REPAIRMANUAL2005-2008

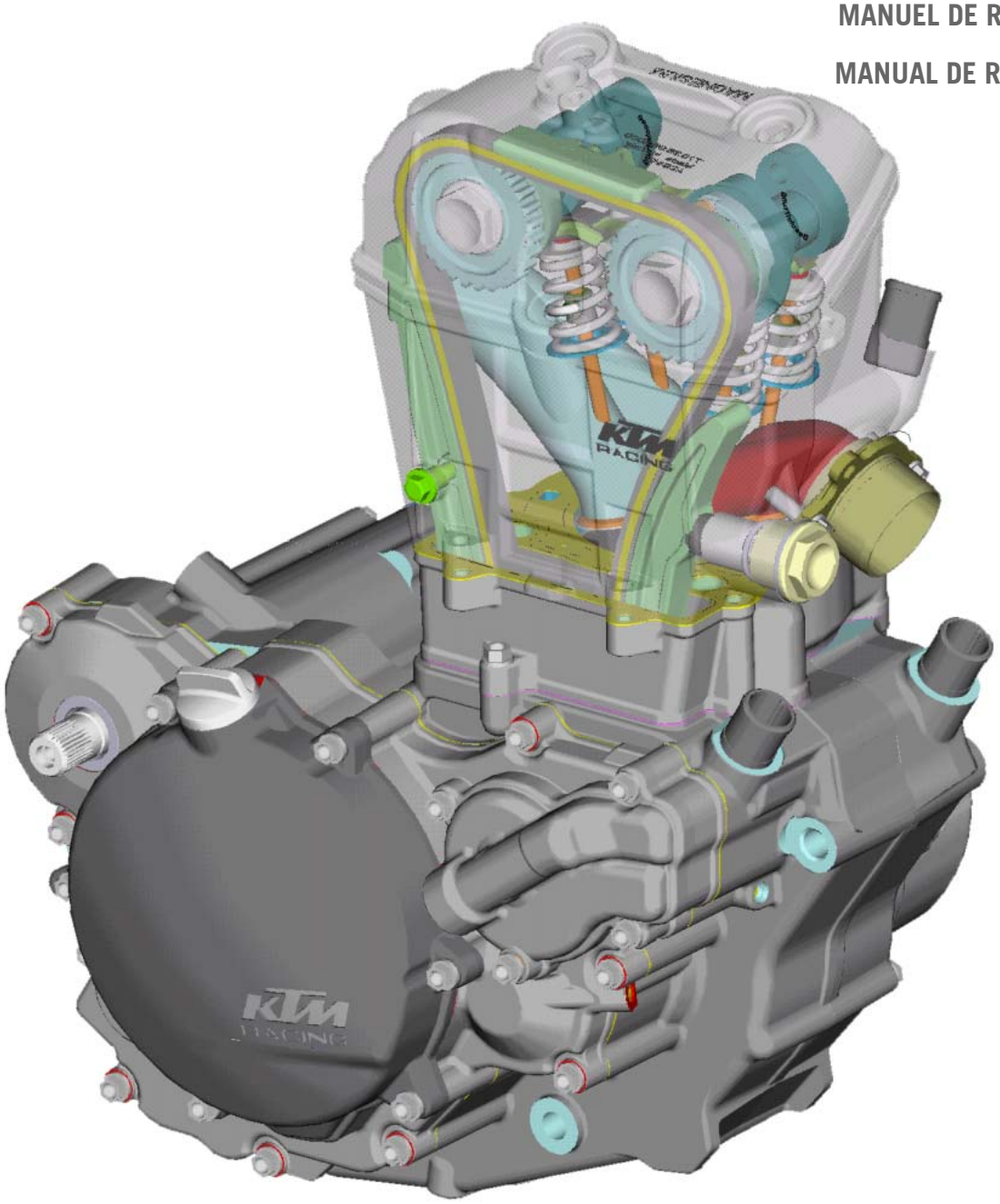
250 SX-F, EXC-F, EXC-F SIX DAYS
XCF-W, XC-F, SXS-F

REPARATURANLEITUNG

MANUALE DI RIPARAZIONE

MANUEL DE RÉPARATION

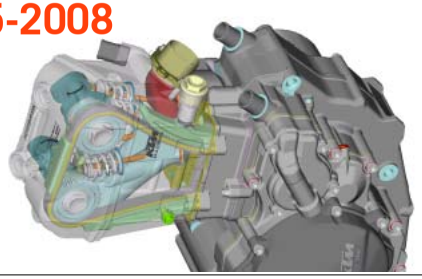
MANUAL DE REPARACIÓN



ART.NR.: 3.206.052-E

REPAIRMANUAL2005-2008

250 SX-F, EXC-F,
EXC-F Six Days, XCF-W,
XC-F, SXS-F



KTM Group Partner

IMPORTANT INFORMATION/UPDATING INSTRUCTIONS

To be able to continue using the existing loose-leaf repair instructions, simply print the following pages and insert them in the existing repair instructions:

1,3,7,9,20,21,40,55,68,69,74,75,80,81,87-94,111-114-151

Remove page (s))	Replace by page (s)	Insert page (s)	after page
2-5 to 2-6	2-5 to 2-6		
4-7	4-7		
5-8	5-8		
5-21 to 5-22	5-21 to 5-22		
6-3 to 6-4	6-3 to 6-4		
6-9 to 6-10	6-9 to 6-10		
7-1 to 7-5	7-1 to 7-7		
9-1 to 9-3	9-1 to 9-3		
10-1 to 10-6	10-1 to 10-12		
11-1 to 11-3	11-1 to 11-11		
12-1 to 12-3	12-1 to 12-10		

KTM REPAIR MANUAL IN LOOSE-LEAF FORM

STORING THE REPAIR MANUAL IN THE BINDER

- Put the index into the binder.
- Put the front page of the repair manual (210x297 mm) into the transparent pocket provided for this purpose on the outside of the binder.
- Put the spine label (170x45 mm) into the transparent pocket provided for this purpose on the spine of the binder.
- Put the summary list of contents (150x297 mm) into the transparent pocket provided for this purpose on the inside of the binder or insert this page at the beginning of the manual.
- Then insert the individual chapters of the manual between the sheets of the index according to the page number printed in the right bottom corner of each page.
  Example: page no. 3-5 3 = chapter 3 5 = page 5
  For example: All pages with a page number that begins with the digit 3, must be put under the index heading “Chapter 3“.
- Index sheets that have not been marked with a certain chapter are for your personal convenience. The respective headings can be entered in the list of contents.

EXPLANATION - UPDATING

3.206.027-E Repair Manual 250 SX-F 5/2005

Basic version Model year 2005/06
(Engine number with first digit "5" and "6")

3.206.052-E Updating of Rep.Manual 3.206.027-E 10/2007

Model year 2007/08
(Engine number with first digit "7" and "8")

Modification / Updating:
Technical Details Models EXC, XC-W, XC, 2007/08, Technical Specifications, Tightening torques, Periodic Maintenance Schedule

Edition: 10/2007

INTRODUCTION

This repair manual offers extensiv repair-instructions and is an up-to-date version that describes the latest models of the series. However, the right to modifications in the interest of technical improvement is reserved without updating the current issue of this manual.

A description of general working modes common in work shops has not been included. Safety rules common in the work shop have also not been listed. We take it for granted that the repairs are made by qualified profesionally trained mechanics.

Read through the repair manual before beginning with the repair work.

⚠ WARNING ⚠

STRICT COMPLIANCE WITH THESE INSTRUCTIONS IS ESSENTIAL TO AVOID DANGER TO LIFE AND LIMB.

! CAUTION !

NON-COMPLIANCE WITH THESE INSTRUCTIONS CAN LEAD TO DAMAGE OF MOTORCYCLE COMPONENTS OR RENDER MOTORCYCLES UNFIT FOR TRAFFIC !

„NOTE" POINTS OUT USEFUL TIPS.

Use only **ORIGINAL KTM SPARE PARTS** when replacing parts.

The KTM high performance engine is only able to meet user expectations if the maintenance work is performed regularly and professionally.

TÜV MANAGEMENT SERVICE ISO 9001
REG.NO. 12 100 6061

In accordance with the international quality management ISO 9001 standard, KTM uses quality assurance processes that lead to the highest possible product quality.

KTM Sportmotorcycle AG reserves the right to modify any equipment, technical specifications, colors, materials, services offered and rendered, and the like so as to adapt them to local conditions without previous announcement and without giving reasons, or to cancel any of the above items without substituting them with others. It shall be acceptable to stop manufacturing a certain model without previous announcement. In the event of such modifications, please ask your local KTM dealer for information.

KTM Sportmotorcycle AG
5230 Mattighofen, Austria

REPLY FAX FOR REPAIR MANUALS

We have made every effort to make our repair manuals as accurate as possible but it is always possible for a mistake or two to creep in.

To keep improving the quality of our repair manuals, we request mechanics and shop foremen to assist us as follows:

If you find any errors or inaccuracies in one of our repair manual – whether these are technical errors, incorrect or unclear repair procedures, tool problems, missing technical data or torques, inaccurate or incorrect translations or wording, etc. – please enter the error(s) in the table below and fax the completed form to us at 0043/7742/6000/5349.

NOTE to table:
- Enter the complete item no. for the repair manual in column 1 (**e.g.: 3.206.052-E**).
  You will find the number on the cover page or in the left margin on each right page of the manual.
- Enter the corresponding page number in the repair manual (**e.g.: 5-7**) in column 2.
- Enter the current text (inaccurate or incomplete) in column 3 by quoting or describing the respective passage of the text. If your text deviates from the text contained in the repair manual, please write your text in German or English if possible.
- Enter the correct text in column 4.

Your corrections will be reviewed and incorporated in the next issue of our repair manual.

Item no. of repair manual	Page	Current text	Correct text

Additional suggestions, requests or comments on our Repair Manuals (in German or English):

Name mechanic/shop foreman **Company/work shop**

GENERAL INFORMATION 2

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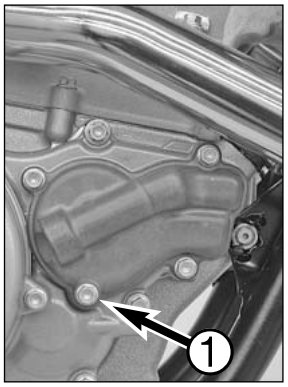
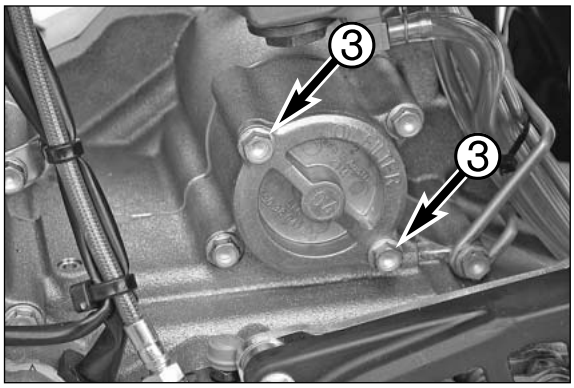
Art.-No. 3.206.052-E



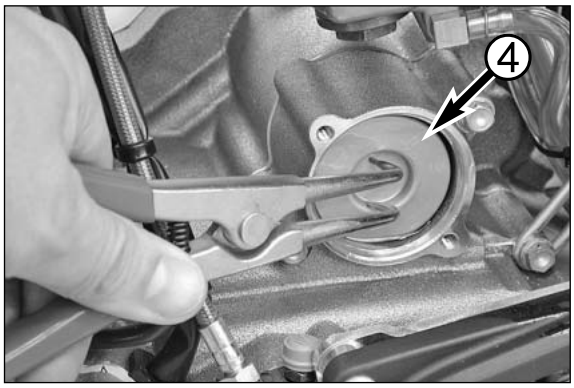
Bleeding the cooling system

The cooling liquid can be drained by removing the screw ❶ on the water pump cover.
To bleed the cooling system add approx. 1 liter of cooling liquid and remove the bleeder screw ❷. Do not replace the bleeder screw until cooling liquid starts to leak out of the hole without bubbles. Now add cooling liquid until it reaches a level of approx. 10 mm above the radiator fins. Take a short ride and check the cooling liquid level again.

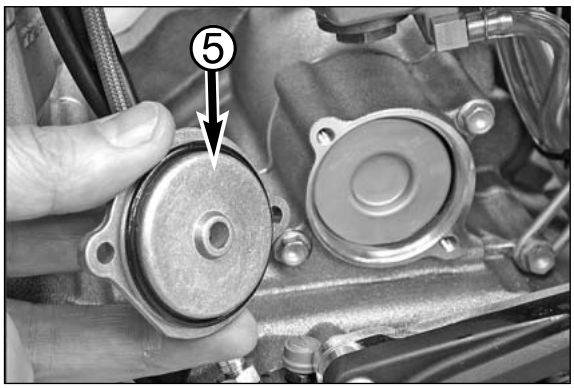


Changing the oil filter

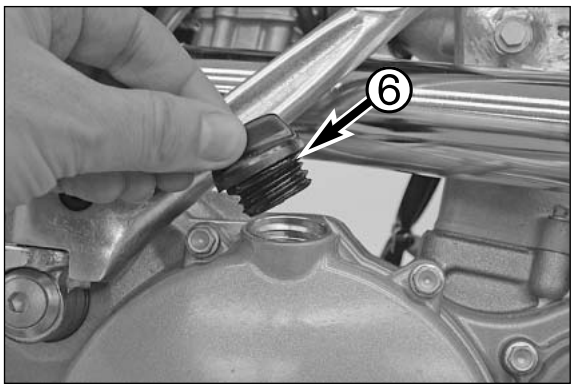
– Place a vessel under the engine to catch the used oil. Remove the 2 screws ❸ and take off the oil filter cover.



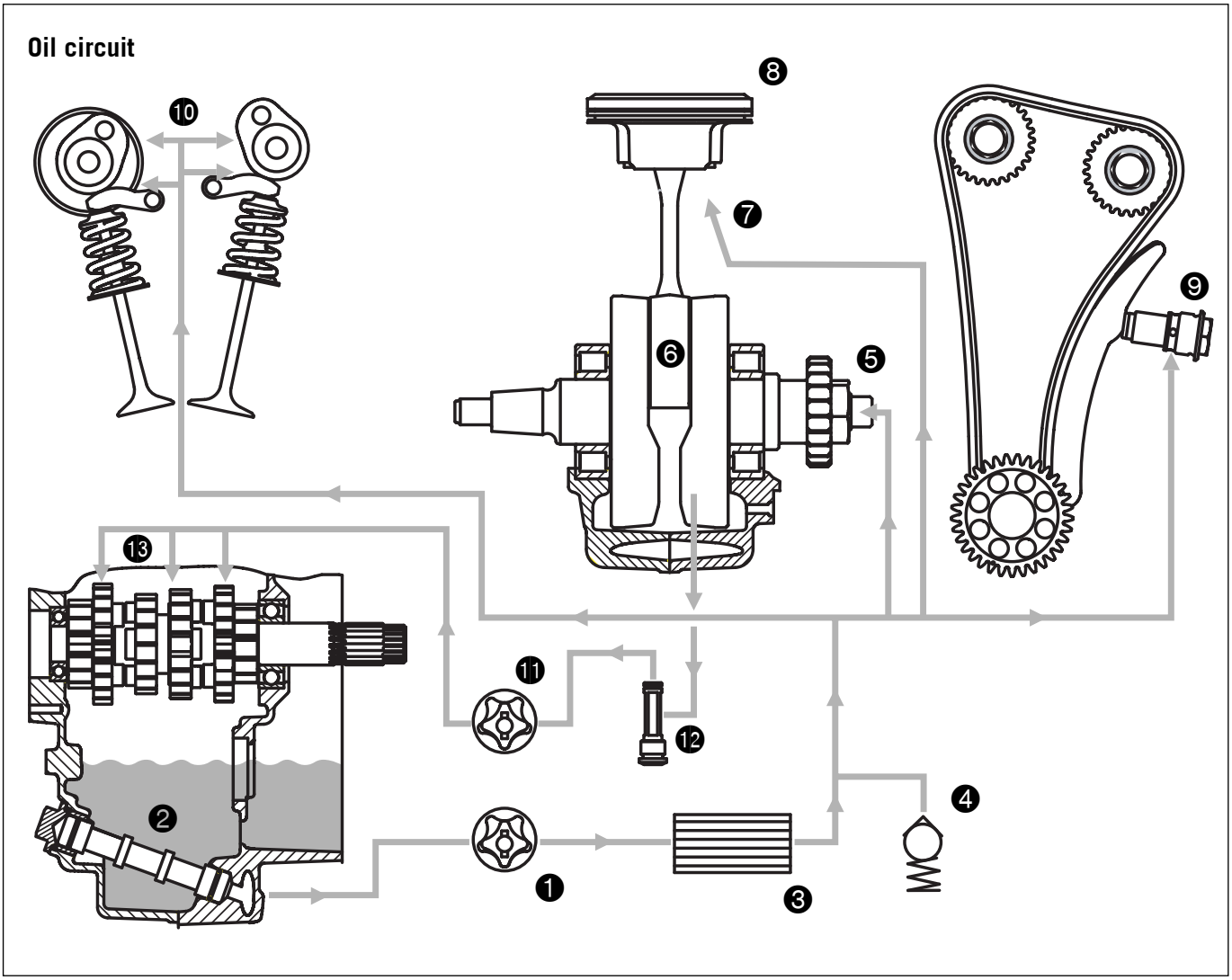
– Use circlip pliers to pull the oil filter insert ❹ out of the case.
– Clean the oil filter cover, the sealing area on the O-ring and the engine case. Check the O-ring in the oil filter cover for damage and replace if necessary.



– Lay the motorcycle down and fill the oil filter case about half full with engine oil. Fill the oil filter up with oil and insert the oil filter in the case.
– Grease the O-ring in the oil filter cover and mount the cover ❺. Mount the screws and tighten to 6 Nm.

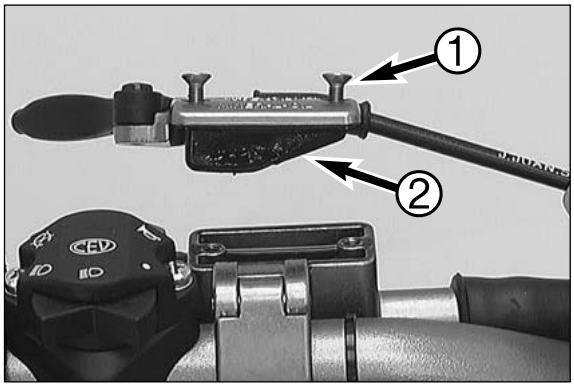


– Put the motorcycle in an upright position again.
– Remove the screw cap ❻ from the clutch cover and add 1.1 liters of fully synthetic engine oil (Motorex Power Synt 4T 10W/50).
– Start the engine and check all screw connections and the oil filter cover for leaks.
– Finally, check the engine oil level and correct if necessary.



Oil circuit

The oil pump ❶ draws the engine oil from the transmission oil sump through the long oil screen ❷ and conveys it to the oil filter ❸, where any contamination is filtered out. The cleansed engine oil is pumped past the bypass valve ❹ through the hole in the crankshaft ❺ to the conrod bearing ❻ and sprayed onto the piston ❽ from below through a jet ❼.
Two other oil ducts lead into the cylinder head. One duct supplies the hydraulic chain tensioner ❾, the other duct leads to the camshaft bearing bridge ❿, where the camshaft bearings and the cam lever are supplied with oil (via spraying nozzles).
The second oil pump ⓫ draws the engine oil out of the crankcase through the short oil screen ⓬ and uses it to grease the transmission gears ⓭.

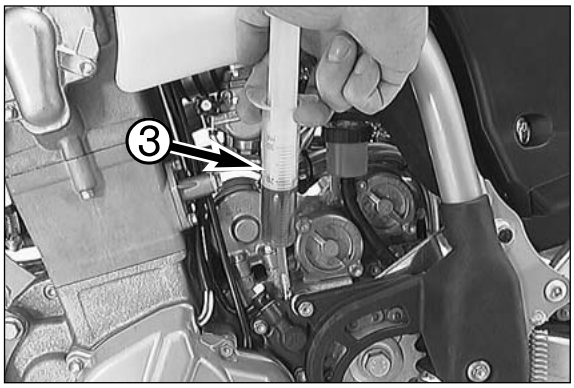


Checking the oil level of the hydraulic clutch

To check the oil level in the master cylinder of the clutch remove the cover. For this purpose, remove bolts ❶ and cover together with the rubber boot ❷. The oil level in the horizontal-standing master cylinder should be 4 mm (0,157 in) below the upper edge. If necessary add SAE 10 biodegradable hydraulic oil (Motorex Kupplungs-Fluid 75).

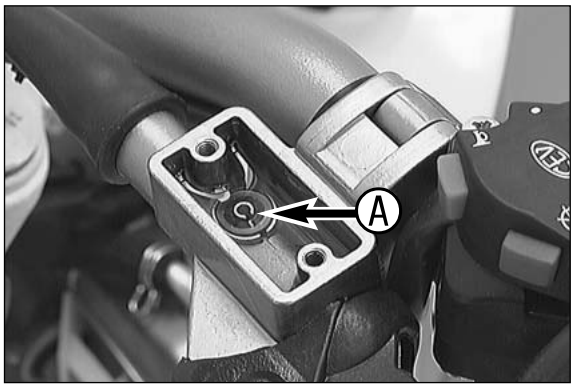
! CAUTION !

ONLY USE SAE 10 BIODEGRADABLE HYDRAULIC OIL (MOTOREX KUPPLUNGS-FLUID 75) TO REFILL THE MASTER CYLINDER. NEVER USE BRAKE FLUID!



Bleeding of the hydraulic clutch

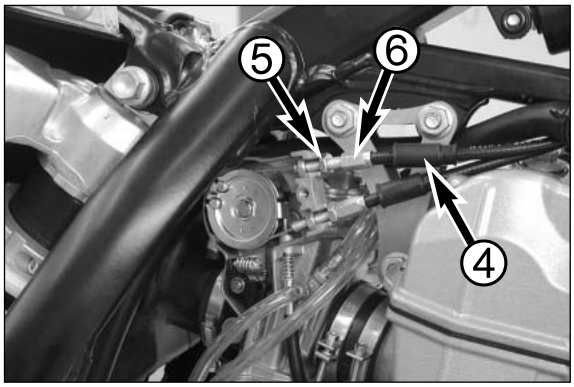
– For bleeding, the cover of the master cylinder of the clutch needs to be removed. For this purpose, remove screws ❶ and take off cover together with rubber bellows ❷.
– At the slave cylinder of the clutch, remove the bleeder nipple. At its place, mount the bleeder syringe ❸ which is filled with biodegradable hydraulic oil (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 (MOTOREX KUPPLUNGS-FLUID 75) ONLY. NEVER USE BRAKE FLUID NOR MIX BIODEGRADABLE HYDRAULIC OILS WITH MINERAL OILS.

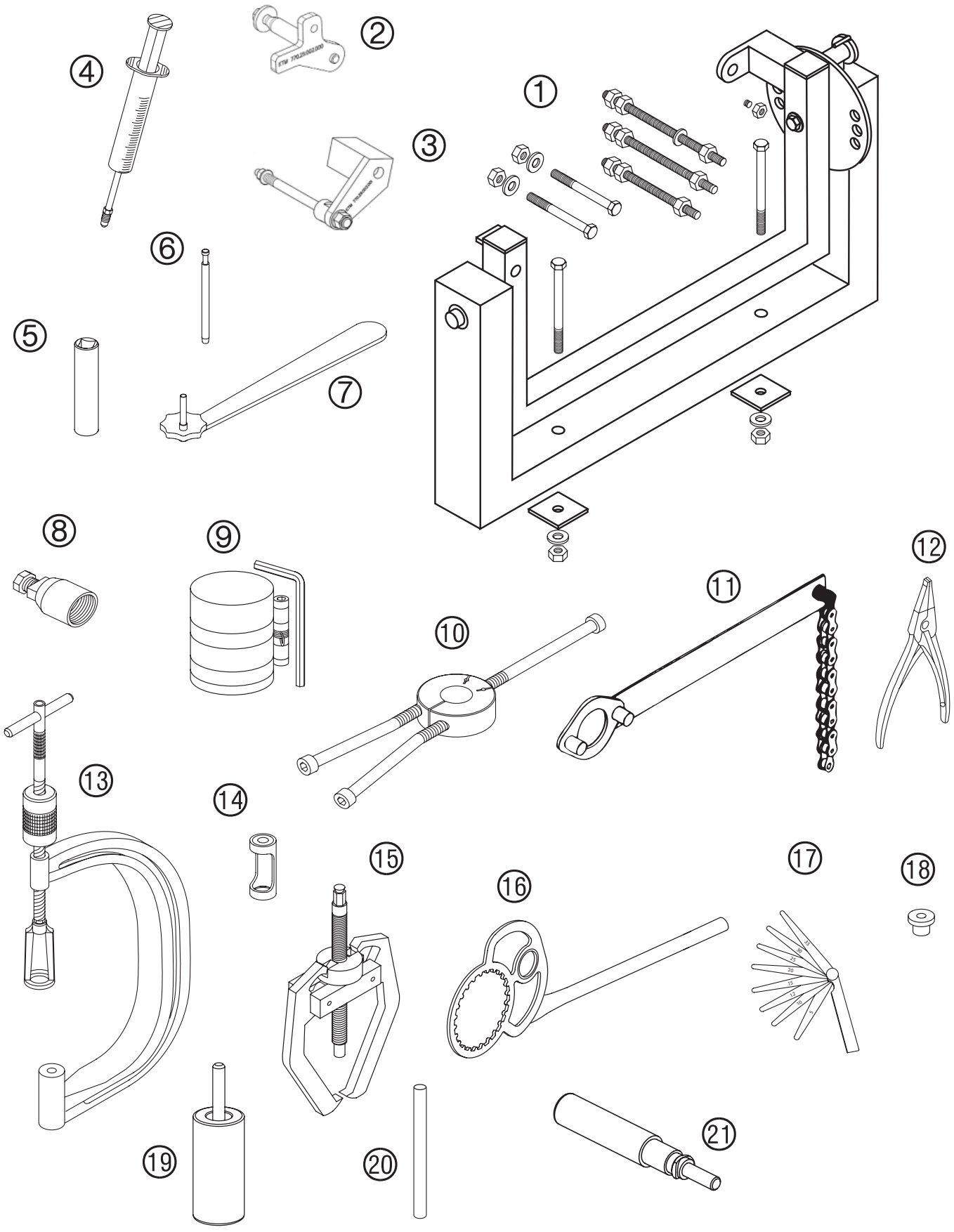


Adjusting the throttle cables

The throttle grip should always provide for a backlash of 3-5 mm. Besides, with the engine running, the idling speed must not change if you turn the handlebar all the way to the left or right.
To adjust the throttle cables, dismount the seat and the tank together with spoilers. Slide back the protection cover ❹. Loosen the counter nut ❺ and turn the adjusting screw ❻ accordingly. Turning the adjusting screw counterclockwise will reduce the backlash, turning the adjusting screw clockwise will increase the backlash.
Tighten the counter nut and check whether the throttle grip can be actuated smoothly. Mount tank and seat.

– After a short, careful test ride, check engine oil and coolant level once more.

SPECIAL TOOLS – ENGINE 250 -F



SPECIAL TOOLS – ENGINE 250 -F

FIG	PART NO.	DESCRIPTION
1	560.12.001.000	Universal engine work stand
2	770.29.002.000	Engine holder for engine work stand
3	770.29.003.000	Engine holder for engine work stand
4	503.29.050.000	Bleeding syringe for hydraulic clutch
5	600.29.073.000	Spark plug wrench 16 mm
6	770.29.026.000	Limit plug gauge 5 mm
7	590.29.034.000	Wrench for mixture regulating screw
8	580.12.009.000	Magneto extractor
9	600.29.015.000	Piston ring mounting tool
10	584.29.037.037	Mounting tool for inner rings of crankshaft bearings
11	510.12.012.000	Chain sprocket holder
12	510.12.011.000	Circlip pliers
13	590.29.019.000	Valve spring mounter
14	770.29.041.000	Valve spring mounter
15	590.29.033.000	Puller for camshaft bearings
16	503.29.003.000	Clutch holder
17	590.29.041.000	Feeler gauge for valve clearance
18	770.29.035.000	Protection cover for camshaft
19	770.29.018.000	Pressing tool for valve guides
20	770.29.018.050	Reamers for valve guides
21	770.29.036.000	Tool for piston pin lock ring.

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REMOVING AND REFITTING ENGINE 3

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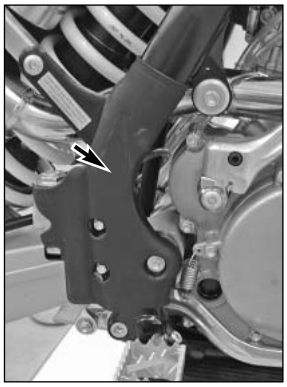
Art.-No. 3.206.052-E



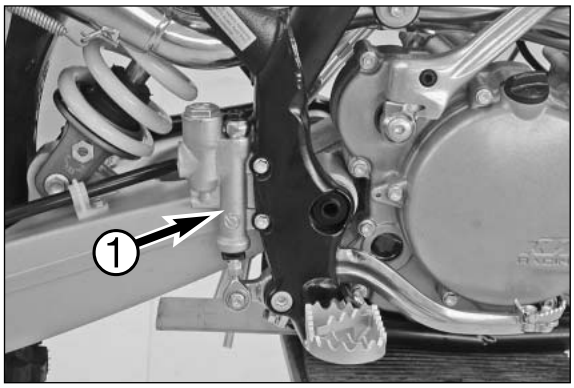
Dismounting the engine

– Thoroughly clean the motorcycle and jack up on a suitable assembly stand. Make sure it cannot tip over.
– Remove the seat and tank with the spoiler.

– Remove the frame protector on both sides.

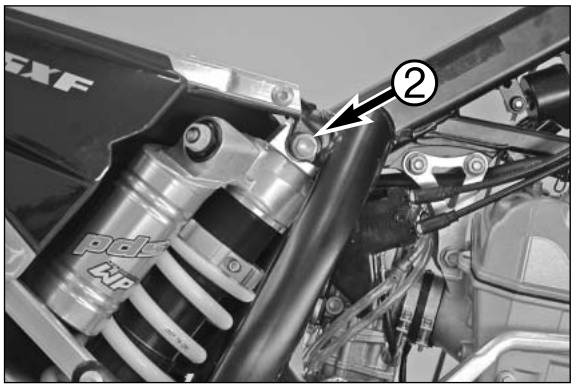
NOTE: you do not need to take the screws on the outside of the swing arm pivot all the way out. Just loosen and pull them out with the bushing.

– Open the chain and remove.

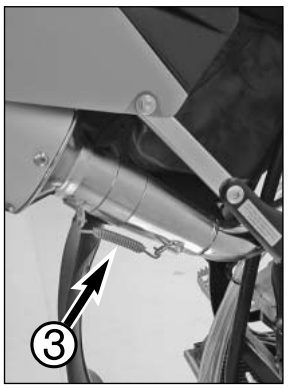


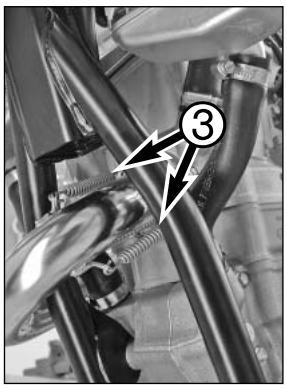
– Dismount the foot brake cylinder ❶; you do not need to loosen the line to the rear wheel brake.

– Detach the return spring on the foot brake lever.

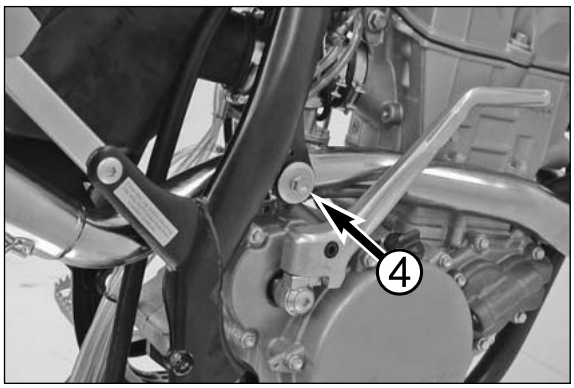


– Remove the upper shock absorber screw ❷.
– Loosen the nut on the swing arm pivot, knock out the swing arm pivot with a suitable driver and completely remove the swing arm, shock absorber and rear wheel from the motorcycle.

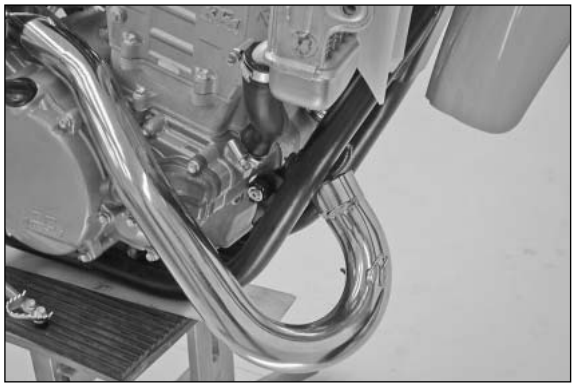




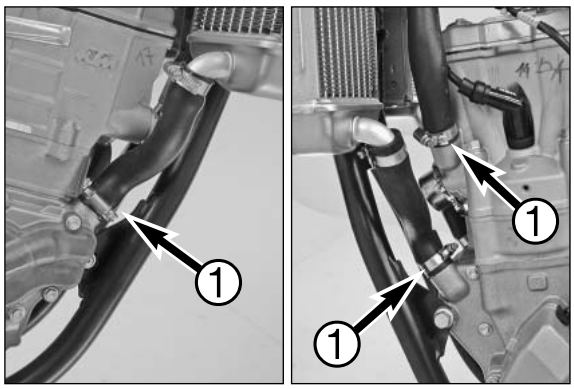
– Detach the exhaust springs ❸ on the cylinder head and between the manifold pipe and main silencer with a suitable tool.



– Remove the fixing screw ❹ on the manifold pipes together with the washer and rubber sleeve.

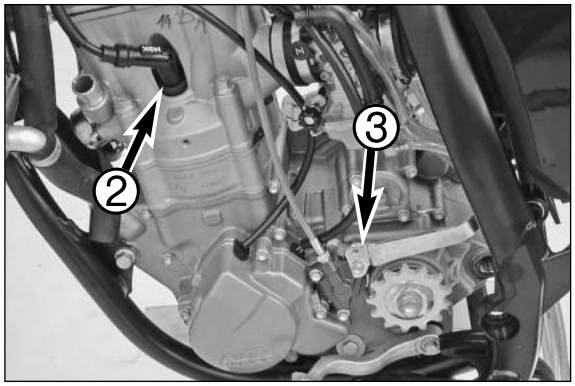


– Pull the manifold pipe forward and remove from the motorcycle.



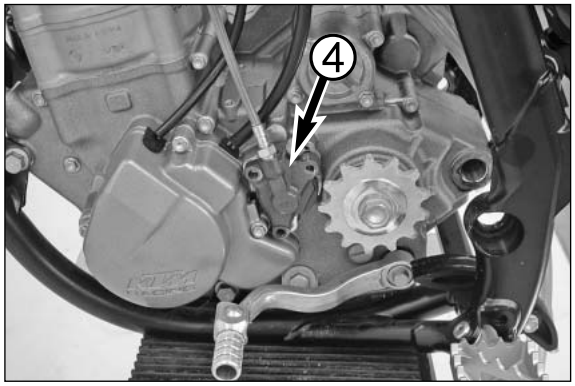
– Open the drain plug on the water pump and allow the cooling liquid to drain into a suitable vessel.

– Loosen the hose clamp ❶ and pull the radiator hoses off of the engine.



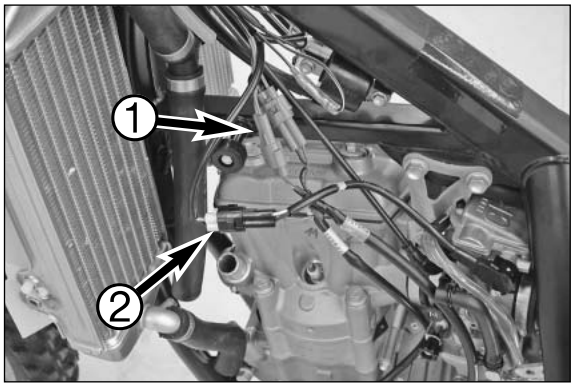
– Disconnect the spark plug connector ❷.

– Unscrew the chain securing guide ❸ on the clutch slave cylinder and tilt up.

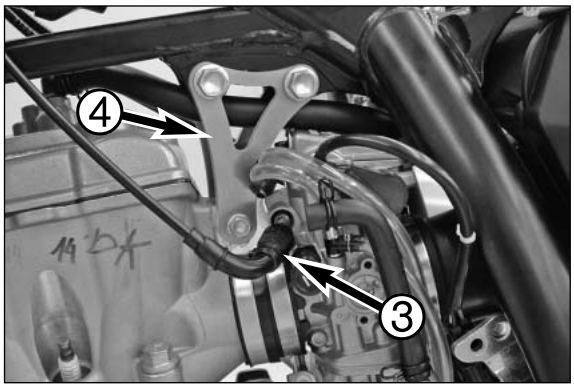


– Unscrew the clutch slave cylinder ❹ and let it hang down on the side.

NOTE: do not actuate the clutch lever as long as the clutch slave cylinder is dismounted.

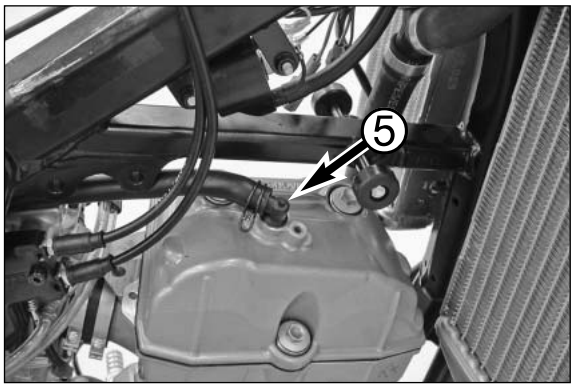


– Disconnect the generator connector ❶ and the throttle potentiometer connector ❷.



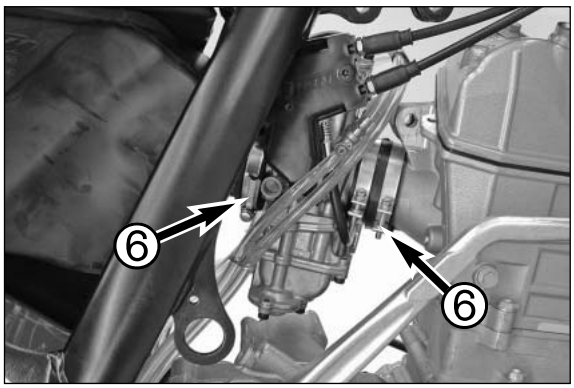
– Unscrew the hot start control ❸ from the carburetor.

– Remove both upper engine braces ❹.



– Carefully disconnect the engine vent ❺ and remove from the motorcycle together with the hose.

NOTE: only pull the connection upwards, otherwise it can easily break.

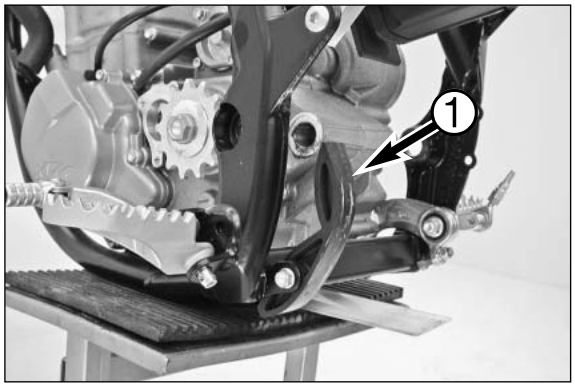


– Loosen the carburetor connection boots ❻.

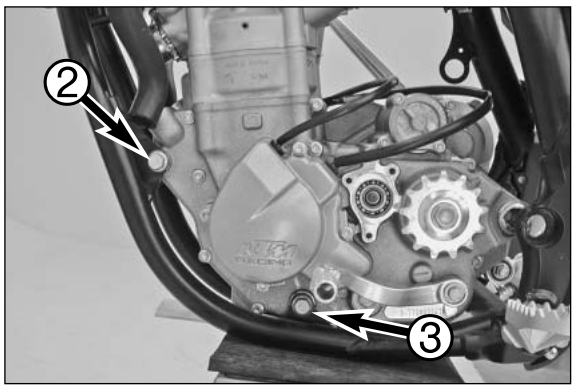
– Dismount the carburetor towards the right and let it hang down.

! CAUTION !

DO NOT PLACE THE CARBURETOR IN THE AIR FILTER BOX SINCE THE AIR FILTER WILL ABSORB ANY LEAKING FUEL.



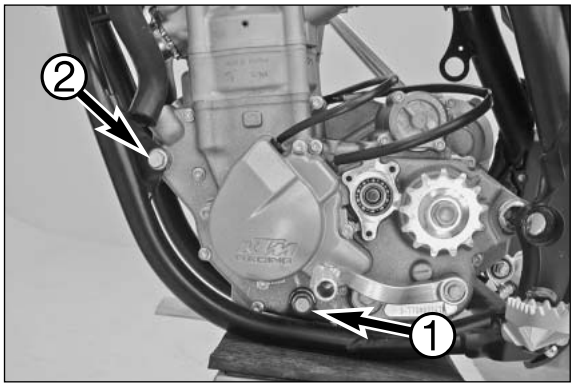
– Loosen the chain guide ❶ and tilt upwards.



– Remove the front ❷ and lower ❸ engine fixing screws and lift the engine out of the frame from the left side.

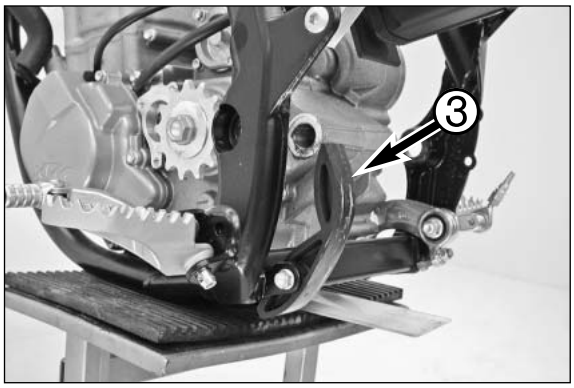
! CAUTION !

MAKE SURE THE MOTORCYCLE CANNOT TIP OVER.



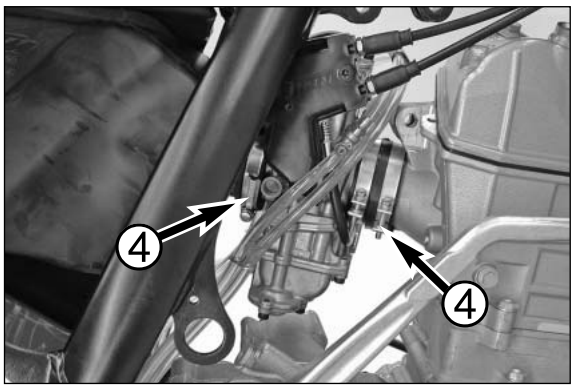
Mounting the engine

– Lift the engine into the frame from the left, position and screw in the lower ❶ and the front ❷ engine fixing screws but do not tighten them yet.

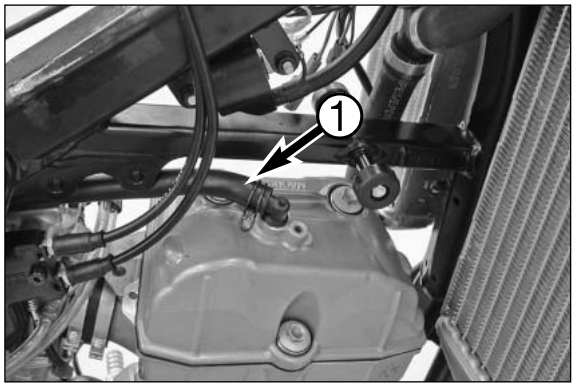


– Mount the chain guide ❸ and tighten the screw.

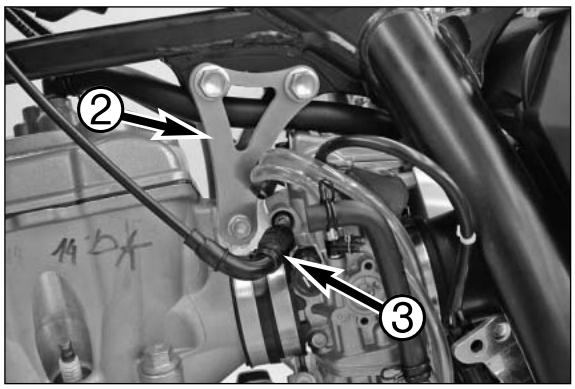
– Place the carburetor into the boots.



– Tighten the carburetor connection boots ❹.



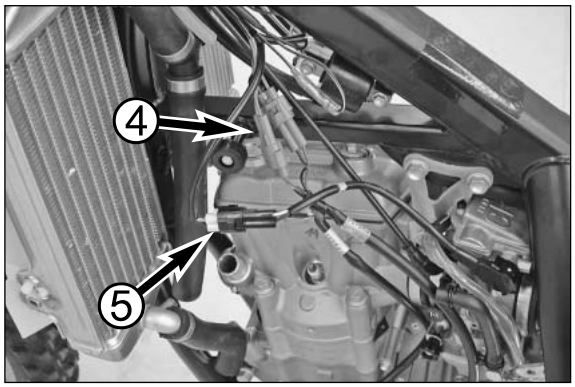
– Mount the engine vent ❶.



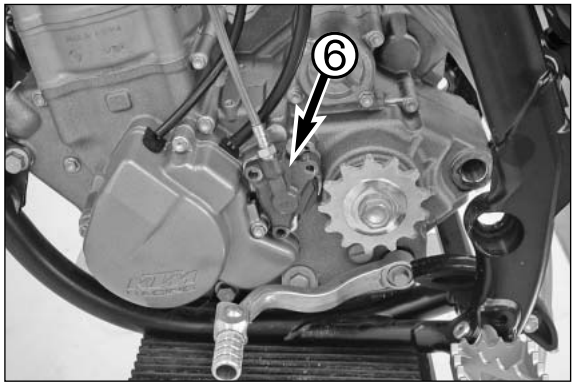
– Mount both upper engine braces ❷ but do not tighten the screws yet.

NOTE: the hose the engine vent should run between the two engine braces.

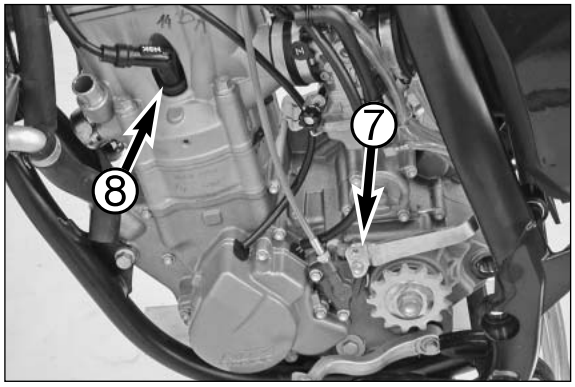
– Screw the hot start control ❸ into the carburetor.



– Connect the generator connector ❹ and throttle potentiometer connector ❺. Attach the wiring harnesses with cable clips.

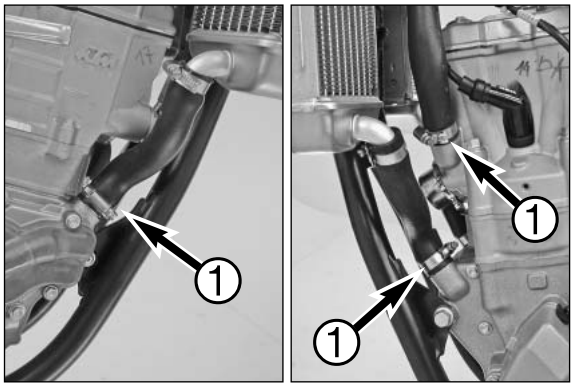


– Mount the clutch slave cylinder ❻, screw in both front screws (M6x20) and tighten to 10 Nm.

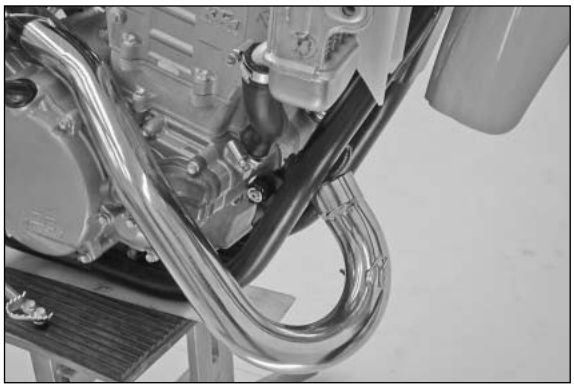


– Position the chain securing guide ❼, mount the M6x25 screw and tighten to 10 Nm. Tighten the screw on the chain roller.

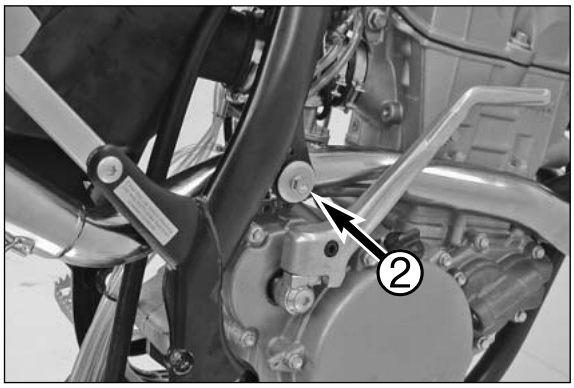
– Connect the spark plug connector ❽.



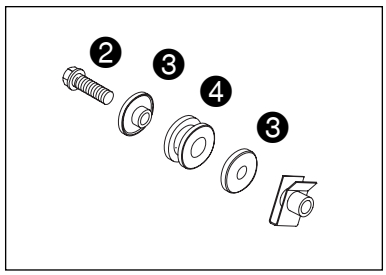
– Connect the radiator hoses to the engine and tighten the hose clamp ❶.

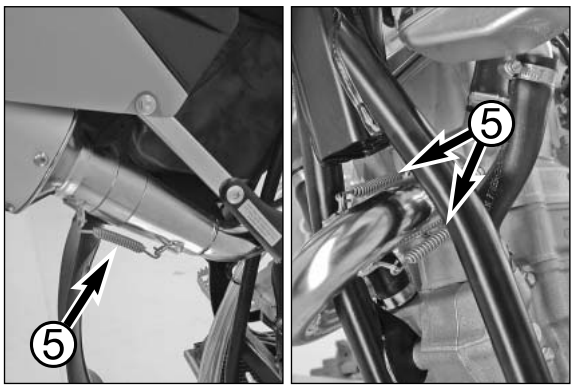


– Attach the manifold pipe to the front of the motorcycle and slide into the main silencer.

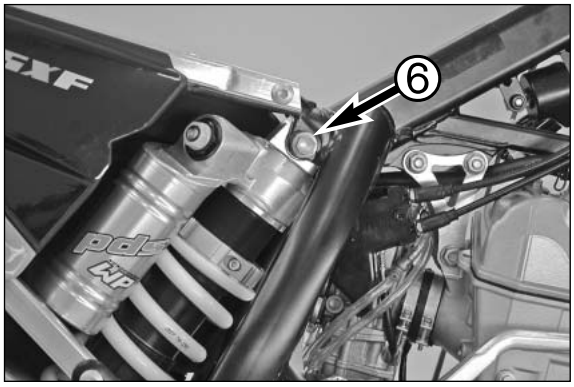


– Mount the fixing screw ❷ for the manifold pipe with washers ❸ and the rubber sleeve ❹.





– Attach the exhaust springs ❺.



– Position the rear wheel with the swing arm and shock absorber in the frame.

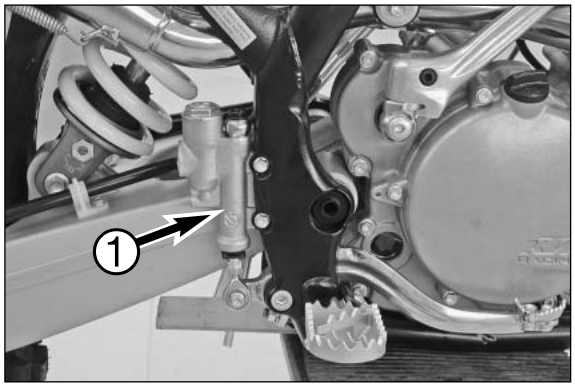
– Insert the swing arm pivot and tighten the nut.

– Tighten the upper shock absorber screw ❻ to 70 Nm.

– Tighten the nut on the swing arm pivot to 100 Nm.

– Tighten the nuts on the two engine braces to 33 Nm.

– Tighten the front and lower engine fixing screws to 60 Nm.



– Mount the foot brake cylinder ❶, apply Loctite 243 to the screws and tighten to 10 Nm.
– Apply Loctite 243 to the ball joint of the pushrod and tighten to 10 Nm.

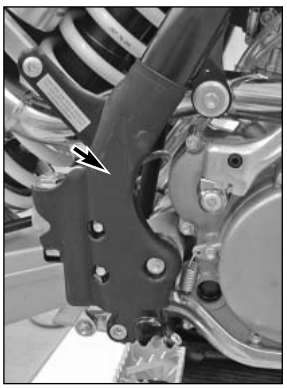
– Attach the return spring for the foot brake lever.

– Mount the chain and chain joint.

! CAUTION !

WHEN YOU MOUNT THE CHAIN JOINT, MAKE SURE THE CLOSED SIDE OF THE GUIDE POINTS IN THE RUNNING DIRECTION.

– To adjust the chain tensioning: see Owner's Manual.



– Mount both sides of the frame protector.

– To fill and bleed the cooling system: see Chapter 2

– Mount the seat and tank with the spoiler and take the motorcycle off the assembly stand.

DISASSEMBLING THE ENGINE 4

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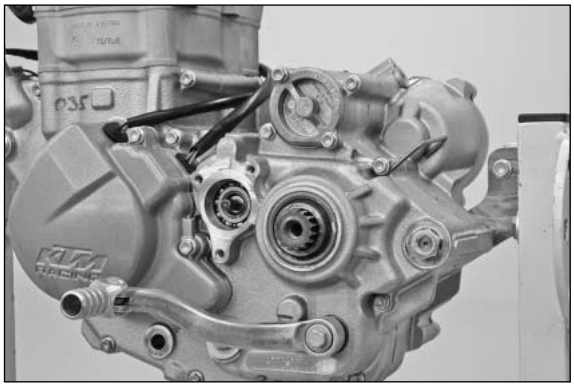
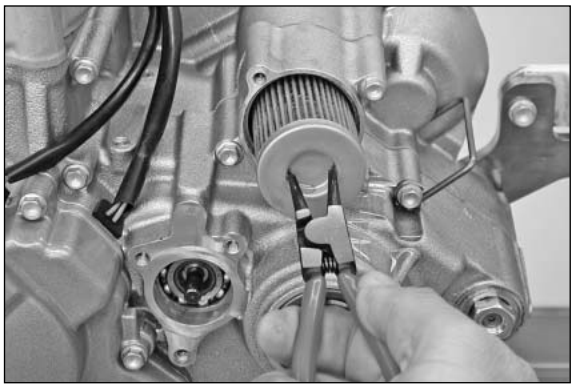


Preparatory work

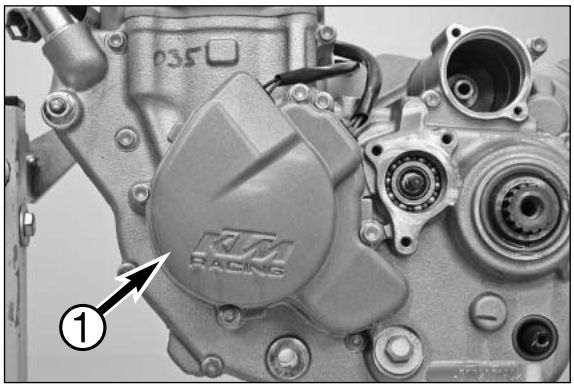
– Thoroughly clean the outside of the engine and screw onto the engine work stand 560.12.001.000 with both engine holders 770.29.002.000 and 770.29.003.000.

– Unscrew the shift lever, drain the oil and remove the oil filter cover. Discard the O-ring in the oil filter cover and the seal ring on the oil drain plug.

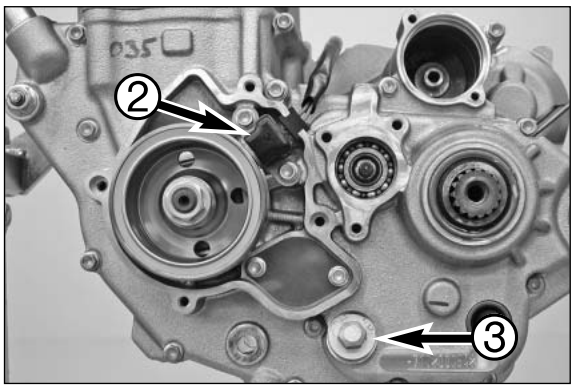


– Use suitable pliers (circlip pliers 510.12.011.000) to pull out the oil filter and discard.

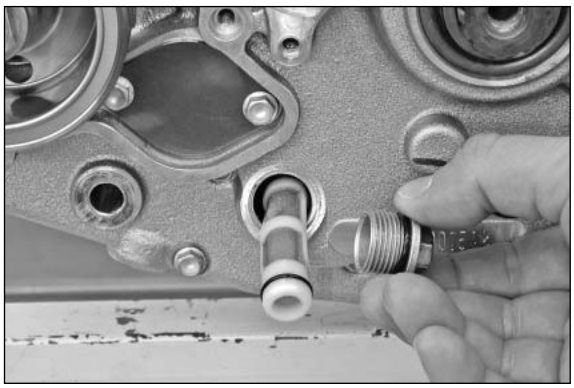
– Unscrew the spark plug.



– Dismount the ignition cover ❶.

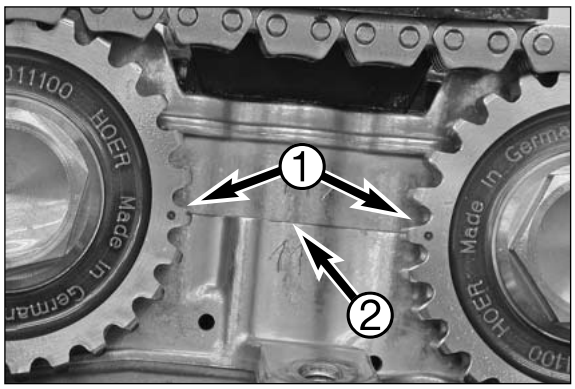


– Unscrew the pulse generator ❷, pull the rubber duct out of the recess and remove the pulse generator.



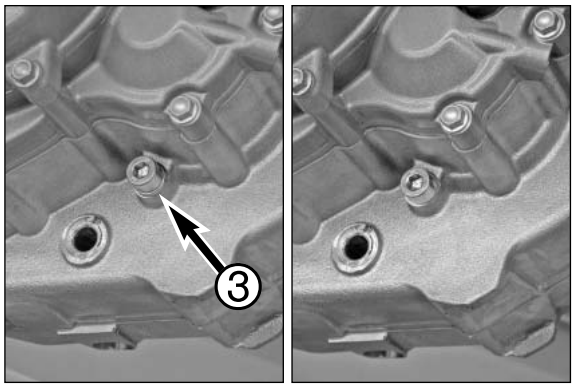
– Remove the plug ❸ and pull out the oil screen. Discard the seal rings on the plug and on the oil screen.

– Remove the valve cover.

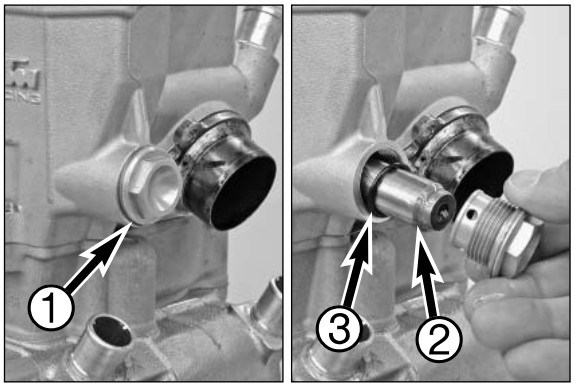


Moving the engine into the TDC position

– Turn the crankshaft until the two marks ❶ on the camshaft gears are aligned and precisely above the dividing line ❷ between the two camshaft bearing bridges.

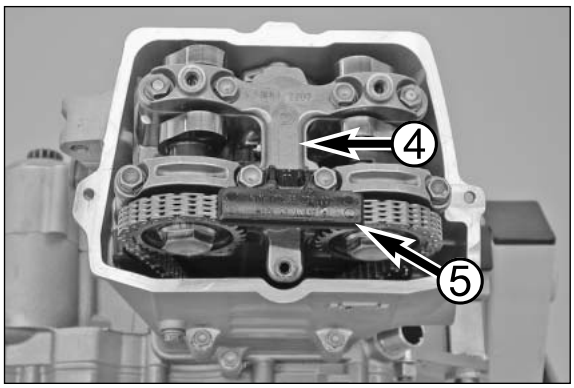


– Unscrew the engine locking screw ❸, remove the seal ring and screw the engine locking screw back in (tightening torque 20 Nm).



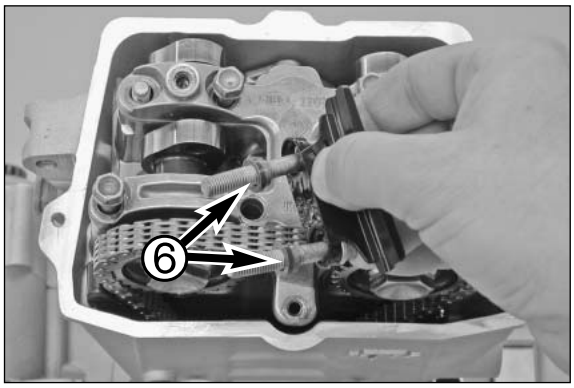
Removing the camshafts

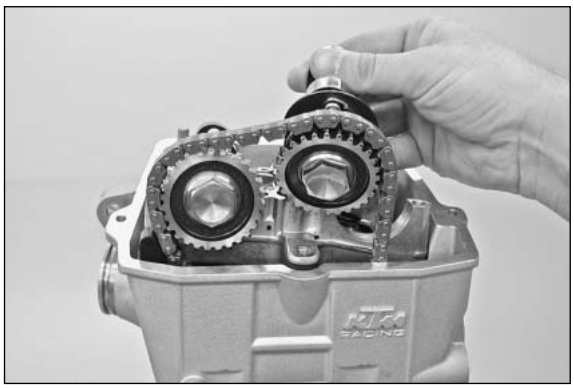
– Open the plug on the chain tensioner ❶ and pull out the chain tensioner ❷.
– Discard the sealing washer on the plug and the O-ring ❸ on the chain tensioner.



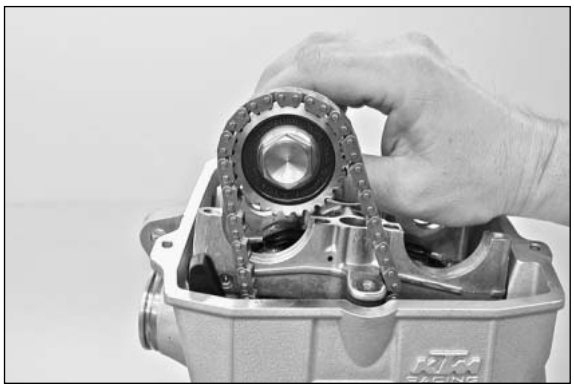
– Loosen all of the screws and nuts on the upper camshaft bearing bridge ❹ and carefully remove the camshaft bearing bridge.

NOTE: the screws on the timing chain guide rail ❺ have distance bushings ❻, be careful not to lose them.

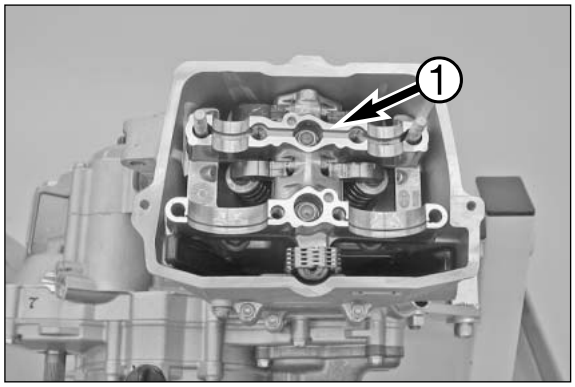




– Turn the exhaust camshaft up along the timing chain and towards the intake camshaft; take the timing chain off the camshaft gear.

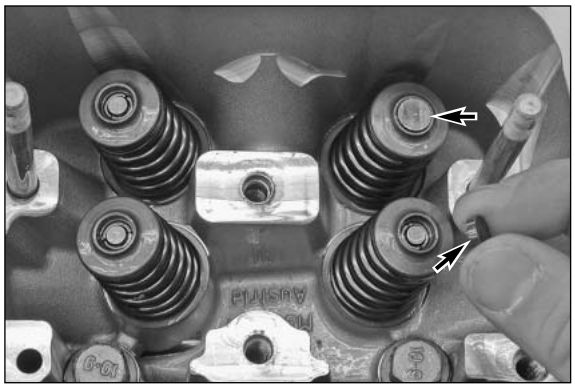


– Also remove the intake camshaft; let the timing chain fall into the timing chain compartment.



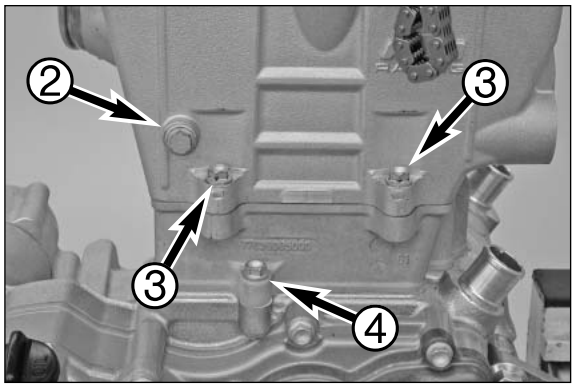
Removing the cylinder head and piston

– Remove the lower camshaft bearing bridge ❶, remove the dowels.

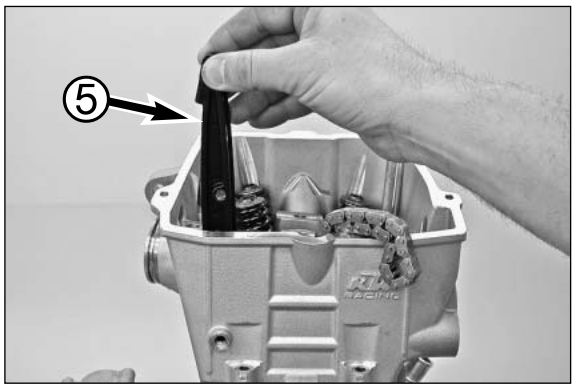


– Take the shims out of the spring retainers and mark their mounted positions.

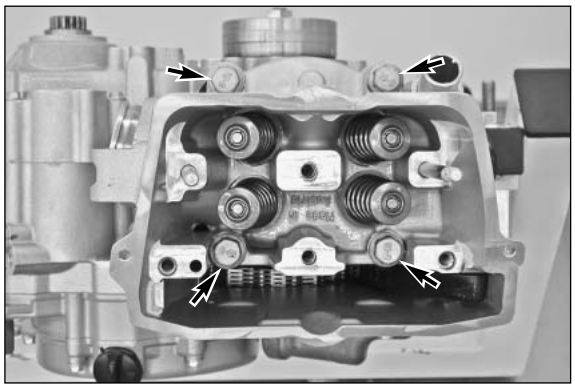
NOTE: you will only need to check the valve clearance after assembling; if valves or other parts in the valve control or replaced, the valve clearance will need to be readjusted.



– Remove the screws from the chain guide ❷, the cylinder head ❸ and the cylinder base ❹.

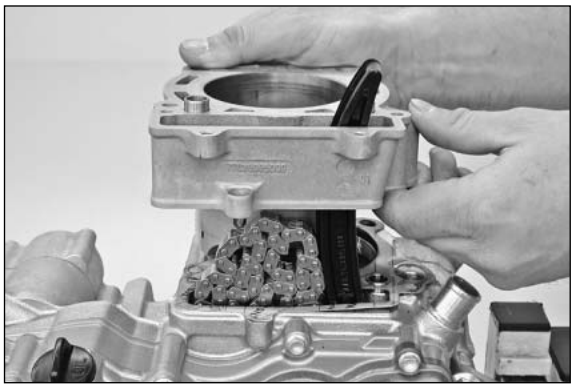


– Pull the timing chain guide ❺ out of the timing chain compartment.



– Loosen the cylinder head crews crosswise and remove together with the washers.

– Lift off the cylinder head, paying attention to the chain tensioning rail.
– Discard the cylinder head gasket, remove the dowels.



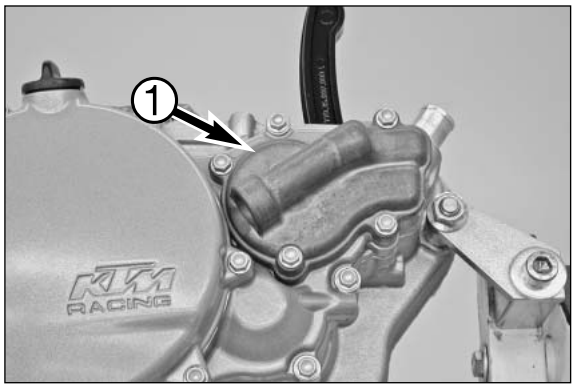
– Lift off the cylinder, paying attention to the chain tensioning rail.
– Discard the cylinder base gasket, remove the dowels.

– Carefully remove the piston pin retainer from the groove.

NOTE: for easier demounting/mounting, remove the piston pin retainer opposite the timing chain compartment.

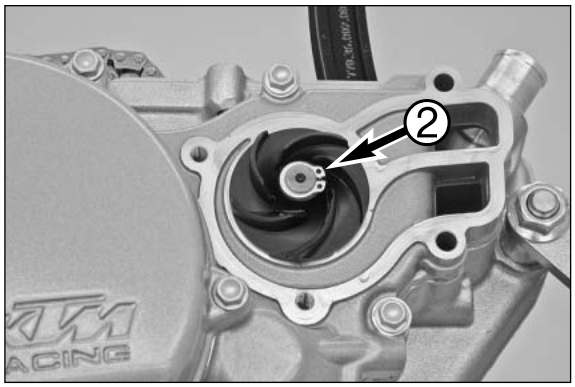
– Carefully push the piston pin out of the piston; remove the piston.

– Loosen the rotor nut and remove together with the detent edged lock washer.
– Screw the special tool 580.12.009.000 on the rotor, hold with a wrench and pull the rotor off the crankshaft by turning in the ejector screw. Remove the special tool from the rotor again.

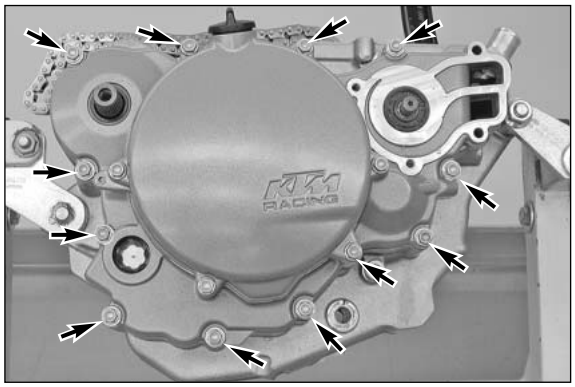


Removing the clutch cover

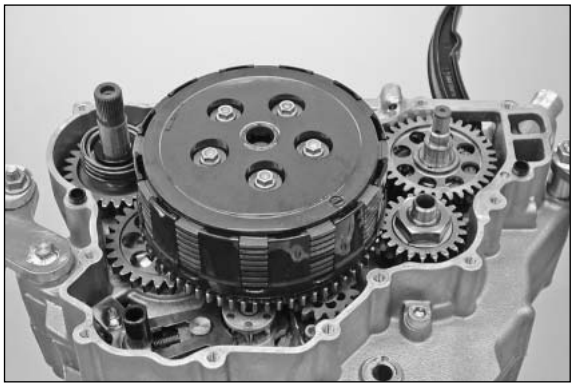
– Remove the water pump cover ❶.



– Use a suitable wrench (510.12.011.000) to remove the lock ring ❷; pull the water pump wheel off the shaft and take the needle roller out of the cross bore.

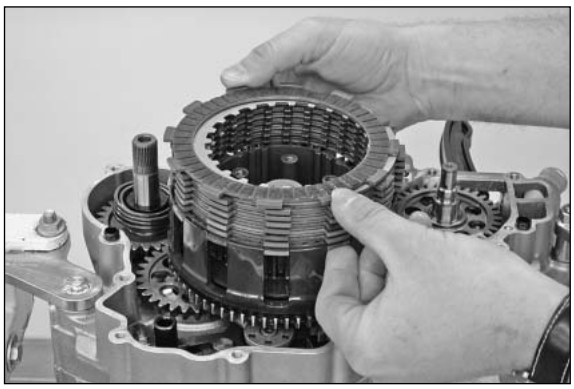


– Remove all of the screws from the big clutch cover as well as both of the upper screws and the lower right screw on the outer clutch cover.
– Remove the dowels and discard the gasket.

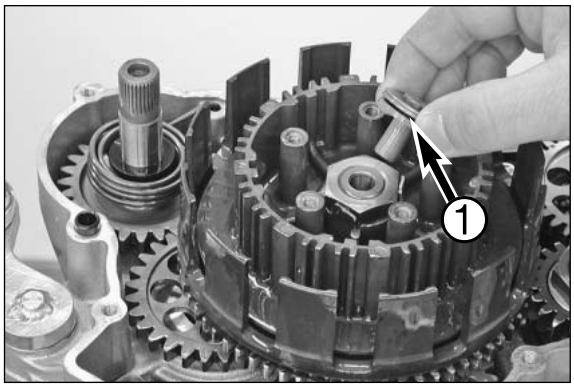


Dismantling the clutch

– Pull out the pushrod.
– Loosen the screws on the pressure cap crosswise and remove together with the washers and springs.
– Remove the pressure cap.

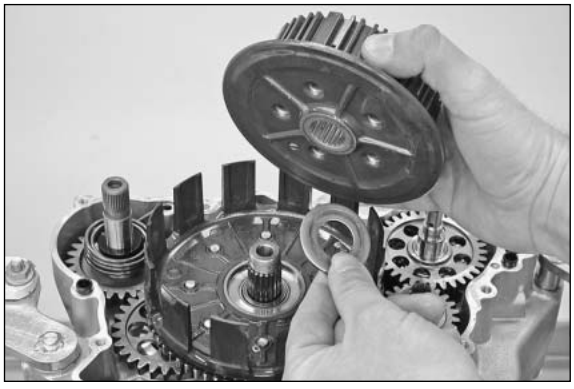


– Take the clutch disks out of the outer clutch hub.



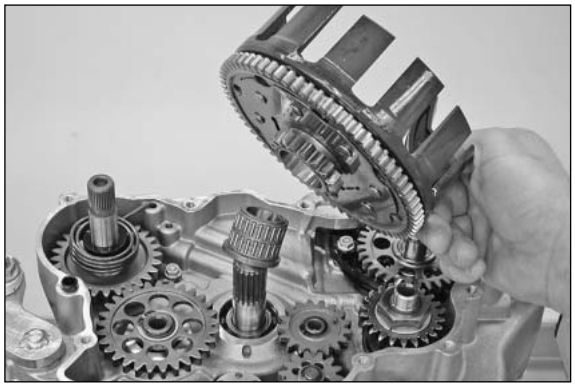
– Remove the pressure piece ❶ and bend up the lock washer on the driving nut.

– Hold the driver with the special tool 503.29.003.000 and unscrew the driving nut (A/F 27).
– Remove the driving nut together with the lock washer.

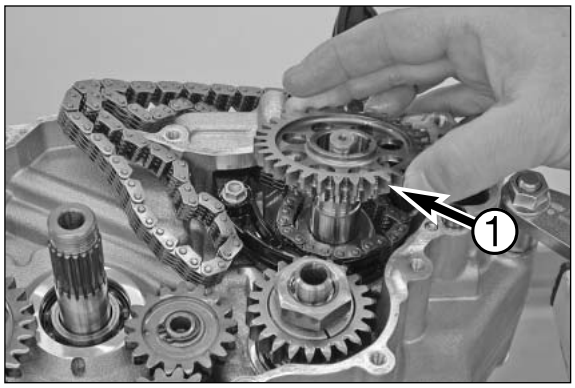


– Remove the driver together with the stop disk under the driver.

NOTE: the stop disk usually adheres to the driver.

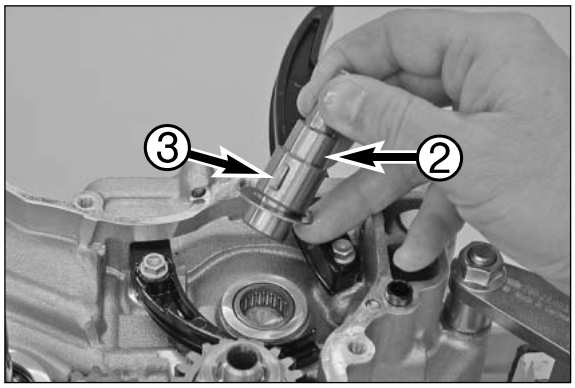


– Remove the outer clutch hub with the needle bearing and inner ring.



Removing the chain drive and primary gear

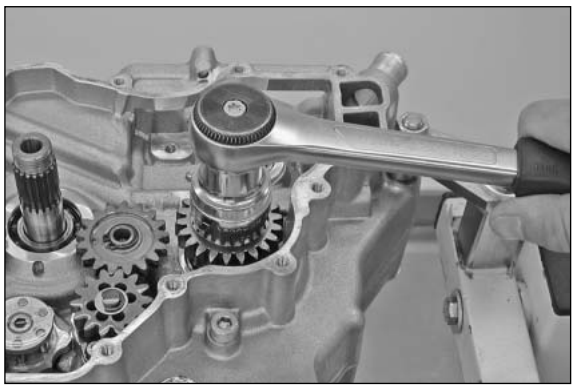
– Push the timing chain towards the rear sprocket ❶ and pull the rear sprocket off the timing train idler shaft.



– Pull the timing train idler shaft ❷ out of the bearing seat together with the stop disk and remove the woodruff key ❸.
– Slip off the timing chain.

NOTE: mark the running direction if you plan to use the timing chain again.

– Remove the timing chain tensioning rail and the chain securing guide.

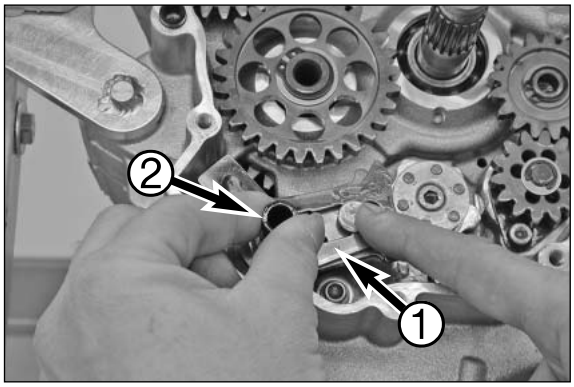


– Loosen the nut on the primary pinion (A/F 27, LH thread) and remove together with the detent edged lock washer.

– Remove the primary gear.

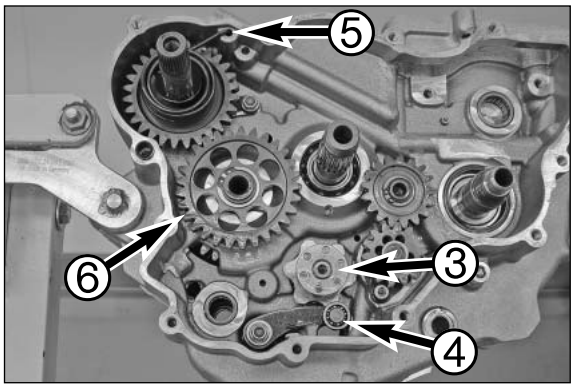
NOTE: if you cannot remove the primary gear by hand, use a suitable extractor with a protector for the crankshaft.

– Remove the crankshaft locking screw.



Dismantling the shift mechanism

– Push back the shift rail ❶ and pull out the shift shaft ❷ together with the stop disk underneath.



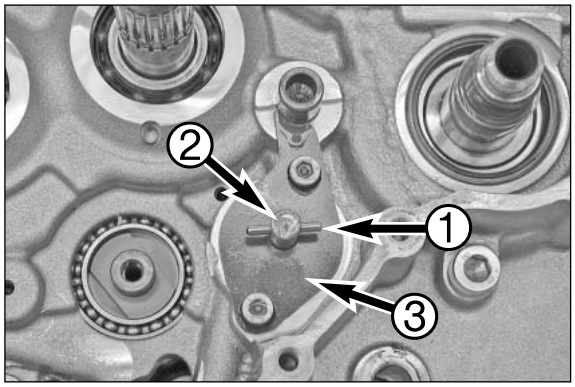
– Remove the screw on the shift lock ❸, push back the locking lever ❹ and pull off the shift lock; let go of the locking lever.

– Remove the locking lever.

– Detach the kickstarter spring ❺ and pull the kickstarter shaft all the way out, being careful not to lose the washer and spring underneath.

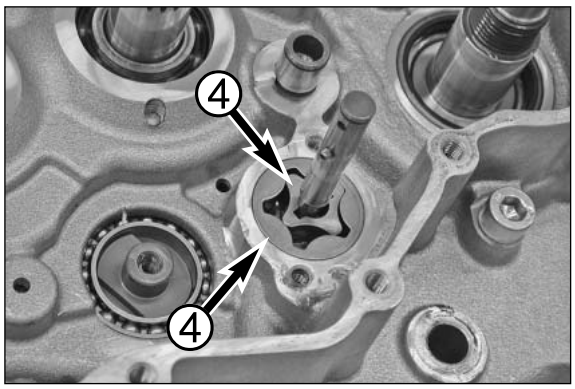
NOTE: slightly turn the kickstarter shaft in a counterclockwise direction while you pull it out.

– Remove the lock ring and washer from the starter idler ❻; pull off the kickstarter idler.



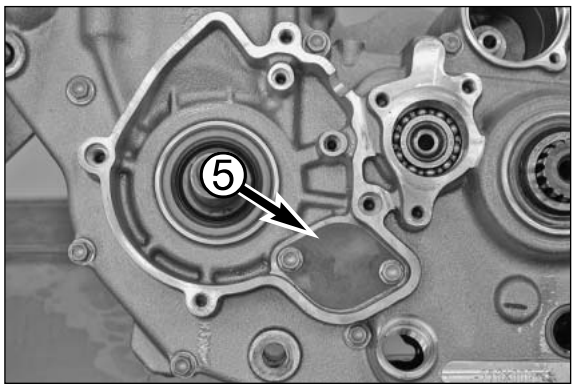
Removing the oil pumps

– Remove the oil pump gear and the oil pump idler.
– Pull the needle roller ❶ out of the oil pump shaft ❷.
– Remove the screws and remove the pump cover from the pressure pump ❸.

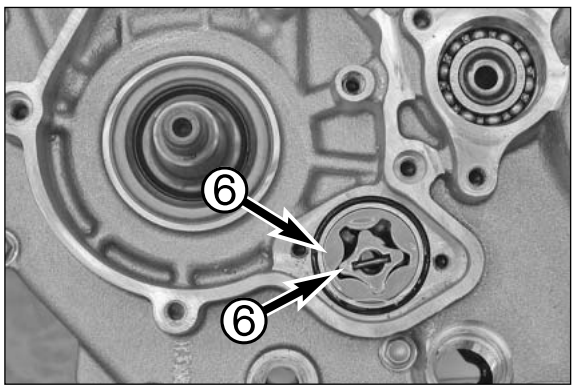


– Pull out the oil pump shaft and remove the needle roller.

– Take both pressure pump rotors ❹ out of the engine case.

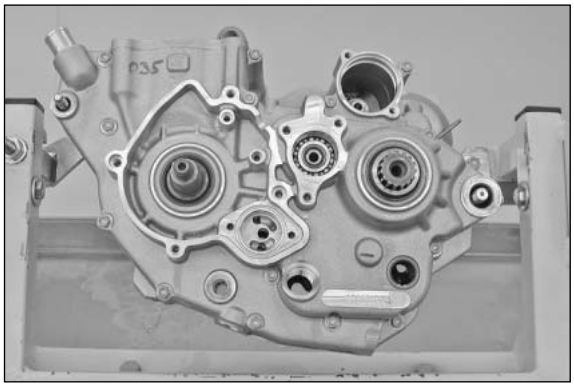


– Remove the screws and lift the pump cover off the suction pump ❺, discarding the O-ring.



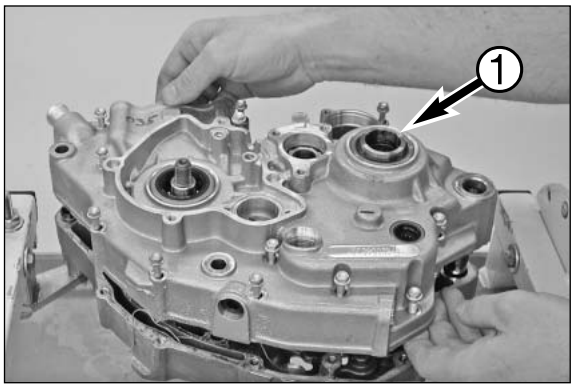
– Remove both suction pump rotors ❻ out of the engine case, do not lose the needle roller for the inner rotor.

NOTE: the pressure pump rotors are narrower than the suction pump rotors.



Separating the casing halves, removing the crankshaft and transmission shafts

– Turn the engine over and remove all of the casing screws as well as both nuts on the engine work stand holders.



– Lift off the left casing half; if necessary, gently tap on the shaft with a plastic hammer.

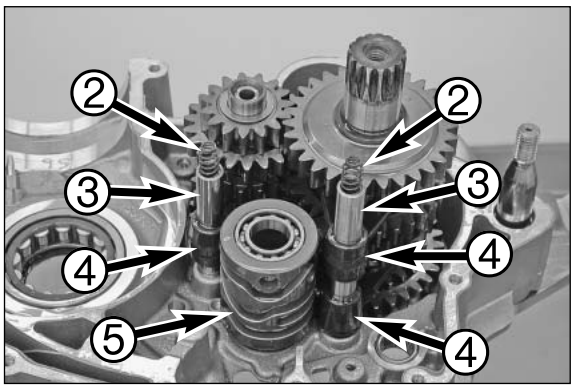
! CAUTION !

DO NOT USE A SCREWDRIVER OR SIMILAR TOOL TO PRY THE HOUSING HALVES APART SINCE THIS WILL DAMAGE THE SEALING AREAS.

– Pull the bushing ❶ and O-ring for the countershaft out of the countershaft shaft seal ring, discarding the O-ring.

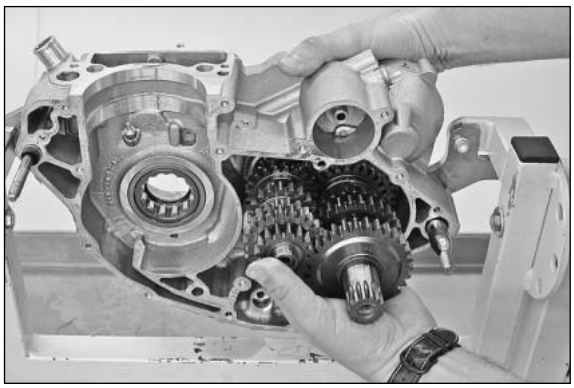
NOTE: the main shaft has a stop disk which usually adheres to the bearing; be careful not to lose it.

– Lift the crankshaft out of the bearing.



– First pull out the upper springs ❷ in the shift rails and then pull out the shift rails ❸.

– Tilt the shift forks ❹ aside and pull out the shift drum ❺; remove the shift forks. If the lower springs do not stick to the shift rails, remove them with a suitable tool.



– Move the engine case into the upright position and hold both transmission shafts with one hand while you press the shafts out of the bearing seats from behind with your other hand. Make sure the engine case cannot fall off the mounting rack.

SERVICING INDIVIDUAL COMPONENTS 5

INDEX

Art.-No. 3.206.052-E

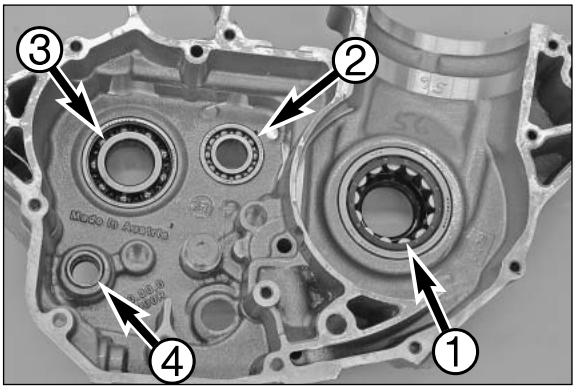
IMPORTANT NOTE REGARDS WORKING ON ENGINE HOUSING

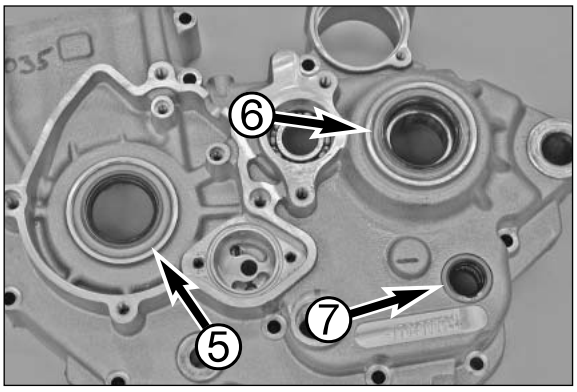
Read through the following section before commencing work. Then determine the assembly sequence so that the engine housing halves only need to be heated up once before replacing the bearings.

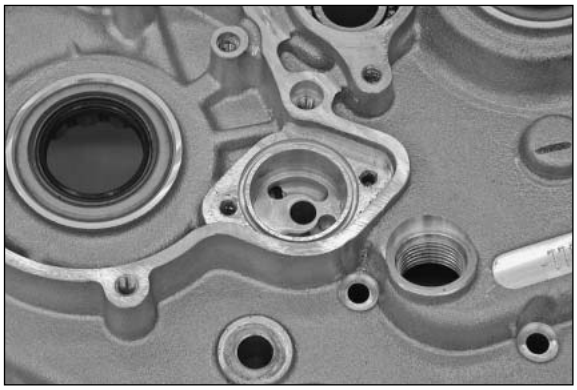
Having first removed the dowels, in order to expel the bearings or remove them with light mallet blows, the housing halves must be placed on a suitably large plane surface, supporting the whole of the sealing surface without damaging it. A wooden panel is best used as a base.

Bearings or shaft seal rings should not be hammered into their seats. If no suitable press is available, use a suitable mandrel and hammer them in with great care. Cold bearings will practically drop into their seats at an engine housing temperature of approx. 150° C.

After cooling, should the bearings fail to lock in the bore, they are bound to rotate after warming. In that event the housing must be replaced.







Left casing half

Remove all shaft seal rings and the bearing fixing screws, heat the casing half in the oven to approx. 150° C.

– Roller bearing for the crankshaft ❶
  Press in the roller bearing from the outside with a suitable driver. Press in a new roller bearing from the inside up to the stop.

– Grooved ball bearing for the main shaft ❷
  Press in a grooved ball bearing from the outside with a suitable driver. Press in a new grooved ball bearing from the inside up to the stop.

– Grooved ball bearing for the countershaft ❸
  Press in the grooved ball bearing with a suitable driver from the outside. Press in a new bearing from the inside up to the stop.

– Needle bearing for the shift shaft ❹
  Press in the needle bearing from the outside. Press in a new needle bearing from the inside until flush.

– Shaft seal ring for the crankshaft ❺
– Press in a new shaft seal ring from the outside (open side on the inside)until flush.

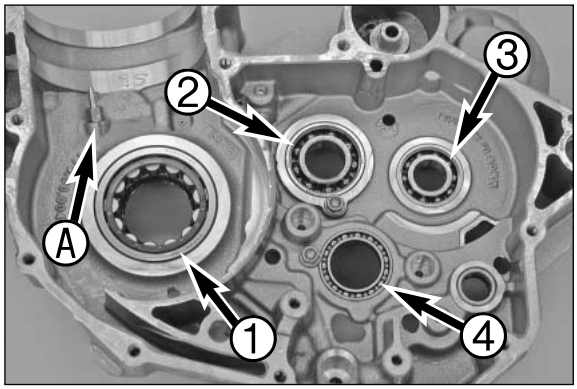
– Shaft seal ring for the countershaft ❻
  Press in a new shaft seal ring from the outside (open side on the inside) until flush.

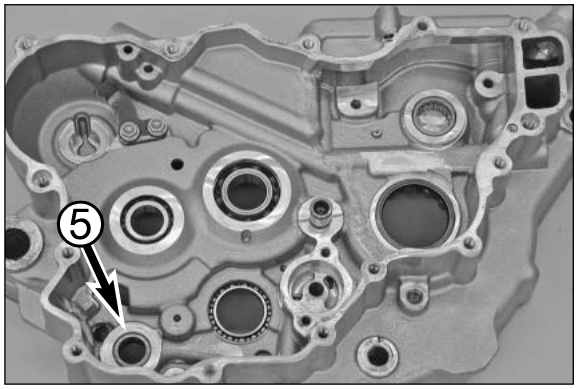
– Shaft seal ring for the shift shaft ❼
  Press in a new shaft seal ring from the outside (open side on the inside) until flush.

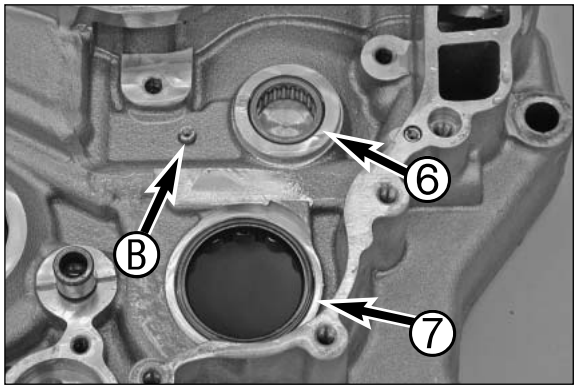
– When the casing half has cooled, check the bearings for a tight fit.

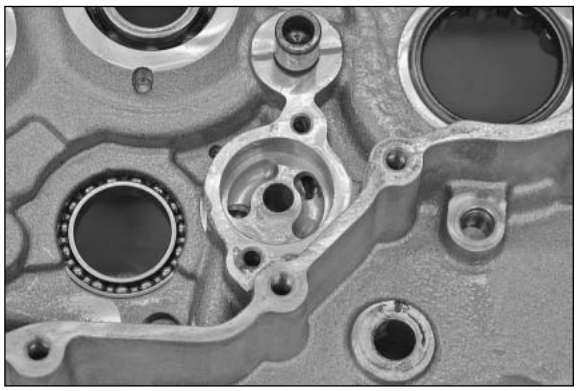
– Make sure there are no score marks or seizing marks on the oil pump housing.

– Blow compressed air through all oil ducts and make sure they are not clogged.









Right casing half

Remove the shaft seal ring and the bearing fixing screws, heat the casing half in the oven to approx. 150° C.

– Roller bearing for the crankshaft ❶
  Press in the roller bearing from the outside with a suitable driver. Press in a new roller bearing from the inside up to the stop.

– Grooved ball bearing for the main shaft ❷
  Press in the grooved ball bearing from the outside with a suitable driver. Press in a new grooved ball bearing from the inside up to the stop.

– Grooved ball bearing for the countershaft ❸
  Press in the grooved ball bearing from the outside with a suitable driver. Press in a new grooved ball bearing from the inside up to the stop.

– Grooved ball bearing for the shift drum ❹
  Press in the grooved ball bearing from the outside with a suitable driver. Press in a new grooved ball bearing from the inside up to the stop.

– Needle bearing for the shift shaft ❺
  Press in the needle bearing from the outside. Press in a new needle bearing from the inside until flush.

– Needle bearing for the timing train idler shaft ❻
  Pull the Needle bearing out of the casing half with a bearing extractor. Press in a new bearing up to the stop.

– Shaft seal ring for the crankshaft ❼
  Press in a new shaft seal ring (open side on the inside) until flush.

– When the casing half has cooled, check the bearings for a tight fit.

– Apply Loctite 243 to the bearing fixing screws and tighten to 10 Nm.

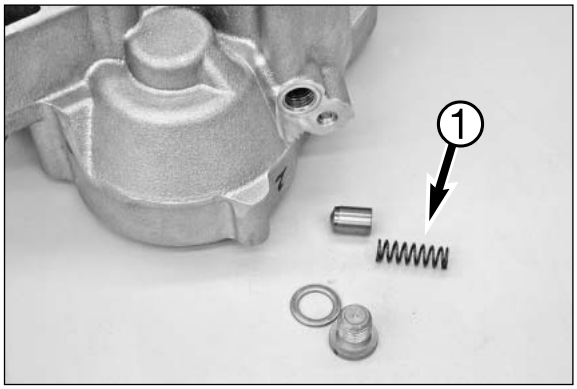
– Make sure there are no score marks or seizing marks on the oil pump housing.

– Make sure the oil ducts are not clogged.

NOTE: remove the jets and the bypass valve to clean the oil ducts and check whether they are clogged.

– Apply Loctite 243 to the oil jet 70 Ⓐ and tighten to 3 Nm.

– Apply Loctite 243 to the oil jet 150 Ⓑ and tighten by hand.

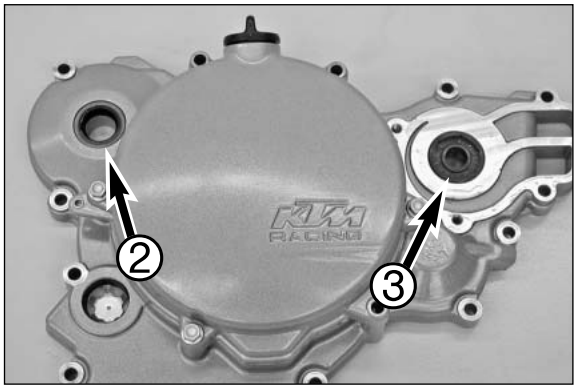


Bypass valve

– Check the valve piston, sealing seat and pressure spring for damage.

Minimum length of the pressure spring ❶: 23.5 mm

NOTE: if the length of the pressure spring is less than 23.5 mm, the opening pressure of the bypass valve will be reduced. This will lead to a drop in the oil pressure and consequently to increased wear.



Clutch cover

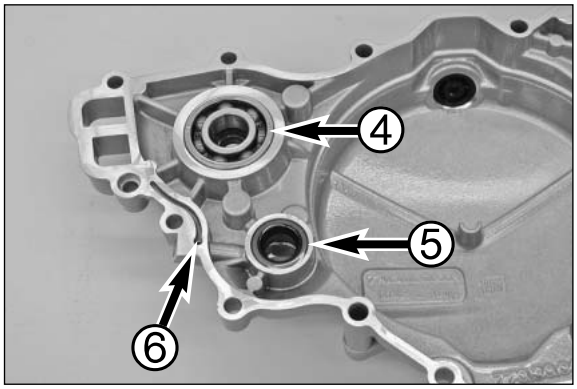
– Pry the shaft seal ring out of the kickstarter shaft ❷, press in a new shaft seal ring (open side on the inside) up to the stop.

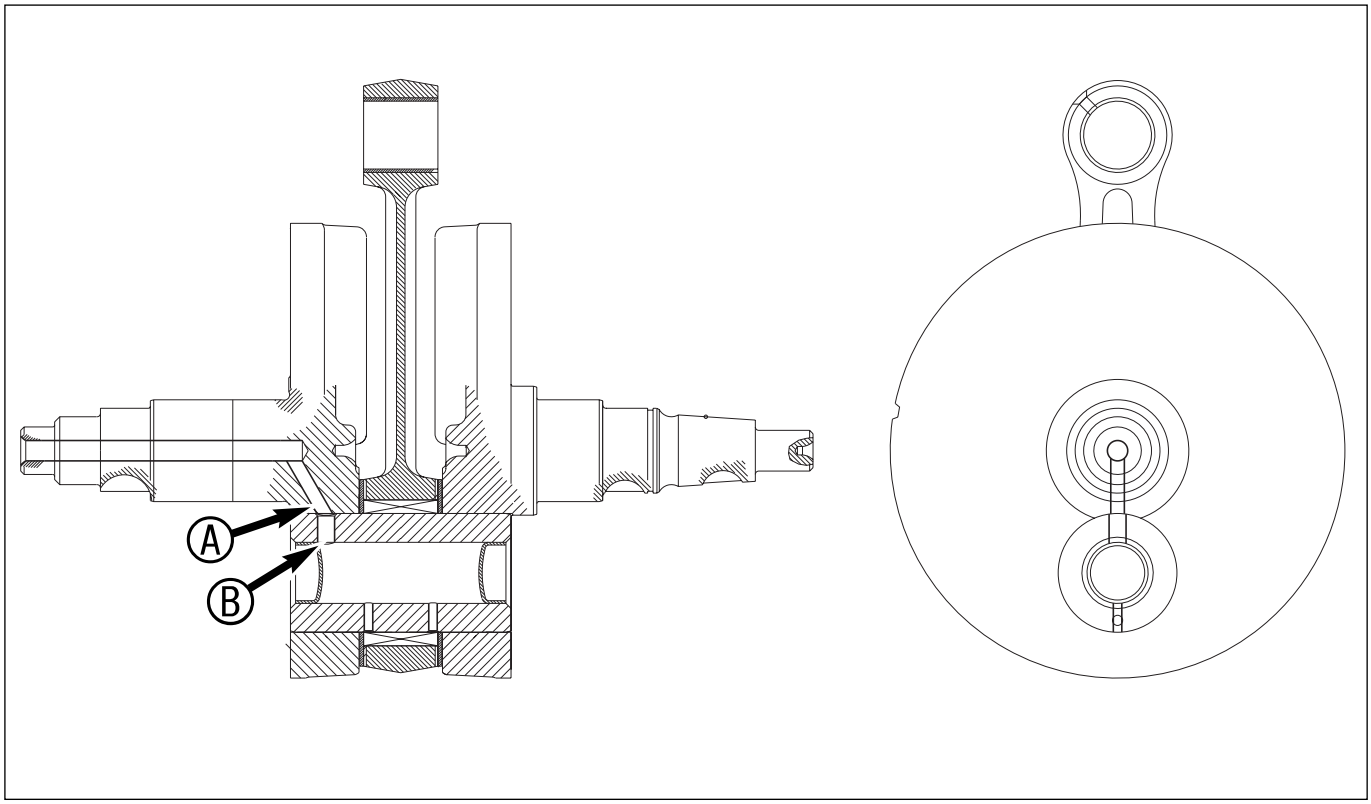
– Pry the shaft seal ring ❸ out of the water pump.
– Press the grooved ball bearing ❹ out of the timing train idler shaft from the outside to the inside. Press in a new grooved ball bearing from the inside to the outside up to the stop.

– Press a new shaft seal ring into the water pump (open side on the outside) until flush.

– Pry the shaft seal ring out of the crankshaft ❺, press in a new shaft seal ring (open side on the inside) up to the stop.

– Blow compressed air through the oil duct ❻ and make sure it is not clogged.



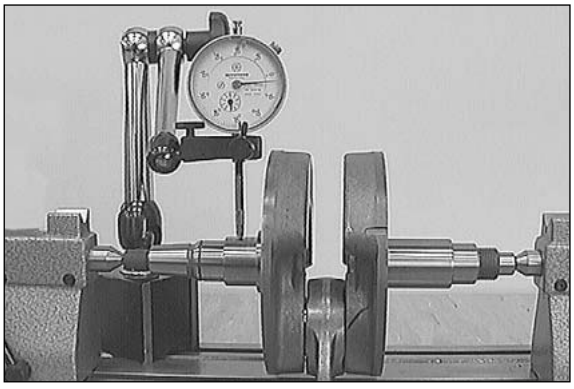


Crankshaft

If replacing the conrod bearing, make sure the crank pin is in the right position. The holes in the crankshaft web ❶ must align with the holes in the crank pin ❷.

! CAUTION !

IF YOU PRESS IN THE CRANK PIN IN THE WRONG POSITION, THE CONROD BEARING WILL NOT BE SUPPLIED WITH ENGINE OIL, WHICH WILL RESULT IN DAMAGE TO THE BEARINGS.

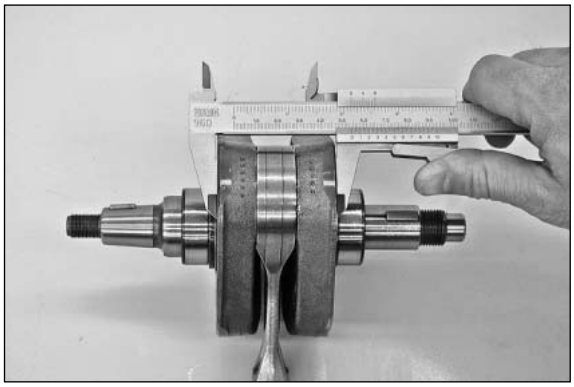


If you will continue to use the crankshaft, check the crankshaft journal for runout. Place the crankshaft on a roller stand or similar support and use a dial gauge to check the crankshaft journal for runout.

Crankshaft journal runout: max. 0.15 mm

Check the conrod bearing for radial and axial clearance.

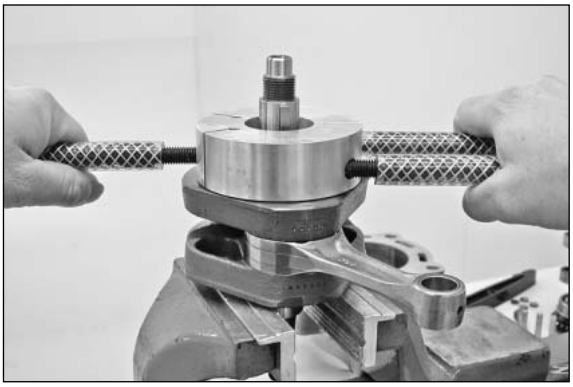
Radial clearance: max. 0.03 mm
Axial clearance: max. 0.8 mm



Measuring the outside dimension of the crankshaft webs

– Measure the outside dimension of the crankshaft webs using a sliding gauge, as illustrated.

Outside dimension of the crankshaft webs = 54 mm ± 0.05 mm



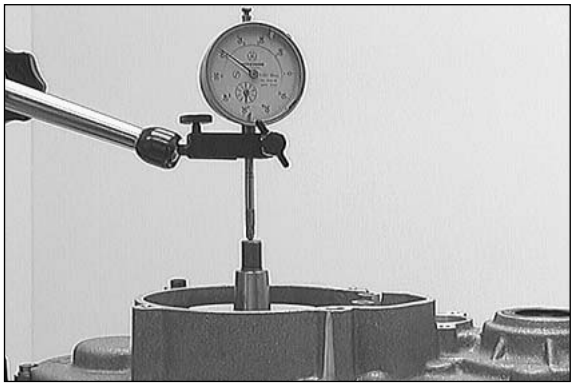
Crankshaft bearings

– Fix the crankshaft in the vise with protective jaws.
– Heat the special tool 584.29.037.037 on a hotplate to approx. 150° C and immediately slip onto the inner ring. Firmly press the special tool together to obtain a good heat transfer and pull the inner ring off the crankshaft.

– To mount the new inner ring, heat the special tool to approx. 150° C again, clamp around a new inner ring and immediately slip onto the crankshaft journal.
– Make sure the new inner ring fits flush.
– After replacing the inner ring, measure the axial clearance of the crankshaft.

! CAUTION !

NEVER CLAMP THE CRANKSHAFT INTO A VISE WITH THE CRANKSHAFT JOURNAL AND TRY TO STRIKE THE INNER BEARING RING. THE CRANKSHAFT WEB WILL BE PRESSED TOGETHER AND RENDER THE CRANKSHAFT USELESS.



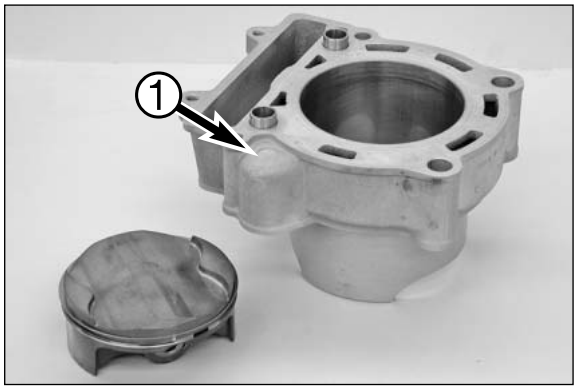
Axial clearance of the crankshaft

– Insert the crankshaft in the right casing half and mount the left casing half.
– Mount the casing screws around the crankcase and tighten.
– Mount the dial gauge support on the engine case and measure the axial clearance of the crankshaft.

Axial clearance: 0.25 - 0.35 mm

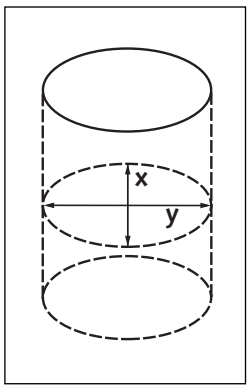
– Correct the axial clearance if the measured value does not correspond to the setpoint value.
– To correct, remove the crankshaft and pull the inner ring off the crankshaft on the ignition side using the special tool. Add or remove compensating disks.

NOTE: Add compensating disks if the axial clearance is too large. Remove compensating disks if the axial clearance is too small. Only add compensating disks on the ignition side.



Nikasil cylinder coating

Nikasil is the brand name for a cylinder coating process developed by the Mahle piston company. The name is derived from the two materials used in the process - one layer of nickel in which the exceptionally hard silicon carbite is embedded. The major advantages of the Nikasil coating include its outstanding heat dissipation and the improved power output, the insignificant wear and low weight of the cylinder. It is inexpensive to repair (replace) a worn coating if the cylinder barrel is not damaged.

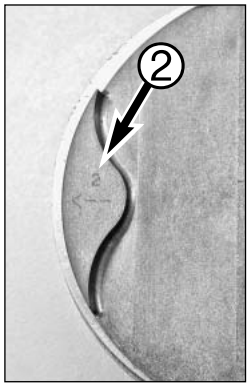


Measuring the piston and cylinder, establishing the mounting clearance of the piston

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

Cylinder diameter	Size I: 76.000 - 76.012 mm Size II: 76.013 - 76.025 mm

NOTE: mark the cylinder size ❶ on the side of the cylinder, the piston size ❷ on the piston head.



– The piston is measured at the piston skirt across the piston pin, as illustrated.

Piston diameter	Size I: 75.960 - 75.970 mm Size II: 75.971 - 74.980 mm

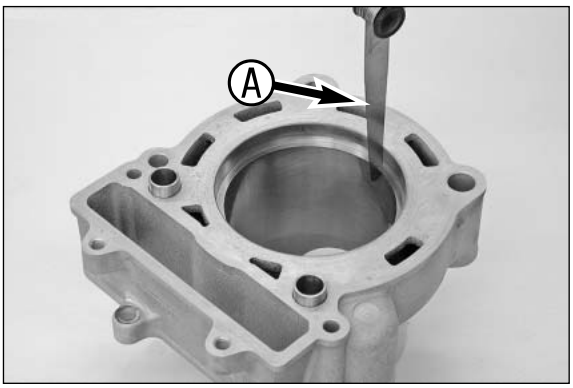
– The piston mounting clearance is the difference between the smallest cylinder diameter and the piston diameter.

Piston mounting clearance	Size I: 0.030 - 0.052 mm Size II: 0.032 - 0.055 mm Wear limit: 0.070 mm

Piston

– Replace the piston if oil consumption is high or the piston skirt is excessively grooved.
– If the piston is to be remounted:

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. Replace piston pins that are badly discolored or have visible running marks. Place the piston pin in the conrod and check for clearance.

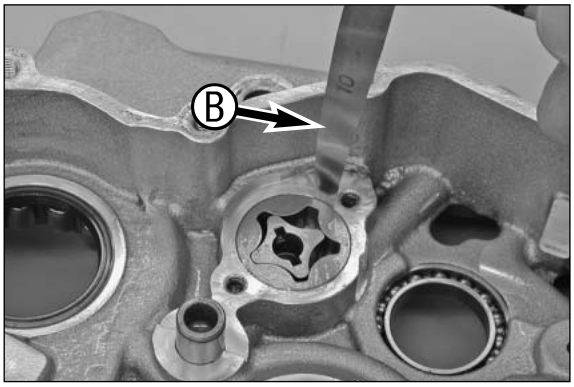


Piston ring end gap

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

Compression ring : max. 0.80 mm
Oil scraper ring : max. 1.00 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.

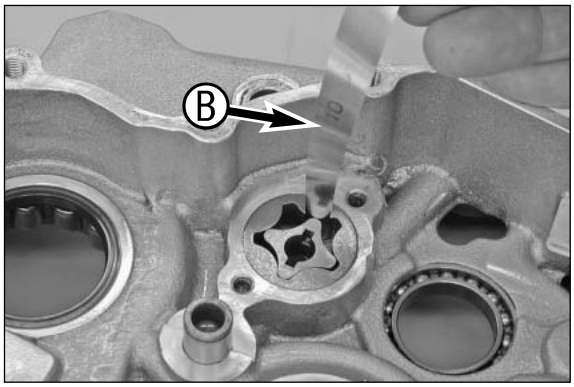


Checking the oil pumps for wear

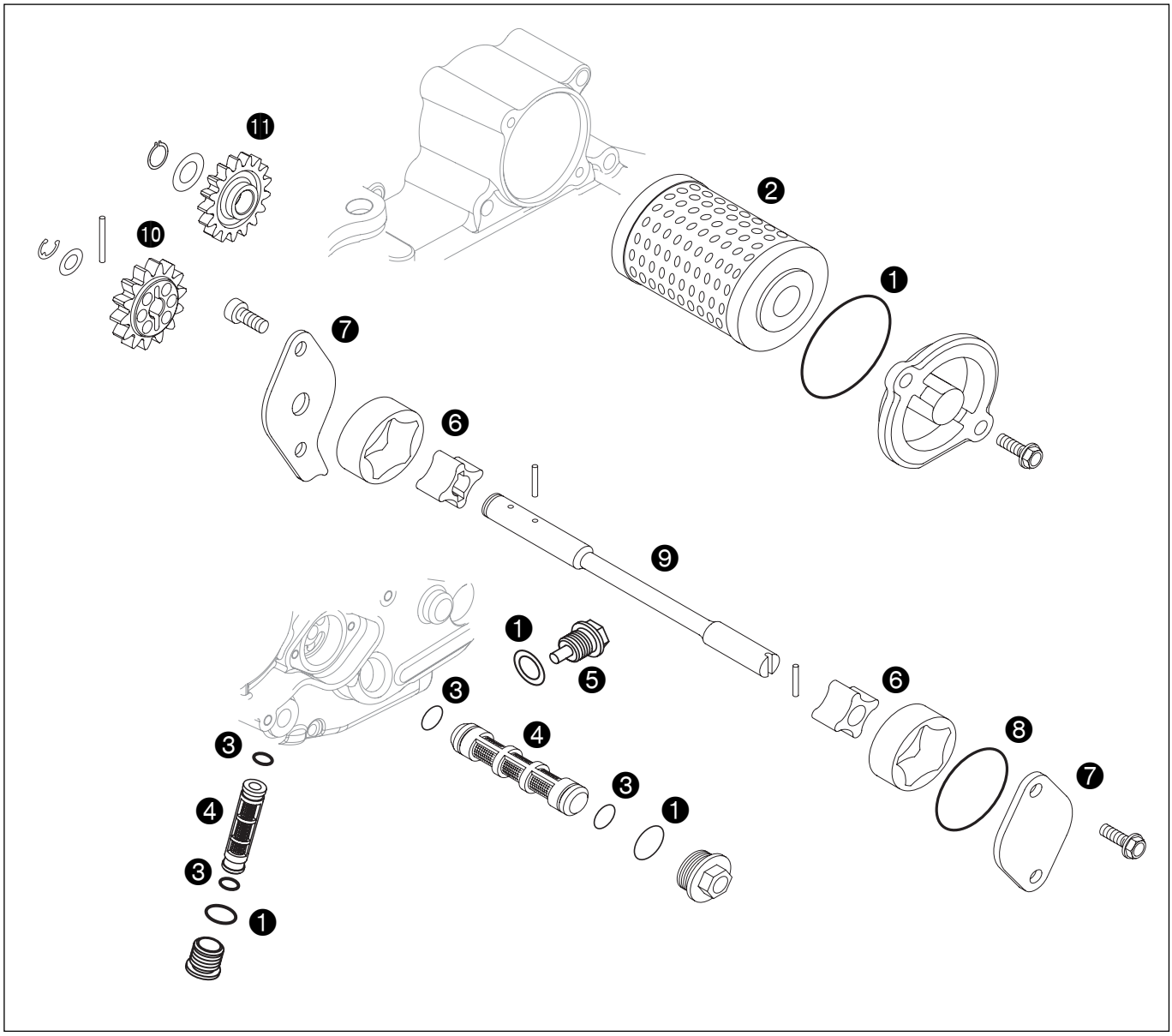
– Insert the inner and outer rotors in the engine case with the marks facing the case. The marks should no longer be visible when mounted.

– Use a feeler gauge ❷ to measure the wear:

Outer rotor - oil pump housing: max. 0.20 mm



Outer rotor - inner rotor: max. 0.20 mm



Lubricating system

– Replace the O-rings and sealing washer ❶ each time you change the oil filter.

– Replace the oil filter ❷ each time you change the oil.

– Check whether the O-rings ❸ are brittle and replace if necessary; always replace the O-rings when you repair the engine.

– Clean the oil screens ❹ with compressed air and petroleum; replace if damaged.

– Thoroughly clean the magnet on the oil drain plug ❺ each time you change the oil filter.

– Check the oil pump rotors ❻ (see pages 5-8). Thoroughly clean the oil pump rotors before remounting.

– Check the inside of the oil pump covers ❼ for seizing marks and replace if necessary; replace the O-ring ❽.

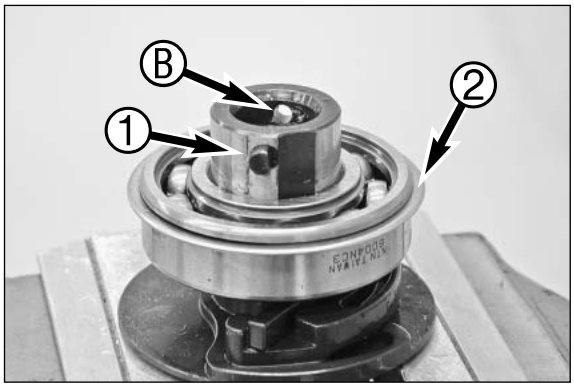
– Place the oil pump shaft ❾ on an even surface and check for eccentricity.

– Check whether the toothing on the oil pump wheel ❿ and oil pump idler ⓫ is worn. The recess for the needle roller should not be worn.

Camshaft bearing

– Clamp the camshaft in a vise with protective aluminum jaws. Position one of the cams so that the camshaft cannot be turned.
– Loosen the camshaft gear (A/F 21) and remove the screw.

– Pull off the camshaft gear using the extractor 590.29.033.000 and pressure tool 770.29.035.000.



– Knock out the positioning pin ❶.

NOTE: There is a hole ❽ in the camshaft across from the positioning pin. The positioning pin can be knocked out through this hole with a suitable driver.

– Pull off the camshaft bearing using the extractor 590.29.033.000 and pressure tool 770.29.035.000.

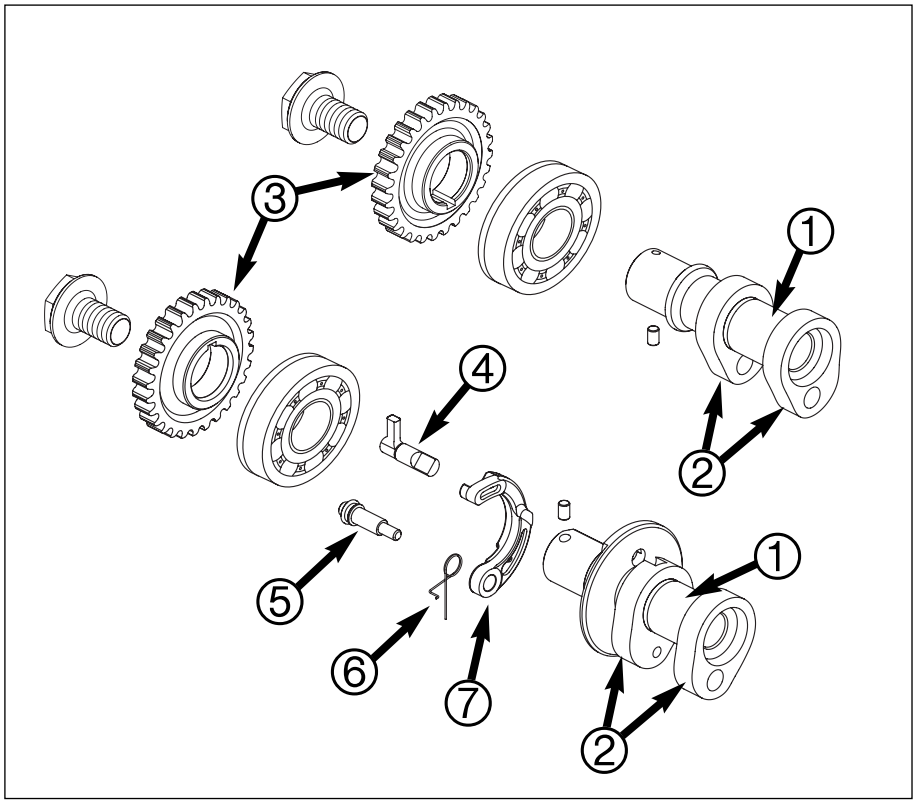
– Slide on a new camshaft bearing; if necessary, knock on the inner ring with a suitable pipe.

NOTE: the positioning ring ❷ for the camshaft bearing must face up, as shown in the photo. If the camshaft bearing is mounted upside down, the camshaft will not fit in the cylinder head.

– Knock in the positioning pin.

– Slide on the camshaft gear, apply Loctite 243 to the screw and tighten to 80 Nm.

NOTE: use the same procedure for both camshafts.

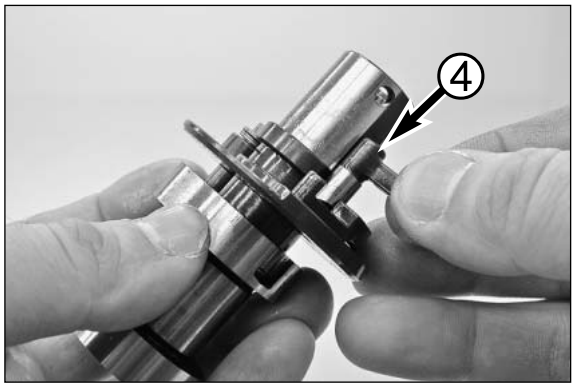


Camshafts

– Check pivot points ❶ and cams ❷ for wear and damage.

– Check the toothing of the camshaft gears ❸ for wear and damage.

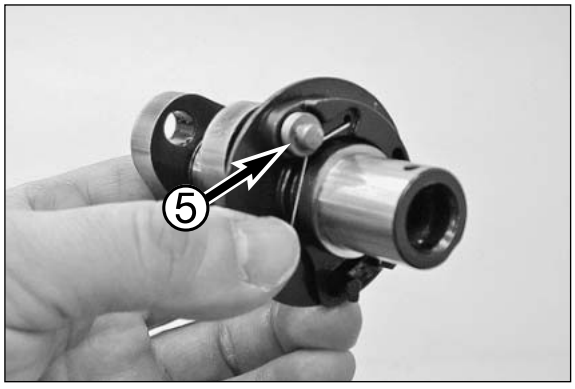
– Replace the camshaft bearings (see pages 5-10).



Automatic decompression

– Remove the camshaft gear and camshaft bearing (see pages 5-10).

– Pull out the automatic decompression shaft ❹.



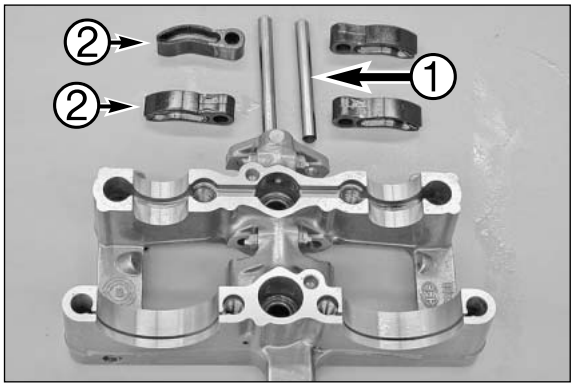
– Use a driver to knock out the bearing bolts ❺ through the hole in the cam.

– Remove the automatic decompression spring ❻ and automatic decompression weight ❼.

– Check all parts for damage and wear.

– Assemble in the reverse order.

– Perform a function test. The spring should turn the automatic decompression shaft back to the stop, if not, increase the preload or replace.



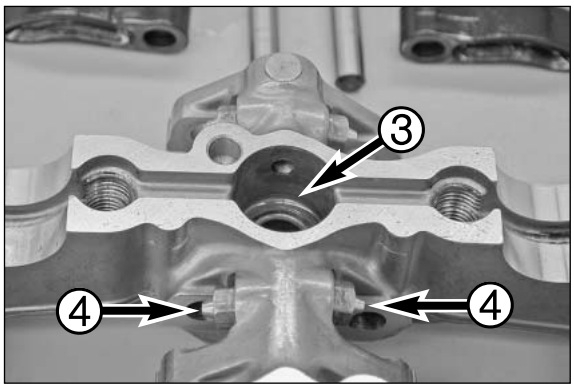
Camshaft bearing bridges

– Check both camshaft bearing bridges for wear, seizing marks and damage.

– Pull out the cam lever shafts ❶; they are inserted loosely, and can easily be removed by tapping gently on the camshaft bearing bridge.

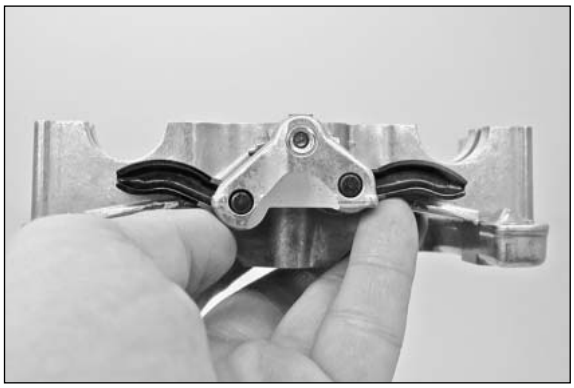
NOTE: if remounting the cam lever, write down the installation position.

– Check the cam lever shafts and cam lever ❷ for wear, seizing marks and damage.



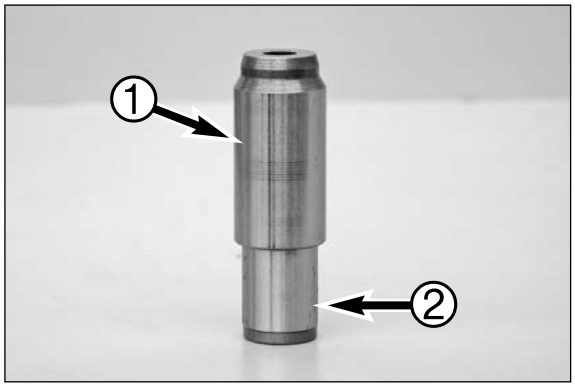
– Blow into the oil bore ❸ with compressed air or a cleansing spray to make sure the oil jets ❹ are not clogged.

– If the oil jets ("50") were removed, apply Loctite 243 and tighten to 3 Nm.



– Install the cam lever according to the original installation position and slide into the cam lever shafts.

NOTE: the cam levers must be arched up towards the camshaft (see photo). The cam levers will break if they are mounted upside down.

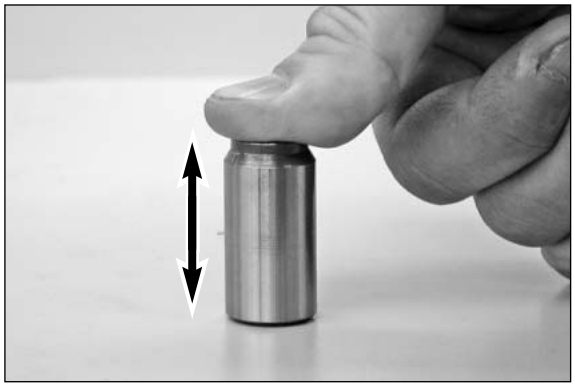


Timing chain tensioner

! CAUTION !

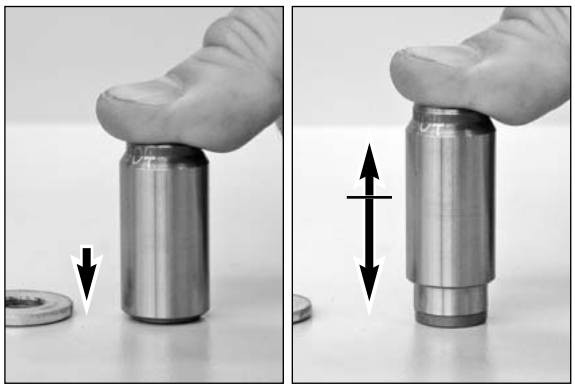
IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, THE TIMING CHAIN WILL NOT BE TENSIONED CORRECTLY AND WILL SKIP, RESULTING IN ENGINE DAMAGE.

NOTE:
- The timing chain tensioner ❶ operates with spring force and with oil pressure. A stop system is used to ensure the right timing chain tension in the engine starting phase, even if the oil pressure is insufficient. The stop system prevents the piston ❷ on the timing chain tensioner from being retracted.
- In a dismounted state, the piston on the timing chain tensioner extends completely.

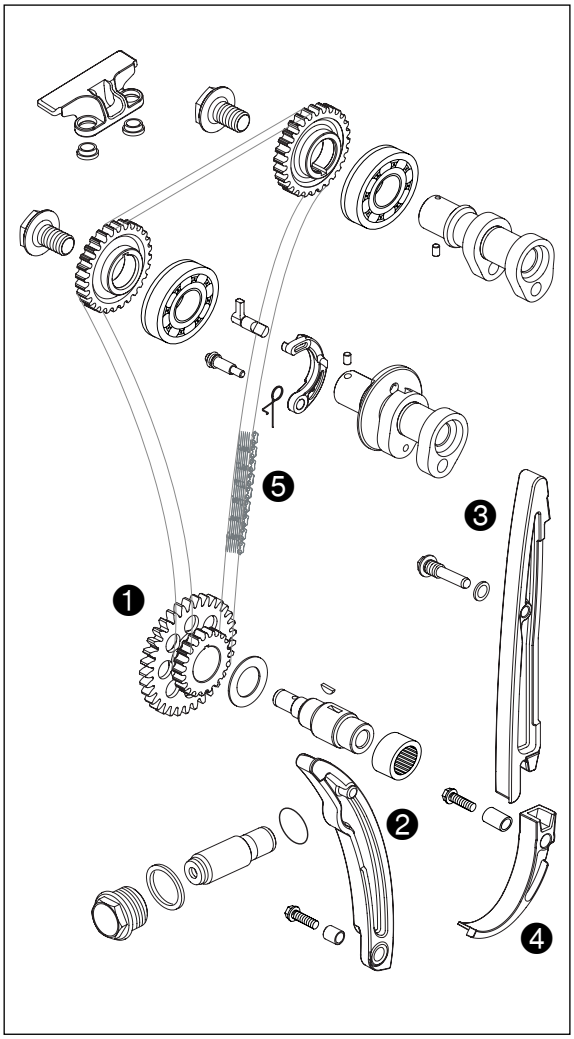


- Fully depress the spring tensioner. This will require some effort since the oil must be squeezed out. If the timing chain tensioner is released it will extend completely again; it may not be mounted in this state, since the locking mechanism will not function.
- Press down on the timing chain tensioner to ensure smooth operation.

- **To prepare the timing chain tensioner for installation, place 2 spacing washers or similar implements with a thickness of 2 - 2.5 mm next to the piston of the timing chain tensioner. This will ensure that the piston cannot be completely retracted when the piston is pressed down. If you release the piston, the stop system will lock, the piston will protrude approx. 3 mm and stay in this position - <u>this position is required for refitting!</u>**



- If you press the timing chain tensioner again and it extends no more than half way (preventing it from extending completely), the stop system will lock and the timing chain tensioner can no longer be pressed together - this position is necessary to ensure that the timing chain is adequately tensioned, even if the oil pressure is low.



Timing train

Thoroughly clean all parts and check for wear.

– Check the toothing of the control idler ❶ for breakout and wear.

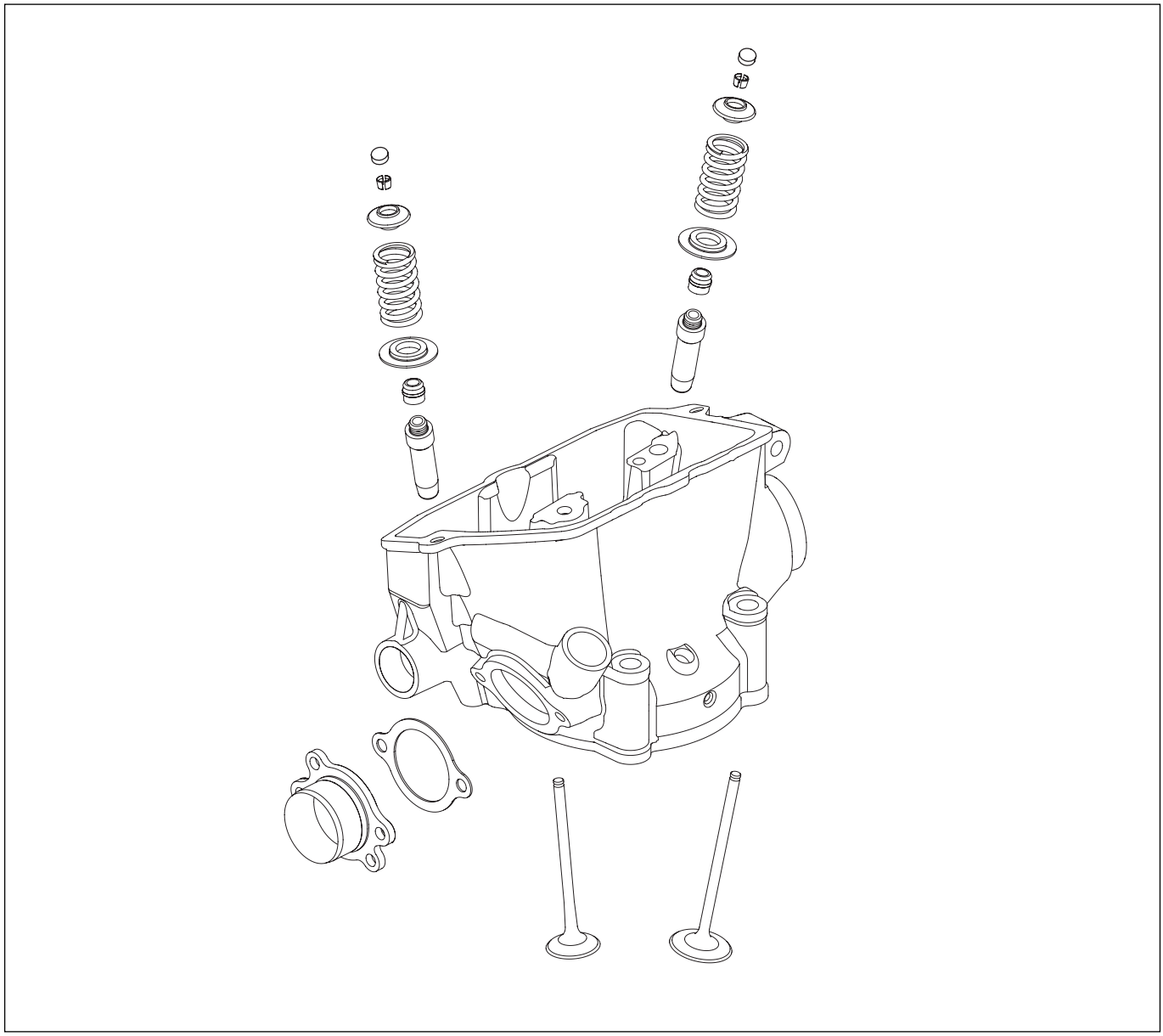
– Check the timing chain tensioning rail ❷ for seizing marks and damage.

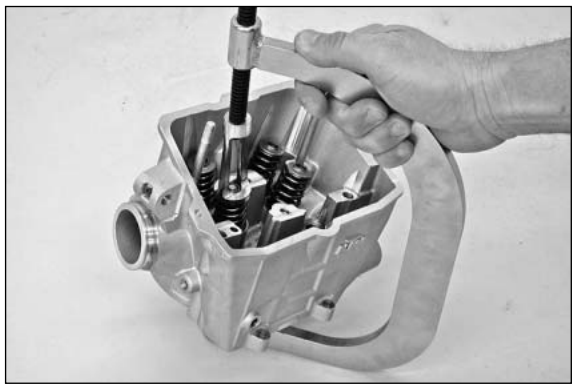
– Check the timing chain guide ❸ for seizing marks and damage.

– Check the timing chain clip ❹ for seizing marks and damage.

– Check the timing chain ❺ for damage and wear; make sure the chain links operate smoothly.

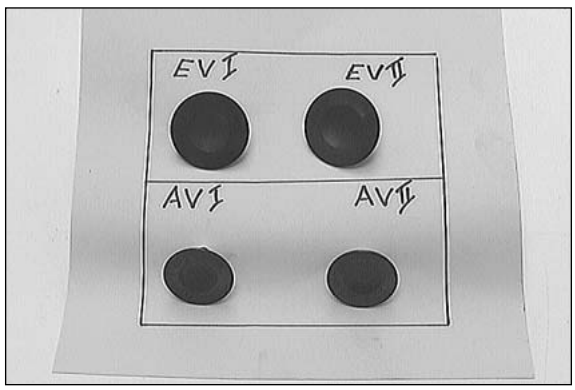
NOTE: The smooth operation of the chain links can easily be checked by simply letting the timing chain hang down - the chain links should align in a row. Replace the timing chain if the chain links do not align in a row - they are no longer free-moving.





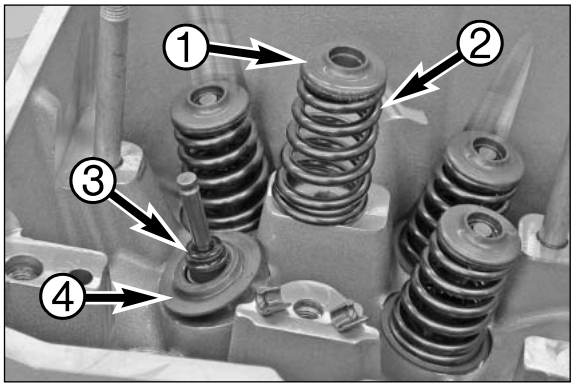
Cylinder head

– Loosen the screws and remove the exhaust flange together with the gasket.



– Remove the shims from the valve spring retainers (if still mounted).
– Dismount the valve keys using the special tools 590.29.019.000 and 770.29.041.000 and relieve the valve springs.

NOTE: Used valves must be remounted in the same valve guide as before. We suggest that you place the valves in a carton in the position they were previously mounted in the cylinder head (see illustration).

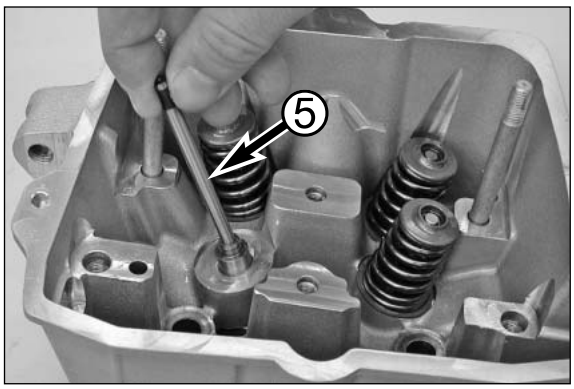


– Remove the valve spring retainer ❶ and valve springs ❷ from the cylinder head.
– Pull the valve stem sealing ❸ off the valve guides and take out the spring washers ❹.

– Check the sealing areas of the spark plug thread and the valve seats for damage and cracks. Use a ruler and a feeler gauge to check the distortion of the sealing area to the cylinder. Distortion max. 0.10 mm.

– Check the valve guides using the limit plug gauge 770.29.026.000 ❺ (Ø 5.05 mm). If you can easily slide the limit plug gauge into the valve guide, it must be renewed and reamed in a special workshop.

– Valve seats may not be impacted. Sealing seat width: Inlet max. 1.50 mm; outlet max. 1.50 mm. Grind the valves if necessary.



– Check the valve disks for wear and runout. Runout at the valve disk max. 0.05 mm. The valve seat should not be impacted. The sealing area should be in the center of the valve seat. The valve stem is hard-plated, wear usually appears at the valve guide.

– Check the valve springs for ruptures or wear (visual check), measure the length with a sliding gauge. Minimum length 38.5 mm. Replace the spring if it is shorter.

– Always replace the valve stem seal if dismounting the valves.

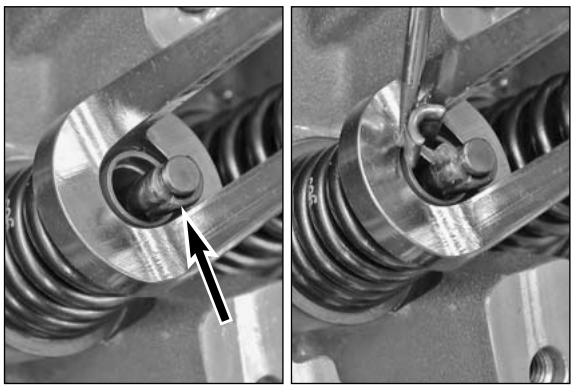
– Measure the thickness of the valve spring retainers, minimum thickness 0.9 mm.

– Insert the valve spring retainers in the cylinder head.

– Mount the valve stem seals on the valve guides and oil.

– Thoroughly oil the valve stem and insert in the valve guides.

NOTE: Make sure the valves are in the correct position when mounted.



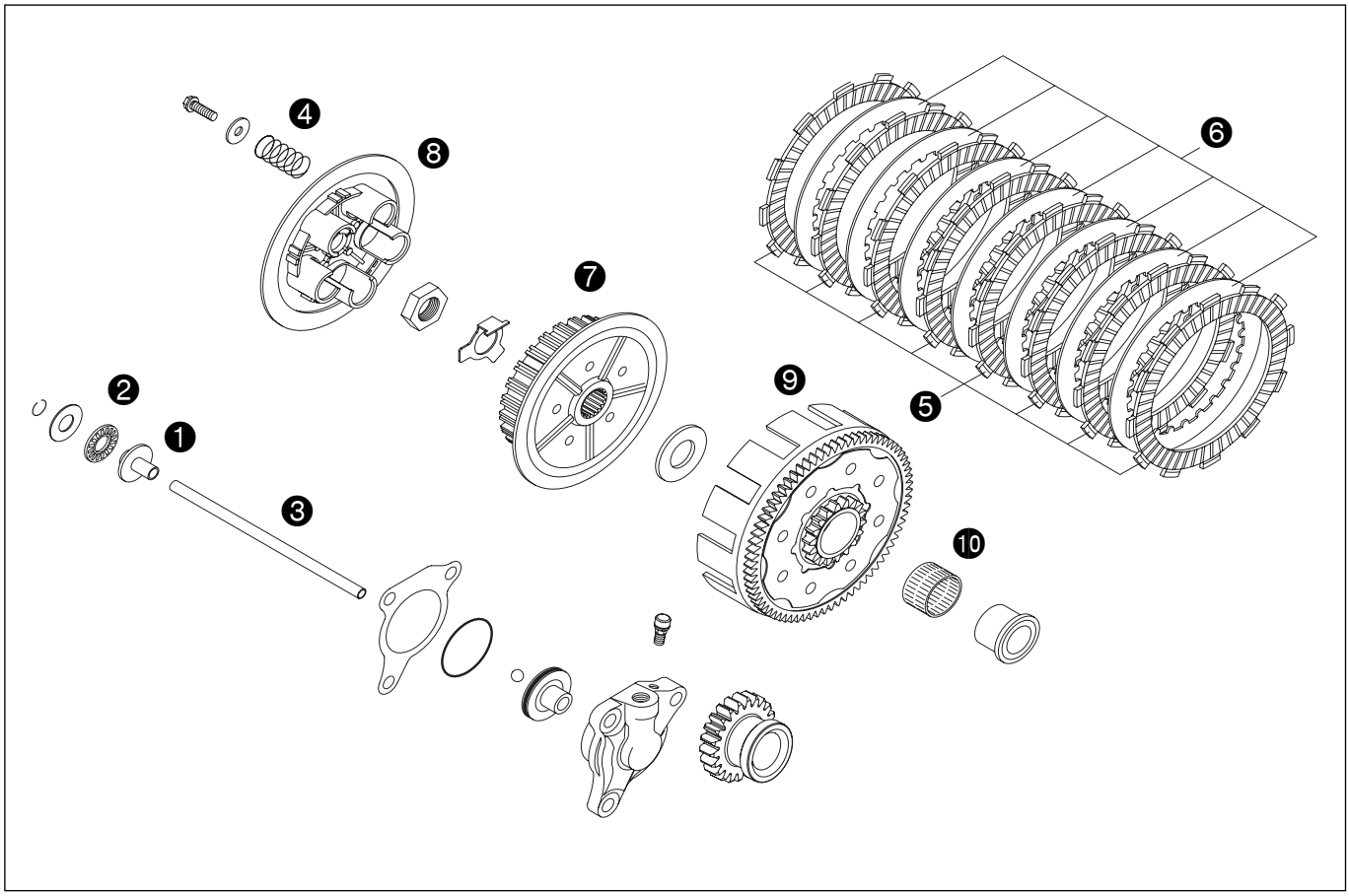
– Position the valve springs, insert the valve spring retainers in the valve springs.

NOTE: mount the valve springs with the end with the larger diameter on the bottom.

– Pretension the valve springs with the special tool and mount the valve keys.

NOTE: make sure the valve keys fit correctly, use a little grease to attach them to the valve.

– Finally, tap on the valve spring retainer several times with a plastic hammer.



Clutch

– Check the pressure piece ❶ for seizing marks and smooth operation.

– Check the axial bearing ❷ for damage.

– Lay the pushrod ❸ on an even surface and check for runout.

– Check the length of the clutch springs ❹; minimum length 37.0 mm (new 38.0 mm), replace all 5 springs if necessary.

– Check the thickness of the lining disks (8 pieces) ❺; minimum thickness 2.9 mm. The lining disks must be flat.

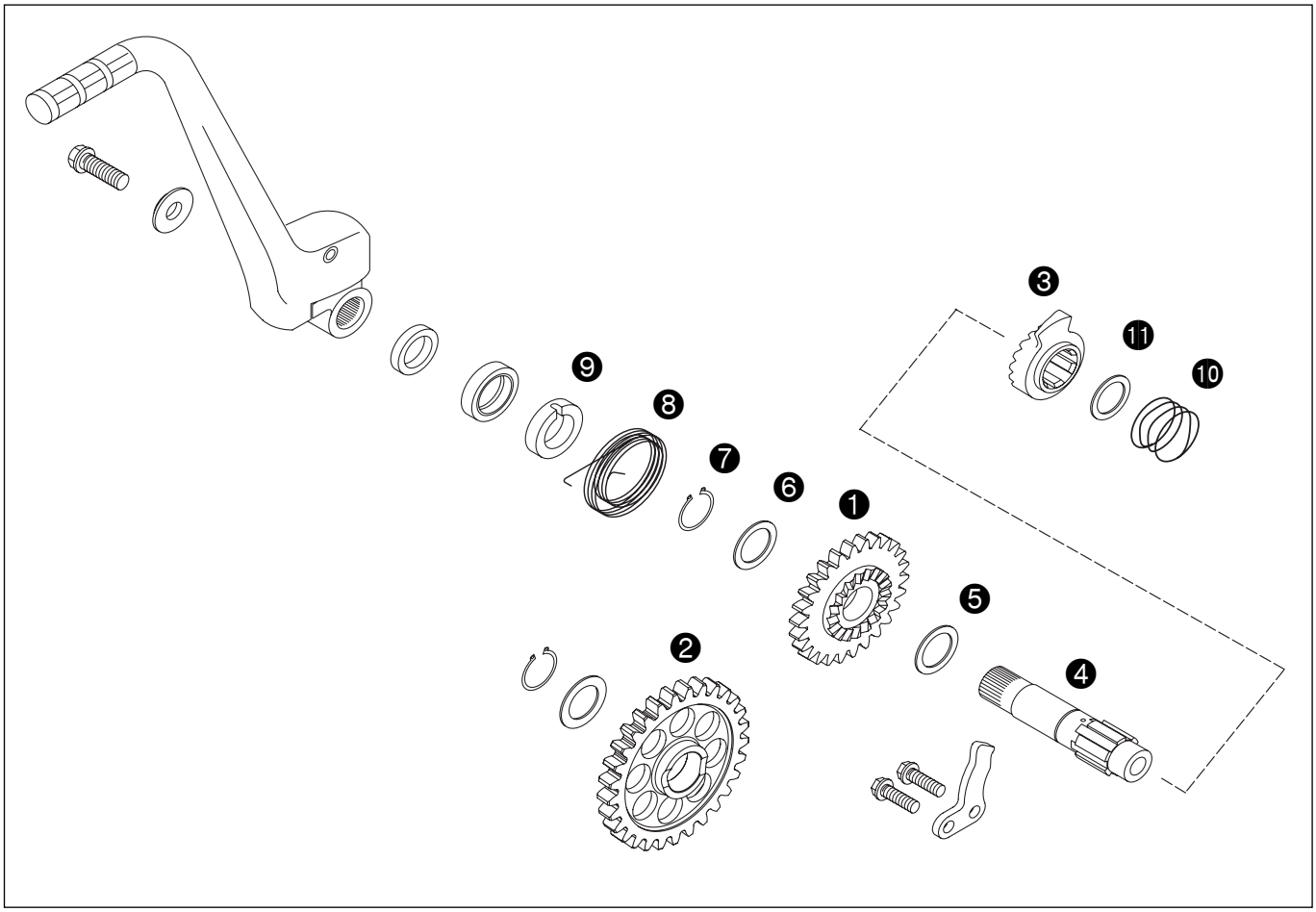
– Clutch disks (7 pieces) ❻; must be flat; check for mechanical damage. Replace the clutch disks if they have score-shaped breakout.

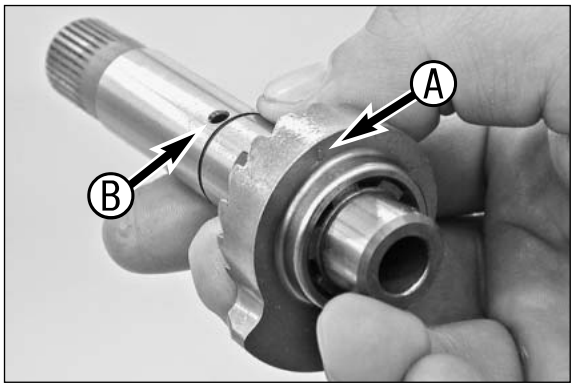
– Check the driver ❼ for seizing marks and damage.

– Check the pressure cap mounting face ❽ for damage.

– Check the thrust face ❾ of the outer clutch hub and the lining disks for wear. If the depressions are larger than 0.5 mm, replace the lining disks and the outer clutch hub.

– Check the needle bearing ❿ for seizing marks and damage.





Kickstarter

– Remove all parts from the kickstarter shaft and clean.

– Check the toothing on the kickstarter pinion ❶ for wear and the clearance of the mounting.

– Check the toothing of the kickstarter idler ❷ for wear and the clearance of the mounting.

– Check the ratchet surface and toothing of the kickstarter ratchet gear ❸ for wear.

– Check the pivot points and toothing of the kickstarter shaft ❹ for wear and damage. Make sure the oil bore for the kickstarter pinion is not clogged.

Pre-mounting the kickstarter shaft

– Clamp the kickstarter shaft in a vise with the toothed end facing up (use protective jaws).

– Mount the stop disk ❺ and kickstarter pinion with the lock toothing facing down.

– Mount the stop disk ❻ and circlip ❼ with the sharp edge facing up.

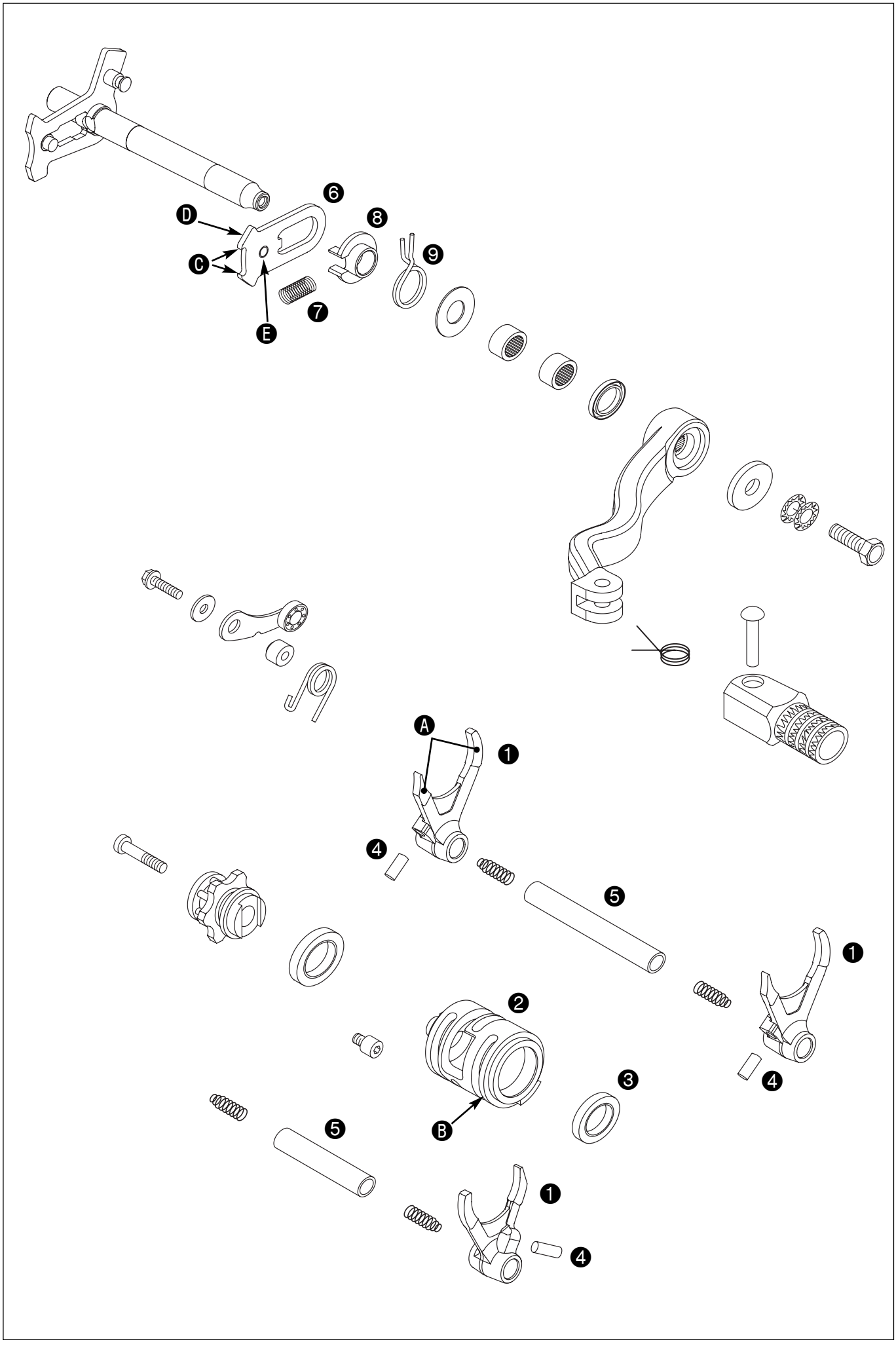
– Mount the kickstarter spring ❽, inserting the inner end in the hole in the kickstarter shaft.

– Mount the driving hub ❾, pushing the recess over the end of kickstarter spring.

– Unclamp the kickstarter shaft.

– Slide the kickstarter ratchet gear on the kickstarter shaft so that mark Ⓐ on the ratchet gear coincides with the hole Ⓑ for the spring in the kickstarter shaft.

– Mount the ratchet gear spring ❿ and stop disk ⓫ on the kickstarter shaft.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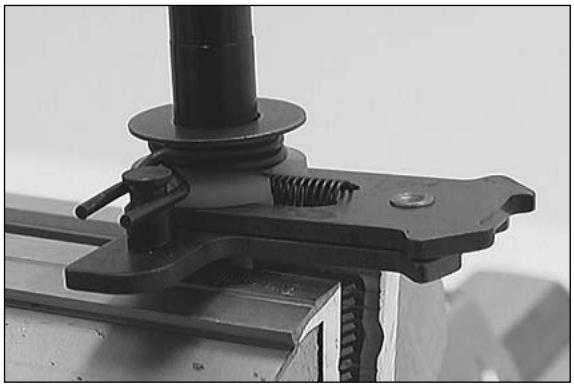
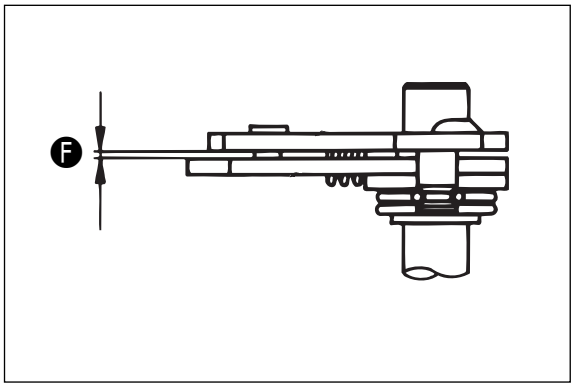




Shift mechanism

– Check the shift forks ❶ on the leaf Ⓐ for wear. The forks have a thickness of 4.8 to 4.9 mm when new, the wear limit is 4.6 mm.

– Check the shift grooves Ⓑ on the shift drum ❷ for wear.
– Check the fit of the shift drum in the grooved ball bearing ❸.

– Check the grooved ball bearing ❸ for smooth operation.

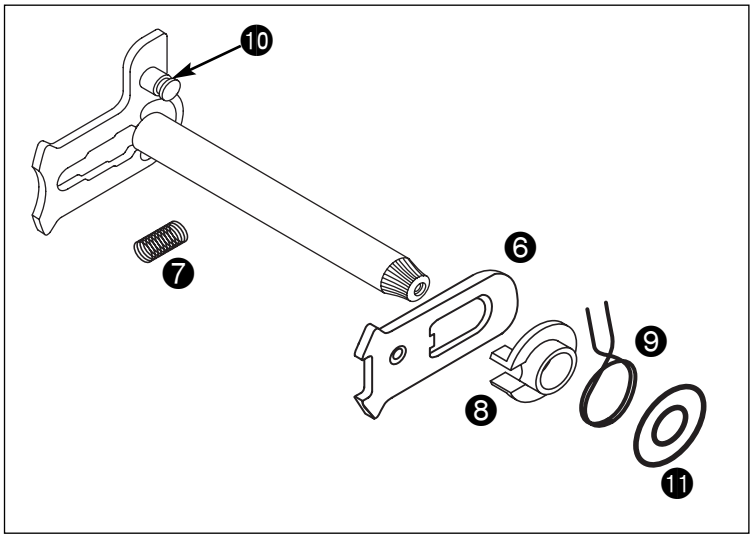
– Check the shaft rollers ❹ for pressure points and cracks.

– Check the shift rails ❺ for runout on an even surface. Check the shift rails for score marks and seizing marks. The shift forks must operate smoothly on the shift rails.

– Check the shift rail ❻ at the contact areas Ⓒ for wear. Check the return surface Ⓓ on the shift rail for wear (replace in case of severe indentation).

– Check the guide bolt Ⓔ for a tight fit and wear.

– Pre-mount the shift shaft and check the clearance Ⓕ between the shift rail ❻ and the shift quadrant. The clearance must lie between 0.40 - 0.80 mm.



Pre-mounting the shift shaft

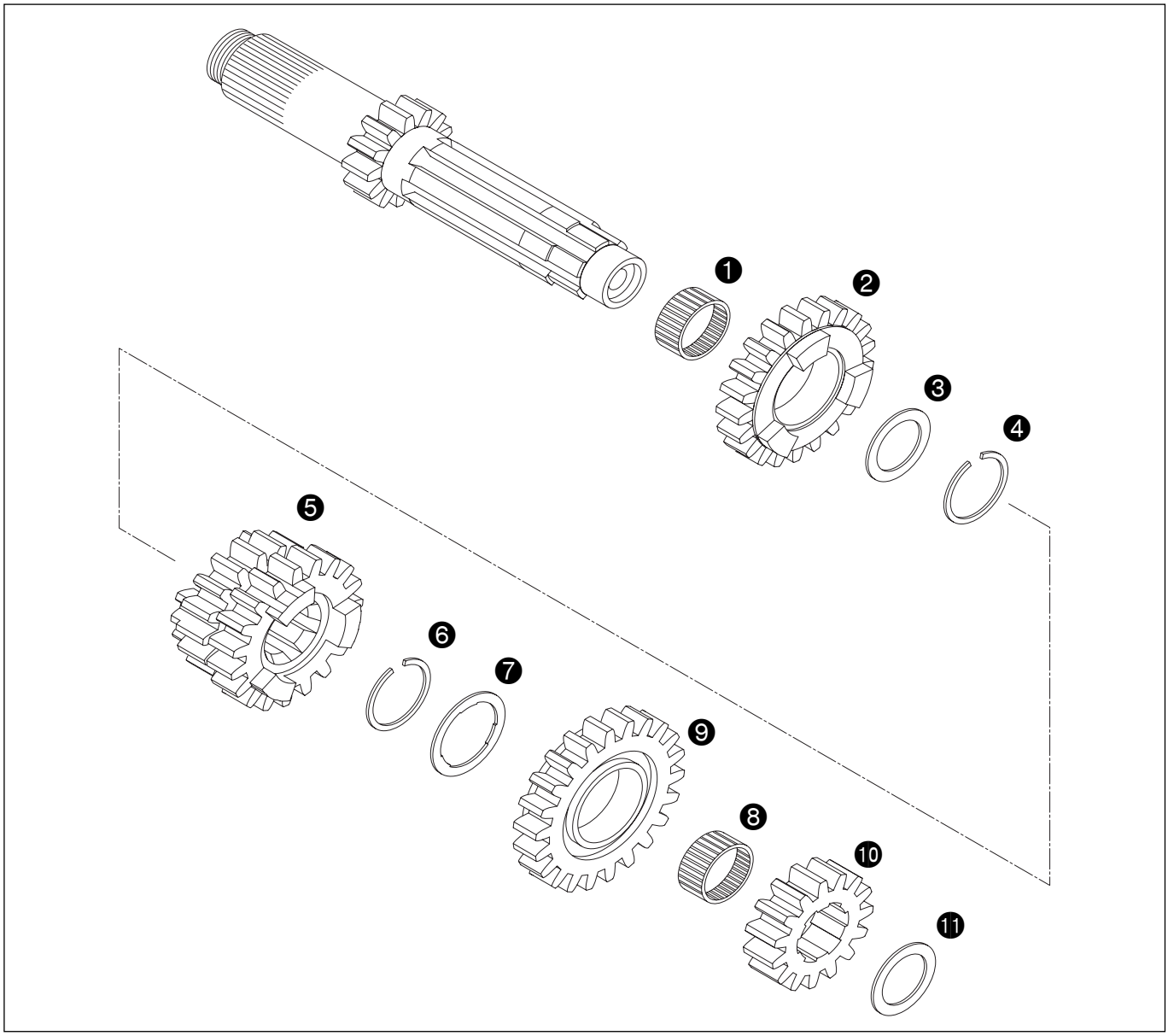
– Clamp the short end of the shift shaft in a vise (use protective jaws).

– Mount the shift rail ❻ with the guide bolt facing down and attach the guide bolt to the shift quadrant.

– Mount the pressure spring ❼.

– Slide on the spring guide ❽, slide the return spring ❾ over the spring guide with the angled end up and lift the angled end over the dolly bolt ❿ (see illustration).

– Mount the stop disk ⓫.



General information on servicing the transmission

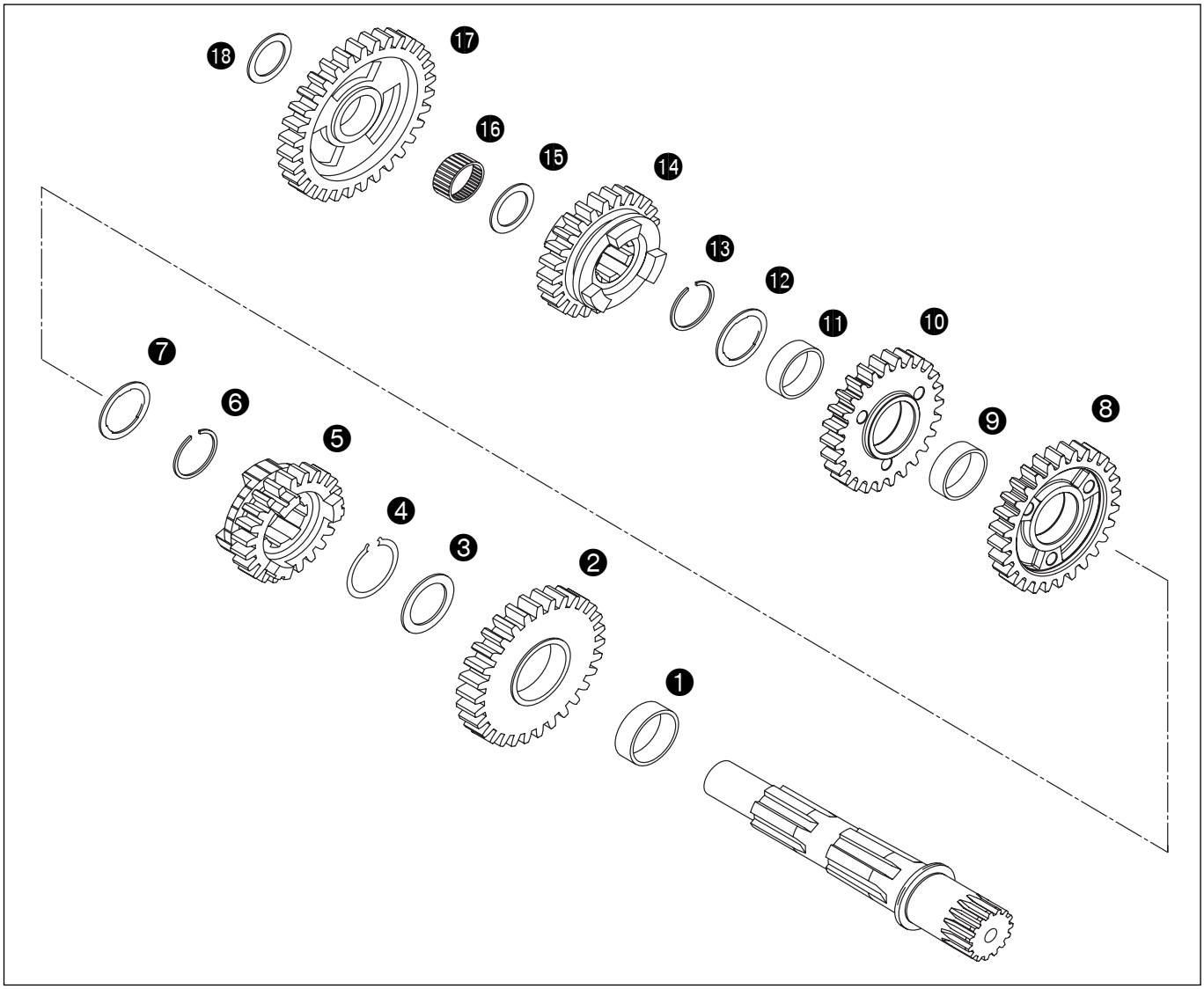
Clamp the main shaft or countershaft in a vise (use protective jaws). Remove the gear wheels and check the following parts for wear and seizing marks:

- Bearings
- Pivot points on the main shaft and countershaft and pivot points on the idler gears
- Shift dogs
- Tooth faces on all gear wheels
- Tooth profiles on the main shaft and countershaft as well as the corresponding gear wheels
- Profiles of all sliding gears for smooth operation

Carefully clean all parts, replace any damaged and ❹+❻ parts.
Mount new circlips whenever you repair the transmission.

Assembling the main shaft

- Clamp the main shaft in the vise with the toothed end facing down (use protective jaws).
- Carefully oil all parts before mounting.
- Mount the split needle bearing ❶, mount the 5-speed idler gear ❷ with the shift dogs facing up.
- Mount the stop disk ❸ (22x28,5x1mm) and circlip ❹ with the sharp edge facing up.
- Slip on the 3rd/4th gear sliding gear ❺ with the small gear wheel on the bottom and mount the circlip ❻.
- Slip on the stop disk ❼ and the split needle bearing ❽.
- Slip on the 6th gear sliding gear ❾ with the recess facing up.
- Slip on the 2nd gear fixed gear ❿ with the collar facing down and mount the stop disk ⓫ (17.2x24x1mm).
- Finally, check all of the gear wheels for smooth operation.



Art.-No. 3.206.052-E

General information on servicing the transmission

Clamp the main shaft or countershaft in the vise (use protective jaws).
Remove the gears and check the following parts for wear and seizing marks:

- Bearings
- Pivot points on the main and countershaft and pivot points on idler gears
- Shift dogs
- Tooth faces on all gear wheels
- Tooth profiles on the main shaft and countershaft as well as the corresponding gear wheels
- Profiles of all sliding gears for smooth operation

Carefully clean all parts, replace any damaged and ❻+⓲ parts.
Mount new circlips whenever you repair the transmission.

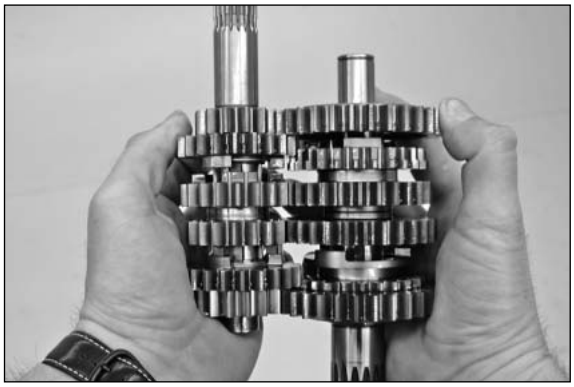
Assembling the countershaft

- Clamp the countershaft in the vise with the toothed end facing down (use protective jaws).
- Carefully oil all parts before mounting.
- Mount the idler gear sleeve(25x28x9.7mm) ❶ and the 2nd gear idler gear ❷ on the countershaft with the recess for the shift dogs facing up.
- Mount the thrust washer ❸ (25x35x1mm) 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 and the stop disk ❼ (25.2x32x1mm).
- Mount the 2 split needle bearings ❾ + ⓫ and the 4th gear idler gear ❽ with the recess for the shift dogs facing down.
- Mount the 3rd gear idler gear ❿ with the recess for the shift dogs facing up.
- Mount the stop disk ⓬ (25.2x32x1mm) and the lock ring ⓭.
- Slip on the 5th gear sliding gear ⓮ with the shift groove facing down and the stop disk ⓯ (20x31.9x1mm).
- Mount the needle bearing ⓰, 1st gear idler gear ⓱ with the recess facing down and the stop disk ⓲ (17.2x30x1mm).

ASSEMBLING THE ENGINE 6

INDEX

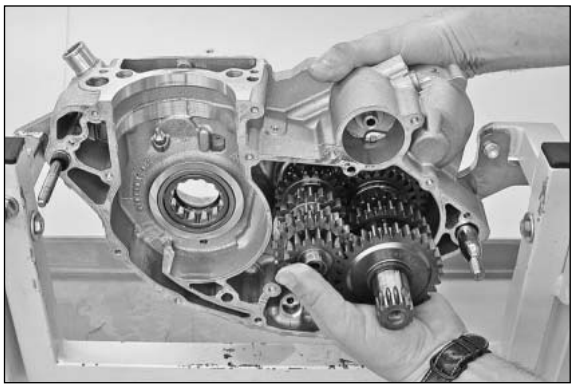
Art.-No. 3.206.052-E

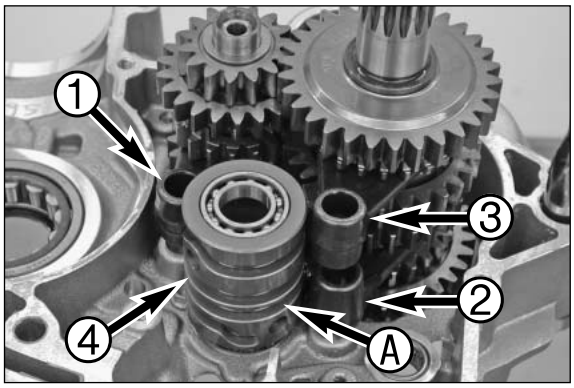


Installing the transmission shafts and crankshaft, assembling the casing halves

– Place the right casing half on the engine work stand in an upright position.
– Put the two transmission shafts together and insert in the casing half with one hand while you guide the transmission shafts into the bearings with the other hand.

NOTE: the countershaft has a stop disk facing the bearing, the main shaft does not.



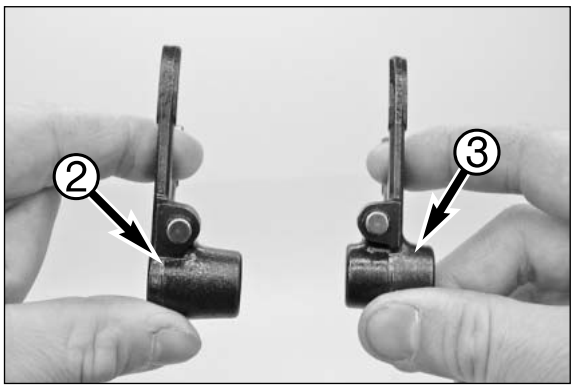


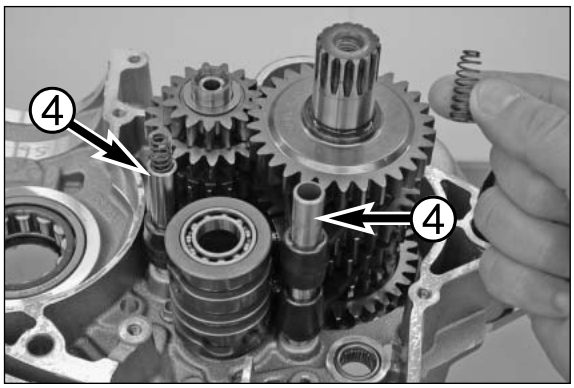
– Lay the engine case down and insert the shift forks.

NOTE:
– The smaller shift fork ❶ is used for the main shaft, the larger forks (❷ and ❸) for the countershaft.
– The "one-sided" shift fork ❷ is inserted on the bottom, the "symmetrical" shift fork ❸ on top.
– The needle rollers on the shift forks must point towards the shift drum.

– Mount the shift drum and allow the needle rollers on the shift forks to engage.

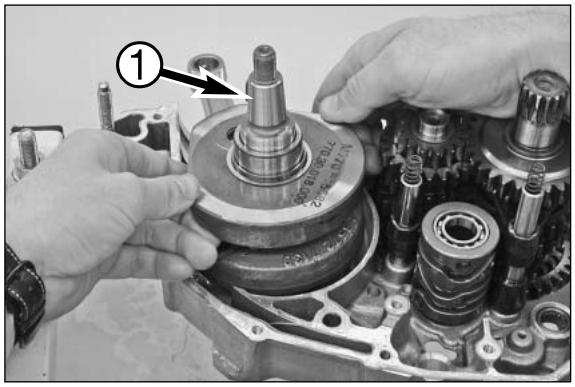
NOTE: the shift drum has a groove Ⓐ without "curves" around its edge; no shift fork can engage in this shift groove.





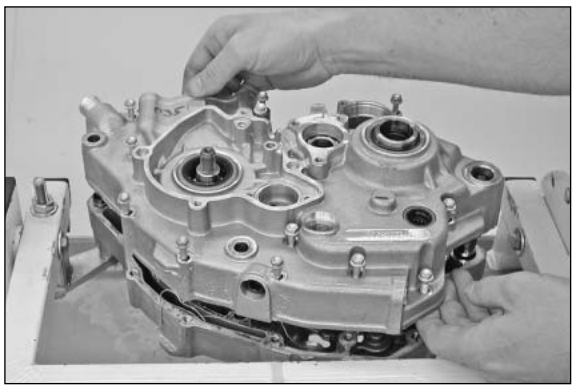
– Attach the lower springs to the shift rails ❹ with grease and mount the shift rails; press down on the shift rails to check for smooth operation.
– Insert the upper springs in the shift rails.

NOTE:
– The conical ends of the springs point towards the outside.
– The shorter shift rail is used for the single shift fork on the main shaft.



– Mount the crankshaft.

NOTE: the cone ❶ for the rotor must face up.



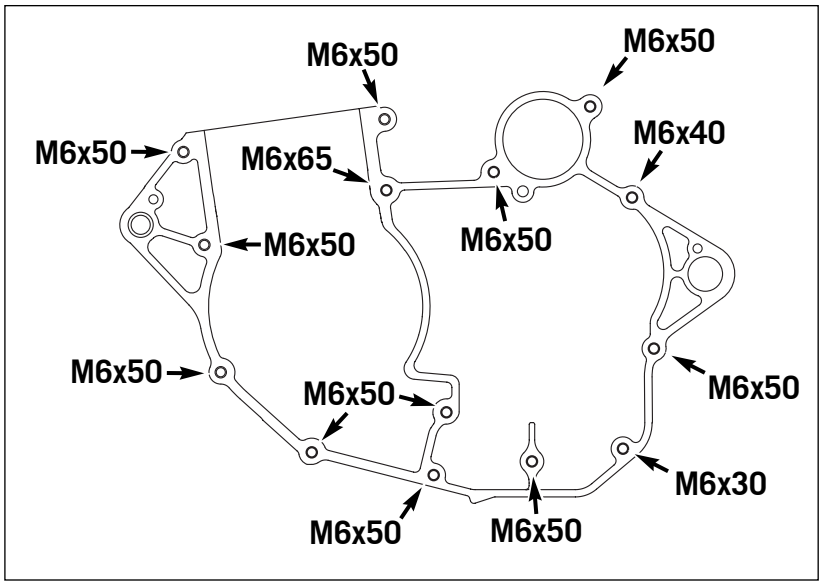
– Degrease the entire sealing area and apply a thin coat of permanently elastic sealing compound (309 098).
– Mount the dowels; do not forget the stop disk for the main shaft.
– Mount the left casing half, gently tapping on the bearings with a plastic hammer if necessary.
– Turn in the screws as illustrated and tighten to 10 Nm.

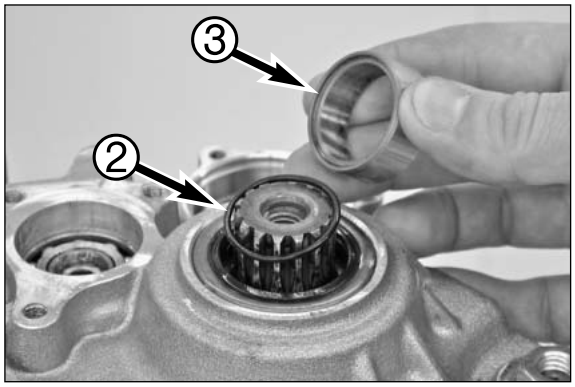
! CAUTION !

DO NOT PULL THE CASING HALVES TOGETHER BY TIGHTENING THE SCREWS.

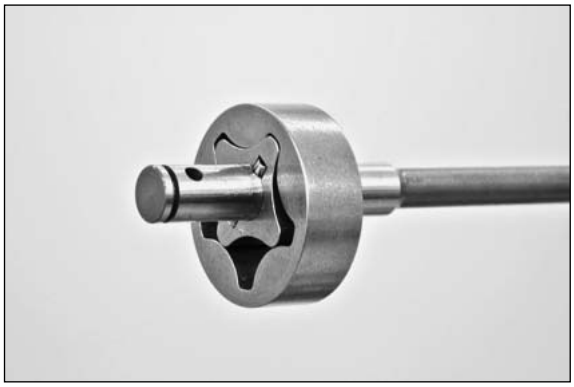
NOTE: use the M6x45 screw to fasten the hose retaining clip *up to model 2007).

– Unscrew the nuts on the engine work stand holder again.



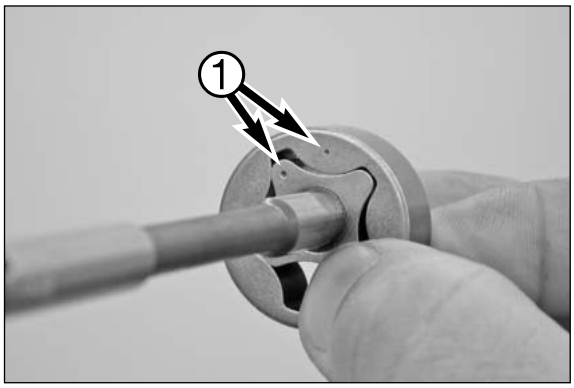


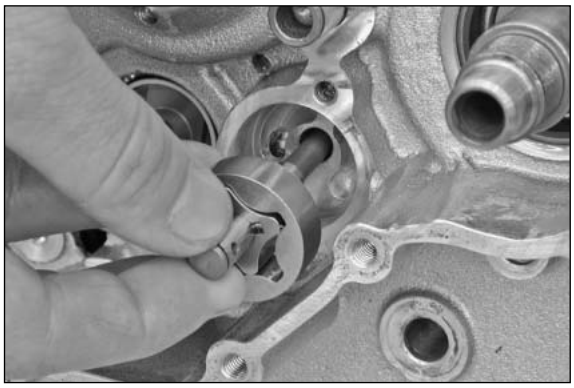
– Grease a new O-ring ❷ for the countershaft and insert in the collar ❸ of the bushing; mount the bushing with the collar facing down.



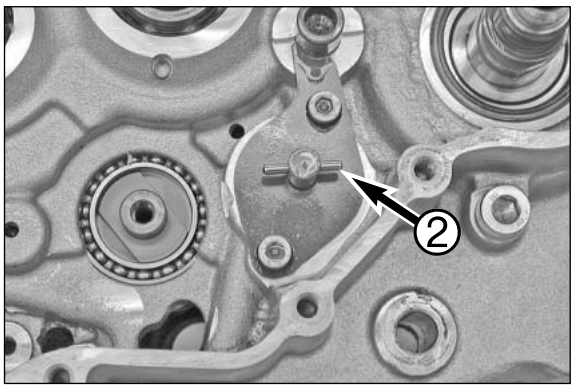
Mounting the oil pumps

– Mount the oil pump shaft with the pressure pump rotors and the needle roller as illustrated. The marks ❶ on both rotors must be opposite the needle roller.

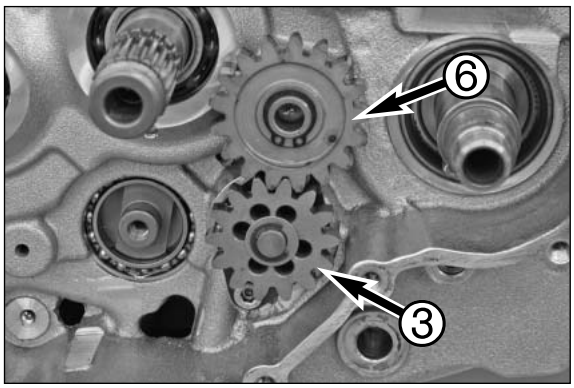


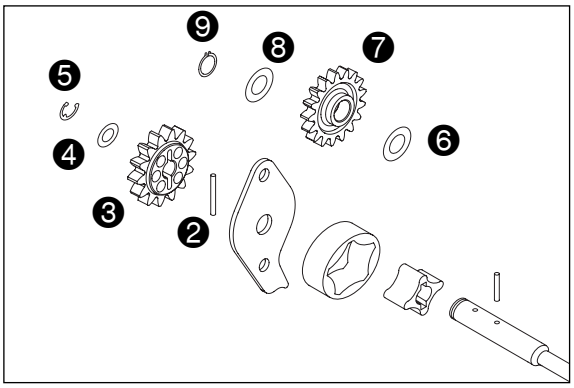


– Slide the preassembled oil pump shaft into the right engine case half. The marks should no longer be visible.
– Fill the oil pump with engine oil.

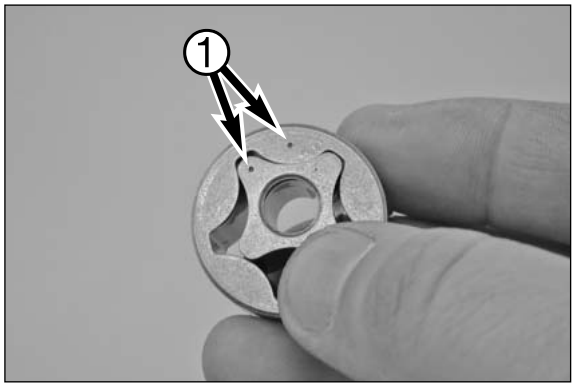


– Mount the pressure pump cover. Apply Loctite 222 to the screws and tighten to 6 Nm.
– Insert the needle roller ❷ in the oil pump shaft and mount the oil pump gear ❸.
– Mount the stop disk ❹ and lock washer ❺, holding the oil pump shaft on the other side.

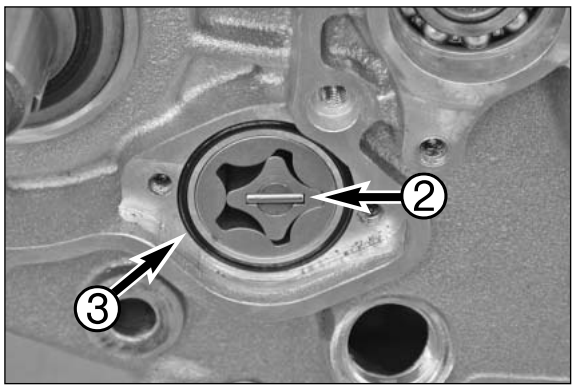




– Slide on the thrust washer ❻ and oil pump idler ❼, mount the thrust washer ❽ and the lock ring ❾. Check the wheels for easy action.

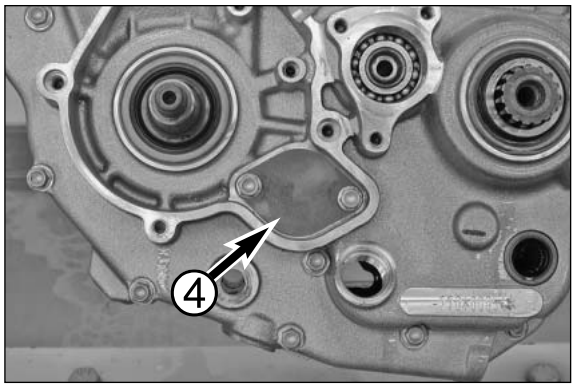


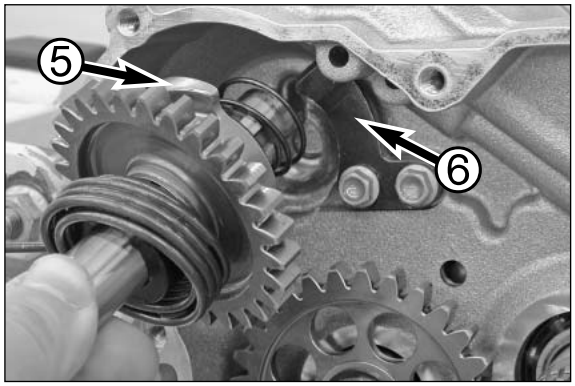
– Mount the suction pump rotors ❶ with the marks facing the case. The marks should no longer be visible when mounted.



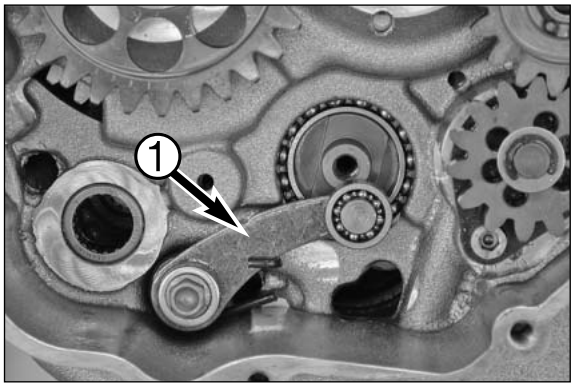
– Insert the needle roller ❷ in the recess of the oil pump shaft and inner rotor.
– Fill the oil pump with engine oil.

– Insert a new O-ring ❸ and mount the oil pump cover ❹. Apply Loctite 222 to the screws and tighten to 6 Nm.



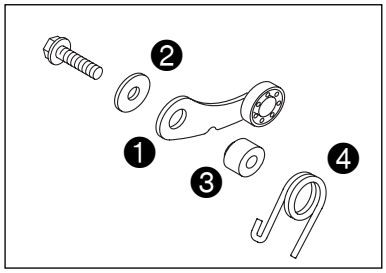


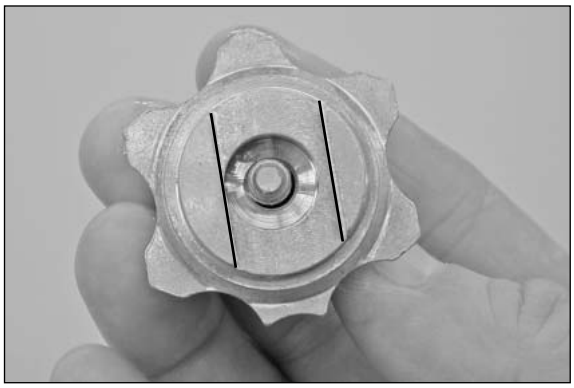
– Insert the preassembled kickstarter shaft in the seat of the engine case; slightly turn the kickstarter shaft in a clockwise direction until the kickstarter ratchet gear ❺ stops behind the stop plate ❻. Attach the kickstarter spring again.



Mounting the shift mechanism

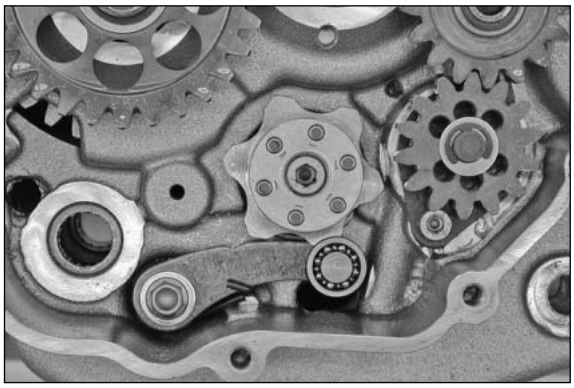
– Mount the locking lever ❶ with the washer ❷, bushing ❸ and spring ❹. Apply Loctite 243 to the screw and tighten to 6 Nm.



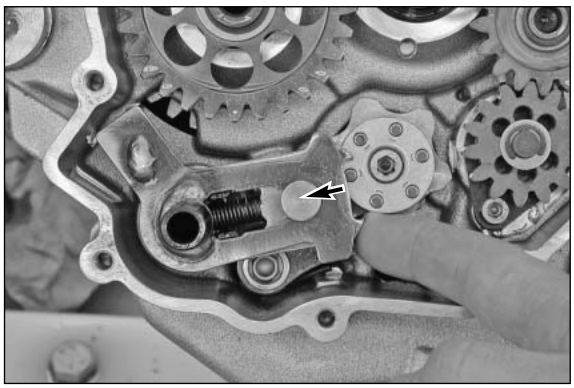


– Press the locking lever away from the shift drum and slip on the shift lock.

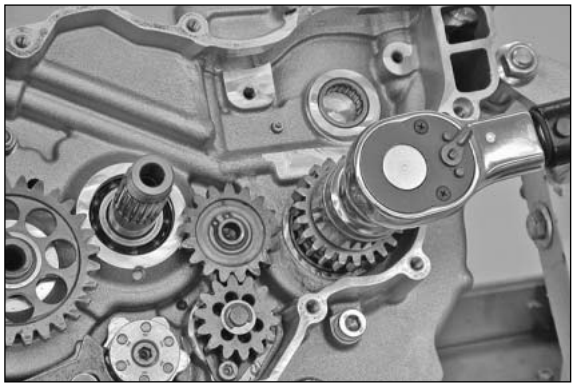
NOTE: the flat surfaces on the shift lock are not symmetrical.



– Apply Loctite 243 to the shift lock and tighten to 10 Nm.

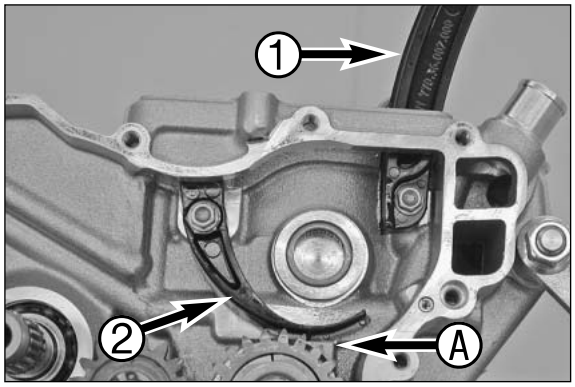


– Mount the preassembled shift shaft in the case (do not forget the stop disk), press the shift rail back and allow to engage in the shift lock.
– Mount the shift lever and shift through the gears while turning the main shaft; remove the shift lever again.



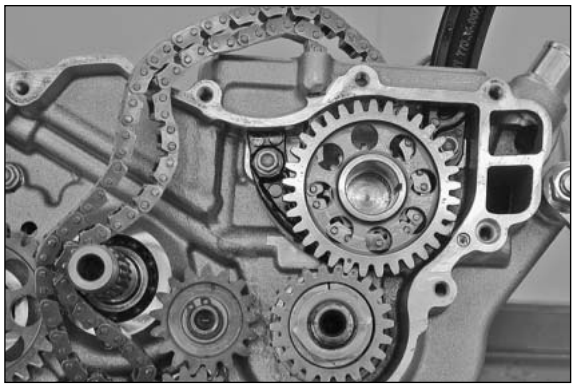
Mounting the primary pinion and the chain drive

– Move the crankshaft into the TDC position and lock in place with the locking screw (20 Nm).
– Mount the woodruff key (if previously removed).
– Mount the primary gear, detent edged lock washer and nut (+ Loctite 243, A/F 27, LH thread). Tighten the nut to 150 Nm.

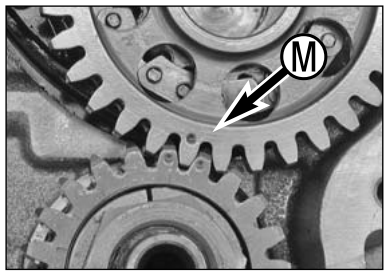


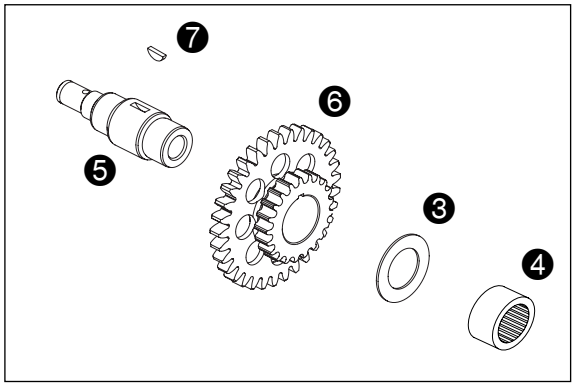
– Mount the timing chain tensioning rail ❶ and the chain securing guide ❷. Apply Loctite 243 to the screws and tighten to 10 Nm.

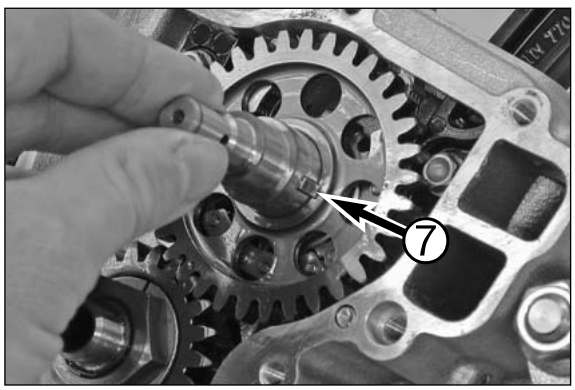
NOTE:
– Make sure you only apply Loctite 243 to the screw thread otherwise the timing chain tensioning rail will block and can break.
– The chain securing guide must rest against the stop Ⓐ.



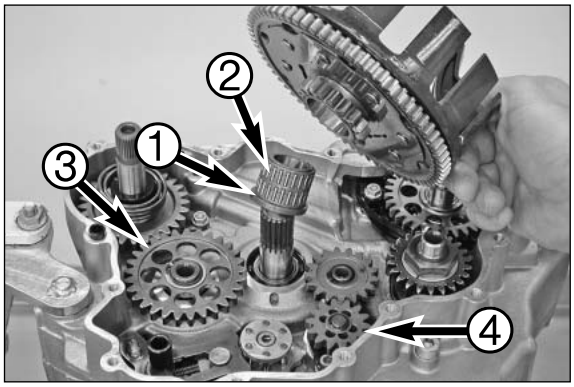
– Slip on the timing chain. Pay attention to the running direction if using a used chain.
– Place the stop disk ❸ on the bearing ❹ of the timing train idler shaft ❺.
– Position the timing train idler ❻ on the bearing and align the marks Ⓜ with the primary gear.







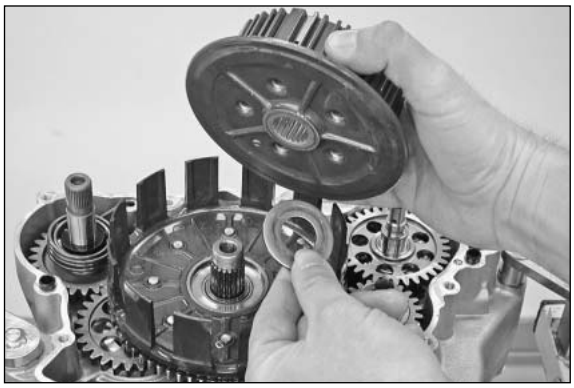
– Slide in the timing train idler shaft with the woodruff key ❼.



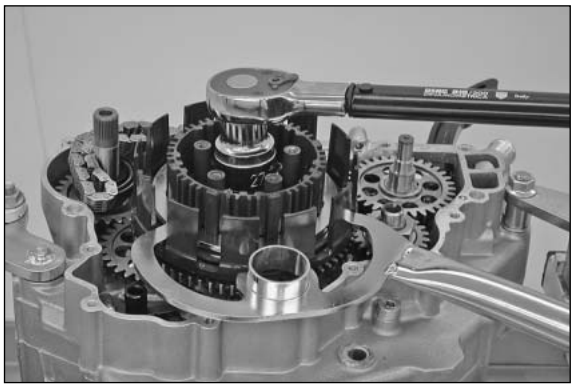
Mounting the clutch

– Slide the inner ring ❶, needle bearing ❷ and outer clutch hub on the main shaft.

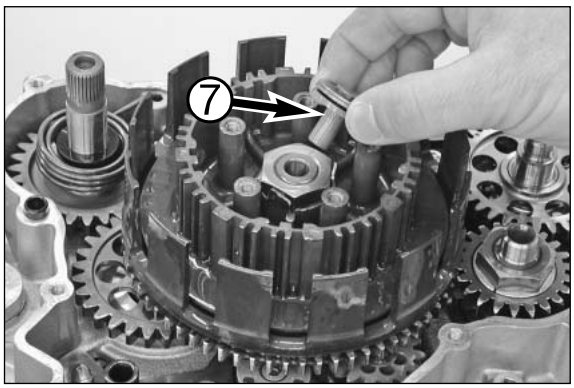
NOTE: Turn the starter idler ❸, oil pump gear ❹ and outer clutch hub back and forth until the toothing engages.



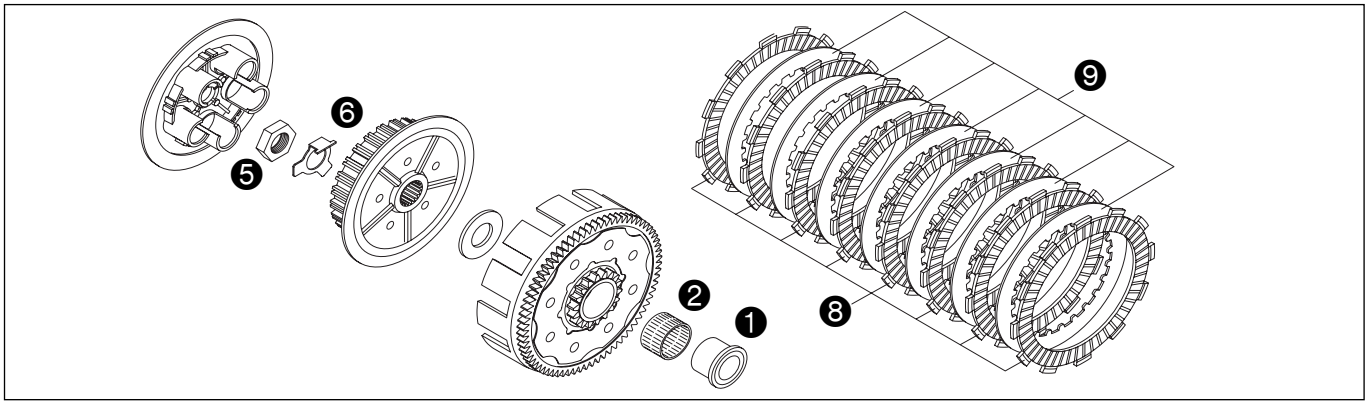
– Slide on the stop disk and driver.

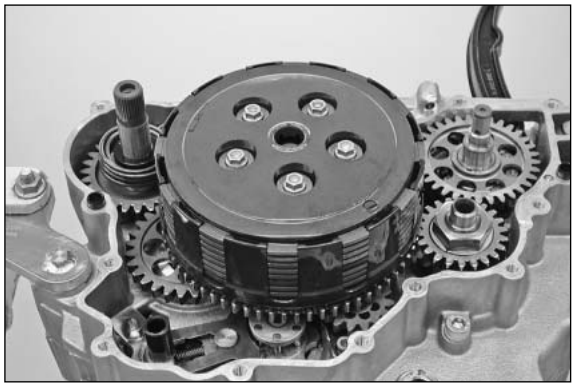


– Apply Loctite 243 to the driving nut ❺ and mount with a new lock washer ❻.
– Hold the driver with special tool 503.29.003.000 and tighten the driving nut to 120 Nm (A/F 27).
– Turn down the lock washer the driving nut.

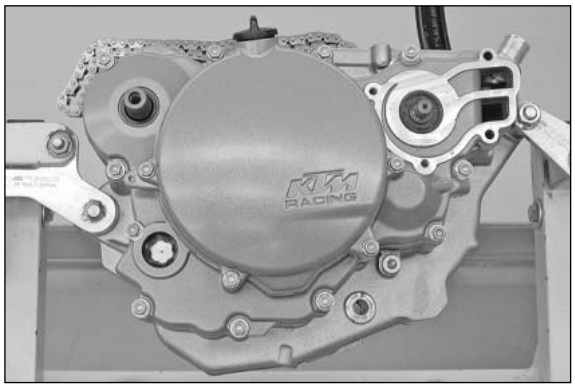


– Insert the pressure piece ❼.
– Thoroughly oil all lining disks.
– Starting with lining disk ❽, insert all 8 lining disks and all 7 clutch disks ❾ in the outer clutch hub, ending with a lining disk on top.



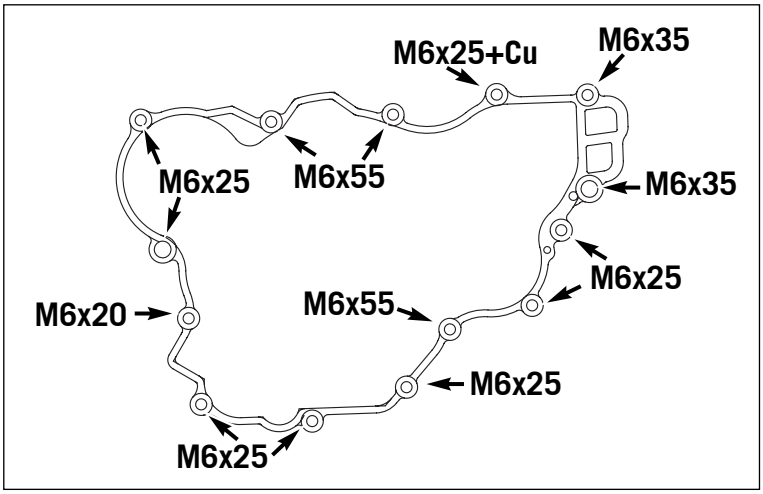


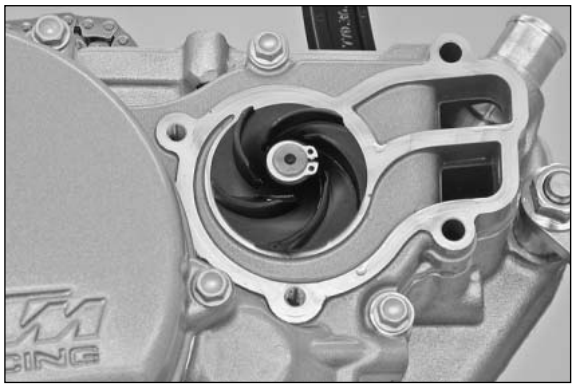
– Mount the pressure cap and gradually tighten the screws with the washers and springs crosswise to 10 Nm.



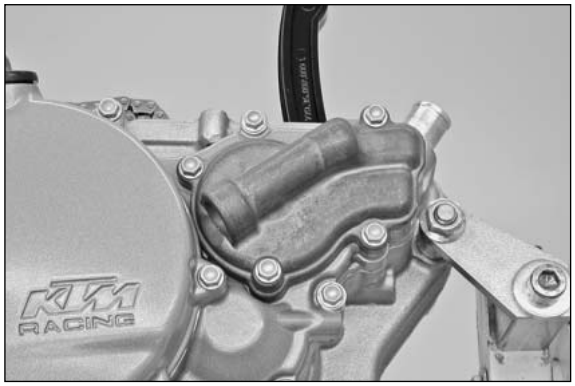
Mounting the clutch cover

– Mount a new gasket and the clutch cover (do not forget the dowels).
– Turn in the screws as illustrated and tighten to 10 Nm.

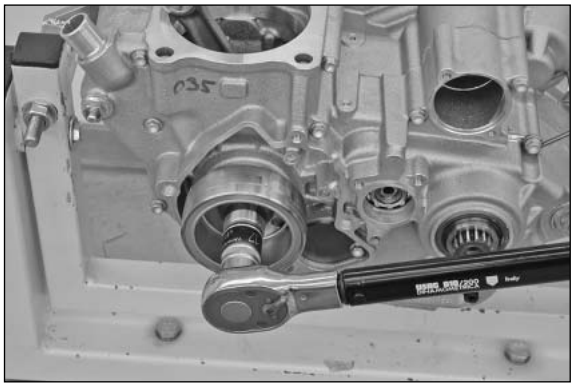




– Insert the needle roller in the shaft, mount the water pump wheel and lock ring.



– Mount the water pump cover with a new gasket and tighten the screws to 10 Nm.



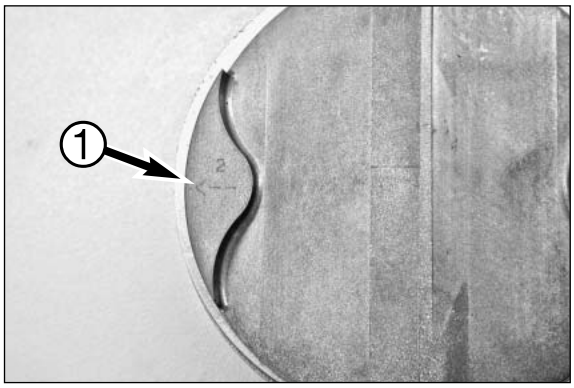
– Insert the woodruff key in the crankshaft groove.
– Slip on the rotor.
– Mount the spring washer and nut. Tighten the nut to 60 Nm.

Mounting the piston and cylinder head

– Place the well-oiled piston on the cylinder and clamp the piston rings together with the piston ring compressor 600.29.015.000.
– Gently tap on the piston ring compressor with a plastic hammer from above to make it fit flush against the cylinder.
– Carefully tap the piston into the cylinder with the hammer handle, making sure the piston rings do not jam.

! CAUTION !

IF THE PISTON RING COMPRESSOR PRESSES THE PISTON RINGS TOGETHER PROPERLY AND FLUSH AROUND THE ENTIRE CYLINDER, YOU WILL BE ABLE TO PUSH THE PISTON INTO THE CYLINDER BY TAPPING LIGHTLY WITH THE HAMMER HANDLE. EXCESSIVE FORCE USUALLY DAMAGES THE PISTON RINGS.



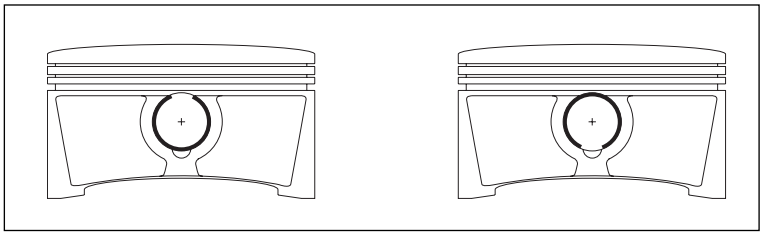
– Mount a new cylinder base gasket and thrust bushing.
– Slide the piston out of the bottom of the cylinder until you can push in the piston pin.

NOTE:
– You should easily be able to push the piston pin into the conrod bearing.
– The arrow mark ❶ on the piston must point to the front, i.e. the exhaust side.

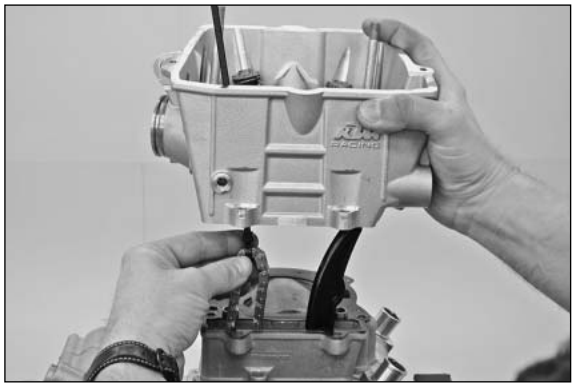
– Cover the engine case with a cloth or towel to prevent the piston pin lock ring from falling in while mounting.

– Mount the piston pin lock ring (special tool 770.29.036.000).

NOTE: the gap must be on the top or bottom but not on the side.

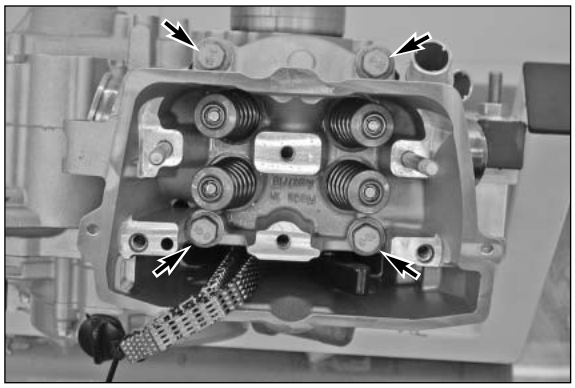


– Attach a cable clip to the timing chain and pull it through the timing chain compartment.
– Slide the cylinder onto the engine case.



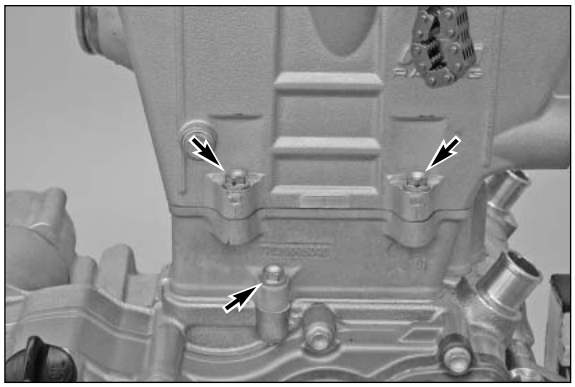
– Attach thrust bushings to the cylinder and mount a new cylinder head gasket.

– Pull the timing chain through the timing chain compartment with the cable clips and mount the cylinder head, being careful not to damage the chain tensioning rail.

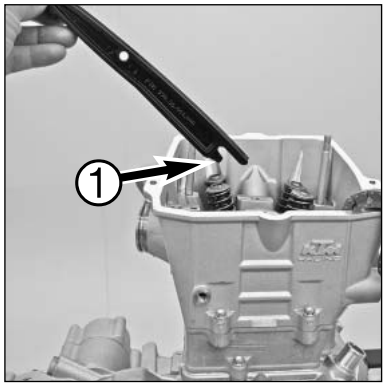


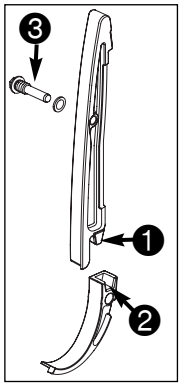
– Turn in the well-oiled cylinder head screws and washers and tighten crosswise to 40 Nm in the first stage.

– Tighten crosswise to 50 Nm in the second stage.

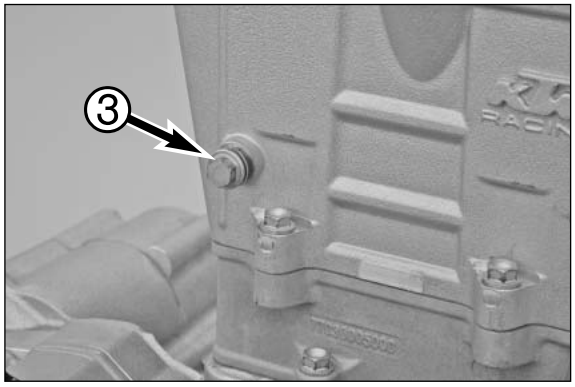


– Tighten the 3 screws to 10 Nm.





– Insert the guide rail with the nose ❶ resting in the recess ❷ in the securing guide.

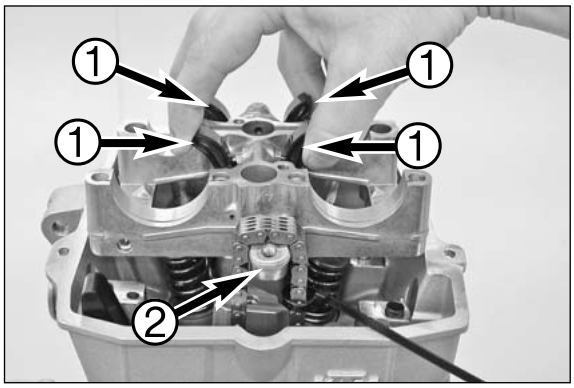


– Align the hole in the guide rail with the hole in the cylinder head.

– Apply Loctite 243 to the thread of the bearing bolt ❸, mount the bearing bolt with a new CU seal ring and tighten to 10 Nm.

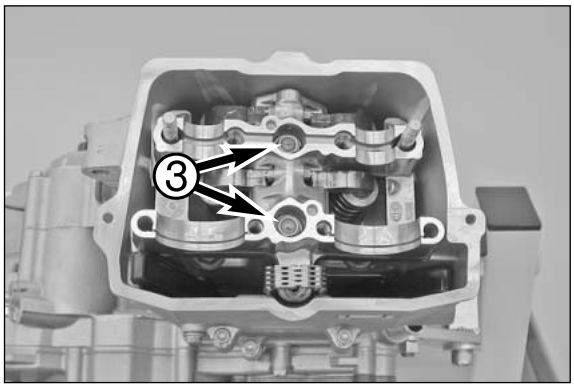
– Place the shims in the spring retainers in accordance with their mounted position.

NOTE: check the valve clearance after assembling; adjust the valve clearance if valves or other parts in the valve control were replaced.

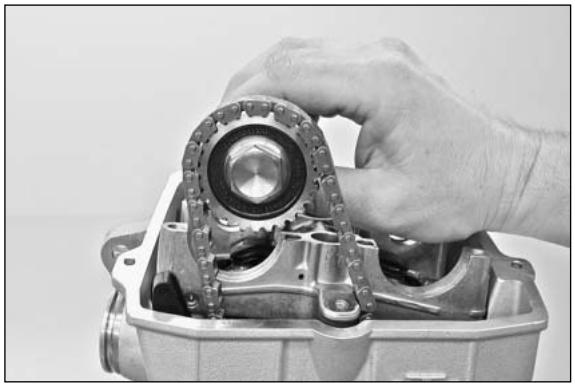


– Mount the thrust bushings and pull the timing chain up.
– Fold all 4 cam levers ❶ up and mount the lower camshaft bearing bridge, positioning the timing chain over the nose ❷.

– Remove the cable clip from the timing chain.



– Oil the screws ❸ on the lower camshaft bearing bridge, turn in and tighten to 18 Nm.



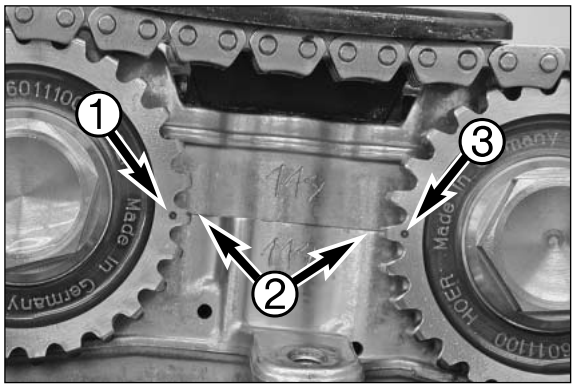
Mounting the camshafts

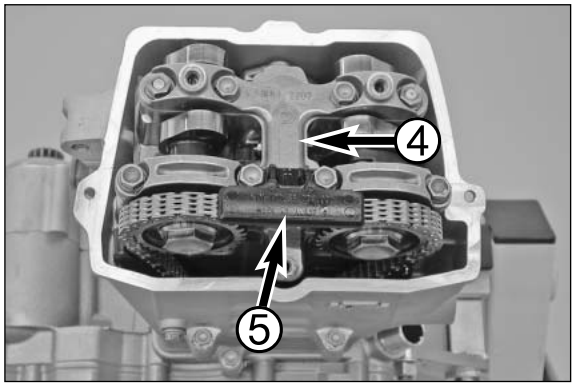
– Place the intake camshaft in the bearing seat, mark ❶ aligned with the dividing edge ❷ between the camshaft bearing bridges, and run the chain over the camshaft gear such that the chain is tensioned on the intake side.

NOTE:
– The camshafts are differentiated by the automatic decompressor, which is mounted on the exhaust camshaft.
– The lock ring on the camshaft ball bearing must engage in the groove in the camshaft bearing bridge.

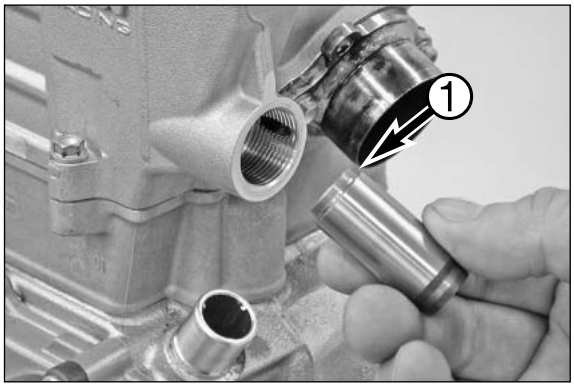
– Run the timing chain over the rear sprocket of the exhaust camshaft and press the exhaust camshaft into the bearing seat.

NOTE:
– The lock ring on the camshaft ball bearing must engage in the groove in the camshaft bearing bridge.
– If mark ❸ on the exhaust camshaft is not positioned over the dividing edge ❷ of the camshaft bearing bridge, lift the exhaust camshaft out again and turn it accordingly.





– Mount the upper camshaft bearing bridge ❹ - do not forget the needle rollers required for centering.
– Mount the timing chain guide rail ❺ with the distance bushings.
– Oil the screws and nuts on the camshaft bearing bridge and tighten to 18 Nm.

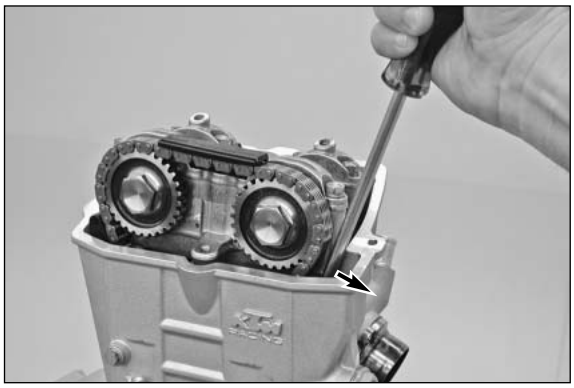


Mounting the chain tensioner

– Press the chain tensioner together up to the first notch and lock in this position. Slide into the hole in the cylinder heads together with a new O-ring.

NOTE:
– Check and lock the chain tensioner: see Chapter 5.
– The piston ❶ must protrude approx. 3 mm out of the chain tensioner.

– Mount the plug with a new seal ring and tighten to 25 Nm.



– Press against the piston of the chain tensioner with a screwdriver to cause the mounting lock to yield and the piston to extend. The chain tensioner rail will be loaded and the timing chain tensioned.

NOTE: if you press against the chain tensioner now it will lock. This makes sure that the timing chain is tensioned when you start the engine and not enough oil pressure has been built up yet.

! CAUTION !

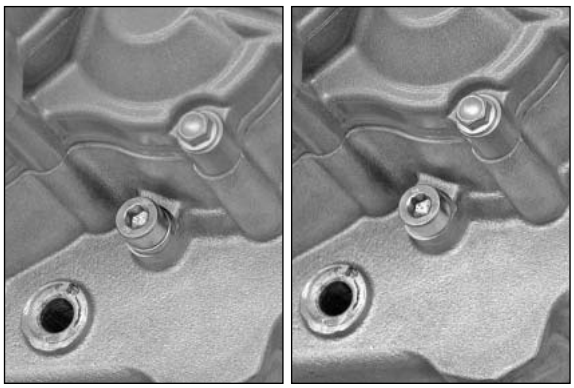
IF THE CHAIN TENSIONER IS NOT LOCKED AND RELIEVED AFTER ASSEMBLY AS DESCRIBED IN CHAPTER 5, THE TIMING CHAIN WILL SKIP WHEN THE ENGINE IS STARTED, RESULTING IN ENGINE DAMAGE.

Checking the valve clearance

– Use the feeler gauge 590.29.041.000 to measure the valve clearance:

Intake valves 0.10 - 0.20 mm
Exhaust valves 0.12 - 0.22 mm

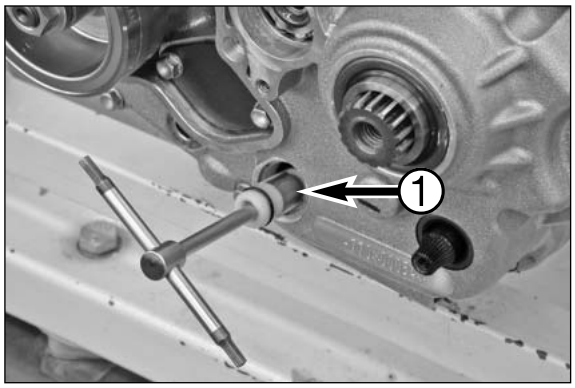
– Write down any deviations from the specified valve clearance, remove the camshafts and measure the thickness of the installed shims. If the measured valve clearance is too small, use thinner shims; if the valve clearance is too large, install thicker shims. Shims are available in thicknesses of 1.72 to 2.60 mm in graduations of 0.04 mm.
– Check the valve clearance again after assembly and correct again if necessary.



– Unscrew the engine locking screw, remount with the CU-seal ring and tighten to 20 Nm.

Assembling the engine

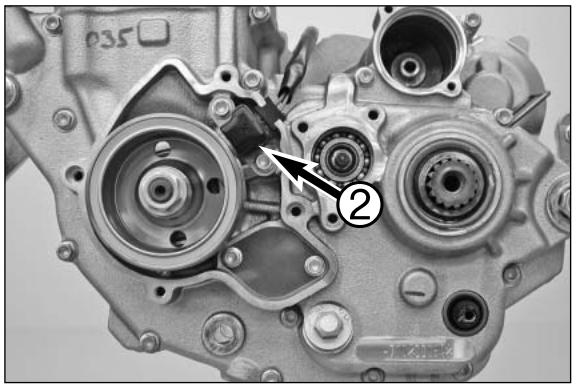
– Mount the valve cover with a new gasket and tighten the screws.



– Place the oil screen ❶ on a pin wrench approx. 300 mm long. Insert the pin wrench through the opening in the bore of the opposite engine case wall and slide the oil screen all the way into the engine case. Pull out the pin wrench, mount the plug with a new gasket and tighten to 15 Nm.

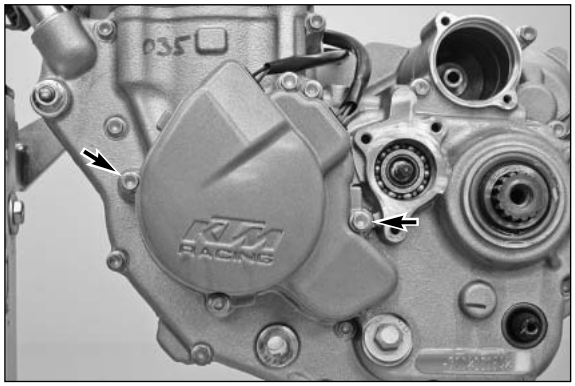
! CAUTION !

THE SCREEN IS MOUNTED SLANTING DOWNWARDS. IF MOUNTED INCORRECTLY IT WILL LOSE ITS FILTERING EFFECT AND LEAD TO EXCESSIVE ENGINE WEAR.



– Push in the pushrod.

– Mount the pulse generator ❷, apply Loctite 243 to the screws and tighten to 6 Nm. Press the cable guide into the recess in the case.

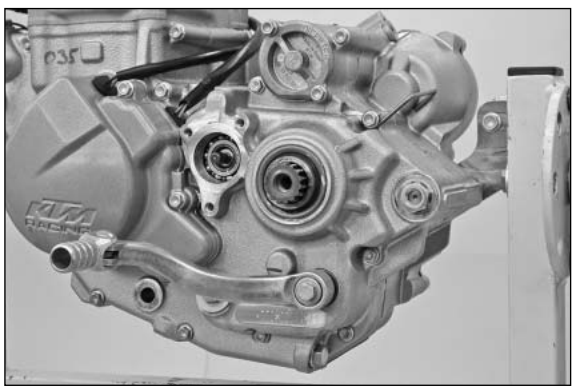


– Mount the ignition cover with dowels and a new gasket.
– Tighten the screws to 10 Nm.

NOTE: longer screws (M6x35 instead of M6x30) are used at the dowel positions.

– Fill the oil filter case approx. 1/3 full with engine oil, slide in the filter and mount the cover with a new O-ring. Tighten the screws to 6 Nm.

– Screw in the spark plug and tighten to 12 Nm.



– Mount the oil drain plug with a new seal ring and tighten to 20 Nm.

– Mount the shift lever, apply Loctite 243 to the screw and tighten to 10 Nm.

ELECTRICAL 7

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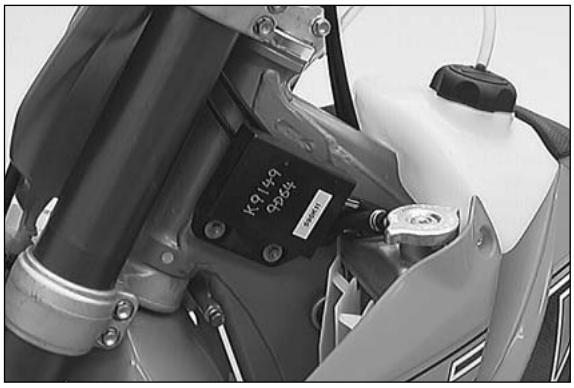


CDI unit

Check the cables and socket connections to the CDI unit.
The CDI unit can only be tested on an ignition test bench.

! CAUTION !

NEVER TEST THE CDI UNIT WITH A CONVENTIONAL MEASURING DEVICE. HIGHLY SENSITIVE ELECTRONIC COMPONENTS COULD BE DESTROYED.

Checking the ignition coil

– Disconnect the ignition coil and remove the spark plug connector.
– Use an ohmmeter to take the following measurements:

NOTE: the following measurements only correspond to the setpoint values at a coil temperature of 20° C.

Replace the ignition coil if the measured values deviate significantly from the setpoint value.

Measurement	Cable colors	Resistance
Primary coil	blue/white - ground	0.30 Ω ± 0.05 Ω
Secondary coil	blue/white - ignition wire	6.30 kΩ ± 1.25 kΩ

Ignition system troubleshooting

Check the emergency OFF switch before you test the ignition system.

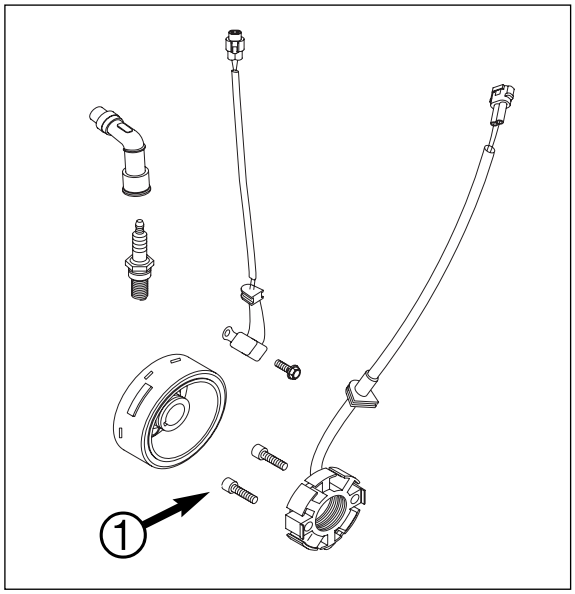
Check whether there is an ignition spark upon starting, proceeding as follows:
– Pull off the spark plug connector.
– Disconnect the spark plug connector from the ignition wire
– Hold the loose end of the ignition wire approx. 5 mm from the ground.
– A strong spark should be visible when the kickstarter is actuated.

– If a spark is visible, mount the spark plug connector again.
– Unscrew the spark plug and insert in the spark plug connector.
– Hold the spark plug against the ground. A strong spark should be visible when the kickstarter is actuated. If not, the spark plug connector or spark plug is defective.

If no spark is visible during the first test, check the following parts:
– Emergency OFF switch
– Cable tree parts belonging to the emergency OFF switch.
– Test with a peak voltage adapter

If the ignition is being supplied with voltage but no spark is visible, check:
– The ground connection from the CDI unit and ignition coil
– The cable from the CDI unit to the ignition coil
– The pulse generator
– The stator
– The ignition coil
– The short-circuit button

NOTE: the CDI unit cannot be tested with simple devices. It can only be tested on an ignition test bench.



Ignition system

General information

The measurements described below will only detect serious defects. Short circuits in the coil that lead to a weak ignition spark or poor generator capacity can be established with the peak voltage adapter 584.29.042.000. In case of a defect, check the cable and the plug and socket connections in the ignition system first.

Always pay attention to the right measuring range when measuring.

Checking the stator and pulse generator

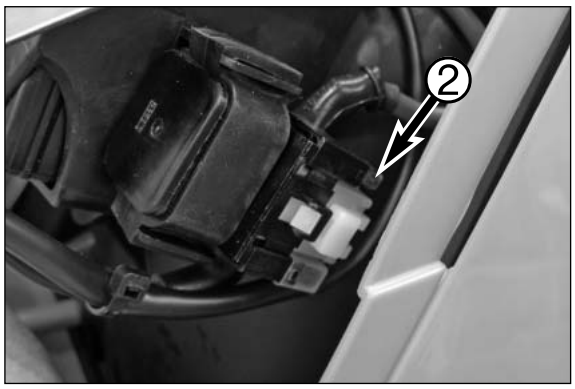
Use an ohmmeter to take the following measurements:

IGNITION	MEASURE	CABLE COLOURS	RESISTANCE
4K-3A	pulse generator	red – green	100 Ω ± 20 Ω
		ground – red	∞ Ω
	charging coil	ground – yellow	0,74 Ω ± 0,15 Ω
	stator	black/red– red/white	26 Ω ± 5,2 Ω
		ground – black/red	∞ Ω
4K-3B	pulse generator	red – green	100 Ω ± 20 Ω
		ground – red	∞ Ω
	charging coil	ground – yellow	0,65 Ω ± 0,15 Ω
		white – yellow	0,16 Ω ± 0,03 Ω
	stator	black/red– red/white	15 Ω ± 3 Ω
		ground – black/red	∞ Ω

NOTE: the measurements must be performed at a temperature of 20° C, otherwise the readings will deviate significantly.

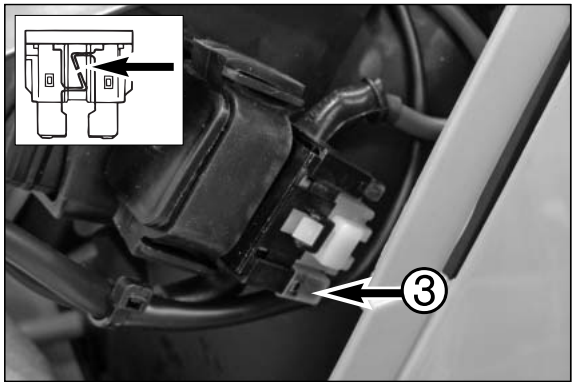
Replacing the stator

– Remove the screw and the retaining bracket.
– Remove the 2 screws ❶ and take the stator out of the ignition cover.
– Place a new stator in the ignition cover.
– Degrease the thread of all 3 screws and apply Loctite 243.
– Mount the screws and tighten (tightening torques see chapter 10).
– Run the wiring harness stress free and fix with the retaining bracket. Don't forget the cable socket.



Main fuse

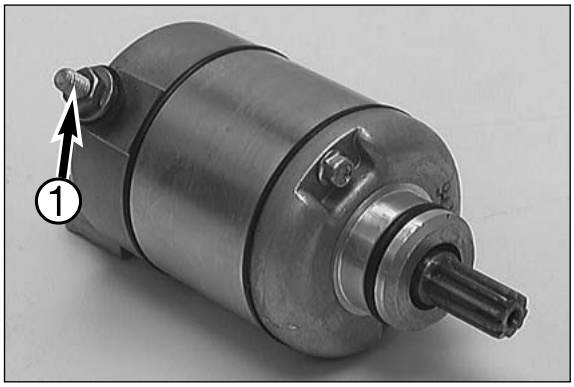
– The main fuse (10 amperes) is located under the filter box cover in the starter engine relay.
– The main fuse ❷ is visible after you remove the filter box cover and protection cover.



! CAUTION !

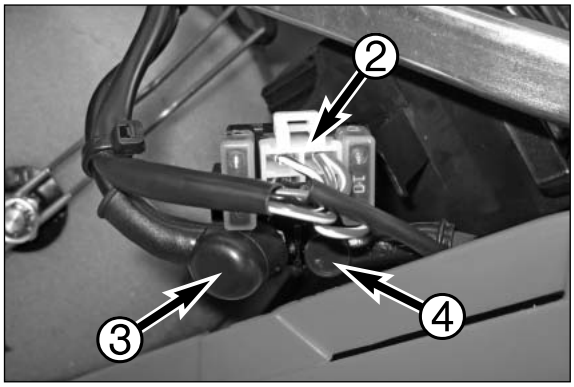
NEVER USE A STRONGER FUSE OR A REPAIRED FUSE. IMPROPER USE CAN DESTROY THE ENTIRE ELECTRIC SYSTEM

– The spare fuse is located under the protection cover ❸.



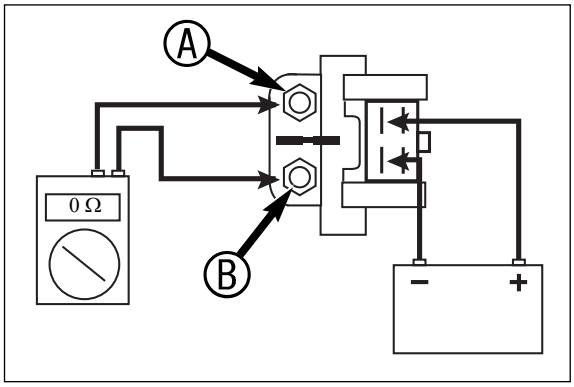
Checking the starter

– Disconnect the negative terminal from the battery and remove the starter.
– Connect the negative terminal from a 12V battery to the starter case and briefly connect the positive terminal from the battery to connector ❶ on the starter (use thick cables).
– The starter should start to turn when the electric circuit is closed.
– If not, replace the starter.



Checking the start relay

– Remove the seat and the filter box cover.
– Disconnect the negative terminal from the battery.
– Remove the starter relay from the support.
– Pull the connector ❷ from the starter relay.
– Disconnect cables ❸ and ❹ from the starter relay and remove the starter relay.



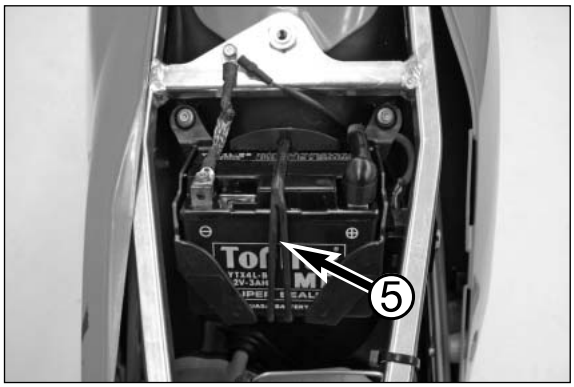
– Connect the starter relay to a 12 V battery as illustrated.
– Use an ohmmeter to check the continuity between terminals ❹ and ❺.

Setpoint value: 0 Ω OK
Setpoint value: ∞ Ω defective

NOTE: you should hear a click when you switch the starter relay.

The starter relay is mounted in the reverse order, paying attention to the following points:

– Replace any damaged or defective parts.



Dismounting and mounting the battery

– Remove the seat.
– First disconnect the negative terminal, then the positive terminal from the battery.
– Remove the filter box cover, detach the rubber strap ❺ and remove the battery.

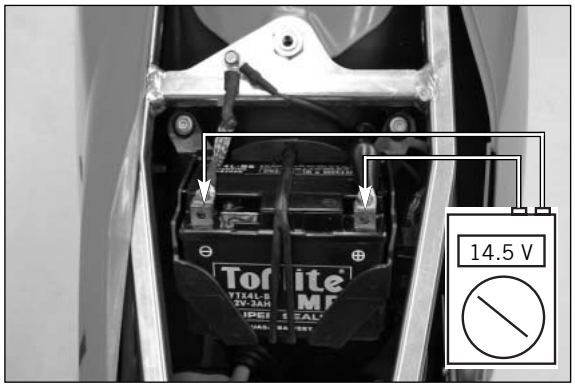
The battery is mounted in the reverse order, paying attention to the following points:

– Replace any damaged or defective parts.
– Connect the positive terminal then the negative terminal to the battery.

Charging the battery

! CAUTION !

– DO NOT REMOVE THE LOCKING STRIPS.
– TO LOAD, CONNECT THE BATTERY TO THE BATTERY CHARGER BEFORE YOU SWITCH ON THE BATTERY CHARGER.
– IF YOU ARE CHARGING THE BATTERY IN A CLOSED ROOM, MAKE SURE IT IS WELL VENTILATED. THE BATTERY PRODUCES EXPLOSIVE GASSES WHILE CHARGING.
– IF THE BATTERY IS CHARGED TOO LONG OR AT AN EXCESSIVE VOLTAGE, ACID WILL LEAK THROUGH THE SAFETY VALVES AND THE BATTERY WILL LOSE CAPACITY.
– QUICK CHARGES WITH HIGH VOLTAGE WILL IMPAIR THE SERVICE LIFE OF YOUR BATTERY.
– Connect KTM battery charger no. 584.29.074.000. The battery charger can also be used to test the offload voltage, the battery's startability and the generator capacity. This battery charger cannot be overcharged.
– If it is not used for longer periods of time, recharge the battery every 3 months.



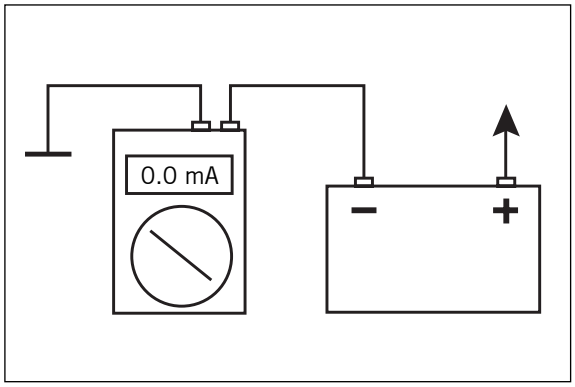
Checking the charging voltage

NOTE: the following figures only apply to fully charged batteries (charging condition at least 90 %).

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

Setpoint value: 14.0 – 15.0 V

If the measured value deviates significantly from the setpoint value:
– Check the socket connectors from the stator to the voltage regulator and from the voltage regulator to the wiring harness.
– Check the stator.
– Replace the voltage regulator.

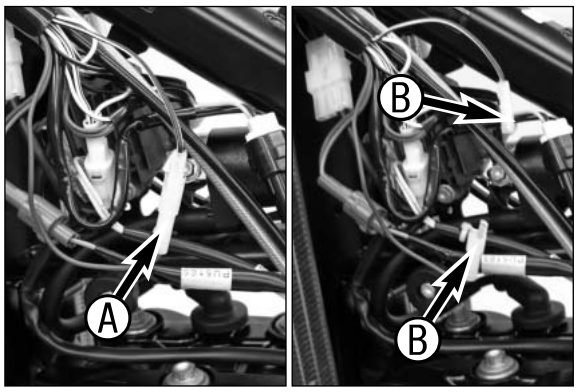


Checking for loss of current

Check for loss of current before you check the voltage regulator.
– Disconnect the ground wire from the battery.
– Connect an ammeter between the ground wire and the negative terminal on the battery.

Setpoint value: max. 0.2 mA

– If this value is higher than specified, look for the power consumers.



Engine characteristic (250 EXC-F)

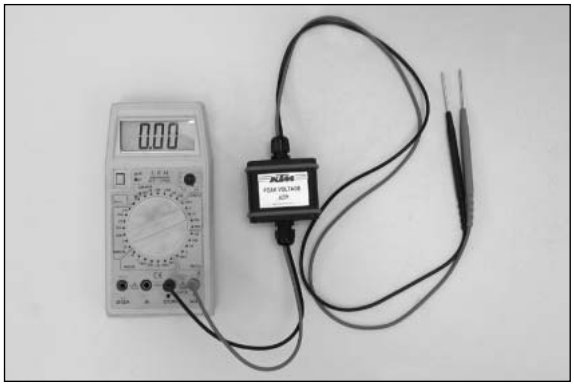
– Two ignition curves (performance and soft) are stored in the CDI unit. The performance ignition curve is activated in the condition at delivery.

– Remove the seat and tank to change the ignition curve:

Ⓐ Performance (higher engine performance)	socket connector connected
Ⓑ Soft (better driveability)	socket connector disconnected

Measuring with the peak voltage adapter 584.29.042.000: static ignition values

Measuring conditions:
- cold engine
- seat and tank removed
- all plug and socket connectors and the ground connection in a non-corroding condition, plugs tightly connected
- depress the kickstarter forcefully at least 5 times for each measurement



Connecting the peak voltage adapter and setting the multimeter

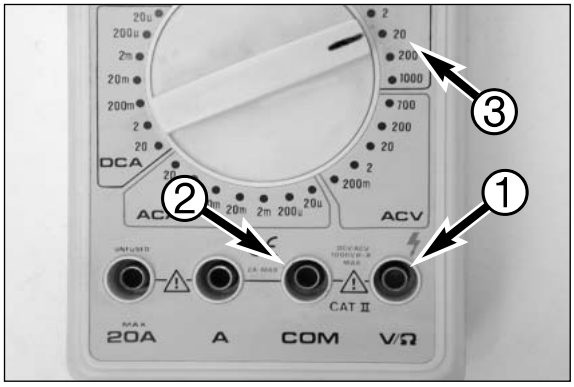
The peak voltage adapter is equipped with 4 cables: 2 red and 2 black. One red and one black cable have a measuring tip which - to measure - is applied to the electric terminals of the components. The two other cables have plugs that are plugged into the respective sockets on the multimeter. The red plug is plugged into the socket on the multimeter marked with a +, V or a red circle ❶.
The black plug must be plugged into the socket marked with a -, Com or a black circle ❷.
Turn the multimeter on and switch to the range for voltage measurements - DCV. Depending on the measurement, some multimeters must be set to the level of voltage to be measured ❸.

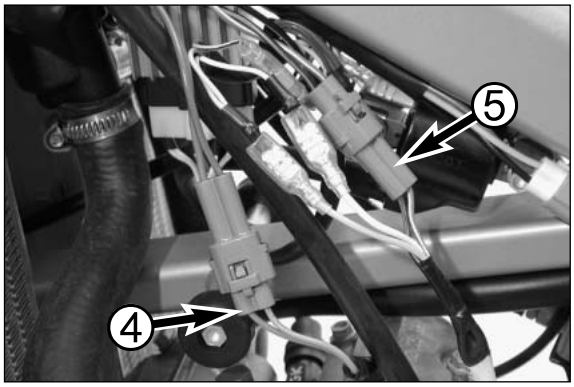
! CAUTION !

THE PEAK VOLTAGE ADAPTER IS NOT SUITABLE TO MEASURE SECONDARY VOLTAGES (THE HIGH-VOLTAGE SIDE OF THE IGNITION COIL). THE MEASURING RANGE IS BETWEEN 0 AND APPROX. 500 VOLTS.

⚠ WARNING ⚠

TO PREVENT AN ELECTRIC SHOCK, DO NOT TOUCH METAL PARTS OR THE ENDS OF THE CONNECTING CABLE WITH YOUR BARE HANDS DURING OR IMMEDIATELY AFTER MEASURING.





Check the **pulse generator (pick up)** for an output signal - two-pole plug ❹ with green and red cables:

- Apply the red measuring tip of the peak voltage adapter 584.29.042.000 to the green cable and the black measuring tip to the red cable, disconnect plug ❹ to disconnect the CDI unit.

  Multimeter display: 4.5 volts +/- 0.5 volt

- Same measurement with CDI unit connected.

  Multimeter display: 3 volts +/- 0.5 volt

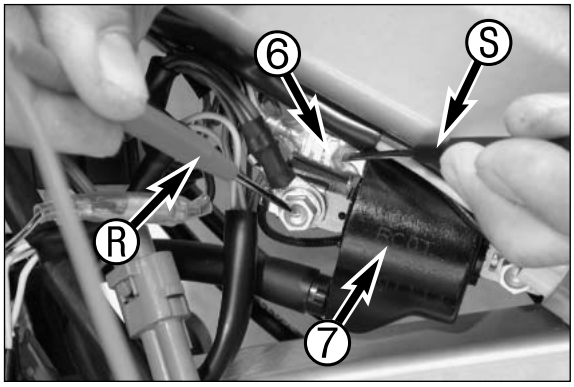
Check the **generator charging coil** for ignition capacitor charge - two-pole plug ❺ with black/red and red/white cables:

- Apply the red measuring tip of the peak voltage adapter to the black/red cable and the black measuring tip to the red/white cable, disconnect plug ❺ to disconnect the CDI unit.

  Multimeter display: 30 volts +/- 5 volts

- Same measurement with CDI unit connected

  Multimeter display: 200 volts +/- 10 volts



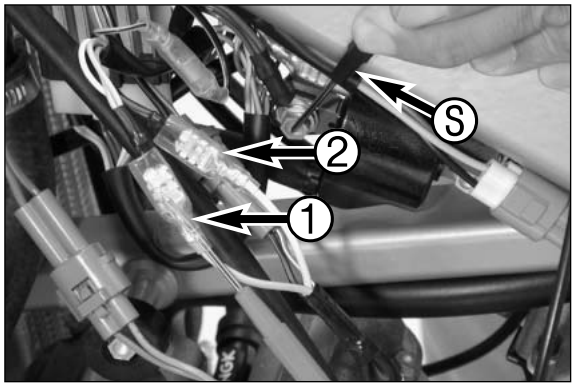
Check the **primary voltage output** ❻ for ignition coil control for output voltage (blue/white cable):

- Apply the red measuring tip Ⓡ of the peak voltage adapter to the black/white cable (ground) and the black measuring tip Ⓢ to the blue/white cable, CDI unit and ignition coil ❼ connected.

  Multimeter display: 200 volts +/- 10 volts

Measuring with the peak voltage adapter 584.29.042.000: static generator values

Measuring conditions:
- **cold engine**
- **seat and tank removed**
- **all connectors and the ground connection in a non-corroding condition, connectors tightly connected**
- **battery loaded (if installed) and light switch turned off**
- **compression release lever pulled**
- **kick the kick starter forcefully at least 5 times for each measurement**



Check the **generator output** ❻ for voltage between the following cable colors:

- between yellow and brown (ground), connector ❶ disconnected
  Multimeter display: 15 volts +/- 1 volt
- take the same measurement with connector ❶ connected
  Multimeter display: 12 volts +/- 1 volt
- between white and brown (ground), connector ❷ disconnected
  Multimeter display: 19 volts +/- 1 volt
- take the same measurement with connector ❷ connected
  Multimeter display: 14 volts +/- 1 volt

NOTE: The black measuring lead Ⓢ of the peak voltage adapter must be applied to the ground.

FUEL SYSTEM 8

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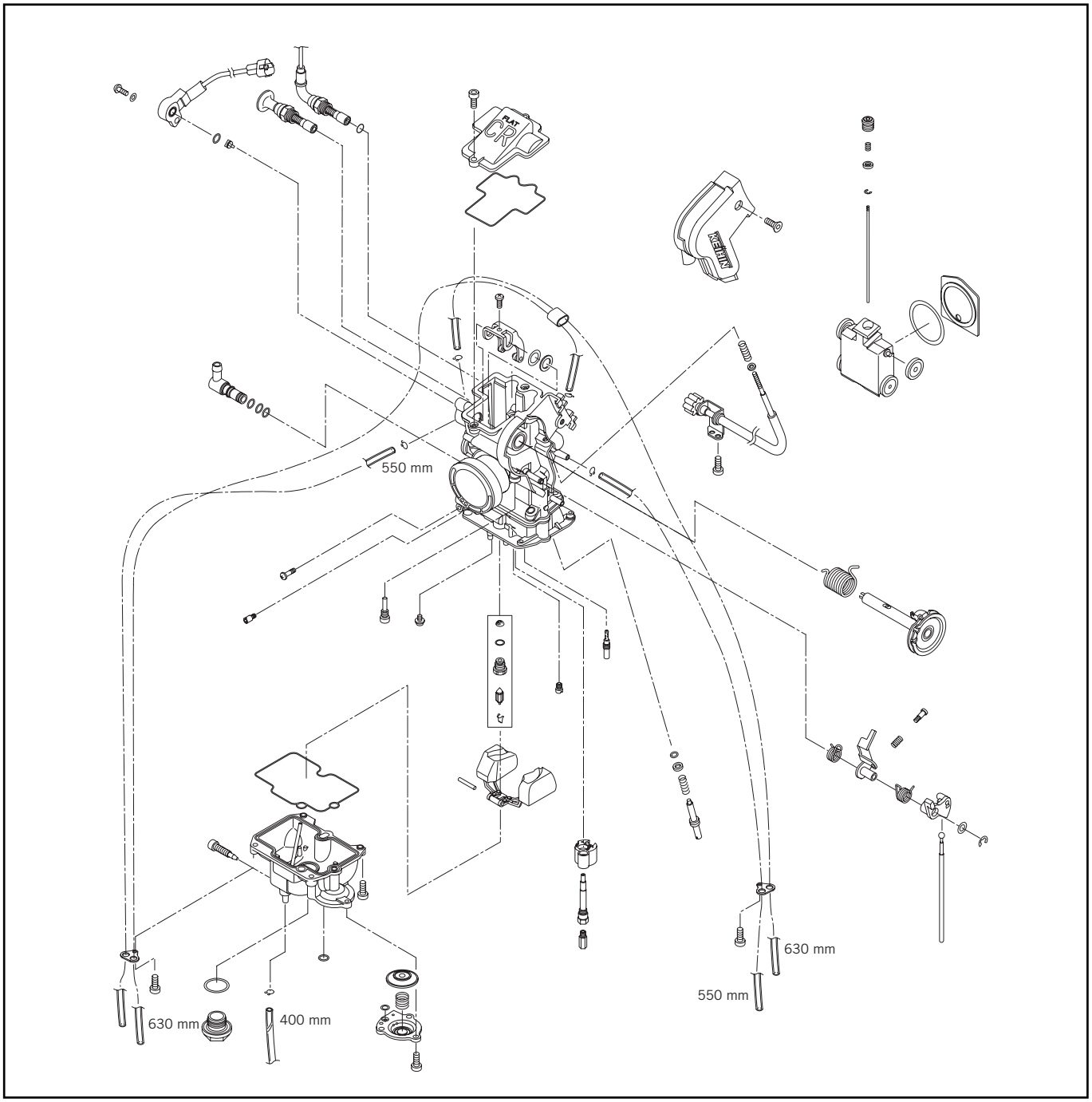
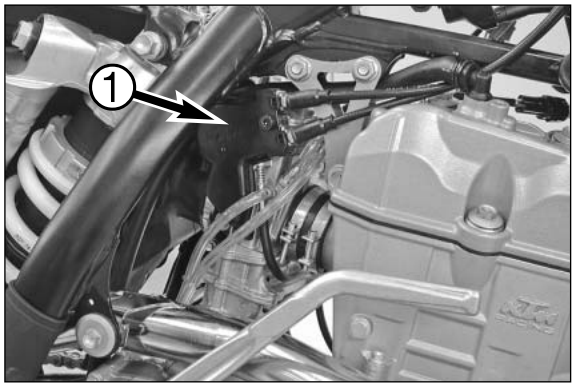
CARBURATOR - KEIHIN FCR-MX 39

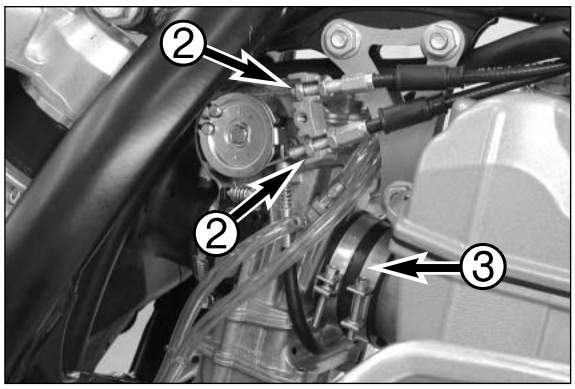




Dismounting and mounting the carburetor

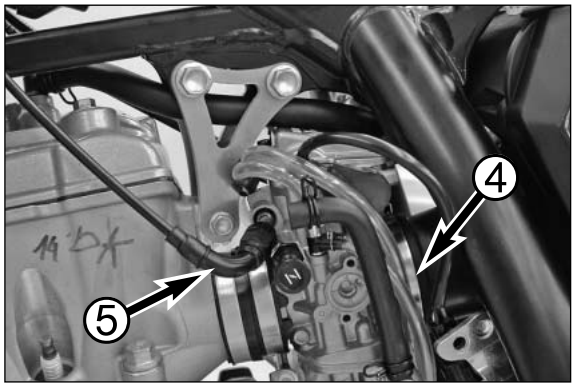
NOTE: clean the motorcycle thoroughly before you start to work on the carburetor.

– Remove the seat and tank with the spoilers.
– Remove the carburetor cover ❶.



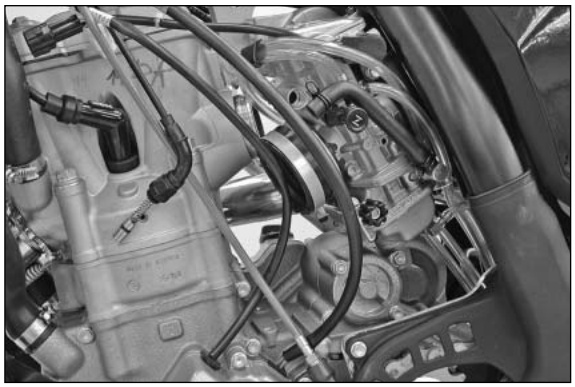
– Loosen the 2 nuts ❷ and disconnect both throttle cables from the carburetor.

– Loosen the 2 hose clamps ❸ and ❹.



– Loosen the socket connection on the throttle sensor.

– Unscrew the hot start control ❺.



– Pull the carburetor out of the connection boot and remove from the left side.

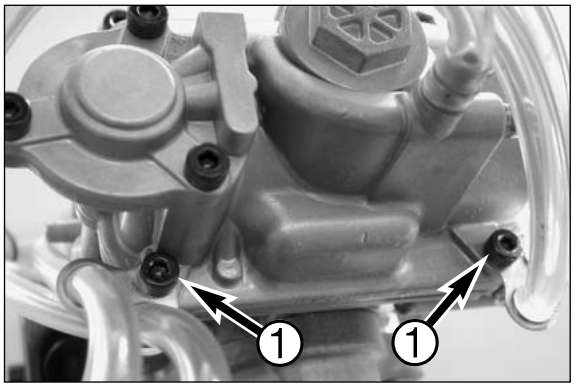
– To mount the carburetor, insert in the connection boot and attach with the hose clamps. Make sure the carburetor is mounted vertically.

– Attach/Adjust both throttle cables and check the throttle grip for smooth operation.

– Connect the throttle sensor connector, screw in the hot start control.

– Run the carburetor vent hoses through the retainer on the rear of the engine.

– Start the engine and check whether the carburetor functions properly. Turn the handlebar all the way to the left and right; the engine speed should not change. If it does, check whether the throttle cables are installed correctly.

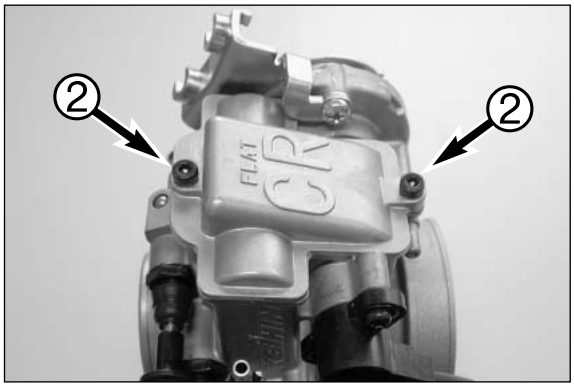


Disassembling the carburetor

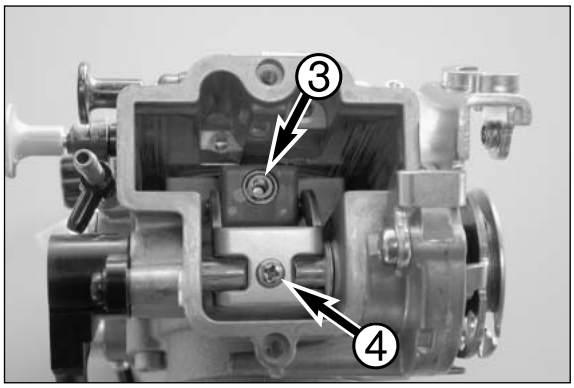
NOTE: Before you start disassembling the carburetor, you should look for a clean workplace. It should offer you enough space to lay out all individual components of the carburetor in perfect order.

– Dismount the carburetor and remove any coarse dirt.

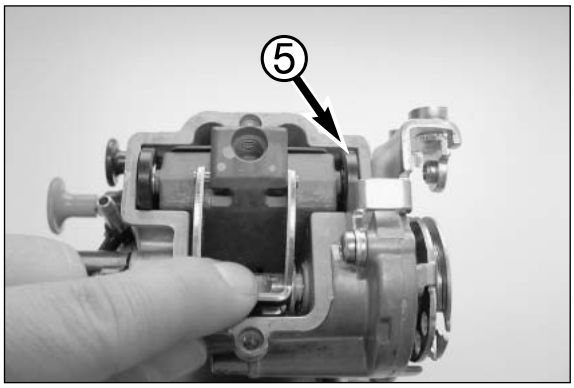
– Loosen both screws ❶ and remove all of the vent hoses from the carburetor.



– Remove both screws ❷ and remove the slide cover and gasket from the carburetor.



– Remove screw ❸ and pull the jet needle out of the throttle slide.
– Remove screw ❹.

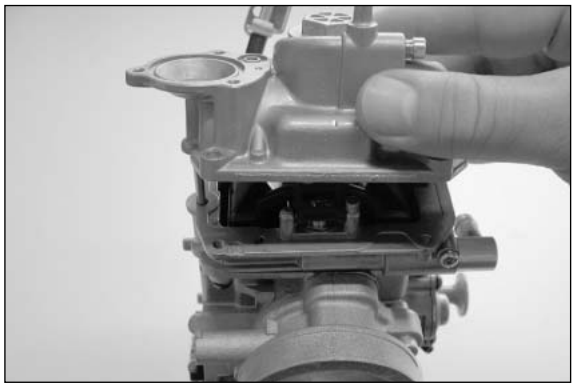


– Pull the throttle slide arm up and take the throttle slide roller ❺ and the slide shim out of the carburetor.

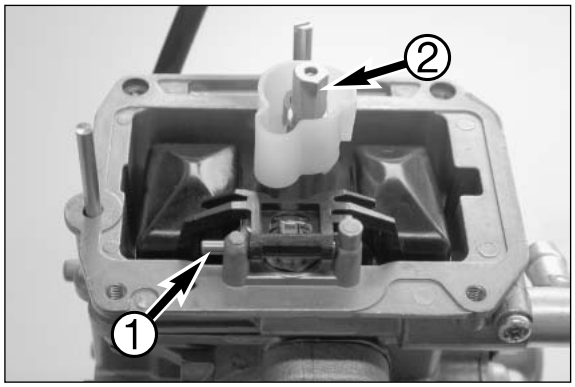
– Turn the carburetor around, remove the 3 screws and remove the cover of the accelerator pump.

NOTE: When dismounting the cover, watch out for the spring and the sealing rings as they may get lost easily.

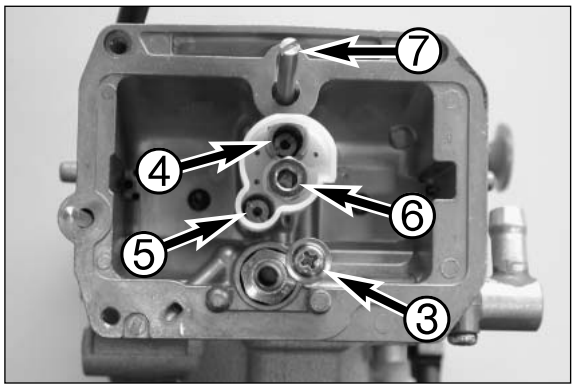
– Remove the 2 sealing rings, the spring and the diaphragm from the pump housing.



– Remove the screws on the float chamber and remove the housing.



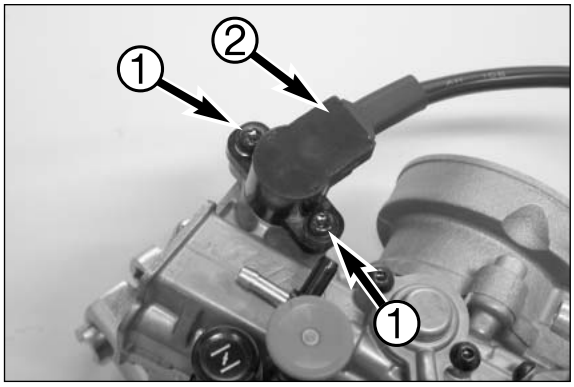
– Pull out the float hinge pin ❶ and remove the float together with the float needle valve.
– Remove the main jet ❷.



– Remove the screw ❸ and use pliers to carefully extract the seat of the float needle valve from the carburetor.
– Screw out the idling jet ❹, the starting jet ❺ and the needle jet ❻.

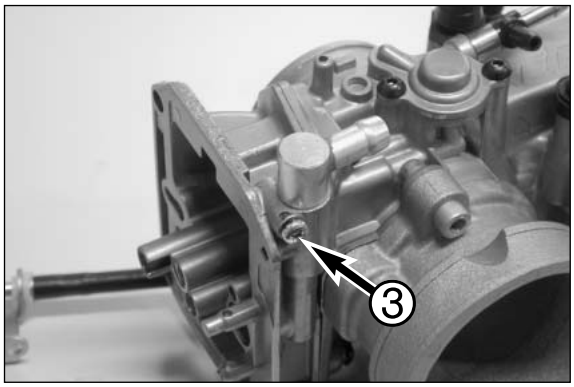
– Turn in the mixture control screw ❼ down to the stop, count the number of turns and write it down.
– Turn out the mixture control screw and dismount it together with the spring, the washer, and the O-ring.

NOTE: The spring, the washer, and the O-ring will usually remain in the bore. These parts can be removed with the help of compressed air.

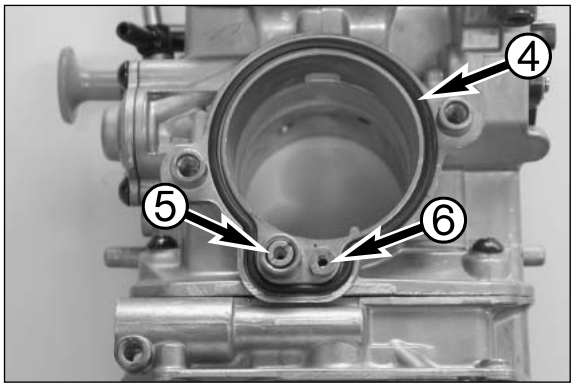


– Remove screws ❶ and the throttle sensor ❷.

NOTE: the throttle sensor should only be dismounted if defective. If the screws ❶ are loosened, the throttle sensor must be adjusted again.



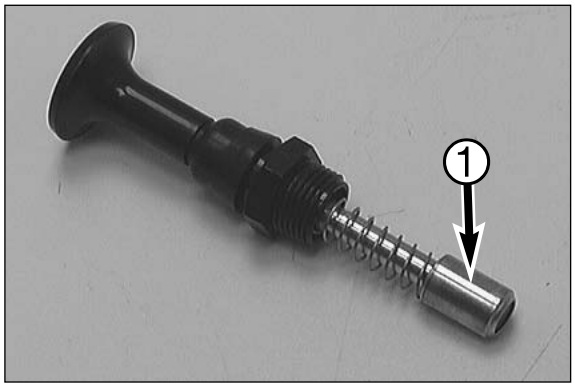
– Remove screw ❸ and pull the connecting piece out of the carburetor.



– Remove the 2 screws and take the intake trumpet together with the O-ring ❹ off the carburetor.
– Unscrew the idle-air jet ❺ and the main air jet ❻.

– Thoroughly clean all jets and other parts and blow compressed air through them.
– Clean the carburetor housing and blow compressed air through all the ducts in the carburetor.

– Check all gaskets for damage and, if necessary, replace them.



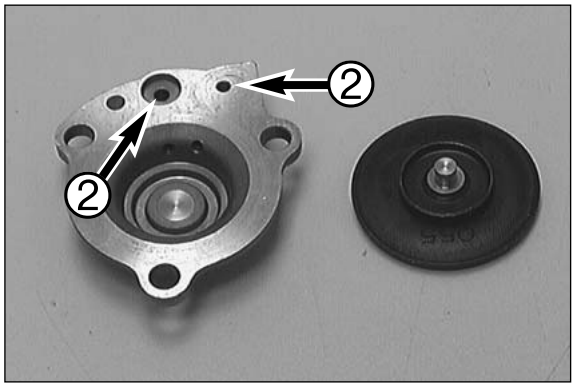
Checking the choke knob and hot start slide

Choke knob:

The choke knob must be easy to actuate .
The piston ❶ of the choke knob must not have any pronounced score marks or deposits.

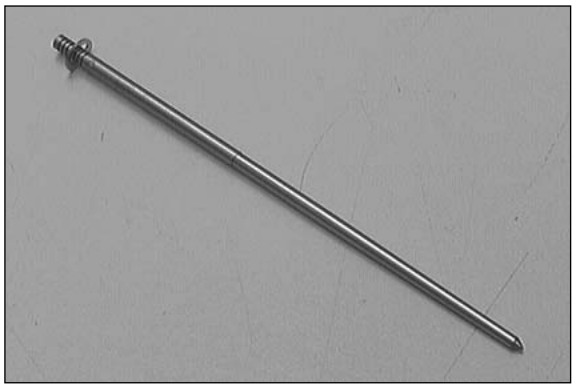
Hot start slide:

The hot start slide must be easily actuated.
The piston on the hot start slide may not have any scores or deposits.



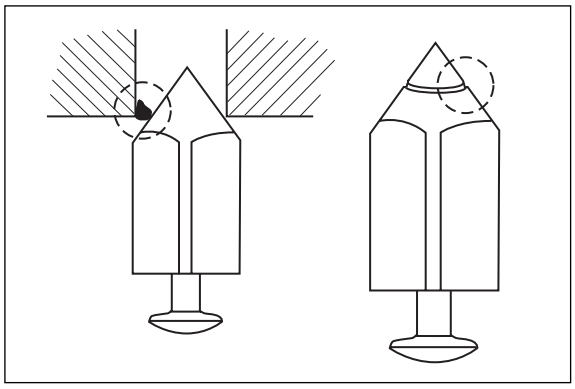
Checking the accelerator pump

Check the membranes for cracking or brittleness.
Check gaskets for damage.
Check if the bores ❷ are unobstructed.



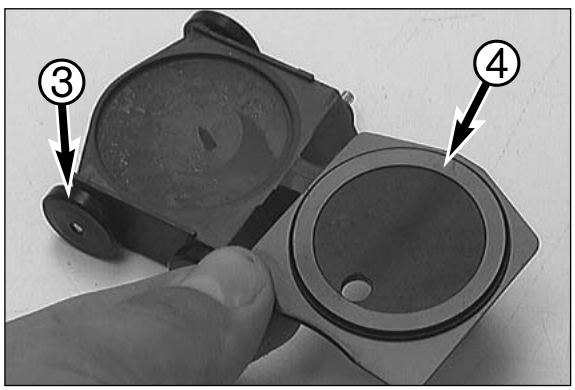
Checking the jet needle

Check the jet needle for bending and wear.



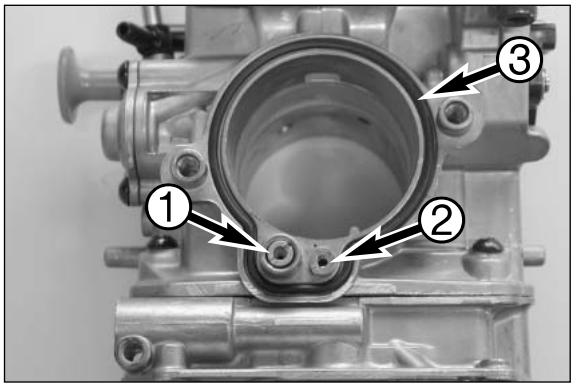
Checking the float needle valve

Check the sealing surface of the needle valve for notches.
There must not be any dirt between the valve seat and the float needle.



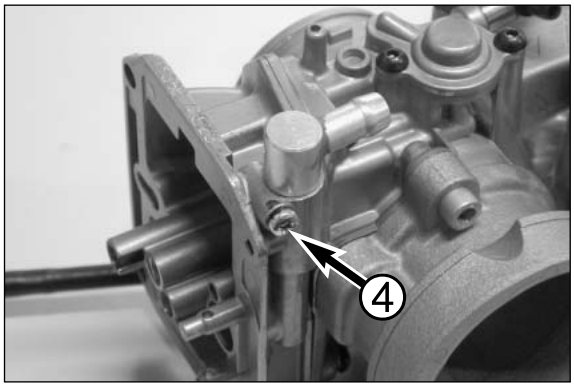
Checking the throttle valve

The rollers ❸ at the throttle valve must be easy to turn and must not have any flat spots.
Check the throttle valve paddles ❹ for damage.



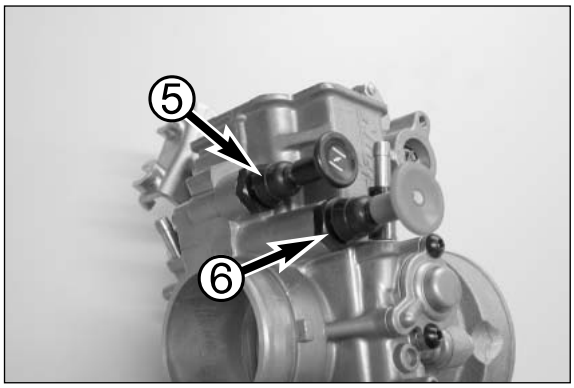
Assembling the carburetor

– Mount the idle-air jet ❶ and the main air jet ❷.
– Place the O-ring ❸ in the groove and secure the intake trumpet to the carburetor by means of the 2 screws.

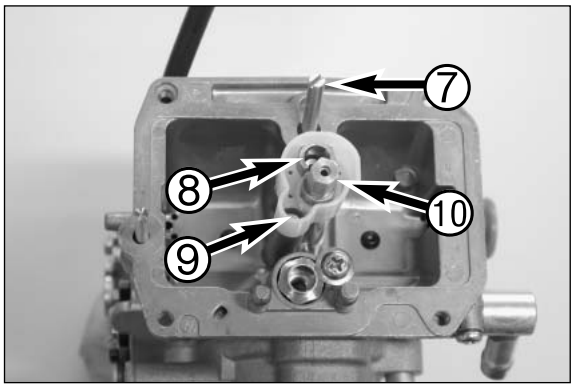


– Insert the fuel port in the carburetor and fix with screw ❹.

NOTE: In the mounted state, the connection piece must be easy to turn.



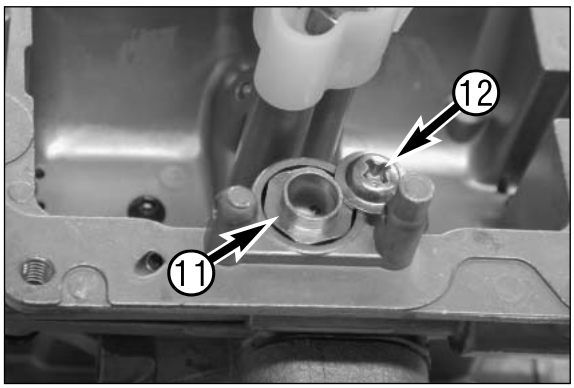
– Mount the choke slide ❺, the hot start knob ❻ and actuate several times, checking for smooth operation. Also make sure the choke and the hot start knob lock into place.



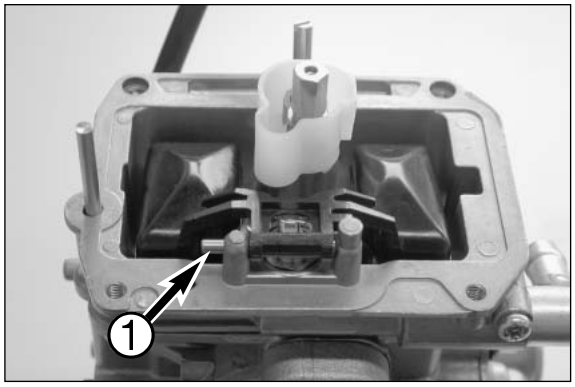
– Thread the spring, the washer and the O-ring onto the mixture control screw ❼ and screw the mixture control screw in as far as it will go.
– Now, unscrew the mixture control screw the number of turns written down during disassembly.

NOTE: See the Technical Specifications for the basic carburetor setting.

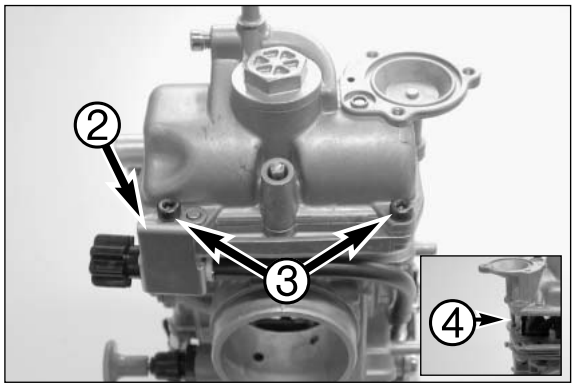
– Mount idling jet ❽, starting jet ❾ and needle jet together with main jet ❿.



– Insert the needle valve seat ⓫ in the bore and fix with screw ⓬.

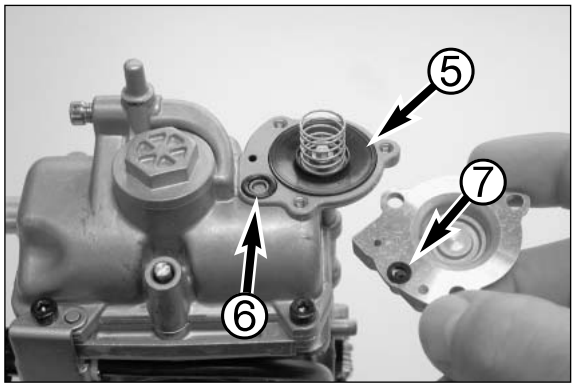


– Position the float and the float needle valve and mount the float hinge pin ❶.
– Check the float level (see page 8-14).

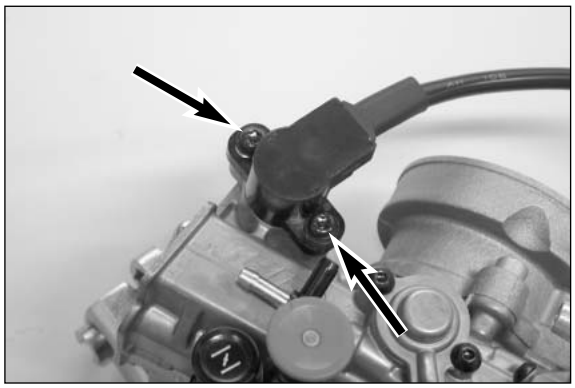


– Mount the float chamber and the gasket, position the bracket for the adjustment screw ❷ and fix the float chamber with the screws ❸.

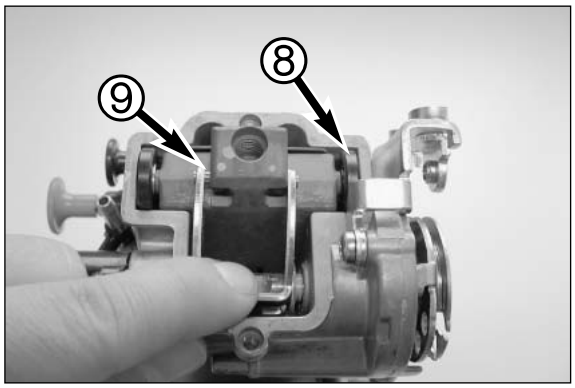
NOTE: When positioning the float chamber, make sure that the push rod ❹ of the accelerator pump slides into the bore.



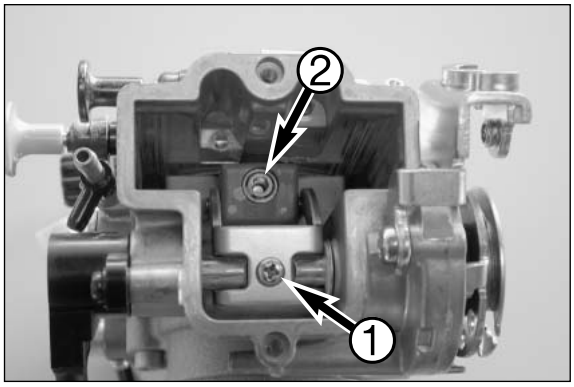
– Place the membrane ❺ with the labeling facing upwards and the spring into the pump housing.
– Place the O-ring ❻ into the groove. Secure the sealing ring ❼ with some grease in the cover and fasten the cover by means of 3 screws.



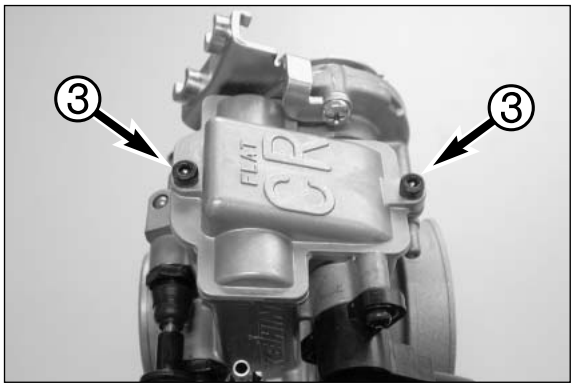
– Mount the throttle valve sensor such that the flat spot at the carburetor engages the groove of the throttle valve sensor and secure it by means of the screw.



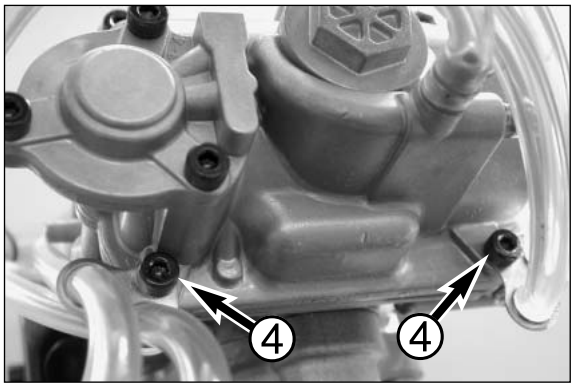
– Pull up the throttle slide arm, push the throttle slide together with roll ❽ and the slide shim into the carburetor so that the rolls ❾ engage in the throttle slide (see illustration).
– Check the throttle slide for smooth operation.



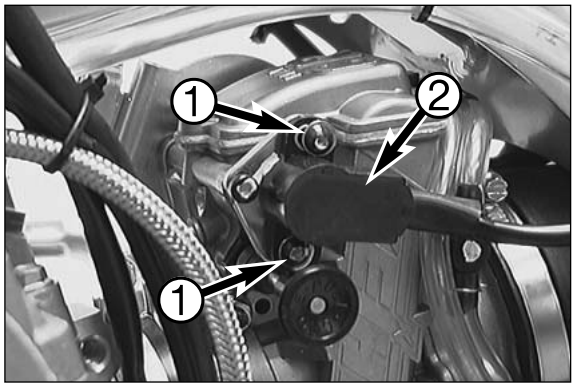
– Apply Loctite 243 to the screw ❶ and tighten.
– Mount the jet needle and fix with the screw ❷.



– Position the slide cover with the gasket and fasten with the 2 screws ❸.



– Fix the vent hoses on the float chamber with the 2 screws ❹.



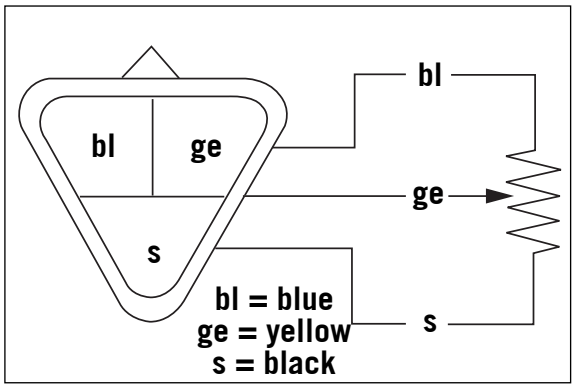
Adjusting the position of the throttle valve sensor

NOTE: Before checking the position of the throttle valve sensor, you have to adjust the idle speed correctly.

– Disengage the plug-and-socket connection of the throttle valve sensor.
– Connect a multimeter (measuring range Ω x 1k) to the **blue (+)** and the **black (-)** cable of the throttle valve sensor and measure the throttle valve resistance.
– Now, multiply this value by 0.15. This yields the adjustment value for the throttle valve sensor.

EXAMPLE:
Throttle valve sensor resistance (bl/s) = 5 kΩ

Throttle valve sensor resistance (ge/s) =
5 kΩ x 0.15 = 750 Ω ± 50 Ω



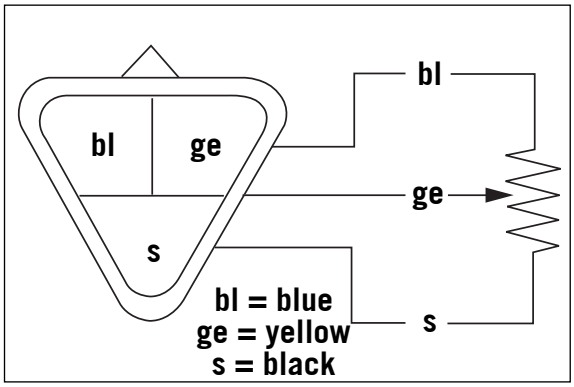
– Connect the multimeter (measuring range Ω x100) to the **yellow (+)** and the **black (-)** cable of the throttle valve sensor and measure the throttle valve sensor resistance with the throttle grip closed. According to the above example, this value should be 750 Ω ± 50 Ω.
– If the value measured does not correspond to the desired value, loosen the 2 screws ❶ and turn the throttle valve sensor ❷ until the instrument displays the desired value.
– Secure the throttle valve sensor in this position by fastening the screws and check the value once more.
– Connect the throttle valve sensor to the wiring harness.

Checking the throttle valve sensor

NOTE: The following measurement must be taken at a component temperature of approx. 20°C.

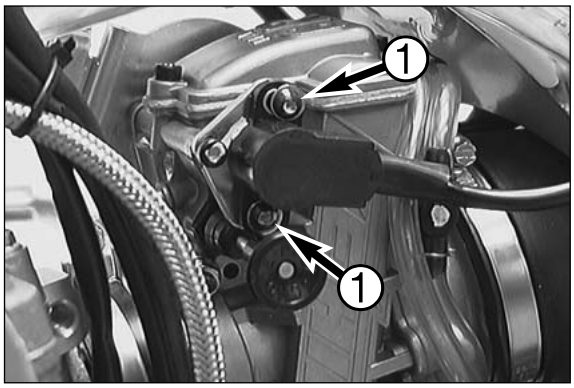
– Open the plug-and-socket connection of the throttle valve sensor.
– Connect a multimeter (measuring range Ω x 1k) to the **blue (+)** and the **black (-)** cable of the throttle valve sensor.

Resistance of throttle valve sensor: 4 - 6 kΩ



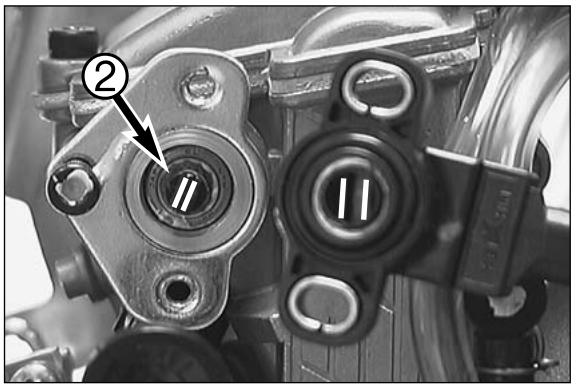
– Now, connect the multimeter to the **yellow (+)** and the **black (-)** cable of the throttle valve sensor.
– As you open the throttle grip slowly, the resistance must change evenly.

Resistance of throttle valve sensor: 0-5 kΩ ±1 kΩ
(while opening the throttle grip)

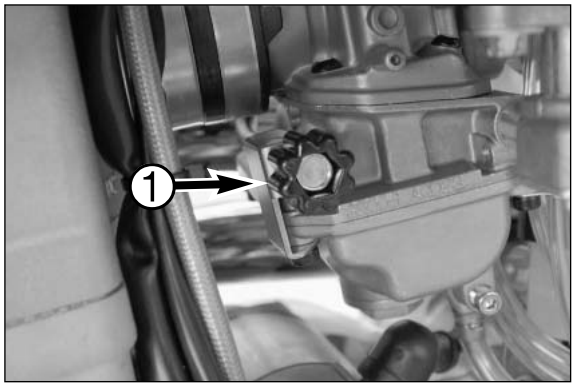


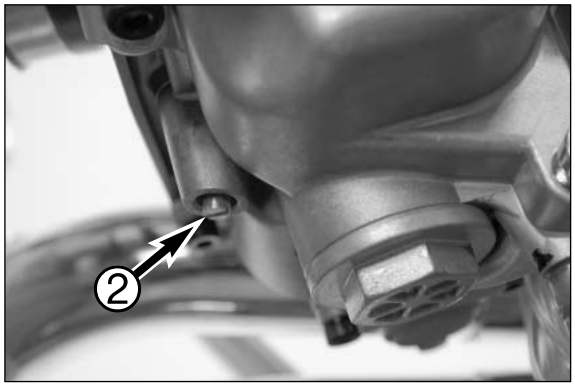
Dismounting and installing the throttle valve sensor

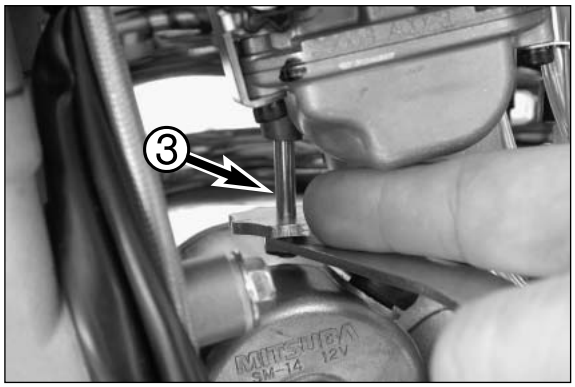
– Disconnect the plug-and-socket connection of the throttle valve sensor and remove the screws ❶.
– Take the throttle valve sensor off the carburetor.



– When mounting the throttle valve sensor, make sure that the flat spot at the throttle valve pin engages the groove on the throttle valve sensor.
– Mount the 2 screws, however, do not yet tighten them fully and adjust the position of the throttle valve sensor. Secure the 2 screws with Loctite 243.







CARBURETOR – Adjust idling

Idling adjustment of the carburetor strongly affects the engine's starting behavior. That is, an engine whose idling speed is adjusted correctly will be easier to start than one whose idling speed has not been adjusted correctly.

The idle speed is controlled by means of the adjusting wheel ❶ and the mixture control screw ❷. The adjusting wheel is used to adjust the basic setting of the slide. The mixture control screw is used to control the idle mixture which arrives at the engine by way of the idle system. Clockwise turning reduces the fuel quantity (lean mixture), counterclockwise turning increases the fuel quantity (rich mixture).

TO ADJUST IDLING CORRECTLY, PROCEED AS FOLLOWS:

1. Turn in mixture control screw ❷ up to the stop, and turn it back out to the basic position (see technical date-engine)
2. Warm up the engine
3. Use the adjusting wheel ❶ to set the normal idle speed (1400 - 1500 rpm).
4. Turn mixture control screw ❷ slowly clockwise until idling speed starts to decrease. Memorize this position, and turn mixture control screw slowly counterclockwise until the idling speed decreases again. Adjust the point of the highest idling speed between these two positions. If, in the course of this procedure, the speed undergoes a relatively high increase, reduce the idle speed to a normal level and repeat the procedure specified in 4. Serious competitive racers will choose a setting approx. 1/4 turn (clockwise) leaner than this ideal value because their engine will heat up more when used in competitions.

NOTE: If you fail to obtain a satisfying result by following the procedure described above, an incorrectly dimensioned idling nozzle may be the cause. If:

a) the mixture control screw has been screwed in up to the stop without causing any change in rotational speed, a smaller idling jet has to be installed;

b) the engine dies when the mixture control screw is still open by 2 turns, a larger idling jet needs to be selected.

Naturally, in cases of jet changes, you have to start your adjusting work from the beginning.

5. Then, use the adjusting wheel to set the desired idle speed.
6. In cases of greater changes in the outside temperature and extremely different altitudes, the idling speed should be readjusted.

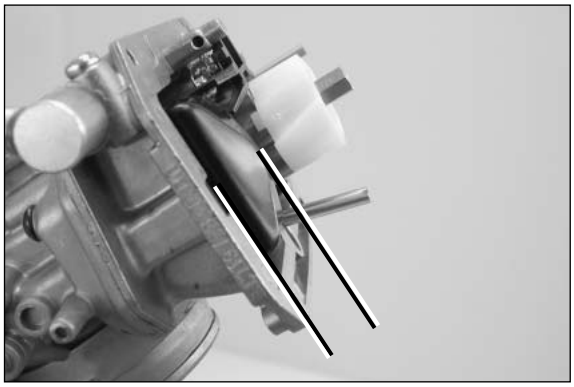
Basic information on carburetor wear

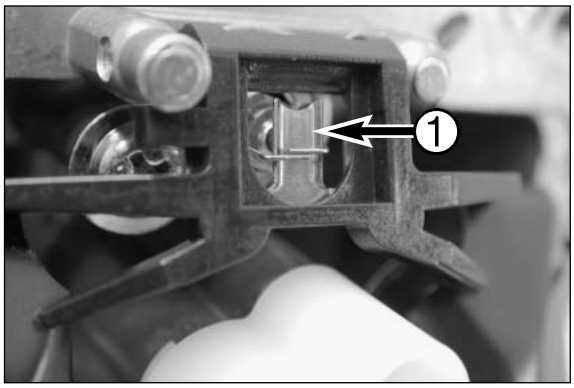
As a result of engine vibrations, the throttle valve, jet needle, and needle jet are subjected to increased wear. This wear may cause the carburetor to malfunction (e.g., overly rich mixture). Therefore, these parts should be replaced after 200 hours.

Adjusting the mixture control screw

Introduce the special tool 590.29.034.000 on the mixture control screw ❷ at the carburetor bottom. Press the tool slightly upward and turn the adjusting wheel ❸ until the tool engages the slot of the mixture control screw.

Now, you can go about adjusting the screw. Marks were provided on the adjusting wheel, making it easier to keep track of the turns.





Checking the float level (float height)

For this purpose, dismount the carburetor and remove the float chamber. Hold the carburetor in a slanted position such that the float will abut the float needle valve but not compress it.
In this position, the edge of the float should be parallel with the float chamber sealing surface (see illustration).
If the float height does not correspond to the desired value, check the float needle valve and, if necessary, replace it.

If the float needle valve is o.k., you can adjust the float height by bending the float lever ❶.

Mount the float chamber, install the carburetor, and adjust the idle speed.

TROUBLE SHOOTING 9

INDEX

Art.-No. 3.206.052-E

TROUBLE	CAUSE	REMEDY
Engine doesn't crank (E-starter).	Blown fuse	Dismount the left paneling and the filter box cover and replace the fuse in the starter relay.
	Discharged battery.	Recharge the battery and investigate the causes for discharging; contact a KTM dealer.
Engine cranks but doesn't start (E-starter).	Operating error	Open fuel tap, tank fuel, actuate choke. Pay attention to starting information (see driving instructions).
Engine will not start (Kickstarter).	The motorcycle has been out of operation for a longer period of time. Therefore old fuel has accumulated in the float chamber	The easily inflammable components of the new fuels evaporate during longer periods of standing still. When the motorcycle has been out of operation for more than a week, it is therefore recommended to drain the old fuel from the float chamber. The engine will immediately start when the float chamber is filled with new fuel.
	Fuel supply interrupted	Close fuel tap, loosen fuel hose at carburetor, lead into a basin and open fuel tap – if fuel leaks out, the carburetor may need cleaning – if no fuel leaks out, check tank ventilation, i.e. clean fuel tap
	Flooded engine	Clean and dry the spark plug or exchange it, respectively
	Sooty or wet spark plug	Clean and dry the spark plug or exchange it, respectively
	Electrode gap too large	Adjust spark plug electrode gap to 0.6 mm
	Spark plug connector or spark plug faulty	Dismount spark plug, connect ignition cable, hold to ground (blank place on engine) and actuate starter, a strong spark must be produced at the spark plug – If no spark is created replace the spark plug. – If the new spark plug doesn't produce a spark either, disconnect the spark plug connector from the ignition cable, hold it a distance of approx. 5 mm from ground and start. – If a spark now occurs, replace spark plug cap – If no spark is produced, control ignition system
	Short circuit cable scored in wiring harness, short circuit button faulty	Dismount the fuel tank, disconnect the black/yellow cable from the cable of the short-circuit button, respectively, and check the ignition spark. If a spark is generated, look for the problem in the short-circuit circuit.
	The plug connection of the CDI-unit, the pulse generator or the ignition coil has oxydized	Remove the seat and the fuel tank. Clean the plug connection and treat it with contact spray
	Water in carburetor or jets blocked	Dismount and clean the carburetor
Engine fails to idle	Glogged idling jet	Disassemble the carburetor and clean the jets
	Incorrect adjustment of adjusting screws on carburetor	Have the carburetor adjusted
	Defective spark plug	Replace the spark plug
	Defective ignition system	Have the ignition system checked

TROUBLE	CAUSE	REMEDY
Engine does not rev up	Carburetor fuel level too high because float needle valve is dirty or worn out	Dismount carburetor and check if worn out
	Loose carburetor jets	Tighten jets
	Electronic ignition timing faulty	Have ignition system checked
Engine will not reach full power	Fuel supply partially interrupted or carburetor dirty	Clean and check fuel system as well as carburetor
	Float leaks	Replace the float
	Air filter very dirty	Clean or replace air filter
	Exhaust system is not tight, deformed, or the silencer does not contain enough glassfiber yarn	Check if exhaust is damaged, replace glasfiber yarn in exhaust silencer
	Valve gap too small	Adjust valve gap
	Electronic ignition timing faulty	Have ignition system checked
Engine stops or splutters in carburetor	Insuffient fuel	Clean and check fuel system and carburettor
	Engine takes air out of control	Check rubber sleeve and carburetor for tight fit
Engine gets too hot	Insufficient cooling liquid	Refill cooling liquid (see maintenace work), check cooling system for leaks
	Not enough air stream	Drive on briskly
	Cooling system has not been bled	Bleed cooling system
	Radiators very dirty	Clean radiators with water jet
	Foam formation in cooling system	Replace cooling liquid, use antifreeze liquid with brand name
	Bent cooling hose	Shorten or replace cooling hose
High oil consumption	Hose of engine ventilation is bent	Dislocate i.e. replace non-buckling vetilation hose
	Engine oil level too high	Check engine oil level and, if necessary, correct it
	Motor oil too thin (viscosity)	Use thicker engine oil; see chapter “Engine oil“
The battery is discharged	The battery isn’t charged by the generator because	Remove seat and fuel tank and check voltage regulator connections; voltage regulator and generator should be checked by a KTM dealer.

TECHNICAL SPECIFICATIONS 10

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TECHNICAL DATA – ENGINE 250 SX-F 2005/06/07, SXS-F 2006/07

Design	Liquid-cooled single cylinder 4-stroke engine
Displacement	249.51 ccm
Bore/Stroke	76 / 55 mm
Ratio	12.8 : 1
Fuel	unleaded fuel with at least RON 95
Valve timing	4 valves controlled by finger levers and 2 camshafts, driven by a pair of spur gears and a tooth-type chain
Camshaft	05
Valve diameter Intake	30.9 mm
Valve diameter Exhaust	26.5 mm
Valve clearence cold Intake	0.10 - 0.20 mm
Valve clearence cold Exhaust	0.12 - 0.22 mm
Crank shaft bearing	2 cylinder roller bearings
Connecting rod bearing	needle bearing
Top end bearing	bronze bushing
Piston	alluminium alloy forged
Piston rings	1 compression ring, 1 oil scraper ring
Engine lubrication	pressure circulation lubrication with 2 rotor pumps
Engine oil	full synthetic oil (Motorex Power Synt 4T 10W/50)
Quantity of engine oil	1.1 liters
Primary drive	22:68
Transmission claw shifted	6-speed
1st gear	13:32
2nd gear	15:30
3rd gear	17:28
4th gear	19:26
5th gear	21:25
6th gear	22:24
Ignition system	contactless DC-CDI ignition with digital advanced system by KOKUSAN
Generator	no generator
Spark plug	NGK CR 9 EBK
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanically driven water pump
Cooling liquid	1.2 liters, 50% antifreeze, 50% destilled water, at least -25° (-13° F)

BASIC CARBURATOR SETTING				
	250 SX-F 2005/06	**250 SXS-F 2006**	**250 SX-F 2007**	**250 SXS-F 2007**
Type	Keihin FCR-MX 39			
Main jet	168	180	175	180
Jet needle	OBETP			
Idling jet	40			
Main air jet	200			
Idling air jet	100			
Needle position	5th from top			
Starting jet	85			
Mixture control screw open	1,25			
Slide	15			
Performance restrictor	–			
Stop pump membrane	858 / 2,15 mm			
Leak jet	-			50
Hot start device	2,5 mm			

TECHNICAL DATA – CHASSIS 250 SX-F 2005/06, SXS-F 2006

Frame	Central tube chrome-moly-steel frame
Fork	4860 MA/PA
Wheel travel front/rear	300/335 mm
Rear suspension	WP Progressive Damping System shock absorber, aluminium swing arm
Front brake	Disk brake with carbon-steel brake disc Ø 260 mm, brake caliper floated
Rear brake	Disk brake with carbon-steel brake disc Ø 220 mm, brake caliper floated
Brake disc	Wear limit max. 2,5 mm front and 3,5 mm rear
Front tires Air pressure offroad	80/100 - 21“ 1,0 bar
Rear tires Air pressure offroad	100/90 - 19“ 1,0 bar
Fuel tank capacity	7 liters
Final drive ratio	13:48 Z
Chain	X-ring 5/8 x 1/4 "
Steering head angle	63,5°
Wheel base	1481 ± 10 mm
Seat height, unloaded	925 mm
Ground clearance, unloaded	380 mm

STANDARD-ADJUSTMENT – FORK			
	250 SX-F 2005 WP 4860 MA/PA 14.18.7A.03	**250 SX-F 2006** WP 4860 MA/PA 14.18.7B.03	**250 SXS-F 2006** WP 4860 MA/PA 14.18.7B.15
Compression adjuster	22	20	22
Rebound adjuster	20	18	24
Spring	4,4 N/mm		
Spring preload	5 mm		5,5 mm
Air chamber length	100 mm		-
Fork oil	SAE 5		

STANDARD-ADJUSTMENT – SHOCK ABSORBER			
	250 SX-F 2005 WP PDS 5018 DCC 12.18.7A.03	**250 SX-F 2006** WP PDS 5018 DCC 12.18.7B.03	**250 SXS-F 2006** WP PDS 5018 DCC 12.18.7B.11
Compression adjuster	15 LS (low speed) 2 HS (high speed)	2,5 HS (high speed)	12 LS (low speed) 2 HS (high speed)
Rebound adjuster	22		25
Spring	80/250	76/250	84-250
Spring preload	5 mm		

TECHNICAL DATA – CHASSIS 250 SX-F/SXS-F 2007

Frame	Central tube chrome-moly-steel frame
Fork	WP 4860 CC MA
Wheel travel front/rear	300/335 mm
Rear suspension	WP PDS shock absorber 5018 DCC, aluminium swing arm
Front brake	Disk brake with carbon-steel brake disc Ø 260 mm, brake caliper floated
Rear brake	Disk brake with carbon-steel brake disc Ø 220 mm, brake caliper floated
Brake disc	Wear limit max. 2.5 mm front and 3.5 mm (SXS-F: 3,8 mm) rear
Front tires Air pressure offroad	80/100-21“ 1.0 bar
Rear tires Air pressure offroad	110/90-19“ 1.0 bar
Fuel tank capacity	8 liters (2.1 US gall.)
Final drive ratio	13:48
Chain	5/8 x 1/4“
Available final sprockets	38, 40, 42, 45, 48, 49, 50, 51, 52
Steering head angle	63.5°
Wheel base	1475 ± 10 mm
Seat height, unloaded	925 mm
Ground clearance, unloaded	380 mm
Weight (without fuel)	approx . 98.2 kg

STANDARD-ADJUSTMENT – FORK		
	250 SX-F	**250 SXS-F**
	WP 4860 CC MA 14.18.7C.03	WP 4860 CC MA 14.18.7C.15
Compression adjuster	15	
Rebound adjuster	20	
Spring	4,4 N/mm	
Oil capacity without CC	385 ml	
Oil capacity CC	195 ml	
Gas pressure	1,2 bar	
Fork oil	SAE 5	

STANDARD-ADJUSTMENT – SHOCK ABSORBER		
	250 SX-F	**250 SXS-F**
	WP PDS 5018 DCC 12.18.7C.03	WP PDS 5018 DCC 12.18.7C.011
Compression adjuster	15 LS (low speed)	12 LS (low speed)
	1 HS (high speed)	24 HS (high speed)
Rebound adjuster	25	20
Spring	63-250	69-250
Spring preload	5 mm	4 mm

TECHNICAL DATA – ENGINE 250 XC-F, XCF-W, EXC-F 2007

ENGINE	250 XC-F	250 XCF-W, EXC-F
Design	Liquid-cooled single cylinder 4-stroke engine	
Displacement	249.51 ccm	
Bore/Stroke	76 / 55 mm	
Ratio	12.8 : 1	
Fuel	unleaded fuel with at least RON 95 (USA = Premium PON 91)	
Valve timing	4 valves controlled by finger levers and 2 camshafts, driven by a pair of spur gears and a tooth-type chain	
Camshaft	Intake: 770.36.009.100 / Exhaust: 770.36.110.100	
Valve diameter Intake	30.9 mm	
Valve diameter Exhaust	26.5 mm	
Valve clearence cold Intake	0.10 - 0.20 mm (0.004 - 0.008 in)	
Valve clearence cold Exhaust	0.12 - 0.22 mm (0.005 - 0.009 in)	
Crank shaft bearing	2 cylinder roller bearings	
Connecting rod bearing	needle bearing	
Top end bearing	bronze bushing	
Piston	alluminium alloy forged	
Piston rings	1 compression ring, 1 oil scraper ring	
Engine lubrication	pressure circulation lubrication with 2 rotor pumps	
Engine oil	full synthetic oil (Motorex Power Synt 4T 10W/50)	
Quantity of engine oil	1.1 liters	
Primary drive	22:68	
Clutch	multiple disc clutch in oil bath, hydraulically operated (brake fluid DOT 5.1)	
Transmission claw shifted	6-speed	6-speed
1st gear	13:32	13:33
2nd gear	15:30	17:33
3rd gear	17:28	19:29
4th gear	19:26	23:28
5th gear	21:25	23:23
6th gear	22:24	26:22
Ignition system	contactless DC-CDI ignition with digital advanced system by KOKUSAN	
Generator	12 V 150 W	
Spark plug	NGK CR 9 EBK	
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanically driven water pump	
Cooling liquid	1.2 liters, 50% antifreeze, 50% destilled water, at least -25° (-13° F)	
Starting equipment	kick - electric starter	

BASIC CARBURATOR SETTING				
	250 XCF-W ZA	250 XC-F, XCF-W USA	250 EXC-F EU, AUS	250 EXC-F SIXDAYS
Type	Keihin FCR-MX 3900G	Keihin FCR-MX 3900G	Keihin FCR-MX 3900G	Keihin FCR-MX 3900G
Main jet	168	168	168	172
Jet needle	OBETP	OBEKT	OBEKT	OBETP
Idling jet	42	40	40	42
Main air jet	200	200	200	200
Idling air jet	100	100	100	100
Needle position	5th from top	3rd from top	2nd from top	5th from top
Starting jet	85	85	85	85
Mixture control screw open	1,25	0,75	0,75	1,25
Slide	15	15	15	15
Performance restrictor	–	–	Slide stop	–
Stop pump membrane	858 / 2,15 mm	858 / 2,15 mm	858 / 2,15 mm	858 / 2,15 mm
Leak jet	70	70	70	70

TECHNICAL DATA – CHASSIS 250 250 XC-F, XCF-W, EXC-F 2007

Frame	Central tube chrome-moly-steel frame
Fork	WP Suspension – 4860 MXMA / MXMA + PA
Wheel travel front/rear	300/335 mm
Rear suspension	WP Suspension – 5018 PDS MCC / DCC, aluminium swing arm
Front brake	Disk brake with carbon-steel brake disc Ø 260 mm (10.2 in), brake caliper floated
Rear brake	Disk brake with carbon-steel brake disc Ø 220 mm (8.7 in), brake caliper floated
Brake disc	Wear limit max. 2,5 mm front and 3,5 mm rear
Front tires	XC-F, XCF-W: 80/100-21“ EXC-F: 90/90-21“
Air pressure offroad Air pressure road	1,0 bar 1,5 bar
Rear tires	XC-F, XCF-W: 100/100-18“ EXC-F: 120/90-18“
Air pressure offroad Air pressure road	1,0 bar 2,0 bar
Fuel tank capacity	C-F, XCF-W, EXC-F AUS: 8,5 Liter EXC-F EU: 7 Liter
Final drive ratio	XC-F: 13:48 XCF-W: 13:52 EXC-F: 14:38
Chain	5/8 x 1/4“
Available final sprockets	38, 40, 42, 45, 48, 49, 50, 51, 52
Bulbs (EXC)	headlight 12V 35/35W (socket BA20D) parking light 12V 5W (socket W2, 1x9,5d) brake - rear light 12V 21/5W (socket BaY15d) flasher light 12V 10W (socket Ba15s)
Battery	maintenance-free battery 12V 4Ah
Steering head angle	63.5°
Wheel base	1475 ± 10 mm
Seat height, unloaded	925 mm
Ground clearance, unloaded	380 mm
Weight (without fuel)	approx. 107 kg (235.4 lbs)

STANDARD ADJUSTMENT – FORK		
	250 XCF-W 250 EXC-F	**250 XC-F 250 EXC-F SIXDAYS**
	WP 4860 MXMA 14187C04	WP 4860 MXMA + PA 14187C28
Compression adjuster	20	18
Rebound adjuster	20	20
Spring	4.2 N/mm	4.4 N/mm
Spring preload	–	2 turns
Air chamber length	110 mm	110 mm
Fork oil	SAE 5	SAE 5

STANDARD ADJUSTMENT – SHOCK ABSORBER		
	250 XCF-W 250 EXC-F	**250 XC-F 250 EXC-F SIXDAYS**
	WP 5018 PDS MCC 12187C04	WP 5018 PDS DCC 12187C28
Compression adjuster	15	15 LS (low speed) 1.0 HS (high speed)
Rebound adjuster	25	24
Spring	76/250	76/250
Spring preload	5 mm	5 mm

TECHNICAL DATA – ENGINE 250 SX-F, XC-F, XCF-W, EXC-F 2008

ENGINE	250 SX-F, XC-F	250 XCF-W, EXC-F
Design	Liquid-cooled single cylinder 4-stroke engine	
Displacement	249.51 ccm	
Bore/Stroke	76 / 55 mm	
Ratio	12.8 : 1	
Fuel	unleaded fuel with at least RON 95 (USA = Premium PON 91)	
Valve timing	4 valves controlled by finger levers and 2 camshafts, driven by a pair of spur gears and a tooth-type chain	
Valve diameter Intake	30.9 mm	
Valve diameter Exhaust	26.5 mm	
Valve clearence cold Intake	0.10 - 0.15 mm	
Valve clearence cold Exhaust	0.12 - 0.17 mm	
Crank shaft bearing	2 cylinder roller bearings	
Connecting rod bearing	needle bearing	
Top end bearing	bronze bushing	
Piston	alluminium alloy forged	
Piston rings	1 compression ring, 1 oil scraper ring	
Engine lubrication	pressure circulation lubrication with 2 rotor pumps	
Engine oil	full synthetic oil (Motorex Power Synt 4T 10W/50)	
Quantity of engine oil	1.1 liters	
Primary drive	22:68	
Clutch	multiple disc clutch in oil bath, hydraulically operated (brake fluid DOT 5.1)	
Transmission claw shifted	6-speed	6-speed
1st gear	13:32	13:33
2nd gear	15:30	17:33
3rd gear	17:28	19:29
4th gear	19:26	23:28
5th gear	21:25	23:23
6th gear	22:24	26:22
Ignition system	contactless DC-CDI ignition with digital advanced system by KOKUSAN	
Generator	12 V 80 W at 5000 rpm, SX-F without generator	
Spark plug	NGK CR 9 EBK	
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanically driven water pump	
Cooling liquid	1.2 liters, 50% antifreeze, 50% destilled water, at least -25° (-13° F)	
Starting equipment	Kick-and Electric starter; SX-F kickstarter only	

BASIC CARBURATOR SETTING					
	250 SX-F	250 XC-F/XCF-W ZA	250 XCF-W USA	250 EXC-F EU, AUS	250 EXC-F Six Days
Type Keihin FCR-MX	3925F	3900K	3900K	3900H	3900K
Main jet	175	168	168	168	172
Jet needle	OBETP	OBETP	OBEKT	OBDYS	OBETP
Idling jet	40	40	42	42	42
Main air jet	200	200	200	200	200
Idling air jet	100	100	100	100	100
Needle position	4th from top	4th from top	3rd from top	3rd from top	5th from top
Starting jet	85	85	85	65	85
Mixture control screw open	1	1	1,5	1,25	1,25
Slide	15	15	15	15	15
Performance restrictor	–	–	–	Slide stop	–
Leak jet	–	–	50	70	70
Hot start device	2.5 mm	–	–	–	–

TECHNICAL DATA – CHASSIS 250 SX-F, XC-F, XCF-W, EXC-F 2008

Frame	Central tube chrome-moly-steel frame
Fork	WP Suspension – 4860 MXMA CC / MXMA + PA
Wheel travel front/rear	300/335 mm
Rear suspension	WP Suspension – 5018 PDS DCC, aluminium swing arm
Front brake	Disk brake with carbon-steel brake disc Ø 260 mm (10.2 in), brake caliper floated
Rear brake	Disk brake with carbon-steel brake disc Ø 220 mm (8.7 in), brake caliper floated
Brake disc	Wear limit max. 2,5 mm front and 3,5 mm rear
Front tires	SX-F, XC-F, XCF-W 80/100-21“ EXC-F, EXC-F Six Days 90/90-21“
Air pressure offroad Air pressure road	1.0 bar 1.5 bar
Rear tires	SX-F 100/90-19“ XC-F, XCF-W 100/100-18“ EXC-F, EXC-F Six Days 120/90-18“
Air pressure offroad Air pressure road	1.0 bar 2.0 bar
Fuel tank capacity	250 SX-F: 7.2 liters 250 XC-F, XCF-W, EXC-F: 9.2 liters, 2 liters Reserve
Final drive ratio	250 SX-F, XC-F 13:48 250 XCF-W, EXC-F Six Days 13:52 250 EXC-F 14:38 (13:52)
Chain	5/8 x 1/4“
Available final sprockets	38, 40, 42, 45, 48, 49, 50, 51, 52
Bulbs (250 XCF-W ZA, 250 EXC-F, Six Days)	headlight 12V 35/35W (socket BA20D) parking light 12V 5W (socket W2, 1x9,5d) brake - rear light 12V 21/5W (socket BaY15d) flasher light 12V 10W (socket Ba15s)
Battery	maintenance-free battery 12V 4Ah
Steering head angle	63.5°
Wheel base	1475 ± 10 mm
Seat height, unloaded	925 mm (36.5 in)
Ground clearance, unloaded	380 mm
Weight (without fuel)	SX-F: 96.5 kg XC-F: 104.2 kg XCF-W USA: 105.2 kg XCF-W ZA, EXC-F, EXC-F Six Days: 107.2 kg

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STANDARD ADJUSTMENT – FORK				
	250 SX-F	**250 XC-F**	**250 XCF-W, EXC-F**	**250 EXC-F Six Days**
	WP 4860 MXMA CC 14.18.7D.03	WP 4860 MXMA CC 14.18.7D.28	WP 4860 MXMA PA 14.18.7D.04	WP 4860 MXMA PA 14.18.7D.34
Compression adjuster	14	20	22	24
Rebound adjuster	21	21	20	22
Spring	4.4 N/mm	4.4 N/mm	4.2 N/mm	4.4 N/mm
Spring preload	–	–	2 turns	2 turns
Air chamber length	–	–	110 mm	110 mm
Fork oil	SAE 5	SAE 5	SAE 5	SAE 5

STANDARD ADJUSTMENT – SHOCK ABSORBER				
	250 SX-F	**250 XC-F**	**250 XCF-W, EXC-F**	**250 EXC-F Six Days**
	WP 5018 PDS DCC 12.18.7D.03	WP 5018 PDS DCC 12.18.7D.28	WP 5018 PDS DCC 12.18.7D.04	WP 5018 PDS DCC 12.18.7D.34
Compression adjuster	14 LS (low speed) 1.0 HS (high speed)	15 LS (low speed) 1.0 HS (high speed)	15 LS (low speed) 1.5 HS (high speed)	15 LS (low speed) 1.5 HS (high speed)
Rebound adjuster	23	23	24	22
Spring	66/250	66/250	69/250	69/250
Spring preload	5 mm	5 mm	6 mm	8 mm

ASSEMBLY CLEARANCE, WEAR LIMIT

Crankshaft	axial clearance	0.25 - 0.35 mm
	run out of crank stud	max 0.15 mm
	crankshaft webs - measure outer dimension	54 mm ± 0.05 mm
Conrod bearing	radial clearance	max. 0.03 mm
	axial clearance	max. 0.8 mm
Cylinder	bore diameter size I	76.000 - 76.012 mm
	bore diameter size II	76.013 - 76.025 mm
Piston	diameter size I	75.960 - 75.970 mm
	diameter size II	75.971 - 75.980 mm
	assembly clearance size I	0.030 - 0.052 mm
	assembly clearance size II	0.032 - 0.055 mm
	wear limit	0.070 mm
Piston ring end gap	compression ring	max. 0.80 mm
	oil scraper ring	max. 1.00 mm
Valves	seat sealing intake	max. 1.50 mm
	seat sealing exhaust	max. 1.50 mm
	spring washer	0.90 mm
Valve springs	minimum length	38.50 mm
Oil pumps	clearance outer rotor - housing	max. 0.20 mm
	clearance outer rotor - inner rotor	max. 0.20 mm
	axial clearance	0.12 mm
Bypass valve	minimum spring length	23.5 mm
Clutch	length of springs	min. 37.0 mm (new 38.0 mm)
	wear limit	min. 2.90 mm
Transmission shafts	axial clearance	0.1 - 0.4 mm
	eccentricity	0.06 mm

TIGHTENING TORQUES - ENGINE		
Oil drain plug	M12x1.5	20 Nm
HH plug, long oil screen	M20x1.5	15 Nm
AH plug, short oil screen	M16x1.5	oil + 15 Nm
Pressure relief valve plug	M12x1.5	20 Nm
HH/AH screws on oil pump cover	M5	Loctite 222 + 6 Nm
Cylinder head screws	M10	oil + 40/50 Nm
Oil spraying nozzle “70”	M6x0.75	Loctite 243 + 4 Nm
Oil reducing jet “150”	M4	by hand + Loctite 243
HH collar screws on exhaust flange	M6	Loctite 243 + 10 Nm
Camshaft screw	M12x1	Loctite 243 + 80 Nm
HH collar screw/nut on camshaft bearing bridge	M7	oil + 18 Nm
Camshaft bearing bridge stud	M7	by hand + Loctite 2701
Camshaft bearing bridge oil spraying nozzle “50”	M5	Loctite 243 + 4 Nm
HH nut primary gear	M18x1.5	Loctite 243 + 150 Nm
HH nut clutch drive	M18x1.5	Loctite 243 + 120 Nm
HH collar screws clutch springs	M6	10 Nm
AH screw shift roller lock	M6	Loctite 243 + 10 Nm
HH collar screw locking lever	M5	Loctite 243 + 6 Nm
Lock screw on shift drum bearing	M6	Loctite 243 + 6 Nm
Lock screw on main shaft bearing	M6	Loctite 243 + 6 Nm
HH collar screw on securing guide/tensioning rail	M6	Loctite 243 + 10 Nm
Plug on chain tensioner	M24x1.5	25 Nm
Bearing bolt for chain guide rail	M8	Loctite 243 + 10 Nm
HH collar screws on stator	M5	Loctite 243 + 6 Nm
HH collar screws on pulse generator	M5	Loctite 243 + 6 Nm
HH collar nut on rotor	M12x1	60 Nm
HH collar screw on kickstarter stopper	M6	Loctite 243 + 10 Nm
HH collar screw on cable retaining bracket (ignition)	M6	Loctite 243 + 6 Nm
AH screw on kickstarter	M8	Loctite 243 + 25 Nm
HH collar screw on shift lever	M6	Loctite 243 + 10 Nm
HH screw on engine sprocket	M10	Loctite 243 + 60 Nm
Spark plug	M10	12 Nm
HH collar screw on valve cover shield	M6	Loctite 243 + 3 Nm
Engine locking screw	M8	20 Nm
Remaining engine screws	M5	6 Nm
	M6	10 Nm

TIGHTENING TORQUES - CHASSIS

Collar screw, front wheel spindle	M24x1,5	40 Nm
Brake caliper, front	M8	Loctite 243 + 25 Nm
Brake disks	M6	14 Nm
Clamping screws, upper fork bridge XCF-W ZA, EXC-F	M8	20 Nm
Clamping screws, lower fork bridge XCF-W ZA, EXC-F	M8	15 Nm
Clamping screws, upper fork bridge SX-F, XC-F, XCF-W USA, EXC-F Six Days	M8	17 Nm
Clamping screws, lower fork bridge SX-F, XC-F, XCF-W USA, EXC-F Six Days	M8	12 Nm
Clamping screw, steering stem	M8	Loctite 243 + 17 Nm
Clamping screws, fork stubs	M8	15 Nm
Hexagon nut, swing arm bolt	M16x1,5	100 Nm
Hexagon collar screw, handlebar clamp	M8	20 Nm
Allan head srew, handlebar support	M10	Loctite 243 + 40 Nm
Shock absorber, top	M12	Loctite 243 + 80 Nm
Shock absorber, bottom	M12	Loctite 243 + 80 Nm
Collar nut, swing arm bolt	M20x1,5	80 Nm
Sprocket Screws	M8	Loctite 243 + 35 Nm
Ball joint for push rod	M6	10 Nm
Engine mounting bolt	M10	60 Nm
Engine brace	M8	33 Nm
Spoke nipple	M4,5 / M5	5 Nm
Screw adjusting ring spring preload shock abs.	M6	5 Nm
Other screws on chassis	M6 M8 M10	10 Nm 25 Nm 45 Nm
Other collar nuts on chassis	M6 M8 M10	15 Nm 30 Nm 50 Nm

PERIODIC MAINTENANCE SCHEDULE 11

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PERIODIC MAINTENANCE SCHEDULE 2005

A CLEAN MOTORCYCLE CAN BE CHECKED MORE QUICKLY WHICH SAVES MONEY!		1st service after 3 hours or 20 l fuel	every 10 hours or 70 l fuel
ENGINE	Change engine oil, oil filter	●	●
	Clean oil screen and drain plug magnet	●	●
	Replace spark plug (after 30 hours)		
	Check and adjust valve clearance	●	●
	Check engine mounting bolts for tightness	●	●
	Clean the spark-plug connector and check for a tight fit	●	●
	Check the screws on the kick starter and shift lever for a tight fit	●	●
CARBURETOR	Check carburetor connection boot for cracks and leaks		●
	Check idle speed setting	●	●
	Check vent hoses for damage or bends	●	●
ADD-ON PARTS	Check cooling system for leaks, check quantity of antifreeze	●	●
	Check exhaust system for leaks and fitment		●
	Check cables for damage, smooth operation and bends, adjust and lubricate	●	●
	Check fluid level of the clutch master cylinder	●	●
	Clean air filter and filter box		●
	Check electric wires for damage and bends		●
BRAKES	Check brake fluid level, lining thickness, brake discs	●	●
	Check brake lines for damage and leaks	●	●
	Check/function smooth operation and adjust free travel of handbrake/foot brake lever	●	●
	Check the screws and guide bolts on the brake system for a tight fit	●	●
CHASSIS	Check shock absorber and fork for leaks and function	●	●
	Clean fork dust bellows		●
	Bleed fork legs		●
	Check swing arm bearings		●
	Check/adjust steering head bearings	●	●
	Check tightness of chassis screws (triple clamps, fork leg axle passage, swingarm, shock aborber)	●	●
WHEELS	Check/adjust steering head bearings	●	●
	Check tires and air pressure	●	●
	Check chain, chain joint, rear sprockets and chain guides for wear, fit and tension	●	●
	Lubricate chain, clean and grease the adjusting screws on the chain tensioner	●	●
	Check clearance of wheel bearings	●	●

IMPORTANT RECOMMENDED MAINTENANCE WORK THAT CAN BE CARRIED OUT BY EXTRA ORDER	at least once a year	every 2 years
Complete maintenance of fork	●	
Complete maintenance of shock absorber		●
Clean and grease steering head bearings and gasket elements	●	
Clean and adjust carburetor	●	
Treat electric contacts and switches with contact spray	●	
Change hydraulic clutch fluid	●	
Change brake fluid	●	

IF MOTORCYCLE IS USED FOR COMPETITION 10 HOURS SERVICE SHOULD BE CARRIED OUT AFTER EVERY RACE.
Service intervalls should never be exceeded by more than 2 hours or 15 liters of fuel.
Maintenance work done by KTM authorised workshops is not a substitute for care and checks done by the rider.

PERIODIC MAINTENANCE SCHEDULE 2005

IMPORTANT CHECKS AND MAINTENANCE TO BE CARRIED OUT BY THE RIDER

	Before each start	After every cleaning	For cross-country use	at least once a year
Check oil level	●			
Check brake fluid level	●			
Check brake pads for wear	●			
Lubricate and adjust cables and nipples		●		
Bleed fork legs regularly			●	
Remove and clean fork dust bellows regularly			●	
Clean and lubricate chain, check tension and adjust if necessary		●	●	
Clean air filter and filter box			●	
Check tires for pressure and wear	●			
Check cooling fluid level	●			
Check fuel lines for leaks	●			
Drain and clean float chamber		●		●
Check all control elements for smooth operation	●			
Check brake performance	●	●		
Treat blank metal parts (with the exception of brake and exhaust system) with wax-based anti corrosion agent		●		
Check tightness of screws, nuts and hose clamps regularly				●

RECOMMENDED INSPECTIONS OR MAINTENANCE WORK BY THE AUTHORIZED KTM WORKSHOP FOR COMPETITIVE RACING (ADDITIONAL ORDER FOR THE KTM WORKSHOP)

A 100 liter fuel consumption is equivalent to approx. 15 operating hours	every 10 hours 70 liter	every 20 hours 140 liter	every 40 hours 270 liter	every 60 hours 400 liter	every 80 hours 540 liter
Check the clutch disks for wear		●	●	●	●
Check the length of the clutch springs		●	●	●	●
Check the clutch drive for indentations			●		●
Check the outer clutch hub for indentations			●		●
Check the cylinder and piston for wear			●		●
Check the groove on the piston pin retainer for wear (visual check)			●		●
Check the camshaft for wear (visual check)			●		●
Check the spring cap for wear			●		●
Check the eccentricity of the valve disk			●		●
Check the valve guides for wear			●		●
Replace the valves					●
Replace the valve springs			●		●
Check the function of the chain tensioner			●		●
Check the eccentricity of the crankshaft journal			●		●
Replace the conrod bearings			●		●
Check piston pin bearing			●		●
Replace the crankshaft main bearings					●
Check the entire transmission including the roller and bearings for wear			●		●
Check the length of the bypass valve spring			●		●
Replace the glass-fiber yarn filling in the silencer	●	●	●	●	●
Replace the sealing cup for the foot brake cylinder	●	●	●	●	●
Replace the throttle slide, jet needle and main jet holder (every 200 hours)					

NOTE: If the inspection establishes that permissible tolerances are exceeded, the respective components must be replaced.

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PERIODIC MAINTENANCE SCHEDULE 2006

A CLEAN MOTORCYCLE CAN BE CHECKED MORE QUICKLY WHICH SAVES MONEY!		1st service after 3 hours or 20 l fuel	every 10 hours or 70 l fuel
ENGINE	Change engine oil, oil filter	●	●
	Clean oil screen and drain plug magnet	●	●
	Replace spark plug (after 30 hours)		
	Check and adjust valve clearance	●	●
	Check engine mounting bolts for tightness	●	●
	Clean the spark-plug connector and check for a tight fit	●	●
	Check the screws on the kick starter and shift lever for a tight fit	●	●
CARBURETOR	Check carburetor connection boot for cracks and leaks		●
	Check idle speed setting	●	●
	Check vent hoses for damage or bends	●	●
ADD-ON PARTS	Check cooling system for leaks, check quantity of antifreeze	●	●
	Check exhaust system for leaks and fitment		●
	Check cables for damage, smooth operation and bends, adjust and lubricate	●	●
	Check fluid level of the clutch master cylinder	●	●
	Clean air filter and filter box		●
	Check electric wires for damage and bends		●
BRAKES	Check brake fluid level, lining thickness, brake discs	●	●
	Check brake lines for damage and leaks	●	●
	Check/function smooth operation and adjust free travel of handbrake/foot brake lever	●	●
	Check the screws and guide bolts on the brake system for a tight fit	●	●
CHASSIS	Check shock absorber and fork for leaks and function	●	●
	Clean fork dust bellows		●
	Bleed fork legs		●
	Check swing arm bearings		●
	Check/adjust steering head bearings	●	●
	Check tightness of chassis screws (triple clamps, fork leg axle passage, swingarm, shock aborber)	●	●
WHEELS	Check/adjust steering head bearings	●	●
	Check tires and air pressure	●	●
	Check chain, chain joint, rear sprockets and chain guides for wear, fit and tension	●	●
	Lubricate chain, clean and grease the adjusting screws on the chain tensioner	●	●
	Check clearance of wheel bearings	●	●

IMPORTANT RECOMMENDED MAINTENANCE WORK THAT CAN BE CARRIED OUT BY EXTRA ORDER	at least once a year	every 2 years
Complete maintenance of fork	●	
Complete maintenance of shock absorber		●
Clean and grease steering head bearings and gasket elements	●	
Clean and adjust carburetor	●	
Treat electric contacts and switches with contact spray	●	
Change hydraulic clutch fluid	●	
Change brake fluid	●	

IF MOTORCYCLE IS USED FOR COMPETITION 10 HOURS SERVICE SHOULD BE CARRIED OUT AFTER EVERY RACE.
Service intervalls should never be exceeded by more than 2 hours or 15 liters of fuel.
Maintenance work done by KTM authorised workshops is not a substitute for care and checks done by the rider.

PERIODIC MAINTENANCE SCHEDULE 2006

IMPORTANT CHECKS AND MAINTENANCE TO BE CARRIED OUT BY THE RIDER

	Before each start	After every cleaning	For cross-country use	at least once a year
Check oil level	●			
Check brake fluid level	●			
Check brake pads for wear	●			
Lubricate and adjust cables and nipples		●		
Bleed fork legs regularly			●	
Remove and clean fork dust bellows regularly			●	
Clean and lubricate chain, check tension and adjust if necessary		●	●	
Clean air filter and filter box			●	
Check tires for pressure and wear	●			
Check cooling fluid level	●			
Check fuel lines for leaks	●			
Drain and clean float chamber		●		●
Check all control elements for smooth operation	●			
Check brake performance	●	●		
Treat blank metal parts (with the exception of brake and exhaust system) with wax-based anti corrosion agent		●		
Check tightness of screws, nuts and hose clamps regularly				●

RECOMMENDED INSPECTIONS OR MAINTENANCE WORK BY THE AUTHORIZED KTM WORKSHOP FOR COMPETITIVE RACING (ADDITIONAL ORDER FOR THE KTM WORKSHOP)

A 100 liter fuel consumption is equivalent to approx. 15 operating hours	every 10 hours 70 liter	every 20 hours 140 liter	every 40 hours 270 liter	every 60 hours 400 liter	every 80 hours 540 liter
Check the clutch disks for wear		●	●	●	●
Check the length of the clutch springs		●	●	●	●
Check the clutch drive for indentations			●		●
Check the outer clutch hub for indentations			●		●
Check the cylinder and piston for wear			●		●
Check the groove on the piston pin retainer for wear (visual check)			●		●
Check the camshaft for wear (visual check)			●		●
Check the spring cap for wear			●		●
Check the eccentricity of the valve disk			●		●
Check the valve guides for wear			●		●
Replace the valves					●
Replace the valve springs			●		●
Check the function of the chain tensioner			●		●
Check the eccentricity of the crankshaft journal			●		●
Replace the conrod bearings			●		●
Check piston pin bearing			●		●
Replace the crankshaft main bearings					●
Check the entire transmission including the roller and bearings for wear			●		●
Check the length of the bypass valve spring			●		●
Replace the glass-fiber yarn filling in the silencer	●	●	●	●	●
Replace the sealing cup for the foot brake cylinder	●	●	●	●	●
Replace the throttle slide, jet needle and main jet holder (every 200 hours)					

NOTE: If the inspection establishes that permissible tolerances are exceeded, the respective components must be replaced.

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PERIODIC MAINTENANCE SCHEDULE 2007

A CLEAN MOTORCYCLE CAN BE CHECKED MORE QUICKLY WHICH SAVES MONEY!		1st service after 3 hours or 20 l fuel	every 20 hours or 140 l fuel or 1 race
ENGINE	Change engine oil, oil filter	●	●
	Clean oil screen and drain plug magnet	●	●
	Replace spark plug (after 30 hours)		
	Check and adjust valve clearance	●	●
	Check engine mounting bolts for tightness	●	●
	Clean the spark-plug connector and check for a tight fit	●	●
	Check the screws on the kick starter and shift lever for a tight fit	●	●
CARBURETOR	Check carburetor connection boot for cracks and leaks		●
	Check idle speed setting	●	●
	Check vent hoses for damage or bends	●	●
ADD-ON PARTS	Check cooling system for leaks, check quantity of antifreeze	●	●
	Check exhaust system for leaks and fitment		●
	Check cables for damage, smooth operation and bends, adjust and lubricate	●	●
	Check fluid level of the clutch master cylinder	●	●
	Clean air filter and filter box		●
	Check electric wires for damage and bends		●
	Check headlamp setting		●
	Check function of electric systems (low high beam, brake light, indicator lamps, speedometer illumination, horn, emergency OFF switch or button	●	●
BRAKES	Check brake fluid level, lining thickness, brake discs	●	●
	Check brake lines for damage and leaks	●	●
	Check/function smooth operation and adjust free travel of handbrake/foot brake lever	●	●
	Check the screws and guide bolts on the brake system for a tight fit	●	●
CHASSIS	Check shock absorber and fork for leaks and function	●	●
	Clean fork dust bellows		●
	Bleed fork legs		●
	Check swing arm bearings		●
	Check/adjust steering head bearings	●	●
	Check tightness of chassis screws (triple clamps, fork leg axle passage, swingarm, shock aborber)	●	●
WHEELS	Check/adjust steering head bearings	●	●
	Check tires and air pressure	●	●
	Check chain, chain joint, rear sprockets and chain guides for wear, fit and tension	●	●
	Lubricate chain, clean and grease the adjusting screws on the chain tensioner	●	●
	Check clearance of wheel bearings	●	●

ADDITIONAL SERVICE WORK THAT MUST BE PERFORMED UNDER A SEPARATE ORDER		
	at least once a year	every 2 years
Complete maintenance of fork	●	
Complete maintenance of shock absorber		●
Clean and grease steering head bearings and gasket elements	●	
Clean and adjust carburetor	●	
Treat battery connections with contact grease	●	
Treat electric contacts and switches with contact spray	●	
Change hydraulic clutch fluid	●	
Change brake fluid	●	
Clean Sparkarrestor (XC-W USA)	●	

Service intervalls should never be exceeded by more than 2 hours or 15 liters of fuel.
Maintenance work done by KTM authorised workshops is not a substitute for care and checks done by the rider.

PERIODIC MAINTENANCE SCHEDULE 2007

IMPORTANT CHECKS AND MAINTENANCE TO BE CARRIED OUT BY THE RIDER

	Before each start	After every cleaning	For cross-country use	at least once a year
Check oil level	●			
Check brake fluid level	●			
Check brake pads for wear	●			
Check lights for function	●			
Check horn for function	●			
Lubricate and adjust cables and nipples		●		
Bleed fork legs regularly			●	
Remove and clean fork dust bellows regularly			●	
Clean and lubricate chain, check tension and adjust if necessary		●	●	
Clean air filter and filter box			●	
Check tires for pressure and wear	●			
Check cooling fluid level	●			
Check fuel lines for leaks	●			
Drain and clean float chamber		●		●
Check all control elements for smooth operation	●			
Check brake performance	●	●		
Treat blank metal parts (with the exception of brake and exhaust system) with wax-based anti corrosion agent		●		
Treat ignition and steering locks and light switches with contact spray		●		
Check tightness of screws, nuts and hose clamps regularly				●

IMPORTANT INSPECTIONS OR MAINTENANCE WORK THAT MUST BE PERFORMED BY THE SPECIALIZED KTM WORKSHOP FOR COMPETITIVE RACING / FOR HOBBY-USE (SEPARATE ORDER FOR SPECIALIZED KTM WORKSHOP)

A 100 liter fuel consumption is equivalent to approx. 15 operating hours				
COMPETITIVE RACING	**every 10 hours 70 liter**	**every 20 hours 140 liter**	**every 40 hours 270 liter**	**every 80 hours 540 liter**
HOBBY-USE	**every 20 hours 140 liter**	**every 40 hours 270 liter**	**——**	**every 80 hours 540 liter**
Check the clutch disks for wear		●	●	●
Check the length of the clutch springs		●	●	●
Check the clutch drive for indentations			●	●
Check the outer clutch hub for indentations			●	●
Check the cylinder and piston for wear			●	●
Check the groove on the piston pin retainer for wear (visual check)			●	●
Check the camshaft for wear (visual check)			●	●
Check the spring cap for wear			●	●
Check the eccentricity of the valve disk			●	●
Check the valve guides for wear			●	●
Replace the valves				●
Replace the valve springs			●	●
Check the function of the timing chain tensioner			●	●
Check the eccentricity of the crankshaft journal			●	●
Replace the conrod bearings			●	●
Check piston pin bearing			●	●
Replace the crankshaft main bearings				●
Check the entire transmission including the roller and bearings for wear			●	●
Check the length of the bypass valve spring			●	●
Replace the glass-fiber yarn filling in the silencer	●	●	●	●
Replace the sealing cup for the foot brake cylinder		●	●	●
Replace the throttle slide, jet needle and main jet holder (every 200 hours)				

NOTE: If the inspection establishes that permissible tolerances are exceeded, the respective components must be replaced.

PERIODIC MAINTENANCE SCHEDULE 2008

250 SX-F/XC-F A CLEAN MOTORCYCLE CAN BE CHECKED MORE QUICKLY WHICH SAVES MONEY!		1st service after 3 hours or 20 l fuel	every 20 hours or 140 l fuel or 1 race
ENGINE	Change engine oil, oil filter	●	●
	Clean oil screen and drain plug magnet	●	●
	Replace spark plug (after 30 hours)		
	Check and adjust valve clearance	●	●
	Check engine mounting bolts for tightness	●	●
	Clean the spark-plug connector and check for a tight fit	●	●
	Check the screws on the kick starter and shift lever for a tight fit	●	●
CARBURETOR	Check carburetor connection boot for cracks and leaks		●
	Check idle speed setting	●	●
	Check vent hoses for damage or bends	●	●
ADD-ON PARTS	Check cooling system for leaks, check quantity of antifreeze	●	●
	Check exhaust system for leaks and fitment		●
	Check cables for damage, smooth operation and bends, adjust and lubricate	●	●
	Check fluid level of the clutch master cylinder	●	●
	Clean air filter and filter box		●
	Check electric wires for damage and bends		●
	Check headlamp setting		●
	Check function of electric systems (low high beam, brake light, indicator lamps, speedometer illumination, horn, emergency OFF switch or button	●	●
BRAKES	Check brake fluid level, lining thickness, brake discs	●	●
	Check brake lines for damage and leaks	●	●
	Check/function smooth operation and adjust free travel of handbrake/foot brake lever	●	●
	Check the screws and guide bolts on the brake system for a tight fit	●	●
CHASSIS	Check shock absorber and fork for leaks and function	●	●
	Clean fork dust bellows		●
	Bleed fork legs		●
	Check swing arm bearings		●
	Check/adjust steering head bearings	●	●
	Check tightness of chassis screws (triple clamps, fork leg axle passage, swingarm, shock aborber)	●	●
WHEELS	Check/adjust steering head bearings	●	●
	Check tires and air pressure	●	●
	Check chain, chain joint, rear sprockets and chain guides for wear, fit and tension	●	●
	Lubricate chain, clean and grease the adjusting screws on the chain tensioner	●	●
	Check clearance of wheel bearings	●	●

250 SX-F/XC-F ADDITIONAL SERVICE WORK THAT MUST BE PERFORMED UNDER A SEPARATE ORDER	at least once a year	every 2 years
Complete maintenance of fork	●	
Complete maintenance of shock absorber		●
Clean and grease steering head bearings and gasket elements	●	
Clean and adjust carburetor	●	
Treat battery connections with contact grease	●	
Treat electric contacts and switches with contact spray	●	
Change hydraulic clutch fluid	●	
Change brake fluid	●	
Clean Sparkarrestor (XC-F USA)	●	

Service intervalls should never be exceeded by more than 2 hours or 15 liters of fuel.
Maintenance work done by KTM authorised workshops is not a substitute for care and checks done by the rider.

PERIODIC MAINTENANCE SCHEDULE 2008

250 SX-F/XC-F
IMPORTANT CHECKS AND MAINTENANCE TO BE CARRIED OUT BY THE RIDER

	Before each start	After every cleaning	For cross-country use	at least once a year
Check oil level	●			
Check brake fluid level	●			
Check brake pads for wear	●			
Check lights for function	●			
Check horn for function	●			
Lubricate and adjust cables and nipples		●		
Bleed fork legs regularly			●	
Remove and clean fork dust bellows regularly			●	
Clean and lubricate chain, check tension and adjust if necessary		●	●	
Clean air filter and filter box			●	
Check tires for pressure and wear	●			
Check cooling fluid level	●			
Check fuel lines for leaks	●			
Drain and clean float chamber		●		●
Check all control elements for smooth operation	●			
Check brake performance	●	●		
Treat blank metal parts (with the exception of brake and exhaust system) with wax-based anti corrosion agent		●		
Treat ignition and steering locks and light switches with contact spray		●		
Check tightness of screws, nuts and hose clamps regularly				●

250 SX-F/XC-F
IMPORTANT INSPECTIONS OR MAINTENANCE WORK THAT MUST BE PERFORMED BY THE SPECIALIZED KTM WORKSHOP FOR COMPETITIVE RACING / FOR HOBBY-USE (SEPARATE ORDER FOR SPECIALIZED KTM WORKSHOP)

A 100 liter fuel consumption is equivalent to approx. 15 operating hours	every 10 hours 70 liter	every 20 hours 140 liter	every 40 hours 270 liter	every 60 hours 400 liter	every 80 hours 540 liter
Check the clutch disks for wear		●	●	●	●
Check the length of the clutch springs		●	●	●	●
Check the clutch drive for indentations		●	●	●	●
Check the outer clutch hub for indentations		●	●	●	●
Check the cylinder and piston for wear			●		●
Check the groove on the piston pin retainer for wear (visual check)			●		●
Check the camshaft for wear (visual check)			●		●
Check the spring cap for wear			●		●
Check the eccentricity of the valve disk			●		●
Check the valve guides for wear			●		●
Replace the valves					●
Replace the valve springs			●		●
Check the function of the chain tensioner			●		●
Check the eccentricity of the crankshaft journal			●		●
Replace the conrod bearings			●		●
Check piston pin bearing			●		●
Replace the crankshaft main bearings					●
Check the entire transmission including the roller and bearings for wear			●		●
Check the length of the bypass valve spring			●		●
Replace the glass-fiber yarn filling in the silencer	●	●	●	●	●
Replace the sealing cup for the foot brake cylinder		●	●	●	●
Check the throttle slide, jet needle and main jet holder (every 50 hours)					

NOTE: If the inspection establishes that permissible tolerances are exceeded, the respective components must be replaced.

PERIODIC MAINTENANCE SCHEDULE 2008

250 XCF-W/EXC-F A CLEAN MOTORCYCLE CAN BE CHECKED MORE QUICKLY WHICH SAVES MONEY!		1st service after 3 hours or 20 l fuel	every 15 hours or 100 l fuel or 1 race
ENGINE	Change engine oil, short and long oil filters	●	●
	Clean oil screen and drain plug magnet	●	●
	Check oil lines for damage or bends	●	●
	Replace spark plug (after 30 hours)		
	Check and adjust valve clearance	●	●
	Check engine mounting bolts for tightness	●	●
	Clean the spark-plug connector and check for a tight fit	●	●
	Check the screws on the kick starter and shift lever for a tight fit	●	●
CARBURETOR	Check carburetor connection boot for cracks and leaks		●
	Check idle speed setting	●	●
	Check vent hoses for damage or bends	●	●
ADD- ON PARTS	Check cooling system for leaks, check quantity of antifreeze	●	●
	Check exhaust system for leaks and fitment		●
	Check cables for damage, smooth operation and bends adjust and lubricate	●	●
	Check fluid level of the clutch master cylinder	●	●
	Clean air filter and filter box		●
	Check electric wires for damage and bends		●
	Check headlamp setting		●
	Check function of electric systems (low high beam, brake light, indicator lamps, speedometer illumination, horn, emergency OFF switch or button	●	●
BRAKES	Check brake fluid level, lining thickness, brake discs	●	●
	Check brake lines for damage and leaks	●	●
	Check/function smooth operation and adjust free travel of handbrake/foot brake lever	●	●
	Check the screws and guide bolts on the brake system for a tight fit	●	●
CHASSIS	Check shock absorber and fork for leaks and function	●	●
	Clean fork dust bellows		●
	Bleed fork legs		●
	Check swing arm bearings		●
	Check/adjust steering head bearings	●	●
	Check tightness of chassis screws (triple clamps, fork leg axle passage, swingarm, shock aborber)	●	●
WHEELS	Check spoke tension and rim joint	●	●
	Check tires and air pressure	●	●
	Check chain, chain joint, rear sprockets and chain guides for wear, fit and tension	●	●
	Lubricate chain, clean and grease the adjusting screws on the chain tensioner	●	●
	Check clearance of wheel bearings	●	●

250 XCF-W/EXC-F ADDITIONAL SERVICE WORK THAT MUST BE PERFORMED UNDER A SEPARATE ORDER	at least once a year	every 2 years
Complete maintenance of fork	●	
Complete maintenance of shock absorber		●
Clean and grease steering head bearings and gasket elements	●	
Clean and adjust carburetor	●	
Treat electric contacts and switches with contact spray	●	
Treat battery connections with contact grease	●	
Change hydraulic clutch fluid	●	
Change brake fluid	●	
Clean Sparkarrestor (XCF-W USA)	●	

Service intervalls should never be exceeded by more than 2 hours or 15 liters of fuel.
Maintenance work done by KTM authorised workshops is not a substitute for care and checks done by the rider.

PERIODIC MAINTENANCE SCHEDULE 2008

250 XCF-W/EXC-F
IMPORTANT CHECKS AND MAINTENANCE TO BE CARRIED OUT BY THE RIDER

	Before each start	After every cleaning	For cross-country use	at least once a year
Check oil level	●			
Check brake fluid level	●			
Check brake pads for wear	●			
Check lights for function	●			
Check horn for function	●			
Lubricate and adjust cables and nipples		●		
Bleed fork legs regularly			●	
Remove and clean fork dust bellows regularly			●	
Clean and lubricate chain, check tension and adjust if necessary		●	●	
Clean air filter and filter box			●	
Check tires for pressure and wear	●			
Check cooling fluid level	●			
Check fuel lines for leaks	●			
Drain and clean float chamber		●		●
Check all control elements for smooth operation	●			
Check brake performance	●	●		
Treat blank metal parts (with the exception of brake and exhaust system) with wax-based anti corrosion agent		●		
Treat ignition and steering locks and light switches with contact spray		●		
Check tightness of screws, nuts and hose clamps regularly				●

250 XCF-W/EXC-F
IMPORTANT INSPECTIONS OR MAINTENANCE WORK THAT MUST BE PERFORMED BY THE SPECIALIZED KTM WORKSHOP FOR COMPETITIVE RACING / FOR HOBBY-USE (SEPARATE ORDER FOR SPECIALIZED KTM WORKSHOP)

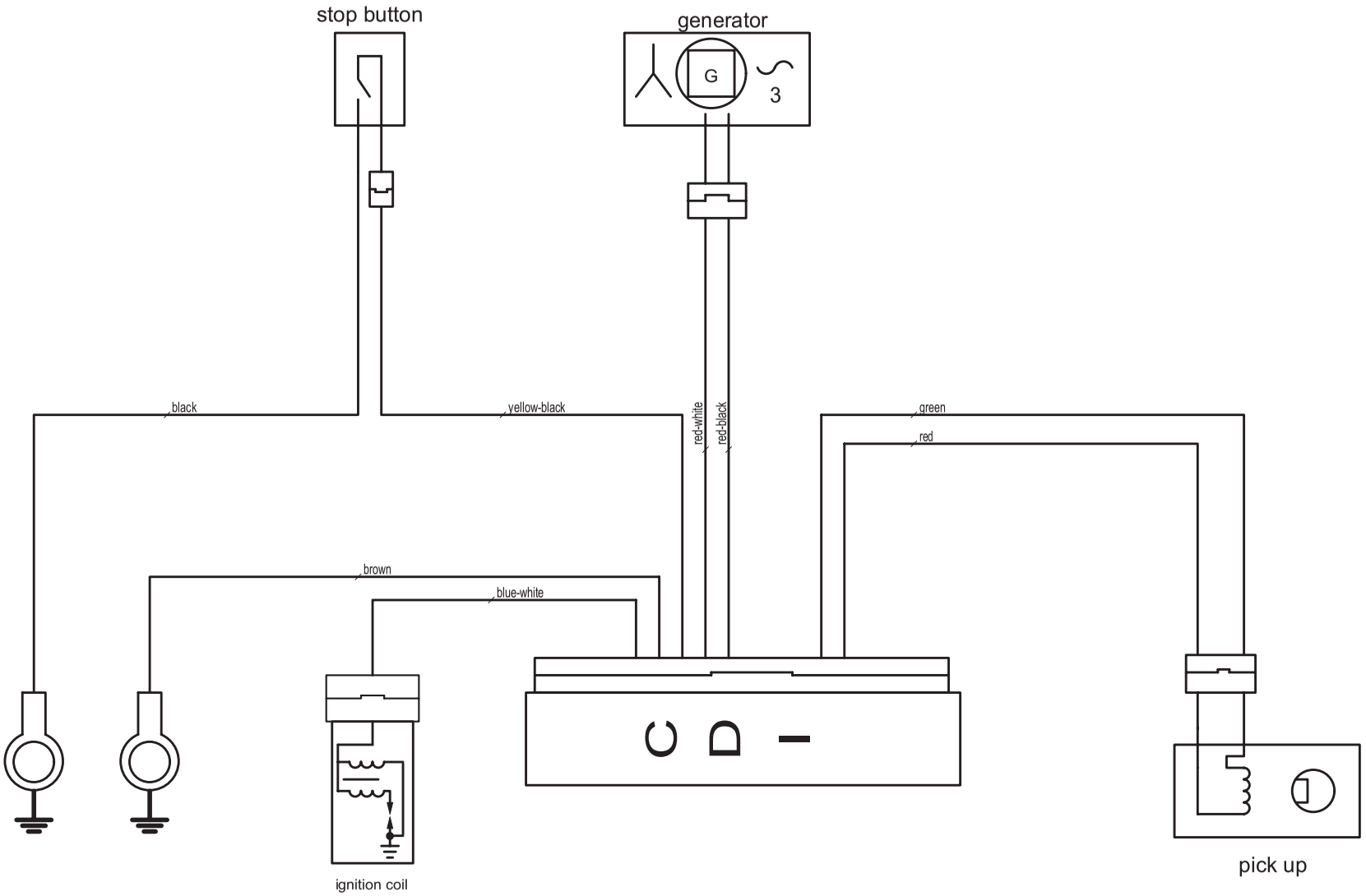
A 100 liter fuel consumption is equivalent to approx. 15 operating hours				
COMPETITIVE RACING	**every 10 hours 70 liter**	**every 20 hours 140 liter**	**every 40 hours 270 liter**	**every 80 hours 540 liter**
HOBBY-USE	**every 20 hours 140 liter**	**every 40 hours 270 liter**	**——**	**every 80 hours 540 liter**
Check the clutch disks for wear		●	●	●
Check the length of the clutch springs		●	●	●
Check the clutch drive for indentations			●	●
Check the outer clutch hub for indentations			●	●
Check the cylinder and piston for wear			●	●
Check the groove on the piston pin retainer for wear (visual check)			●	●
Check the camshaft for wear (visual check)			●	●
Check the spring cap for wear			●	●
Check the eccentricity of the valve disk			●	●
Check the valve guides for wear			●	●
Replace the valves				●
Replace the valve springs			●	●
Check the function of the timing chain tensioner			●	●
Check the eccentricity of the crankshaft journal			●	●
Replace the conrod bearings			●	●
Check piston pin bearing			●	●
Replace the crankshaft main bearings				●
Check the entire transmission including the roller and bearings for wear			●	●
Check the length of the bypass valve spring			●	●
Replace the glass-fiber yarn filling in the silencer	●	●	●	●
Replace the sealing cup for the foot brake cylinder		●	●	●
Check the throttle slide, jet needle and main jet holder (every 50 hours)				

NOTE: If the inspection establishes that permissible tolerances are exceeded, the respective components must be replaced.

WIRING DIAGRAMS 12

INDEX

Art.-No. 3.206.052-E



KTM	250 SX-F 2005/06	CDI harness - 594.39.032.000	20.02.2005

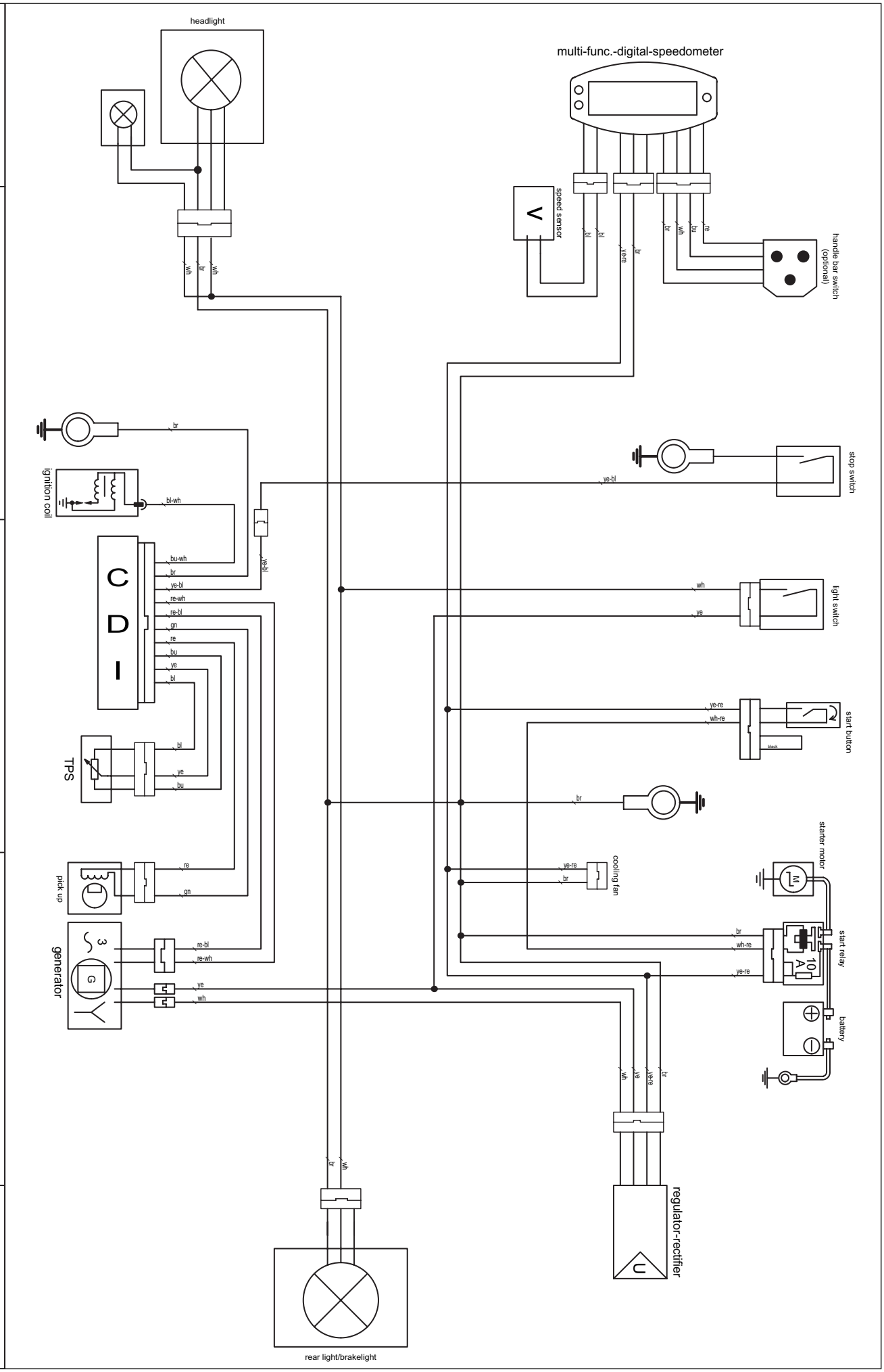
250 EXC-F USA 2005/06

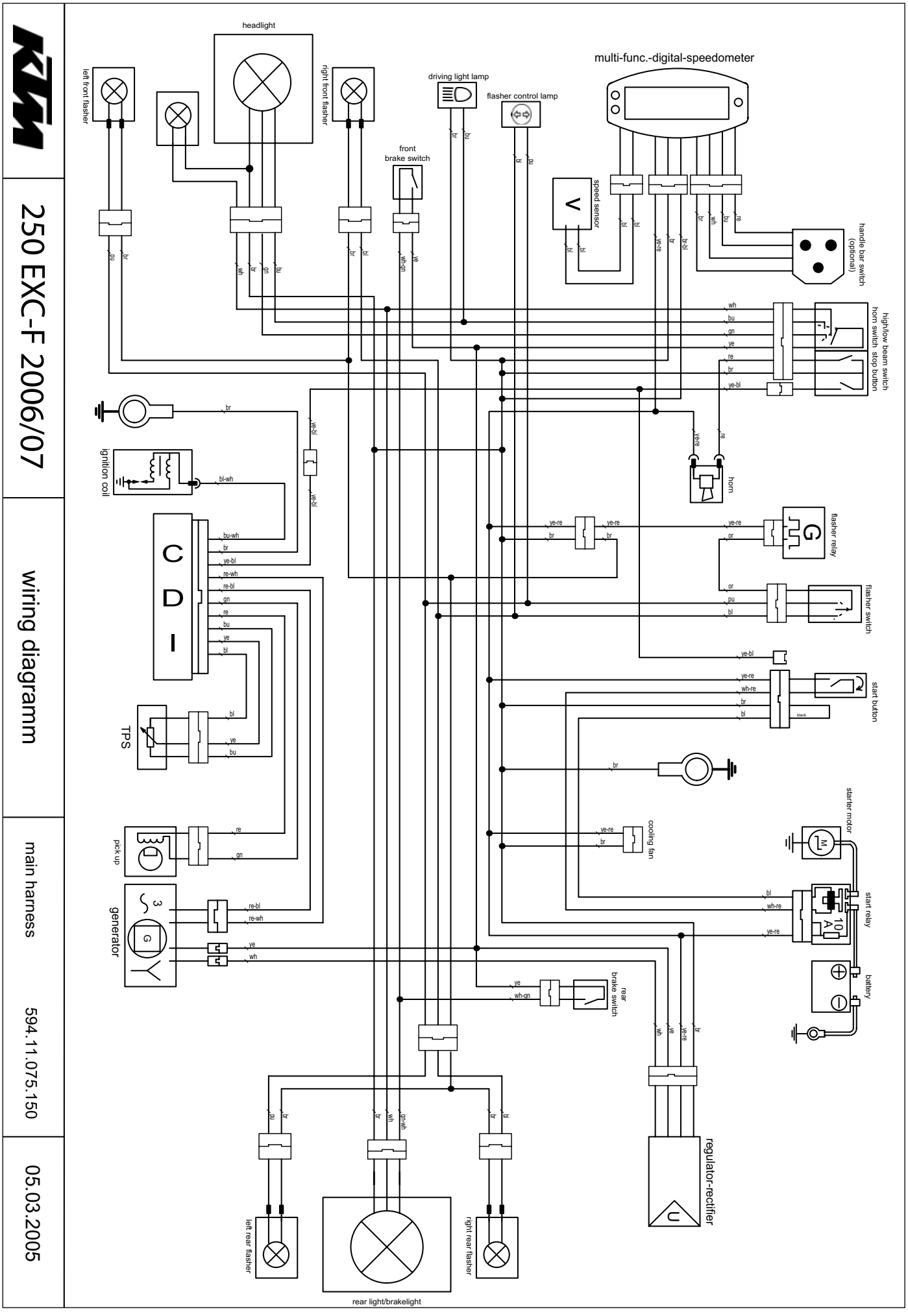
wiring diagramm

main harness

594.11.075.100

25.02.2005





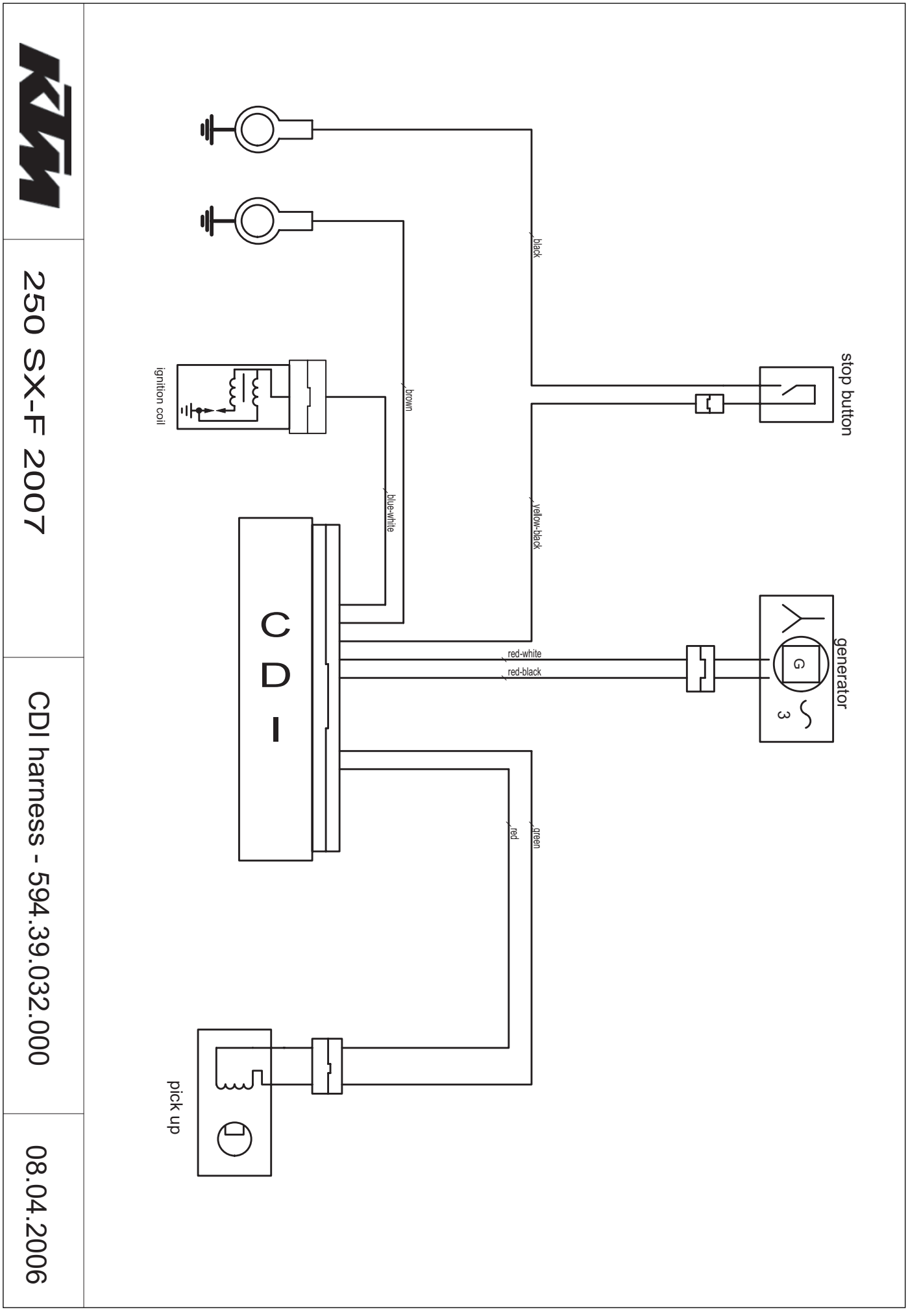
250 EXC-F 2006/07

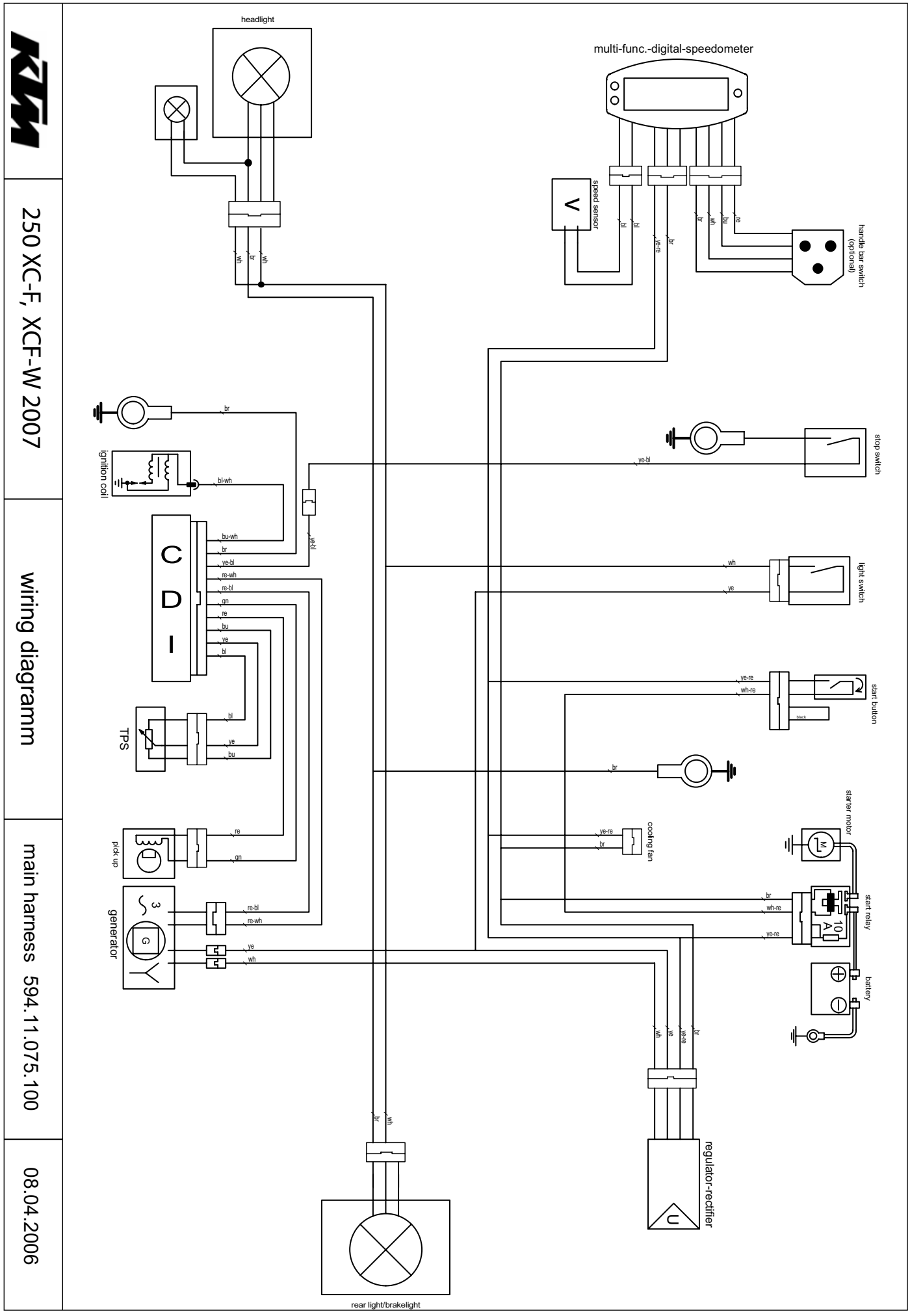
wiring diagramm

main harness

594.11.075.150

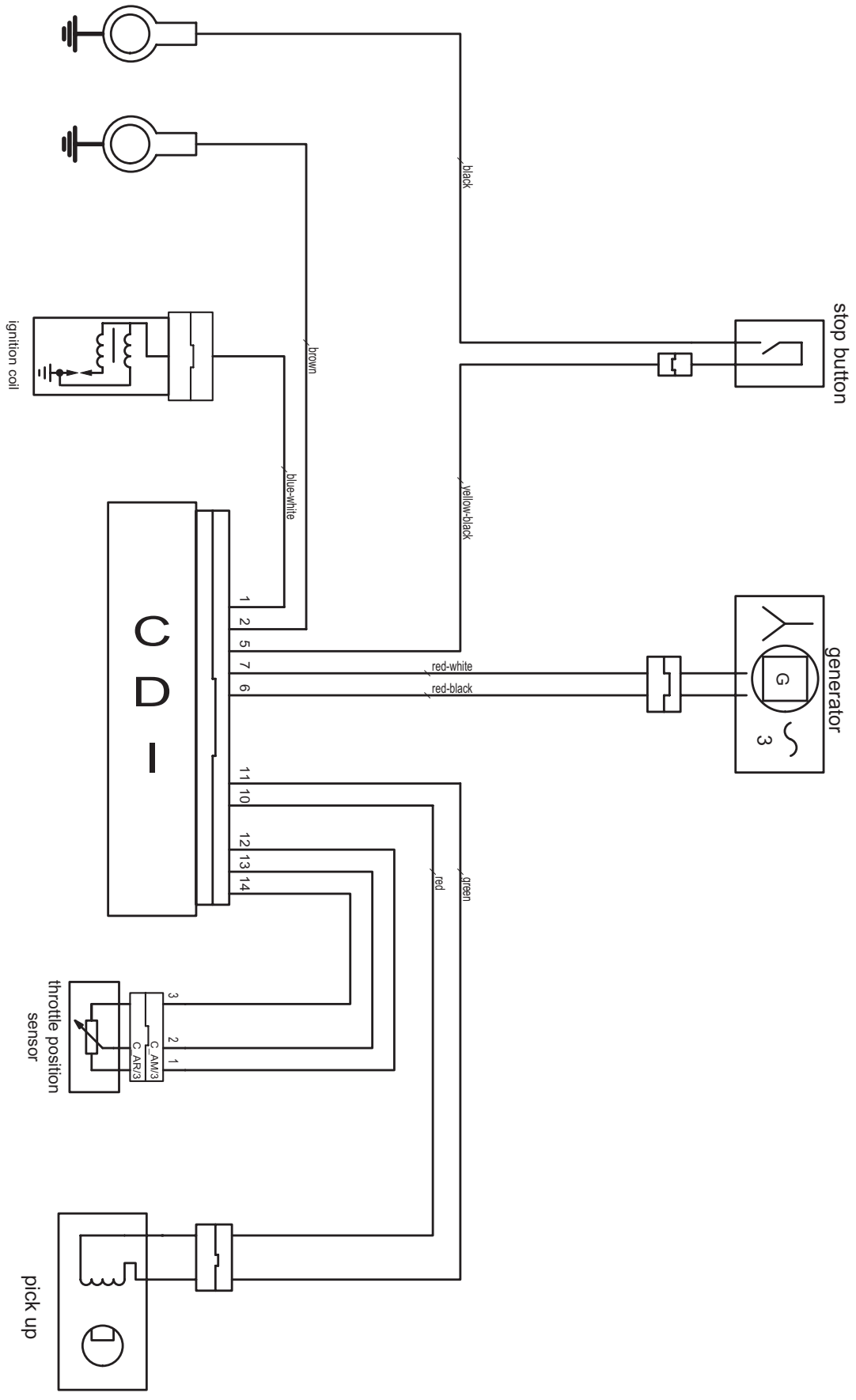
05.03.2005


250 SX-F 2007
CDI harness - 594.39.032.000
08.04.2006
black
brown
blue-white
yellow-black
red-white
red-black
red
green
ignition coil
stop button
generator
G
3
C D I
pick up

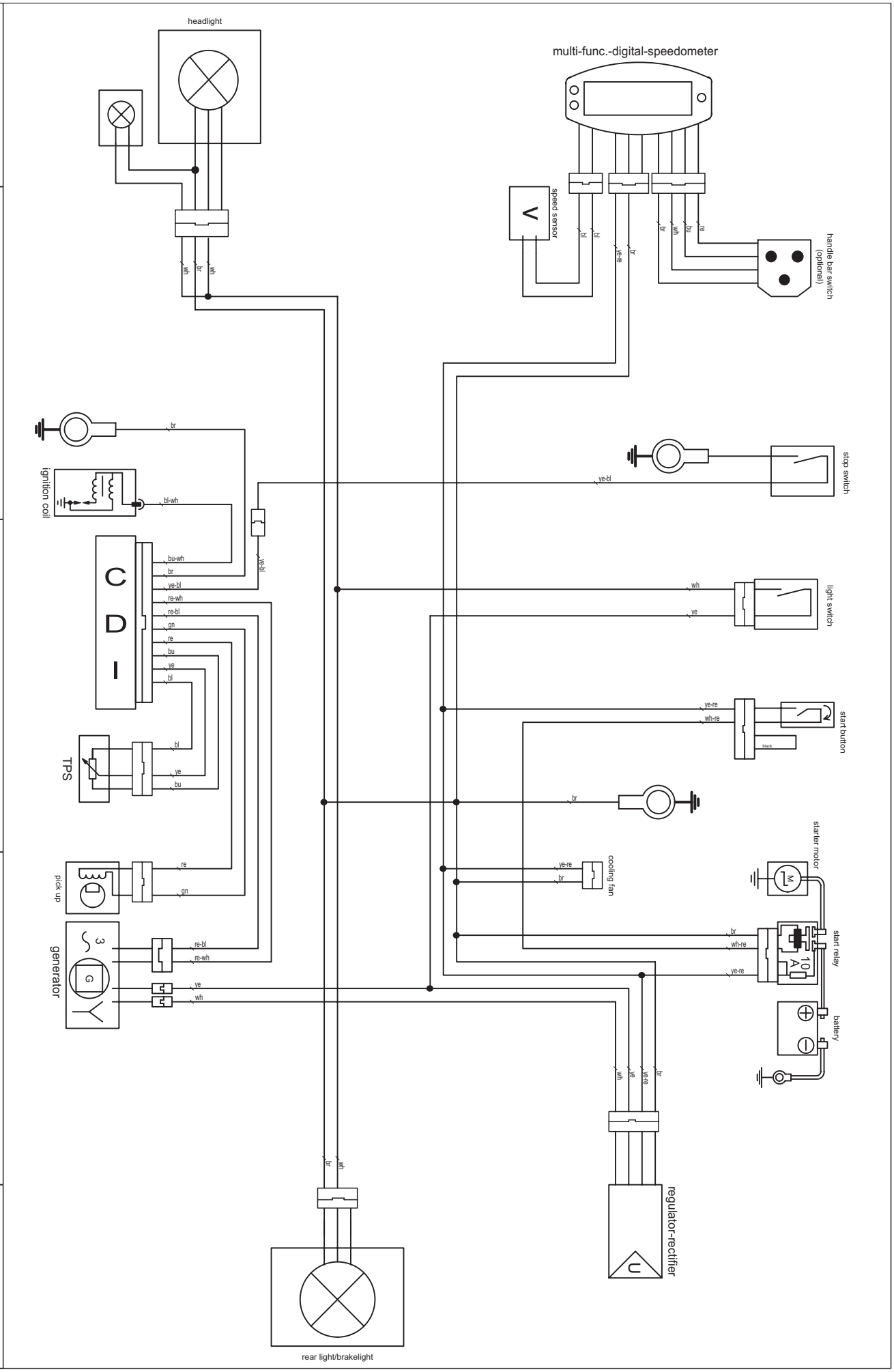

250 XC-F, XCF-W 2007
wiring diagramm
main harness 594.11.075.100
08.04.2006
Art.-No. 3.206.052-E
Repair manual KTM 250 -F
headlight
multi-func.-digital-speedometer
speed sensor
handle bar switch (optional)
stop switch
light switch
start button
ignition coil
C D I
TPS
pick up
generator
starter motor
cooling fan
start relay
battery
regulator-rectifier
rear light/brakelight

250 SX-F 2008

CDI harness 594.39.032.100



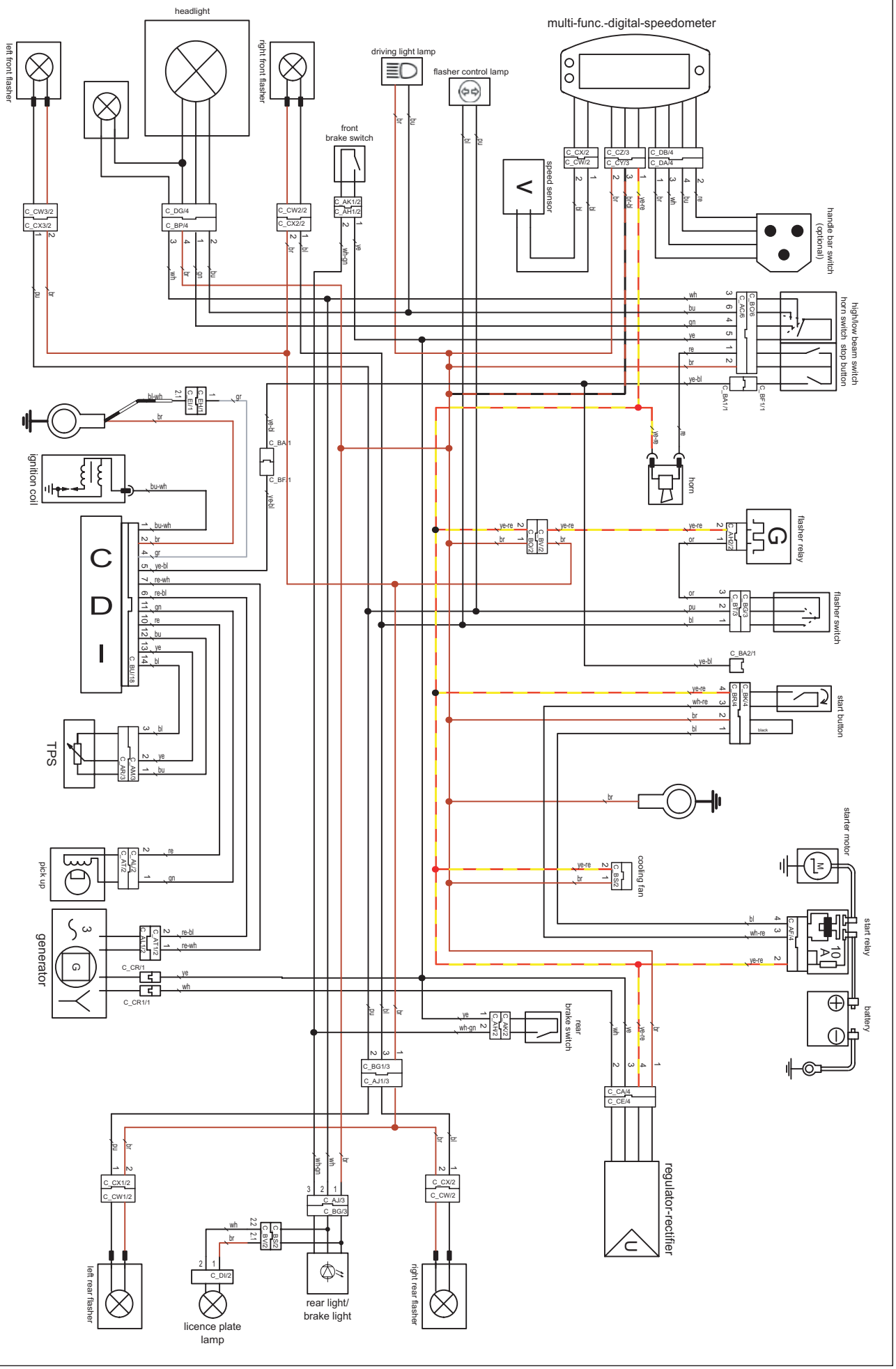
Art.-No. 3.206.052-E



250 EXC-F 2008

wiring diagram

main harness 594.11.075.150
CDI harness 780.39.032.000



Cable colours

bl: black
ye: yellow
bu: blue
gn: green
re: red
wh: white
br: brown
or: orange
pi: pink
gr: grey
pu: purple

Art.-No. 3.206.052-E