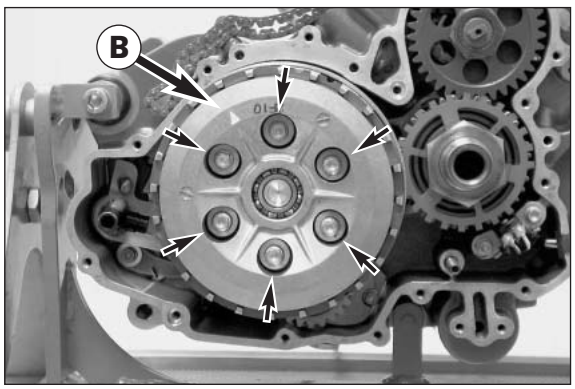




Clutch disks

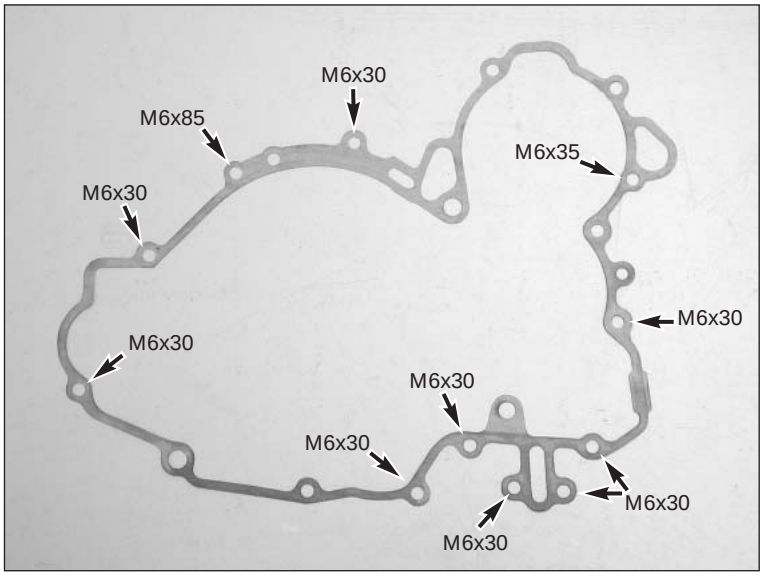
– First mount the supporting plate ❶ and then the spring washer ❷ with the open side facing outwards (see illustration).
– Starting with the lining disk ❸ with the largest inner diameter, alternately insert 11 lining disks and 10 clutch disks.

NOTE:
– Thoroughly oil all disks.
– The clutch lining on the first and last clutch disks have a different color since these two disks run on aluminum on one side.
– The first clutch disk has a larger inner diameter to hold the support and lining disk.
– The clutch disks are punched out. The sharp edges on all of the disks must point in the same direction. The round recesses (for demounting) must be in the same meshing.
– The last lining disk must be turned one meshing further.



– Push the clutch pushrod into the transmission main shaft.

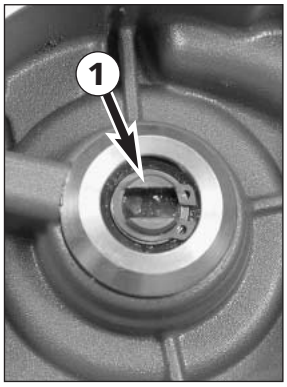
– The marks Ⓑ on the pressure cap and inner clutch hub must coincide when the pressure cap is mounted.
– Mount the pressure springs with disks and bolts (M6x16). Tighten the bolts crosswise to 10 Nm.

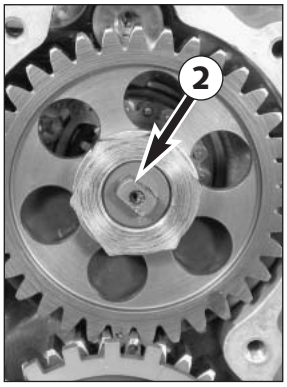


Clutch cover

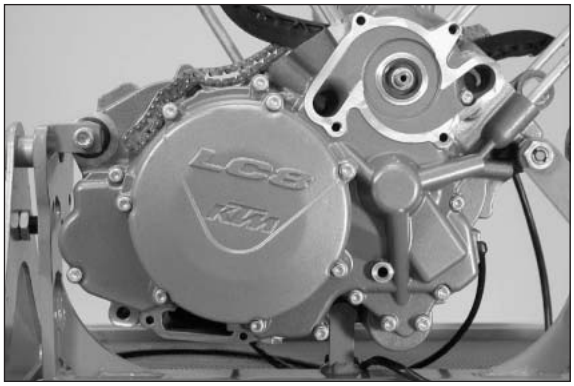
– Mount the dowel pins on the engine case and put a new clutch cover gasket in place.

NOTE: remove the locking bolt to make it easier to mount the clutch cover.



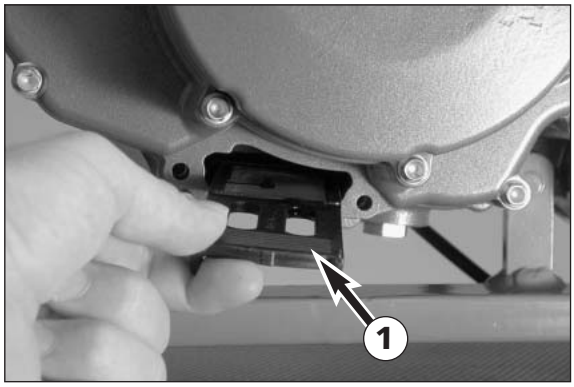


– Turn the water pump shaft ❶ until the recess fits over the driver ❷ of the balancer shaft when the clutch cover is mounted.



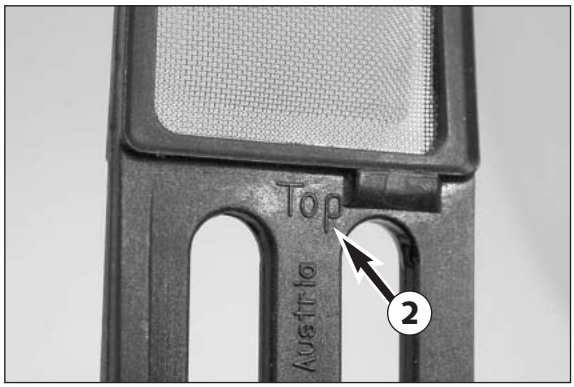
– Mount the inner clutch cover together with the outer clutch cover, inserting the bolts as illustrated. Tighten to 10 Nm.

– Screw the locking bolt back in.



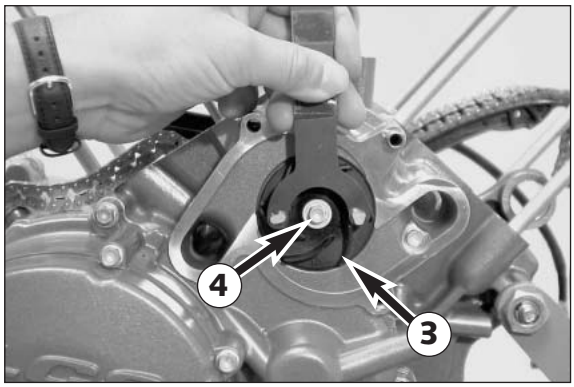
Oil screen

– Insert the oil screen ❶ in the opening in the case.



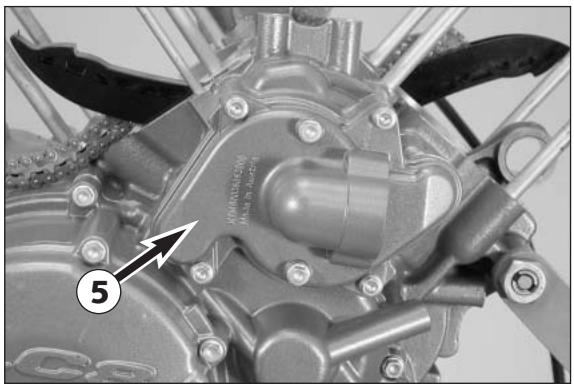
NOTE: the oil screen has a TOP marking ❷ which must point up.

– Mount the oil screen cover; tighten the two M6x35/M6x40 bolts to 10 Nm.

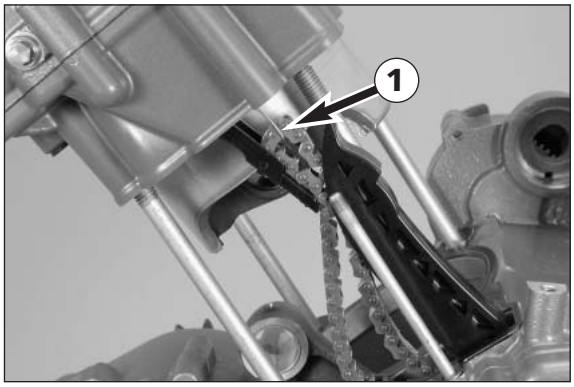


Water pump

– Mount the water pump wheel ❸ and disk on the shaft. Hold with the holding spanner 600.29.082.000, secure the bolt ❹ M6x15 with Loctite 243 and tighten to 10 Nm.



– Mount the dowel pins and replace the O-ring gasket.
– Mount the water pump cover ❺ with 4 M6x60 bolts. Tighten to 10 Nm.



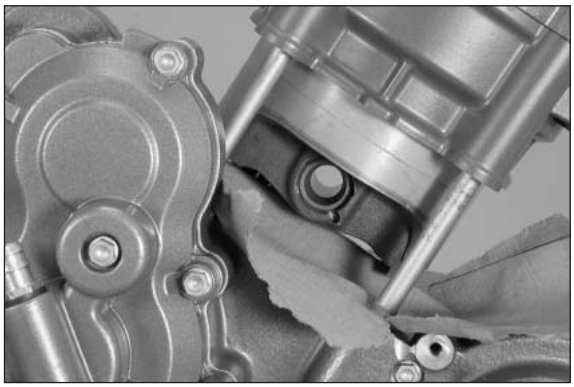
Cylinder head rear with timing chain

– Mount a new base gasket.

NOTE: make sure the crankshaft is blocked in the cylinder rear TDC position.

– Fit the timing chain and chain tensioning rail in the cylinder.

NOTE:
– The chain guide is mounted on the exhaust side of cylinder rear.
– The timing chain should be drawn up and held in the chain tunnel with a thin welding wire ❶ or a rubber band.

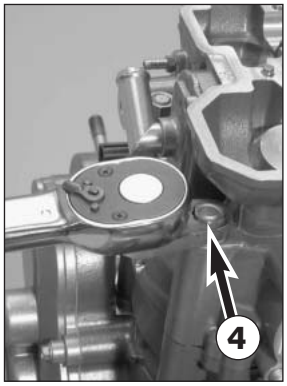


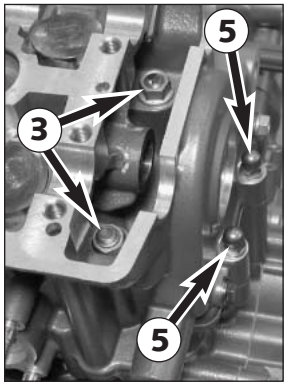
– Push the cylinder head and cylinder over the stud bolts until the piston pin can be pressed into the piston by hand from the output end. Insert a new piston pin retainer with a screwdriver into the piston groove.

! CAUTION !

– Do not pull the piston out of the cylinder up to the oil scraper ring since the piston ring will be damaged by the lower edge of the cylinder.
– The opening towards the crankshaft should be covered with a cloth to prevent the piston pin retainer from falling out of the engine case.
– The piston pin retainer ❷ must be in the position shown in the illustration.







– Push the cylinder head and cylinder down. Mount the cylinder head nuts.

The cylinder head nuts are tightened in 2 stages.

1st stage:
– Tighten the cylinder head nuts crosswise. Use the special nut 600.29.083.000 for the internal nuts ❸ and the special wrench 600.29.081.000 for the outer nut ❹.

! CAUTION !

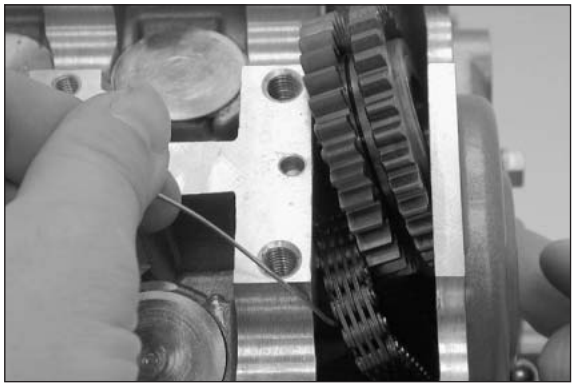
– The tightening torque for the 1st stage is 25 Nm. since the special wrench 600.29.081.000 is used for nut ❹, it must be tightened to 23 Nm.
– The torque wrench used must be used in line with the special wrench 600.29.081.000 (see illustration).

– Tighten the two outer nuts ❺ to 8 Nm.

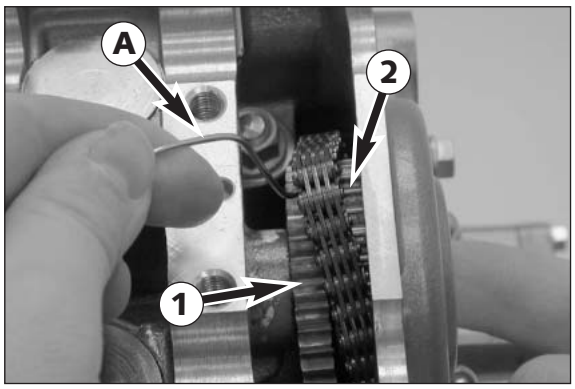
2nd stage:
– Tighten the cylinder head nuts crosswise.

! CAUTION !

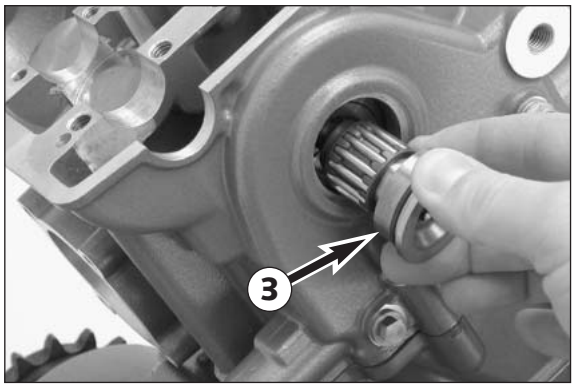
– The tightening torque for the 2nd stage is 43 Nm. since the special wrench 600.29.081.000 is used for nut ❹, it must be tightened to 36 Nm.
– The torque wrench used must be used in line with the special wrench 600.29.081.000 (see illustration).



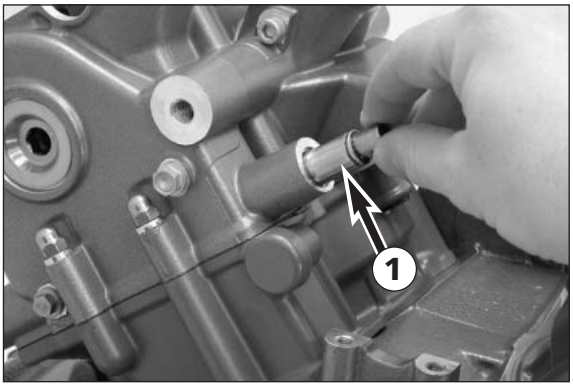
– Push the double timing gear down into the chain tunnel draw the timing chain along the side on the inside.



– Use the wire hook ❹ to lift the side of the chain on the inside over the gear teeth ❶ onto the chain teeth ❷ of the double timing gear. Hold the double timing gear towards the outside by inserting your finger through the hole in the bearing bolt.



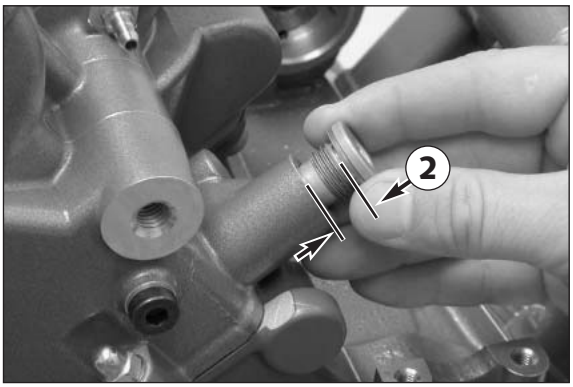
– Mount and grease a new O-ring on the bearing bolt ❸ of the double timing gear.
– Lift the double timing gear, insert the bearing bolt on the double timing gear and the needle bearing into the cylinder head and tighten to 30 Nm.



Chain tensioner cylinder rear

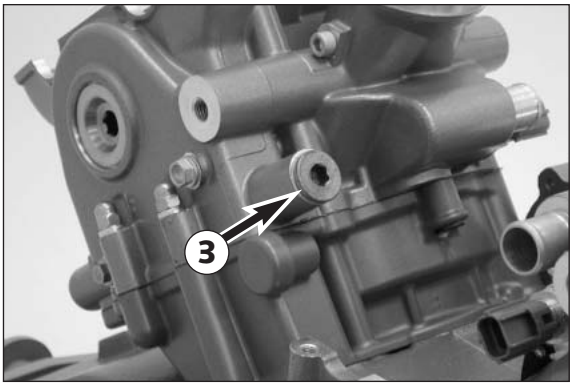
– Insert the chain tensioner element ❶ in the cylinder head bore.

NOTE: the housing and tensioning piston of the chain tensioner are compression molded. If the two parts cannot be separated, the chain tensioner must be replaced.



– Apply the chain tensioner bolt and new sealing washer to the chain tensioner element without compressing the spring.
– Measure the distance ❷ between the sealing washer and the cylinder head.

The measured value has to be between 6 mm and 11 mm. If the value is lower, the tensioning rail could be worn or the timing chain excessively elongated. If it is higher, the engine was turned to TDC against the running direction.

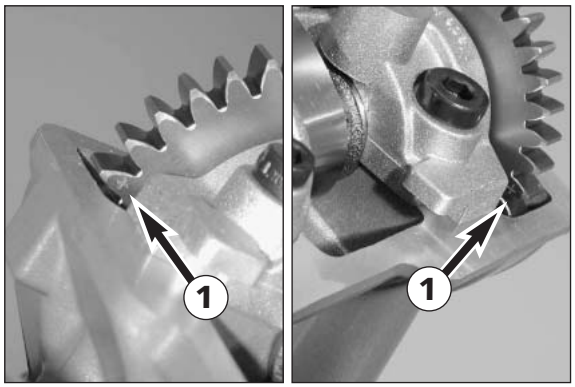


– Mount the chain tensioner bolt ❸ with a new sealing washer and tighten to 20 Nm.



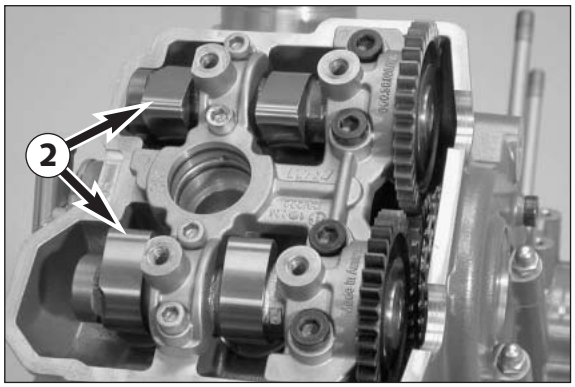
Camshafts cylinder rear

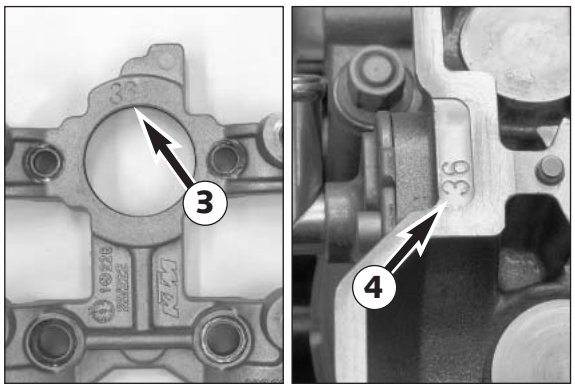
– Insert the two camshafts marked "in re" (rear intake camshaft) and "ex re" (rear exhaust camshaft) into the bearings without tilting. The marks on the camshaft gears must coincide with the flat outer surface of the cylinder head (see illustrations).



NOTE:

– The same camshaft gears are used in both cylinders but they have marks for cylinder rear and front. Use the camshaft gear marked with a cross ❶ for cylinder rear and the camshaft gear marked with a circle for cylinder front.
– The cams ❷ of both camshafts on the cylinder rear will point towards the inside in the TDC position.
– The camshaft bearing bridges ❸ and the cylinder heads ❹ have coinciding marks to ensure that the same camshaft bearing bridge is mounted on the same cylinder head.

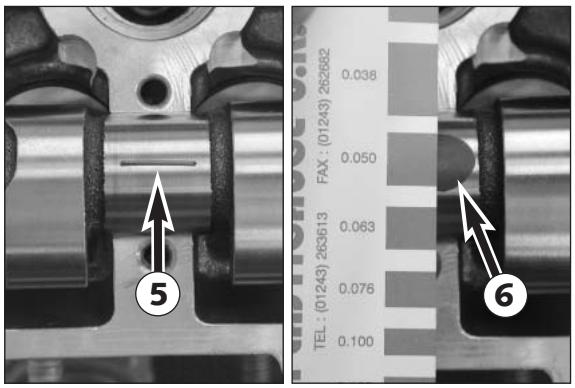




– Place plastigauge measuring strips ❺ (600.29.012.000) on the camshaft bearing positions.
– Carefully mount the camshaft bearing bridge and tighten the bolts in the camshaft bearing bridge to 10 Nm (M8) and 5 Nm (M6) in the first stage.
– Tighten to 18 Nm (M8) and 10 Nm (M6) in the second stage.

! CAUTION !

WHEN TIGHTENING THE BOLTS OF THE CAMSHAFT BEARING BRIDGE, MAKE SURE THAT THE VALVES ARE NOT ACTUATED BY THE CAMSHAFT (SEE ILLUSTRATION), OTHERWISE THE BEARING BRIDGE WILL BREAK.

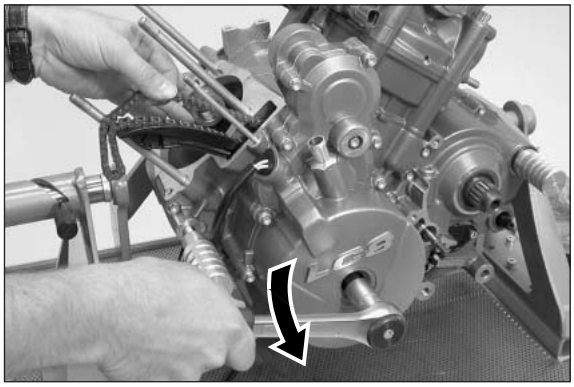


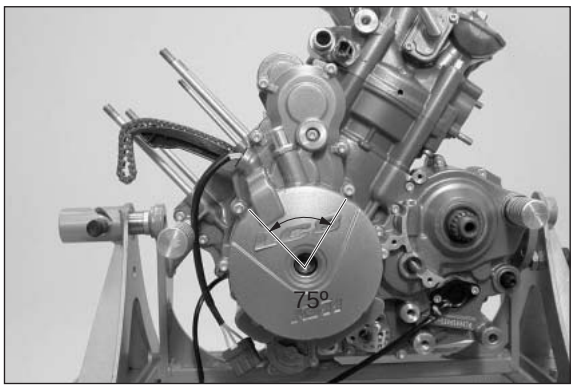
NOTE: do not turn the camshafts.

– Remove the camshaft bearing bridge again and compare the width of the plastigauge measuring strip ❻ with the information on the packing. The width of the plastiguage measuring strip is equivalent to the bearing clearance.

Camshaft bearing clearance: 0.020 mm – 0.061 mm
Wear limit: 0.09 mm

– Carefully mount the camshaft bearing bridge and tighten the bolts in the camshaft bearing bridge to 10 Nm (M8) and 5 Nm (M6) in the first stage.
– Tighten to 18 Nm (M8) and 10 Nm (M6) in the second stage.





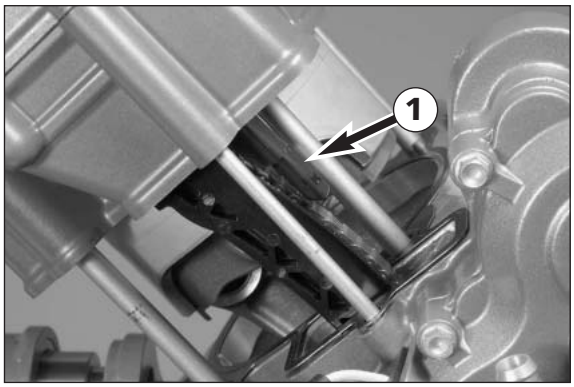
Setting cylinder front to TDC

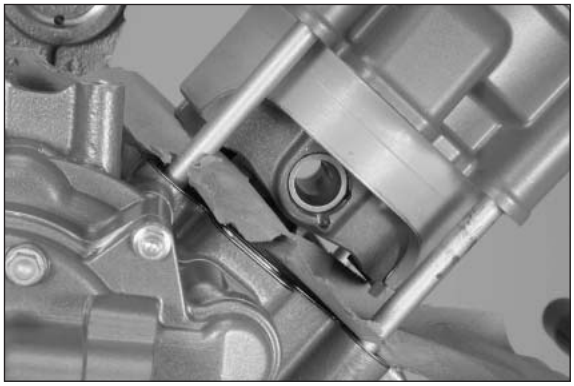
– Loosen the crankshaft locking bolt and turn the engine counterclockwise 1 rotation and then 75° towards the front cylinder's TDC position, keeping the timing chain on the cylinder rear slightly tensioned and holding the conrod in the center of the opening in the case.

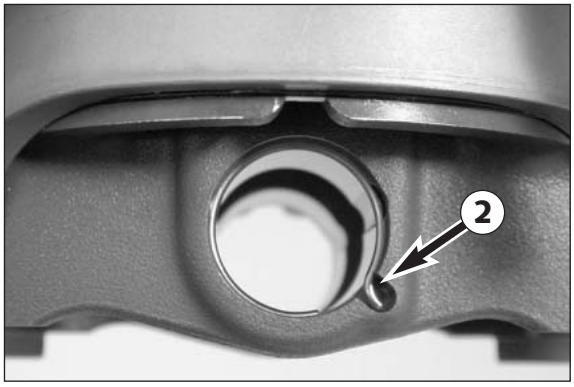
! CAUTION !

– THE CRANKSHAFT MUST BE TURNED 1 ROTATION AND 75° IN A COUNTERCLOCKWISE DIRECTION, OTHERWISE THE IGNITION INTERVAL WILL NOT BE CORRECT AND THE MOTOR WILL NOT RUN.
– IF YOU DO NOT HOLD THE CHAIN, IT MAY GET JAMMED BETWEEN THE TIMING CHAIN ON THE CRANKSHAFT AND THE TENSIONING RAIL.
– IF THE CONROD IS NOT POSITIONED IN THE CENTER OF THE OPENING IN THE CASE, THE CONROD BOTTOM WILL BLOCK ON THE BALANCER SHAFT AND PREVENT THE CRANKSHAFT FROM TURNING.

– Screw the crankshaft locking bolt back in.







Cylinder head front with cylinder and timing chain

– Mount a new base gasket.

NOTE: make sure the crankshaft is blocked in the cylinder front TDC position.

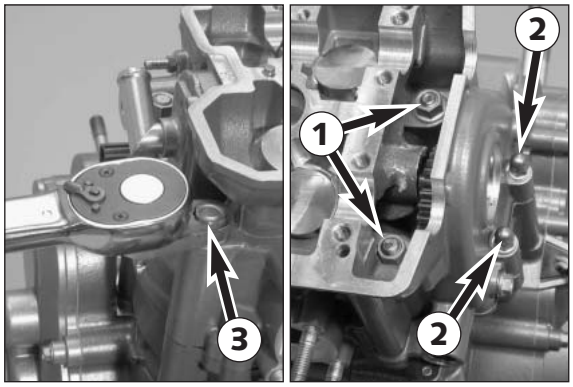
– Fit the timing chain and chain tensioning rail in the cylinder. Tilt the chain tensioning rail ❶ towards the chain to allow it to engage in the chain tunnel of the engine case.

NOTE:
– The chain guide is mounted on the intake side of cylinder front .
– The timing chain should be drawn up and held in the chain tunnel with a thin welding wire or a rubber band.

– Push the cylinder head and cylinder over the stud bolts until the piston pin can be pressed into the piston by hand from the output end. Insert a new piston pin retainer with a screwdriver into the piston groove.

! CAUTION !

– DO NOT PULL THE PISTON OUT OF THE CYLINDER UP TO THE OIL SCRAPER RING SINCE THE PISTON RING WILL BE DAMAGED BY THE LOWER EDGE OF THE CYLINDER.
– THE OPENING TOWARDS THE CRANKSHAFT SHOULD BE COVERED WITH A CLOTH TO PREVENT THE PISTON PIN RETAINER FROM FALLING OUT OF THE ENGINE CASE.
– THE PISTON PIN RETAINER ❷ MUST BE IN THE POSITION SHOWN IN THE ILLUSTRATION.



– Push the cylinder head and cylinder down. Mount the cylinder head nuts.

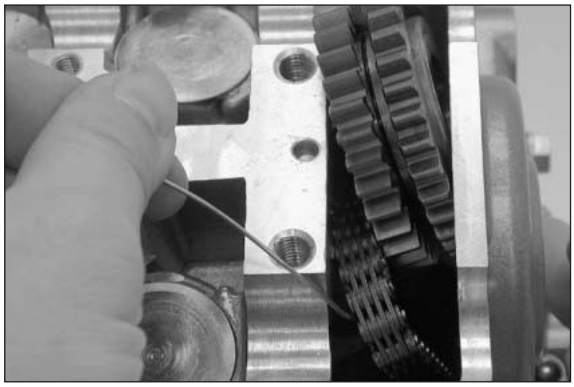
The cylinder head nuts are tightened in 2 stages.

1st stage:

– Tighten the cylinder head nuts crosswise. Use the special nut 600.29.083.000 for the internal nuts ❶ and the special wrench 600.29.081.000 for the outer nut ❸.

! CAUTION !

– THE TIGHTENING TORQUE FOR THE 1ST STAGE IS 25 NM. SINCE THE SPECIAL WRENCH 600.29.081.000 IS USED FOR NUT ❸, IT MUST BE TIGHTENED TO 23 NM.
– THE TORQUE WRENCH USED MUST BE USED IN LINE WITH THE SPECIAL WRENCH 600.29.081.000 (SEE ILLUSTRATION).



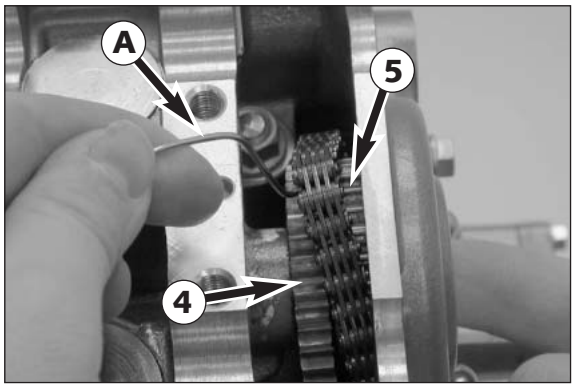
– Tighten the two outer nuts ❷ to 8 Nm.

2nd stage:

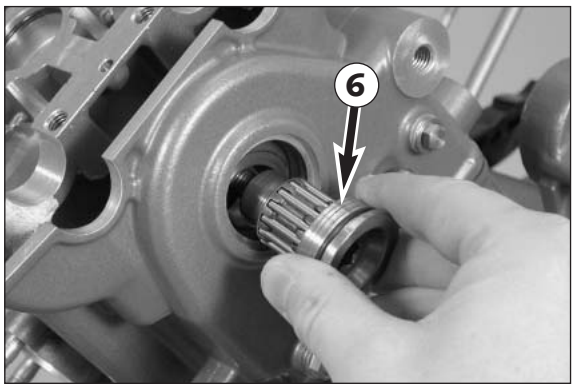
– Tighten the cylinder head nuts crosswise.

! CAUTION !

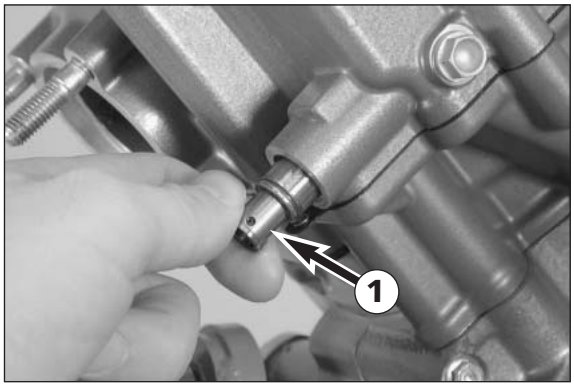
– THE TIGHTENING TORQUE FOR THE 2ND STAGE IS 43 NM. SINCE THE SPECIAL WRENCH 600.29.081.000 IS USED FOR NUT ❸, IT MUST BE TIGHTENED TO 36 NM.
– THE TORQUE WRENCH USED MUST BE USED IN LINE WITH THE SPECIAL WRENCH 600.29.081.000 (SEE ILLUSTRATION).



– Use the wire hook Ⓐ to lift the side of the chain on the inside over the gear teeth ❹ onto the chain teeth ❺ of the double timing gear. Hold the double timing gear towards the outside by inserting your finger through the hole in the bearing bolt.



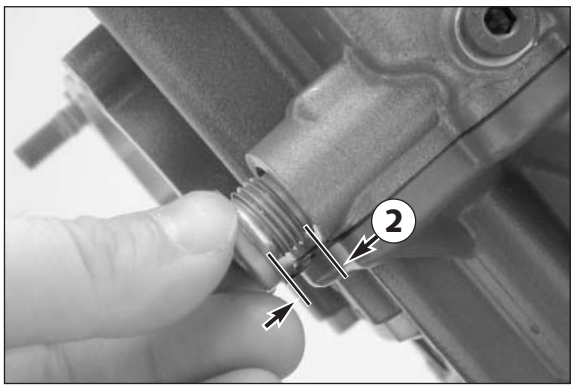
– Mount and grease a new O-ring on the bearing bolt ❻ of the double timing gear.
– Lift the double timing gear, insert the bearing bolt on the double timing gear and the needle bearing into the cylinder head and tighten to 30 Nm.



Chain tensioner cylinder front

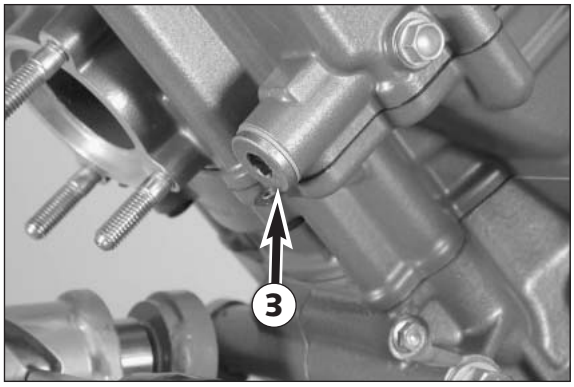
– Insert the chain tensioning element ❶ in the cylinder head bore.

NOTE: the housing and tensioning piston of the chain tensioner are compression molded. If the two parts cannot be separated, the chain tensioner must be replaced.

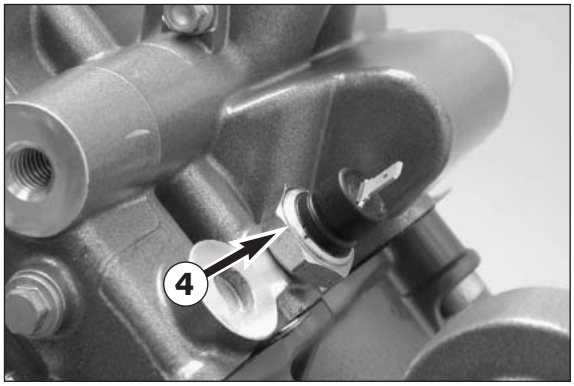


– Apply the chain tensioner bolt and new sealing washer to the chain tensioner element without compressing the spring.
– Measure the distance ❷ between the sealing washer and the cylinder head.

The measured value should be between 6 mm and 11 mm. If the value is lower, the tensioning rail could be worn or the timing chain excessively elongated. If it is higher, the engine was turned to TDC against the running direction.



– Mount the chain tensioner bolt ❸ and tighten to 20 Nm.



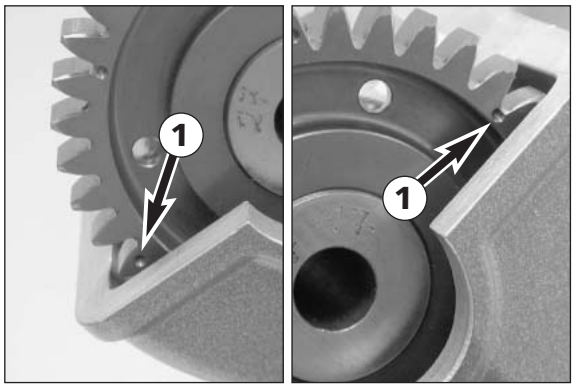
Oil pressure switch

– Mount the oil pressure switch ❹ with a new sealing washer and tighten to 10 Nm.



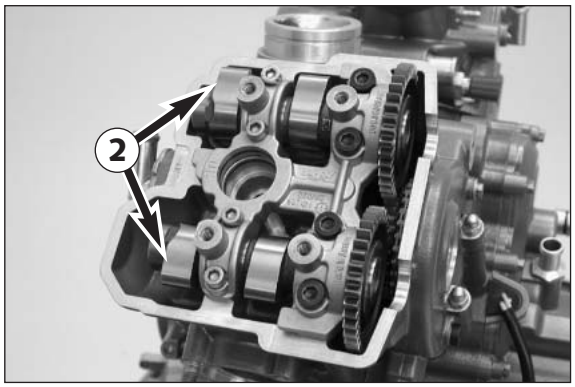
Camshafts cylinder front

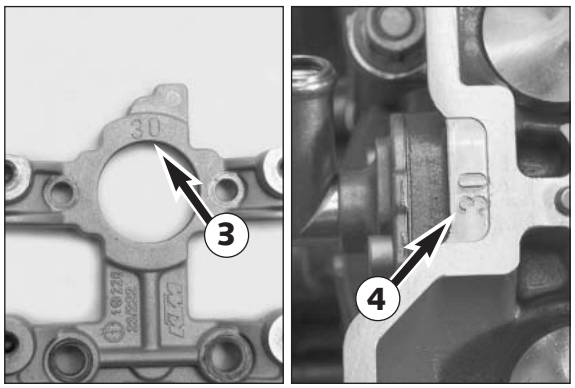
– Insert the two camshafts marked "in fr" (front intake camshaft) and "ex fr" (front exhaust camshaft) into the bearings without tilting. The marks on the camshaft gears must coincide with the cylinder head surface (see illustrations).



NOTE:

– The same camshaft gears are used in both cylinders but they have marks for cylinder rear and front. Use the camshaft gear marked with a cross for cylinder rear and the camshaft gear marked with a circle ❶ for cylinder front.
– The cams ❷ of both camshafts on the cylinder front will point towards the outside in the TDC position.
– The camshaft bearing bridges ❸ and the cylinder heads ❹ have coinciding marks to ensure that the same camshaft bearing bridge is mounted on the same cylinder head.

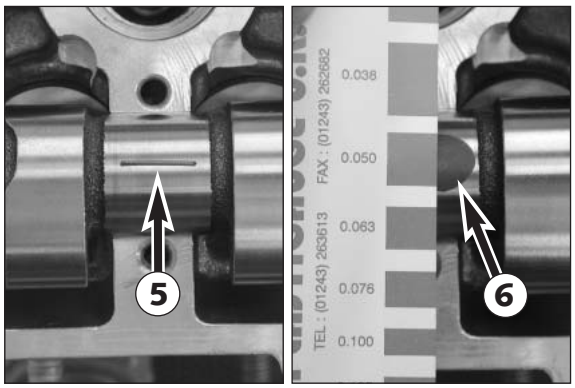




– Place plastigauge measuring strips ❺ (600.29.012.000) on the camshaft bearing positions.
– Carefully mount the camshaft bearing bridge and tighten the bolts in the camshaft bearing bridge to 10 Nm (M8) and 5 Nm (M6) in the first stage.
– Tighten to 18 Nm (M8) and 10 Nm (M6) in the second stage.

! CAUTION !

WHEN TIGHTENING THE BOLTS OF THE CAMSHAFT BEARING BRIDGE, MAKE SURE THAT THE VALVES ARE NOT ACTUATED BY THE CAMSHAFT (SEE ILLUSTRATION), OTHERWISE THE BEARING BRIDGE WILL BREAK.

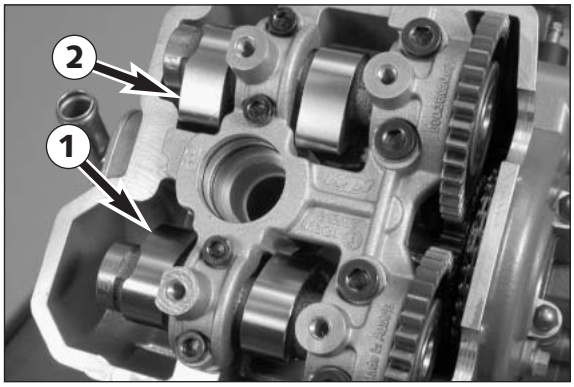


NOTE: do not turn the camshafts.

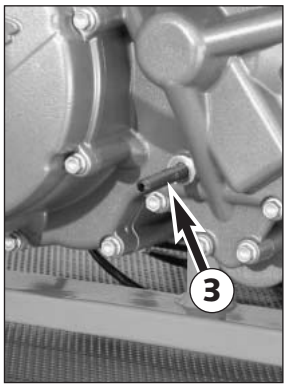
– Remove the camshaft bearing bridge again and compare the width of the plastigauge measuring strip ❻ with the information on the packing. The width of the plastiguage measuring strip is equivalent to the bearing clearance.

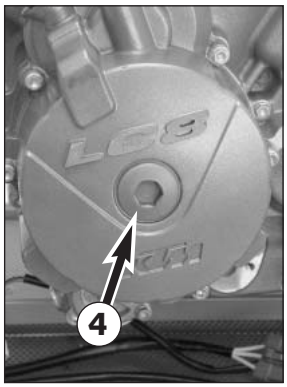
Camshaft bearing clearance: 0.020 mm – 0.061 mm
Wear limit: 0.09 mm

– Carefully mount the camshaft bearing bridge and tighten the bolts in the camshaft bearing bridge to 10 Nm (M8) and 5 Nm (M6) in the first stage.
– Tighten to 18 Nm (M8) and 10 Nm (M6) in the second stage.



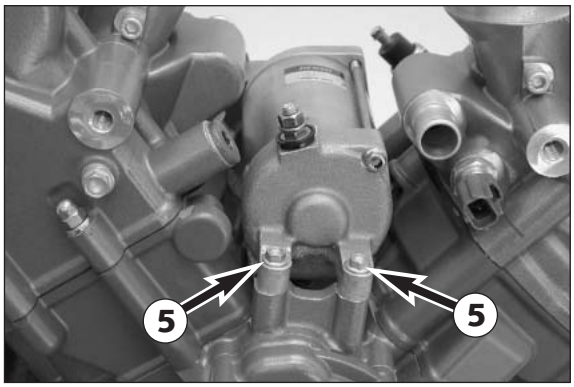
NOTE:
– Check the position of the camshafts on cylinder front in the TDC position of cylinder rear. The cams on the exhaust camshaft ❶ will point towards the inside and rest against the bucket tappet. The cams on the intake camshaft ❷ also point towards the inside, the bucket tappets are not actuated. If the camshafts are in a different position, check the timing and reset.
– Check valve clearance (see page 12-7)





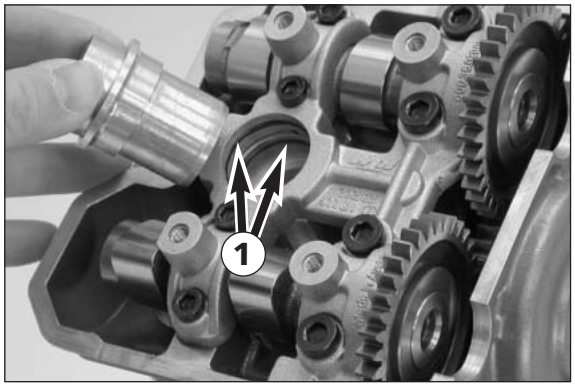
– Remove the crankshaft blocking tool ❸. Insert the case bolt (M8x60) with a new sealing washer and tighten to 10 Nm.

– Screw the plug ❹ into the generator cover.



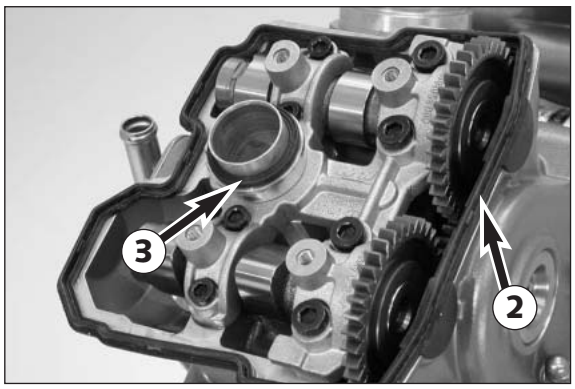
Starter motor

– Insert the starter motor into the opening in the case with a new O-ring (greased). Insert both bolts ❺ (M6x25) and tighten to 10 Nm.

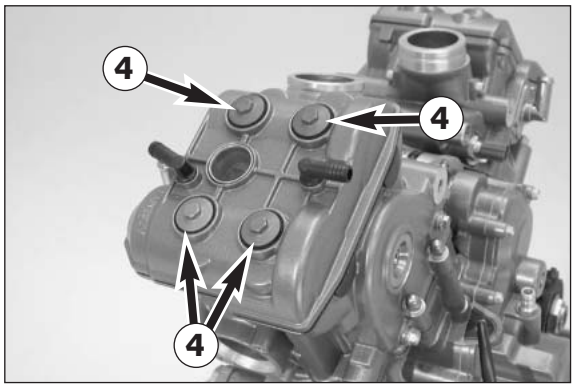


Spark plug shaft inserts

– Mount new O-rings ❶ on the spark plug shafts and grease. Push the spark plug shaft inserts all the way in.



– Mount the valve cover gaskets ❷ and spark plug shaft gaskets ❸.



Valve cover

– Mount the valve cover. Insert bolts ❹ with the sealing washers and tighten to 10 Nm.

– Screw in the spark plugs with special tool 600.29.073.000 and tighten to 12 Nm. Connect the spark plug connectors.

ELECTRICAL 7

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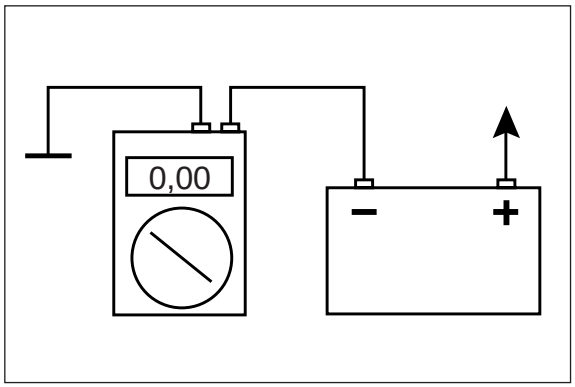
Checking for loss of current

Check for loss of current before you check the rectifier regulator.

– Switch off the ignition and disconnect the ground wire from the battery.
– Connect an ammeter between the ground wire and the negative pole on the battery.

Set point value: max. 2 mA

– If the value is higher, look for the current consumers.
  For example:
– a defective regulator/rectifier
– a defective multifunctional digital speedometer
– Creepage current in the socket connectors or in the ignition lock



NOTE: you will need to set the clock on the multifunctional digital speedometer after the battery is connected.

Dismounting/replacing the battery

see Chapter 3

Charging the battery

see Owner's Manual page 33

Jump start

see Owner's Manual page 33

Checking the charging voltage / rectifier regulator

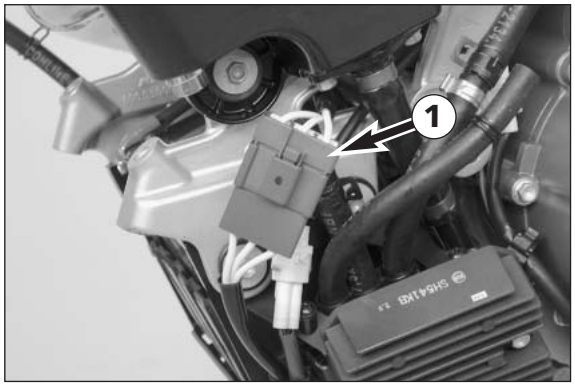
NOTE: the following figures only apply to fully charged batteries.

– Connect a voltmeter to both battery terminals.
– Start the engine and switch on the low beam.
– Rev the engine up to 5000 rpm and read the voltage.

Set point value: 14.0 – 15.0 V

If the measured value deviates significantly from the set point value:

– Check the socket connectors from the stator to the regulator rectifier and from the regulator rectifier to the cable tree.
– Check the generator coils
– Replace the regulator rectifier

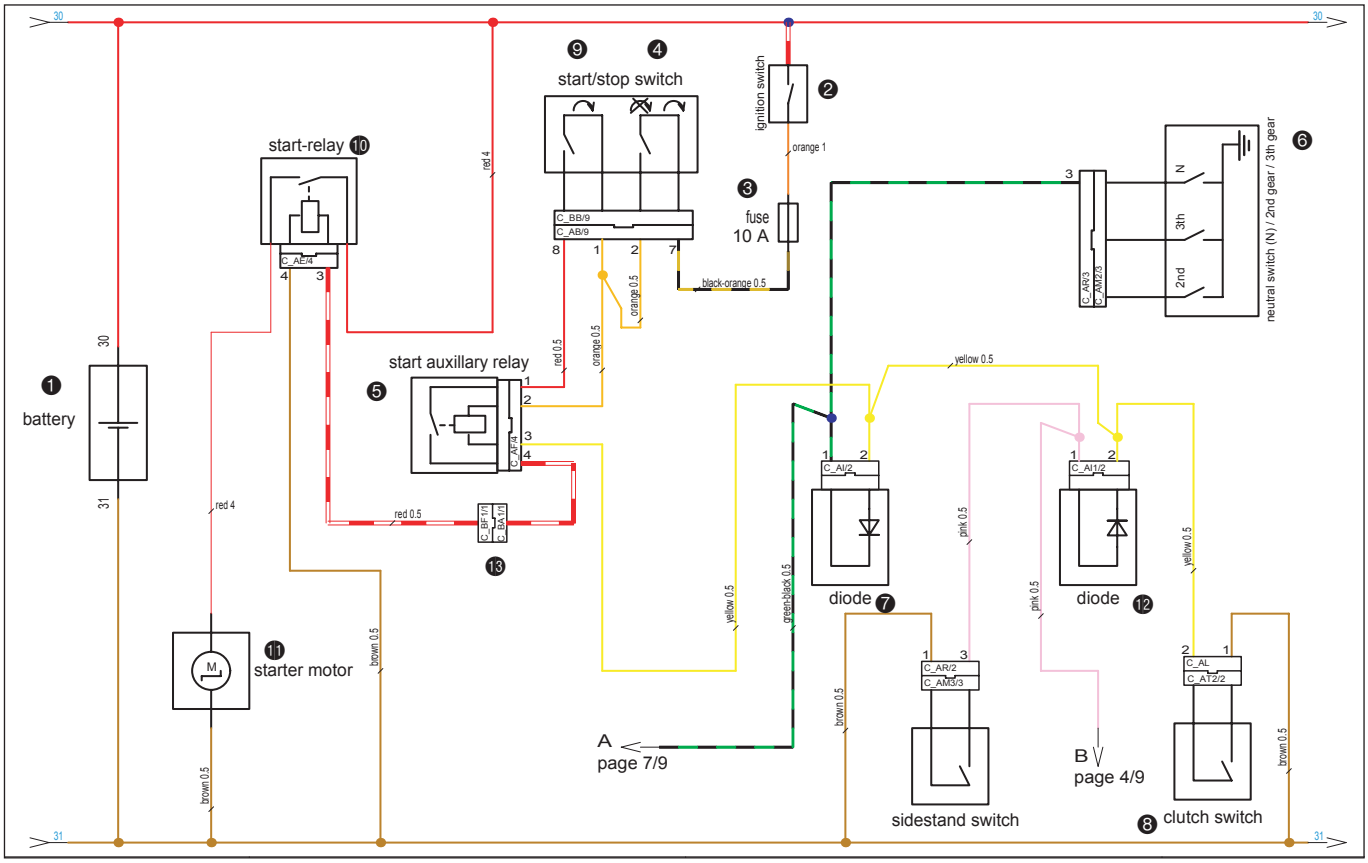


Checking the generator coils

– Disconnect the socket connector ❶ and measure the 3 cables (yellow) to the generator back to back for resistance.

Set point value: max 1.0 Ω at 20°C

– Check all three cables for short circuit to ground.
– Check both connectors for damage.



Electric starter system

NOTE: the starter system is equipped with a safety feature.
You will only be able to start under the following conditions:

– If the gnition lock is in the ON position
– If the emergency OFF switch is in the ON position
– If the transmission is shifted to neutral or the clutch is pulled

How the starter system operates:
Battery voltage travels from the battery ❶ through the ignition lock ❷ , fuse ❸ and the emergency OFF switch ❹ to the coil of the auxiliary starter relay ❺ .
The ground supply to the coil of the auxiliary starter relay takes place if at least one of the following conditions are met:
– Transmission is shifted to neutral (neutral switch ❻ is closed, current can flow through diode ❼ and the neutral switch against the ground)
– Clutch is pulled (clutch switch ❽ is closed, the current can flow through the clutch switch against the ground)

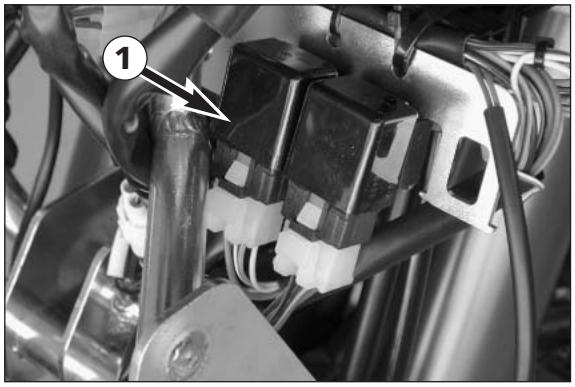
NOTE: if these conditions are met, the load contact from the coil is closed (nonrecurring "click “).

When the tip switch ❾ is actuated, battery voltage flows through the closed contact on the of the auxiliary start relay ❺ to the coil of the start relay ❿ and from there against the ground. This causes the contact on the start relay to close and battery voltage to flow via the start relay contact to the starter engine ⓫ .

The diode ⓬ is one of the electric starter system's important safety features which prevents the starter engine from being actuated although a gear is engaged and the clutch is not pulled. The diode does not allow current to flow when the side stand is folded down, in other words, the auxiliary starter relay will not have a ground connection via the side stand switch.

If the clutch is released with the engine running and a gear engaged although the side stand is folded down (driving off with the side stand folded down) the ECU will not have a ground connection through the pink cable, the voltage will increase to over 2.5 volts and the ECU will break the ignition, immediately causing the engine to stall.

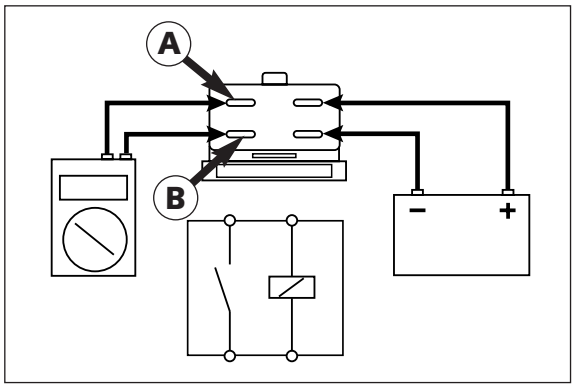
An alarm system (accessory) can be connected to the BA/BF ⓭ connectors. The two connectors must be connected together if no alarm system is installed.



Checking the auxiliary starter relay

– Dismount the auxiliary starter relay ❶.

NOTE: orange, yellow, red and white/red cable colors.



– Connect the auxiliary starter relay (see drawing) to a 12 V battery, making sure you hear the relay switch (nonrecurring "click").

NOTE: the 12 V battery must be connected to the two terminals to which the orange and yellow cable colors are connected when the plug is connected.

– Use an ohmmeter to measure the continuity between terminals Ⓐ and Ⓑ.

Reading: max 1.0 Ω OK
Reading: ∞ Ω defective



Functional check of the auxiliary starter relay

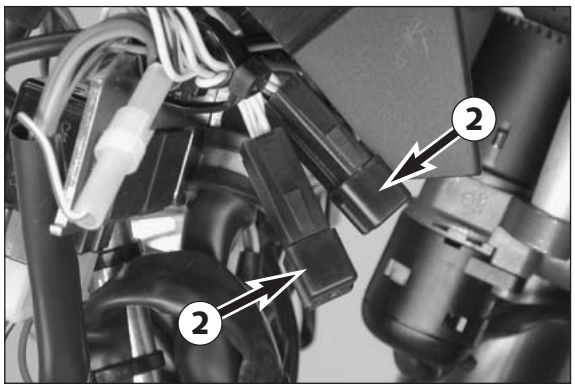
– Pull the auxiliary starter relay out of the bracket.
– Connect an ohmmeter or continuity tester to the cable of the auxiliary starter relay (red and red/white cables).

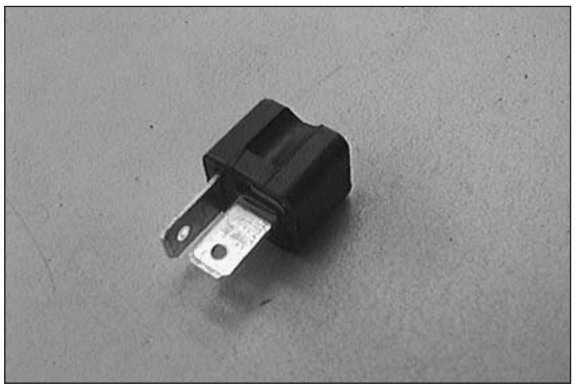
– Perform the tests in the specified order. The auxiliary starter relay must switch under the following 2 conditions:

– Slowly pull the clutch lever with the gear engaged. The auxiliary starter relay should switch at half of the lever travel.
If not, check the clutch switch. Observe the idle indicator lamp, it may not light up. If it does, check the diode.

– Switch the transmission to neutral with the clutch released. The auxiliary starter relay should switch on and switch off when the gear is engaged. If not, check the diode and neutral switch

NOTE: You will hear a faint click when the auxiliary starter relay switches. The ohmmeter or the continuity tester will display the continuity when the auxiliary starter relay is switched on.





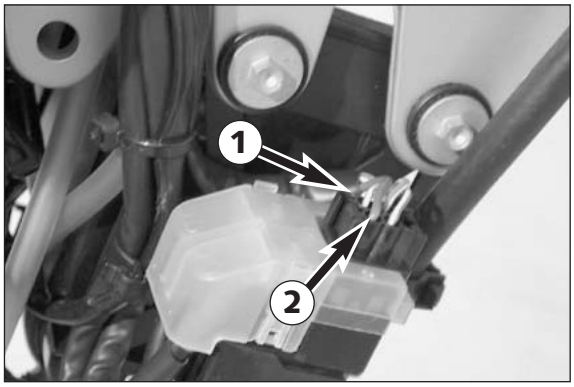
Checking the diodes

NOTE: Diodes only conduct the current in one direction. They block in the other direction.

Diodes can have 2 defects:
– the diode has no continuity.
– the diode has continuity in both directions.
Various malfunctions can occur, depending on the type of defect.

Each diode ❷ is plugged into a bipolar connector (connector AI)

Functional check:
– Connect a suitable ohmmeter to the diode and check the diode for continuity.
– Connect the ohmmeter in the other direction and check if the diode is blocked.



Checking the starter relay

– Disconnect the negative pole from the battery and dismount the start relay.

NOTE: white/red ❶ and brown ❷ cable colors.

– Connect the starter relay to a 12 V battery, making sure you hear the relay switch (nonrecurring "click").

NOTE: the 12 V battery must be connected to the same terminals to which the 3 white/red and the brown cable are connected when the connector is attached.

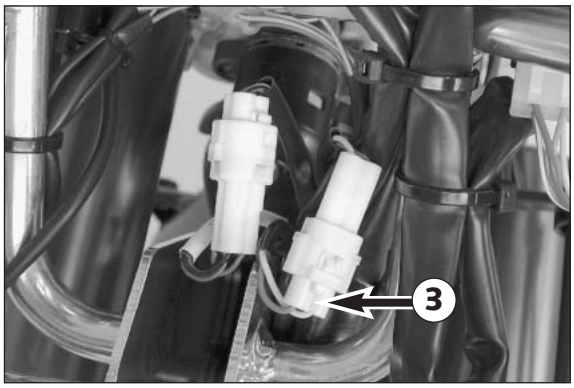
– Check the continuity between the two screw terminals with an ohmmeter.

Reading: max. 1 Ω OK
Reading: ∞ Ω defective

– Pull out the fuse of the starter relais and check for continuity.

Checking the starter engine

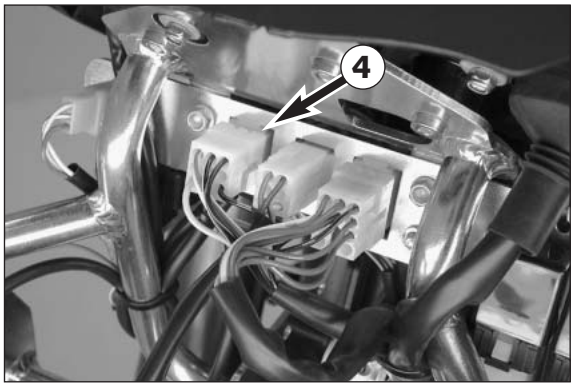
– Switch off the ignition.
– Disconnect the negative pole of the battery and remove the electric starter motor.
– Clamp startermotor in a vice.
– Connect the negative pole of a 12 V battery to the housing of the E starter motor and briefly connect the positive pole of the battery to connection of the electric starter motor (use thick cables).
– The starter must turn as soon as the circuit is closed.
– If this is not the case, replace the starter.



Checking the clutch switch

– Disconnect the clutch switch connector from the cable tree.
– Connect an ohmmeter to the bipolar connector AL ❸ (yellow and brown cable colors) of the clutch switch and slowly pull the clutch lever.
– The switch should close around 2/3 of the lever travel.

Reading: max. 1 Ω when the clutch lever is pulled
Reading: ∞ Ω when the clutch lever is not pulled



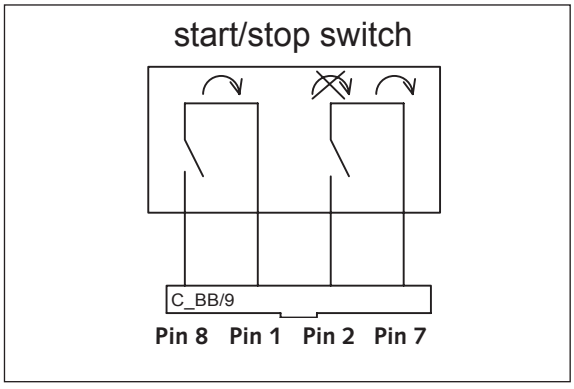
Checking the tip switch and emergency OFF switch

– Disconnect the four-terminal connector BB ❹ on the tip switch / emergency OFF switch from the cable tree.
– Check both switches with an ohmmeter.

Tip switch: between pin 1 and pin 8
Reading: max. 1 Ω when the tip switch is actuated
Reading: ∞ Ω when the tip switch is not actuated

Emergency OFF switch: between pin 2 and pin 7
Reading: max. 1 Ω when the emergency OFF switch is switched on
Reading: ∞ Ω when the emergency OFF switch is switched off

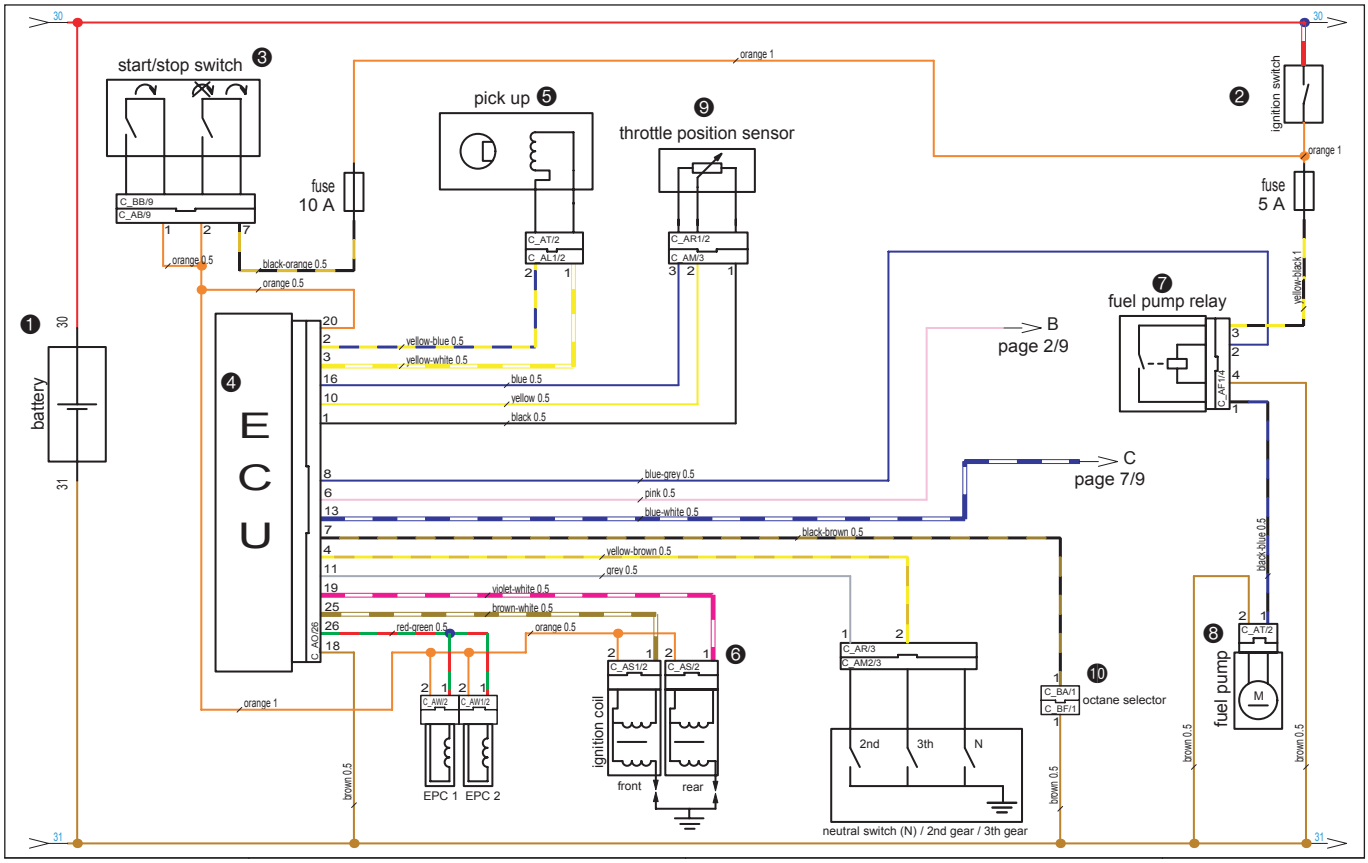
– Afterwards check all lines for short circuit to ground.



Troubleshooting in the starter system

If you actuate the tip switch but the starter engine does not run, check the following points:

– Is the ignition lock in the ON position?
– Is the emergency OFF switch in the ON position?
– Does the idle indicator lamp light up when the ignition is switched on?
– Can you start the engine when the clutch is pulled?
– Is the battery charged?
– Has the main fuse blown?
– Has the fuse for the electric starter system and ignition blown?
– Check the auxiliary starter relay
– Check the starter relay
– Check the E-starter engine



Ignition system, ECU

NOTE: this is a digital battery ignition system with the current supplied by the battery.

Battery voltage from the battery ❶ flows to the ECU (control unit) ❹ through the switched on ignition lock ❷ and the switched on emergency OFF switch ❸.

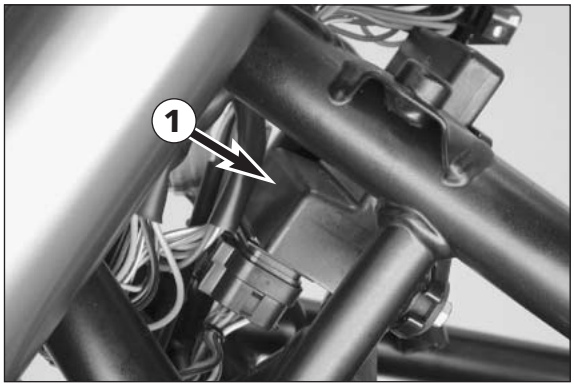
The pulse generator ❺ reports the crankshaft position to the ECU ❹. The ECU uses this signal to calculate the ignition point for each cylinder.
Battery voltage is supplied to both ignition coils ❻ via the emergency OFF switch, the ground is switched by the ECU.

The coil on the fuel pump relay ❼ obtains battery voltage from the ECU. After the ignition is switched on, the fuel pump relay switches on for a few seconds and switches off again. If you start with the engine running, the fuel pump relay will stay on.

The fuel pump ❽ obtains battery voltage from the battery through the switched on ignition lock ❷ , via the fuse and the contact on the fuel pump relay.

The throttle potentiometer (TPS) ❾ reports the position of the carburetor throttle valves to the ECU via the yellow cable (on connector AM or AR). The TPS is supplied with 5 volts of supply voltage (blue cable on connector AM or AR) by the ECU. The black cable (on connector AM or AR) supplies the ground.
NOTE: See page 8-11 for the adjustment of the TPS.

The ECU receives a ground signal via the connected octane selector ❿ (connector BA and BF) and uses the stored ignition curve for fuel with a minimum octane number of 95 (ROZ 95). If the octane selector is disconnected (connectors BA and BF pulled apart) the engine can be operated with fuel with a minimum quality of ROZ 80.



ECU

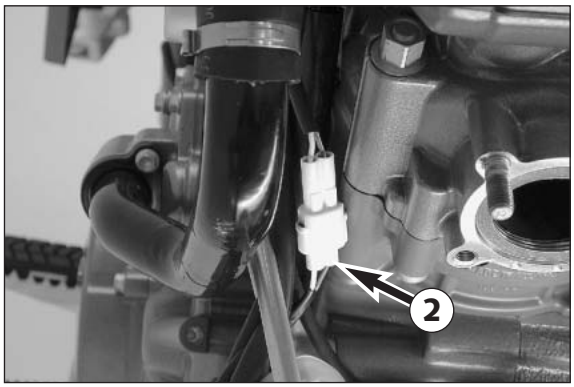
Check the cables and socket connectors on the ECU ❶.
A functional check of the ECU can only be performed on an ignition test stand.

– Check the ignition coil control: remove the ignition coil connector and apply the measuring tips of the peak voltage adapter to the pins of the connector AS (see ❹ on the lower photo).
– Actuate the tip switch and let the starter engine run for a few seconds

Multimeter reading: 12 volts

! CAUTION !

NEVER TEST THE ECU WITH A CONVENTIONAL MEASURING DEVICE. THIS MAY DESTROY HIGHLY SENSITIVE ELECTRONIC COMPONENTS.



Checking the pulse generator

– Disconnect the connectors AL and AT and apply the measuring tips of the peak voltage adapter to the connector AT ❷ (yellow/blue and yellow/white cable colors).
– Actuate the tip switch and run the starter engine for a few seconds.

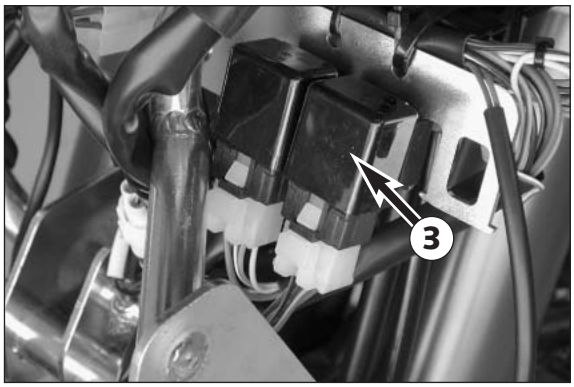
Digital multimeter reading: 4.0 volts +/- 0.5 volts

NOTE: make sure the battery is fully charged.

– If the measured value deviates from the set point value, measure the resistance of the pulse generator:

190 - 300 ... at 20°C

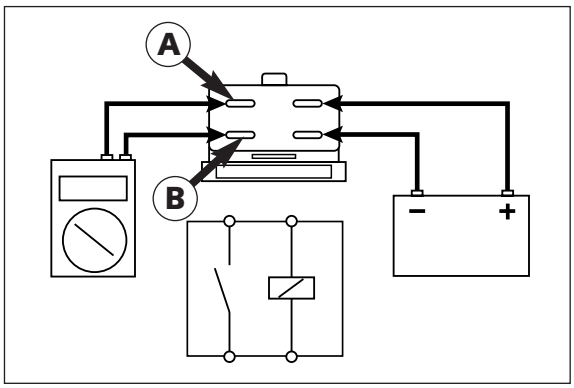
NOTE: if the resistance figure is correct but the signal voltage deviates, check the distance between the pulse generator and the pulse generator wheel (see page 6-9)



Checking the fuel pump relay

– Dismount the fuel pump relay ❸.

NOTE: black/blue, blue/gray, yellow/black and brown cable colors

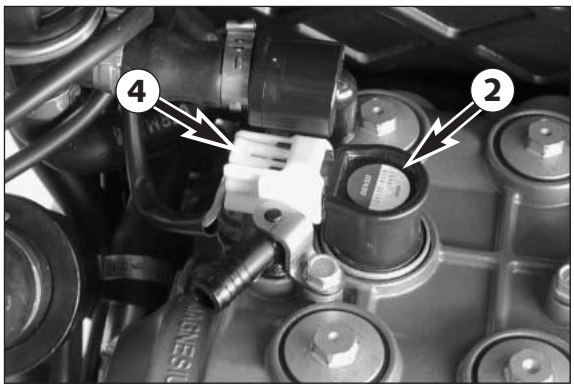


– Connect the fuel pump relay to a 12 V battery as shown, making sure you hear the relay switch (nonrecurring "click").

NOTE: the 12 V battery must be connected to the two terminals to which the blue/gray and brown cable colors are connected when the plug is connected.

– Use an ohmmeter to measure the continuity between the terminals Ⓐ and Ⓑ.

Reading: max. 1 Ω OK
Reading: ∞ Ω defective



Checking the ignition coils

– Disconnect and remove the ignition coil ❷.
– Use an ohmmeter to obtain the following measurements:

Resistance of the primary coil (measured between the terminals):
1.0 – 1.6 Ω.... at 20°C

Resistance of the secondary coil (measured between one terminal and the spark plug connector: 9.4 – 17.6 Ω... at 20°C

NOTE:
– Repeat the measurement for the other ignition coil.
– Replace the respective ignition coil if the measurement deviates significantly from the set point value.

Troubleshooting in the ignition system

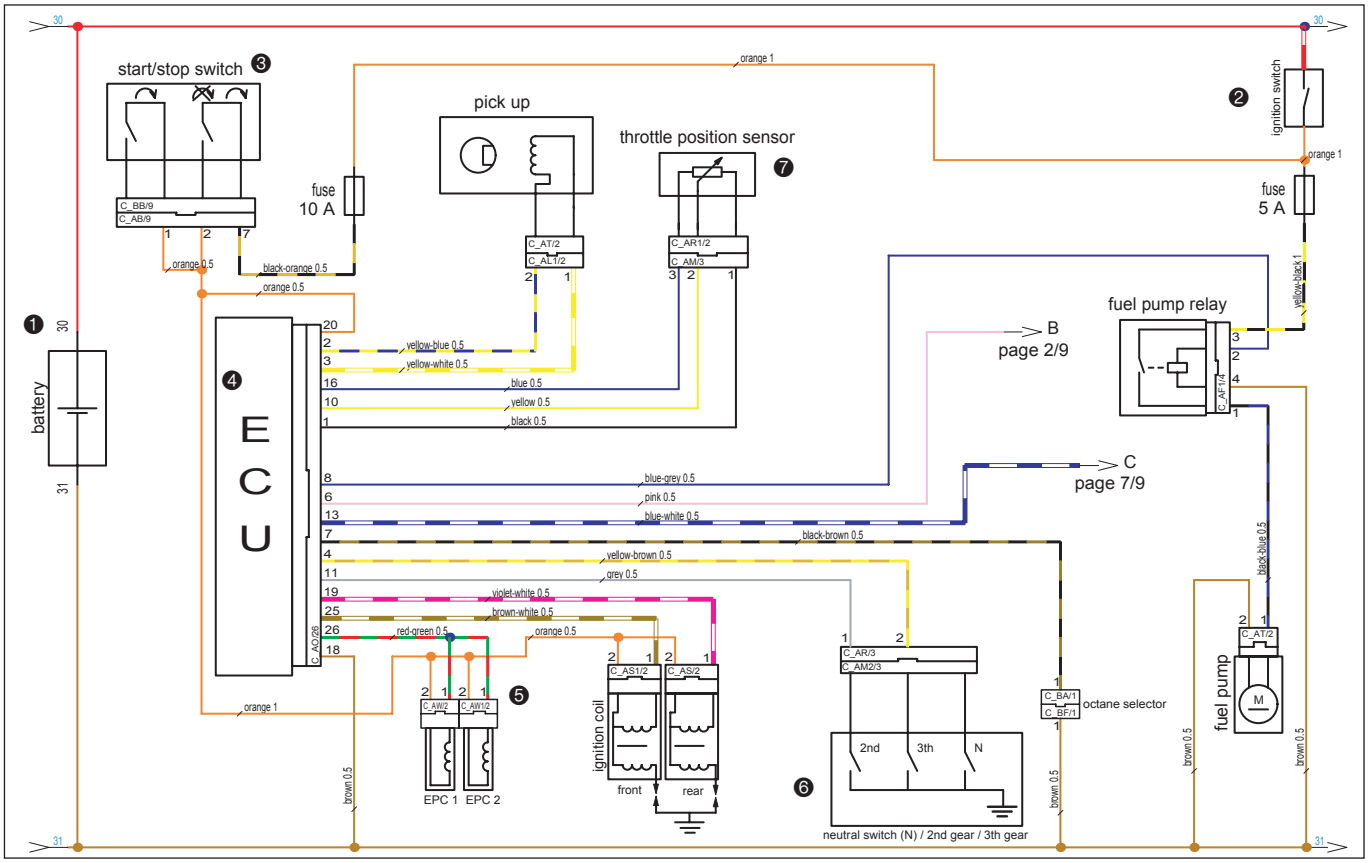
Before checking the ignition, make sure:
– the ignition lock is in the ON position
– the emergency OFF switch is in the ON position
– the battery is charged
– the main fuse is OK
– the fuse for the electric starter system and ignition is OK

Check whether there is an ignition spark upon starting:
– Pull of the ignition coil and remove the spark plug.
– Hold the spark plug and the ignition coil against the ground (engine case).
– A strong spark should be visible when the starter is actuated. If not, try a new ignition coil or new spark plug.

If no spark is visible during the first test, perform the following tests:
– Is battery voltage being applied to the ECU (orange cable color at connector AO) and to the ignition coils (orange cable colors to both connectors AN)?
– Check the ignition control. Are the coils being controlled?
– If not, check the ignition lock, emergency OFF switch and the corresponding parts on the cable tree and the fuse for the ignition and electric starter system.

If the ignition is being supplied with voltage but no spark is visible, check:
– the ground from the ECU
– the cable from the ECU to the ignition coil
– the pulse generator

NOTE: the ECU cannot be tested with simple devices. It can only be tested on an ignition test stand.



The EPC system

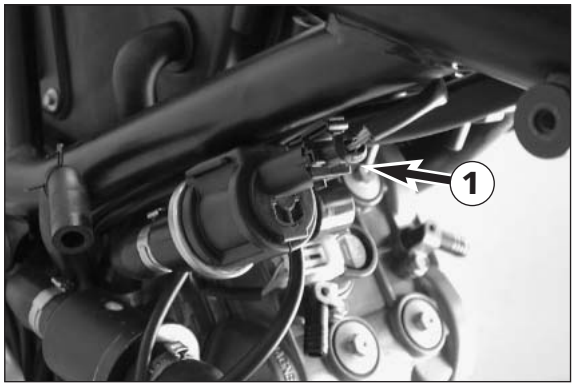
Mode of operation:
Battery voltage from the battery ❶ is conducted to the ECU (control unit) ❹ through the switched on ignition lock ❷ and the switched on emergency OFF switch ❸.
The EPC valves ❺ are supplied with battery voltage via the emergency OFF switch, the ground (red/green cable) is switched by the ECU.

The ECU receives a ground from the gear sensor ❻ via the gray (2nd gear) or via the violet/brown (3rd gear) cable if one of the two gears is engaged.

If the throttle grip is opened all the way (which the ECU recognizes via the TPS ❼) at a certain speed (or a certain number of revolutions) in 2nd or 3rd gear, the ECU activates the ground control of the EPC valves.

Subsequently, the EPC valves will open an air connection to the carburetor diaphragm covers. A controlled amount of fresh air can be sucked into the space above the diaphragm, reducing the vacuum over the carburetor diaphragm.
This causes the carburetor slides to open more slowly resulting in a lower air-gap area to be sucked in through the engine. The engine performance and noise are significantly reduced.

NOTE: if the EPC valves are disconnected, this will not influence the other systems.



Checking the solenoid valve for the EPC

– To check, disconnect connector AW ❶ from the solenoid valve.
– Connect a 12-V battery with the two terminals on the solenoid valve.

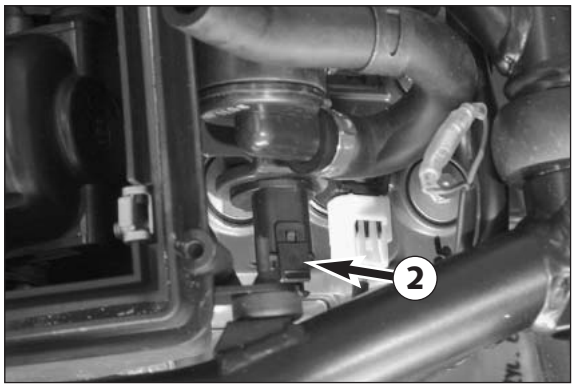
– You should hear a click in the solenoid valve (the diaphragm opening) when the circuit is closed.

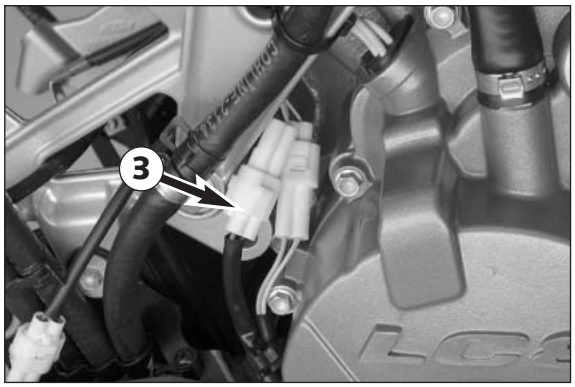
– If you don't hear a click, the solenoid valve needs to be replaced.

– Repeat the procedure for the second valve ❷.

! CAUTION !

IF THE RETAINING CLIP FOR THE FRONT EPC VALVE IS BENT, THE EPC VALVE WILL BE ABLE TO TOUCH THE FRAME. THE ENGINE VIBRATIONS CAN CAUSE IT TO OPEN SLIGHTLY, RESULTING IN A LACK OF POWER FOR THE ENTIRE SPEED RANGE.





Checking the gear sensor

– Use a digital multimeter to measure the voltage between the blue/green cable (neutral) and the ground on connector AM/AR ❸ with the cables connected.

Multimeter reading: 0 – 2.5 volts with the transmission in neutral
Multimeter reading: over 2.6 volts with a gear engaged

– Measure the voltage between the gray cable (2nd gear) and the ground.

Multimeter reading: 0 – 2.5 volts with the transmission in 2nd gear
Multimeter reading: over 2.6 volts with the transmission not in 2nd gear

– Measure the voltage between the yellow/brown cable (3rd gear) and the ground.

Multimeter reading: 0 – 2.5 volts with the transmission in 3rd gear
Multimeter reading: over 2.6 volts with the transmission not in 3rd gear

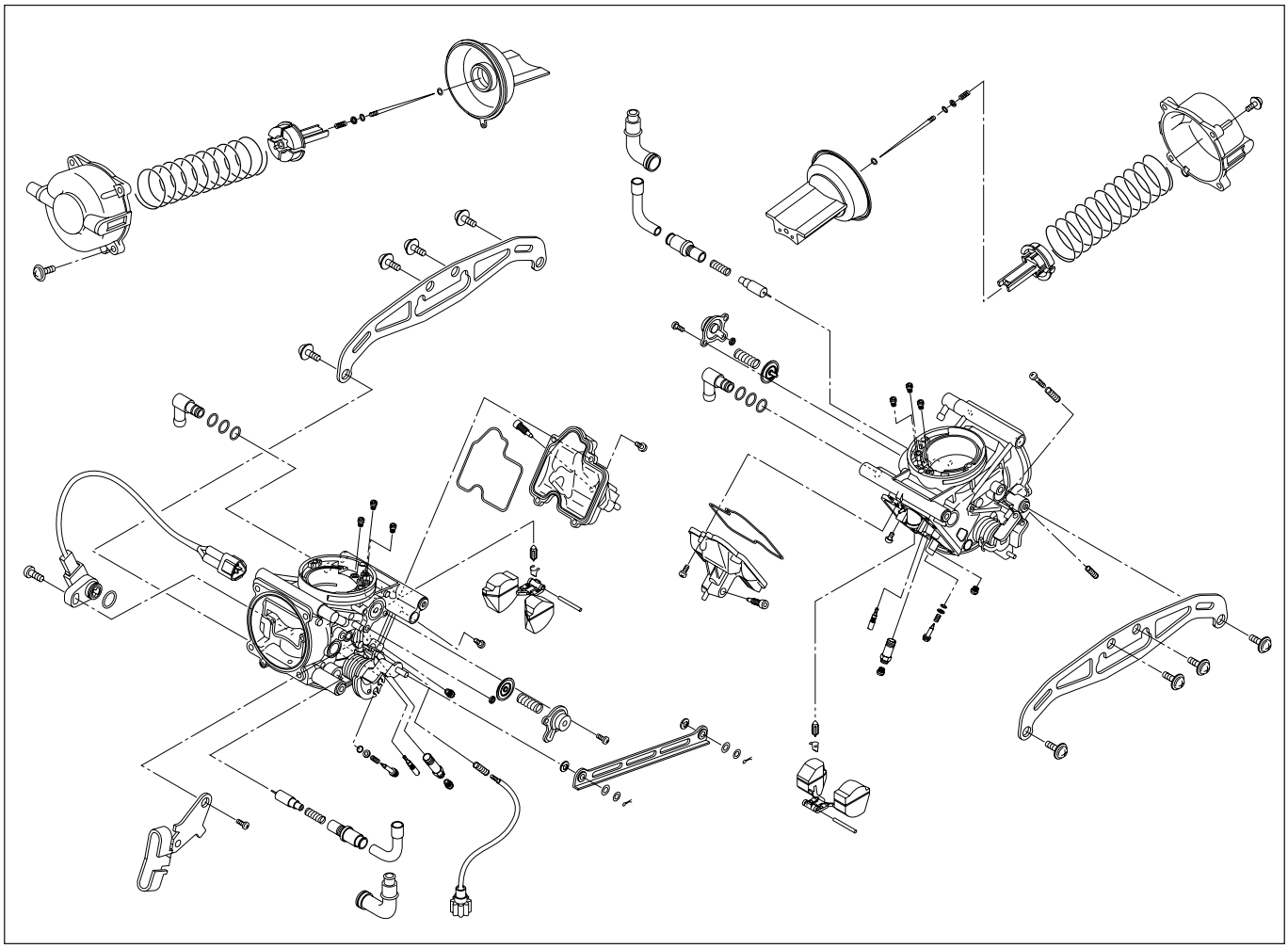
FUEL SYSTEM 8

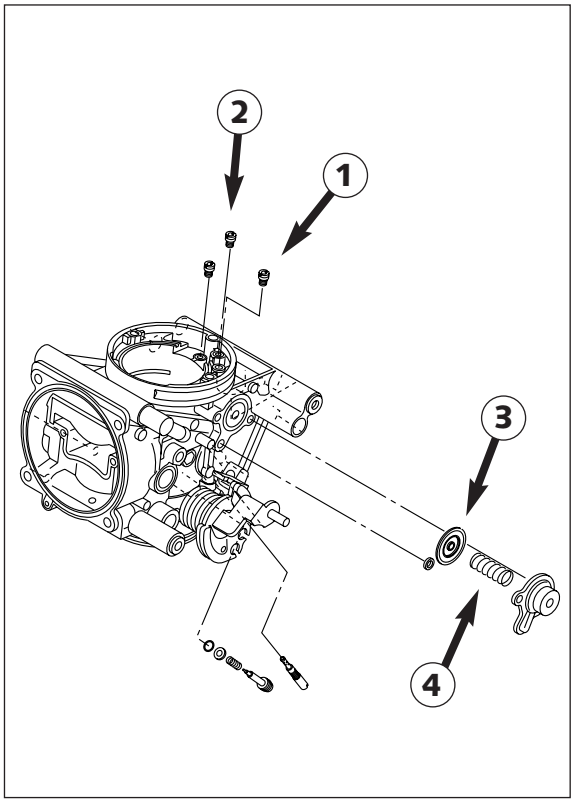
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CARBURATOR - KEIHIN CVRD 43





Description of the ACV (air cut valve) system

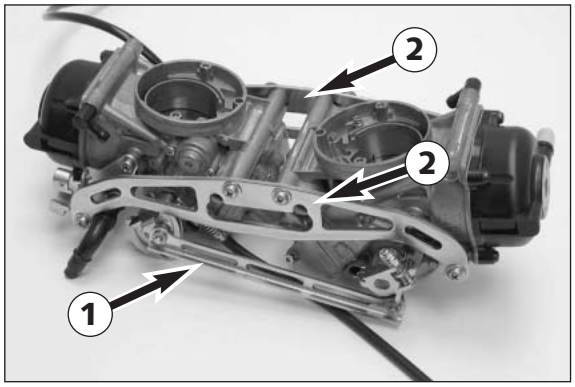
ACV stands for Air Cut Valve.

The ACV system enriches the mixture by reducing the idle-air quantity to prevent the exhaust from backfiring in an overrun condition or upon sudden closure of the throttle valve.

Normally the required idle-air reaches the mixture through two air jets, the idle air jet ❶ (jet diameter 50) and the ACV jet ❷ (jet diameter 80).

In an overrun condition or during upon sudden closure of the throttle valve, the momentary high under-pressure causes the diaphragm ❸ of the ACV valve to close the air channel to the idle-air jet against the pressure of the ACV spring ❹. Now the air can only be drawn in through the ACV jet ❷, resulting in a richer mixture.

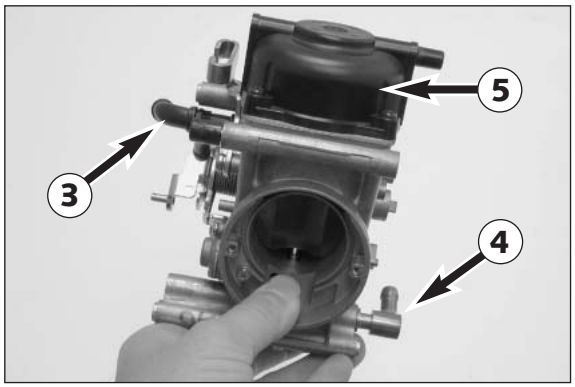
The system needs no maintenance. No servicing is required other than an inspection of the components when the carburetor is overhauled. No adjustments can be made.



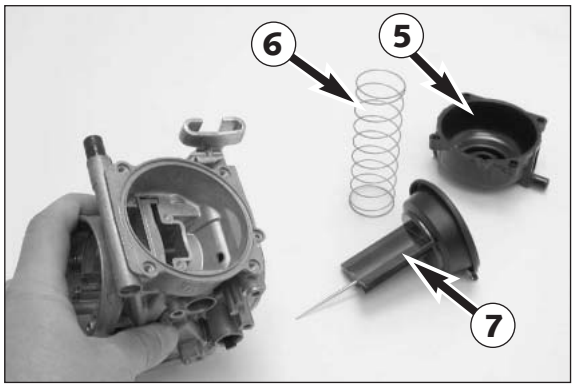
Disassembling the carburetor

– Loosen the throttle linkage arm ❶ and remove together with the shims.
– Unscrew the throttle sensor and cable for the idle setting.
– Loosen the screws and remove both connecting rods ❷.

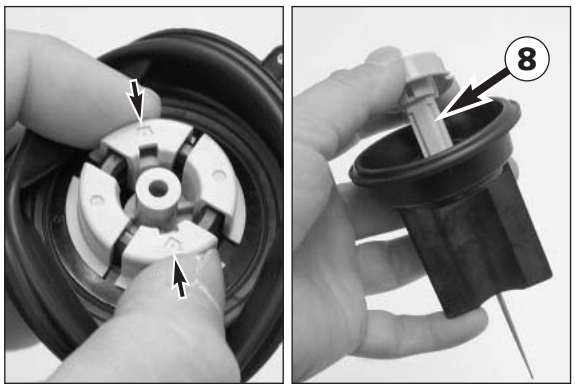
NOTE:
– The screws on the connecting rods are glued in. Place the carburetor on an aluminum plate and tap the screws carefully with a hammer to loosen.
– The fuel connections must be turned aside before the connecting rods can be removed.



– Unscrew the connection for the electric starter system ❸ and remove the starter piston and spring, unless already removed when the carburetor was dismounted.
– Pull the fuel connection ❹ out of the carburetor.
– Remove the diaphragm cover ❺.

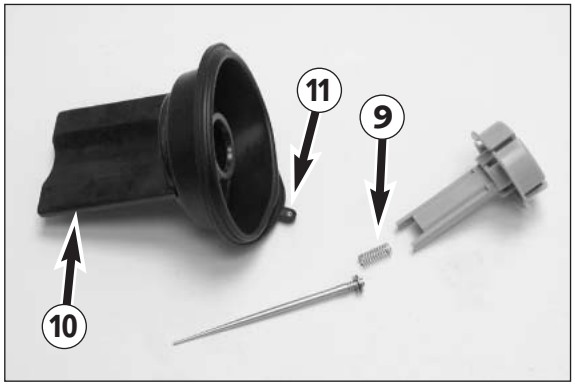


– Remove the throttle slide spring ❻ and pull the throttle slide ❼ out of the carburetor together with the diaphragm.



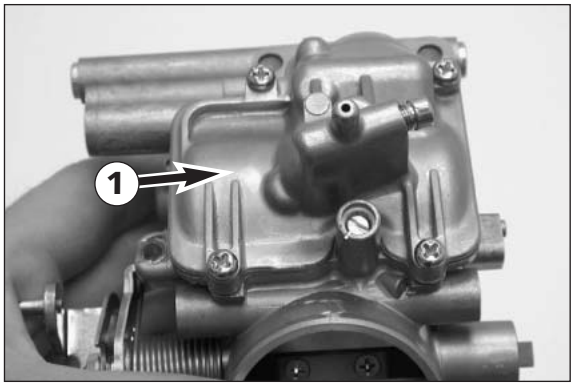
– Press the jet needle holder ❽ together in the direction of the arrows, carefully unclip from the jet needle and remove.

NOTE: the spring ❾ on the jet needle usually remains in the jet needle holder.

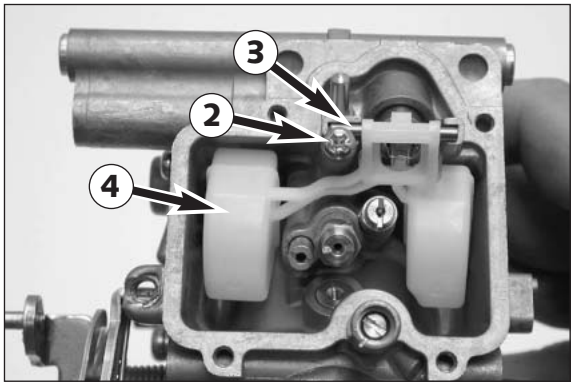


– Check all parts for wear, especially the jet needle and the guide surfaces ❿ of the throttle slide.
– Check the throttle slide diaphragm carefully for cracks or fractures.

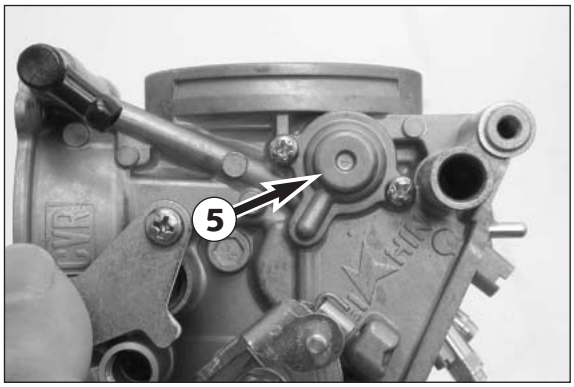
NOTE: the tab of the throttle slide diaphragm contains a small air jet ⓫ – be carefully not to lose it.



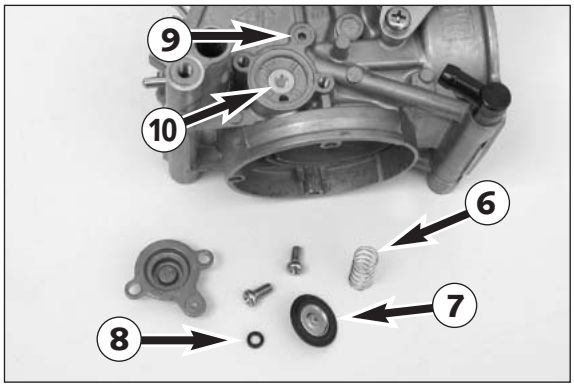
– Remove the float chamber ❶ and discard the gasket.



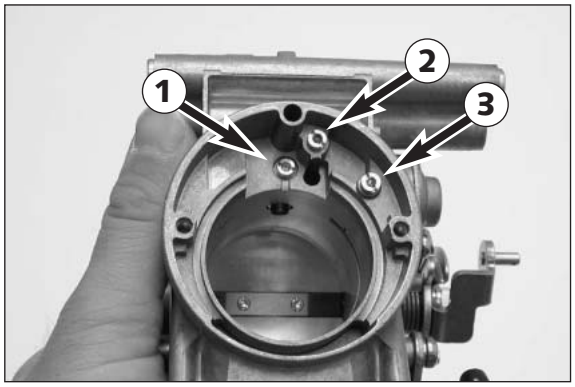
– Loosen the fixing screw ❷ on the float hinge pin ❸ and remove the float ❹ together with the hinge pin and the needle valve.
– Check the needle valve for wear at the conical seat.



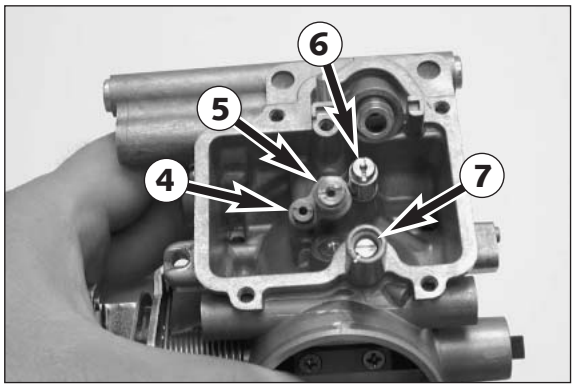
– Unscrew the ACV cover ❺ and remove the spring ❻ together with the diaphragm ❼.



– Remove the O-ring ❽ from the recess around the air jet ❾.
– Check the diaphragm ❼ for cracks or other damage.
– Use a needle or similar tool to press lightly on the ACV valve ❿. The ACV valve should move down. The valve should close completely when you let go.



– Unscrew the main air jet ❶, the ACV jet ❷ and the idle-air jet ❸ with a suitable screwdriver.

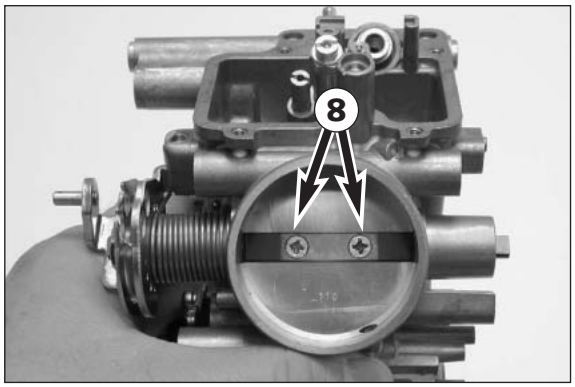


– Unscrew the idle-air jet ❹, the main jet ❺ with the main jet holder and starter jet ❻.
– Before removing the idle-air mixture control screw ❼, screw in to the limit. Count and note down the number of turns. Then remove the mixture control screw together with the O-ring, shim and spring.
– Check the jets for damage and wear.
– Clean all parts thoroughly and blow compressed air through all of the bores.

! CAUTION !

CAREFULLY BLOW THE AIR THROUGH THE ACT JET AIR DUCT FROM THE ACV VALVE SIDE TO AVOID DAMAGING THE ACV VALVE.

– Hold the throttle valve against the light in a closed condition. No light should be visible on the side of the throttle valve.



NOTE: if any light is visible, check the throttle valve and carburetor housing for wear. The throttle valve usually becomes worn on the side near the throttle shaft.

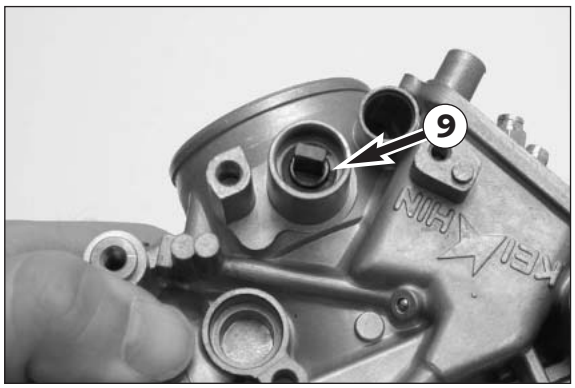
– Remove the screws ❽.

! CAUTION !

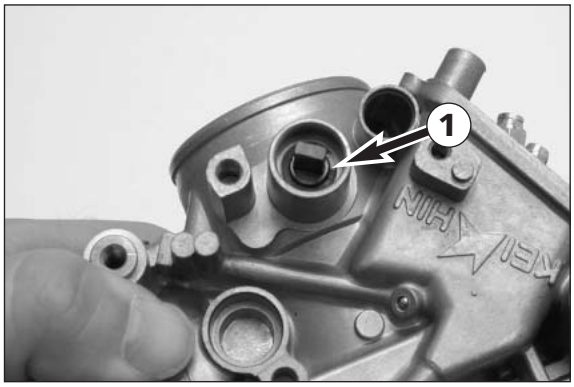
HOLD A SUITABLE MANDREL AGAINST THE THROTTLE SHAFT TO KEEP IT FROM BENDING.

NOTE: bore out the screws if you are unable to loosen them.

– Remove the throttle valve.

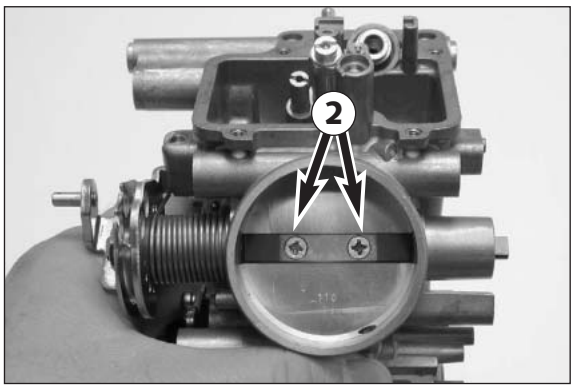


– Remove the lock ring ❾ from the throttle shaft and pull the throttle shaft out from the side of the carburetor.
– Check the throttle shaft for wear and deformation.



Assembling the carburetor

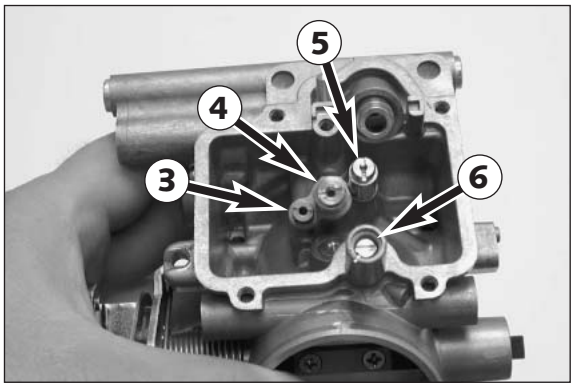
– Push the throttle shaft into the carburetor housing, fit the spring and mount the lock ring ❶.



– Mount the throttle valve ❷, tighten and caulk the screws.

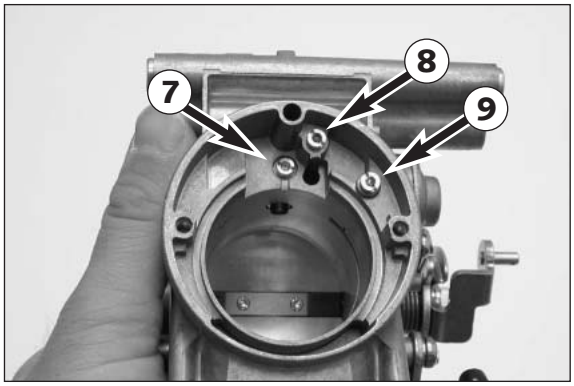
! CAUTION !

HOLD A SUITABLE MANDREL AGAINST THE THROTTLE SHAFT TO KEEP IT FROM BENDING.

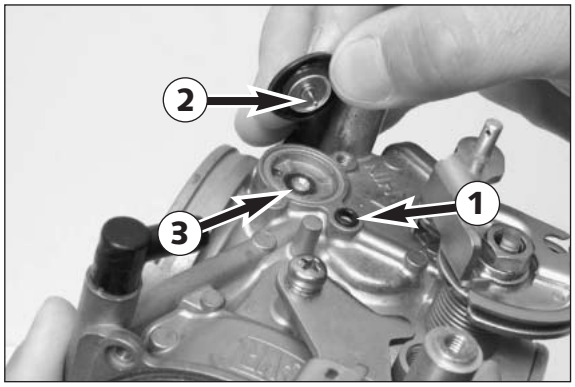


– Screw on the idle-air jet ❸, main jet ❹ with main jet holder and starter jet ❺.
– Screw the idle-air mixture control screw ❻ with the O-ring, shim and spring in to the limit, unscrew the number of turns previously noted.

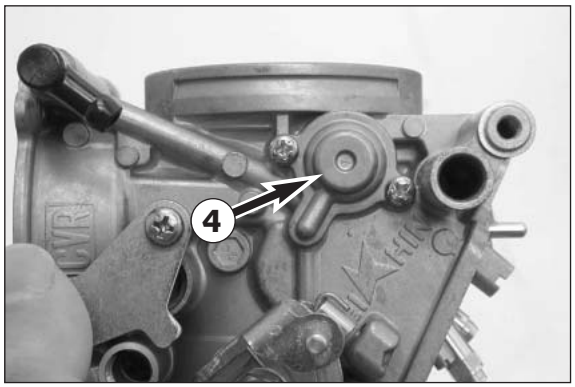
See pages 8-10 to adjust the mixture control screw.



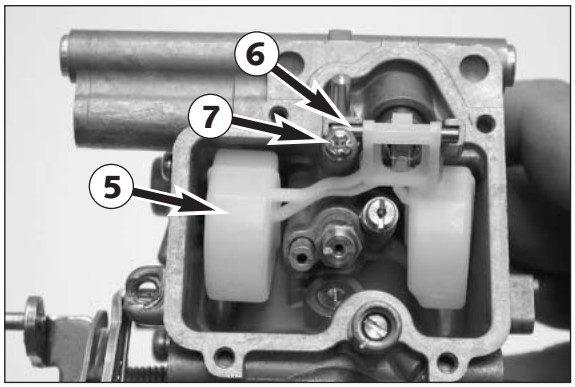
– Mount the main air jet ❼, ACV jet ❽ and idle-air jet ❾ with a suitable screwdriver.



– Place the O-ring ❶ in the recess around the air jet.
– Mount the ACV diaphragm so that the pin ❷ presses on the ACV valve plate ❸.

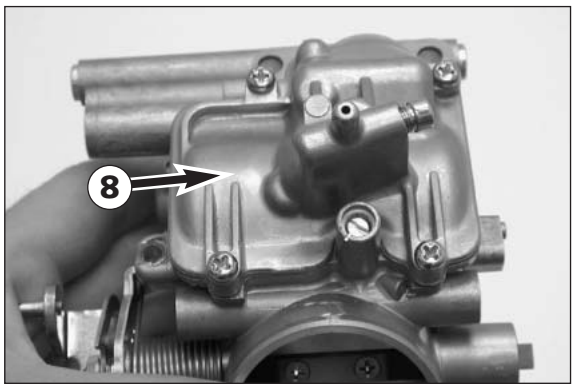


– Place the spring on the diaphragm and mount the ACV cover ❹.

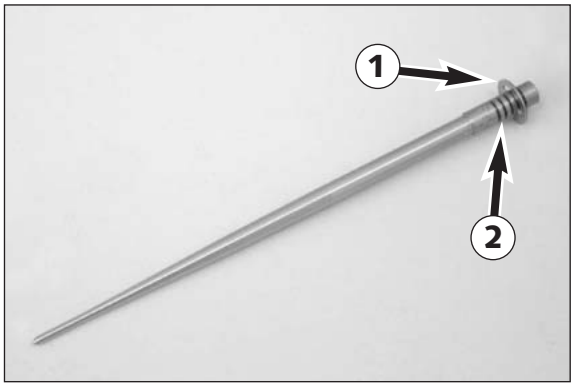


– Position the float ❺ together with the needle valve and float hinge pin ❻ in the carburetor housing.
– Tighten the fixing screw ❼ on the float hinge pin.

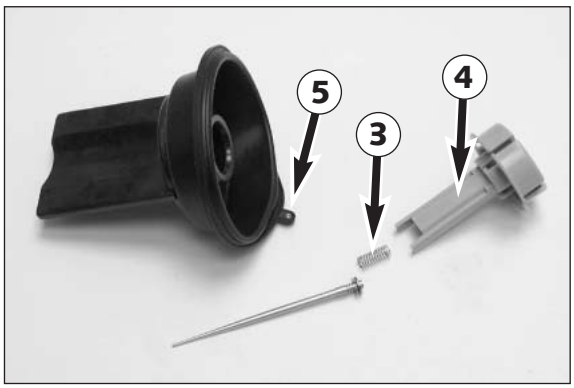
See pages 8-10 to adjust the float level.



– Mount the float chamber ❽ with a new gasket. Tighten the screws.

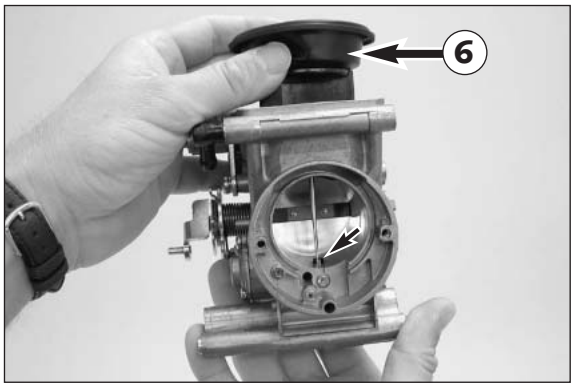


– Mount the lock ring ❶ in the respective position on the jet needle ❷ (2nd notch from the top – see technical specifications).

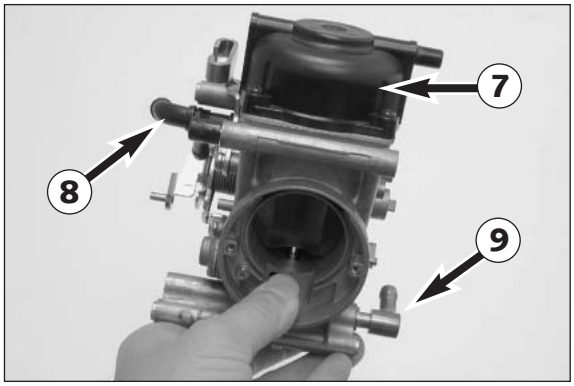


– Insert the spring ❸ in the jet needle holder ❹ and position in the throttle slide together with the jet needle. Clip the jet needle holder into place.

NOTE: a small air jet ❺ should be mounted in the tab of the throttle slide diaphragm.



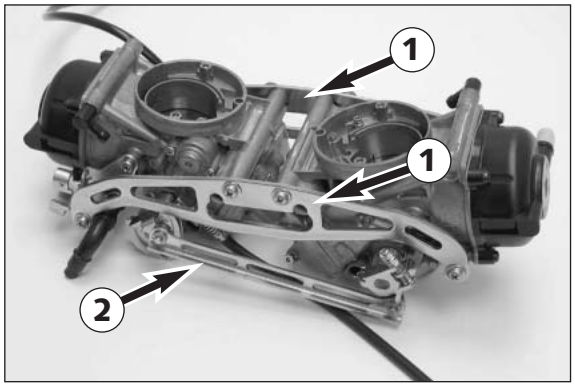
– Insert the throttle slide and diaphragm ❻ in the carburetor, pushing the jet needle in the needle jet (see arrow).
– Mount the throttle slide spring and screw on the diaphragm cover ❼.



– Fit the starter cable in the piston and screw on the connection for the electric starter system ❽.

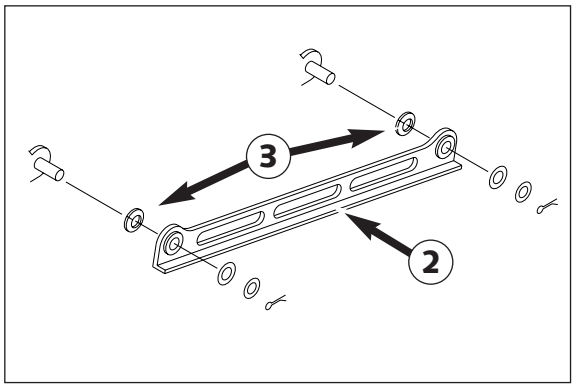
See pages 8-11 to adjust the starter cable.

– Insert the fuel connection ❾ in the bore with new O-rings.



– Position both connecting rods ❶, coat the thread of the screws with Loctite 243 and mount.

NOTE: bend the fuel connections according to the recesses in the connecting rods before mounting the connecting rods.

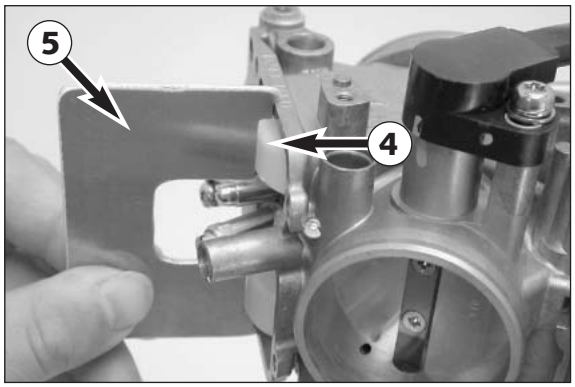


– Mount the throttle linkage arm ❷ with shims as shown in the drawing and secure with the pins.

NOTE: slide the curved plastic shims ❸ on the bolts first.

– Screw on the throttle sensor and cable for the idle setting.

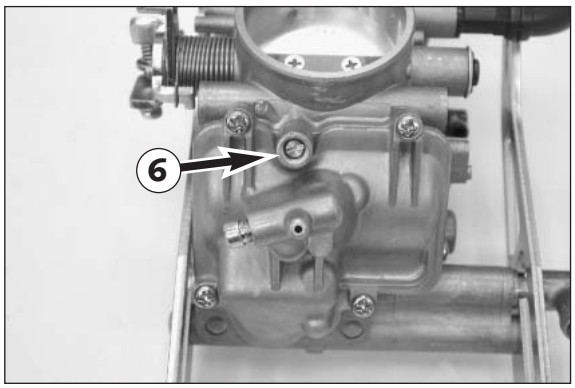
See page 8-11 to adjust/check the throttle sensor.
See page 12-9 to adjust the idle speed.
See page 12-9 to synchronize the carburetor.
See page 8-11 to adjust the throttle cable.



Adjusting the float level

NOTE: it is not necessary to separate the two carburetors to adjust the float level.

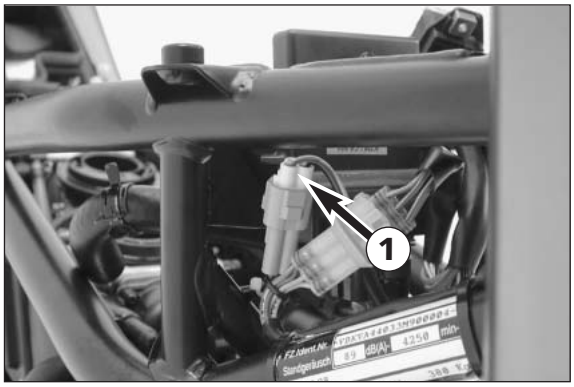
– Remove the float chamber.
– Turn the carburetor aside until the float ❹ presses lightly against the needle valve.
– Place the setting gauge 600.29.016.000 ❺ on the carburetor at the highest part of the float. The setting gauge should not press against the float but there should not be a gap between the setting gauge and the float. If necessary, bend the arm on the float and check again.
– Mount the float chamber.



Adjusting the idle mixture control screw

NOTE: the idle mixture control screw can only be adjusted when the carburetor is dismounted.

– Screw the mixture control screws in to the limit.
– Screw out the mixture control screws 2 1/4 turns (see Technical Specifications).



Checking the throttle sensor

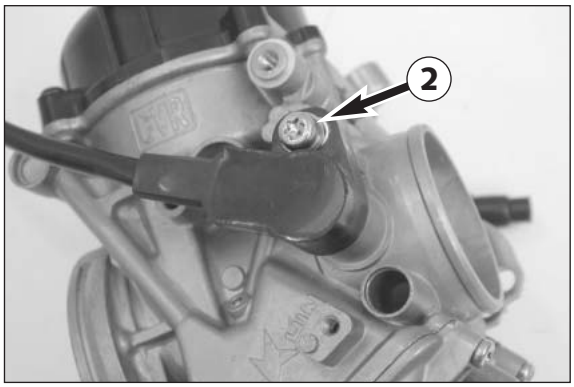
NOTE: the adjustment must be made in a mounted condition with the cable connected and the ignition switched on.

– Use a digital multimeter to measure the voltage between the blue and yellow cables at the connector AM ❶ (under the fuse box).

! CAUTION !

SINCE YOU MUST MEASURE WITH THE CONNECTOR ATTACHED, MAKE SURE TO CAREFULLY PUSH THE MEASURING TIPS ON THE MULTIMETER THROUGH THE SEALING FROM THE CABLE SIDE AND NOT TO DAMAGE ANY PART OF THE CONNECTOR.

– Reading with closed throttle (neutral position): 0.5 – 0.6 volts
– Slowly open the throttle valve with the throttle grip, the measured voltage should increase uniformly up to the full load reading.
– Reading with fully opened throttle grip (full throttle position): 3.6 – 3.7 volts

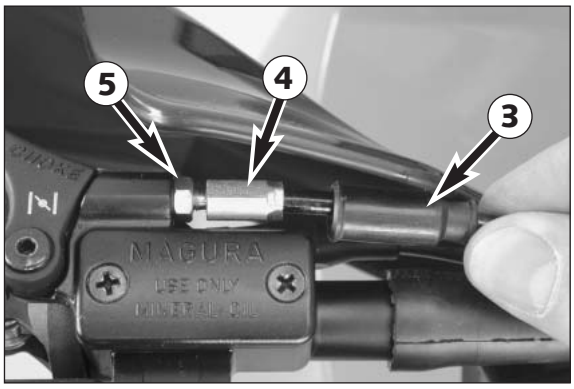


Adjusting the throttle sensor

– Remove the carburetors from the air filter box: see Chapter 3.
– Loosen the screw on the throttle sensor ❷ and turn the throttle sensor until you reach the reading for the neutral position.

NOTE: make sure that you still have enough throttle cable play when the carburetors are dismounted.

– Tighten the screw on the throttle sensor and remount the carburetors (see Chapter 3).
– Check the readings with the carburetors mounted (see above).



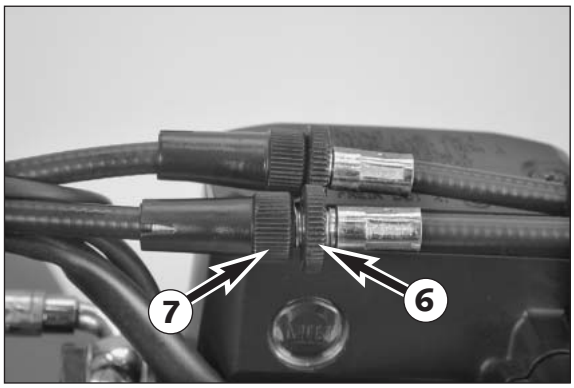
Adjusting the choke cable

The choke cable should always have a play of approx. 3 mm.

– Push back the protection cover ❸; you should be able to lift the cable approx. 3 mm away from the adjusting screw ❹.
– Loosen the counter nut ❺, turn the adjusting screw as needed, tighten the counter nut again and slide on the protection cover.

! CAUTION !

IF THERE IS NO CHOKE CABLE PLAY, THE HOLE IN THE COLD START SYSTEM WILL NOT BE ABLE TO CLOSE COMPLETELY. THIS WILL RESULT IN A HIGH FUEL CONSUMPTION, IRREGULAR ENGINE OPERATION AND EXTREME WEAR ON THE PISTONS AND CYLINDERS.



Adjusting the throttle cable

You should be able to feel 3-5 mm play in the throttle grip when you start to turn it.

– Loosen the counter nut ❻, adjust the adjusting screw ❼ as needed and tighten the counter nut again.

NOTE: the throttle grip will automatically return to the neutral position when released. Start the engine and steer to the left and right all the way to the stop. The idle speed should not change, otherwise the throttle cable play must be increased.

TROUBLE SHOOTING 9

INDEX

TROUBLE SHOOTING 10-2

Art.-Nr. 3.206.009-E

ERROR	CAUSE	REMEDY
Engine does not start when the starter button is actuated	Operating error	Switch on the ignition, switch the transmission to neutral, switch on the emergency OFF switch
	Battery is dead	Charge battery and look for cause of discharging; replace defective parts
	IGNITION fuse is blown	Replace the IGNITION fuse in the fuse box
	Main fuse is blown	Remove the right engine cowl and replace the main fuse in the starter relay
	Ignition lock or emergency OFF switch is defective	Check the ignition lock and emergency OFF switch, replace any defective parts
	Back-up starter system is defective	Repair the back-up starter system
Engine only switches on when the clutch lever is pulled	Back-up starter system is defective	Repair the back-up starter system
Engine switches on although a gear is engaged	Back-up starter system is defective	Repair the back-up starter system
Engine switches on but does not start	Operating error	Open the fuel taps, refuel, do not pull the chock, follow the starting instructions
	Fuel pump hose is blown	Replace the FUEL PUMP fuse
	Plug and socket connector on the wiring harness is oxidizing	Remove the covering and the fuel tank, clean the plug and socket connector and treat with contact spray
Engine does not have enough power	Fuel supply partly interrupted	Check the fuel taps, run the fuel lines without kinks
	Carburetors are leaking	Check the vacuum hoses and vent hoses for a tight fit kink-free installation
	Air filter is heavily soiled	Replace the air filter
	Ignition curve for 80 octane is activated	Activate the ignition curve for 95 octane, provided 95 octane fuel is being used
Engine gets too hot	Not enough coolant in the cooling system	Add cooling liquid (see maintenance work), check the cooling system for leakage
	Radiator fins are heavily soiled	Clean the radiator fins with a water jet
	Formation of foam in the cooling system	Replace the cooling liquid, use brand-name antifreeze
	Kinked or damaged radiator hose	Install the radiator hose correctly or replace
	Thermostat defective	Have the thermostat checked (opening temperature 75°C) or replaced
	Fan fuse is blown	Replace the FAN fuse
	Fan or thermoswitch for fan is defective	Replace defective parts

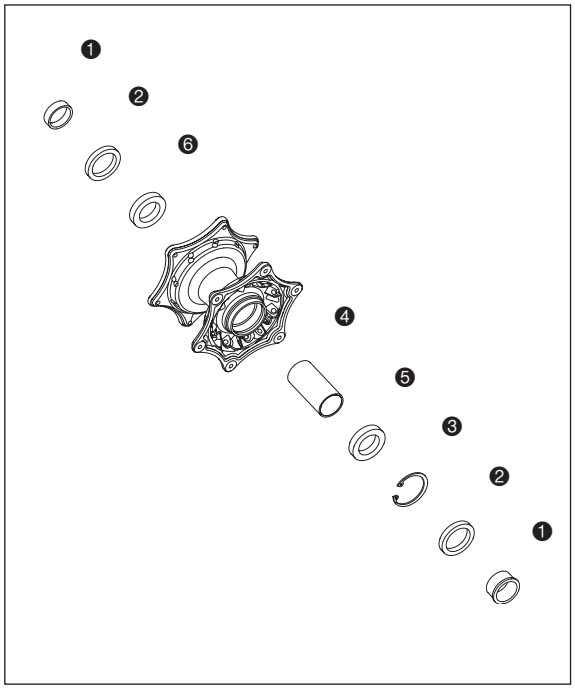
ERROR	CAUSE	REMEDY
Engine does not switch on	EPC valve is not mounted correctly, opens through vibrations	Check the position of the EPC valve (near the oil dipstick): may not rest against the frame
Engine stalls while driving	No fuel	Refuel
	Operating error	Open the fuel taps
	Fuel pump fuse is blown	Replace the FUEL PUMP fuse
High oil consumption	Engine oil level is too high	Check the oil level when the engine is warm and correct if necessary
	Engine oil is too thin (viscosity)	Use a thicker engine oil; see "Engine oil" Chapter 11
Headlight and parking light do not light up	Fuse is blown	Replace the H/L BEAM POSITION fuse
Turn signal, brake light, horn and multifunctional digital speedometer do not work	Fuse is blown	Replace the HORN BRAKE LIGHT SPEEDO fuse
The time is not displayed or not displaced correctly	Fuse is blown, interrupting the current supply	Replace the CLOCK fuse and set the time
Battery is dead	The ignition (power consumer) was not switched off	Charge the battery as specified
	The battery is not being charged by the generator	Remove the left engine cowl and check the brown cable connector on the voltage regulator; check the voltage regulator and the generator; replace any defective parts
No display in the multifunctional digital speedometer	Fuse is blown	Replace the HORN BRAKE LIGHT SPEEDO fuse
The speed display in the multifunctional digital speedometer does not work	Pickup cable is damaged or cable connector contacts are oxidizing	Check the pickup cable for damage; remove the left cover and check the cable connector.

CHASSIS 10

INDEX

REPLACING THE FRONT WHEEL BEARING 10-2
REPLACING THE REAR WHEEL BEARING 10-3
REPLACING THE FORK LEGS 10-4
REPLACING THE SHOCK ABSORBER 10-5
REPLACING THE STEERING HEAD BEARING 10-6
REPLACING THE SWING ARM BEARING 10-7
REPLACING THE CHAIN, PINION AND REAR SPROCKET 10-8
CUTTING AND RIVETING THE CHAIN 10-9

Art.-Nr. 3.206.009-E



Replacing the front wheel bearing

– Jack up the motorcycle on the center stand 600.03.022.000, unscrew the left bump rubber and lock the center stand with the locking device 600.29.055.000.
– Put a load on the vehicle tail to lift the front wheel off of the ground.
– Dismount the front wheel (see Owner's Manual, page 30).

– Pull out both distance bushings ❶, pry both shaft seal rings ❷ out of the hub and take the lock ring ❸ out of the hub with suitable pliers.
– Push the bearing spacing tube ❹ aside and knock the grooved ball bearing ❺ out from the opposite side with a driver.

! CAUTION !

TO AVOID DAMAGE, MAKE SURE THE BRAKE DISKS ARE NOT APPLIED.

– Take the bearing spacing tube out of the hub and knock out the second grooved ball bearing ❻.

– Press a new grooved ball bearing ❻ into the hub with a suitable tool.

! CAUTION !

WHEN YOU PRESS IN THE BEARING, MAKE SURE TO PRESS THE OUTER RING ONLY. IF YOU PRESS THE INNER RING, THE BALLS OR THE BEARING SURFACES OF THE BALLS WILL BE DAMAGED.

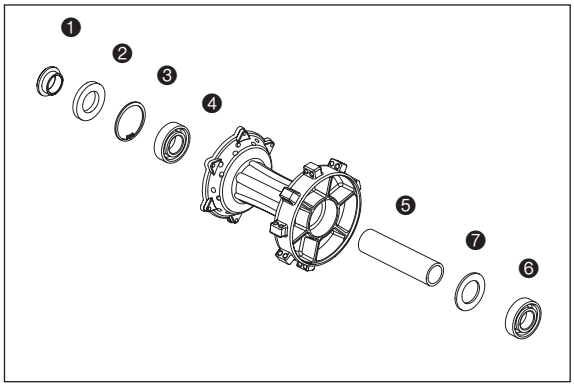
– Insert the bearing spacing tube in the hub and press in the grooved ball bearing ❺, again making sure that you only press the outer bearing ring.

– Mount the lock ring ❸, grease the new shaft seal rings ❷ and press in with the back of 584.29.091.000 until flush.
– Attach both distance bushings ❶.

NOTE: the collared bushing must be mounted on the left.

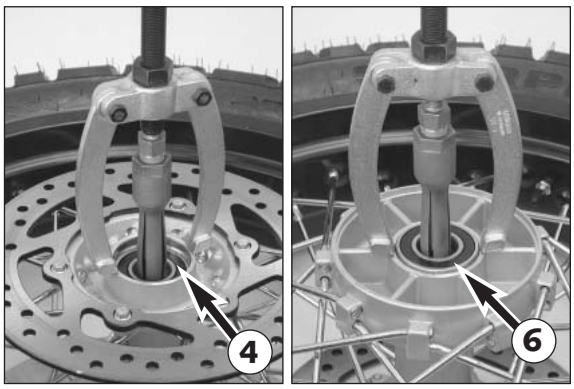
– Mount the front wheel (see Owner's Manual, page 30).

– Remove the center stand lock, mount the bump rubber and take the motorcycle off the center stand.



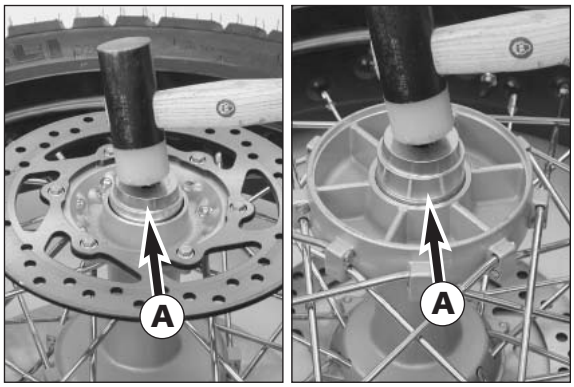
Replacing the rear wheel bearing

– Jack up the motorcycle on the center stand 600.03.022.000, unscrew the left bump rubber and lock the center stand with the locking device 600.29.055.000.
– Dismount the rear wheel (see Owner's Manual, page 31).
– Remove the rear sprocket carrier from the rear hub and pull out the damper rubber.
– Remove the distance bushing ❶ and pry the shaft seal ring ❷ out of the hub, then take the lock ring ❸ out of the hub with suitable pliers.



– Pull the grooved ball bearing ❹ out of the rear hub with the special tool 600.29.018.000 and the bearing puller 151.12.017.000.

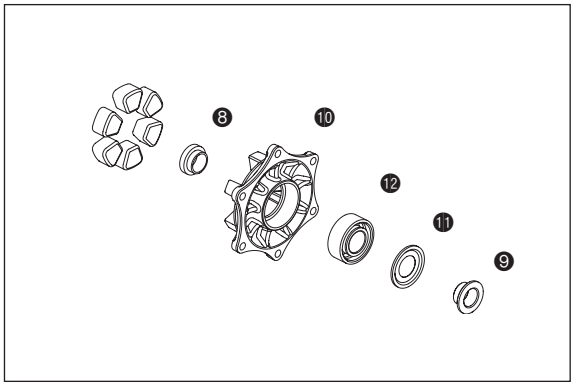
– Remove the distance bushing ❺ from the hub.
– Pull out the grooved ball bearing ❻ with the special tool 600.29.018.000 and the bearing puller 151.12.017.000 and take the spacer ring ❼ out of the hub.



– Insert the spacer ring ❼ in the hub and tap in a new grooved ball bearing ❻ with the back of special tool 584.29.091.000 Ⓐ.

– Slide the distance bushing ❺ in the hub and tap a new grooved ball bearing ❹ in the hub with the back of special tool 584.29.091.000 Ⓐ.

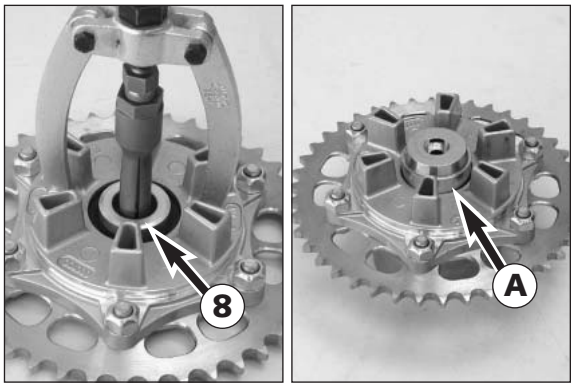
– Mount the lock ring ❸ in the groove and check for a good fit.
– Mount the shaft seal ring ❷, grease and press in the distance bushing ❶.



– Pull both distance bushings (❽ and ❾) out of the rear sprocket carrier ❿ with the special tool 600.29.018.000 and the bearing puller 151.12.017.000.
– Remove the washer ⓫ from the bearing.
– Press out the grooved ball bearing ⓬ from the rear sprocket carrier with the back of the special tool 584.29.091.000 Ⓐ.
– Press a new grooved ball bearing ⓬ into the hub with a suitable pressing sleeve until flush.

! CAUTION !

WHEN YOU PRESS IN THE GROOVED BALL BEARING, MAKE SURE TO PRESS THE OUTER RING ONLY. IF YOU PRESS THE INNER RING, THE BALLS OR THE BEARING SURFACES OF THE BALLS WILL BE DAMAGED.

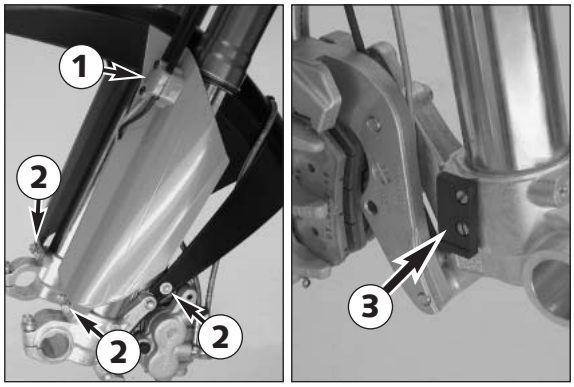


– Slide the washer ⓫ on the distance bushing ❾, mount both distance bushings (❽ and ❾).

– Mount the damper rubber in the rear hub and insert the rear sprocket carrier in the rear hub.

– Mount the rear wheel (see Owner's Manual, page 31).

– Check the chain tension and adjust (see Owner's Manual, page 25).

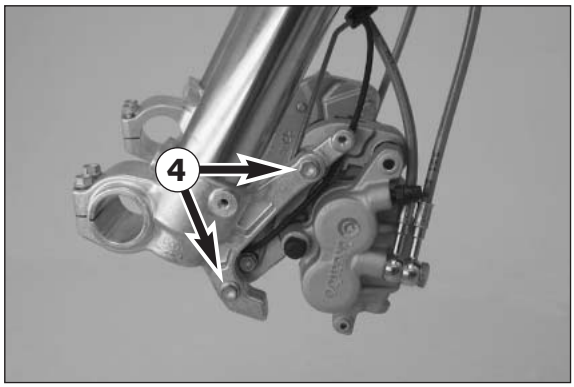


Replacing the fork legs

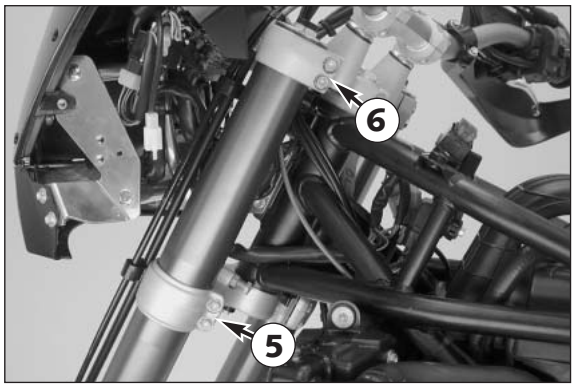
– Jack up the motorcycle on the center stand 600.03.022.000, unscrew the left bump rubber and lock the center stand with the locking device 600.29.055.000.
– Put a load on the vehicle tail to lift the front wheel off of the ground.

– Dismount the front wheel (see Owner's Manual, page 30).

– Unscrew the bracket ❶ for the brake hose and the speed pickup cable and remove from the fender.
– Remove all fender bolts ❷ and then the fender.
– Unscrew the speed pickup ❸.



– Remove the bolts ❹ on both brake calipers.



– Loosen the clamp bolts on both sides of the bottom ❺ and top ❻ triple clamps.
– Pull both fork legs down out of the triple clamps.

The new fork legs are mounted in the reverse order used to dismount. The upper edge of the fork legs must protrude approx. 5 mm from the top triple clamp ❻.

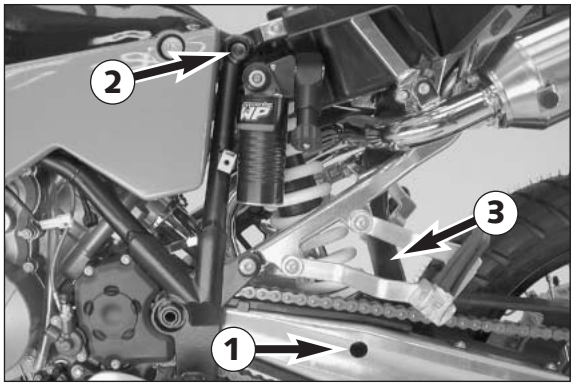
Tighten the clamp bolts on the top triple clamp to 23 Nm and on the the bottom triple clamp to 18 Nm.

Secure the bolts on the brake calipers with Loctite 243 and tighten to 25 Nm.

Also secure the fixing screws on the speed pickup ❸ with Loctite 243.

– Mount the front wheel (see Owner's Manual, page 30).

– Adjust the fork legs (see Technical Data, page 11-4 and Owner's Manual, page 23).



Replacing the shock absorber

– Jack up the motorcycle on the center stand 600.03.022.000, unscrew the left bump rubber and lock the center stand with the locking device 600.29.055.000.

– Unscrew the left side cover and the seat lock.

– Remove the lower shock absorber bolt ❶ and press down on the back of the swing arm to release the shock absorber from the recess in the swing arm.

– Remove the upper shock absorber bolt ❷.



– Press the lower end of the shock absorber back against the splash protector ❸, tilt the upper end of the shock absorber outwards and lift the shock absorber out of the frame.

– Mount the new shock absorber in the same way it was dismounted and tighten the upper bolt to 100 Nm. Secure the lower bolt on the shock absorber with Loctite 243 and tighten to 45 Nm.



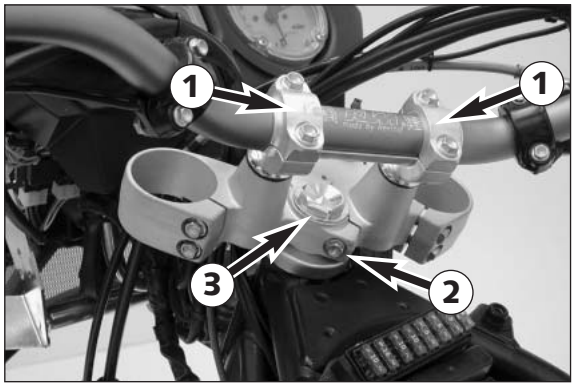
NOTE: if you cannot press the shock absorber into the recess in the swing arm, proceed as follows:

– Dismount the rear wheel (see Owner's Manual, page 31) and the splash protector ❸.
– Lift the back of the swing arm and carefully tap the lower end of the shock absorber into the recess with a rubber hammer.
– Secure the bolt with Loctite 243, insert and tighten to 45 Nm.
– Remount the rear wheel (see Owner's Manual, page 31) and the splash protector.

– Adjust the chain tension (see Owner's Manual, page 25).

– Screw on the left side cover with the seat lock.

To adjust the shock absorber: see Technical Data.



Replacing the steering head bearing

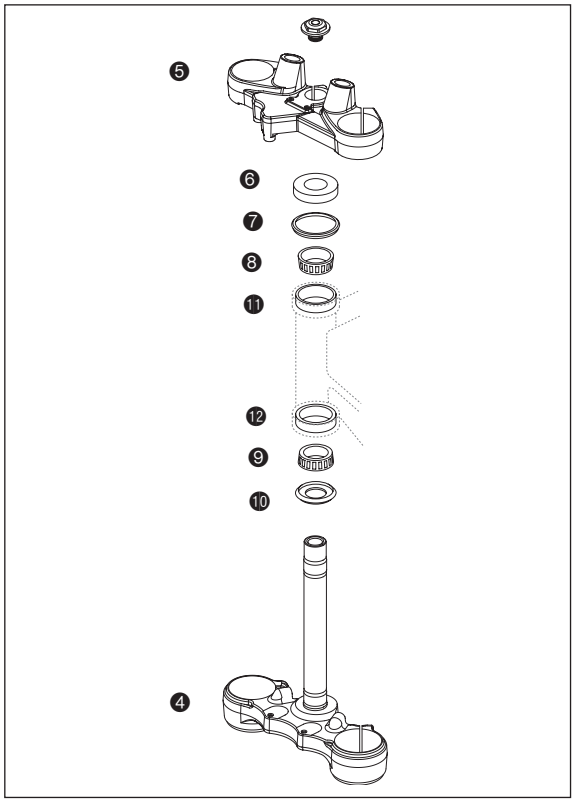
– Dismount the fork legs (see page 10-4).

– Unscrew the brake hose guides from the top and bottom triple clamp.

– Remove the handlebar clamps ❶ and lay the handlebar back.

NOTE: if the tanks and the tank compartment have not been removed, protect these parts from being damaged.

– Loosen the clamp bolt on the steering stem ❷, remove the blind bolt ❸ on the steering stem, holding the bottom triple clamp ❹ to prevent it from sliding out of the steering head.
– Remove the top triple clamp ❺ and pull the bottom triple clamp ❹ and the steering stem down and out of the steering head.



– Remove the protective ring ❻, seal ❼ and the upper steering head bearing ❽.
– Pull the lower steering head bearing ❾ off of the steering stem with a suitable puller and remove the seal ❿.
– Slide on a new seal and a new steering head bearing on the steering stem with a suitable tube.

! CAUTION !

WHEN YOU PRESS IN THE BEARING, MAKE SURE TO PRESS THE INNER RING ONLY. IF YOU PRESS IN THE OUTER RING, THE BALLS OR THE BEARING SURFACES OF THE BALLS WILL BE DAMAGED.





– Insert the special tool 584.29.092.000 with the collet 584.29.089.000 into the steering head from below and drive the outer ring ⓫ on the upper steering head bearing out of the steering head.
– Insert the special tool 584.29.092.000 with the collet 584.29.089.000 into the steering head from above and the drive the outer ring ⓬ on the lower steering head bearing out of the steering head.
– Drive the new outer ring on the upper steering head bearing ⓫ into the steering head using the special tool 584.29.091.000 with the collet 584.29.089.000.
– Drive the new outer ring on the lower steering head bearing ⓬ into the steering head using the special tool 584.29.091.000 with the collet 584.29.089.000.

NOTE: make sure the outer bearing rings do not cant when they are driven in.





Assembly is in the reverse order as disassembly.

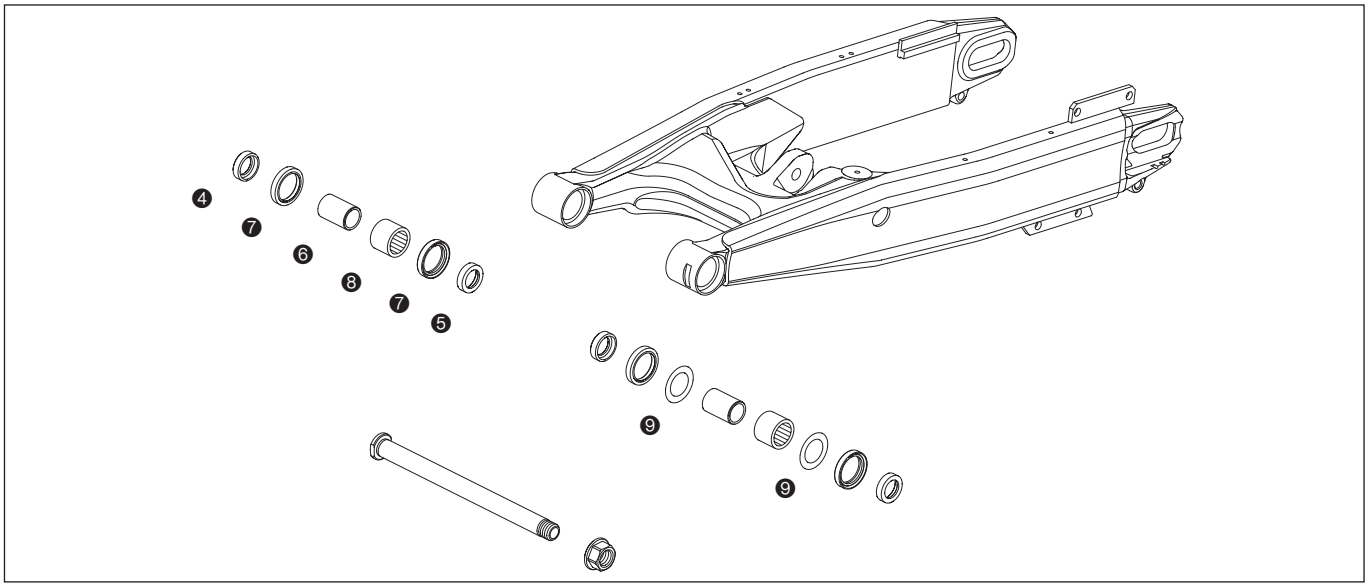
To adjust the play of the steering head bearing, see page 12-13.

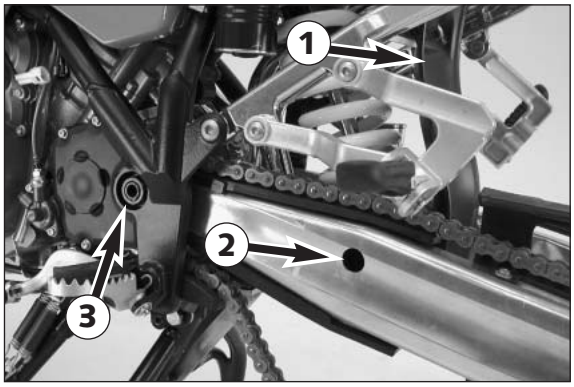
Tighten the clamp bolt on the steering stem and the collar bolts on the top triple clamp to 23 Nm; tighten the collar bolts on the bottom triple clamp to 18 Nm.

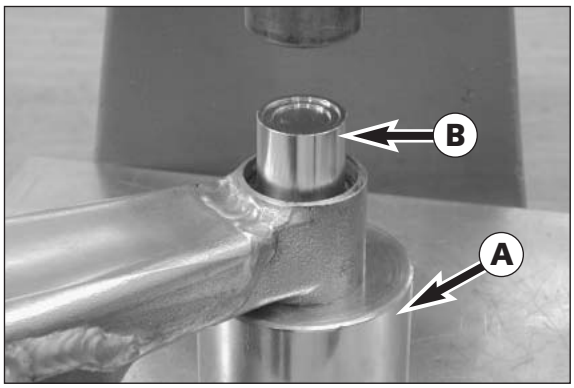
Tighten the collar bolts on the handlebar clamps to 20 Nm.

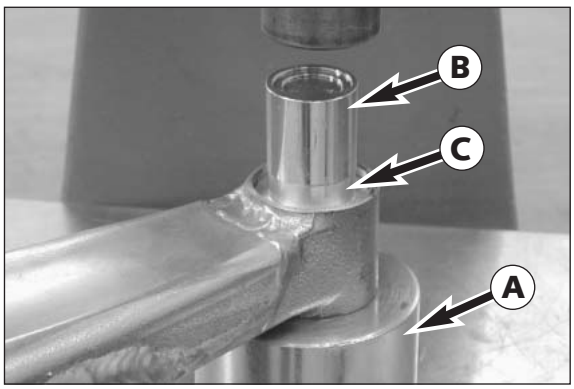
Secure the AH bolts on the upper brake hose guide with Loctite 243 and tighten to 8 Nm.

To mount the fork legs, see page 10-4.









Replacing the swing arm bearing

– Jack up the motorcycle on the center stand 600.03.022.000, unscrew the left bump rubber and lock the center stand with the locking device 600.29.055.000.

– Dismount the rear wheel (see Owner's Manual, page 31).
– Dismount the splash protector ❶.
– Remove the lower shock absorber bolt ❷ and press the swing arm down to release the shock absorber from the recess in the swing arm.
– Remove the foot brake cylinder, pull the brake caliper back and out of the guide and fasten the foot brake cylinder again; do not tighten the bolts.
– Tilt the brake caliper to the side and detach the brake hose from the brackets.
– Loosen the nut on the swing arm bolt ❸ and knock the swing arm bolt out with a suitable tube. Pull the swing arm back and remove.

– Remove the outer tappet for the shaft seal ring ❹ and pull the inner tappet ❺ and inner sleeve ❻ out of the bearing.
– Pry out both shaft seal rings ❼.

– Place the anvil dolly 600.29.056.000 Ⓐ underneath and press the needle bearing ❽ out of the swing arm using the special tool 584.29.086.000 Ⓑ.

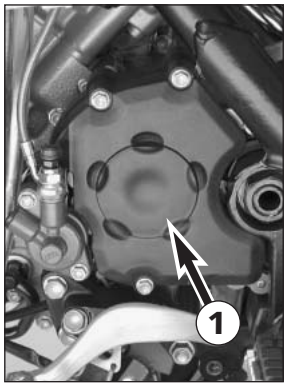
NOTE: the procedure for the second swing arm bearing is identical except that the stop disks ❾ also need to be removed.

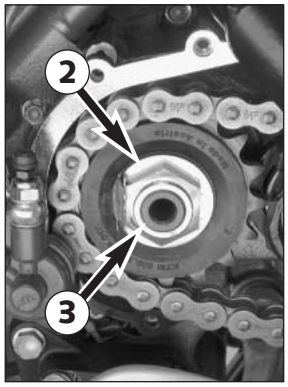
– Place the anvil dolly 600.29.056.000 Ⓐ underneath and press the new needle bearing into the swing arm with special tool 584.29.086.000 Ⓑ and 600.10.013.000 Ⓒ until flush.
– Press in both shaft seal rings until flush.
– Slide the inner tappet for the shaft seal ring ❺ and the inner sleeve ❻ into the bearing and press in the outer tappet.

NOTE: the procedure for the second swing arm bearing is identical except that the stop disks ❾ need to be mounted.

– Position the swing arm on the motorcycle, knock in the swing arm bolt and tighten the nut to 130 Nm.
– Press the shock absorber into the recess in the swing arm (see page 10-5), secure the bolt on the shock absorber with Loctite 243 and tighten to 45 Nm.
– Remove the bolts on the foot brake cylinder, push the brake caliper into the guide from behind and mount the foot brake cylinder again. Secure the bolts with Loctite 243 and tighten to 10 Nm. Press the brake hose into the bracket.

– Remount the rear wheel (to remount, see Owner's Manual, page 31) and the splash protector.
– Adjust the chain tension (see Owner's Manual, page 25).





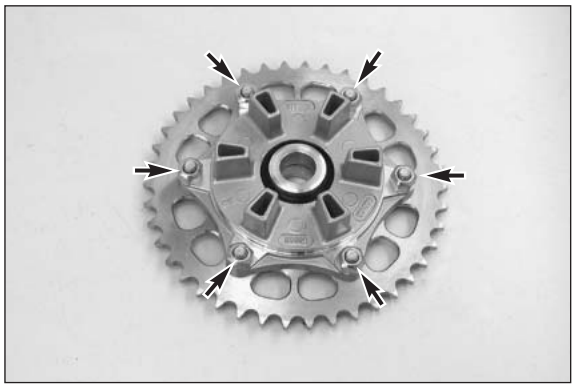
Replacing the chain, pinion and rear sprocket

– Jack up the motorcycle on the center stand 600.03.022.000, unscrew the left bump rubber and the lock the center stand with the locking device 600.29.055.000.

– Unscrew the engine sprocket cover ❶, bend up the lock washer ❷ and loosen the engine sprocket nut ❸.

– Open the chain with a cutting/riveting tool (see page 10-9) and remove the chain.

– Remove the engine sprocket with the lock washer.
– Slip on a new pinion with a lock washer and screw on the nut.



– Dismount the rear wheel (see Owner's Manual, page 31) and pull the rear sprocket carrier out of the rear wheel hub.
– Loosen the rear sprocket nuts and remove the rear sprocket from the sprocket carrier.

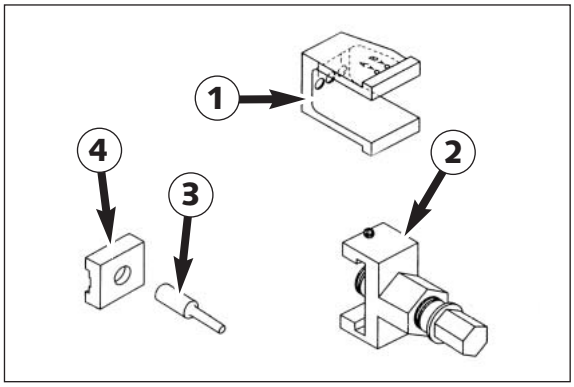
– Position a new rear sprocket, secure the nuts with Loctite 243 and tighten to 50 Nm.
– Place the rear sprocket carrier in the hub of the rear wheel and mount the rear wheel (see Owner's Manual, page 31).

– Pull a new chain over the pinion and rear sprocket.

– Rivet the chain with a cutting/riveting tool (see page 10-9).

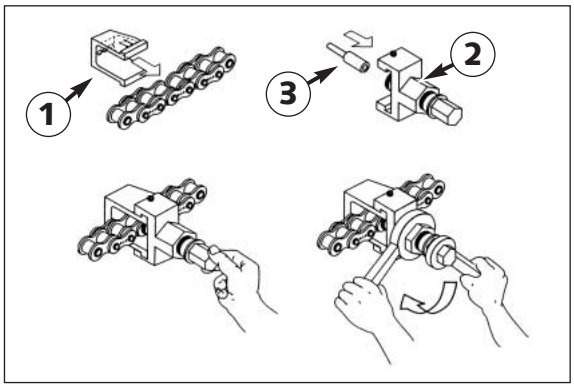
– Tighten the engine sprocket nut to 60 Nm, bend up the lock washer.
– Screw on the engine sprocket cover.

– Adjust the chain tension (see Owner's Manual, page 25).

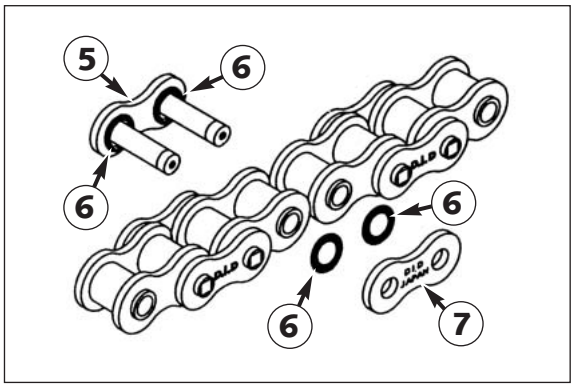


Opening the chain with a separating/rivet tool

NOTE: an X-ring chain, type 525 HV (5/8 x 5/16“), is used for the KTM 950 ADVENTURE model. You will need special tool 600.29.020.000 to separate or rivet the chain according to the manufacturer's specifications. This special tool consists of a bracket ❶ with 2 marks (A and B), a pressing tool ❷ with spindle and a locking screw, pressing pin ❸ and the end plate ❹.

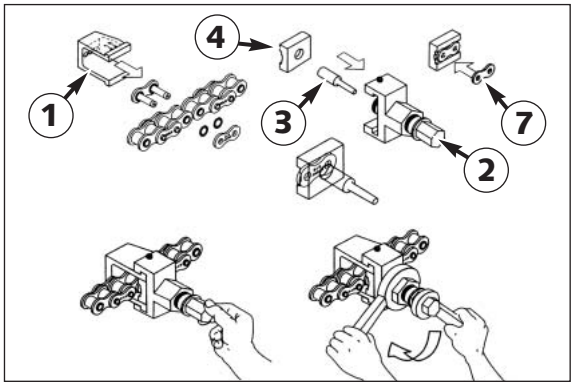


– Place bracket ❶ over the chain from behind. The marks (A, B) should face up.
– Insert pressing pin ❸ with the larger diameter into the spindle of pressing tool ❷ and turn spindle back.
– Apply pressing tool ❷ with pressing pin ❸ to a chain link, the locking screw must face up.
– Slide bracket ❶ into pressing tool ❷ from the side, positioning the bracket in such a way that the arrow on mark A points to the locking screw.
– Screw in the locking screw to fix bracket ❶ in position A.
– Holding pressing tool ❷ with a ring wrench (wrench size 27 mm), screw in the spindle of the pressing tool and press out the chain through the hole in the bracket.



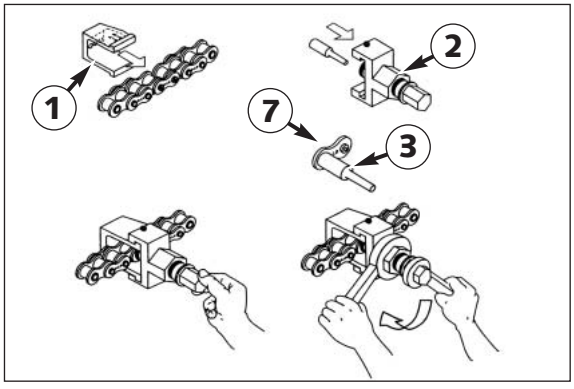
Riveting the chain

– Grease the connecting link ❺, slide an X-ring ❻ on each bolt and connect the ends of the chain.
– Fasten another X-ring ❻ to each bolt.



– Place bracket ❶ over the chain from behind. The marks (A, B) must face up.
– Slide pressing pin ❸ with the smaller diameter into the spindle of pressing tool ❷ and turn spindle back.
– Insert the chain joint shim ❼ in the end plate ❹ and slide both into the pressing tool.

– Apply pressing tool ❷ with end plate ❹ and the chain joint shim ❼ to the connecting link ❺ in such a way that the locking screw faces up; the hole on the back of the end plate will accommodate pressing pin ❸.
– Slide bracket ❶ into pressing tool ❷ fromt he side, positioning the bracket in such a way that the arrow on mark A points to the locking screw.
– Screw in the locking screw to fix bracket ❶ in position A.
– Holding pressing tool ❷ with a ring wrench (wrench size 27 mm), screw in the spindle of the pressing tool and press on the chain joint shim ❼.



– Loosen the locking screw, remove pressing tool ❷ and end plate ❹.
– Apply pressing tool ❷ to the chain again without end plate ❹. The bracket ❶ must be mounted in such a way that the arrow on mark B points to the locking screw.
– Screw in the locking screw to fix bracket ❶ in position B.
– Holding pressing tool ❷ with a ring wrench (wrench size 27 mm), screw in the spindle of the pressing tool and press both bolts of the connecting links together.
– Completely remove the separating/riveting tool.

TECHNICAL SPECIFICATIONS 11

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TECHNICAL SPECIFICATIONS – LC8 2003 ENGINE

Engine	950 LC8
Design	Liquid-cooled, 2-cylinder 4-stroke engine with 75° V arrangement with balancer shaft and electric starter
Displacement	942 cm3
Bore / Stroke	100/60 mm
Compression ratio	11.5:1
Fuel	unleaded premium fuel with at least RON 95 (ROZ 80 - 94 for other ignition curve)
Valve timing	4 valves controlled over bucket tappet and 2 camshafts, camshaft drive with gears/chain
Valve diameter	Intake: 38 mm Exhaust: 33 mm
Valve clearance, cold	Intake: 0,125 - 0,175 mm Exhaust: 0,225 - 0,275 mm
Crankcase bearing	Friction bearings (2 main bearings / 1 supporting bearing)
Conrod bearing	Friction bearing
Piston pin bearing	Dual-fuel bearing
Piston	Light alloy – forged
Piston rings	1 compression ring, 1 taper face ring, 1 single-piece oil scraper ring with spiral-type expander
Engine lubrication	Dry sump with 2 trochoidal pumps (pressure pump and suction pump)
Engine oil	SAE 5W/40, 10W-50 (f.ex. Motorex Power Synt 4T)
Quantity of engine oil	approx. 3.0 liters during oil/filter change or approx. 3.3 liters for dry engine
Primary drive	Straight-toothed spur wheels 67 : 35
Clutch	Multi-disc clutch in oil bath
Transmission	6-speed claw shifted
Gear ratio	1st gear 35:12 2nd gear 32:15 3rd gear 30:18 4th gear 27:20 5th gear 27:24 6th gear 26:27
Ignition system	breakerless transistorized electronic ignition system with digital ignition advance
Ignition timing	5° from TDC at 1200 rpm
Generator	12V 450W at 6000 rpm
Spark plug	NGK CR 8 EK
Electrode distance	0.6 mm
Cooling system	liquid cooled, permanent circulation of cooling liquid through water pump
Cooling liquid	2.1 liters, 40% antifreeze, 60% water, at least –25° C
Starting aid	0.9 kW electric starter

BASIC CARBURETOR SETTING	
	950 LC8 ADVENTURE
Type of carburetor	CVRD 43
Main jet	155 (front) / 160 (rear)
Main air jet	40
Idling jet	42
Idle air jet	50
Idle air cutoff jet	80
Jet needle	NDFB
Needle position	2nd from top
Mixture control screw open	2 1/4 turns
Starting jet	68

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TECHNICAL SPECIFICATIONS CHASSIS – 950 ADVENTURE/ADVENTURE S 2003

	950 ADVENTURE / 950 ADVENTURE S
Frame	Tubular chrome-molybdenum-steel space frame, powder-coated
Fork	**W**hite **P**ower – **U**p **S**ide **D**own 4860 MXMA (Multiadjuster)
Spring travel front	ADVENTURE = 230 mm, ADVENTURE S = 265 mm
Rear suspension	WP Progressive Damping System shock absorber with hydraulic preload adjuster, aluminum rear wheel swinging fork supported by needle bearings
Spring travel rear	ADVENTURE = 230 mm, ADVENTURE S = 265 mm
Front brake	Disk brake, 2 perforated brake disks Ø 300 mm, floating brake calipers
Rear brake	Disk brake, perforated brake disk Ø 240 mm, floating brake caliper
Tires, front	Pirelli MT90 90/90-21 M/C 54V
	(Metzeler MCE Karoo 2 90/90-21 M/C 54R M+S max. 160 km/h)
Air pressure	on road/alone 2,4 bar passenger 2,4 bar
Tires, rear	Pirelli MT90 150/70-18 M/C 70V
	(Metzeler MCE Karoo 150/70R18 M/C 70H M+S max. 160 km/h)
Air pressure	on road/alone 2,6 bar passenger 2,8 bar
Fuel tank capacity	22 liters, 4 liters reserve
Gear ratio – rear wheel	17:42
Chain	525 HV (5/8 x 5/16") X-ring, 118 rolls
Lighting	High beam headlight H3 12V 55W (PK22s base) Low beam headlight H7 12V 55W (PX26d base) High + low beam headlight H4 12V 60/55 W (P43t base) (USA) Front + rear parking light 12V 5W (W2,1x9.5d base) Instrument lights + indicator lamps LED Brake light 12V 21W (BA15s base) Turn signal 12V 10W (BA15s base) License plate illumination 12V 5W (W2,1x9.5d base)
Battery	maintenance-free battery 12V 14 Ah
Steering head angle	63,4°
Wheel base	1590 mm
Seat height, unloaded	ADVENTURE: 880 mm, ADVENTURE: 915 mm
Ground clearance, unloaded	ADVENTURE: 281 mm, ADVENTURE: 316 mm
Dry weight	206 kg
Max. axle load, front	170 kg
Max. axle load, rear	245 kg
Max. total weight	400 kg

STANDARD ADJUSTMENT – FORK	
	950 LC8 ADVENTURE **WP USD 4860 MXMA**
Spring	4,8 N/mm
Air chamber length	100 mm
Fork oil	SAE 5 (WP 4860.0211)

STANDARD ADJUSTMENT – SHOCK ABSORBER		
	950 ADVENTURE / ADVENTURE S **WP PDS 5018 PA**	
Spring	140/255	140/265

STANDARD ADJUSTMENT – FORK AND SHOCK ABSORBER

	950 ADVENTURE									**950 ADVENTURE S**								
	FORK					SHOCK ABSORBER				FORK					SHOCK ABSORBER			
	Driver comfort	Standard adjustment	Driver Sport	Maximum load		Driver comfort	Standard adjustment	Driver Sport	Maximum load	Driver comfort	Standard adjustment	Driver Sport	Maximum load		Driver comfort	Standard adjustment	Driver Sport	Maximum load
Compression damping (clicks)	20	15	15	15		–	–	–	–	20	15	15	15		–	–	–	–
Compression damping, low speed (clicks)	–	–	–	–		12	8	6	6	–	–	–	–		15	12	8	8
Compression damping, high speed (turns)	–	–	–	–		1,5	1,5	1	1	–	–	–	–		1,5	1,5	1	1
Rebound (clicks)	18	18	15	18		17	12	10	10	18	18	15	18		20	17	13	13
Preload adjuster (turns)	5	5	8	5		6	6	8	18	5	5	8	5		6	6	12	12

TOLERANCES AND FITTING CLEARANCES

COMPONENT	MEASUREMENT/TEST	SETPOINT VALUE	TOLERANCE LIMIT
Valves	Valve shaft runout		max. 0.1mm
	Sealing seat width, intake	1.2 mm – 1.4 mm	
	Sealing seat width, exhaust	1.2 mm – 1.4 mm	
	Valve disk runout		max. 0.03 mm
	Valve guide, inner diameter	6.006 mm – 6.018 mm	
	Valve shaft, outer diameter, intake	5.961 mm – 5.975 mm	
	Valve shaft, outer diameter, exhaust	5.946 mm – 5.960 mm	
Valve springs	Inner length, unloaded	new 39.4 mm	min. 38.0 mm
	Outer length, unloaded	new 42.8 mm	min. 41.3 mm
	Inner valve spring tension	20.3 mm with a load of at least 25 kg	
	Outer valve spring tension	23.3 mm with a load of a least 60 kg	
Camshafts/cylinder head	Cam height, intake	37.80 mm – 37.90 mm	
	Cam height, exhaust	36.56 mm – 36.55 mm	
	Camshaft bearing bore	24.000 mm – 24.021 mm	
	Camshaft bearing journal	23,960 mm 23,980 mm	
	Camshaft bearing clearance	0.020 mm – 0..061 mm	max. 0.09 mm
	Cylinder head distortion		max. 0.05 mm
Cylinder	Size I	100.000 mm – 100.012 mm	
	Size II	100.012 mm – 100.025 mm	
	Cylinder distortion		max. 0.05 mm
Piston	Size I – 9 mm (from lower edge)	99.960 mm – 99.972 mm	
	Size II – 9 mm (from lower edge)	99.973 mm – 99.984 mm	99.930 mm
	Mounting clearance	0,04 mm – 0,06 mm	0,10 mm
Piston ring	Gap	0.15 mm – 0.35 mm	0.5 mm
	Width of piston ring groove – 1st ring (L-ring)	0.92 mm – 0.94 mm	
	Width of piston ring groove – 1st ring (L-ring)	1.80 mm – 1.84 mm	
	Width of piston ring groove – 2nd ring	1.27 mm – 1.29 mm	
	Width of piston ring groove – oil scraper ring	2.51 mm – 2.53 mm	
	Thickness of 1st ring (L-ring)	0.85 mm – 0.87 mm	
	Thickness of 1st ring (L-ring)	1.20 mm – 1.22 mm	
	Thickness of 2nd ring	1.22 mm – 1.24 mm	
	Thickness of oil scraper ring	2.47 mm – 2.49 mm	
Piston pin / piston	Diameter of piston ring bore	22.006 mm – 22.11 mm	22.030 mm
	Diameter of piston pin	21.996 mm – 22.000 mm	21.980 mm
Crankshaft/conrod	Diameter of crankshaft journal	49.975 mm – 49.985 mm (blue)	
	Diameter of crankshaft journal	49.986 mm – 49.995 mm (red)	
	Mounting clearance of crankshaft journal	0.025 mm – 0.055 mm	0.08 mm
	Diameter of support bearing journal	27.985 mm – 28.000 mm	
	Mounting clearance of support bearing	0.030 mm – 0.070 mm	0.09 mm
	Axial clearance of crankshaft	0.1 mm – 1.3 mm	2.0 mm
	Diameter of conrod eye	22.010 mm – 22.020 mm	22.040 mm
	Diameter of conrod journal	41.990 mm – 42.000 mm (blue)	
	Diameter of conrod journal	42.001 mm – 42.011 mm (red)	
	Mounting clearance of conrod bearing	0.030 mm – 0.060 mm	0.080 mm
	Axial clearance of conrod eye on conrod journal	0.30 mm – 0.45 mm	0.60 mm
	Width of conrod bottom	21.948 mm – 22.000 mm	
	Width of conrod journal	44.30 mm – 44.35 mm	
Oil pressure	Oil pressure of engine at operating temperature (at least 60° C)	min. 1.5 bar at 1500 rpm	
		min. 3.0 bar – max. 4.0 bar at 6000 rpm	
Pressure pump	Clearance between inner and outer rotor	0.1 mm	0.25 mm
	Clearance between outer rotor and case	0.2 mm	0.4 mm
	Axial clearance	0.04 mm – 0.09 mm	0.25 mm
Suction pump	Clearance between inner and outer rotor	0.1 mm	0.25 mm
	Clearance between outer rotor and housing	0.2 mm	0.40 mm
Axial clearance	0.04 mm – 0.09 mm	0.25 mm	
Bypass valve	Length of spring, unloaded		min. 42.0 mm
	Spring tension	27 mm at a load of at least 3.5 kg	

TOLERANCES AND FITTING CLEARANCES

COMPONENT	MEASUREMENT/TEST	SETPOINT VALUE	TOLERANCE LIMIT
Clutch	Total height of disk package	50.20 mm – 51.20 mm	min. 48.0 mm
	Thickness of lining disks	2.72 mm – 2.88 mm	2.65 mm
	Thickness of steel disks	1.95 – 2.05 mm	1.85 mm
	Length of clutch springs, unloaded	30.77 mm	29.0 mm
	Spring tension	19.0 at a load of at least 20 kg – 24 kg	
Thermostat/radiator	Opening temperature of thermostat	73° C – 77° C	
	Opening stroke of thermostat	over 7 mm at 100° C	
	Discharge pressure of radiator cap	1.4 bar	
	Switch-on temperature of radiator fan switch	102° C	
Transmission	Clearance between shift fork and groove	0.1 mm – 0.25 mm	0.4 mm
	Width of shift fork groove	5.05 mm – 5.10 mm	
	Thickness of shift fork	4.85 mm – 4.95 mm	

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TIGHTENING TORQUES – ENGINE		
Hexagon nut on primary gear	M33x1.5 left	Loctite 243 + 130 Nm
Multipoint head bolt on conrod caps	M10x1	25 Nm/30Nm/60°
Hexagon nut on balancer shaft	M20x1.5	Loctite 243 + 150 Nm
Hexagon nut on cylinder head	M10	25 Nm /43 Nm
AH bolts on cylinder head	M8	18 Nm/23 Nm
Hexagon nut on cylinder head	M6	8 Nm
Studs in engine case	M6	10 Nm
Studs in engine case	M10	20 Nm
Stud on exhaust flange	M8	15 Nm
Plug on front cylinder head	M12x1.5	15 Nm
Screws to attach bearings	M5	Loctite 243 + 6 Nm
Crankshaft locking bolt	M8	10 Nm
Bearing bolts on tensioning rail	M8	Loctite 243 + 20 Nm
Bearing bolts on guide rail	M8	Loctite 243 + 15 Nm
Bearing bolts on double timing gear	M10	30 Nm
Bolt on chain tensioner	M16x1.5	20 Nm
AH bolts on camshaft bearing bridges	M8	10 Nm/18 Nm
AH bolts on camshaft bearing bridges	M6	5 Nm / 10 Nm
HH bolts on valve covers	M6	10 Nm
HH bolts on engine case halves	M6	10 Nm
HH bolts on engine case halves	M8	20 Nm
AH bolts on freewheel support	M6 10.9	Loctite 648 + 13 Nm
HH bolts on freewheel holder	M6	Loctite 243 + 10 Nm
Oil plug (clutch lubrication)	M10	15 Nm
Oil drain plug	M22x1.5	20 Nm
Oil line screw connections	M6	10 Nm
HH bolts on oil pump cover	M6	Loctite 243 + 10 Nm
Plug on oil filter housing	M14x1.5	Loctite 243 + 15 Nm
Oil jets	M6x0.75	Loctite 243 + 10 Nm
Oil pressure switch	M10x1	10 Nm
AH bolt on shift locating drum	M6	Loctite 243 + 10 Nm
HH bolt on shift locking lever	M5	Loctite 243 + 8 Nm
HH bolt on the shift lever	M6	Loctite 243 + 10 Nm
Hexagon nut on clutch clutch hub	M22x1.5	Loctite 243 + 130 Nm
HH bolts on clutch pressure cap	M6	10 Nm
HH bolt on clutch cover	M6	10 Nm
HH bolt on clutch cover	M8	15 Nm
HH bolt on outer clutch cover	M6	10 Nm
AH bolt on ignition rotor	M16	Loctite 243 + 150 Nm
HH bolt on generator cover	M6	10 Nm
Fixing bolts on the stator	M6	Loctite 243 + 10 Nm
Plug on generator cover	M24x1.5	8 Nm
Bleeder flange on generator cover	M16x1.5	Loctite 243 + 10 Nm
Bearing bolt on generator cover	M6	Loctite 243 + 10 Nm
Fixing bolts on ignition pickup	M6	Loctite 243 + 10 Nm
HH bolts on gear sensor	M5	4 Nm
Spark plugs	M10x1.0	12 Nm
Collar bolt on water pump wheel	M6	Loctite 243 + 10 Nm
HH bolt on water pump cover	M6	10 Nm
Water temperature sensor	M12x1.5	12 Nm
Water connections for cylinder head	M20x1.5	Loctite 577 + 10 Nm
HH bolt on the starter motor	M6	10 Nm
Vacuum connections for intake port	M6	Loctite 243 + 8 Nm
Hexagon nut on chain sprocket	M20x1.5	sheet retainer + 60 Nm Nm
Other engine bolts	M5	6 Nm
	M6	10 Nm

TIGHTENING TORQUES – CHASSIS		
Collar bolt on front wheel spindle	M24x1.5	60 Nm
Collar nut wheel spindle rear	M25x1.5	110 Nm
AH bolt shock absorber top	M14x1.5	100 Nm
AH bolt shock absorber bottom	M14x1.5	Loctite 243 + 45 Nm
Collar nut for swing arm bolt	M19x1.5	130 Nm
AH bolts on subframe	M10x1.25	Loctite 243 + 45 Nm
AH bolts on back of footrest support	M8	Loctite 243 + 25 Nm
Engine carrier bolts	M10	45 Nm
HH clamp bolts on top triple clamp	M8	23 Nm
HH clamp bolts on bottom triple clamp	M8	18 Nm
HH clamp bolts on fork legs	M8	10 Nm
Collar bolts for handlebar clamps	M8	20 Nm
AH bolt for handlebar mount	M10	Loctite 243 + 20 Nm
HH clamp bolts for steering stem	M8	23 Nm
Collar bolt front brake disk	M6	Loctite 243 + 10 Nm
Collar bolt rear brake disks	M6	Loctite 243 + 10 Nm
HH bolts on front brake caliper	M8	Loctite 243 + 25 Nm
HH bolts on handbrake cylinder	M6	10 Nm
HH bolts on footbrake cylinder	M6	Loctite 243 + 10 Nm
AH bearing bolt for foot brake pedal	M8	Loctite 243 + 25 Nm
AH bolt for top of brake-hose guide	M6	Loctite 243 + 8 Nm
HH bolts on foot brake pedal surface	M5	Loctite 243 + 6 Nm
HH nuts on rear sprocket bolts	M10x1.25	Loctite 243 + 50 Nm
Spoke nipple	M5	4 Nm
HH bolts for side stand bracket - engine	M10	Loctite 243 + 45 Nm
HH bolts for side stand fixture - side stand bracket	M10	Loctite 243 + 25 Nm
HH bolts for side stand mounting	M10	Loctite 243 + 45 Nm
HH bolt for spring rest on side stand	M8	Loctite 243 + 25 Nm
HH bolt for side stand switch	M6	Loctite 243 + 10 Nm
Drain plug on oil tank	M12x1.5	20 Nm
Exhaust nuts on manifold	M8	evenly, do not bend sheet metal
HH bolts on exhaust suspension	M6	Loctite 243 + 12 Nm
HH bolts for underride protection	M8	Loctite 243 + 25 Nm
HH bolt on gas level indicator	M5	3 Nm
AH bolts on tank cover	M5	5 Nm
AH bolts on tank mounting	M8	25 Nm
HH bolts for fuel taps	M6	6 Nm
Other bolts on chassis	M6	10 Nm
	M8	25 Nm
	M10	45 Nm
Other collar nuts on chassis	M6	15 Nm
	M8	30 Nm
	M10	50 Nm

PERIODIC MAINTENANCE SCHEDULE 12

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PERIODIC MAINTENANCE SCHEDULE 950 ADVENTURE 12-2

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PERIODIC MAINTENANCE SCHEDULE 2003

950 ADVENTURE

	A washed motorcycle can be checked more quickly which saves money!	1. Service after 1000 km	7500 km or once a year	15000 km or every 2 years
ENGINE	Change engine oil and oil filter	●	●	●
	Clean oil screens of engine and oil tank	●	●	●
	Clean magnetic drain plugs of engine and oil tank	●	●	●
	Check oil lines for damage and kink-less arrangement	●	●	●
	Renew spark plugs			●
	Check and adjust valve clearance	●		●
	Check engine fastening bolts for tight fit	●		●
	Check all engine bolts accessible from the outside for tight fit	●	●	●
	Check clutch linings			●
	Check clutch pressure booster system			●
CARBURETOR	Check carburetor connection boots for cracks and leaks	●		●
	Check synchronisation of carburators using special tool, if necessary adjust	●		●
	Check idle setting (1400 rpm)	●		●
	Check bleeder hoses for damage and kink-free arrangement	●		●
ADD-ON-PARTS	Check cooling system for leaks and antifreeze protection	●	●	●
	Check radiator fan for proper operation	●	●	●
	Check exhaust system for leaks and correct fit	●	●	●
	Check actuating cables for damage, smooth operation, and kink-less arrangement,adjust and lubricate	●	●	●
	Check air filter, renew if necessary, clean air filter box			●
	Check cables for damage and kink-less arrangement	●	●	●
	Check headlamp adjustment	●	●	●
	Check electrical system for function (low/high beams, stop light, turn indicators,headlamp flasher,tell-tale lamps, speedometer illumination, horn, side-stand switch, clutch switch, emergency-off switch)	●	●	●
	Make sure all bolts and nuts are tight	●	●	●
BRAKES	Check brake fluid level, lining thickness, and brake discs	●	●	●
	Change brake fluid			●
	Check brake lines for damage and leaks	●	●	●
	Check/adjust smooth operation, free travel of handbrake/footbrake levers	●	●	●
	Check bolts of brake system for tight fit	●	●	●
CHASSIS	Check suspension strut and fork for leaks and proper operation	●	●	●
	Clean fork dust sleeves		●	●
	Bleed fork legs	●	●	●
	Check swingarm pivot	●	●	●
	Check/adjust steering-head bearing	●	●	●
	Check all chassis bolts for tight fit (fork plates, fork leg, axle nuts/bolts, swinging-fork pivot, reversing lever, suspension strut)	●	●	●
WHEELS	Check spoke tension and rim joint	●	●	●
	Check tire condition and inflation pressure	●	●	●
	Check chain and chain guides for wear, force fit and tension	●	●	●
	Check bolts/nuts on pinion and chain sprocket for locking devices and a tight fit	●	●	●
	Lubricate chain	●	●	●
	Check wheel bearings and jerk damper for play		●	●

IF MOTORCYCLE IS USED FOR COMPETITION 7500 KM SERVICE SHOULD BE CARRIED OUT AFTER EVERY RACE!

SERVICE INTERVALLS SHOULD NEVER BE EXCEEDED BY MORE THAN 500 KM.

MAINTENANCE WORK DONE BY KTM AUTHORISED WORKSHOPS IS NOT A SUBSTITUTE OF CARE AND CHECKS DONE BY THE RIDER!

PERIODIC MAINTENANCE SCHEDULE 2003

IMPORTANT RECOMENDED MAINTENANCE PROCEDURES TO BE PERFORMED BASED ON A SEPARATE SUPPLEMENT ORDER

	at least once a year	every 2 years or 15000 km
Perform complete fork maintenance		●
Perform complete suspension strut maintenance		●
Clean and lubricate steering-head bearing and sealing elements	●	
Clean and adjust the carburetors		●
Treat the electrical contacts and switches with contact spray	●	
Treat battery connections with contact grease	●	
Change coolant fluid		●

VITAL CHECKS AND CARE PROCEDURES TO BE CONDUCTED BY THE OWNER OR THE MECHANIC

	before each start	after every cleaning	every 1000 km or after off road use
Check oil level	●		
Check brake fluid level	●		
Check brake pads for wear	●		
Check lighting system for proper operation	●		
Check horn for proper operation	●		
Lubricate and adjust actuating cables and nipples		●	
Bleed fork legs in regular intervals			●
Clean chain			●
Lubricate chain		●	●
Check chain tension	●		
Check tire pressure and wear	●		
Check coolant level	●		
Check fuel lines for leaks	●		
Check all control elements for smooth running	●		
Check brake performance	●	●	
Treat exposed metal components (except for the braking and exhaust systems) with wax-based anti-corrosion agents		●	
Treat ignition/steering lock and light switch with contact spray		●	

Art.-Nr. 3.206.009-E

LUBRICATION AND MAINTENANCE WORK - ENGINE

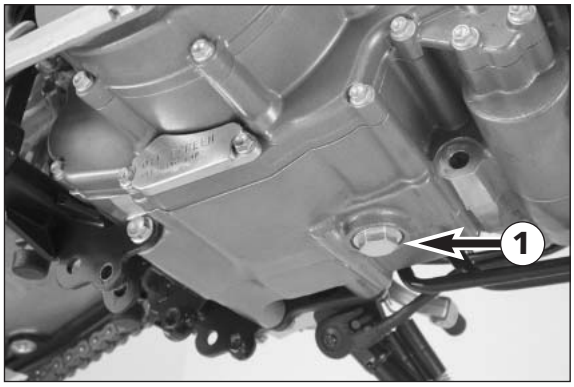
Changing the engine oil and filter, cleaning the oil screens and magnets on the drain plugs

NOTE: Change the engine oil when the engine is at operating temperature.

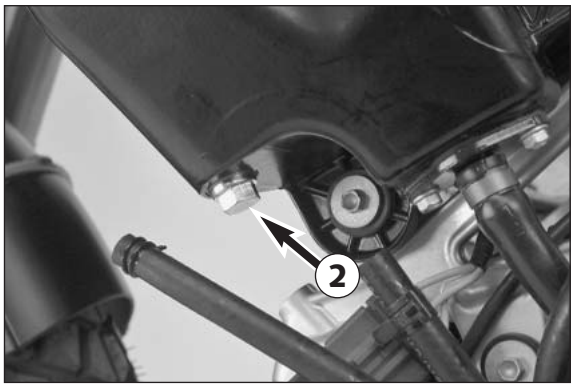
⚠ WARNING ⚠

THE ENGINE AND ENGINE OIL ARE VERY HOT AT OPERATING TEMPERATURE – BE CAREFUL NOT TO BURN YOURSELF.

NOTE: before performing the following greasing and maintenance work, remove the engine guard, the seat and both tanks (see page 3-2). Jack the bike up on the center stand 600.03.022.000 and lock the center stand (600.29.055.000). Remount in the reverse order when the lubrication and maintenance work is completed.



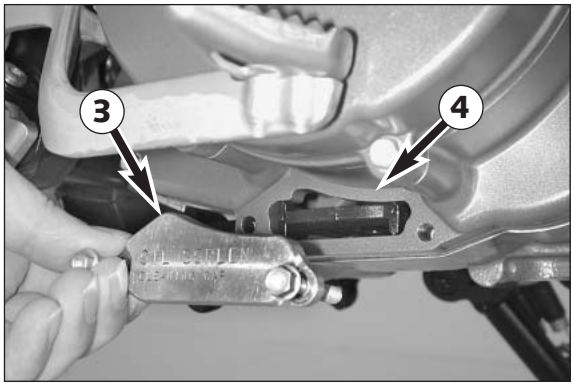
– Remove the oil drain plug on the engine ❶ and allow the oil to drain into a receptacle.
– Clean the magnet on the drain plug.
– Mount a new seal ring on the drain plug, screw back in and tighten to 20 Nm.



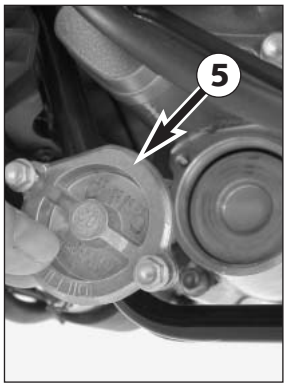
– Unscrew the oil drain plug ❷ on the oil tank and allow the oil to drain into a receptacle.

NOTE: dispose of the used oil properly.
Do not pour the used oil into the sewer system.
1 liter of used oil will pollute 1,000,000 liters of water.

– Clean the magnet on the drain plug.
– Mount a new seal ring on the drain plug, screw back in and tighten to 20 Nm.



– Remove the oil screen cover ❸ and carefully pull out the oil screen ❹ with a pair of pliers.
– Clean the oil screen, remount with the TOP mark facing up and mount the cover.



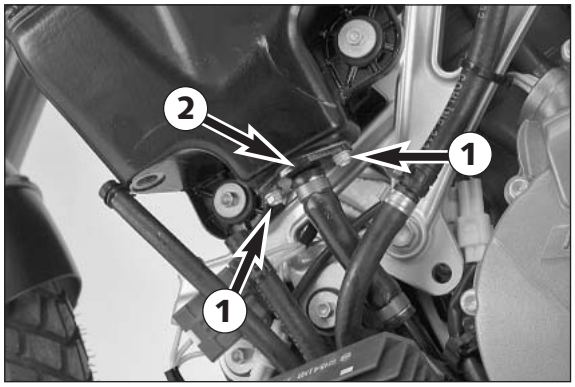


– Remove the oil filter cover ❺ and pull the engine out of the engine case with circlip pliers (upside-down).

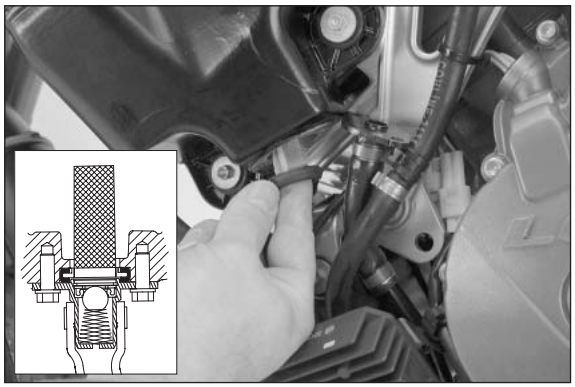
– Insert a new oil filter in the engine case, grease the O-ring and mount the oil filter cover together with the O-ring. Tighten the bolts to 6 Nm.

! CAUTION !

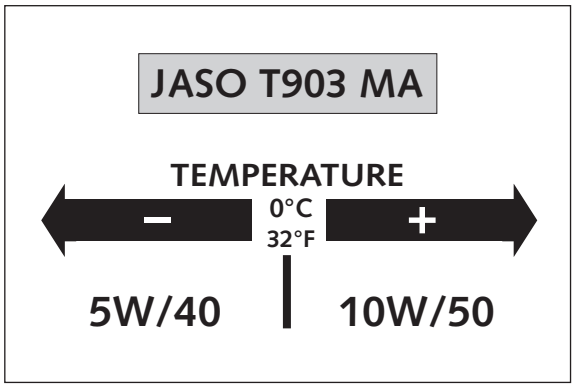
ONLY USE ORIGINAL KTM OIL FILTERS. THE ENGINE CAN BE DAMAGED IF OTHER FILTERS ARE USED.



– Remove both bolts ❶ from the oil tank connection ❷ and tilt the oil tank aside together with the oil return valve.
– Remove the screen and cleanse.

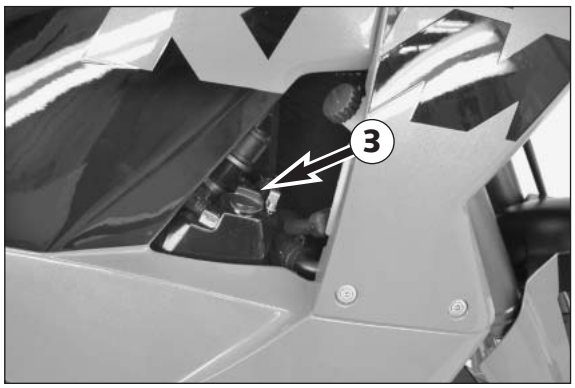


– Grease the seal ring and carefully slide the oil screen into the oil tank. Position the oil tank connection together with the oil return valve, mount the bolts and tighten to 10 Nm.



Engine oil

Automobile engine oil used to be used for four-stroke motorcycles before there were separate motorcycle specifications. Different technical developments made it necessary to have a separate specification for four-stroke motorcycles - the JASO T903 MA standard. Whereas car engines require long changing intervals, motorcycle engines require a higher power output at higher speeds. Most motorcycle engines also use the same oil to lubricate the transmission and the clutch. The JASO MA standard responds to these special requirements.
Only use fully synthetic engine oils that meet the JASO MA quality requirements (see information on the can).
KTM recommends Motorex Power Synt 4T in the 10W/50 viscosity (for temperatures over 0°C) or 5W/40 (for temperatures under 0°C).



– Fill approx. 2.7 liters of engine oil into the oil tank. The oil tank will be filled up to the top.
– Start the engine and allow to idle for about one minute without accelerating.
– Switch off the engine and pour another 0.3 liters into the oil tank. Check the oil system for leakage.

! CAUTION !

DO NOT REV UP THE ENGINE RIGHT AFTER CHANGING THE OIL SINCE ALL OF THE LUBRICATING POINTS WILL NOT BE SUPPLIED WITH ENOUGH OIL YET.

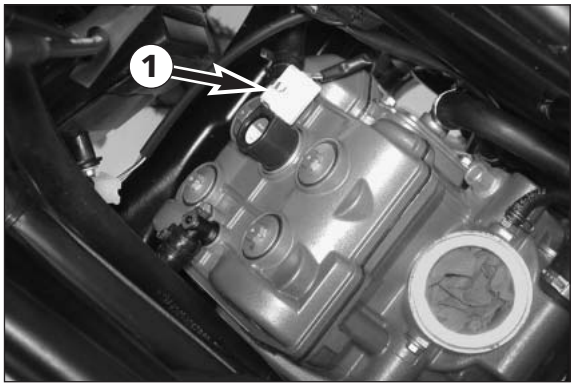


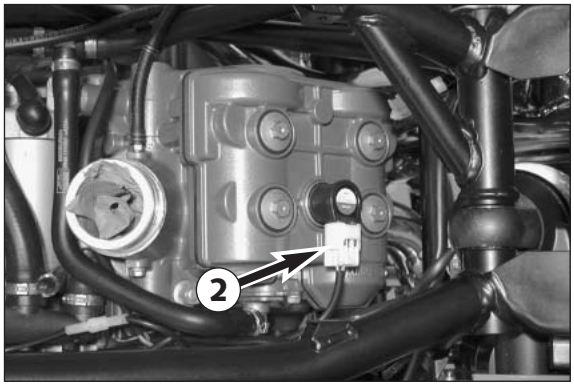
Checking the engine oil level

Check the engine oil level when the engine is warm (at least 4 bars on the temperature indicator will light up). Place the motorcycle on a level surface (not on the side stand).
Turn off the engine, unscrew the oil dipstick ❸ and wipe off with a cloth. Screw the oil dipstick **all the way back in** and back out again. The oil level should fall between the lower end of the oil dipstick (MIN) and the MAX mark.
The oil capacity between the MIN and MAX mark is 0.5 liters. Add more engine oil if necessary and check the engine for leakage.

! CAUTION !

– NOT ENOUGH ENGINE OIL OR LOW-QUALITY OIL WILL LEAD TO PREMATURE ENGINE WEAR.
– DO NOT EXCEED THE MAXIMUM LEVEL.
– DO NOT ALLOW TO FALL BELOW THE MINIMUM LEVEL.







Replacing the spark plugs

NOTE: the carburetors are dismounted during the 15000 km inspection to check/adjust the valve clearance. This work is described in Chapter 3 and will not be described in detail at this point.

– Disconnect the cable connectors (❶ and ❷) from both ignition coils.
– Pull the ignition coils out of the spark plug shafts.
– Unscrew the spark plugs with the special tool 600.29.073.000.

– Check the new spark plugs for the correct electrode distance. The distance should be 0.6 mm.

– Insert new spark plugs with the special tool 600.29.073.000 and tighten to 12 Nm.

! CAUTION !

DO NOT EXCEED THE FIXED TORQUE SINCE SPARK PLUGS BREAK EASILY.

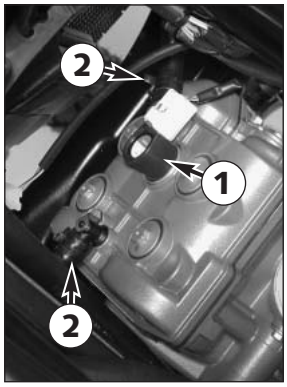
– Insert the ignition coils in the spark plug shafts and push to the stop by hand.

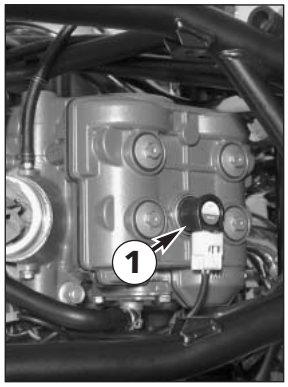
NOTE: if you are checking the valve clearance, insert the ignition coils later.

! CAUTION !

– DO NOT INSTALL THE IGNITION COILS WITH A HAMMER OR SIMILAR TOOL.
– TURN THE CONNECTIONS ON THE IGNITION COILS SO THEY DO NOT COME CLOSE TO THE VALVE COVER BOLTS (SEE PHOTOS) SINCE THIS COULD CAUSE ELECTROMAGNETIC INTERFERENCE.

– Connect the cable connectors to both ignition coils.

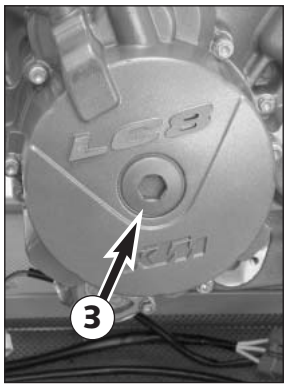


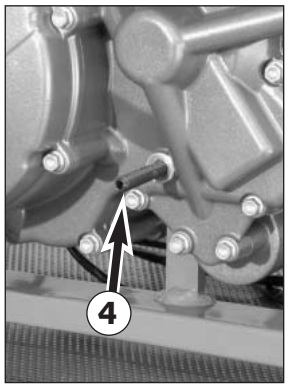


Checking and adjusting the valve clearance

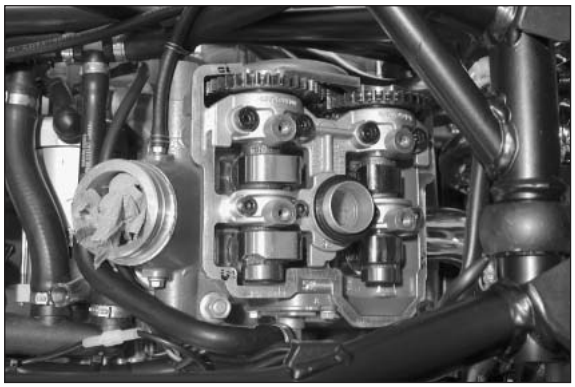
NOTE: to make it easier to work on the front cylinder, remove the 4 radiator retaining bolts and pull the radiator forward.

– Pull the EPC valve on the front cylinder from the bracket.
– Disconnect the ignition coil connectors ❶ and pull the ignition coils out.
– Push back the spring-loaded band-type clamps ❷ with the special pliers 600.29.057.100 and pull the vent hoses from the valve cover connections.
– Remove both valve covers and the gaskets.





– Remove the plug ❸, turn the crankshaft to the rear cylinder TDC position and lock with special tool 0113 080802 ❹. In the TDC position, the cams of the rear cylinder must point towards the inside and the crosses on the camshaft gears must coincide with the plane outer surface of the cylinder head (see Chapter 4).



– Check the valve clearance with the feeler gauge. The minimum clearance when the engine is cold should be 0.125 – 0.175 mm (intake) and 0.225 – 0.275 mm (exhaust).

NOTE: if the valve clearance is incorrect for one or more valves, measure how large the deviation is. Use thinner or thicker compensating washers depending on whether the valve clearance is too small or too large.

– Dismount the camshafts (see page 4-3) and correct the thickness of the shims.

NOTE: Shims for the valves are available in the following thicknesses: 2.30 mm, 2.35 mm, 2.40 mm, 2.45 mm, 2.50 mm, 2.55 mm, 2.60 mm, 2.65 mm, 2.70 mm, 2.75 mm, 2.80 mm, 2.85 mm, 2.90 mm, 2.95 mm and 3.00 mm.



– Unscrew the locking bolt, turn the engine to the TDC position of the front cylinder and lock again(see page 4-5).
– Check the valve clearance of the front cylinder and adjust if necessary.

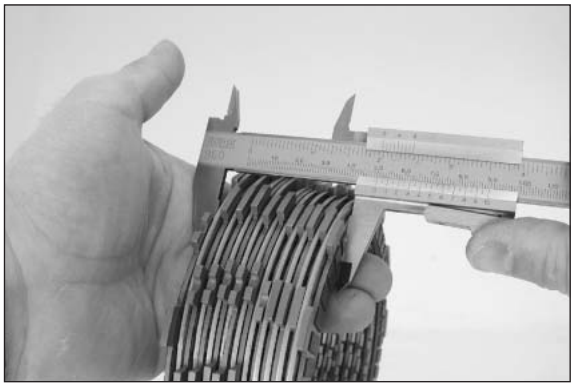
NOTE: the procedure for the front cylinder is the same as for the rear cylinder.

– Mount the EPC valve.

! CAUTION !

IF THE RETAINING CLIP FOR THE FRONT EPC VALVE IS BENT, THE EPC VALVE WILL BE ABLE TO TOUCH THE FRAME. THE ENGINE VIBRATIONS CAN CAUSE IT TO OPEN SLIGHTLY, RESULTING IN A LACK OF POWER FOR THE ENTIRE SPEED RANGE.

– Mount both valve covers.
– Connect the vent hoses to the connections on the valve covers and attach the spring-loaded band-type clamps ❶ with the special pliers 600.29.057.100.
– Mount the ignition coils and connect the connector.
– Screw the radiator back on.



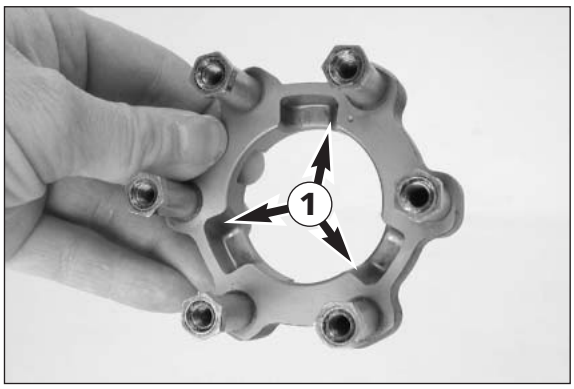
Checking the clutch lining

– Remove the lock clip on the foot brake lever bolt and pull out the bolt.
– Loosen the bearing bolt on the foot brake lever and remove the foot brake lever.
– Dismount the clutch lining (see Chapter 4).

– Measure the total height of the clutch disk package (all of the lining disks and steel disks together)

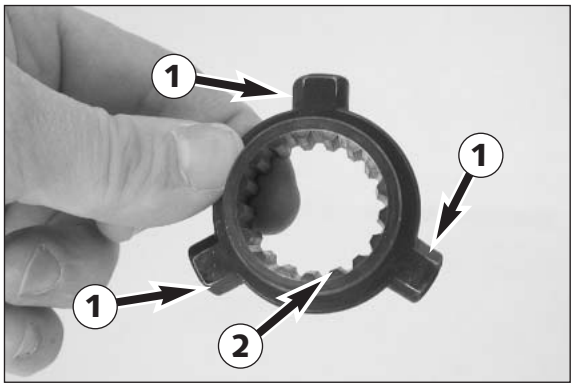
Wear limit: 48.0 mm

– Check the clutch disks for damage (breakage, recesses).



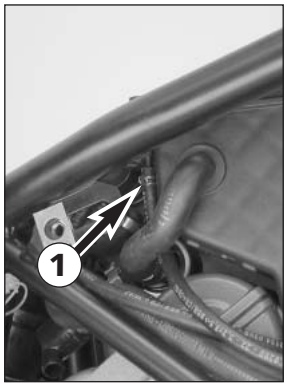
Checking the clutch pressure booster system

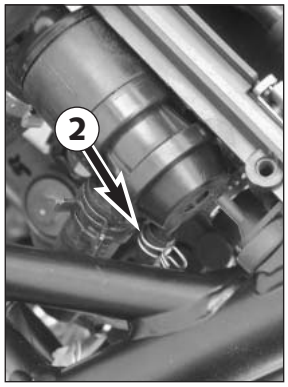
– Check the outer and inner part for wear and breakage, especially near the pressure areas ❶ and the toothing ❷.



– Assemble the clutch again (see Chapter 6).

– Mount the foot brake lever, secure the bearing bolt with Loctite 243 and tighten to 25 Nm.
– Mount the foot brake lever bolt and attach the lock clip.





LUBRICATION AND MAINTENANCE WORK – CARBURETOR

Check the carburetor synchronization with an vacuum gauge and adjust if necessary

– Disconnect the vacuum hoses from the air filter box ❶ and from the secondary air system valve ❷ and run up on the side between the frame and the air filter box.
– Mount both tanks and connect the fuel lines, open the fuel taps.

NOTE: before you use the special tool 600.29.011.000, always check both dial gauges for synchronism:
– Connect both dial gauges to <u>one</u> cylinder with the vacuum hoses and a T-fitting.
– Tighten the knurled nuts on the special tool by turning them in a clockwise direction almost to the stop.
– Start the engine and unscrew the two knurled nuts until the dials barely begin to vibrate. You should still be able to read the gauge clearly. Both dial gauges should indicate the same value. If not, the special tool is damaged and should not be used.
– Turn off the engine, disconnect the hoses and the T-fitting.

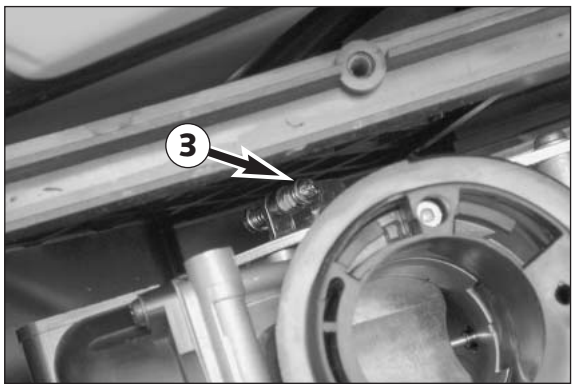


! CAUTION !

IF THE FOLLOWING RULES ARE NOT OBSERVED, THE MEASURING MECHANISM IN THE SPECIAL TOOL WILL BE DAMAGED OR DESTROYED:
– ADJUST THE DAMPING FIRST, THEN START THE ENGINE.
– DO NOT DROP THE SPECIAL TOOL.
– DO NOT RUN THE ENGINE WITH DEFECTIVE CARBURETORS (RISK OF THE ENGINE MISFIRING).



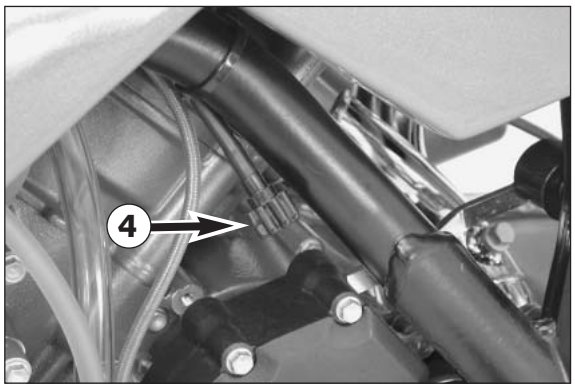
– Connect each dial gauge on the special tool to a cylinder. You can also use the on-board hoses (see photo).
– Tighten the knurled nuts again (also adjust stiff damping).
– Start the engine and unscrew both knurled nuts until the dials barely begin to vibrate. You should still be able to read the gauge clearly.



Both dial gauges should indicate the same value. If not, dismount the air filter and turn the synchronization screw ❸ on the carburetor linkage until the dial gauges indicate a value of +/- 0.03 bar.

NOTE: before making the adjustment, make sure the cold-start system (choke) is completely closed and the engine is at operating temperature.

– Remove the vacuum gauge and connect the vacuum hoses to the secondary air system valve or to the air filter box again.



Checking the idle setting

– Set the idle speed to 1400 rpm.

NOTE: before make the adjustment, make sure the cold-start system (choke) is completely closed and the engine has reached operating temperature.

If the idle speed deviates from the set-point value, correct the value with the adjusting screw ❹: turning in a clockwise direction will increase the idle speed, turning in a counterclockwise direction will decrease the idle speed.

LUBRICATION AND MAINTENANCE WORK – ADD-ON PARTS

Checking the cooling system for leakage and the antifreeze concentration

– Check the cooling liquid level in the radiator and in the compensating tank. Fill up if necessary (see Owner's Manual, page 37).
– Check the antifreeze concentration with a suitable gauge. The antifreeze concentration should be 40% antifreeze and 60% water (at least -25ºC).

NOTE: if the cooling liquid level is far below the minimum mark, check for leakage.

Checking the radiator fan for proper functioning.

– Following the test drive, let the engine run idle until the fan switches on.

! CAUTION !

WATCH THE TEMPERATURE INDICATOR FOR THE COOLING LIQUID TO AVOID ENGINE DAMAGE IN CASE THE RADIATOR FAN IS DEFECTIVE.

Lubricating the cables

NOTE: only use lubricants that are free of resin and acid otherwise they can destroy the inner cable coating and cause the cable to block. Do not use MoS2 spray.

Checking the air filter, replacing if necessary, cleaning the air filter box

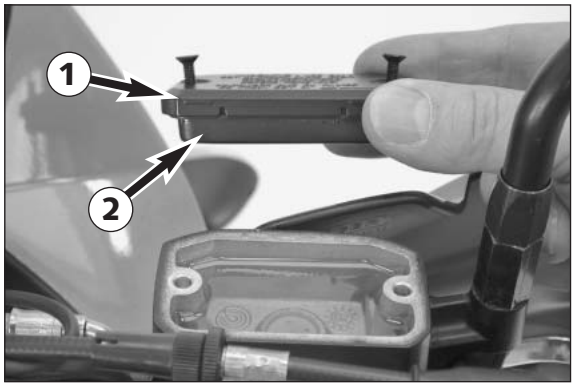
– See Chapter 3 for dismounting the air filter.

NOTE: the air filter insert cannot be cleaned and should be replaced when soiled. Do not use filter oil.
– When mounting the filter, proceed in the reverse order used to dismount.

LUBRICATION AND MAINTENANCE WORK - BRAKES

Checking the brake fluid level, lining thickness, brake disks

– See Owner's Manual, page 27

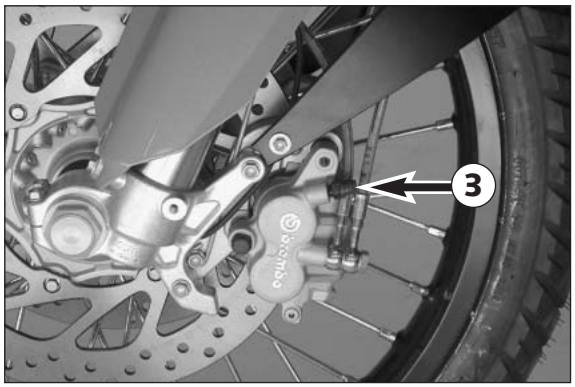


Changing the front brake fluid

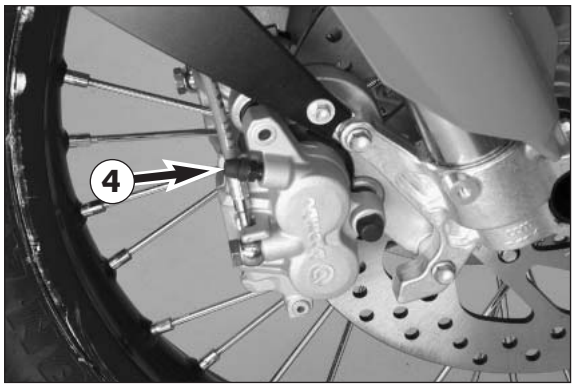
– Unscrew the cover on the brake fluid reservoir ❶ and remove together with the diaphragm ❷.

– Use a syringe to extract the used brake fluid and add fresh DOT 5.1 brake fluid (Motorex Brake Fluid DOT 5.1).

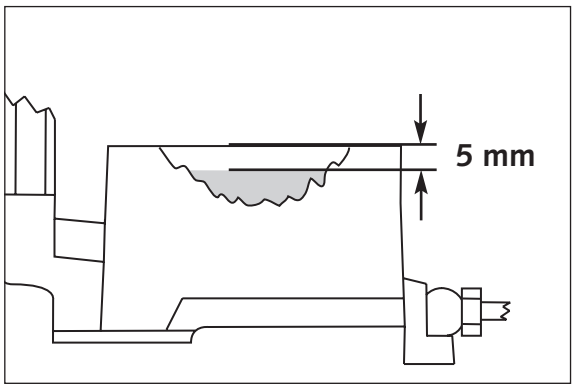
– Press the front brake caliper pistons all the way back.



– Use a commercial extractor (shop equipment) to extract the used brake fluid out of the system through the bleeder screw ❸ on the left brake caliper. Make sure the brake fluid reservoir is always filled with enough fresh brake fluid.
– Tighten the bleeder screw again.



– Now extract the used brake fluid through the bleeder screw ❹ on the right brake caliper, also making sure there is always enough fresh brake fluid in the brake fluid reservoir.
– Tighten the bleeder screw again.

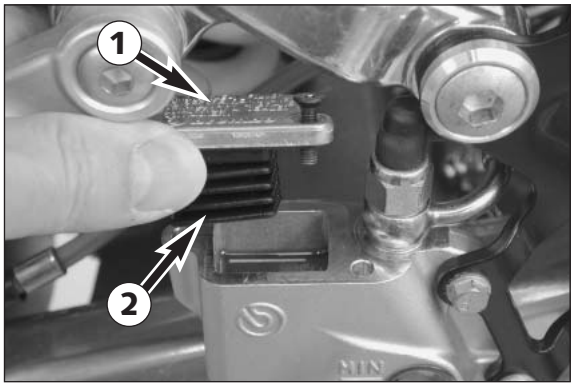


– Move the hand brake cylinder into a horizontal position and add DOT 5.1 brake fluid (Motorex Brake Fluid DOT 5.1) up to 5 mm under the top edge of the reservoir. Remount the rubber boot, cover and screws. Wash off any overflowing or spilled brake fluid with water.

! CAUTION !

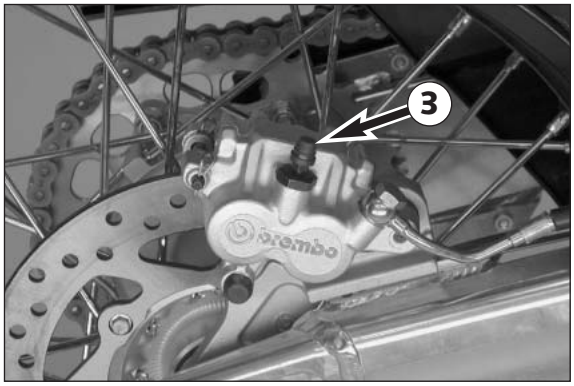
– NEVER USE DOT 5 BRAKE FLUID. IT IS BASED ON SILICONE OIL AND DYED PURPLE. GASKETS AND BRAKE HOSES WILL BE DAMAGED IF DOT 5 BRAKE FLUID IS USED.
– BRAKE FLUID CAN CAUSE SKIN IRRITATIONS. AVOID COMING INTO CONTACT WITH THE SKIN OR EYES. IF BRAKE FLUID SPLASHES INTO YOUR EYES, RINSE THOROUGHLY WITH WATER AND CONSULT A DOCTOR.
– MAKE SURE NO BRAKE FLUID COMES INTO CONTACT WITH PAINTED PARTS SINCE BRAKE FLUID WILL CORRODE THE PAINTWORK.
– ONLY USE CLEAN, NEW BRAKE FLUID FROM TIGHTLY SEALED CONTAINERS.

– Actuate the hand brake lever until you feel the point of pressure.

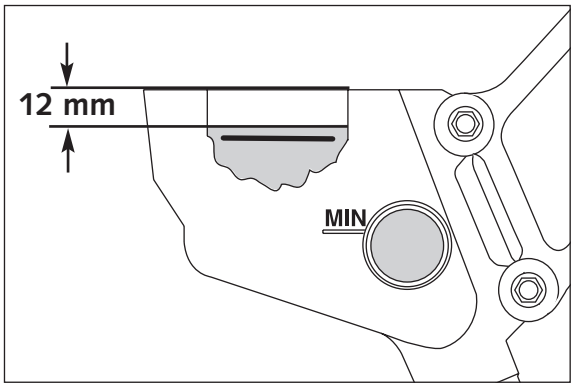


Changing the rear brake fluid

– Unscrew the cover on the brake fluid reservoirs ❶ and remove together with the diaphragm ❷.
– Use a syringe to extract the used brake fluid and add fresh DOT 5.1 brake fluid (Motorex Brake Fluid DOT 5.1).
– Press the brake caliper pistons all the way back..



– Use a commercial extractor (shop equipment) to extract the used brake fluid out of the system through the bleeder screw ❸ on the brake caliper. Make sure the brake fluid reservoir is always filled with enough fresh brake fluid.
– Tighten the bleeder screw again.



– Add DOT 5.1 brake fluid (Motorex Brake Fluid DOT 5.1) up to 12 mm under the top edge of the reservoir. Remount the rubber boot, cover and screws. Wash off any overflowing or spilled brake fluid with water.

! CAUTION !

– NEVER USE DOT 5 BRAKE FLUID. IT IS BASED ON SILICONE OIL AND DYED PURPLE. GASKETS AND BRAKE HOSES WILL BE DAMAGED IF DOT 5 BRAKE FLUID IS USED.
– BRAKE FLUID CAN CAUSE SKIN IRRITATIONS. AVOID COMING INTO CONTACT WITH THE SKIN OR EYES. IF BRAKE FLUID SPLASHES INTO YOUR EYES, RINSE THOROUGHLY WITH WATER AND CONSULT A DOCTOR.
– MAKE SURE NO BRAKE FLUID COMES INTO CONTACT WITH PAINTED PARTS SINCE BRAKE FLUID WILL CORRODE THE PAINTWORK.
– ONLY USE CLEAN, NEW BRAKE FLUID FROM TIGHTLY SEALED CONTAINERS.

– Actuate the foot brake lever until you feel the point of pressure.

Checking the bolts on the brake system for force fit

NOTE: check the bolts listed below with a torque wrench. If a bolt is not tightened to the specified torque (if it can easily be screwed in further), remove the bolt, clean, secure with Loctite 243 and tighten to the correct torque.

Collar bolts on the front brake disks: Loctite 243 + 10 Nm
Collar bolts on the back brake disks: Loctite 243 + 10 Nm
HH bolts on the front brake calipers: Loctite 243 + 25 Nm
HH bolts on the hand brake cylinder: 10 Nm
HH bolts on the foot brake cylinder: Loctite 243 + 10 Nm
HH bearing bolt on the foot brake lever: Loctite 243 + 25 Nm

LUBRICATION AND MAINTENANCE WORK - CHASSIS

Cleaning the dust boots

– See Owner's Manual, page 25

Bleeding the fork legs

– See Owner's Manual, page 25



Checking the swing arm support

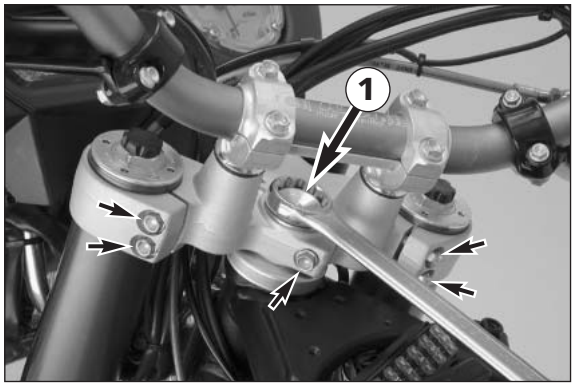
– Try to move the rear wheel to each side in an unloaded condition. You should not feel any clearance

NOTE:
– If you feel any clearance, check whether the swing arm support is worn or the wheel bearing is defective.
– See page 10-7 to replace the swing arm support or page 10-3 to replace the wheel bearing.



Checking/adjusting the steering head bearing

– Try to move the fork back and forth in an unloaded condition.



– If you feel any clearance, loosen the 5 clamp bolts on the top triple clamp and turn in the blind nut ❶ until no clearance is left.

NOTE: do not tighten the blind nut since you may damage the bearing.

– Gently tap on the top triple clamp with a plastic hammer to relieve any distortion and tighten the 5 clamp bolts to 23 Nm.

Checking all chassis bolts for force fit

NOTE: check the bolts listed below with a torque wrench. If a bolt secured with Loctite 243 is not tightened to the specified torque (if it can easily be screwed in further), remove the bolt, clean, secure with Loctite 243 and tighten to the correct torque.

Collar bolt on the front wheel spindle: 60 Nm
Collar nut on the rear wheel spindle: 110 Nm
AH bolts on the upper shock absorber: 100 Nm
AH bolts on the lower shock absorber: Loctite 243 + 45 Nm
AH bolts on the subframe: Loctite 243 + 45 Nm
Collar bolts on the handlebar clamps: 20 Nm
SK clamp bolts on the top triple clamp: 23 Nm
SK clamp bolts on the bottom triple clamp: 18 Nm
SK clamp bolts on the fork legs: 10 Nm

LUBRICATION AND MAINTENANCE WORK - WHEELS

Checking the spoke tension and rim run-out

– Spoke nipple: 4 Nm +2/-1 Nm
– maximum radial/lateral run-out of the rim (without tires): 1.2 mm
– maximum radial/lateral run-out of the rim (with tires): front 2.3 mm, rear 2.5 mm

Checking the chain and chain guides for wear, force fit and tension.

NOTE:
– Replacing the drive elements: see page 10-8.
– Checking and adjusting the chain tension: see Owner's Manual, page 26

Checking the nuts/bolts on the engine sprocket and the rear sprocket for the securing agent and a tight fit

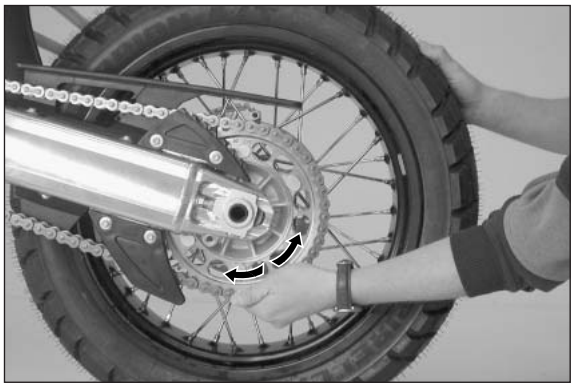
NOTE: check the nuts/bolts listed below with a torque wrench. If a nut secured with Loctite 243 is not tightened to the specified torque (if it can easily be screwed in further), remove, clean, secure with Loctite 243 and tighten to the correct torque.

Hexagon nuts on the rear sprocket bolts: Loctite 243 + 50 Nm
Hexagon nut on the engine sprocket: 60 Nm



Checking the wheel bearing and jerk damper for clearance

– To check the wheel bearing: jack up the motorcycle, lifting the wheel to be inspected off the ground. Try to tilt the wheel to each side. You should not feel any clearance. If you feel any wheel bearing clearance, replace the wheel bearings (see page 10-2 and 10-3).



– To check the jerk damper: hold the rear wheel while you try to move the rear sprocket back and forth in the running direction.

NOTE: the transmission should be switched to neutral.
Maximum clearance: 5 mm (measured on the outside of the rear sprocket)

To replace, see Owner's Manual, page 31.

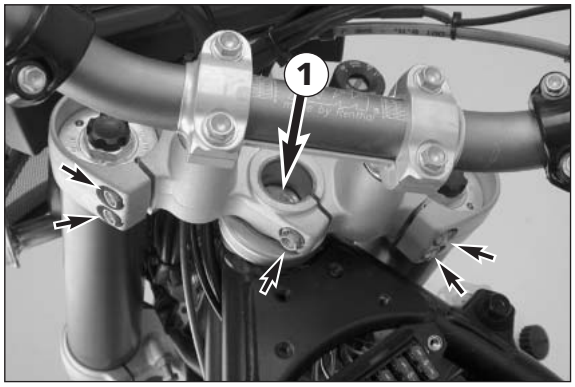
LUBRICATION AND MAINTENANCE WORK – ADDITIONAL WORK

Completely servicing the fork

– Dismounting the fork legs: see page 10-4
– Maintenance: see WP-documentation

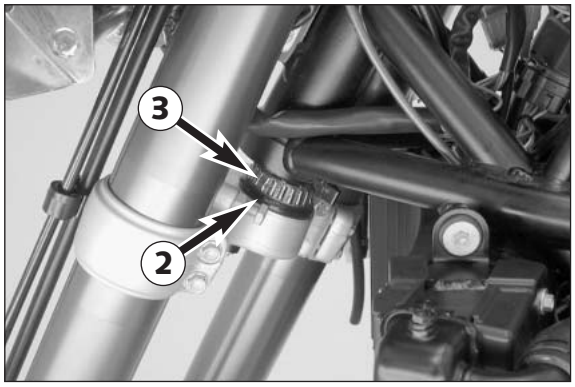
Completely servicing the shock absorber

– Dismounting the shock absorber: see page 10-5
– Maintenance: see WP-documentation

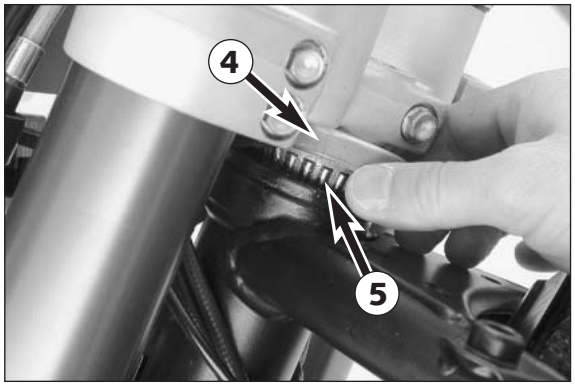


Cleaning and greasing the steering head bearing and sealing elements

– Jack up the motorcycle until the front wheel no longer touches the ground.
– Loosen the 5 clamp bolts on the upper triple clamp and remove the blind nut on the steering stem.
– Move the upper triple clamp upwards but do not pull the triple clamp all the way off of the steering stem ❶. The weight of the front wheel and the fork will give you access to the lower steering head bearing.



– Clean the gasket element ❷ and grease the lower steering head bearing ❸.

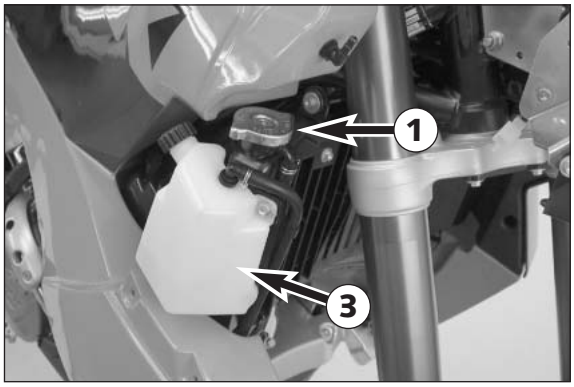


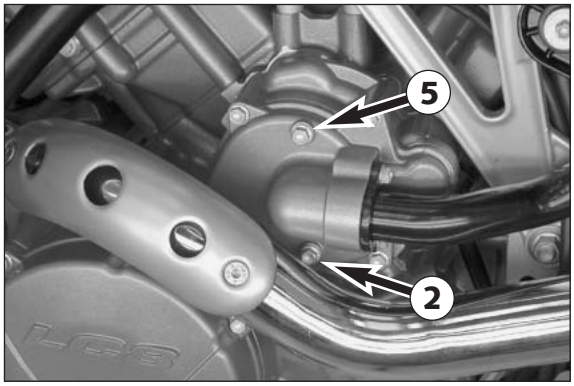
– Lift the front wheel to have access to the upper steering head bearing. Clean the gasket element, raise the protection ring ❹ and grease the upper steering head bearing ❺.

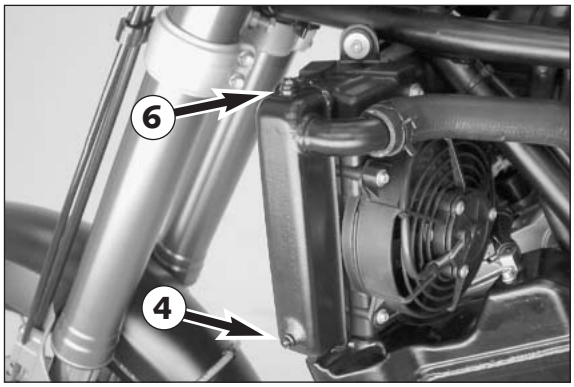
– Place the front wheel on the ground, press the upper triple clamp down, screw the blind nut back in until the bearings have no clearance.

NOTE: do not tighten the blind nut since you may damage the bearing.

– Gently tap on the upper triple clamp with a plastic hammer to relieve any distortion and tighten the 5 clamp bolts on the top triple clamp to 23 Nm.







LUBRICATION AND MAINTENANCE WORK – ADDITIONAL WORK

Cleaning and adjusting the carburetor

– See Chapter 8

Changing the cooling liquid

NOTE: change the cooling liquid after you have finished the general lubrication and maintenance work.

! CAUTION !

TO AVOID BURNING YOURSELF, ALWAYS DRAIN THE COOLING LIQUID WHEN THE ENGINE IS COLD.

– Open the radiator cap ❶.
– Remove the drain plug ❷ on the engine and allow the cooling liquid to drain into a receptacle. Mount the oil drain plug with a new seal ring and tighten to 10 Nm.
– Remove the compensating tank ❸, open and drain the coolant into a receptacle.
– Mount the compensating tank again.
– Remove the drain plug ❹ on the radiator and allow the cooling liquid to drain into a receptacle. Mount the drain plug again and tighten.

– Fill approx. 2.1. liters of a mixture of 40% antifreeze (e.g. Motorex Antifreeze) and 60% water (minimum protection -25ºC), into the radiator and compensating tank.
– Unscrew the bleeder screws on the water pump ❺ and the radiators ❻ until cooling liquid runs out without bubbles, tighten the screws again, close the radiator cap.

! CAUTION !

ONLY USE HIGH-GRADE ANTIFREEZE (E.G. MOTOREX ANTIFREEZE) TO AVOID THE RISK OF CORROSION AND FOAMING.

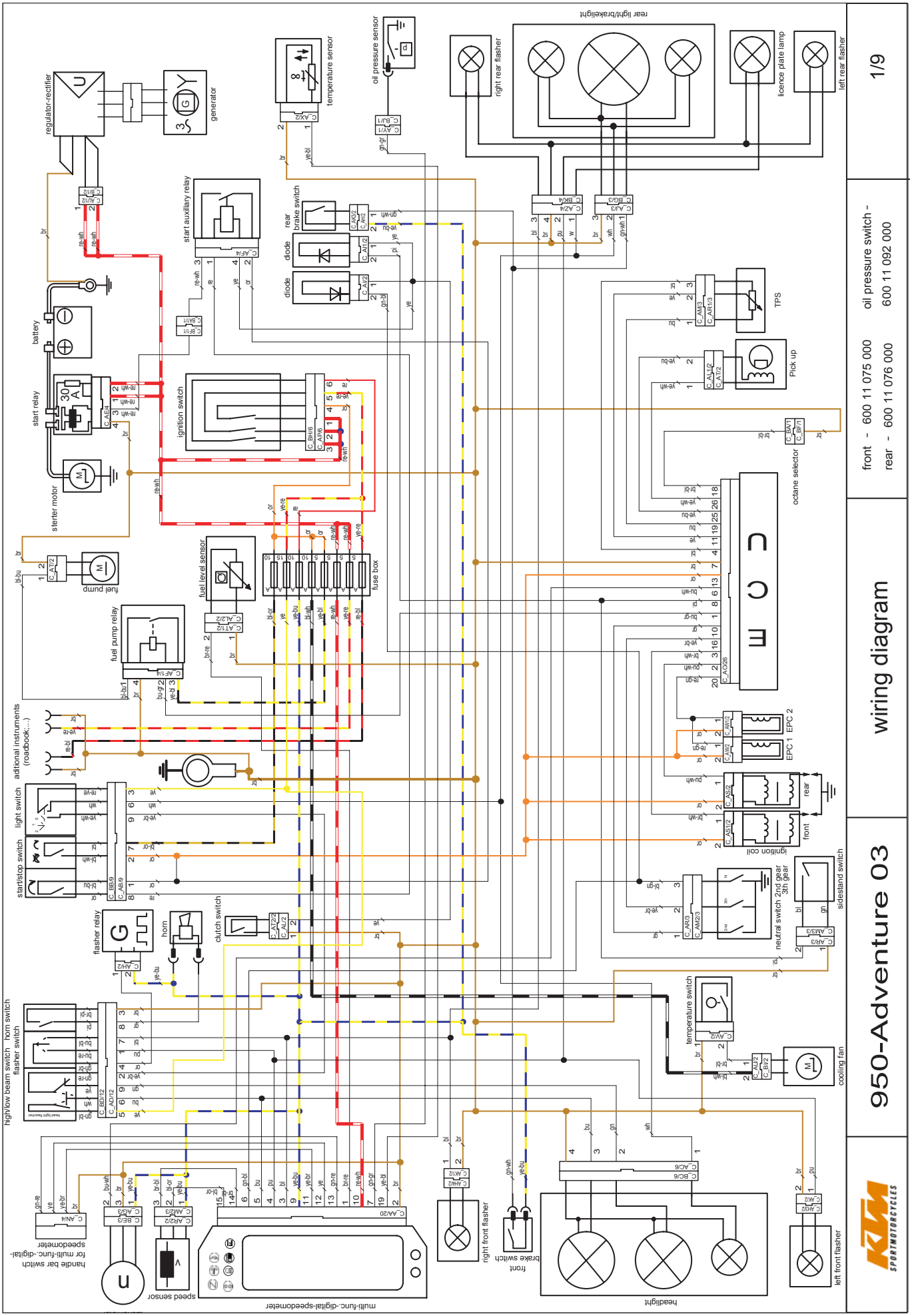
– Start the engine and allow to run warm until the radiator fan switches on.
– Allow the cooling system to cool down and add more coolant if necessary.

WIRING DIAGRAMS 13

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WIRING DIAGRAMS 12-2
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ECU 13-8
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LIGHTS 13-12
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INSTRUMENTS 13-16
GROUND CONNECTION 13-18
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CONNECTOR LIST
Connector AA - AF 13-20
Connector AG - AJ 13-21
Connector AK - AM 13-22
Connector AN - AR 13-23
Connector AS - AW 13-24
Connector AX - AZ, BA 13-25
Connector BB - BG 13-26
Connector BH - BK 13-27

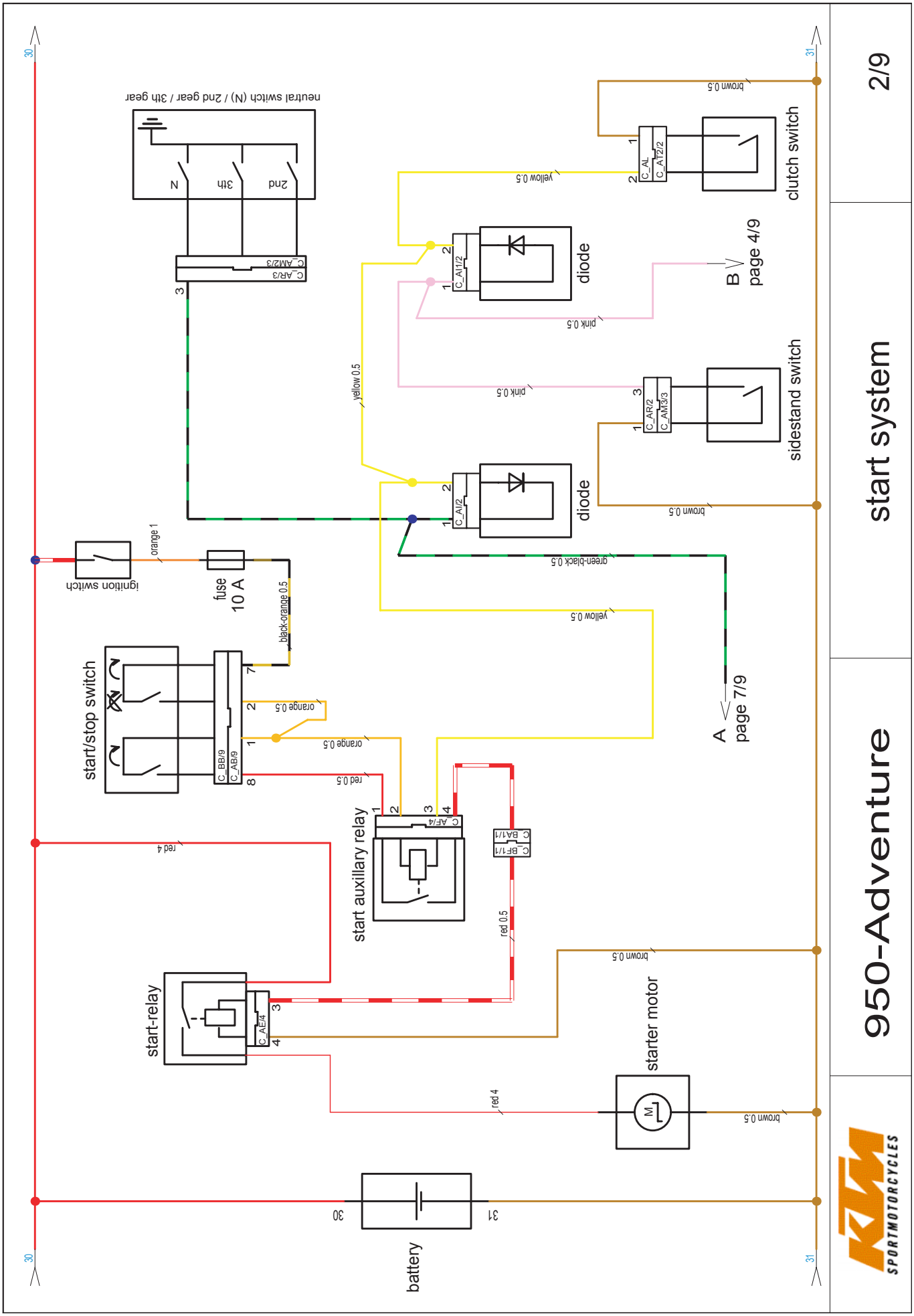
Art.-Nr. 3.206.009-E


950-Adventure 03
wiring diagram
1/9
front - 600 11 075 000
rear - 600 11 076 000
oil pressure switch -
600 11 092 000
regulator-rectifier
generator
temperature sensor
oil pressure sensor
rear light/brakelight
right rear flasher
licence plate lamp
left rear flasher
start auxiliary relay
rear brake switch
diode
diode
battery
start relay
ignition switch
TPS
Pick up
sterter motor
octane selector
fuel pump
fuel level sensor
fuse box
fuel pump relay
adtional instruments (roadbook...)
light switch
start/stop switch
high/low beam switch
horn switch
flasher switch
flasher relay
horn
clutch switch
EPC 1
EPC 2
ignition coil
front
rear
neutral switch
2nd gear
3th gear
sidestand switch
temperature switch
cooling fan
handle bar switch for multi-func.-digital-speedometer
speed sensor
multi-func.-digital-speedometer
right front flasher
front brake switch
headlight
left front flasher

NOTE to the connector designations:
The connector designations are comprised of letters and numbers - e.g.: **C_AA/20**
The 1st position **C** stands for connector (connector).
The 2nd and 3rd positions **AA** stand for the connector type.
The 4th and 5th positions **20** specify the number of pins in the connector, in this case 20 poles. The 5th position is not required for connectors with less than 10 pins.

Cable colours

bl: black
ye: yellow
bu: blue
gr: green
re: red
wh: white
br: brown
or: orange
pi: pink
gr: grey
pu: purple


2/9
start system
950-Adventure
KTM SPORTMOTORCYCLES
neutral switch (N) / 2nd gear / 3th gear
N
3th
2nd
C_AR/3
C_AM2/3
clutch switch
C_AL
C_AT2/2
brown 0.5
yellow 0.5
diode
C_AI1/2
B
page 4/9
pink 0.5
sidestand switch
C_AR/2
C_AM3/3
yellow 0.5
diode
C_AI/2
green-black 0.5
A
page 7/9
ignition switch
orange 1
fuse
10 A
black-orange 0.5
start/stop switch
C_BB/9
C_AB/9
orange 0.5
red 0.5
start auxillary relay
C_AF/4
C_BA1/1
C_BF1/1
red 4
red 0.5
start-relay
C_AE/4
brown 0.5
starter motor
red 4
brown 0.5
30
31
battery

start/stop switch

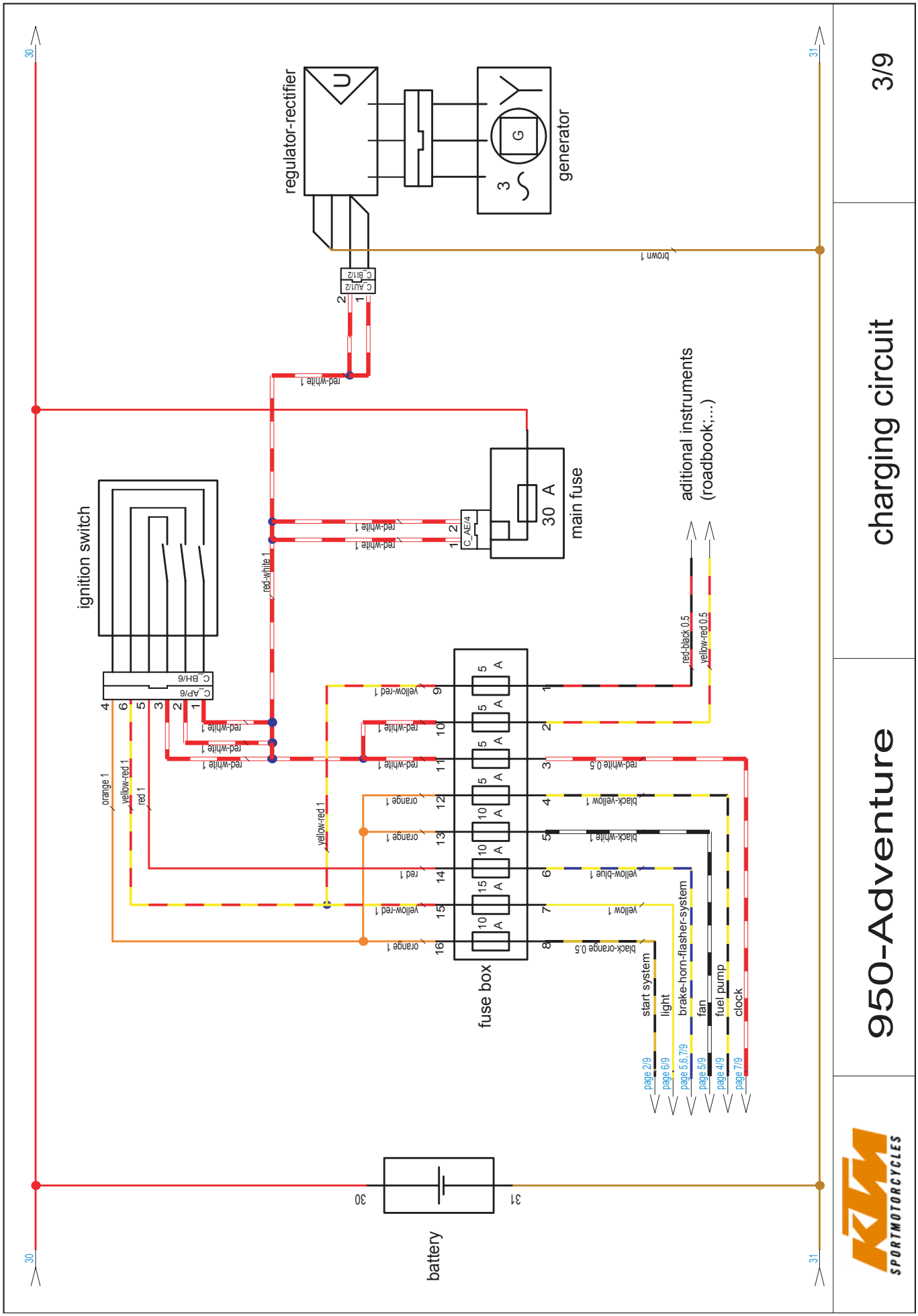
cable harness	re	or	or	bl-or
cable switch	or	bl-bu	bl-wh	bl
START		●		●
RUN	●		●	
STOP				

clutch switch

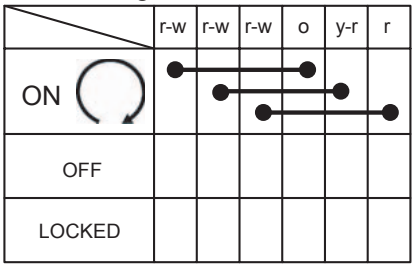
switch position	ye	br
pulled	●	●
unpulled		

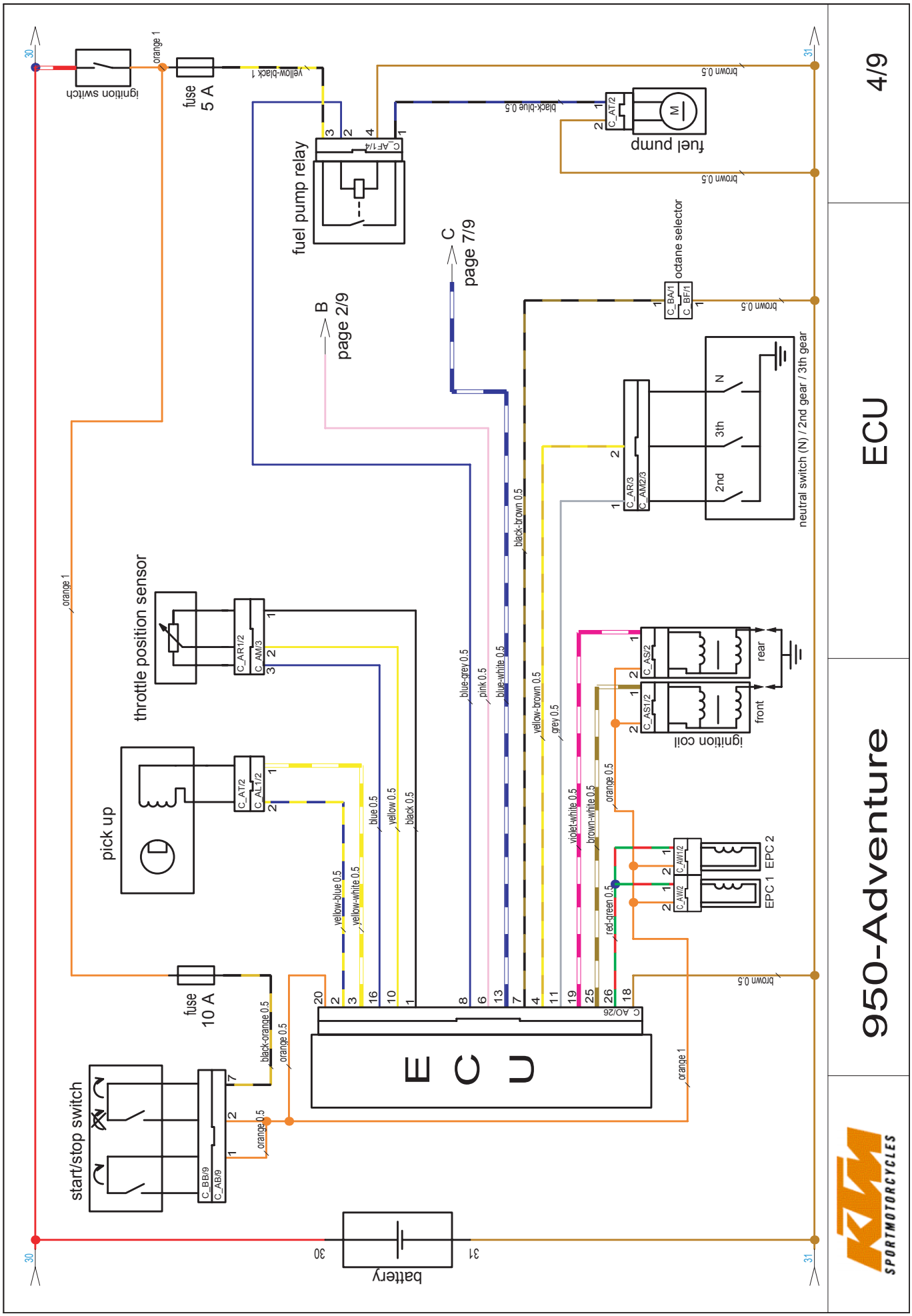
sidestand switch

cable harness	br	pi	
cable switch	gn	bl	br
folded up	●	●	
folded down			

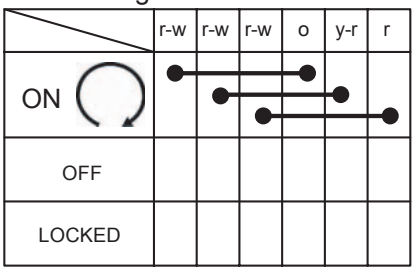

regulator-rectifier
generator
brown 1
C_AU1/2
C_BI1/2
red-white 1
ignition switch
C_BH/6
C_AP/6
C_AE/4
30 A
main fuse
adtional instruments
(roadbook;...)
red-black 0.5
yellow-red 0.5
fuse box
red-white 0.5
black-yellow 1
black-white 1
yellow-blue 1
yellow 1
black-orange 0.5
yellow-red 1
orange 1
red 1
start system
light
brake-horn-flasher-system
fan
fuel pump
clock
page 2/9
page 6/9
page 5,6,7/9
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page 7/9
battery
30
31
3/9
charging circuit
950-Adventure
SPORTMOTORCYCLES

ignition switch

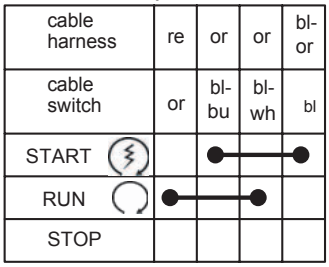


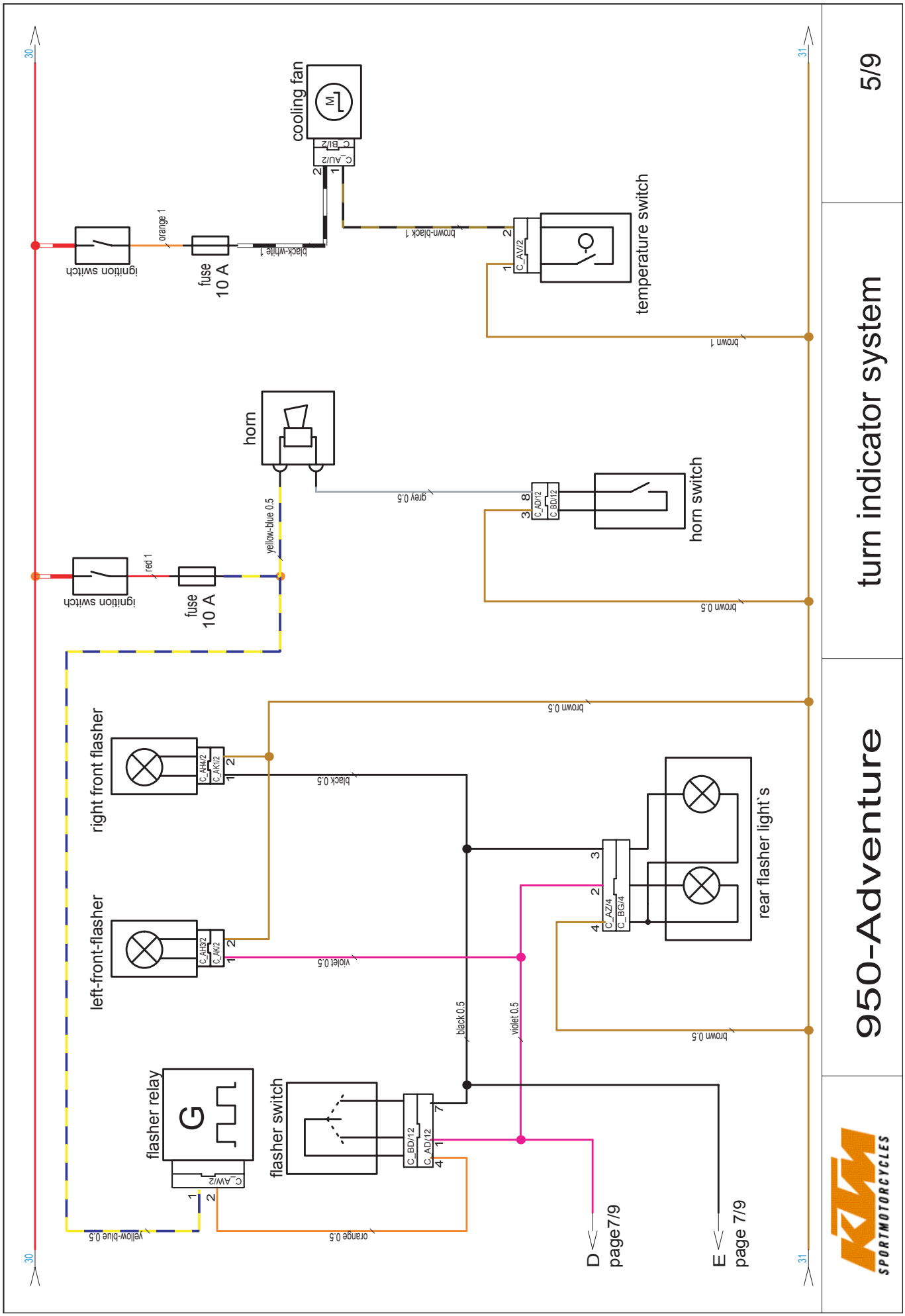

4/9
ECU
950-Adventure
SPORTMOTORCYCLES
ignition switch
fuse 5 A
fuel pump relay
fuel pump
octane selector
neutral switch (N) / 2nd gear / 3th gear
throttle position sensor
pick up
ignition coil
rear
front
EPC 1
EPC 2
start/stop switch
fuse 10 A
battery
E C U
B page 2/9
C page 7/9

ignition switch



start/stop switch




5/9
turn indicator system
950-Adventure
SPORTMOTORCYCLES
cooling fan
C_BI/2
C_AU/2
temperature switch
C_AV/2
brown-black 1
black-white 1
orange 1
ignition switch
fuse
10 A
brown 1
horn
grey 0.5
horn switch
C_AD/12
C_BD/12
yellow-blue 0.5
red 1
ignition switch
fuse
10 A
brown 0.5
right front flasher
C_AH4/2
C_AK1/2
left-front-flasher
C_AH3/2
C_AK/2
black 0.5
violet 0.5
rear flasher light`s
C_AZ/4
C_BG/4
brown 0.5
flasher relay
G
C_AW/2
flasher switch
C_BD/12
C_AD/12
black 0.5
violet 0.5
yellow-blue 0.5
orange 0.5
D
page7/9
E
page 7/9
30
31

ignition switch

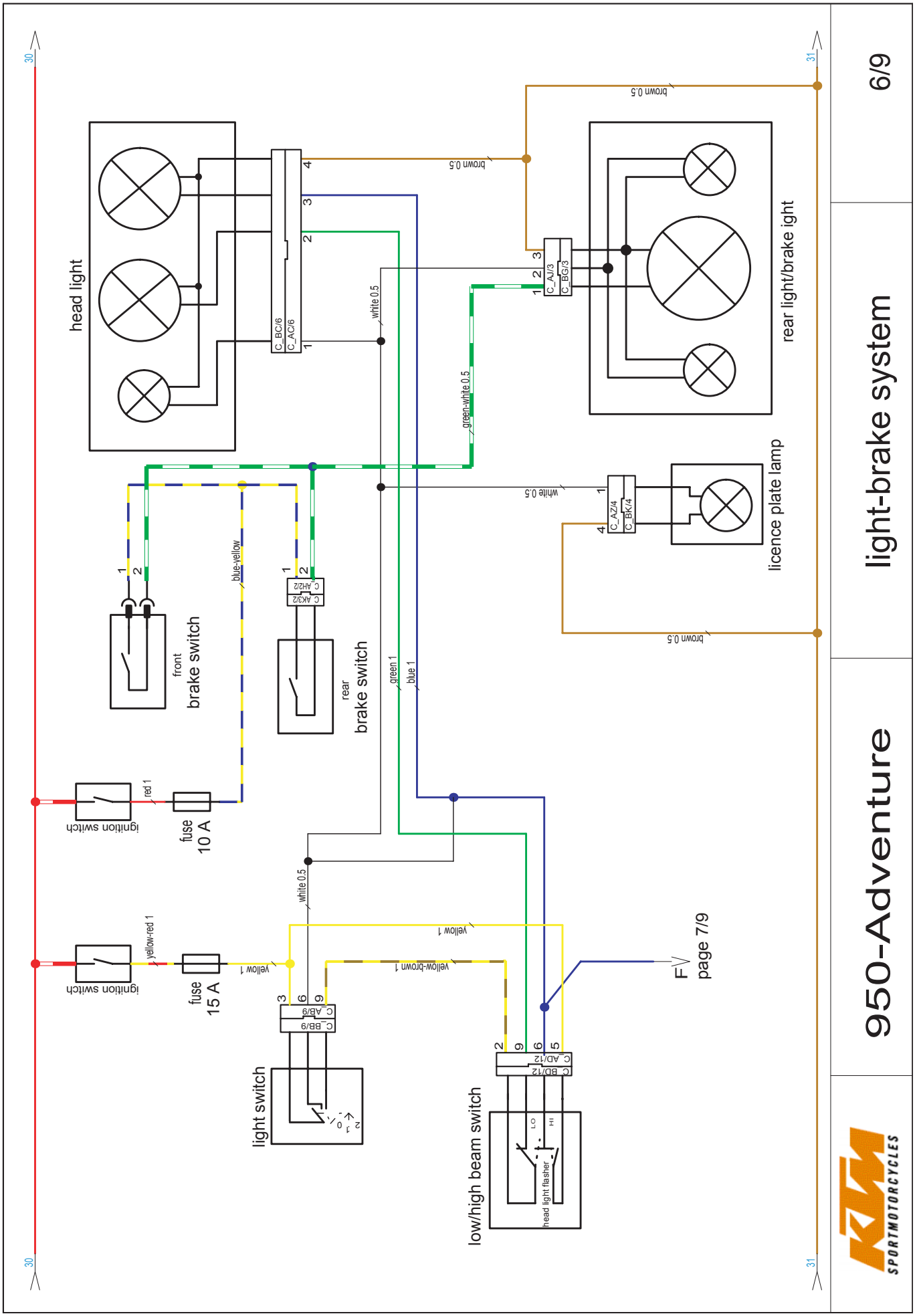
	r-w	r-w	r-w	o	y-r	r
ON	●		●	●		
		●			●	
			●			●
OFF						
LOCKED						

flasher switch

cable harness	or	pu	bl	gr	br
cable switch	gn-br	bu-re	bu-bl	pi	br-pi
TURN L	●	●			
TURN R	●		●		
OFF					

horn switch

cable harness	gr	br
cable switch	pi	br-pi
HORN	●	●
OFF		


6/9
light-brake system
950-Adventure
KTM SPORTMOTORCYCLES
head light
rear light/brake ight
licence plate lamp
front brake switch
rear brake switch
ignition switch
fuse 10 A
fuse 15 A
light switch
low/high beam switch
head light flasher
LO
HI
C_BC/6
C_AC/6
C_AJ/3
C_BG/3
C_AZ/4
C_BK/4
C_AH2/2
C_BB/9
C_AB/9
C_BD/12
C_AD/12
brown 0.5
white 0.5
green-white 0.5
blue-yellow
green 1
blue 1
red 1
yellow-red 1
yellow 1
yellow-brown 1
page 7/9

brake light switch

cable harness	gn-wh	ye-bu
cable switch	bl	bl
pushed	●	●
unpushed		

light switch

cable harness	ye-br	wh	ye
cable switch	ye-wh	wh	re-ye
LIGHT OFF			
P. LIGHT		●	●
LIGHT	●		●

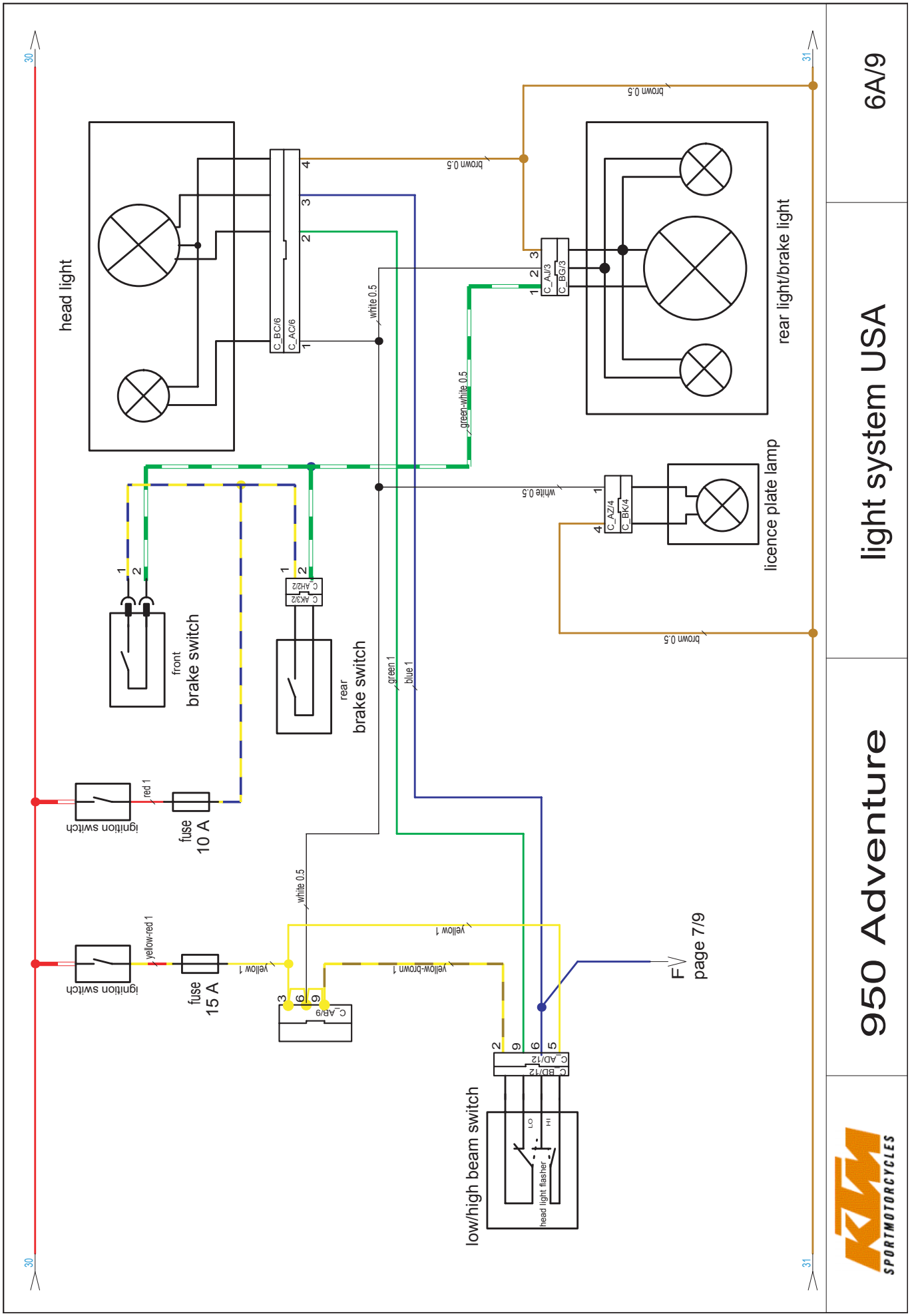
high/low beam switch

cable harness	bu	gn	ye-br
cable switch	wh	ye	gn-re
LO		●	●
HI	●		●

passing light

cable harness	ye	bu
cable switch	gn-bl	wh
P. HORN	●	●
OFF		

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6A/9
light system USA
950 Adventure
SPORTMOTORCYCLES
head light
rear light/brake light
licence plate lamp
front
brake switch
rear
brake switch
low/high beam switch
ignition switch
ignition switch
fuse
10 A
fuse
15 A
head light flasher
LO
HI
C_BC/6
C_AC/6
C_AJ/3
C_BG/3
C_AZ/4
C_BK/4
C_AK/2
C_AH/2
C_AB/9
C_AD/12
C_BD/12
brown 0.5
white 0.5
green-white 0.5
green 1
blue 1
red 1
yellow-red 1
yellow 1
yellow-brown 1
page 7/9

brake light switch

cable harness	gn-wh	ye-bu
cable switch	bl	bl
pushed	●	●
unpushed		

light switch

cable harness	ye-br	wh	ye
cable switch	ye-wh	wh	re-ye
LIGHT OFF			
P. LIGHT		●	●
LIGHT	●		●

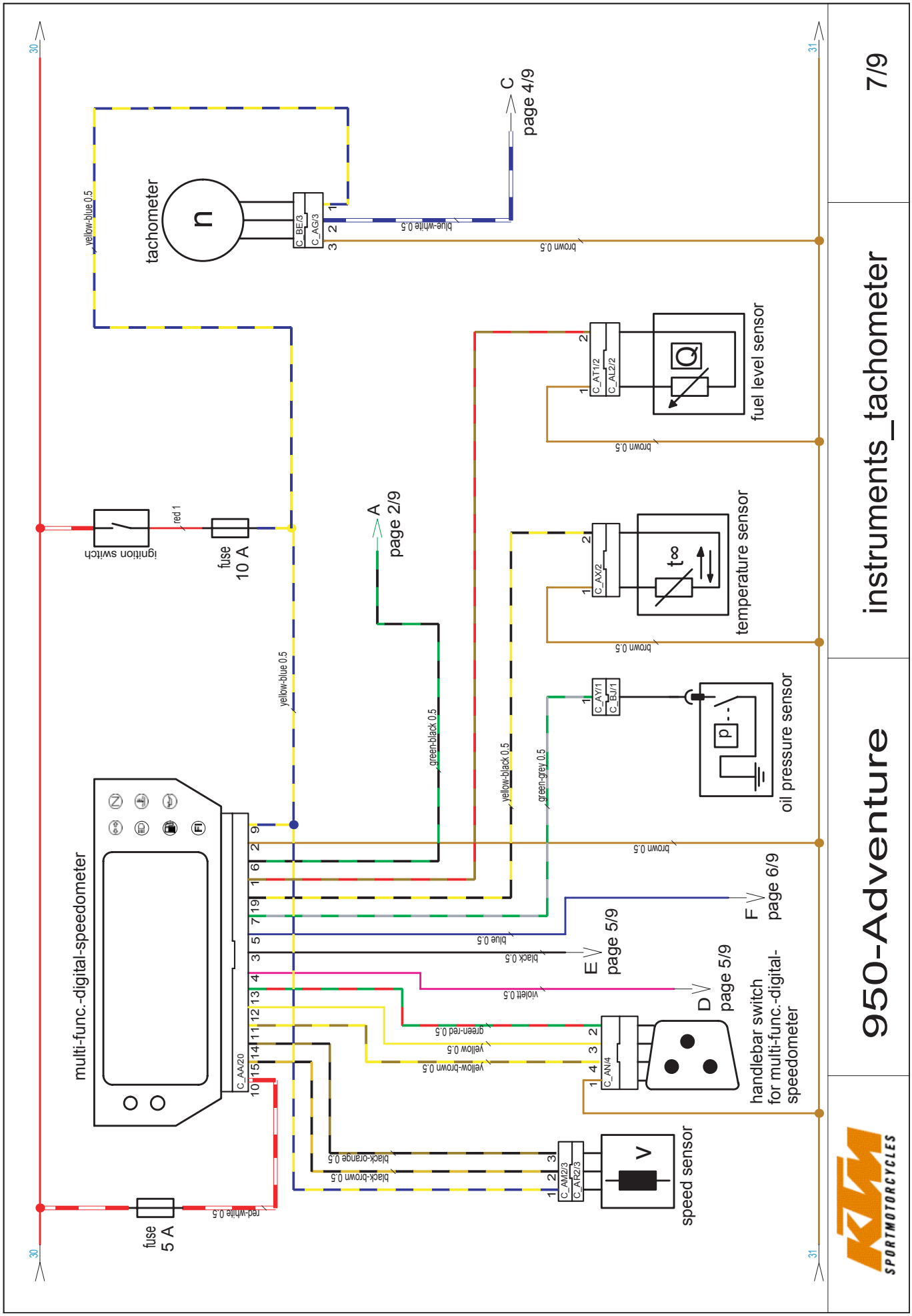
high/low beam switch

cable harness	bu	gn	ye-br
cable switch	wh	ye	gn-re
LO		●	●
HI	●		●

passing light

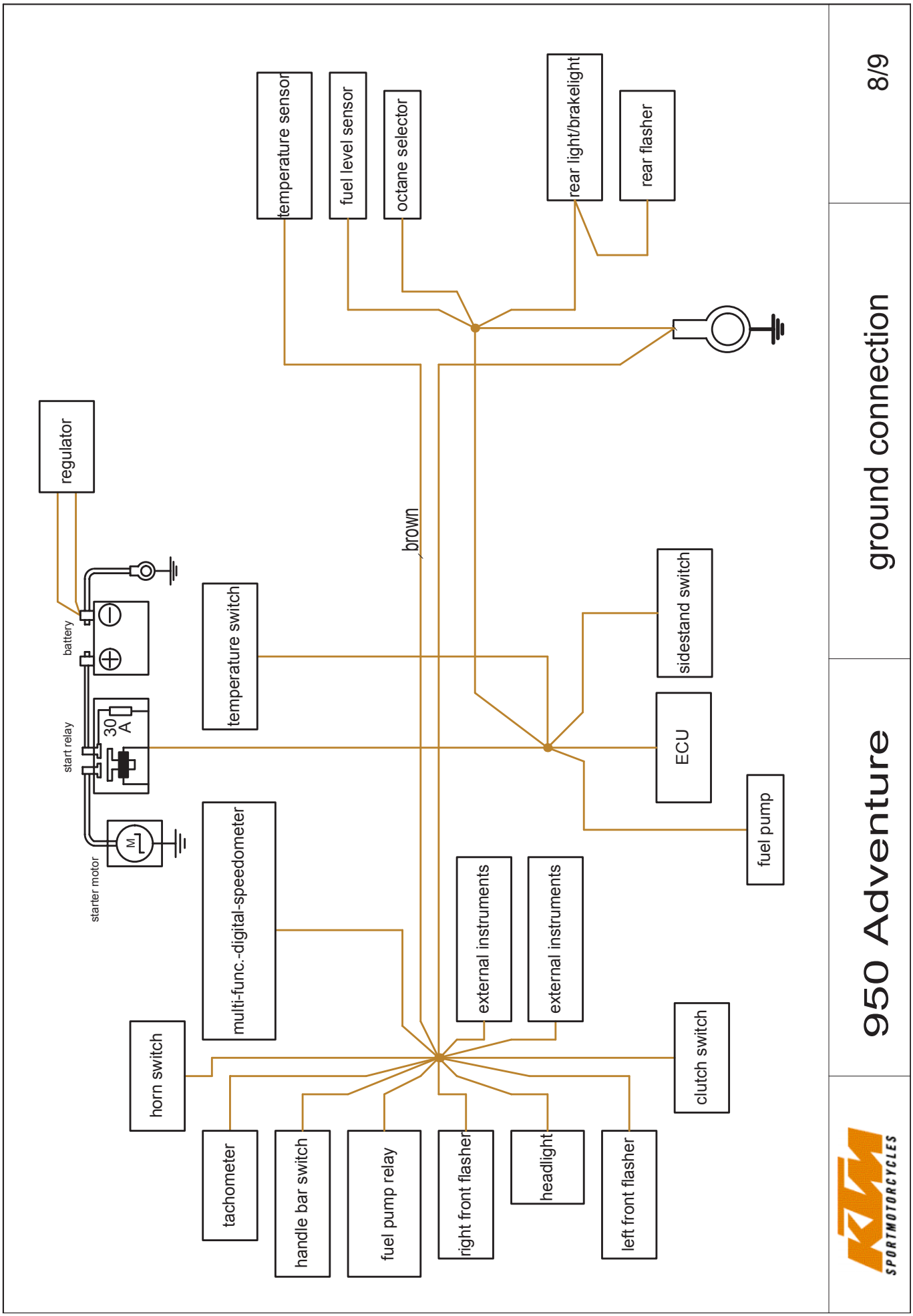
cable harness	ye	bu
cable switch	gn-bl	wh
P. HORN	●	●
OFF		

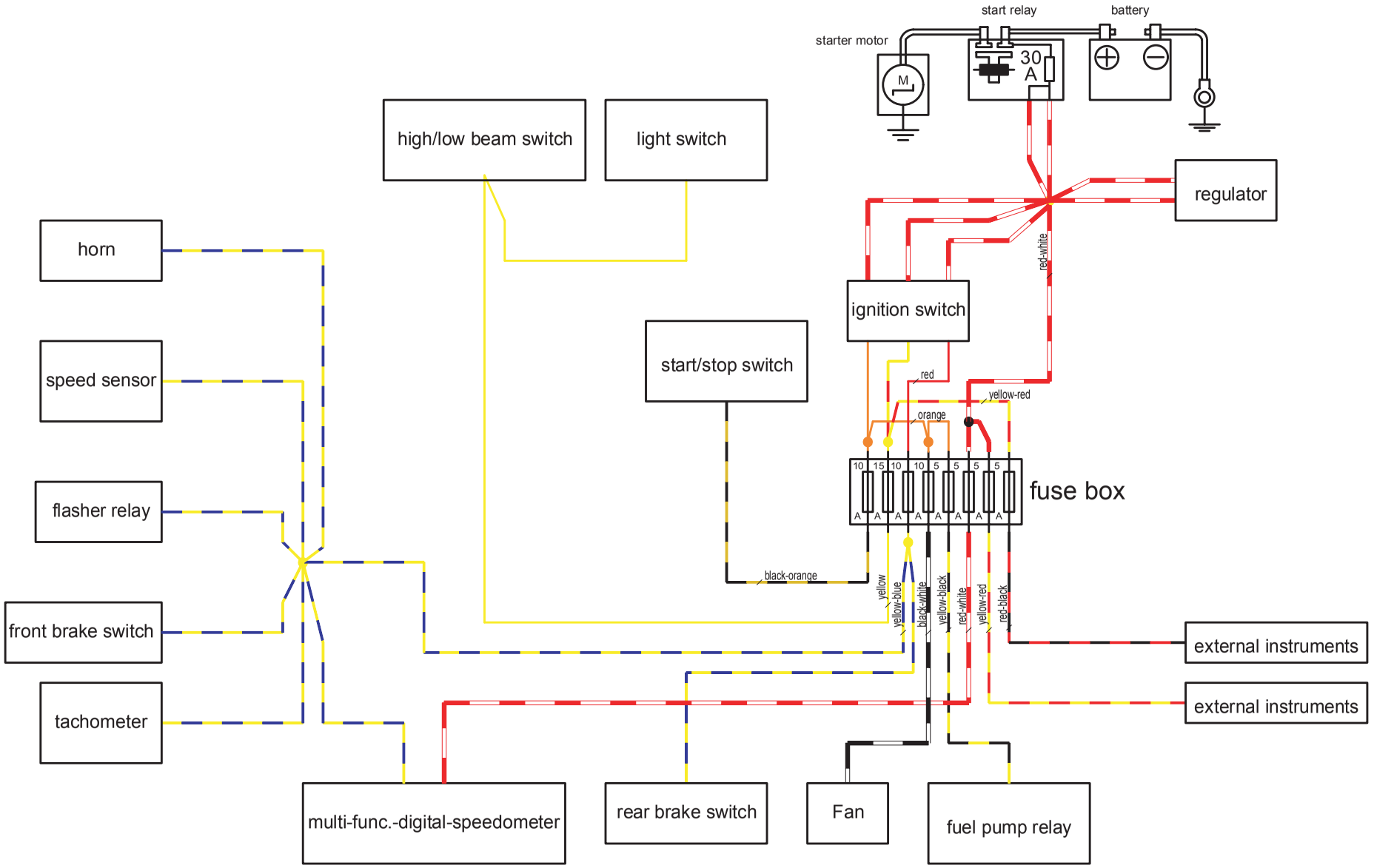
Art.-Nr. 3.206.009-E


7/9
instruments_tachometer
950-Adventure
SPORTMOTORCYCLES
tachometer
n
C_BE/3
C_AG/3
C
page 4/9
yellow-blue 0.5
blue-white 0.5
brown 0.5
fuel level sensor
C_AT1/2
C_AL2/2
Q
temperature sensor
C_AX/2
t∞
oil pressure sensor
C_AY/1
C_BJ/1
p
A
page 2/9
ignition switch
red 1
fuse
10 A
fuse
5 A
red-white 0.5
multi-func.-digital-speedometer
C_AA/20
green-black 0.5
yellow-black 0.5
green-grey 0.5
blue 0.5
black 0.5
violett 0.5
green-red 0.5
yellow 0.5
yellow-brown 0.5
black-orange 0.5
black-brown 0.5
F
page 6/9
E
page 5/9
D
page 5/9
handlebar switch
for multi-func.-digital-
speedometer
C_AN/4
C_AM2/3
C_AF2/3
V
speed sensor
30
31

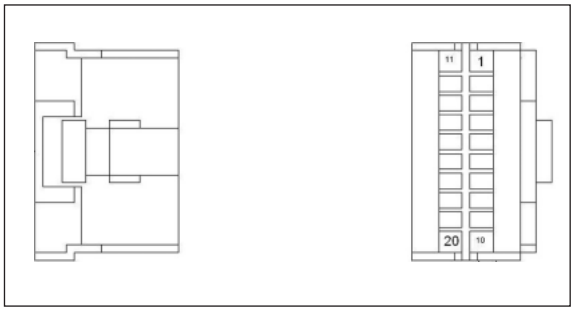
brake light switch

cable harness	gn-wh	ye-bu
cable switch	bl	bl
pushed	●—●	
unpushed		


temperature sensor
fuel level sensor
octane selector
rear light/brakelight
rear flasher
regulator
brown
battery
start relay
30
A
starter motor
temperature switch
sidestand switch
ECU
fuel pump
multi-func.-digital-speedometer
external instruments
external instruments
horn switch
clutch switch
tachometer
handle bar switch
fuel pump relay
right front flasher
headlight
left front flasher
950 Adventure
ground connection
8/9
KTM
SPORTMOTORCYCLES



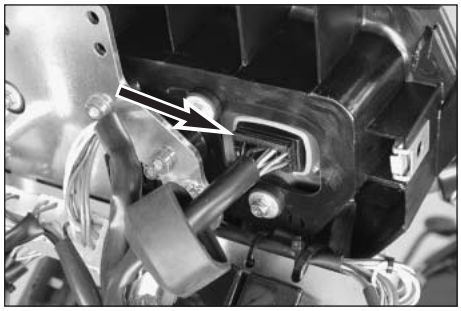
KTM SPORTMOTORCYCLES	950 Adventure	positve connection	9/9

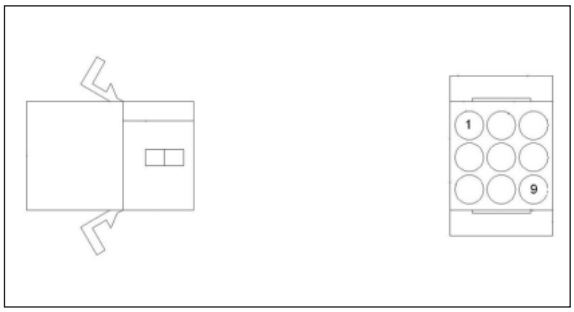


Connector AA
20-pole

Multifunctional digital speedometer

Behind the multi-functional digital speedometer

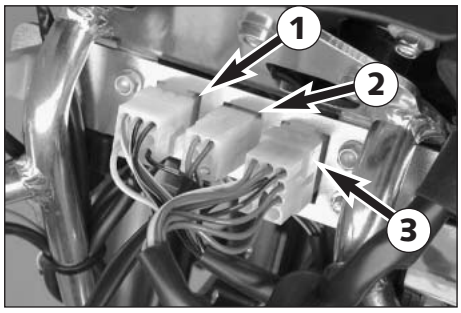


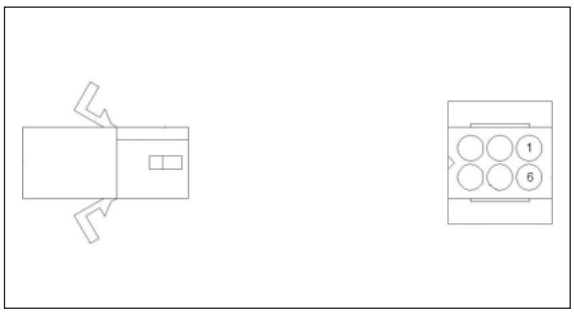


Connector AB
9-pole ❶

Start/stop/light switch

On the connector support under the multifunctional digital speedometer

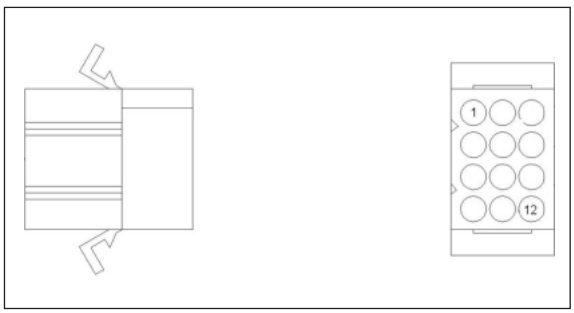




Connector AC
6-pole ❷

Front light

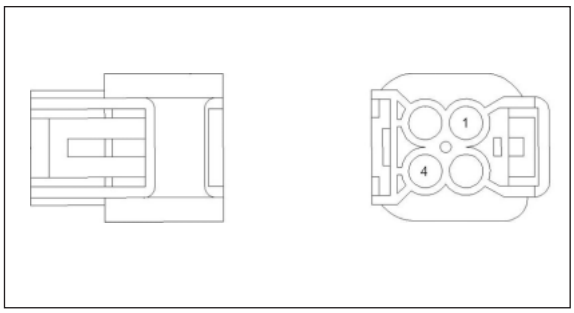
On the connector support under the multifunctional digital speedometer



Connector AD
12-pole ❸

Light/turn signal/horn switch

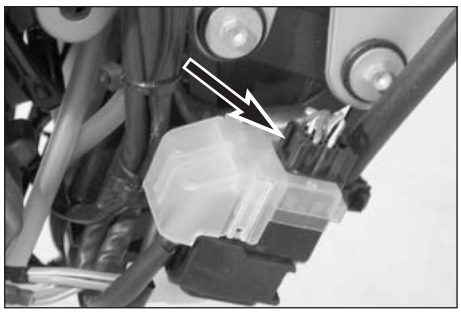
On the connector support under the multifunctional digital speedometer

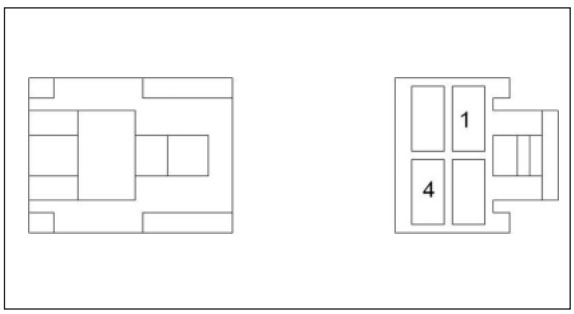


Connector AE
4-pole

Starter relay

On the right side on the battery case

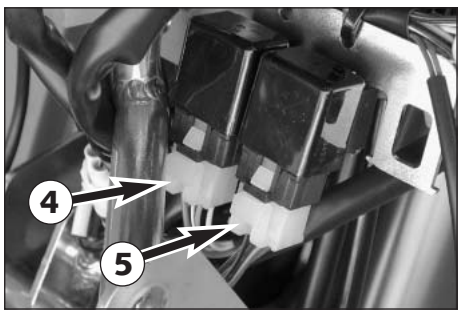


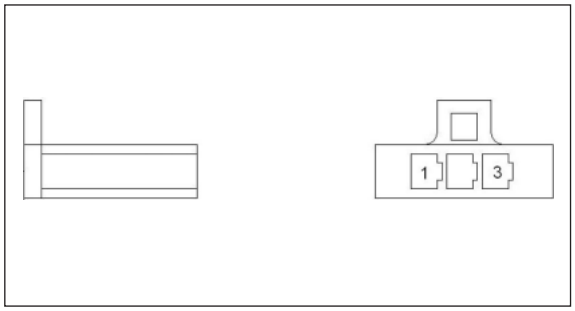


Connector AF
4-pole

Auxiliary start relay ❹
Fuel pump ❺

On the connector support under the multifunctional digital speedometer

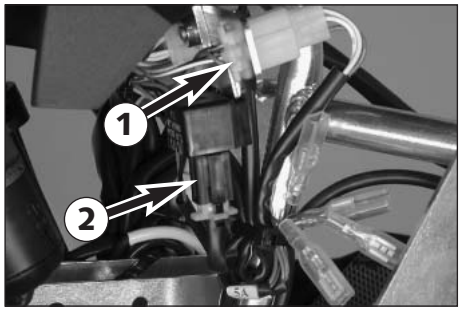


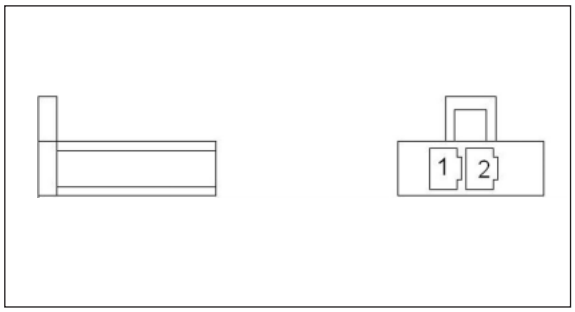


Connector AG
3-pole ❶

Tachometer

On the connector support under the multifunctional digital speedometer





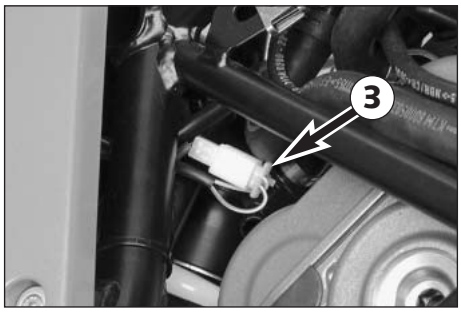
Connector AH
2-pole

Turn signal relay ❷

On the connector support under the multifunctional digital speedometer

Rear brake light switch ❸

Under the right rear side cover

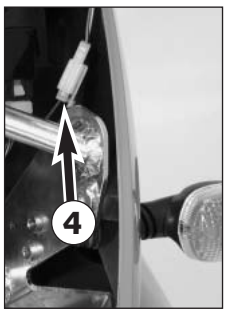


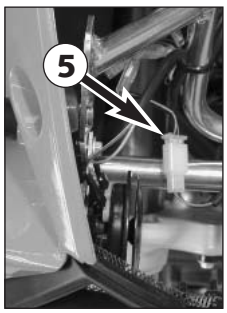
Left front turn signal ❹

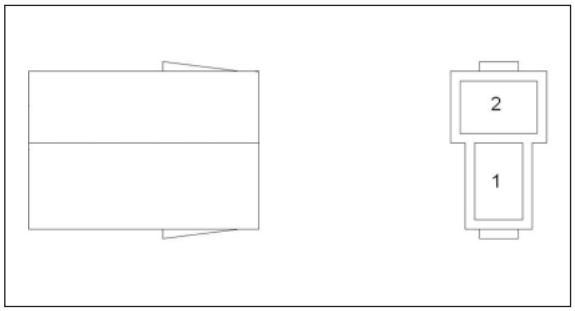
Under the left front side cover

Right front turn signal ❺

Under the right front side cover



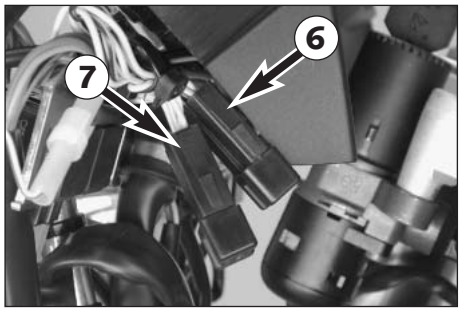


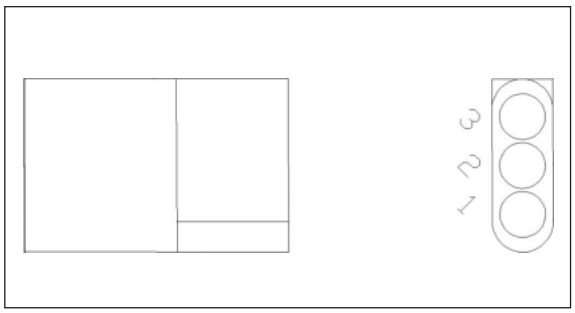


Connector AI
2-pole

Diode neutral switch ❻
Diode side stand switch ❼

On the connector support under the multifunctional digital speedometer

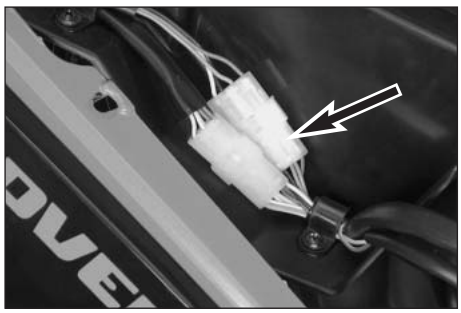


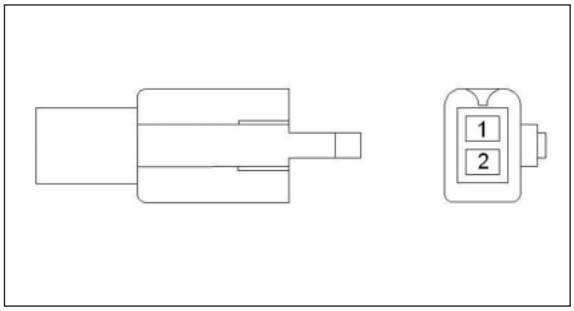


Connector AJ
3-pole

Rear lighting

Under the right rear side cover





Connector AK
2-pole

Rear brake light switch ❶

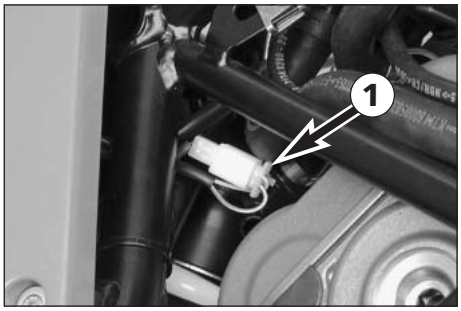
Under the right rear side cover

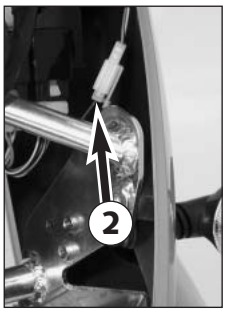
Left front turn signal ❷

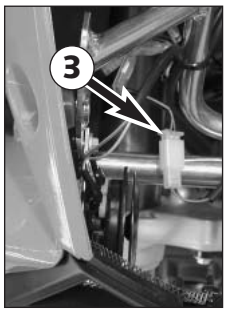
Under the left front side cover

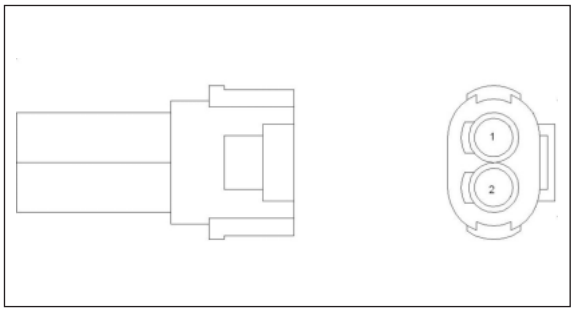
Right front turn signal ❸

Under the right front side cover









Connector AL
2-pole

Clutch switch ❹

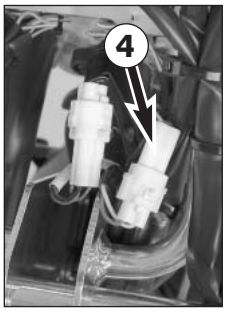
Behind the headlight under the connector support

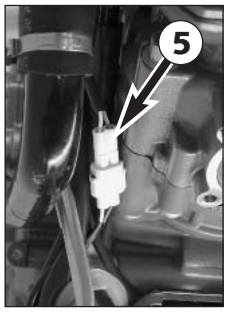
Pick up ❺

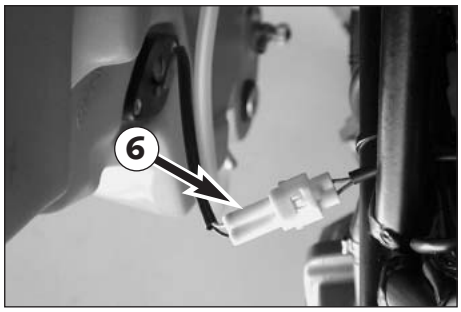
Between the water pipe and the front cylinder head

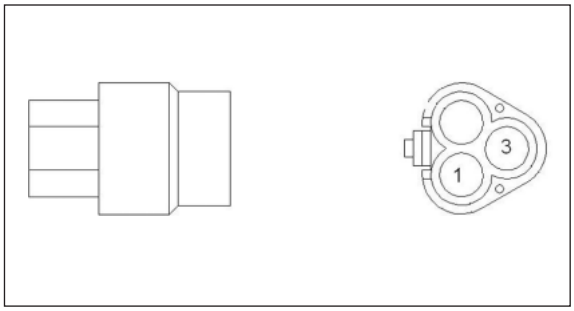
Fuel sender ❻

Between the left tank and the frame









Connector AM
3-pole

Carburetor potentiometer ❼

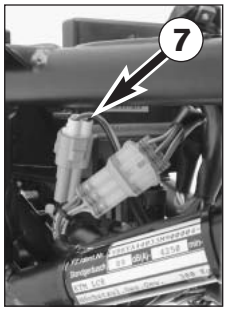
Under the fuse box

Speed sensor ❽

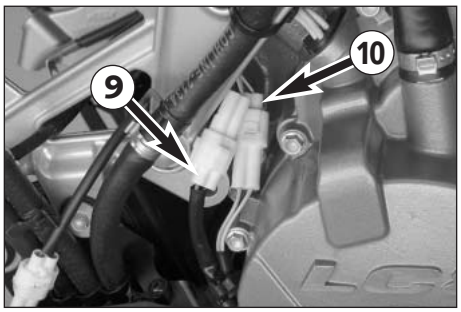
Behind the headlight under the connector support

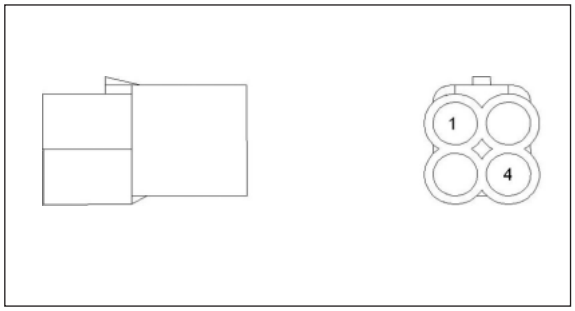
Gear sensor ❾
Side stand switch ❿

On the left side of the engine in front of the generator cover





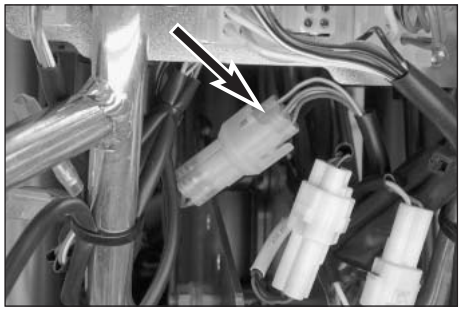


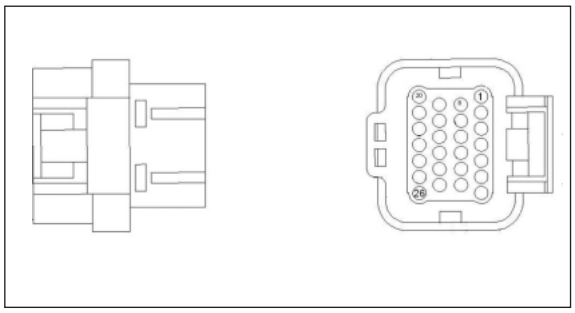


Connector AN
4-pole

Tripmaster switch

Near the connector support under the multifunctional digital speedometer

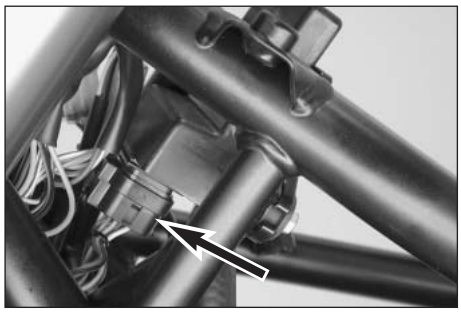


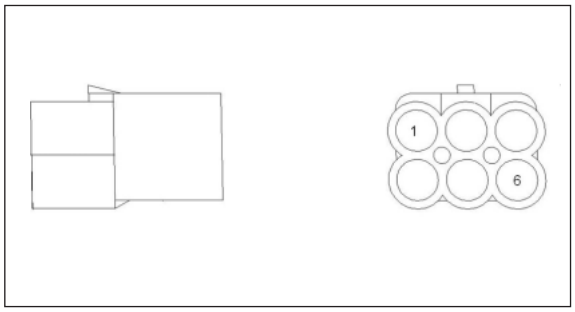


Connector AO
26-pole

ECU (control unit)

Under the fuse box behind the steering head

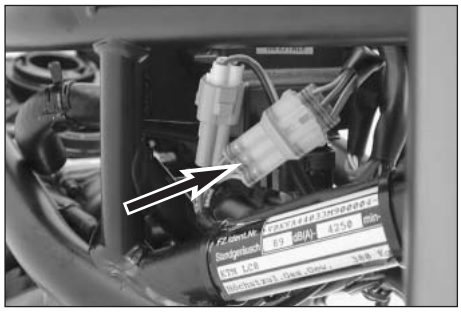


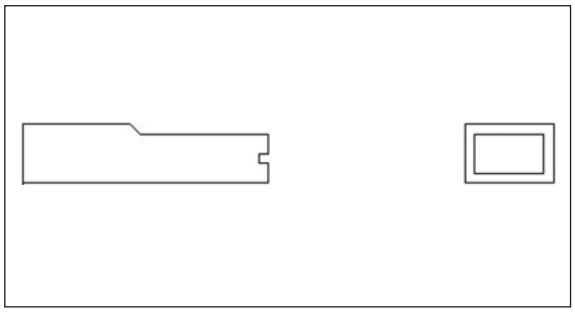


Connector AP
6-pole

Ignition lock

Under the fuse box

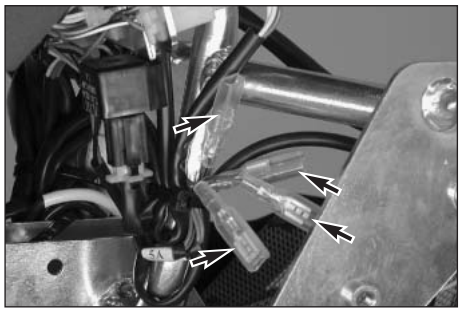


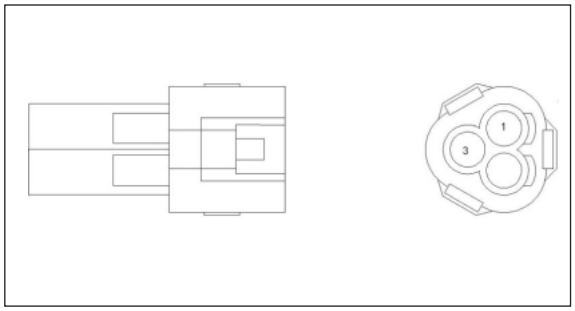


Connector AQ
1-pole

Connector for auxiliary devices:
Kl 15 (ignition)
Kl 30 (battery)
Kl 31 (ground)

Behind the headlight under the connector support





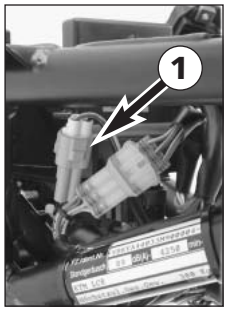
Connector AR
3-pole

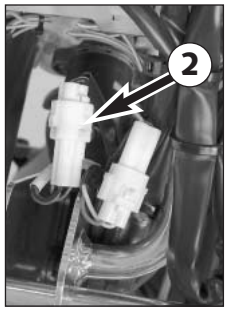
Carburetor potentiometer ❶

Under the fuse box

Speed sensor ❷

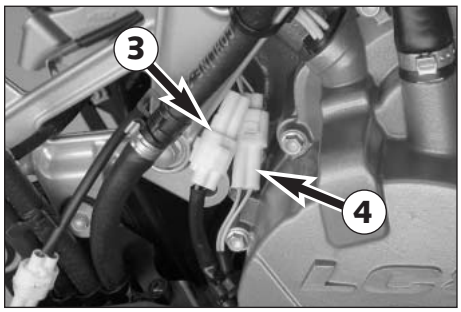
Behind the headlight under the connector support

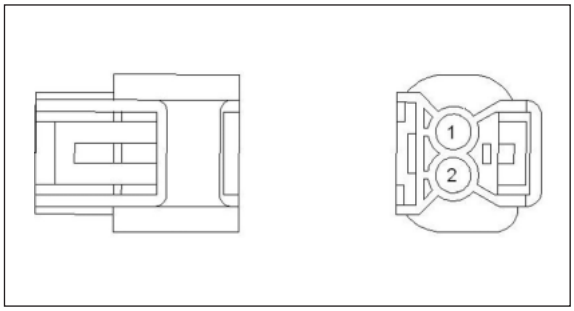




Gear sensor ❸
Side stand switch ❹

On the left side of the engine in front of the generator cover





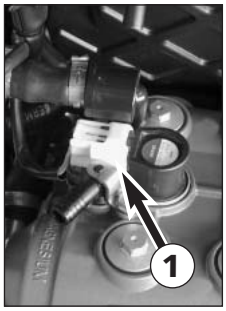
Connector AS
2-pole

Front ignition coil ❶

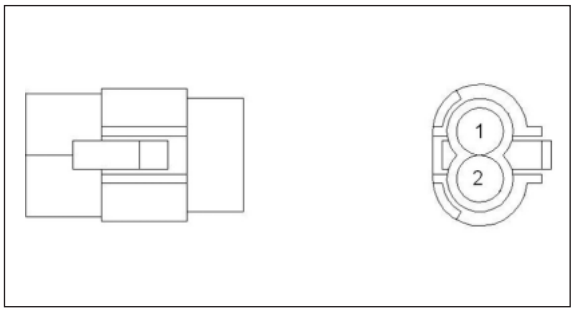
Behind the radiator

Rear ignition coil ❷

Behind the air filter box







Connector AT
2-pole

Clutch switch ❸

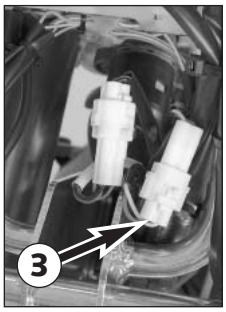
Behind the headlight under the connector support

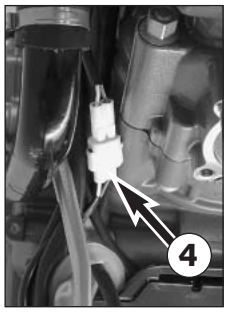
Pick up ❹

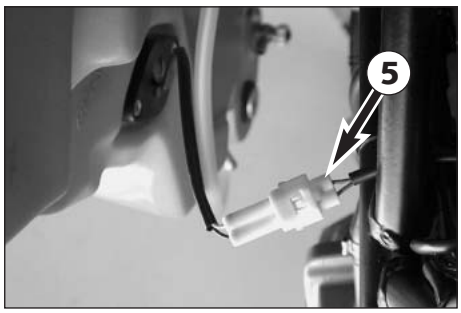
Between the water pipe and the front cylinder head

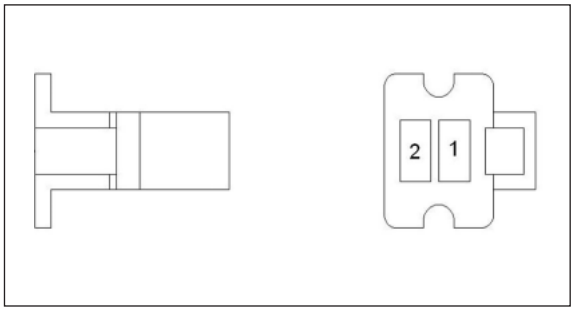
Fuel sender ❺

Between the left tank and the frame









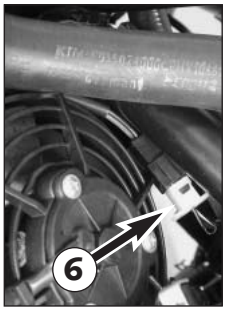
Connector AU
2-pole

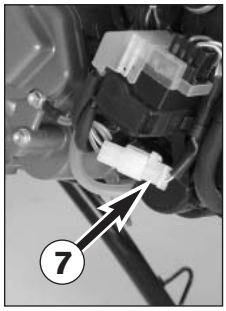
Radiator fan motor ❻

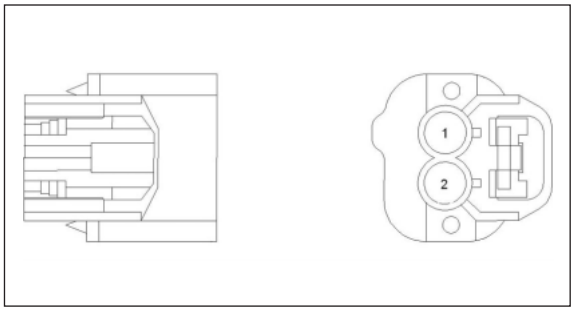
On the right behind the radiator next to the fan

Regulator ❼

On the right side of the battery case under the starter relay



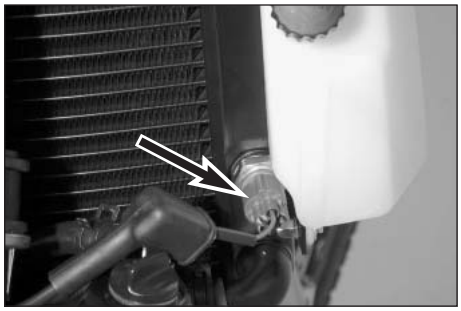


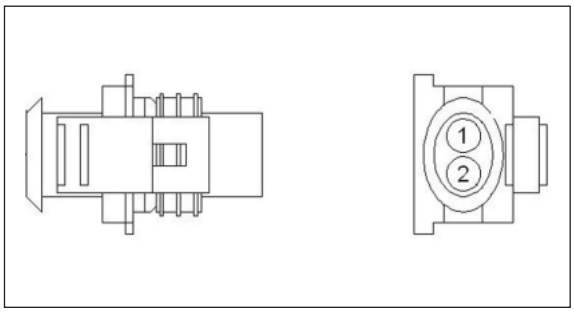


Connector AV
2-pole

Temperature switch for the radiator fan

On the right behind the radiator next to the compensating tank





Connector AW
2-pole

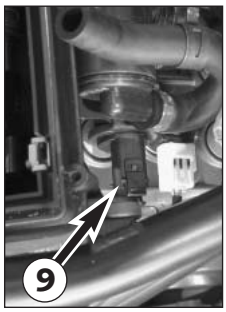
EPC front cylinder ❽

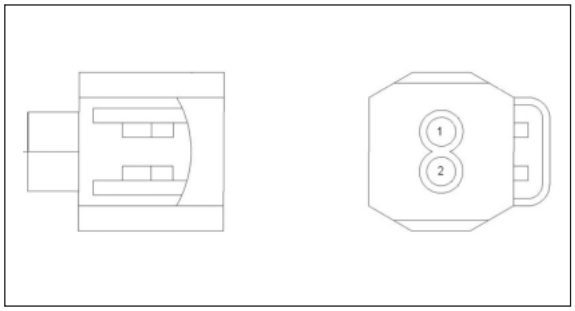
On the right side of the frame

EPC rear cylinder ❾

Behind the air filter box



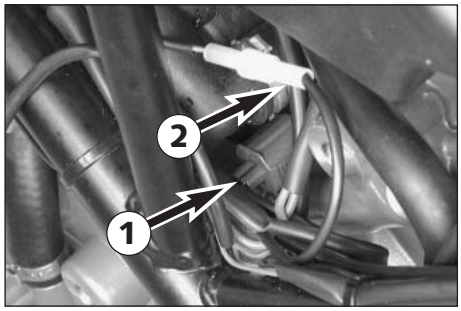


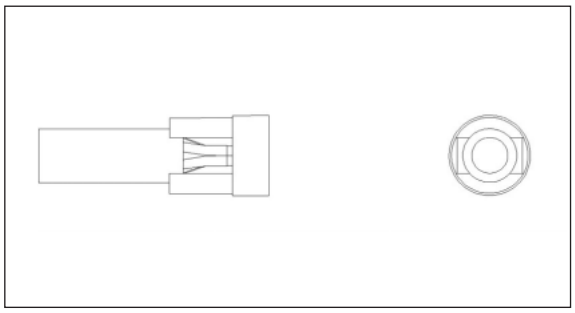


Connector AX
2-pole ❶

Temperature sensor for the multifunctional digital speedometer

On the left side of the engine between the cylinders

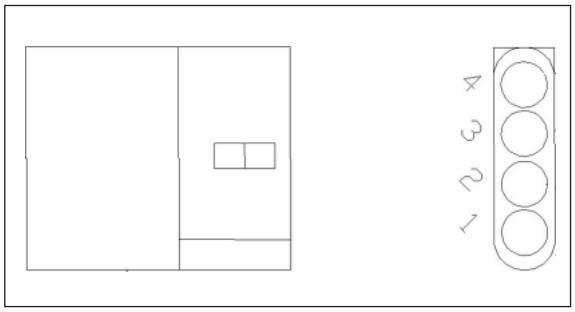




Connector AY
1-pole ❷

Oil pressure switch

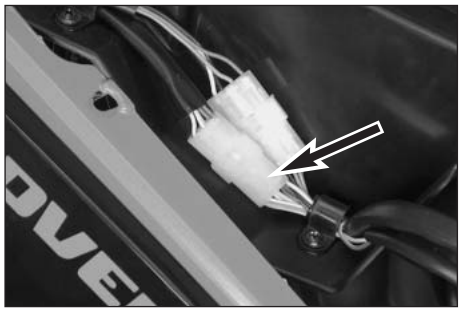
On the left side of the frame under the air filter box

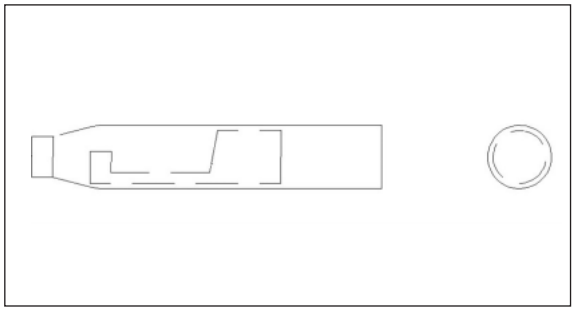


Connector AZ
4-pole

Rear turn signal

Under the right rear side cover

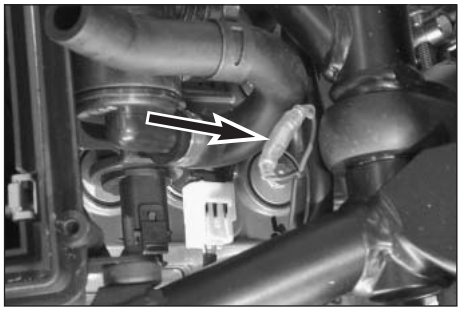


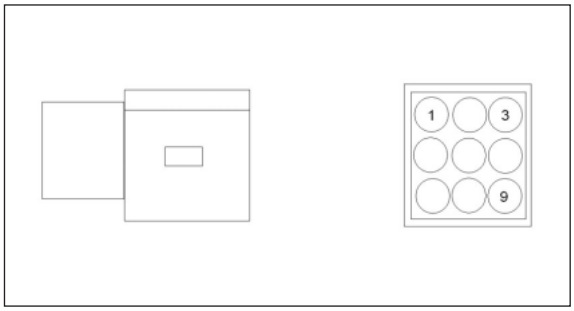


Connector BA
1-pole

Octane selector

Behind the air filter box

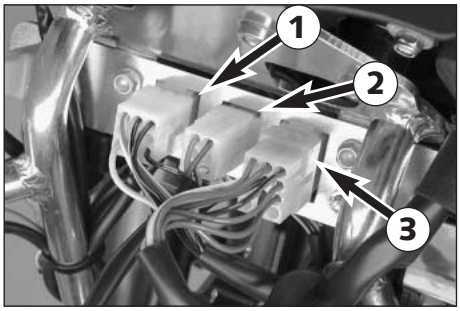


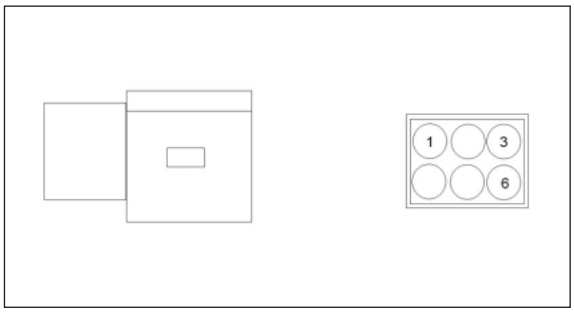


Connector BB
9-pole ❶

Start/stop/light switch

On the connector support under the multifunctional digital speedometer

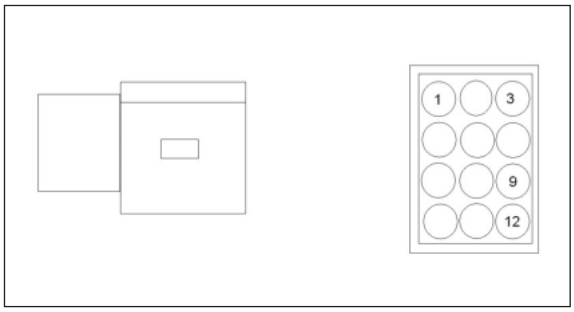




Connector BC
6-pole ❷

Front light

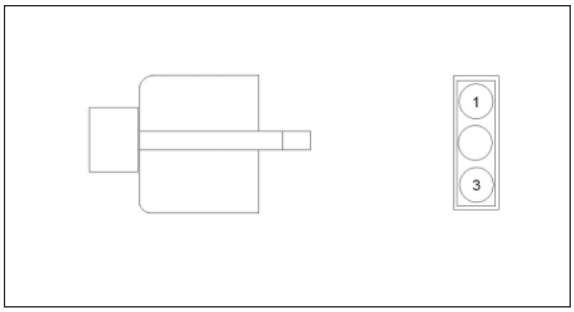
On the connector support under the multifunctional digital speedometer



Connector BD
12-pole ❸

Light/turn signal/horn switch

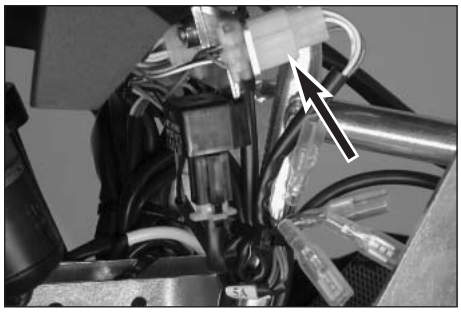
On the connector support under the multifunctional digital speedometer

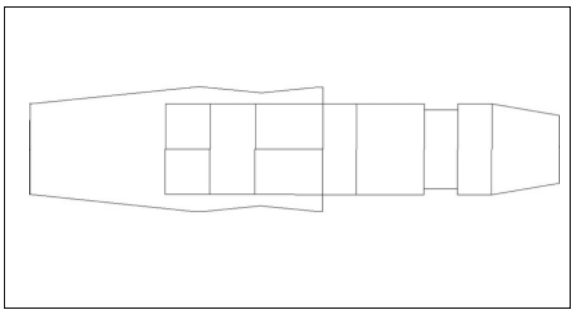


Connector BE
3-pole

Tachometer

On the connector support under the multifunctional digital speedometer

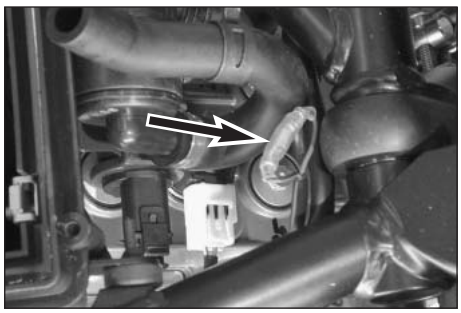


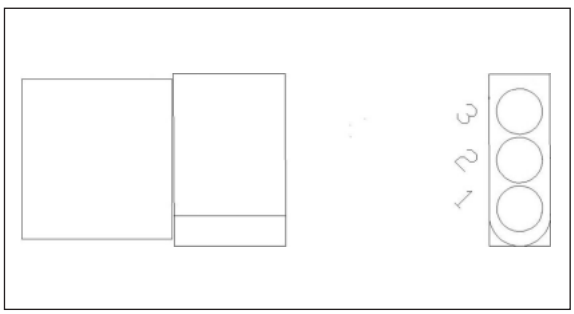


Connector BF
1-pole

Octane selector

Behind the air filter box

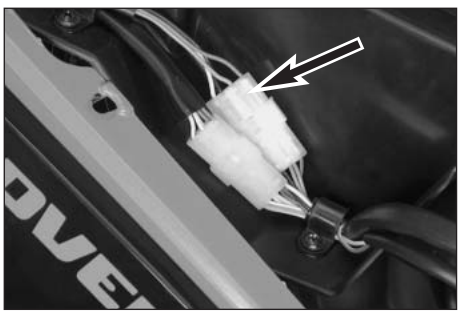


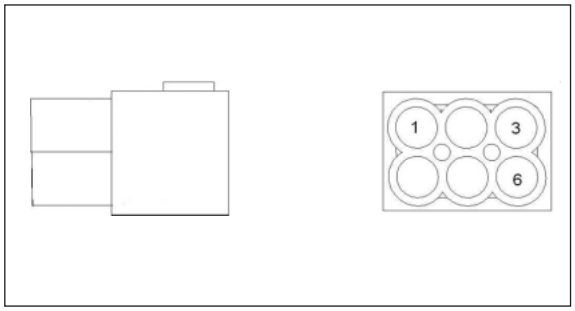


Connector BG
3-pole

Rear lighting

Under the right rear side cover

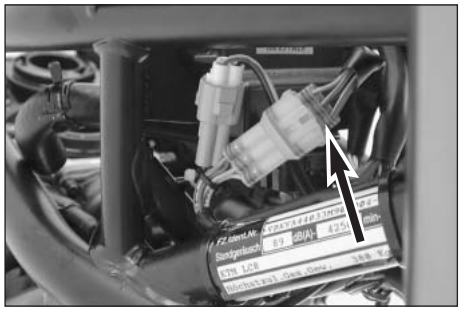


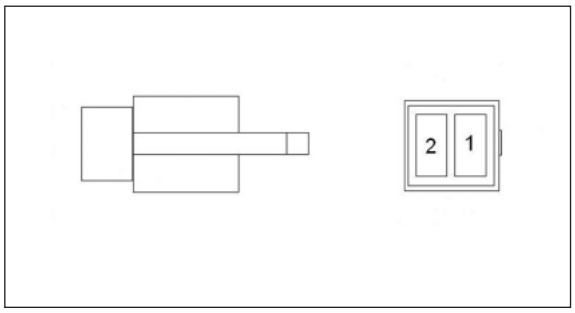


Connector BH
6-pole

Ignition lock

Under the fuse box





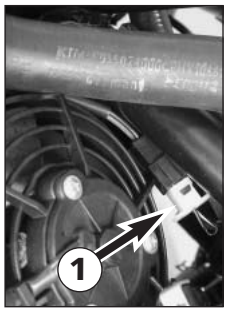
Connector BI
2-pole

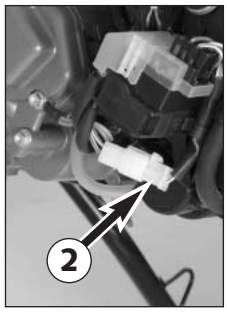
Radiator fan motor ❶

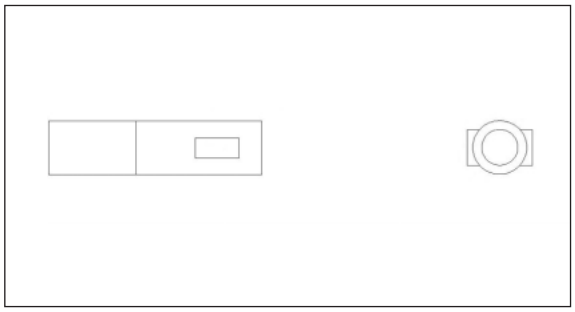
On the right behind the radiator next to the fan

Regulator ❷

On the right side of the battery case under the starter relay



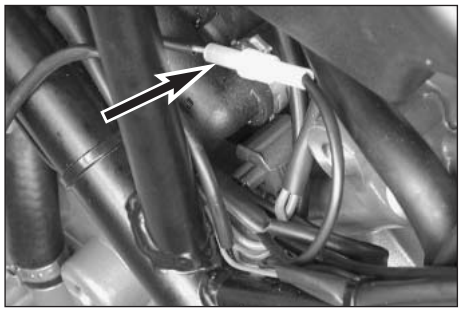


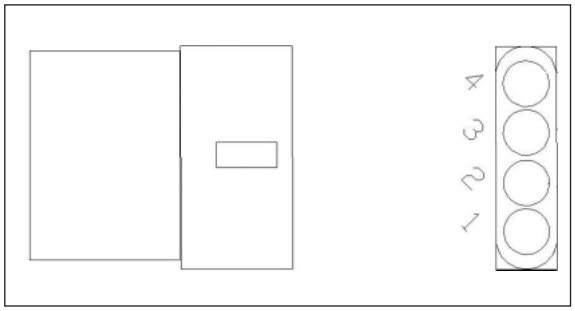


Connector BJ
1-pole

Oil pressure switch

On the left frame under the air filter box





Connector BK
4-pole

Rear turn signal

Under the right rear side cover

