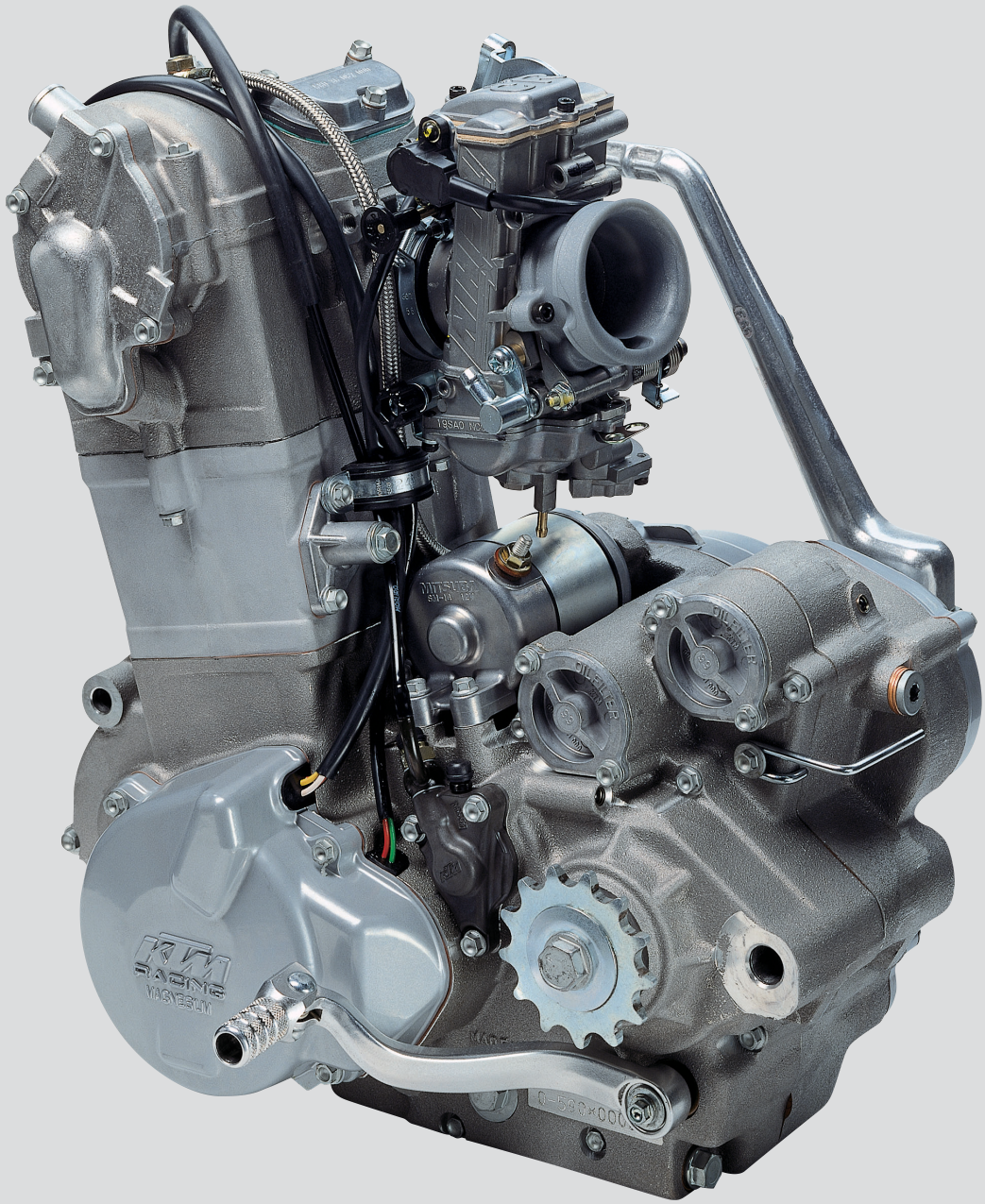
250-525 SX, MXC, EXC RACING

KTM SPORTMOTORCYCLES

REPAIR MANUAL
ENGINE



KTM SPORTMOTORCYCLES

KTM SPORTMOTORCYCLE AG
5230 Mattighofen
Austria
www.ktm.at

250-525 SX, MXC, EXC RACING

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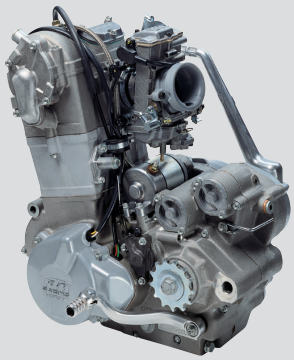

IMPORTANT INFORMATION/UPDATING INSTRUCTIONS

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:

14, 21-24, 30-47, 50-52, 56-76, 79-92, 97-124, 134-140, 142, 150-154, 165-167

Remove page (s)	Replace by page (s)	Insert page (s)	after page
2-1 / 2-7	2-1C	2-7C to 2-9C	
3-1	3-1C		
4-1 to 4-14	4-1C to 4-13C		
5-1 / 5-3	5-1C / 5-3C		
5-6 to 5-8	5-6C to 5-8C		
5-12 to 5-26	5-12C to 5-27C		
6-1 / 6-4	6-1C / 6-4C		
6-7 to 6-16	6-7C to 6-17C		
7-1 to 7-2	7-1C to 7-2C		
7-7 to 7-11	7-7C to 7-11C		
8-1 to 8-13	8-1C to 8-21C		
9-1	9-1C		
9-10 to 9-13	9-10C to 9-16C		
10-1	10-1C	10-8C to 10-11C	
11-1	11-1C	11-11C to 11-13C	

Art.-No. 3206007 -E

Repair manual KTM 250-525 SX, MXC, EXC RACING

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 on 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
  All pages with a page number that begins with the digit 3, for example, 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

3.205.85-E Repair Manual 400/520 SX, MXC, EXC RACING

Basic version Model year 2000
(Engine number with first digit "0")

2/2000

3.210.01-E Updating of Rep.Manual 3.205.85-E

Model year 2001
(Engine number with first digit "1")

1/2001

3.210.44-E Updating of Rep.Manual 3.205.85-E

Model year 2002
(Engine number with first digit "2")

2/2002

3.206.007-E Updating of Rep.Manual 3.205.85-E

Model year 2003
(Engine number with first digit "3")

1/2003

Modification / Updating:
Technical Details Model 2003 (clutch, valve spring, camshaft gear, carburetor)
Technical Specifications, Periodic Maintenance Schedule, Wiring Diagrams

Art.-No. 3206007 -E

Repair manual KTM 250-525 SX, MXC, EXC RACING

Edition 01/2003

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

KTM Austria's certificate of achievement for its quality system ISO 9001 is the beginning of an ongoing total reengineered quality plan for a brighter tomorrow.

KTM Sportmotorcycle AG
5230 Mattighofen, Austria

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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.: 3.210.66-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.: 5-7c**) 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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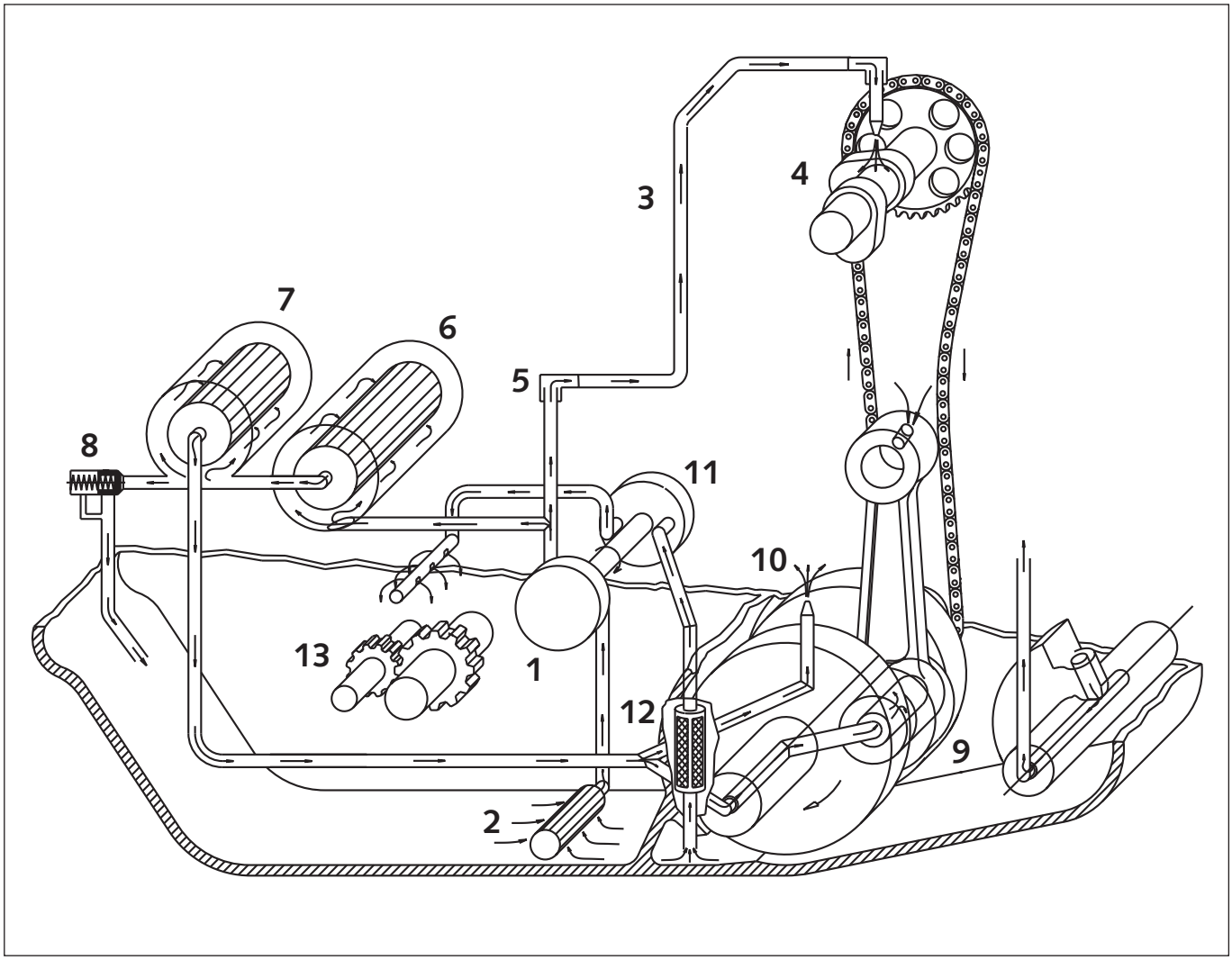
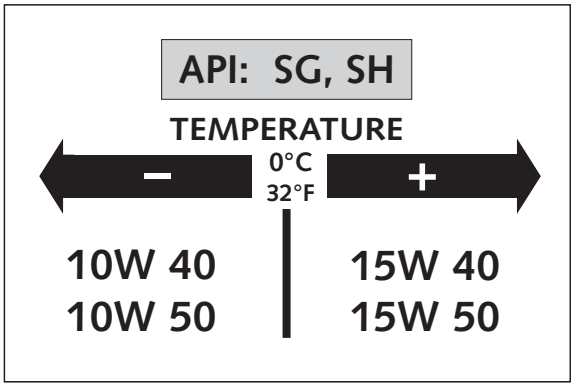


Oil circuit

Via the long oil screen ❷, the oil pump ❶ draws engine oil from the oil sump of the transmission. This engine oil flows through an oil line ❸ into the cylinder head for camshaft lubrication ❹; the oil quantity is controlled by the jet bolt ❺. An oil duct branches off to the long oil filter ❻ where the coarser particles contained in the engine oil are filtered away. Then, the engine oil arrives at the short oil filter ❼ which also filters the fine particles.

Now, the purified engine oil is pumped past the bypass valve ❽ to the conrod bearing ❾ and sprayed from below onto the piston through a nozzle ❿.

The second oil pump ⓫ draws the engine oil via the short oil screen ⓬ out of the crankcase, thereby lubricating the transmission gears ⓭.

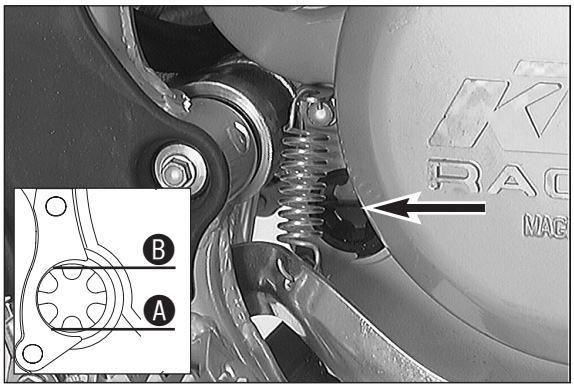


Engine oil

Only use fully synthetic brand oils (Motorex Power Synt. 4T) that meet or surpass the quality requirements of API classes SG or SH (see specifications on the container).

! CAUTION !

INSUFFICIENT AMOUNTS OR LOW-GRADE ENGINE OIL LEAD TO PREMATURE WEAR OF THE ENGINE.



Checking the engine oil level

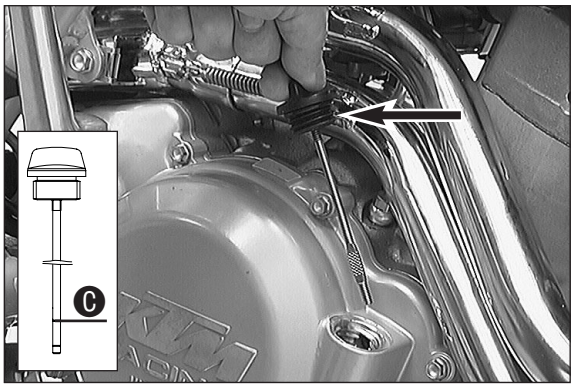
The engine oil level can be checked with the engine being either warm or cold. Place the motorcycle in an upright position and on a horizontal surface (not on the side stand).

If the engine is cold, the engine oil must be visible at the lower edge of the inspection glass Ⓐ.

If the engine is warm, the engine oil must be visible up to the upper edge of the inspection glass Ⓑ.
Replenish the engine oil, if necessary.

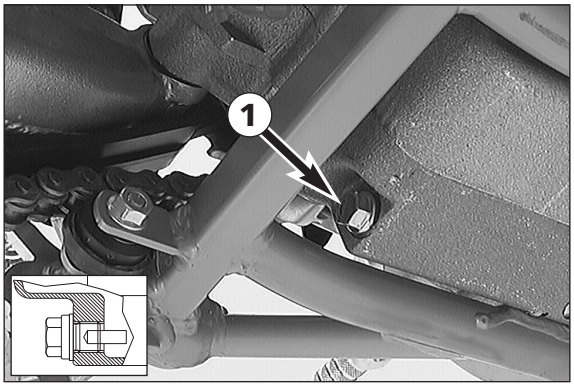
! CAUTION !

INSUFFICIENT AMOUNTS OR LOW-GRADE ENGINE OIL LEAD TO PREMATURE WEAR OF THE ENGINE.



NOTE: Engines up to the 2001 model have a sight glass and an oil dipstick. If the inspection glass is heavily soiled (e.g. after a race in muddy terrain), the engine oil level can also be measured with the oil dipstick. For this purpose, unscrew the dipstick and wipe it clean with a cloth. Screw the dipstick back in and screw it out again. If the engine is warm, the oil level should be near the MAX mark Ⓒ.

Check engine for leaks.



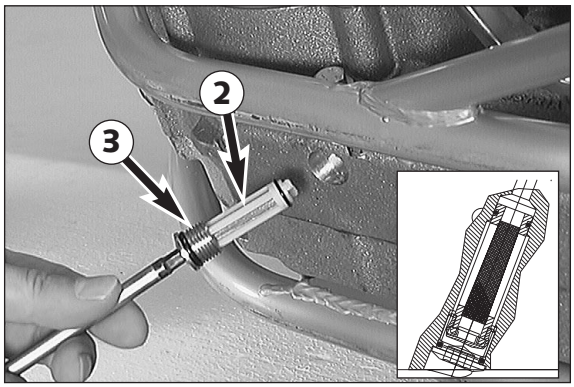
Changing the engine oil

NOTE: When changing the engine oil, it is necessary to clean the short and long oil screens and to replace both oil filters.
Engine oil has be changed with the engine being at an operating temperature.

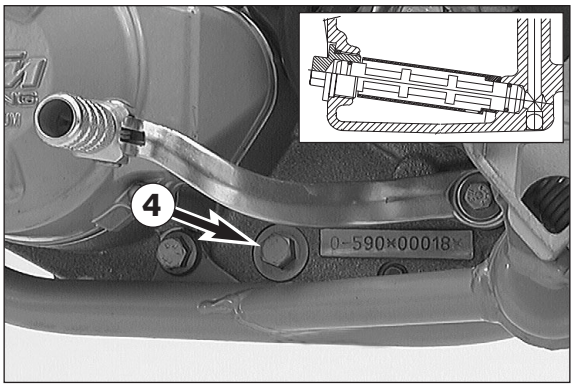
⚠ WARNING ⚠

AN ENGINE AT OPERATING TEMPERATURE AND THE ENGINE OIL IT CONTAINS ARE VERY HOT - DO NOT BURN OR SCALD YOURSELF!

Place the motorcycle on a horizontal surface, remove the plug ❶ and allow the oil to drain into a receptacle.
Clean plug (with magnet) thoroughly.
Once the entire oil has been drained, clean the sealing surface, mount the plug together with the sealing ring and tighten it to 20 Nm/ 15ft.lb.



CLEANING THE SHORT OIL SCREEN
The short oil screen ❷ is accommodated in the hex-socket plug ❸ on the engine bottom.
Insert a pin-type key into the plug and tap on the key a few times with a hammer in order to relieve the stress acting on the plug.
Dismount the oil screen, clean the components thoroughly and blow compressed air through them.
Check the O-rings for damage and, if necessary, replace them.
Mount the oil screen together with the plug again and tighten the plug to 10 Nm.

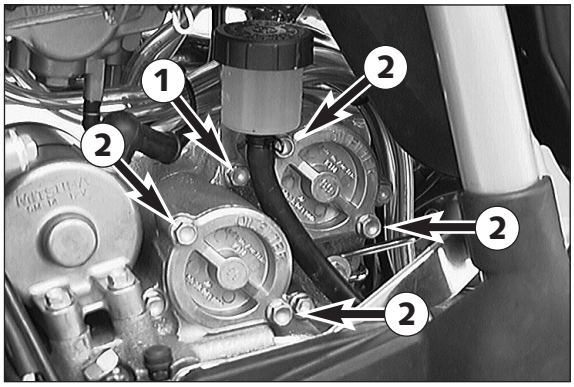


CLEANING THE LONG OIL SCREEN
The long oil screen is accommodated in the hexagon plug ❹ adjacent the engine number.
Dismount the plug together with the oil screen, clean the components thoroughly and blow compressed air through them.
Check the O-rings for damage and, if necessary, replace them.

To mount the long oil screen ❺, place it on an approx. 300 mm/ 11.8 in long pin-type key or a similar tool. Insert the pin-type key through the opening into the bore of the opposite engine casing wall. Then, push the oil screen into the engine casing as far as possible.
Remove the pin-type key, mount the plug and tighten it to 15 Nm/ 11 ft.lb.

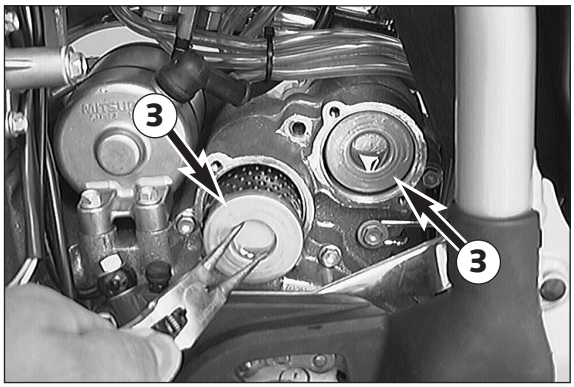
! CAUTION !

THE OIL SCREEN IS MOUNTED SLIGHTLY DOWNWARDS, IF INCORRECTLY FITTED, THE SCREEN LOOSES ITS FUNCTION AND THIS CAN CAUSE INCREASED ENGINE WEAR.

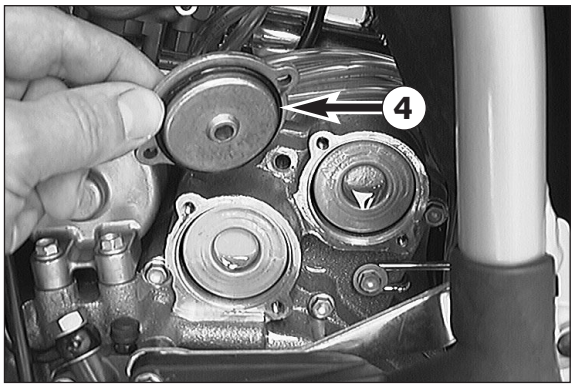


Changing the oil filters

Remove the bolt ❶ and swing the brake fluid container sideward. Place a receptacle underneath the engine to collect the drained oil.
Remove the 4 bolts ❷ and dismount the two oil filter covers.

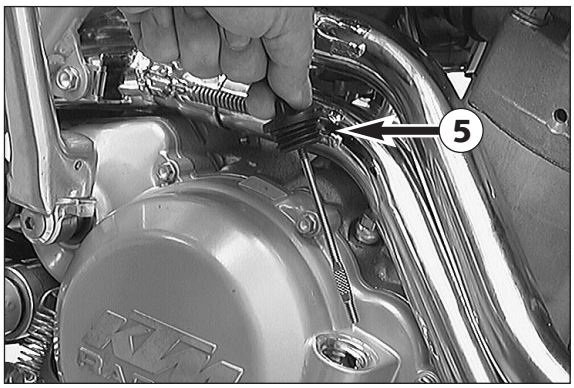


Using circlip pliers, you may now pull the oil-filter inserts ❸ out of the housing.
Clean the oil filter cover, the sealing surfaces of the O-rings and the engine casing.
Check the O-rings of the oil filter covers for damage and, if necessary, replace them.



Put the motorcycle on its side and fill the oil filter housings about halfway with engine oil. Insert the long oil filter at the front and the short oil filter at the back of the housing.
Grease the O-rings ❹ of the oil filter covers and mount the cover. Mount the bolts and tighten them to 6 Nm/5 ft.lb.

Position the brake fluid container and tighten the bolt to 8 Nm/ 6 ft.lb.

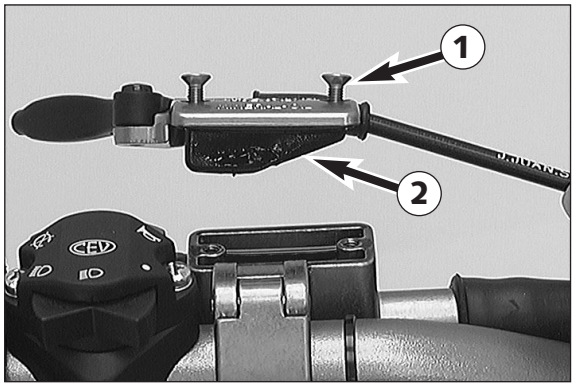


Return the motorcycle to an upright position.

Remove the oil dipstick ❺ at the clutch cover and fill in 1.2 liters of fully synthetic engine oil (Motorex Power Synt. 4T).

Start the engine and check all screwed connections and oil filter covers for leaks.

Finally, check the engine oil level and, if necessary, correct it.

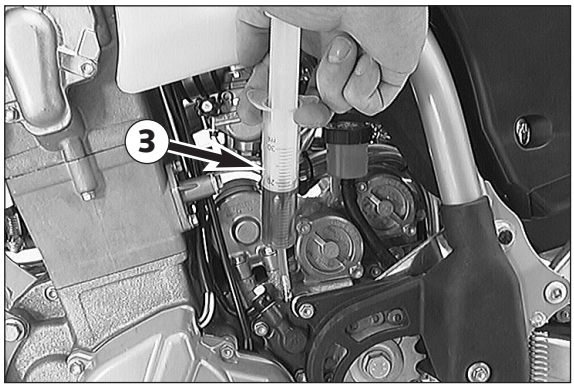


Checking the oil level of the hydraulic clutch

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.

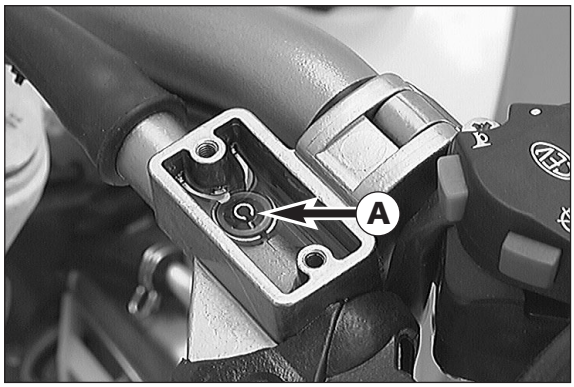
! CAUTION !

ONLY USE SAE 10 BIODEGRADABLE HYDRAULIC OIL TO REFILL THE MASTER CYLINDER. NEVER USE BRAKE FLUID!



Bleeding of the hydraulic clutch

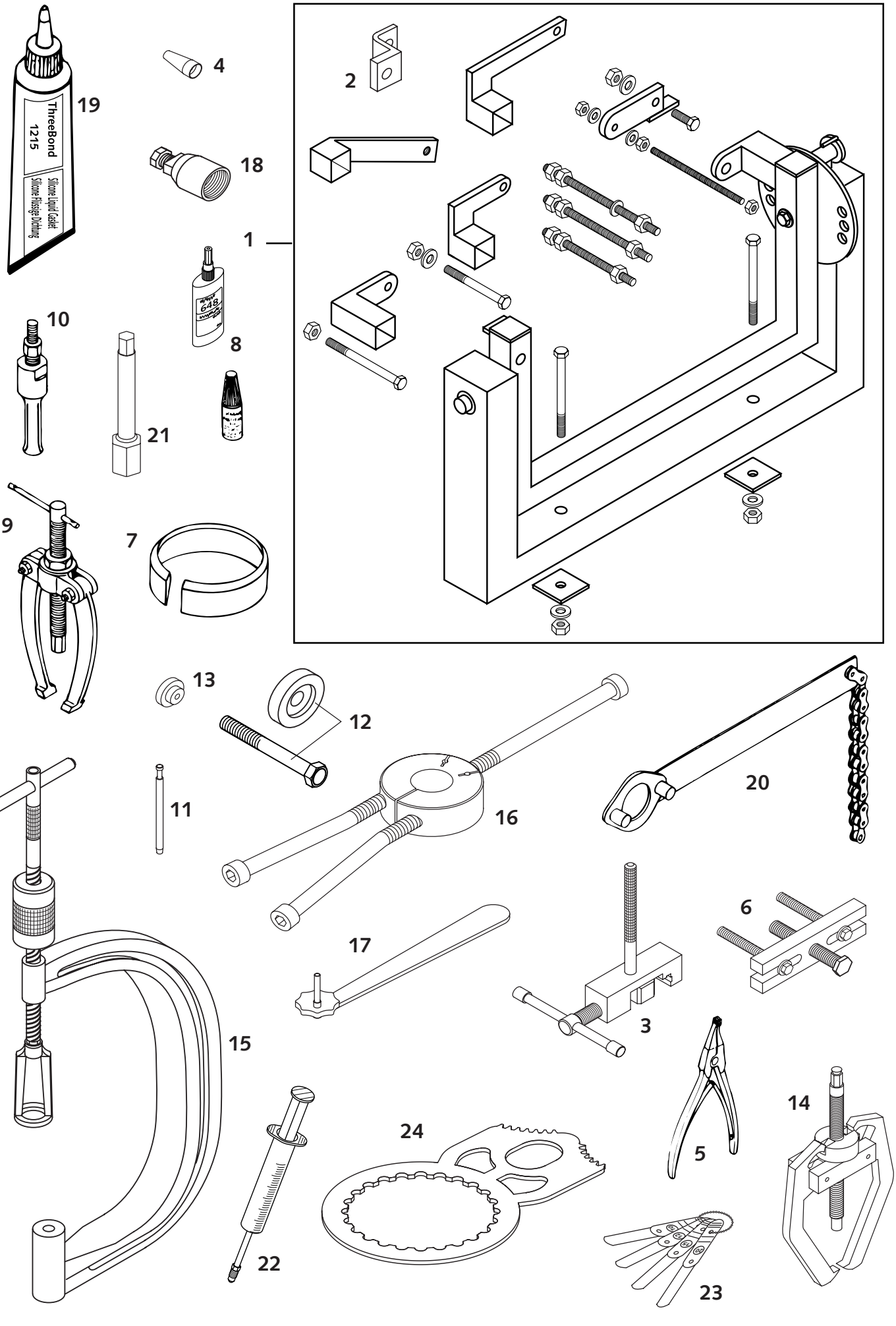
For bleeding, the cover of the master cylinder of the clutch needs to be removed. For this purpose, remove screws ❶ and take off cover together with rubber bellows ❷. At the slave cylinder of the clutch, remove the bleeder nipple. At its place, mount the bleeder syringe ❸ which is filled with biodegradable hydraulic oil.



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

! CAUTION !

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


19
ThreeBond
1215
Silicone Liquid Gasket
Silicone Flüssige Dichtung
4
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SPECIAL TOOLS – ENGINE

FIG	*PART NO.*	*DESCRIPTION*
1	560.12.001.000	Universal engine work stand
2	590.29.002.000	Engine holder for engine work stand
3	590.29.020.000	Rivetting tool for steering chain
4	590.29.005.010	Mounting sleeve for shaft seal ring water pump
5	510.12.011.000	Circlip pliers
6	590.29.021.000	Puller for driving hub and primary gear
7	598.29.015.075	Piston ring spanner Ø 75 mm
	580.12.015.089	Piston ring spanner Ø 89 mm
	580.12.015.095	Piston ring spanner Ø 95 mm
8	6 899 785	Loctite 243 blue 6 cm^3
	584.29.059.000	Loctite 648 green 20 ml
9	151.12.017.000	Gear puller
10	151.12.018.000	Internal gear puller 12-16 mm
	151.12.018.100	Internal gear puller 18-23 mm
11	590.29.026.006	Limit plug gauge 6.05 mm
12	590.29.035.000	Mounting sleeve for driving pin
13	590.29.036.000	Protection sleeve for primary gear
14	590.29.033.000	Puller for camshaft bearings
15	590.29.019.000	Valve spring mounter
16	584.29.037.037	Mounting tool for inner rings of crankshaft bearings
17	590.29.034.000	Wrench for mixture regulating screw
18	580.12.009.000	Magneto extractor
19	309098	Seal (Three-Bond)
20	510.12.012.000	Chain sprocket holder
21	590.29.072.000	Spark plug wrench 16 mm
22	503.29.050.000	Bleeding syringe for hydraulic clutch
23	590.29.041.000	Feeler gauge for valve clearance
24	590.29.003.100	Clutch holder

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CLEANING

Clean your motorcycle regularly in order to maintain the beauty of its plastic surfaces.
The best manner would be to use warm water that has been mixed with a normal brand-name washing detergent and a sponge. The hard dirt can be removed before washing with the help of a soft water jet.

! CAUTION !

NEVER CLEAN YOUR MOTORCYCLE WITH A HIGH-PRESSURED CLEANER OR A HIGH-PRESSURED WATER JET. THE WATER COULD OTHERWISE RUN INTO THE ELECTRICAL COMPONENTS, CONNECTORS, SHEATHED CABLES, BEARINGS, CARBURETOR, ETC. AND CAUSE DISTURBANCES OR LEAD TO A PREMATURE DESTRUCTION OF THESE PARTS.

- You should use normal brand-name detergents to clean the motorcycle. Especially dirty parts should be cleaned additionally with the help of a paint brush.
- Before cleaning with water, plug the exhaust pipe to prevent water ingress.
- After the motorcycle has been rinsed with a soft water jet, it should be dried by air pressure and a cloth. Drain the float chamber of the carburetor. Then take a short drive until the engine has reached the working temperature and also apply the brakes. By warming these components, the residual water can evaporate from inaccessable parts of the engine and the brakes.
- Slide back the protective covers on the handlebar-mounted instruments so that any water that may have seeped into this part of the motorcycle is allowed to evaporate.
- Once the motorcycle has cooled down, oil or grease all sliding and bearing points. Treat the chain with a chain spray. Also oil the fuel tap.
- To avoid malfunctioning of the electric system, you should treat the emergency-OFF switch, short-circuit button, light switch and socket connectors with a contact spray.

CONSERVATION FOR WINTER OPERATION

In the event that the motorcycle is also used in winter and on roads where one has to expect salt spraying, you will have to take precautions against the aggressive road salt.
- clean motorcycle thoroughly and let it dry after each ride.
- treat engine, carburetor, swing arm, and all other bare or galvanized parts (except for brake discs) with a wax-based anti-corrosion agent.

⚠ WARNING ⚠

KEEP ANTI-CORROSION AGENT FROM GETTING INTO CONTACT WITH THE BRAKE DISCS, FOR OTHERWISE THIS WILL SIGNIFICANTLY REDUCE THE BRAKING POWER.

! CAUTION !

AFTER RIDES ON SALTED ROADS, CLEAN MOTORCYCLE THOROUGHLY WITH COLD WATER AND LET IT DRY WELL!

STORAGE

Should you desire to make a pause over a longer space of time, please observe the following instructions:
- Clean motorcycle thoroughly.
- Change engine oil, short and long oil filters (old engine oil contains aggressive contaminants).
- Check antifreeze and amount of cooling liquid.
- Warm up the engine once again, close the fuel cock and wait until the engine dies. Then open the drain plug from the float chamber to remove the remaining fuel.
- Remove spark plug and fill in approx. 5 cc of engine oil into the cylinder through the opening. Actuate kick-starter 10 times in order to distribute the oil onto the cylinder walls and mount the spark plug.
- Set piston to compression so that the valves will be closed (slowly operate the kickstarter until you can hear the automatic decompressor click (release).
- Let fuel flow out of tank into an appropriate container.
- Correct tire pressure.
- Lubricate pivot points of the control levers, footrests, etc. as well as the chain.
- Service the shock absorber linkage.
- Disassemble and charge battery.
- The storage place should be dry and not subject to excessive temperature fluctuations.
- Cover the motorcycle with an air permeated tarpaulin or blanket. Do not use non air permeable materials as any humidity may not be able to escape and could cause corrosion.

! CAUTION !

DO NOT LET THE ENGINE RUN FOR A SHORT TIME DURING THE STORAGE PERIOD. THE ENGINE WOULD NOT GET WARMED UP ENOUGH AND THE THUS DEVELOPED STEAM WOULD CONDENSE DURING THE COMBUSTION PROCESS AND CAUSE THE VALVES AND EXHAUST TO RUST.

RE-INITIATION AFTER TIME OF STORAGE

- Mount the charged battery (match polarity).
- Fill up tank with fresh fuel.
- Check motorcycle as before each start (see driving instructions).
- Take a short, careful test ride first.

DISMOUNTING AND MOUNTING THE ENGINE 3

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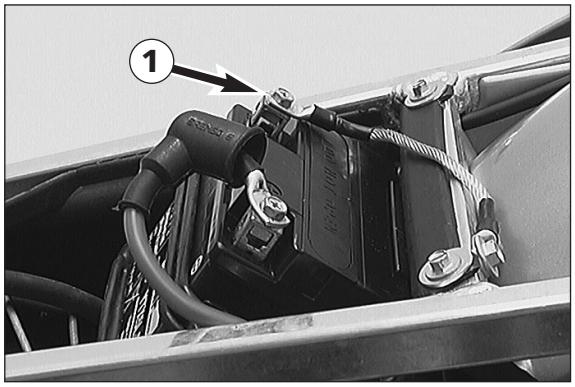
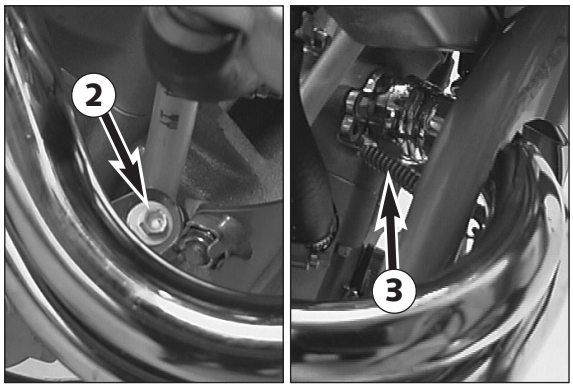
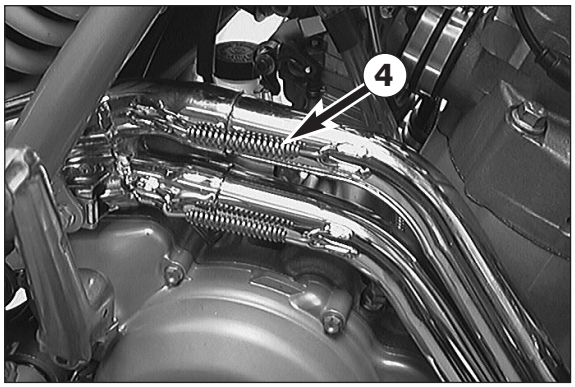


Dismounting the engine

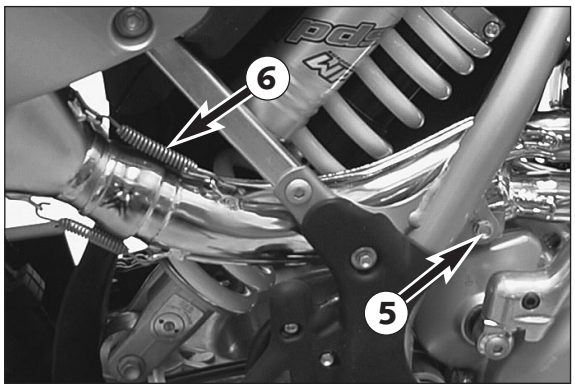
– Clean the motorcycle thoroughly and prop it up on a stable stand.
– Dismount the seat and the tank with spoilers.
– Disconnect the ground cable ❶ of the battery.



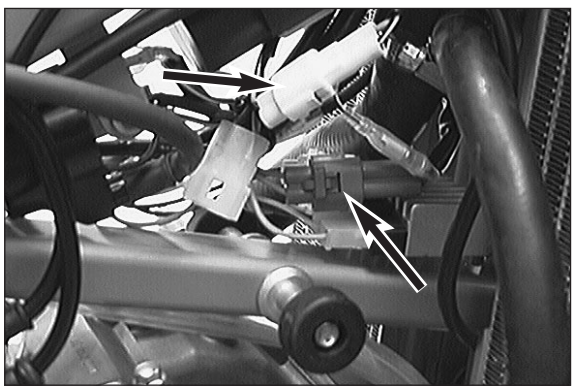
– Remove the screw ❷ and detach the 2 tension springs ❸.



– Detach the 2 tension springs ❹, pull exhaust pipes forward and take them off the vehicle.

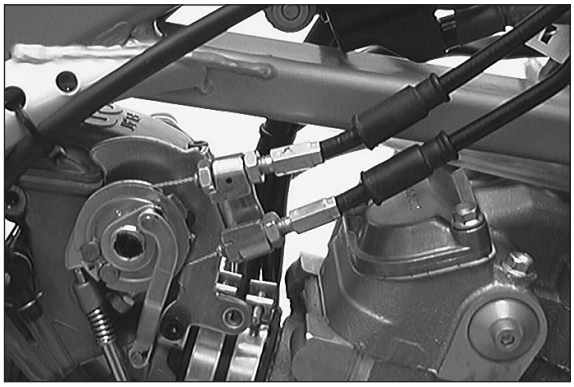


– Detach the 2 tension springs ❻ and remove the screw ❺.
– Pull the intermediate pipe forward and take it off the vehicle.

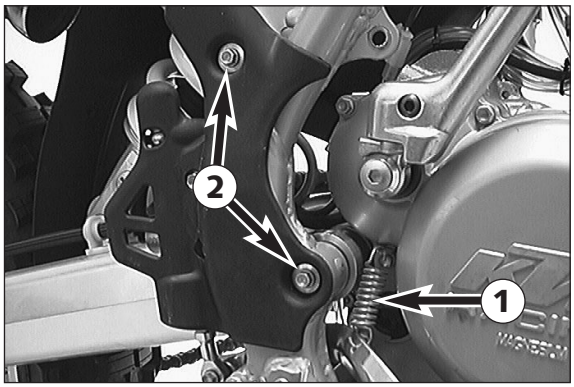


– Disconnect all plug-and-socket connections of the ignition system.

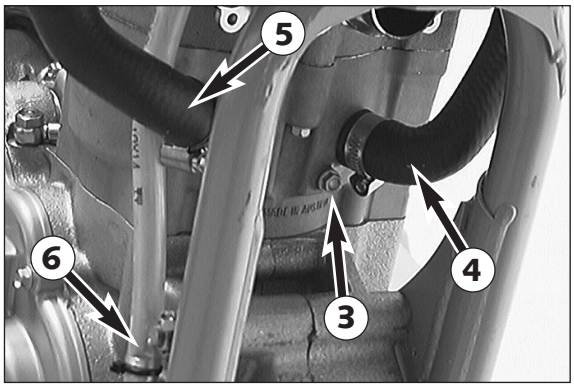
– Unhitch the cable of the hand decompressor at the engine.
– Pull out the spark plug connector.



– Remove the carburetor cover and unhitch both throttle cables.



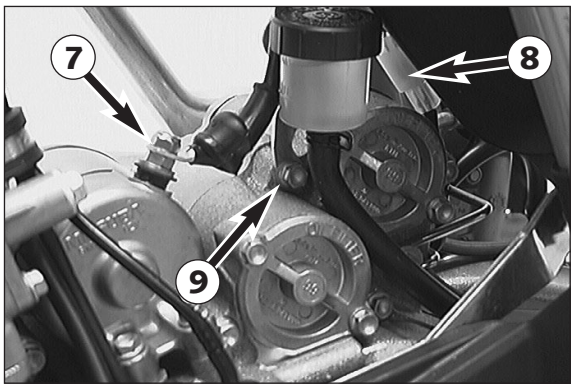
– Detach the return spring ❶ of the footbrake pedal.
– Remove the 2 screws ❷ and take off the frame cover.



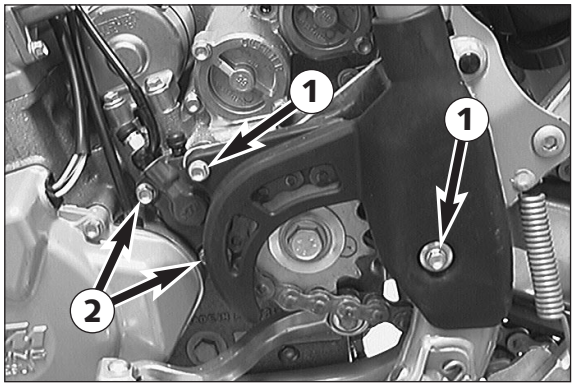
– Open the radiator cap.
– Remove the screw ❸ at the cylinder together with the sealing ring and drain the coolant into a receptacle.

– Disconnect the water hoses ❹ and ❺.
– Disconnect the hose of the engine ventilation system ❻.

– Disconnect the plug-in connection from the throttle-valve sensor.
– Loosen the front and rear hose clamps of the carburetor, pull the carburetor backward and pivot it out of the rubber sleeve at the front.
– Take the carburetor off the vehicle.

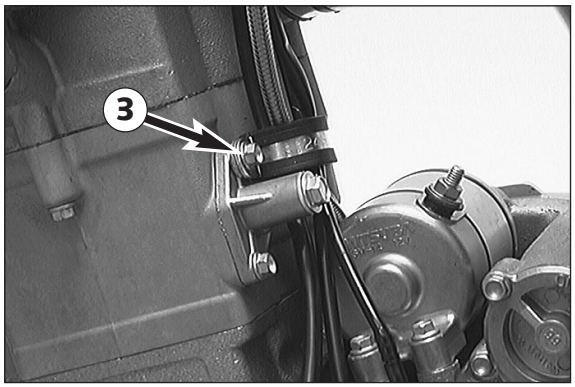


– Disconnect the cable ❼ from the E-starter motor.
– Disconnect the plug-and-socket connection ❽.
– Remove the screw ❾ and swing the brake-fluid container sideward.



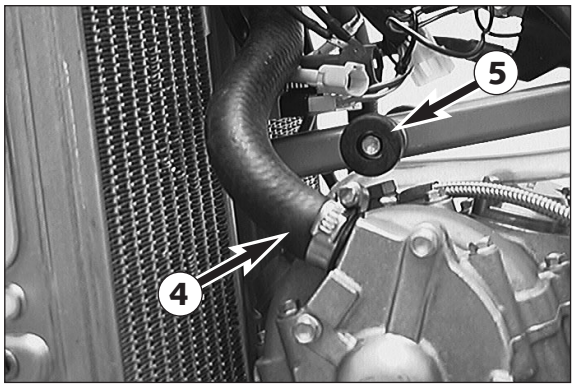
– Remove the bolts ❶ and take off the sprocket cover.
– Remove the 2 bolts ❷ of the clutch slave cylinder and pull the clutch slave cylinder off the casing.

– Swing the chain damper plate backwards.
– Open the chain joint and remove the chain from the vehicle.

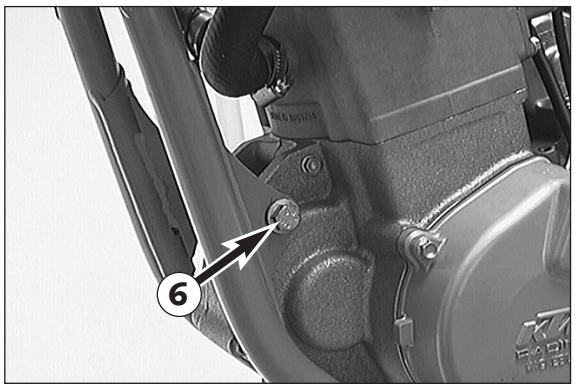


– Remove the bolt ❸ and take off the cable clip.

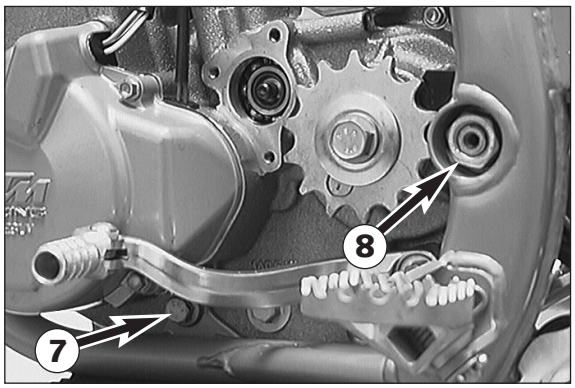
NOTE: From Model 2001 onwards a cable tie is mounted instead of the the cable clip.



– Disconnect the radiator hose ❹ and dismount the tank roller ❺.



– Dismount the front engine mounting bolt ❻.

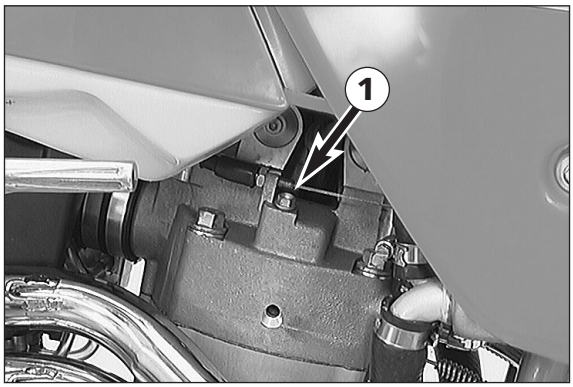


– Remove the engine mounting bolt ❼ and the hex nut ❽.
– Dismount the swing arm pivot and pull the swing arm backwards.
– Lift the engine out of the frame.

Mounting the engine

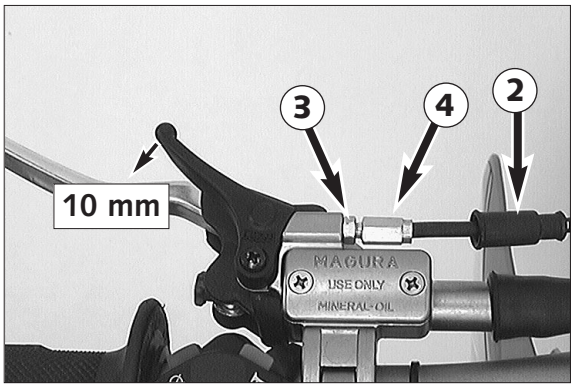
– The engine is mounted exactly the reverse order. Be sure to use the correct fastening torques (see technical specifications).

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



Bleeding the cooling system

To bleed the cooling system, fill in approx. 0.8 liters (0.2 US gallons) of coolant and remove the bleeder bolt ❶. Do not reinstall the bleeder bolt until coolant escapes at the bore without any bubbles.
Then, fill in the coolant until it reaches a level about 10 mm above the radiator fins.
After a short ride, check the coolant level once more.

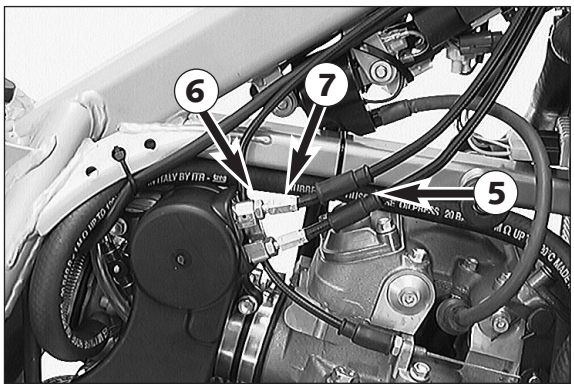


Checking the adjustment of the hand decompression release cable

Start the engine and, at idling speed, slowly pull the hand decompression lever until you can feel the thumping of the rocker arm on the lever. The backlash until said thumping should be approx. 10 mm, measured at the lever's outer end. If necessary, correct this backlash.
To adjust move back the protective cover ❷, loosen the counter nut ❸ and correct the adjustment screw ❹ accordingly. Tighten counter nut and push back protective cover.

! CAUTION !

IF THERE IS NO PLAY IN THE DECO-LEVER, THIS CAN RESULT IN ENGINE DAMAGE.



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 ❺. Loosen the counter nut ❻ and turn the adjusting screw ❼ 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.

DISMANTLING THE ENGINE 4

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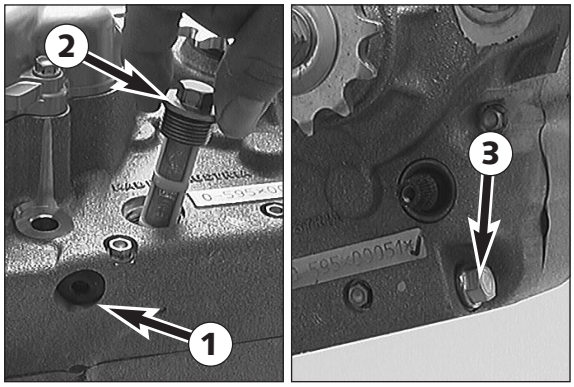
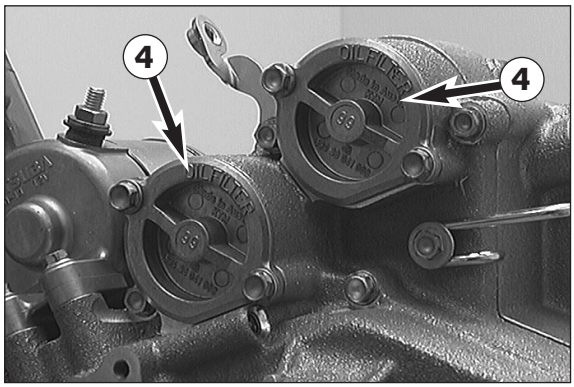


Draining the engine oil

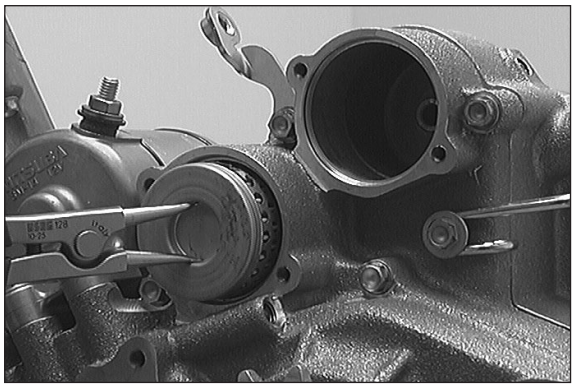
– Remove the bolts ❶, ❷, and ❸, and drain the engine oil into a receptacle.

– Remove kickstart and shift lever.



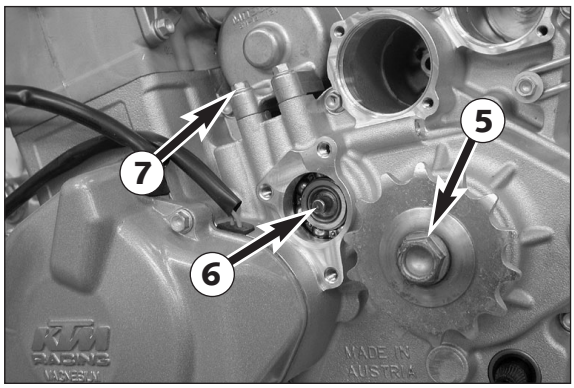
Dismounting the oil filter

– Unfasten the 4 bolts and remove both oil filter covers ❹.



– Pull the 2 oil filters out of the housing.

NOTE: To pull out the oil filters, you should use circlip pliers (see photo).



Dismounting the chain wheel

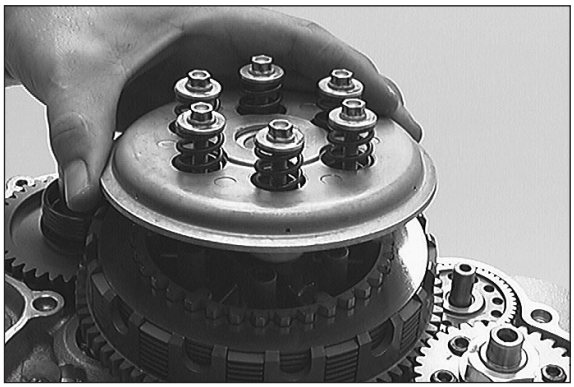
– Remove collar bolt ❺ and disc spring.
– Take the chain wheel off the countershaft.
– Pull the spacer bushing off the countershaft.

NOTE: If the transmission and clutch of the engine are okay, you can engage a gear in order to block the countershaft (force transmission to the blocked crankshaft does exist).
If the countershaft cannot be blocked as described above, you have to use a holding spanner to steady the chain-wheel in order to unfasten the collar bolt.

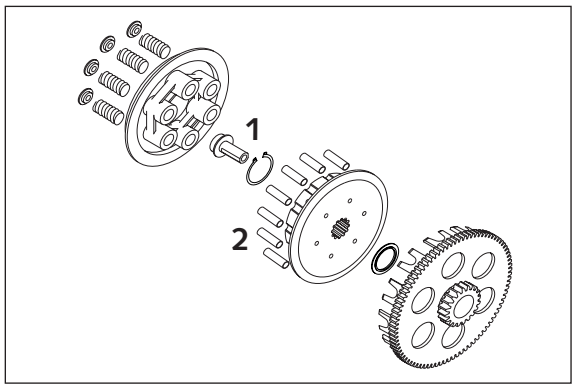
– Pull push rod ❻ out of the main shaft.
– Loosen the 2 bolts ❼ and dismount the E-starter motor.

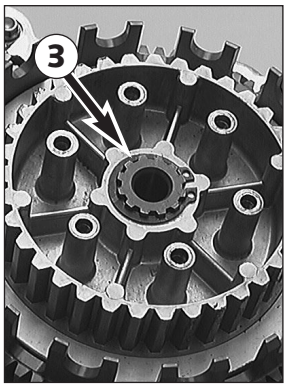
Disassembling the clutch

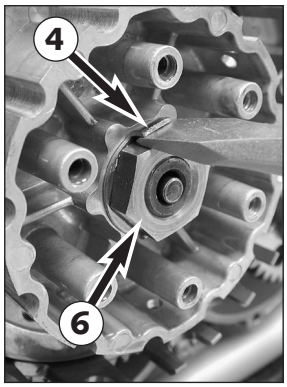
– Loosen all bolts of the clutch cover and dismount clutch cover together with gasket.
– Pull the 2 dowels out of the engine casing.



– Loosen the bolts in a crosswise order to prevent the clutch discs from getting jammed when the clutch springs are released.
– Dismount the pressure cap together with bolts, spring retainer, and clutch springs.
– Remove the pressure piece ❶.
– Take all lining and steel discs out of the outer clutch hub.
– Remove all 12 driving pin sleeves ❷ (from model 2002 on).



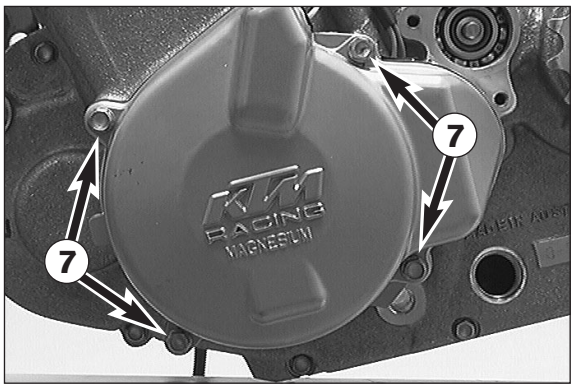




Up to the 2002 model:
– Remove the circlip ❸.

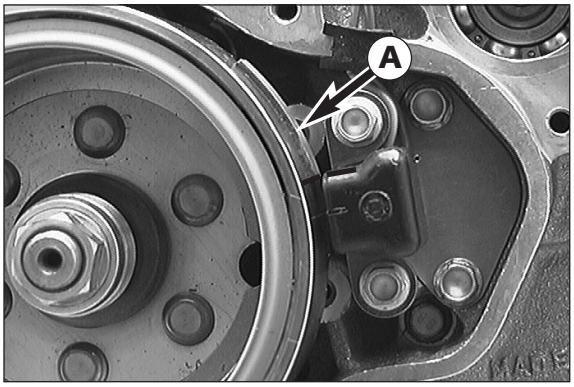
From 2003 model:
– Bend up the lock washer ❹ with a flat chisel, position the clutch holder ❺ with 6 driving sleeves as shown and loosen the nut ❻.

NOTE: Do not remove the clutch holder to allow the flywheel nut to be removed later.



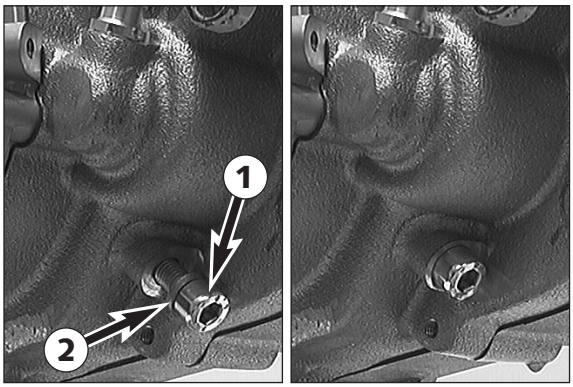
Dismounting the ignition system (models 400/520 until 2002 only)

– Unfasten the 4 bolts ❼ and take the ignition cover together with the seal off the engine casing.

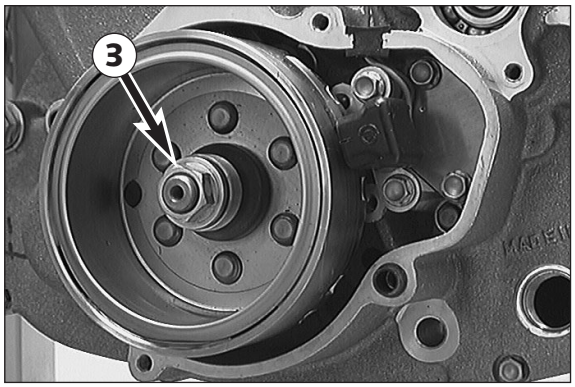


– Turn crankshaft to TDC.

NOTE: In the TDC position, the guidepiece ❹ will be above the pulser coil (see photo).

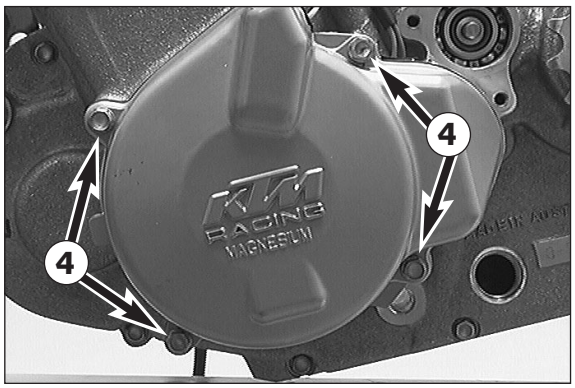


– Turn out the crankshaft fixing bolts ❶ and remove the sealing ring ❷.
– Turn in the crankshaft fixing bolt by hand.
– If you feel any resistance, move the flywheel slightly back and forth so that the crankshaft fixing bolt may engage the recess of the crankshaft.
– Tighten the crankshaft fixing bolt to 10 Nm/8 ft.lb.



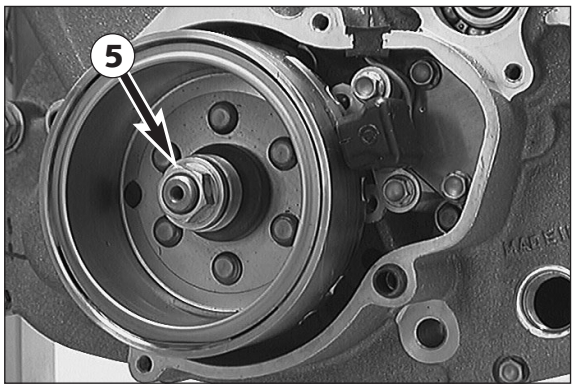
– Loosen the collar nut ❸ and remove the spring washer.

NOTE: When ordering a new part, a forged rotor will be supplied, this part is produced without rivets and is interchangeable.



Dismounting the ignition system and loosening the primary gear (model 250 EXC from 2002, models 450/525 from 2003)

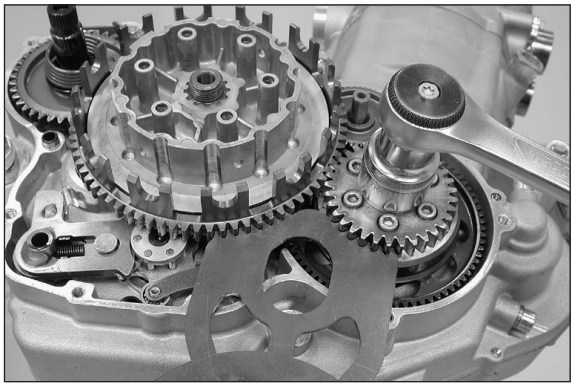
– Unfasten the 4 bolts ❹ and take the ignition cover together with the seal off the engine casing.



– Holding the clutch holder mounted earlier, unscrew the nut ❺.
– Remove the clutch holder.

! CAUTION !

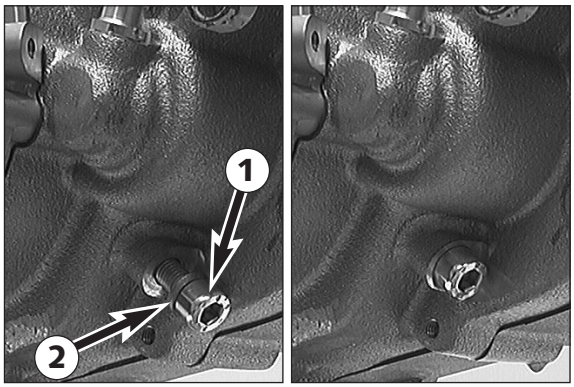
SINCE A LONGER CRANKSHAFT LOCATING SCREW IS MOUNTED ON THE 250 EXC MODELS, IT IS IMPERATIVE THAT YOU HOLD THE CLUTCH HOLDER WHILE UNSCREWING THE NUT ❺, OTHERWISE YOU MAY BEND THE LOCATING SCREW AND DAMAGE THE ENGINE HOUSING.



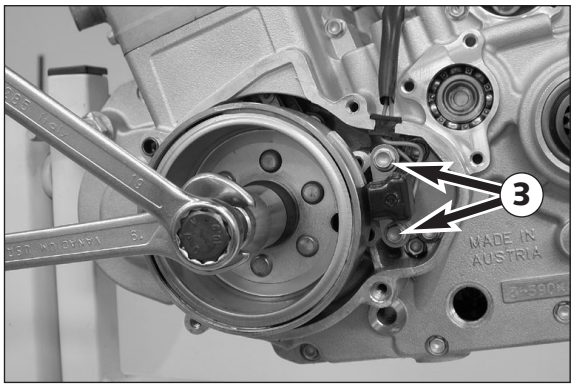
– Apply the special tool as shown, loosen the collar nut from the primary gear and remove.
– Remove the special tool.

! CAUTION !

COLLAR NUTS WITH LEFT-HAND THREAD AND WITH RIGHT-HAND THREAD WERE USED RESPECTIVELY. COLLAR NUTS LABELED AS "LEFT" HAVE A LEFT-HAND THREAD. COLLAR NUTS WITHOUT LABELING HAVE A RIGHT-HAND THREAD.



– Turn the crankshaft to the TDC position (see illustration on page 4-4C).
– Turn out the crankshaft fixing bolts ❶ and remove the sealing ring ❷.
– Turn in the crankshaft fixing bolt by hand.
– If you feel any resistance, move the flywheel slightly back and forth so that the crankshaft fixing bolt may engage the recess of the crankshaft.
– Tighten the crankshaft fixing bolt to 10 Nm/8 ft.lb.

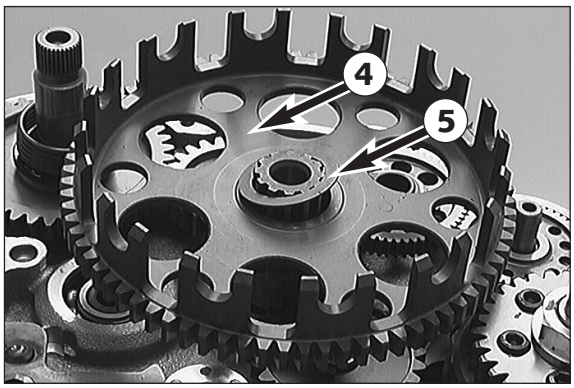


Pulling off the flywheel

– Loosen the 2 bolts ❸ and take the pulse generator out of the engine casing.
– Mount the puller tool and pull off the flywheel. For the pull-off step, use the protection cover.
– Remove the Woodruff key from the crankshaft.

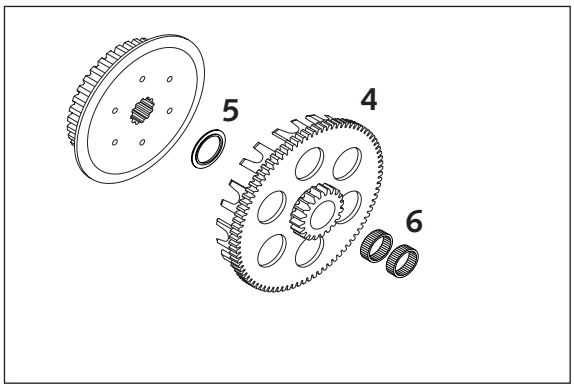
! CAUTION !

– NEVER USE A HAMMER OR OTHER TOOLS TO HIT AGAINST THE FLYWHEEL. THIS MIGHT CAUSE THE MAGNETS TO COME OFF THE FLYWHEEL AND THE CRANKSHAFT TO BE DAMAGED.
– HOLD THE PULLER TOOL TO PREVENT THE LOCATING SCREW FROM BEING BENT (250 EXC MODEL).

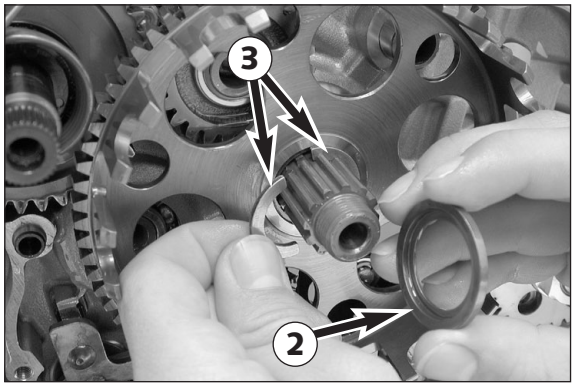


Removing the clutch drive and the outer clutch hub

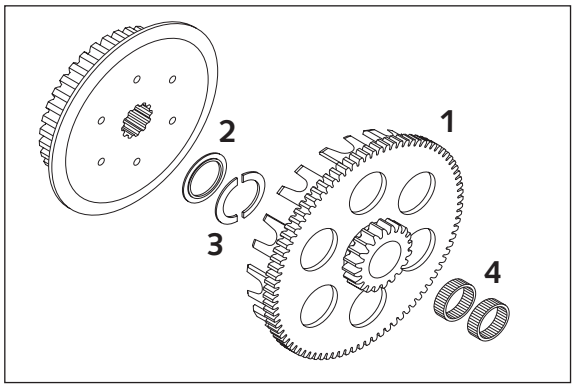
– Insert the protection cover into the main shaft and mount the puller tool.
– Pull the inner clutch hub off the main shaft.
– Take the outer clutch hub ❹ together with the bearing bush and the 2 stop discs off the main shaft.



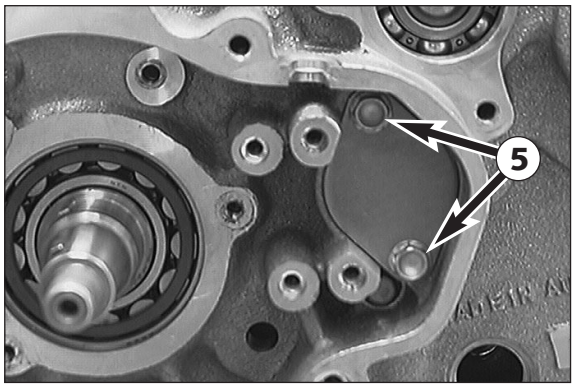
NOTE: In the 2001/2002 models, disk ❺ is replaced by a stepped disk and the bushing by 2 needle bearings ❻ (see illustration).



From the 2003 model:
– Remove the outer clutch hub ❶ together with the stepped disk ❷ and both half disks ❸ from the main shaft.

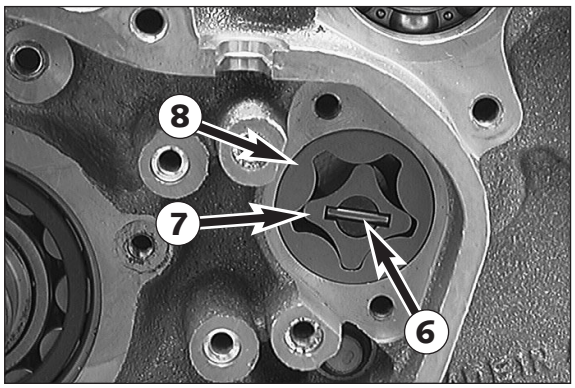


– Remove both needle bearings ❹ and the supporting plate.

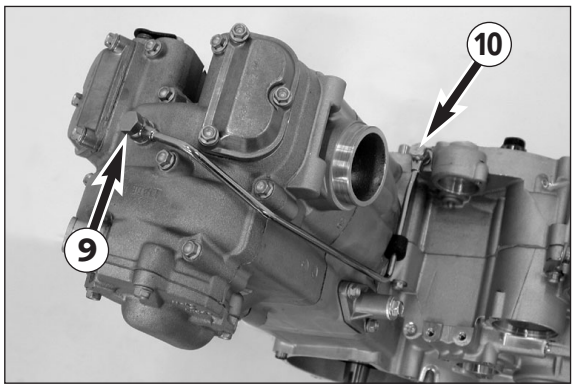


Dismounting the oil pump

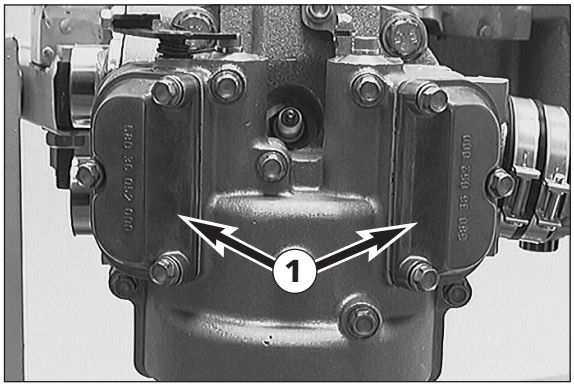
– Loosen the 2 bolts ❺ and remove the oil pump cover.



– Pull needle roller ❻, inner rotor ❼ and outer rotor ❽ out of the oil pump casing.

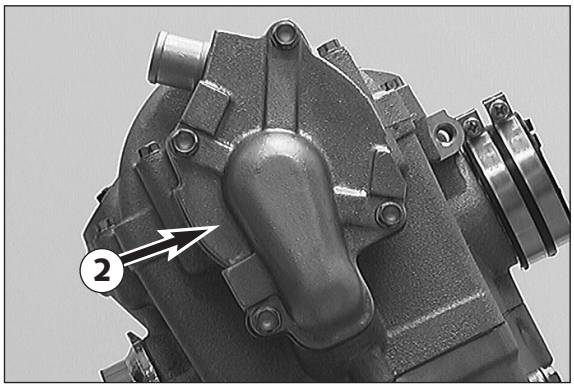


– Remove banjo bolt ❾ and jet bolt ❿ together with their sealing rings and dismount the oil line.

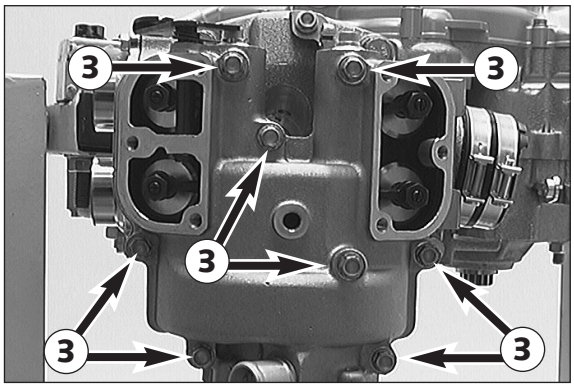


Dismounting the upper cylinder-head portion

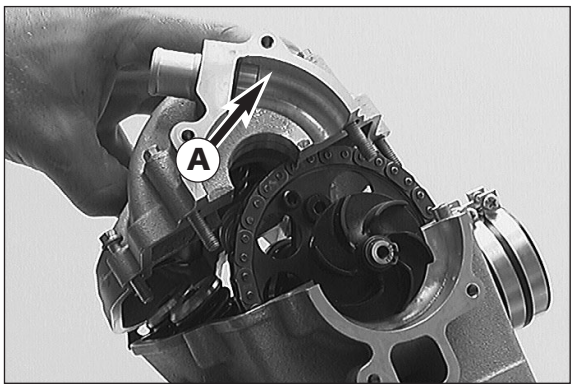
– Loosen each of the 6 bolts together with their sealing rings and dismount both valve covers ❶ together with their gaskets.
– Unscrew the spark plug.



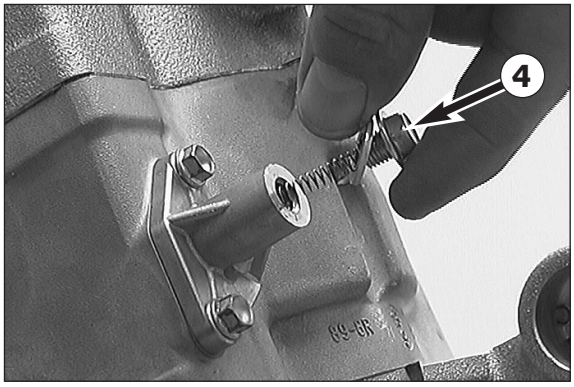
– Unfasten 4 bolts and dismount the water pump cover ❷ together with its gasket.



– Loosen all bolts ❸ of the upper cylinder head part.

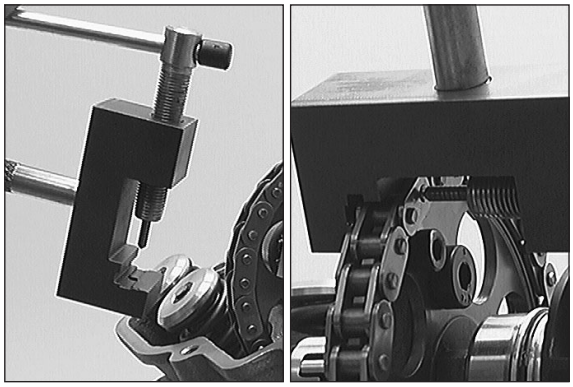


– Use a plastic hammer to carefully tap upwards in area Ⓐ and lift off the upper cylinder head part.



Dismounting cylinder head, cylinder and piston

– Dismount the bolt ❹ together with the sealing ring and the pressure spring.
– Unfasten the 2 bolts and pull the timing-chain tensioner out of the cylinder.

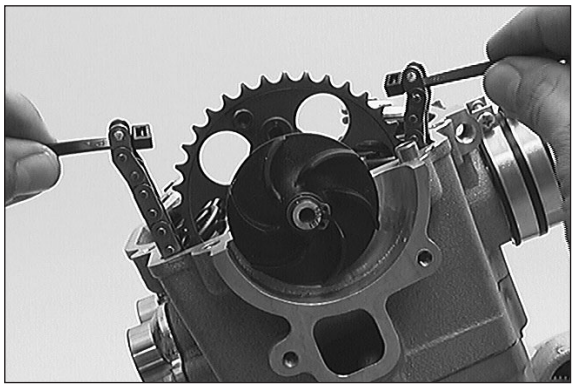


– Apply the timing chain separating tool and open the timing chain by turning the spindle (see photo).

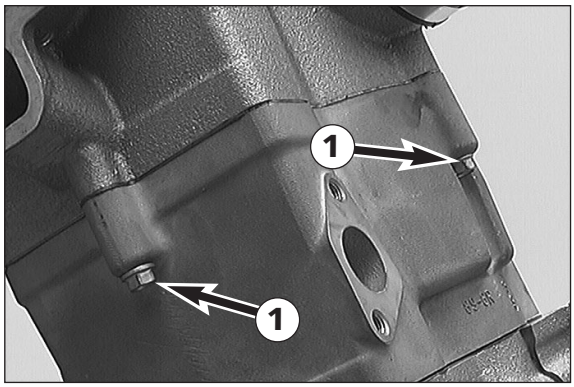
! CAUTION !

– MAKE SURE THAT THE PUSHED-OUT BOLTS DO NOT FALL INTO THE ENGINE.
– PREVENT THE TIMING CHAIN FROM FALLING INTO THE CHAIN TUNNEL.
– THE OPENED RIVET LINK IS TO BE DISCARDED.

NOTE: Every rivet link of the timing chain can be opened.

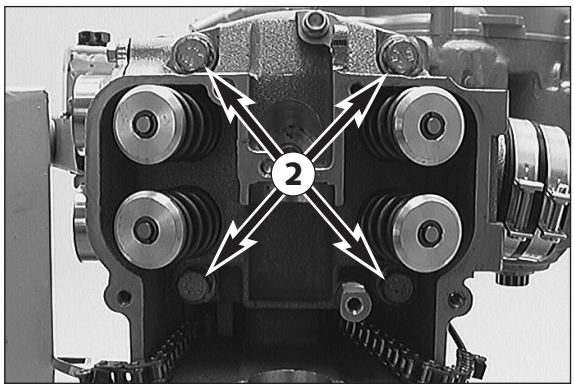


– To keep the timing chain from falling into the chain tunnel, you should insert a cable tie through the ends of the timing chain.
– Extract the camshaft from the cylinder head.

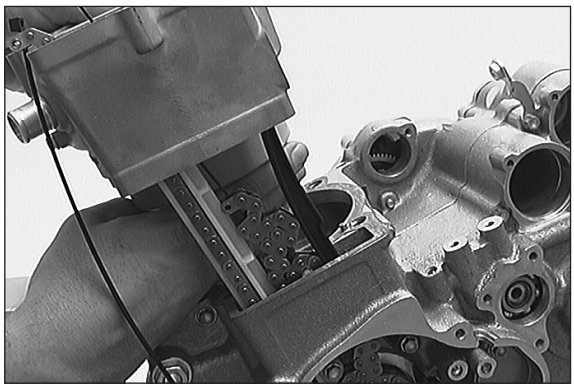


– Remove the 3 bolts ❶.

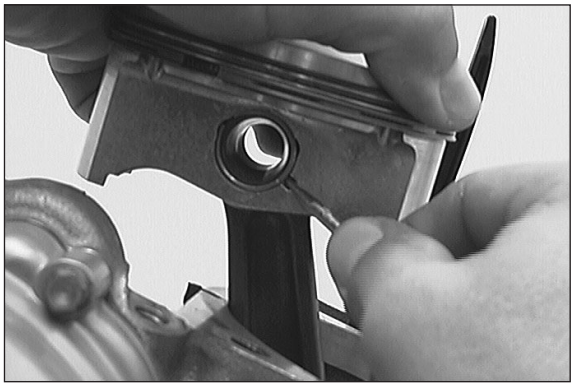
NOTE:
– If no repairs to the cylinder and cylinder head are necessary, these 3 bolts need not be removed. You can dismount the cylinder and the cylinder head as one. In this case, the cylinder head gasket need not be replaced.
– from Model 2001 onwards the bolt outside the chain tunnel is mounted with a copper seal ring (6x10x1)



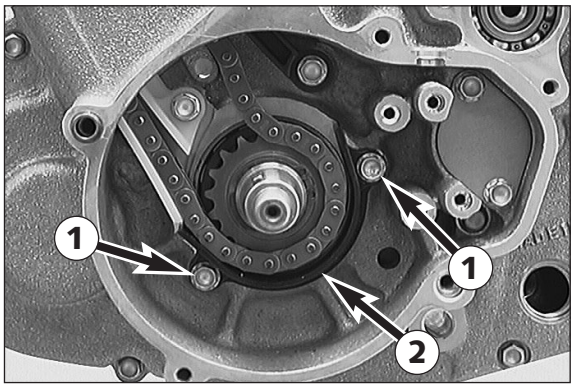
– Remove the 4 cylinder-head bolts ❷ together with washers and dismount the cylinder head together with the cylinder head gasket.



– Pull the cylinder upward while holding the piston.

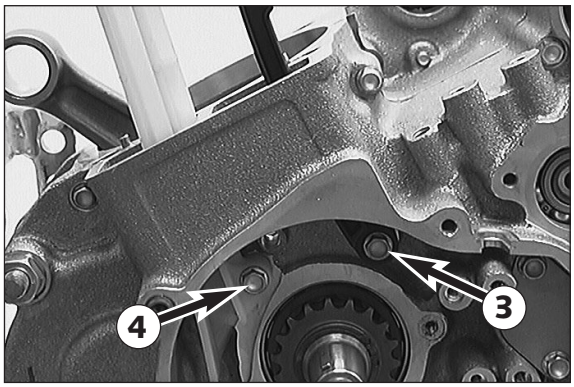


– Remove the wire circlip and the push piston bolt from the piston. Dismount the piston.

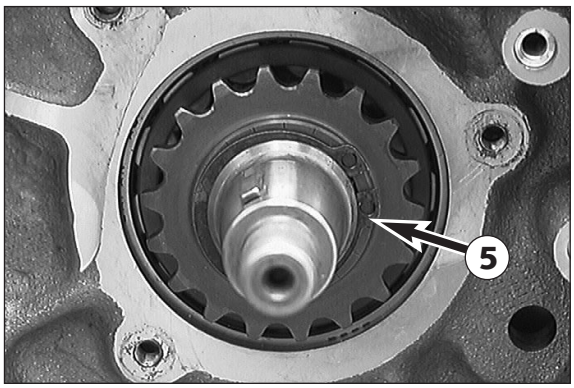


Dismounting timing chain and timing gear

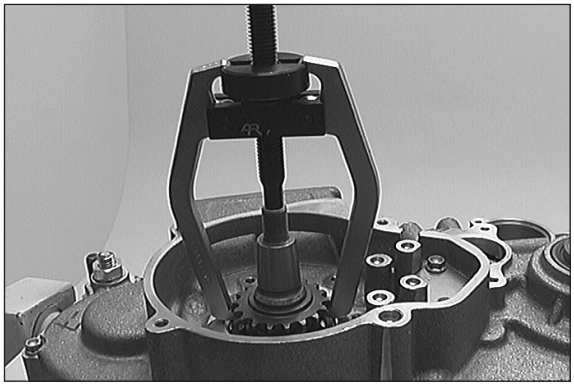
– Loosen the 2 bolts ❶ and dismount the fall-out protection element ❷.
– Remove the timing chain.



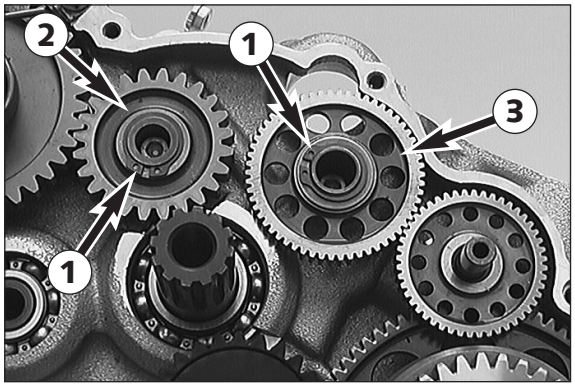
– Remove the bolts ❸ and ❹. Pull timing chain tensioner and timing chain guide upward out of the engine casing.



– Remove circlip ❺.

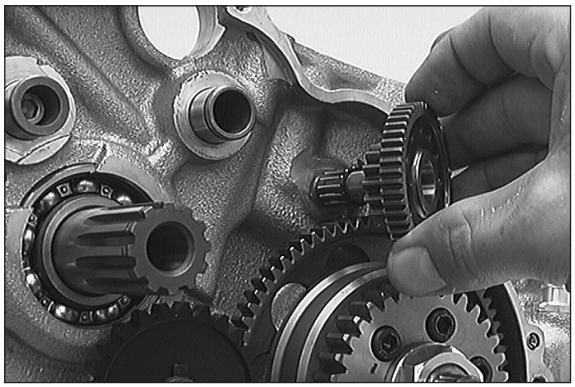


– Apply the puller tool and pull the timing gear off the crankshaft.

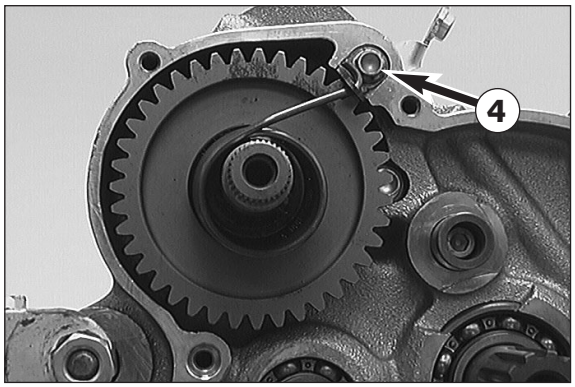


Dismounting E-starter drive gear and kickstarter

– Remove the 2 circlips ❶ and the stop discs. Pull the kickstarter idler gear ❷ and the E-starter idler gear ❸ off the bearing bolts.



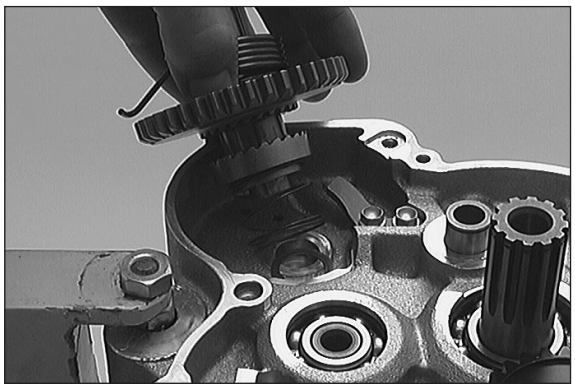
– Pull the reduction gear and the needle bearing off the bearing bolt. Take the bearing bolt out of the engine casing.



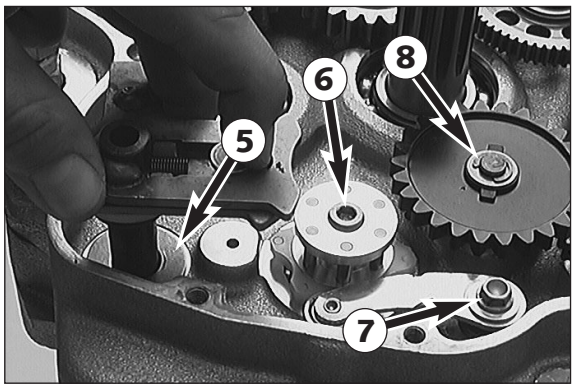
– Carefully loosen the collar bolt ❹ while holding down the kickstarter spring. Release the kickstarter spring and unhitch the spring shackle.

! CAUTION !

BE CAREFUL WHEN RELEASING THE KICKSTARTER SPRING, AS THE RECOILING KICKSTARTER SPRING MAY CAUSE INJURY.



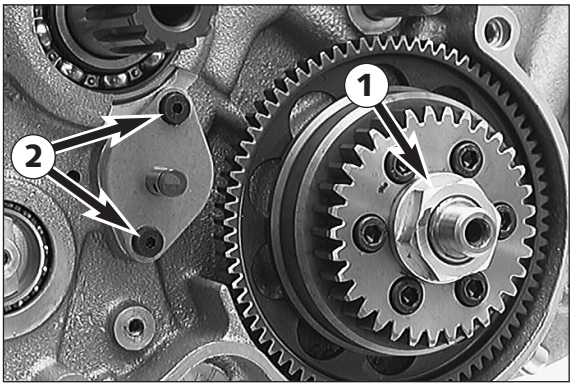
– Pull the kickstarter shaft together with ratchet gear, spring, and disc out of the engine casing.



– Slide back the sliding plate and pull the shift shaft together with the stop disc ❺ out of the engine casing.
– Remove the bolt ❻ and dismount the shift arrester.
– Remove the bolt ❼, dismount the arrester lever together with bushing and spring.

NOTE: The arrester lever only needs to be dismounted if the engine casing is exchanged.

– Remove the tab washer ❽. Pull stop disc, oil pump wheel, and needle roller off the oil pump shaft.



Dismounting primary gear and free wheel

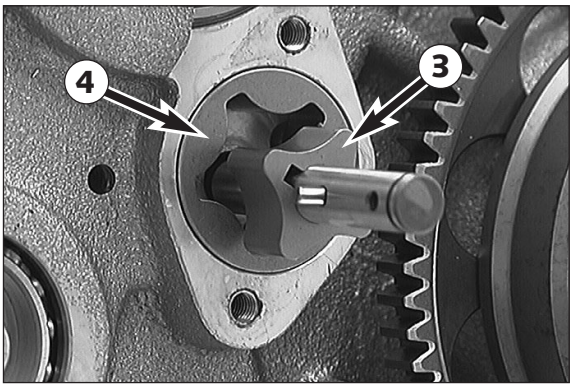
– Remove the collar nut ❶.

! CAUTION !

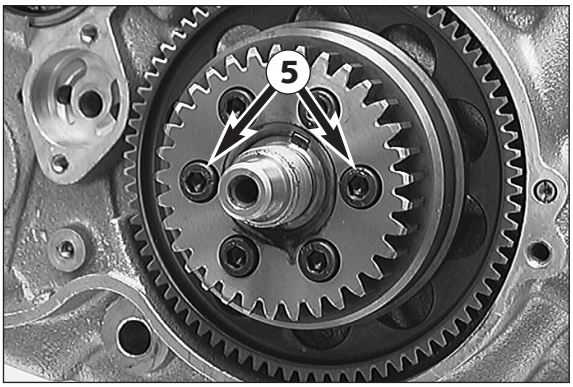
COLLAR NUTS WITH LEFT-HAND THREAD AND WITH RIGHT-HAND THREAD WERE USED RESPECTIVELY. COLLAR NUTS LABELED AS "LEFT" HAVE A LEFT-HAND THREAD. COLLAR NUTS WITHOUT LABELING HAVE A RIGHT-HAND THREAD.

NOTE: The collar nut ❶ was already removed from the 250 EXC models from 2002 and the 450/525 models from 2003 as described on page 4-5.

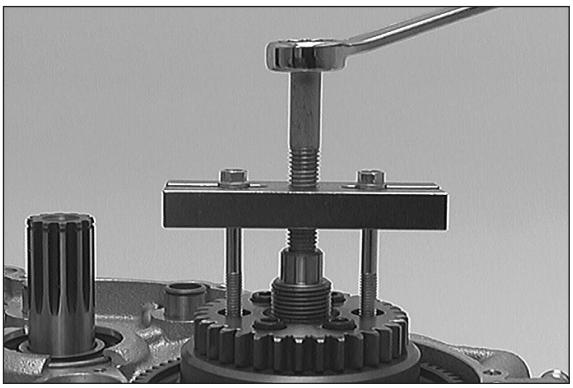
– Loosen the 2 bolts ❷ and dismount the oil pump cover.



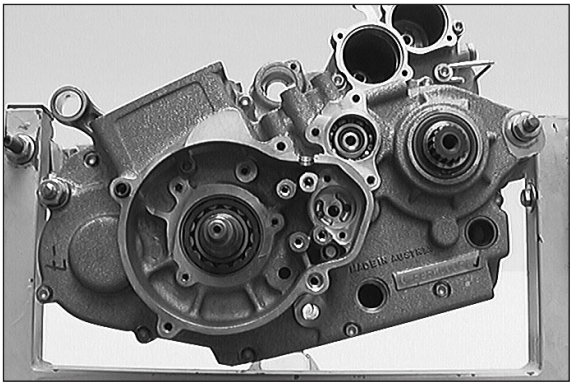
– Take the oil pump shaft together with needle roller, inner rotor ❸ and outer rotor ❹ out of the engine casing.



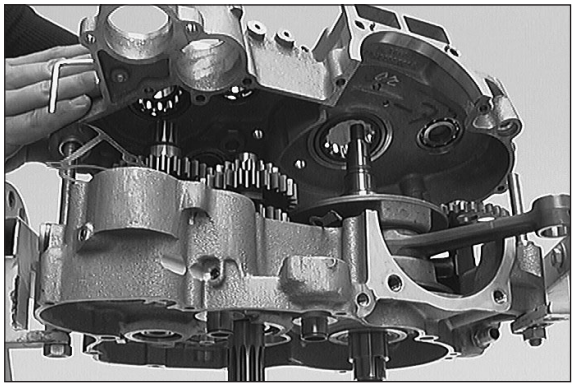
– Remove 2 bolts ❺ opposite located.



– Mount the puller tool and pull the primary gear off the crankshaft.



– Loosen the crankshaft fixing bolt.
– Loosen each of the 13 casing bolts.



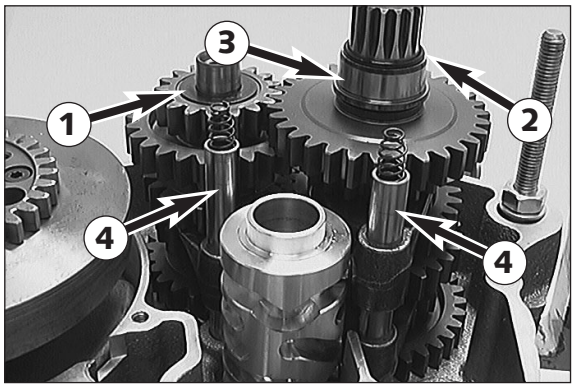
Dismounting shift mechanism and transmission

– Turn the engine sideward.
– Unfasten the engine fixture at the engine work stand
– Applying a suitable tool to the cast-on members on the casing, lift off the left half of the casing, or separate it from the right half by slightly tapping on the countershaft with a plastic hammer.

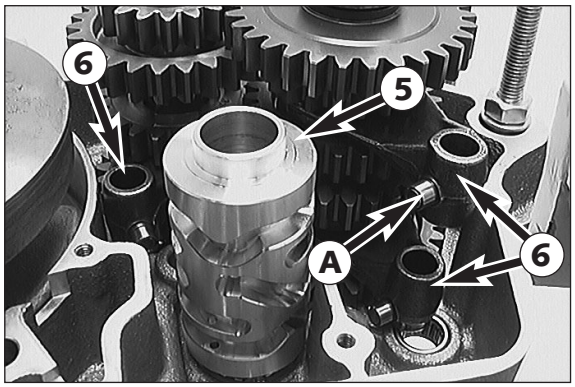
! CAUTION !

TRY TO AVOID PRYING THE HALVES APART WITH A SCREWDRIVER OR A SIMILAR TOOL AS THIS IS APT TO INFLICT DAMAGE ON THE SEALING SURFACES.

– Dismount the left casing half and the gasket.
– Pull the 2 dowels out of the engine casing and secure the right half of the casing in the work stand.

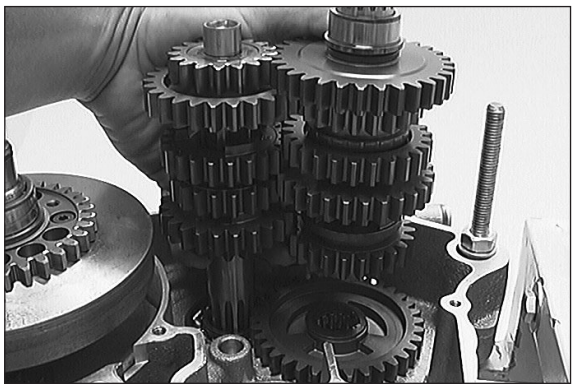


– Remove the stop disc ❶, O-ring ❷, and inner ring ❸.
– Pull both shift rails ❹ together with the 4 springs out of the engine casing and swing the shift forks sideward.

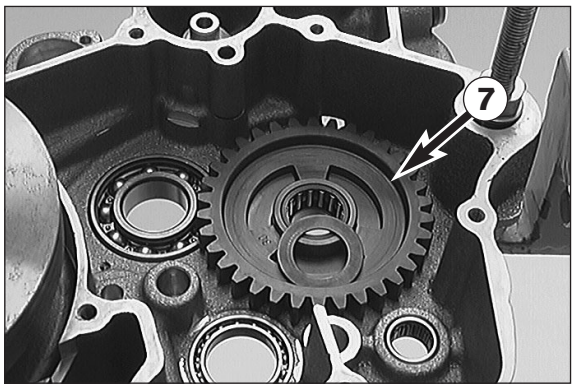


– Pull the shift roller ❺ out of the bearing seat.
– Remove the shift forks ❻.

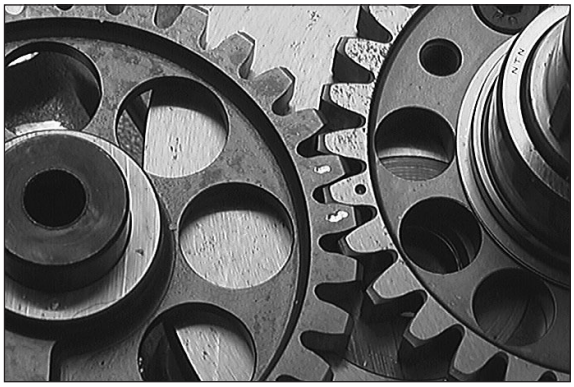
NOTE: During disassembly, watch out for the shift rolls Ⓐ on the driving pins of the shift forks. They may remain in the shift roller.



– Pull main shaft and countershaft out of the bearing seats simultaneously.

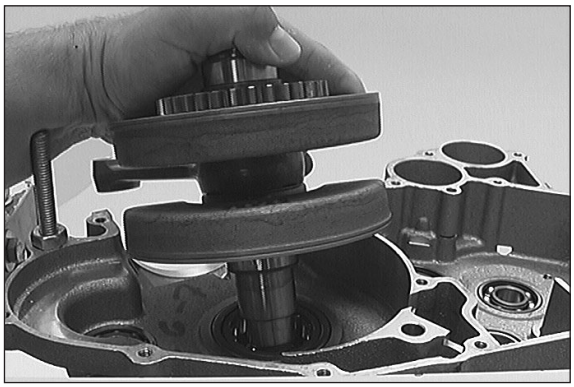


– Take 1st speed idler gear ❼ together with needle cage and the two stop discs out of the engine casing.



Dismounting balancer shaft and crankshaft

– Turn the crankshaft until the marks on the balancer shaft and crankshaft match.
– In this position, the balancer shaft can be pulled out of the bearing seat.



– Pull the crankshaft out of the bearing seat.

– Clean all components, check them for wear and, if necessary, replace them with new ones.

NOTE: For a complete engine overhaul procedure, we recommend that you replace all gaskets, shaft seal rings, O-rings, and bearings.

SERVICING INDIVIDUAL COMPONENTS 5

INDEX

Art.-No. 3206007 -E

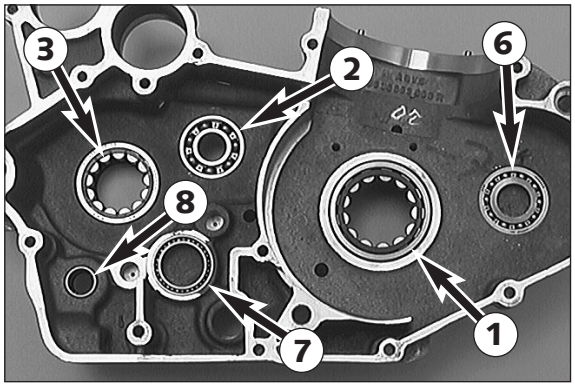
IMPORTANT NOTE REGARDS WORKING ON ENGINE HOUSING

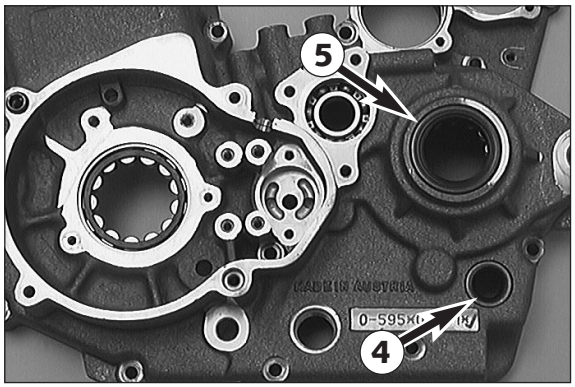
Read through the following section before commencing work. Then determine the assembly sequence so that the engine housing halves only need to be heated up once before replacing the bearings.

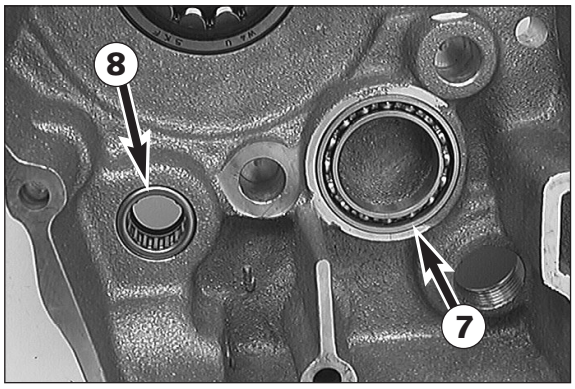
Having first removed the dowels, in order to expel the bearings or remove them with light mallet blows, the housing halves must be placed on a suitably large plane surface, supporting the whole of the sealing surface without damaging it. A wooden panel is best used as a base.

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 use an oven to heat the casing half to approx. 150°C.

Cylindrical roller bearing of crankshaft ❶
Use a suitable punch to press the cylindrical roller bearing from the outside to the inside. From the inside, press in a new cylindrical roller bearing up to the stop.

Grooved ball bearing of main shaft ❷
Use a suitable punch to press the grooved ball bearing from the outside to the inside. From the inside, press in a new grooved ball bearing up to the stop.

Cylindrical roller bearing of countershaft ❸
Use a suitable punch to press the cylindrical roller bearing from the outside to the inside. From the inside, press in a new cylindrical roller bearing up to the stop.

Shaft seal ring of shift shaft ❹
From the outside, press in new shaft seal ring up to a flush position, its open side facing inward.

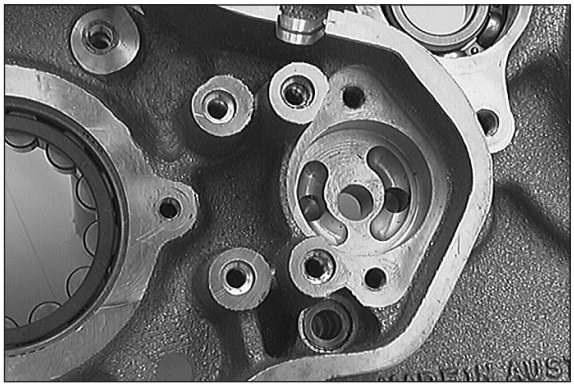
Shaft seal ring of countershaft ❺
From the outside, press in new shaft seal ring up to a flush position, its open side facing inward.

Grooved ball bearing of balancer shaft ❻
Use a bearing extractor to pull the grooved ball bearing out of the casing half. Press a new grooved ball bearing in up to the stop.

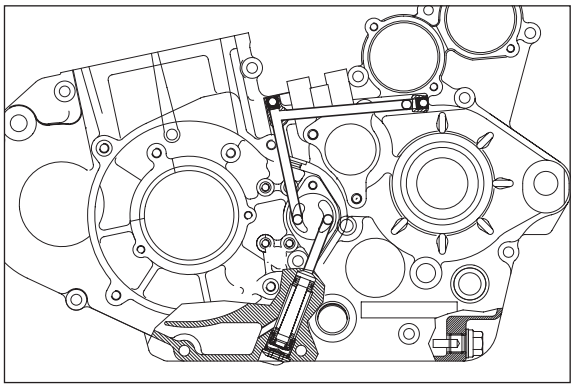
Grooved ball bearing of shift roller ❼
At a casing temperature of approx. 150°C, the grooved ball bearing will fall out from the bearing seat almost by itself.
If necessary, knock the casing half lightly on a planar wooden board. Press a new grooved ball bearing in to a flush position.

Needle bearing of shift shaft ❽
Press needle bearing from the outside to the inside.
Press a new needle bearing in from the inside and up to a flush position.

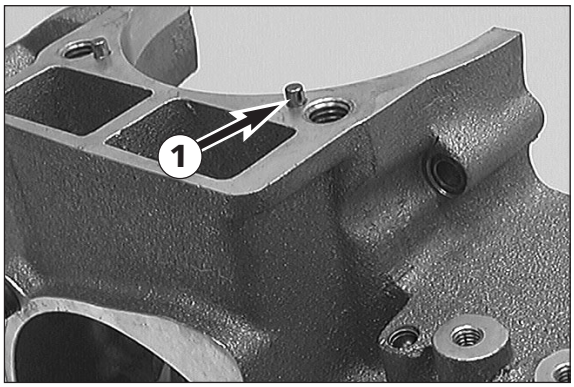
– Once the casing half has cooled down, check the bearings for tight fit.



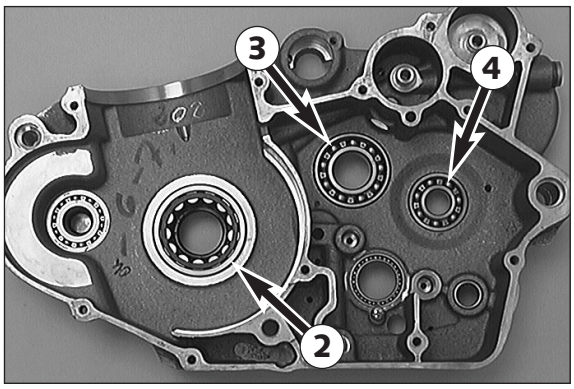
The oil pump housing must not have any score marks or seizing marks.



Blow compressed air through all oil ducts and check them for unobstructed passage.



Check the 2 dowels ❶ for tight fit and, if necessary, adhere them by means of Loctite 243.

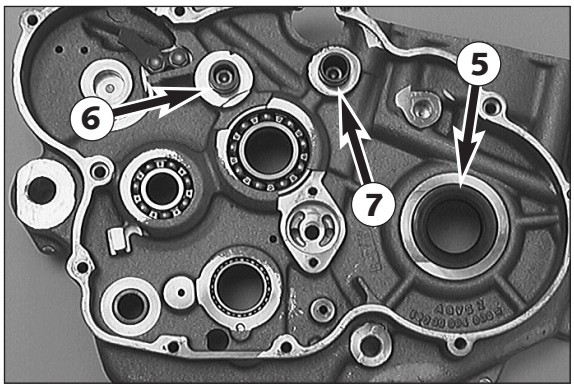


Right casing half

Remove all shaft seal rings and use an oven to heat the casing half to approx. 150°C.

Cylindrical-roller bearing of crankshaft ❷
Use a suitable punch to press the cylindrical-roller bearing from the outside to the inside. From the inside, press in a new cylindrical-roller bearing up to the stop.

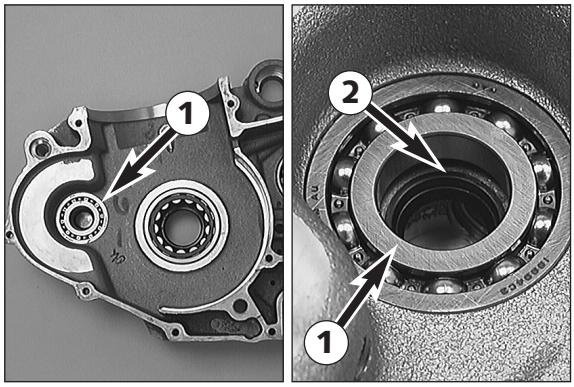
Grooved ball bearing of main shaft ❸
Use a suitable punch to press the grooved ball bearing from the outside to the inside. From the inside, press in a new grooved ball bearing up to the stop.
NOTE: The grooved ball bearing on the main shaft ❸ is secured with a screw from the 2003 models. Apply Loctite 243 to the thread of the screw and tighten to 5 Nm.



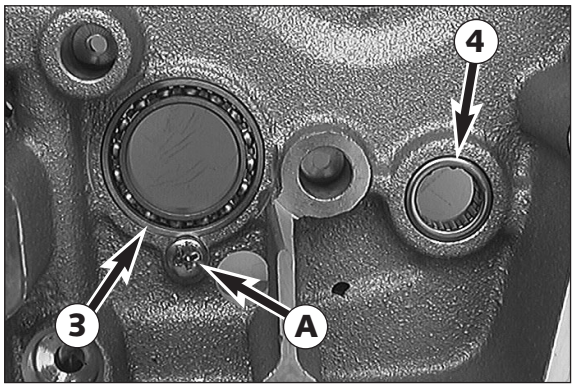
Grooved ball bearing of countershaft ❹
Use a suitable punch to press the grooved ball bearing from the outside to the inside. From the inside, press in a new grooved ball bearing up to the stop.

Shaft seal ring of crankshaft ❺
Press in new shaft seal ring to a flush position, its open side facing inward.

Bearing bolt of the kickstarter idler gear ❻
Bearing bolt of the E-starter idler gear ❼
By experience, no wear occurs on the bearing bolts. Exchanging of bearing bolts is possible only to a limited extent because, in most cases, this will cause damage to the casing.



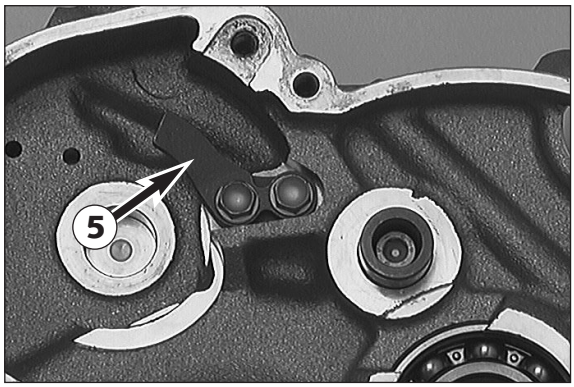
Grooved ball bearing ❶ and seal ring ❷ of balancer shaft.
Use a bearing extractor to pull the grooved ball bearing out of the casing half and remove the seal ring.
Press a new shaft seal ring in to a flush position, its open side facing downward.
Press new grooved ball bearing in up to the stop.



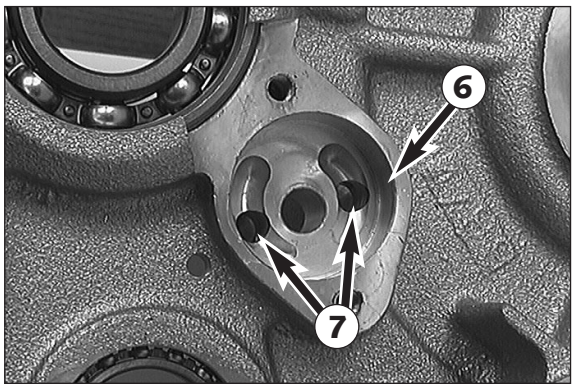
Grooved ball bearing of shift roller ❸
Remove the screw Ⓐ.
At a casing temperature of approx. 150°C, the grooved ball bearing will fall out from the bearing seat almost by itself.
If necessary, knock the casing half lightly on a planar wooden board. Press new grooved ball bearing in to a flush position. Coat the thread of the screw Ⓐ with Loctite 243 and tighten the screw to 5 Nm/4 ft.lb.

Needle bearing of shift shaft ❹
Press needle bearing from the outside to the inside.
Press new needle bearing in from the outside and up to a flush position.

– Once the casing half has cooled down, check if the fit of the bearings is tight.



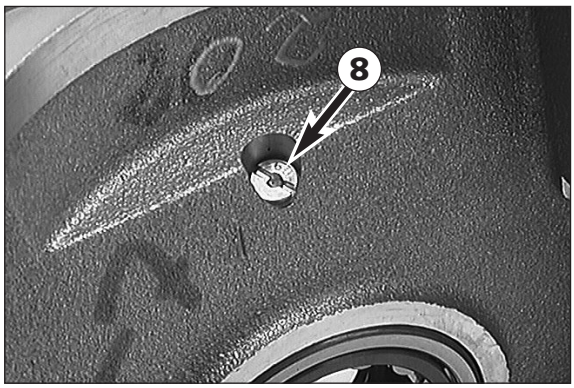
Kickstarter release plate ❺
When exchanging the release plate, secure both bolts with Loctite 243 and tighten to 8 Nm/6 ft.lb.



The oil pump casing ❻ must not have any score marks or seizing marks.

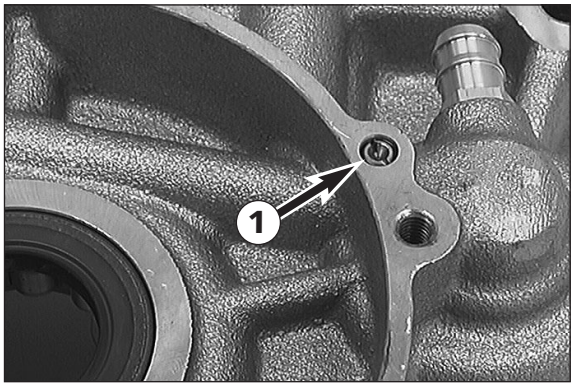
Check oil ducts ❼ for unobstructed passage.

NOTE: In order to clean all oil ducts and check them for unhindered passage you should dismantle both jets and the bypass valve (see below).



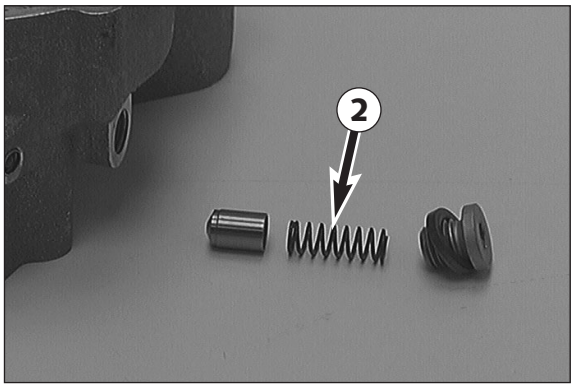
Oil jet "60" ❽
Dismount the oil jet and blow compressed air through the oil duct. Degrease the thread of the oil jet, apply Loctite 243 and mount the oil jet.

NOTE: Through this jet, engine oil is sprayed to the piston bottom in order to cool the piston.



Oil jet "100" ❶
Dismount the oil jet and clean with compressed air. Degrease the thread of the oil jet, apply Loctite 243 and mount the oil jet.

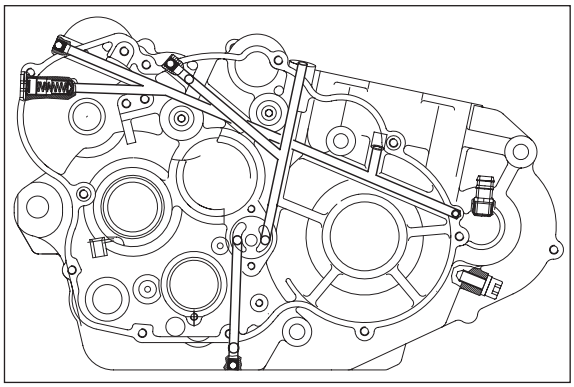
NOTE: This jet is used to dose the amount of oil for the conrod bearing.



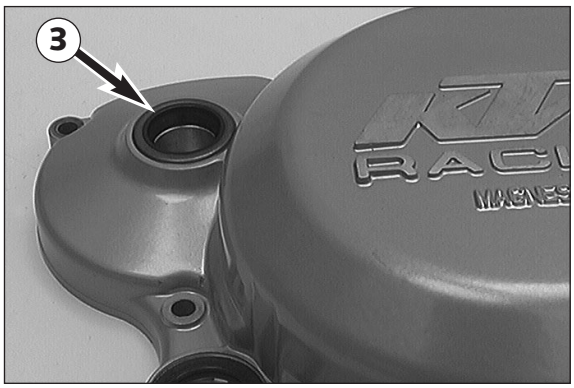
Bypass valve
Check valve plunger, sealing seat, and pressure spring for damage.

Minimum length of pressure spring ❷: 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 decrease. This causes a decrease in oil pressure and subsequently increased wear.

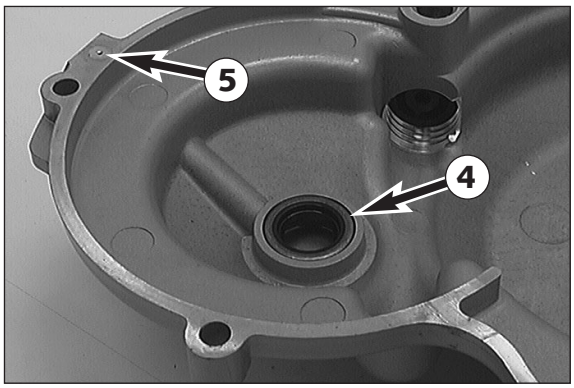


Clean all oil ducts with compressed air and check them for unobstructed passage.



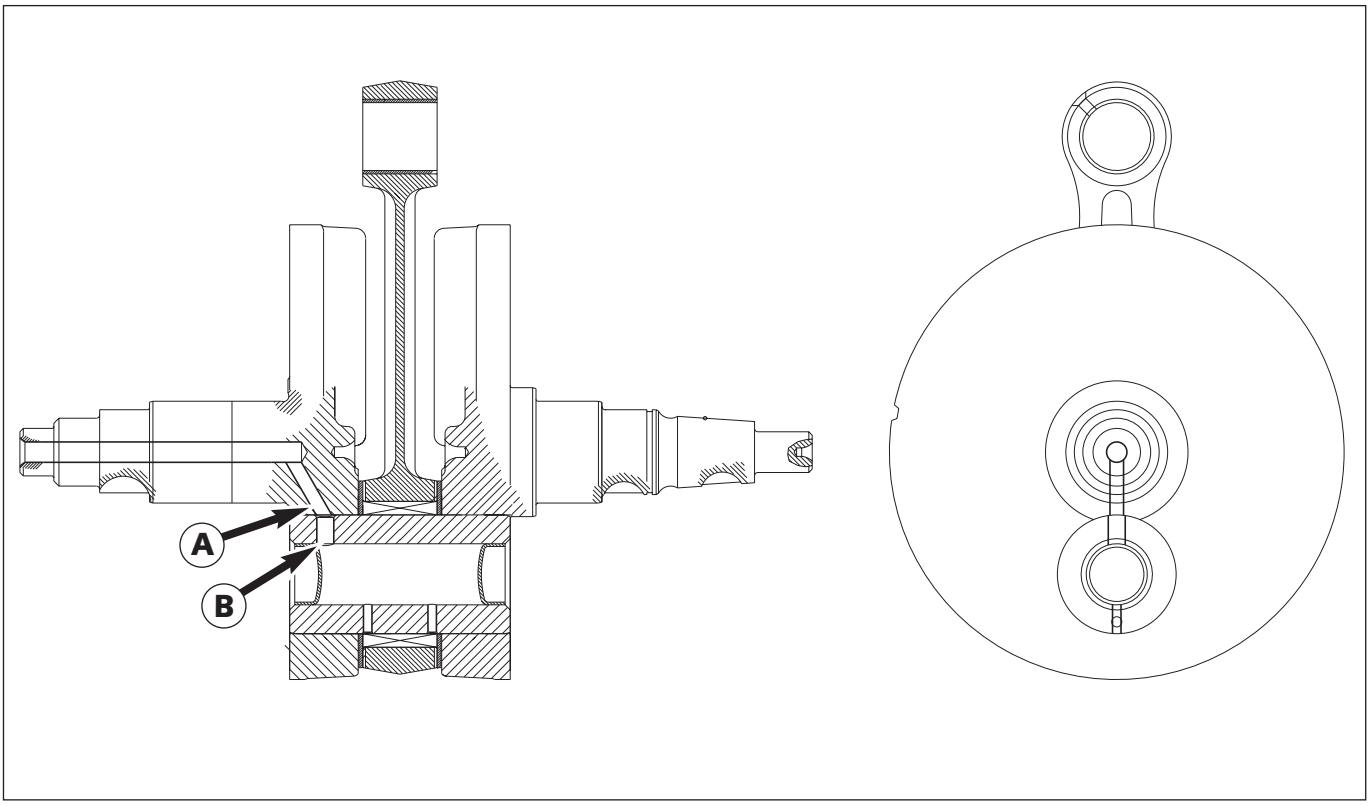
Clutch cover

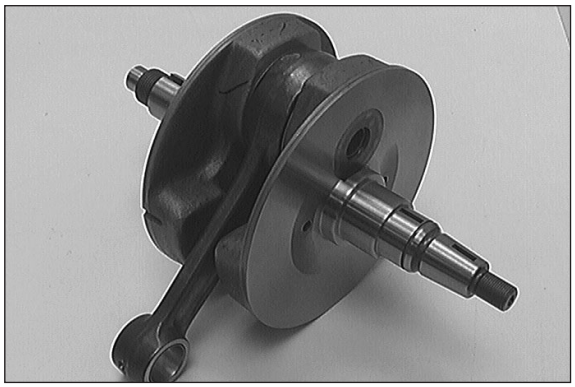
Shaft seal ring of kickstarter shaft ❸
Remove the old shaft seal ring by levering it out with a screwdriver. Press a new shaft seal ring in up to the stop.



Shaft seal ring of crankshaft ❹
Remove the old shaft seal ring by levering it out with a screwdriver.
Press a new shaft seal ring in up to the stop, its open side facing downward.

Oil duct ❺
Clean with compressed air and check for unobstructed passage.



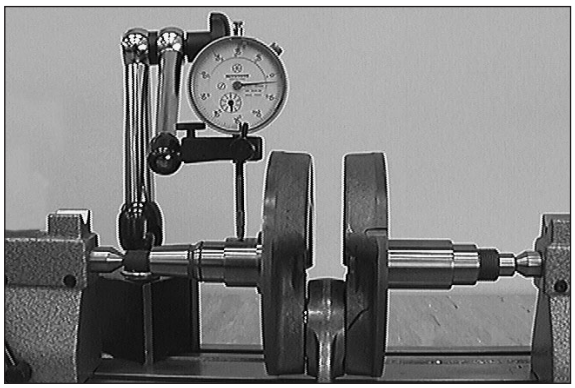


Crankshaft

If the conrod bearing is replaced, take care to properly position the crankpin. The bores of the crank web ❹ and crank pin ❸ must coincide.

! CAUTION !

IF THE CRANK PIN IS PRESSED IN THE WRONG POSITION, THE CONROD BEARING IS SUPPLIED INSUFFICIENTLY OR NOT AT ALL WITH ENGINE OIL, WHICH RESULTS IN BEARING DAMAGE.

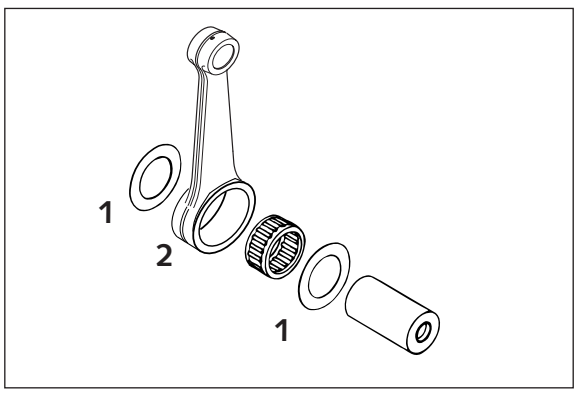


If the crankshaft will continue to be used, check crankshaft journals for run out. Place crankshaft on a roller block or a similar device and check the outer end of the journals for run out with a dial gauge.

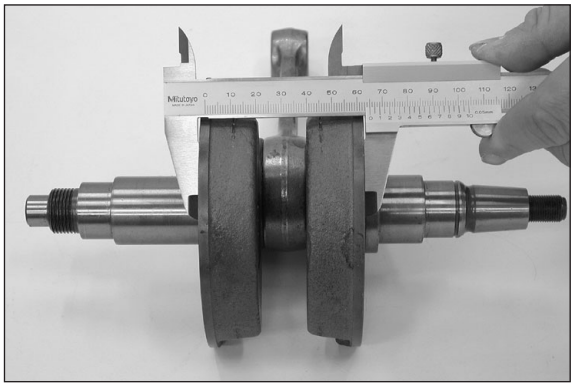
Run out of crankshaft journals: max. 0.08 mm (0.0032 in)
Run out of crankshaft journals (Modelle 2003): max. 0,12 mm (0.0048 in)

The radial play and axial play on the conrod bearing must be checked.

radial clearance: max. 0.05 mm (0.0019 in)
axial clearance: max. 1.10 mm (0.0476 in)



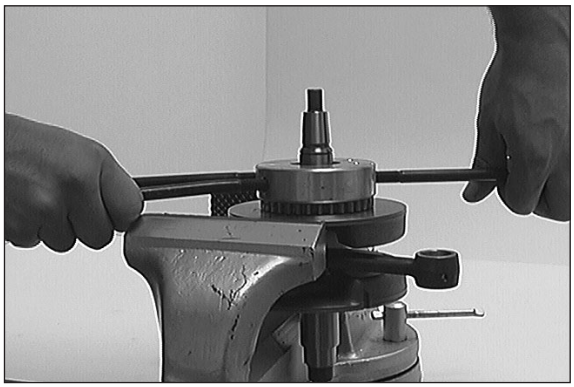
NOTE: From Model 2001 onwards the conrod ❷ is mounted without thrust washers ❶, but the conrod overhaul set (see drawing below) is the same for both Model 2000 and 2001. The trust washers included in the set are not used for Model 2001 engines.



Crankshaft webs – measure outer dimension

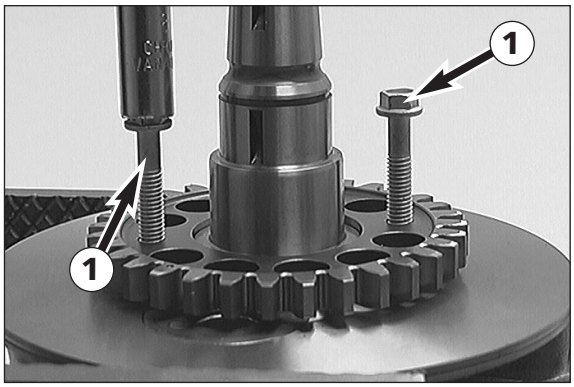
Crankshaft webs – measure outer dimension with a sliding caliper as illustrated.

Crankshaft webs – outer dimension = 65 mm ± 0.05 mm



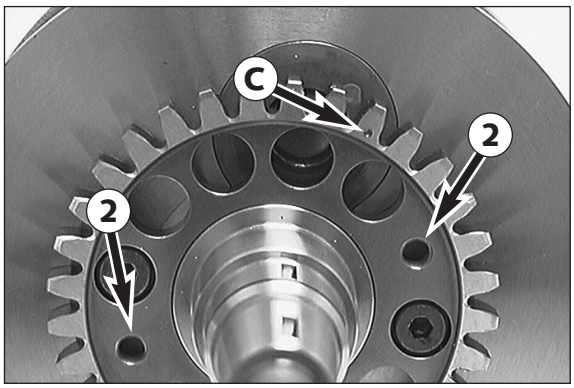
Driving gear of balancer shaft

- Before pulling the driving gear off the balancer shaft you have to remove the inner ring of the crankshaft bearing:
- For this purpose, secure the crankshaft with the crankshaft web carrying the inner ring to be replaced in a vise.
- Heat the special tool 584.29.037.037 on a heating pad up to approx. 150°C and slip it on the inner ring immediately. Press the special tool together tightly so as to obtain a good heat transfer and pull the inner ring off the crankshaft.



- Remove both screws on the drive wheel.
- Insert 2 screws ❶ in the M6 thread ❷.
- Pull off the driving gear by turning in the bolts equally.

- To mount the drive gear, heat it to approx. 100°C.
- Degrease the 2 retaining bolts of the drive gear and coat the threads with Loctite 243.
- Slip the drive wheel on the crankshaft such that the mark ❸ is disposed in the region of the crank pin.
- Mount the retaining bolts and tighten them to 8 Nm (6 ft.lb).



- To mount the new inner ring, heat the special tool again to approx. 150°C, engage the inner ring and slip it on the crankshaft journal immediately.
- Allow the inner ring to cool for about 30 seconds and hammer the inner ring in once more by means of a suitable tube so as to ensure its proper fit.
- Having exchanged the inner rings, measure the axial clearance of the crankshaft.

! CAUTION !

NEVER CLAMP THE CRANKSHAFT IN A VISE WITH A CRANKSHAFT JOURNAL AND TRY TO HAMMER THE INNER BEARING RING APART. THIS WOULD CAUSE THE CRANKSHAFT WEBS TO BE COMPRESSED, MAKING THE CRANKSHAFT UNSUITABLE FOR FURTHER USE.

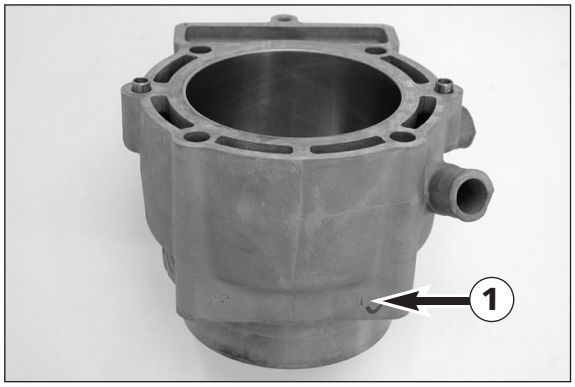
Compensating the axial clearance of the crankshaft

- Insert the crankshaft into the right casing half and apply the casing gasket.
- Mount and tighten the casing bolts in the region of the crankcase.
- Mount the dial gauge holder on the engine casing and measure the crankshaft's axial clearance.

Axial clearance: 0.1 - 0.2 mm (0.0039 - 0.0078)

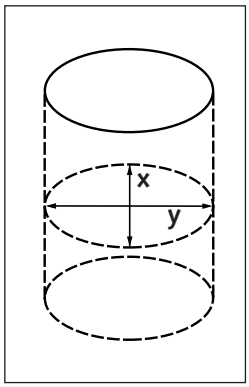
- If the value measured does not correspond to the desired value, correct the axial clearance.
- For this purpose, dismantle the crankshaft and use the special tool to pull the inner ring on the side of the ignition off the crankshaft. Now, add or remove compensating washers.

NOTE: If the axial clearance is too large, you have to add compensating washers. If axial clearance is too small, you have to remove compensating washers. These compensating washers may be added only on the ignition side.



Cylinder – Nikasil coating

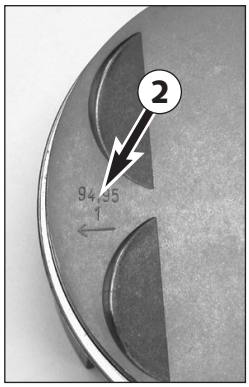
Nikasil is the brand name for a cylinder coating process, developed by the piston manufacturer Mahle. The name is derived from the two materials used in this process - a nickel layer into which the particularly hard silicon carbide is embedded. The main advantages of the Nikasil coating are excellent heat dissipation and thus better power output, low wear and low weight of the cylinder. The worn coating can be regenerated at low cost provided that the running surface of cylinder is flawless.

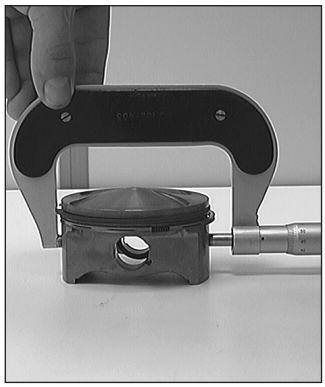


Measuring piston and cylinder, determining the piston fitting clearance

– In order to determine the wear of the cylinder, measure the cylinder center of the running area with a micrometer.
– Measure the diameter of the x-axis and the y-axis in order to check for oval wear, if any.

Cylinder diameter 250	size I: 75.000 - 75.012 mm size II: 75.013 - 75.025 mm
Cylinder diameter 400/ 450 EXC/MXC	size I: 89.000 - 89.012 mm size II: 89.013 - 89.025 mm
Cylinder diameter 520/ 450 SX / 525	size I: 95.000 - 95.012 mm size II: 95.013 - 95.025 mm





NOTE: The size of the cylinder ❶ is marked on the cylinder, the size of the piston is marked at the top of the piston ❷.
– The piston is measured on the piston skirt across to the piston pin as shown in the illustration.

Diameter of piston 250	size I: 74.960 - 74.970 mm size II: 74.971 - 74.980 mm
Diameter of piston 400	size I: 88.930 - 88.940 mm size II: 88.941 - 88.950 mm
Diameter of piston 450 EXC/MXC	size I: 88.916 - 88.946 mm size II: 88.926 - 88.956 mm
Diameter of piston 520	size I: 94.942 - 94.950 mm size II: 94.951 - 94.958 mm
Diameter of piston 450 SX / 525	size I: 94.932 - 94.960 mm size II: 94.940 - 94.968 mm

– The cylinder diameter minus the piston diameter yields the piston assembly clearance.

Piston assembly clearance 250	piston size I: 0.030 - 0.052 mm piston size II: 0.032 - 0.055 mm wear limit: 0.12 mm
Piston assembly clearance 400	piston size I: 0.060 - 0.082 mm piston size II: 0.062 - 0.085 mm wear limit: 0.12 mm
Piston assembly clearance 450 EXC/MXC	size I: 0.054 - 0.096 mm piston size II: 0.056 - 0.099 mm wear limit: 0.12 mm
Piston assembly clearance 520	piston size I: 0.050 - 0.070 mm piston size II: 0.054 - 0.075 mm wear limit: 0.12 mm
Piston assembly clearance 450SX/525	piston size I: 0.040 - 0.080 mm piston size II: 0.044 - 0.085 mm wear limit: 0.12 mm

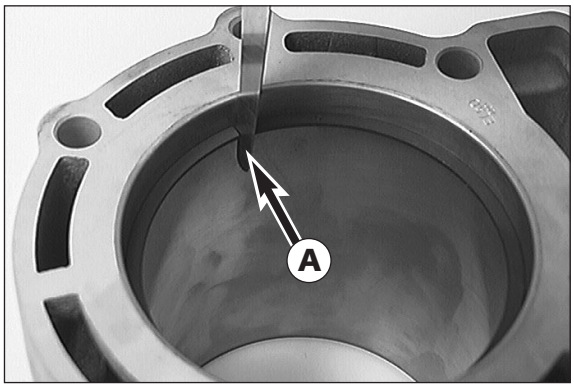
NOTE: Dimensions in Inch see Technical Specification.

Checking the piston

– Replace the piston in the case of excessive oil consumption or grooves in the piston skirt.
– If reinstalling the old piston perform the following steps:

1. Piston bearing surface - check for damage.
2. Piston ring grooves - the piston rings must move easily in the groove. Old piston rings or sandpaper (400 grit) may be used to clean the piston ring grooves.
3. Piston rings - check for damage and end gap (see below).
   Mount the oil scraper ring with the labeling "TOP" facing upwards.
   Mount the rectangular ring with the labeling "O" facing upwards.
4. Piston pin: If the piston pin is heavily discolored or has score marks it must be replaced. Also insert the piston pin into conrod and check its bearing for play.

NOTE: When in place, the piston pin may not have any play. It must be possible to shift it with slight counterpressure.

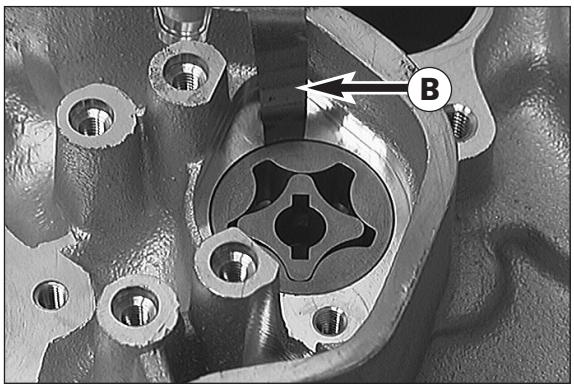


Piston ring end gap

– Insert piston ring into the cylinder and adjust. Piston ring must be approx. 10 mm (0.4 in) from top of cylinder.
– The end gap can now be checked which a feeler gauge Ⓐ.

Compression rings: max. 0.80 mm (0.0315 in)
Oil scraper ring: max. 1.00 mm (0.0393 in)

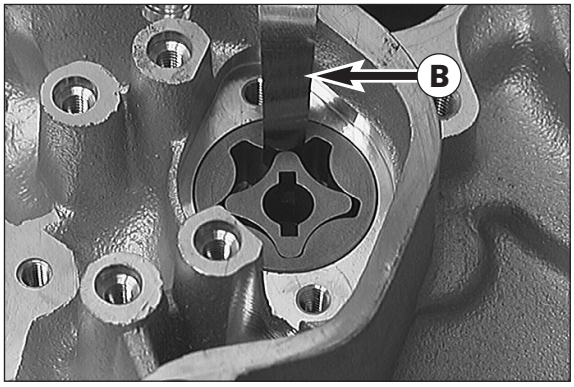
If the end gap is larger, check piston and cylinder for wear. If piston and cylinder wear are within the permitted tolerance limits, replace the piston ring.



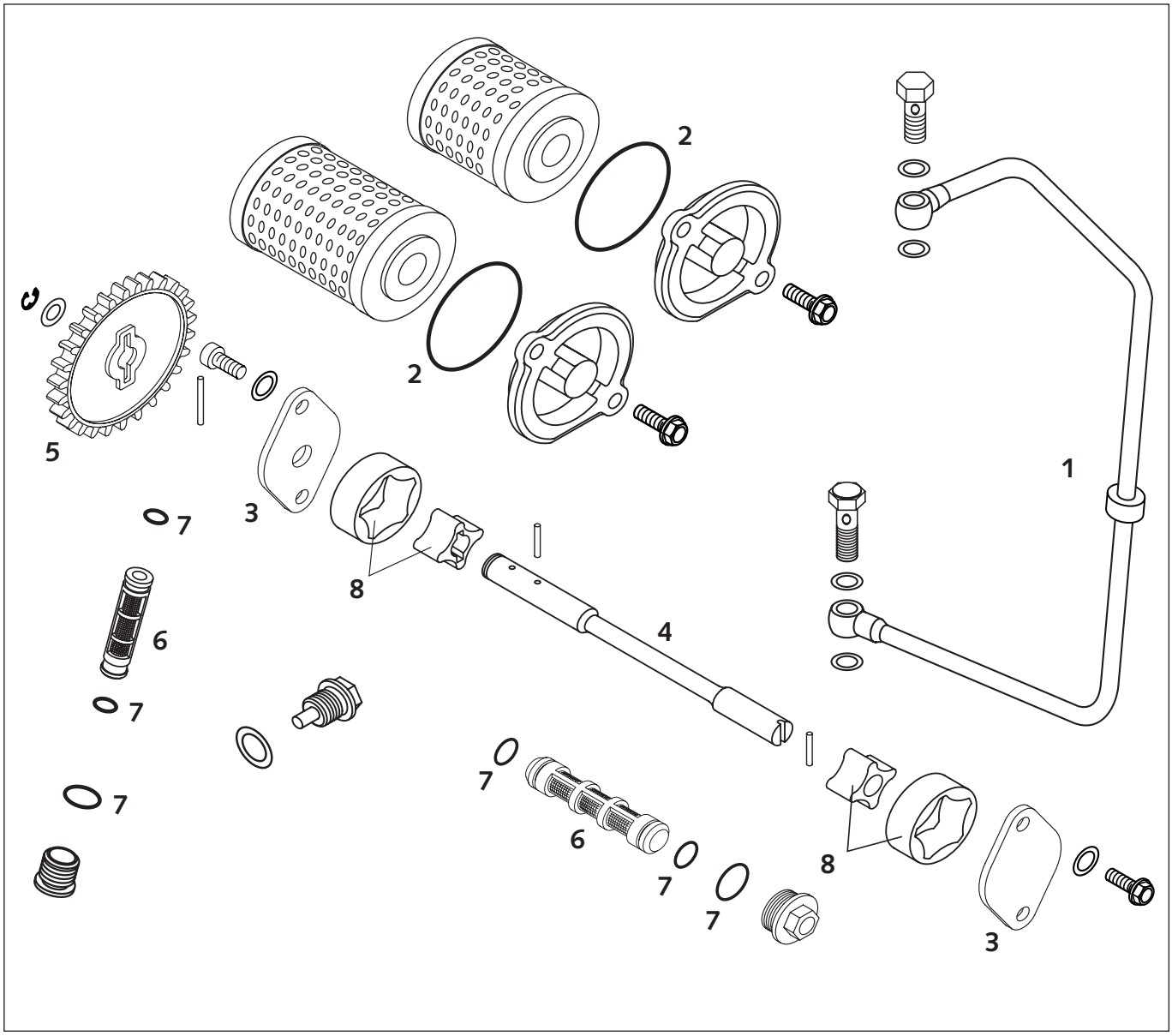
Checking the oil pumps for wear

– Place inner and outer rotors into the engine casing such that the marks are adjacent to one another.
– Now, carry out the following wear measurements with a feeler gauge Ⓑ:

outer rotor - oil pump housing: max. 0.20 mm (0.0078 in)



outer rotor - inner rotor: max. 0.20 mm (0.0078 in)



Lubrication system

Oil line ❶
Check for hairline cracking at the soldering joints, blow compressed air through the oil line and, while doing that, check it for unobstructed passage. In addition, check the oil line for possible scuff marks and replace the copper seal rings (8x12x1)

O-rings ❷
Replace the O-rings during every oil filter change.

Oil pump cover ❸
Check for score marks caused by the oil pump rotors on its inner side and, if necessary, replace it.

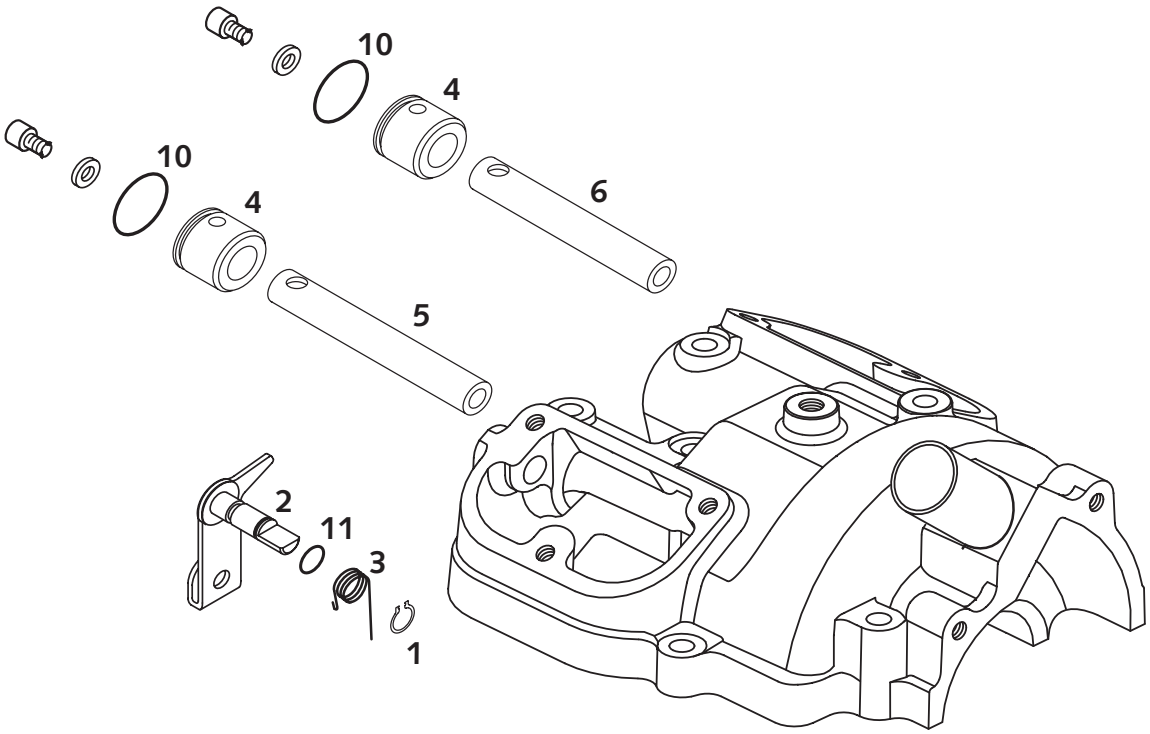
Oil pump shaft ❹
Place it on a planar surface and check it for eccentricity.

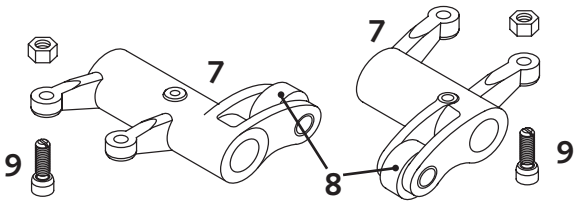
Oil pump wheel ❺
Check toothing for wear. The recess for the needle roller must not be worn out.

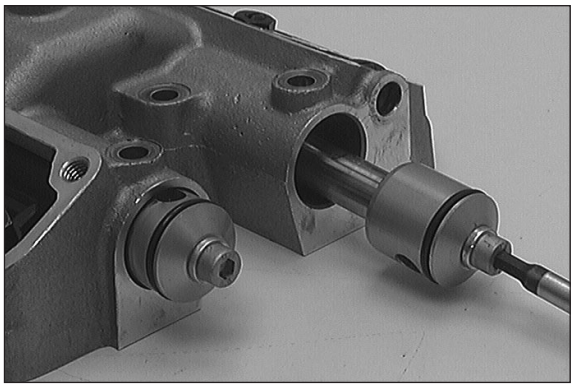
Oil screen ❻
Clean the two oil screens with compressed air and petroleum.

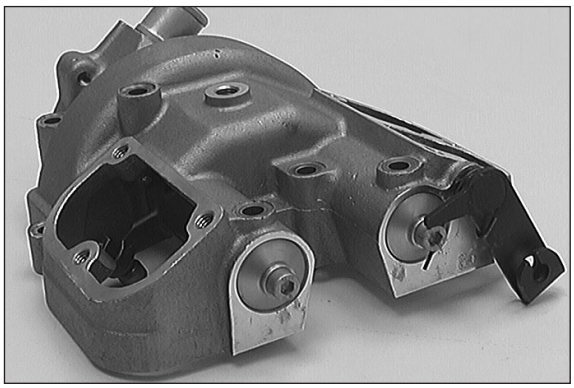
O-rings ❼
Check them for brittleness and, if necessary, replace them.

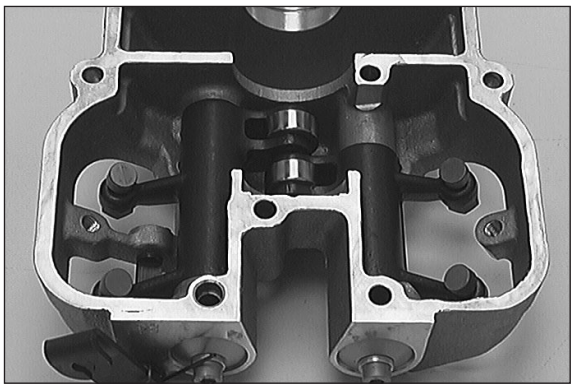
Oil pump rotors ❽
Place the oil pump rotors into the engine casing and check them as shown on page 5-9.
No particles must adhere to the oil pump rotors.











Upper portion of cylinder head

– Remove circlip ❶ and pull the decompressor shaft ❷ together with spring ❸ out of the bore.
– Pull the two end pieces ❹ together with the rocker arm pins ❺ + ❻ out of the cylinder head's upper portion. Withdraw the rocker arms ❼.

– Clean all components and check them for wear.

Rocker arm pins ❺ + ❻
The rocker arm pins must not have any score marks and turning them in the rocker arms ❼ must be easy.

Rocker arm rollers ❽
Check if they move smoothly; if you detect any radial play, you have to replace the rocker arm.

Adjusting bolts ❾
The seating surfaces of the adjusting bolts must be planar.

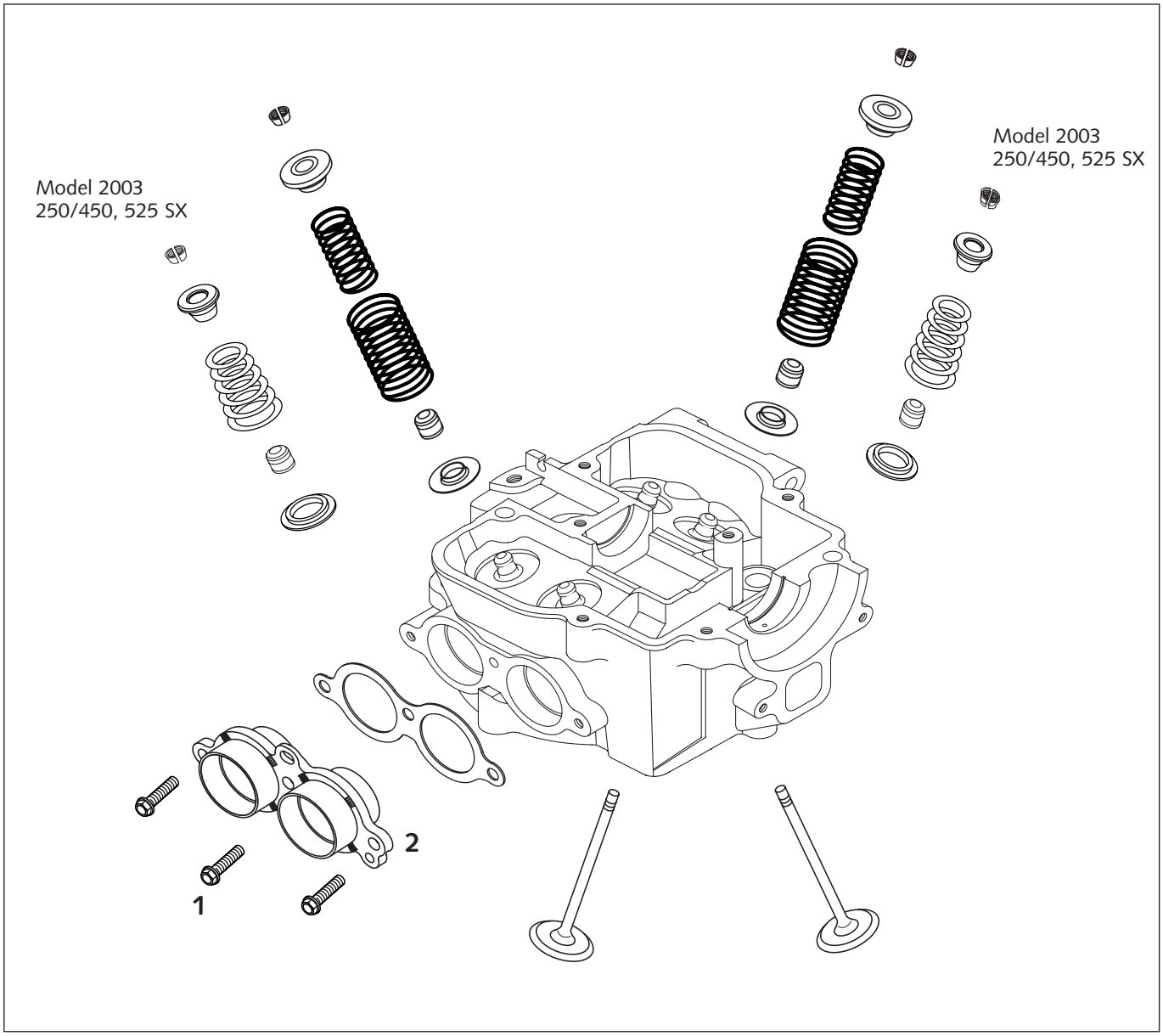
Decompressor shaft ❷
Check for smooth movability and play in the bearing bore. Replace the O-ring ⓫.

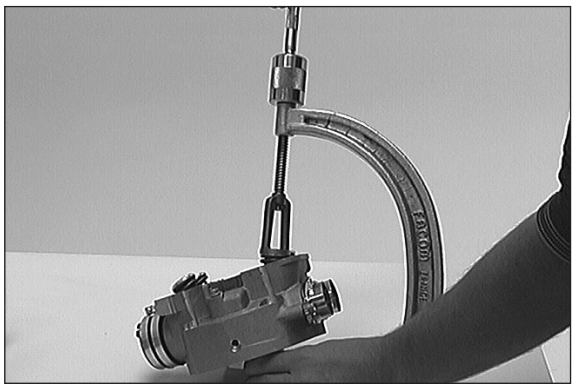
Replace the O-rings ⓾

– Prior to assembly, oil all components thoroughly.
– Position rocker arms in the cylinder head's upper portion and mount the rocker arm pins.

NOTE: The shorter rocker arm pin ❻ must be mounted in the back.

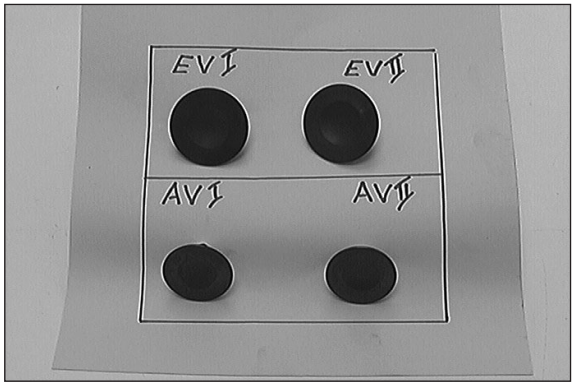
– Mount the end pieces ❹ and turn them such that later on the bolts of the cylinder head's upper portion can be mounted.
– Mount the decompressor shaft ❷ and preload the spring.





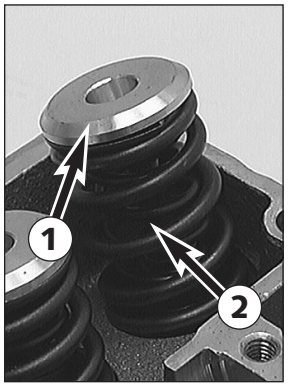
Cylinder head

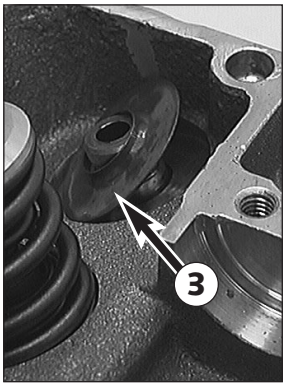
– Loosen the 3 bolts ❶ and dismount the exhaust flange ❷ together with its gasket.

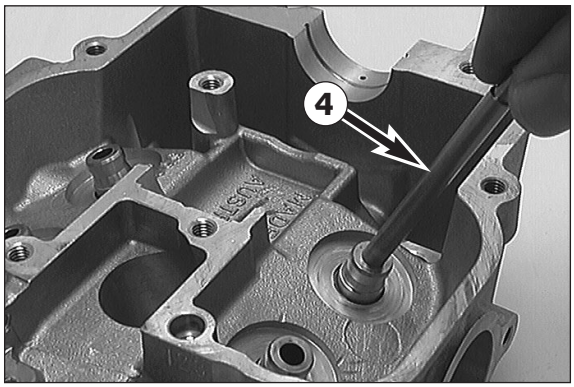


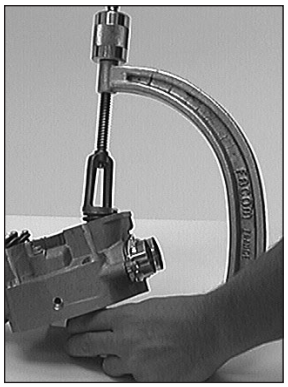
– Dismount the 4 valves with the aid of a special tool.

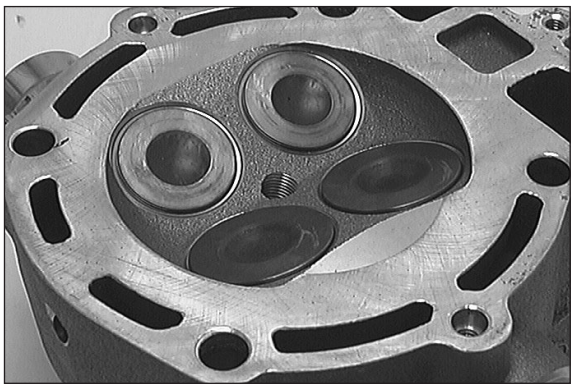
NOTE:
– Conical springs are mounted on the 250 EXC and 450/525 SX models from 2003.
– When being mounted again, used valves must be mounted in the same valve guide as before. For this purpose, place the valves in a cardboard box in the same position they were mounted in the cylinder head (see photo).











– Take the valve spring retainer ❶ and the valve springs ❷ out of the cylinder head.
– Pull the valve stem gaskets off the valve guides and remove the spring seats ❸.

NOTE: Conical springs are mounted on the 250 EXC and 450/525 SX models from 2003.

Sealing surface
Check the spark plug thread and the valve seats for damage and cracks. Use a ruler and a feeler gauge to check the sealing surface of the cylinder head for distortion. Max. distortion: 0.10 mm (0.0039 in).

Valve guides
The valve guides are checked with a limit plug gauge ❹ (Ø 6.05 mm). If the limit plug gauge can be easily inserted into the valve guide, the guide must be replaced in a specialized workshop.

Valve seats
The valve seats must not be "battered". Sealing seat width: inlet: 1.50 mm max. (0.0590 in); outlet: 2.00 mm max. (0.0787 in). If necessary, the valves must be reseated.

Valves
Check the valve disc for wear and eccentricity. Max. eccentricity at valve disc: 0.03mm. The valve seat must not be "battered". The sealing surface should be in the middle of the valve seat. The valve stem is chrome-hardened; by experience, wear occurs at the valve guide.

Valve springs
Check the valve springs for fractures or wear (visual check); use a sliding caliper to measure the length. The minimum length may not be less than 39.20 mm/1.4252 in (outer valve spring) and 36.45 mm/1.435 in (inner valve spring). Replace the spring if it is shorter – also see Technical Information 0003/30/02.

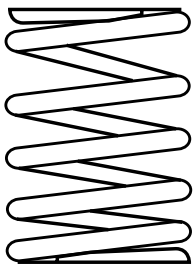
Valve springs (250 EXC, 450/525 SX from the 2003 model)
Check the valve springs for fractures or wear (visual check); use a sliding caliper to measure the length. The minimum length of the valve springs may not be less than 37.70 mm for the 250 EXC and 38.30 mm for the 450/ 525 SX model. Replace the spring if it is shorter.

Valve stem gaskets
Every time the valves are dismounted you should replace the valve stem gaskets.

– Place the 4 spring seats ❸ into the cylinder head.
– Slip the valve stem gaskets onto the valve guides and oil them.
– Thoroughly oil the valves at the stem and insert them into the valve guides. When mounting them, watch for the correct position of the valves.

– Position the valve springs ❷, place the valve spring retainer ❶ into the valve springs.

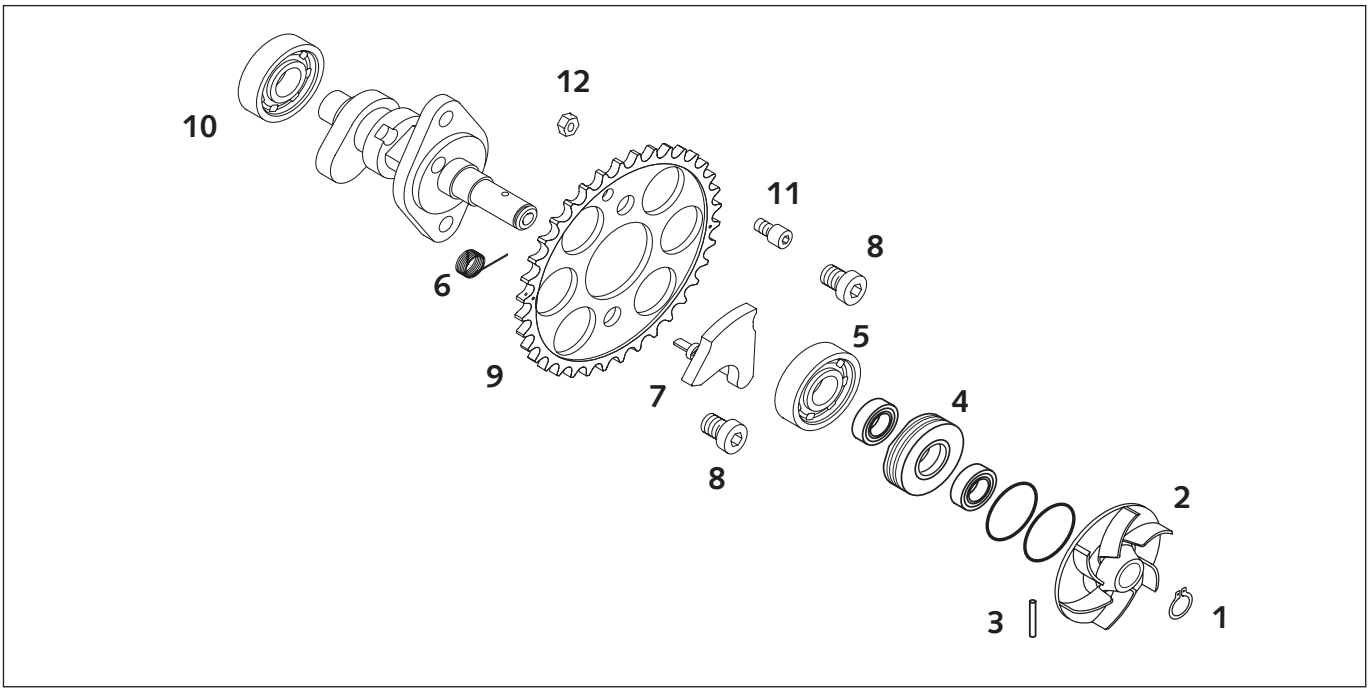
NOTE: The outer valve springs must be mounted with the more narrowly wound end facing downward (up to model 2001).

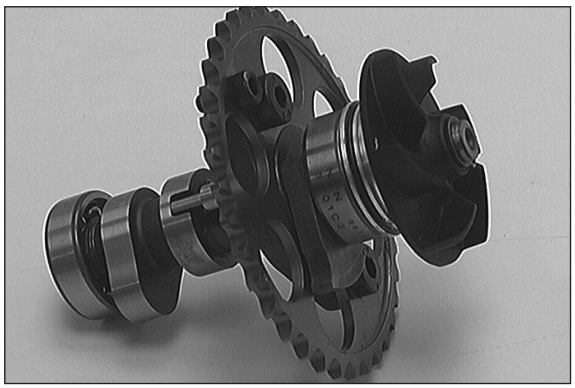


– Preload the valve springs with the special tool and mount the valve keys.

NOTE: When mounting the valve keys ensure their proper fit. It is best to secure the valve keys to the valve by means of some grease.

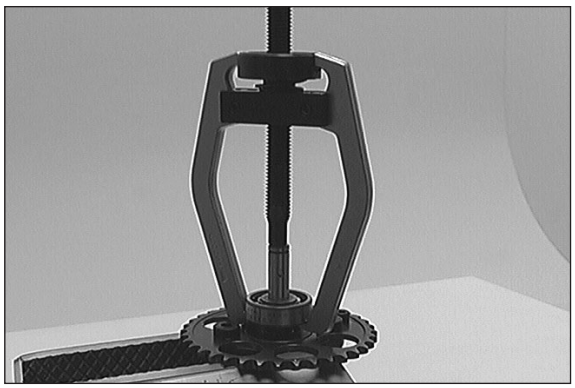
– Finally, use a plastic hammer to tap several times onto the valve spring retainers.





Camshaft

– Dismount circlip ❶ and water pump wheel ❷.
– Pull the needle roller ❸ out of the hole in the camshaft and pull the gasket carrier ❹ off of the camshaft.

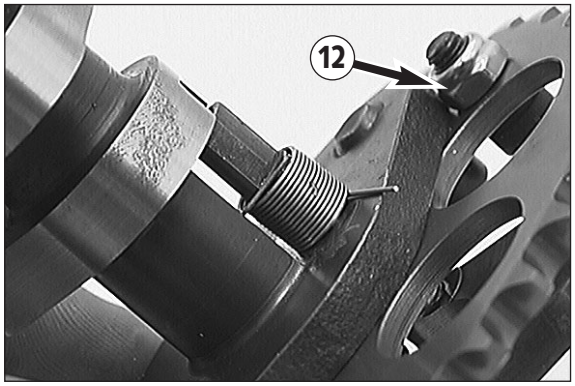


– Use the puller tool to extract the grooved ball bearing ❺ from the camshaft (see photo).

! CAUTION !

NEVER CLAMP THE CAMS OF THE CAMSHAFT INTO A VISE.

– Unhitch the spring ❻ at the automatic decompressor shaft ❼ and at the same time pull the autodecompressor shaft out of the camshaft.
– Loosen the 2 bolts ❽ and take off the camshaft wheel ❾.
– Use the puller tool to pull the grooved ball bearing ❿ off the camshaft.



Clean all components, check them and if necessary replace them with new components.

Camshaft
Check bearing seats and cams for wear.

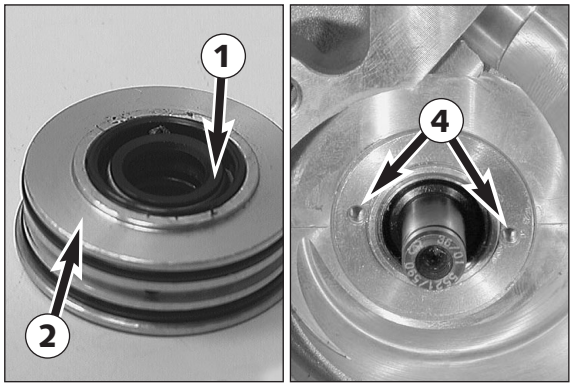
Renew grooved ball bearings ❺ and ❿

Autodecompressor shaft ❼
Check bearing for play and contact surface to the rocker arm for wear.

Camshaft wheel ❾
Check teeth for wear.

Check the bolt ⓫ for tight fit.

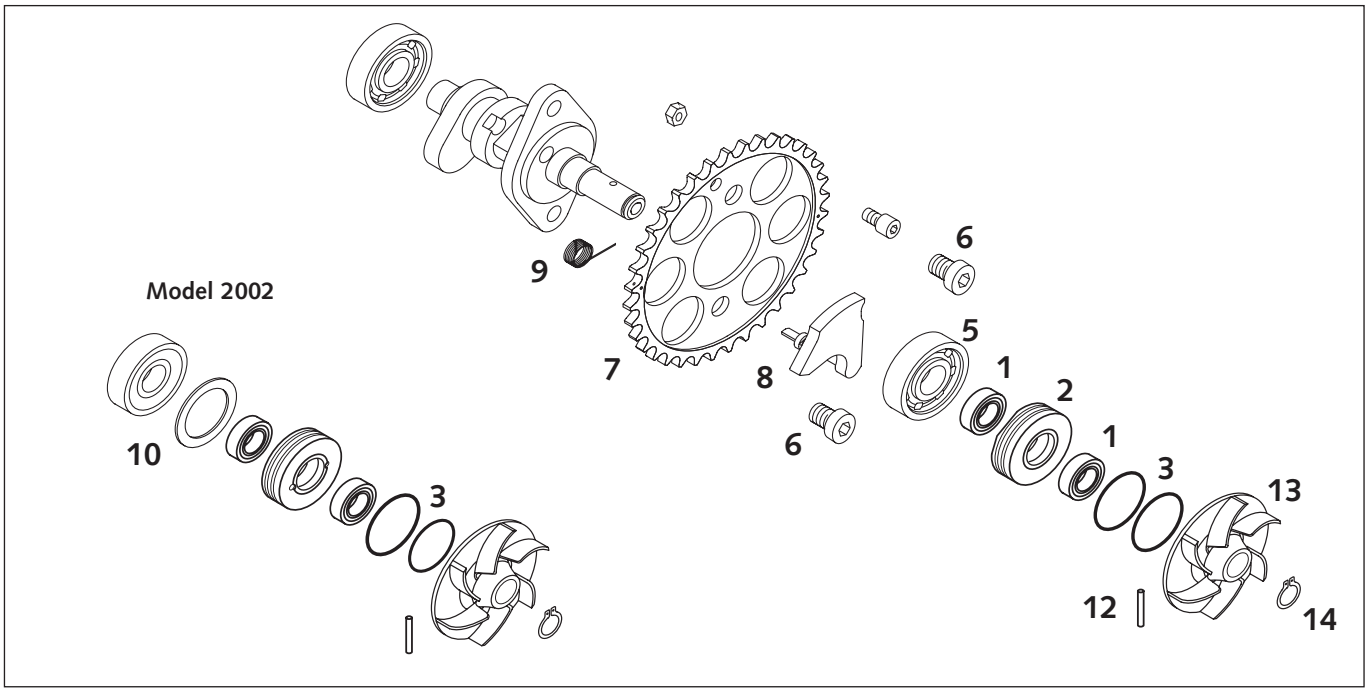
NOTE: The self-locking nut ⓬ was replaced by a normal nut starting with the 2002 model. Secure the nut with Loctite 222 and tighten to 8 Nm – see Technical Information 0111/36/02 for models up to 2001.

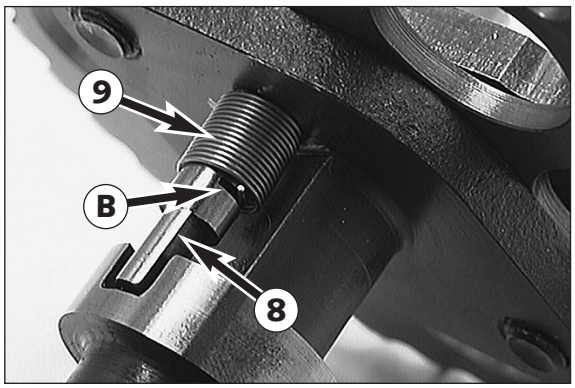


– Press the shaft seal rings ❶ out of the gasket carrier ❷.
– Press the new shaft seal rings in up to a flush position, with the open side facing outwards. Thoroughly grease the sealing lips.

– Take the 2 O-rings ❸ off the gasket carrier and remove the gasket residues with a wire brush.
– Mount 2 new O-rings.

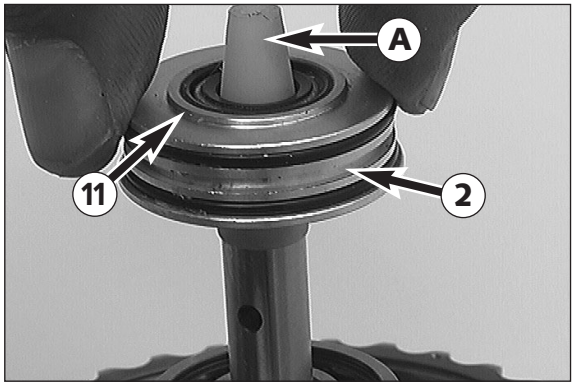
NOTE:
– The two O-rings ❸ have different sizes starting with the 2002 model. The smaller O-ring is mounted on the outside, i.e. facing the water pump wheel.
– The flat marks of the rear side of the gaskets carrier are neccesary only if the gasket carrier is to be taken out with the timing chain mounted, the flat marks make the fitment of the gasket carrier easier.
– Starting with the 2002 model, the gasket carrier can be pulled out of the cylinder head with the two M3 threads ❹ without having to remove the top part of the cylinder head.





Preassembling the camshaft

– Coat the threads of the 2 bolts ❻ with Loctite 243 and mount the camshaft wheel ❼. Tighten bolts to 28 Nm (21 ft.lb).
– For preassembly, press on the grooved ball bearing ❺ by means of a hollow punch.
– Mount the autodecompressor shaft ❽ and the spring ❾. Preload the spring by approx. 1/2 turn and insert the end of the spring into the groove Ⓑ.
  Now, check whether the autodecompressor shaft turns back into its initial position by itself. If not, increase the preloading of the spring.
– Slide on the washer ❿ (only applies to the 2002 model).



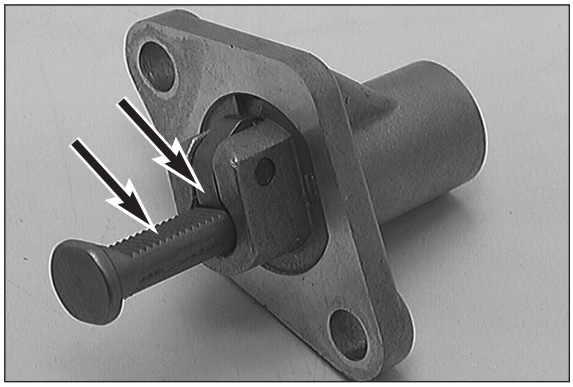
The following steps only apply to models up to 2001
(see page 6-12 for models from 2002 onwards)
– Slide on the mounting sleeve Ⓐ and mount the gasket carrier ❷ with the collar ⓫ facing the camshaft wheel.

! CAUTION !

IT IS IMPERATIVE THAT YOU USE THE MOUNTING SLEEVE. OTHERWISE YOU WILL DAMAGE THE SHAFT SEAL RING.

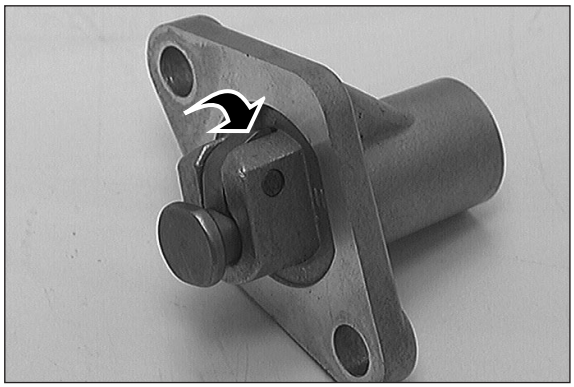
– Dismount the mounting sleeve, insert the needle roller ⓬ into the camshaft and mount the water pump wheel ⓭ with the circlip ⓮.

NOTE: From Model 2001 onwards the length of the needle roller is 17.8 mm (0.7007 in); Model 2000: 13.8 mm (0.5433 in).
The needle roller and water pump wheel are only changeable as a set.

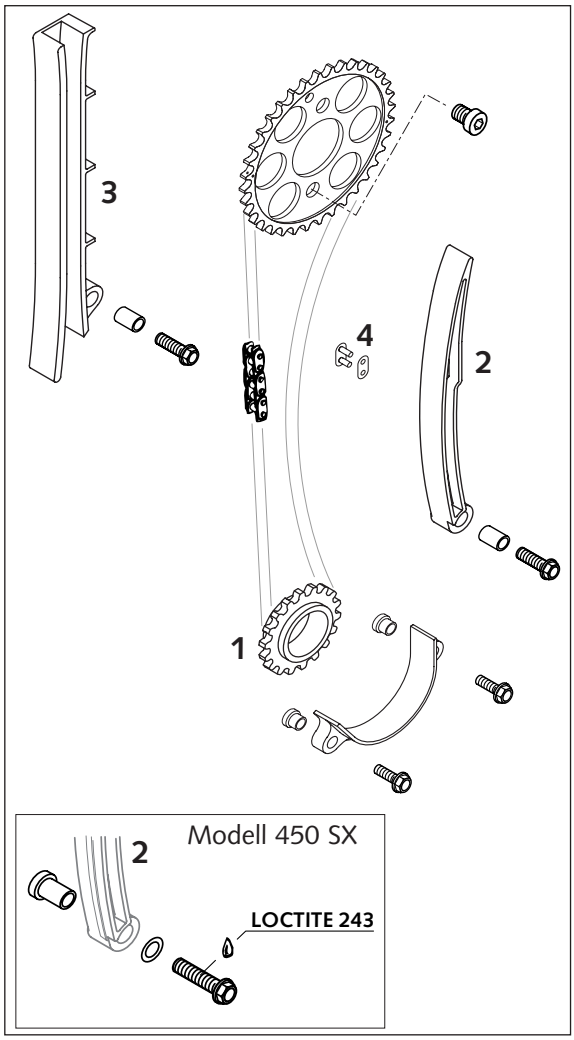


Timing chain tensioner

– Pull the pressure pin of the timing chain tensioner out all the way and check whether or not it moves smoothly.
– Check the toothing on the pressure pin and the ratcheting pawl for wear.



– For mounting, push the ratchet in the direction of the arrow so that the pressure pin will no longer be locked and push the pressure pin all the way into the tensioner housing.



Timing train

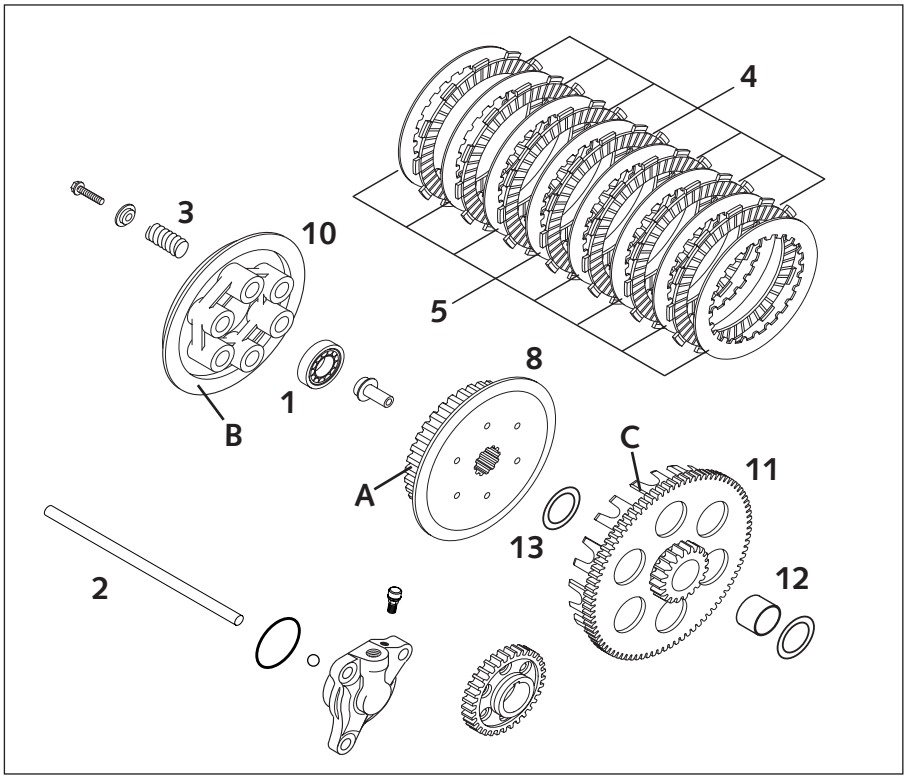
Clean all components thoroughly and check them for wear.

Timing gear ❶
Check the toothing for broken-off parts and wear.

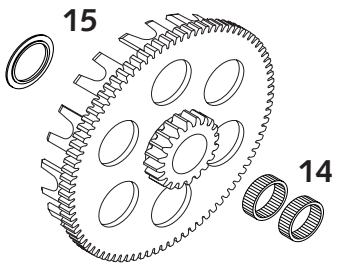
Timing chain tensioner rail ❷
Check for seizing marks at the contact surface.

Timing chain guide ❸
Check for seizing marks at the contact surface.

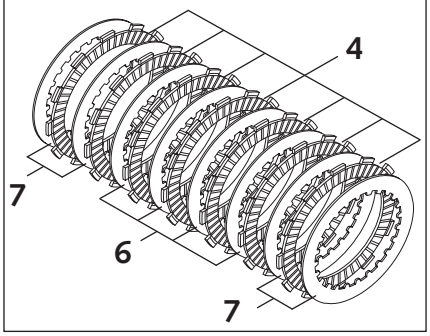
Rivet link ❹
The opened rivet link of the timing chain must be replaced.



Modification - Model 2001

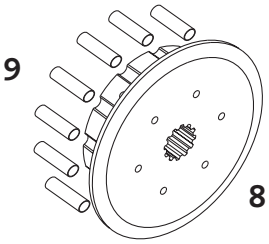


Modification - Model 2002



Checking the clutch for wear

Modification - Model 2002



Thrust bearing ❶
Check it for seizing marks and unobstructed movability.

Push rod ❷
Place it on a planar surface and check it for eccentricity.

Clutch springs ❸
Minimum length: 42 mm (1.6535 in) - new: 43 mm (1.6929 in); if necessary, replace all 6 springs.

7 lining discs ❹
Minimum thickness: 1.7 mm (0.0669 in) - new: 1.8 mm (0.0708 in). The lining discs must be planar.

8 intermediate discs ❺ (up to model 2001)
They must be planar. Check them for mechanical damage. In the case of punctual broken-off portions, you have to replace the intermediate discs.

Four 1.4 mm (0.0551 in) ❻ clutch disks (models from 2002 onwards)
Must be planar. Check for mechanical damage. Replace clutch disks if localized points are broken off.

Four 1.0 mm (0,03937 in) ❼ clutch disks (models from 2002 onwards)
Must be planar. Check for mechanical damage. Replace clutch disks if localized points are broken off.

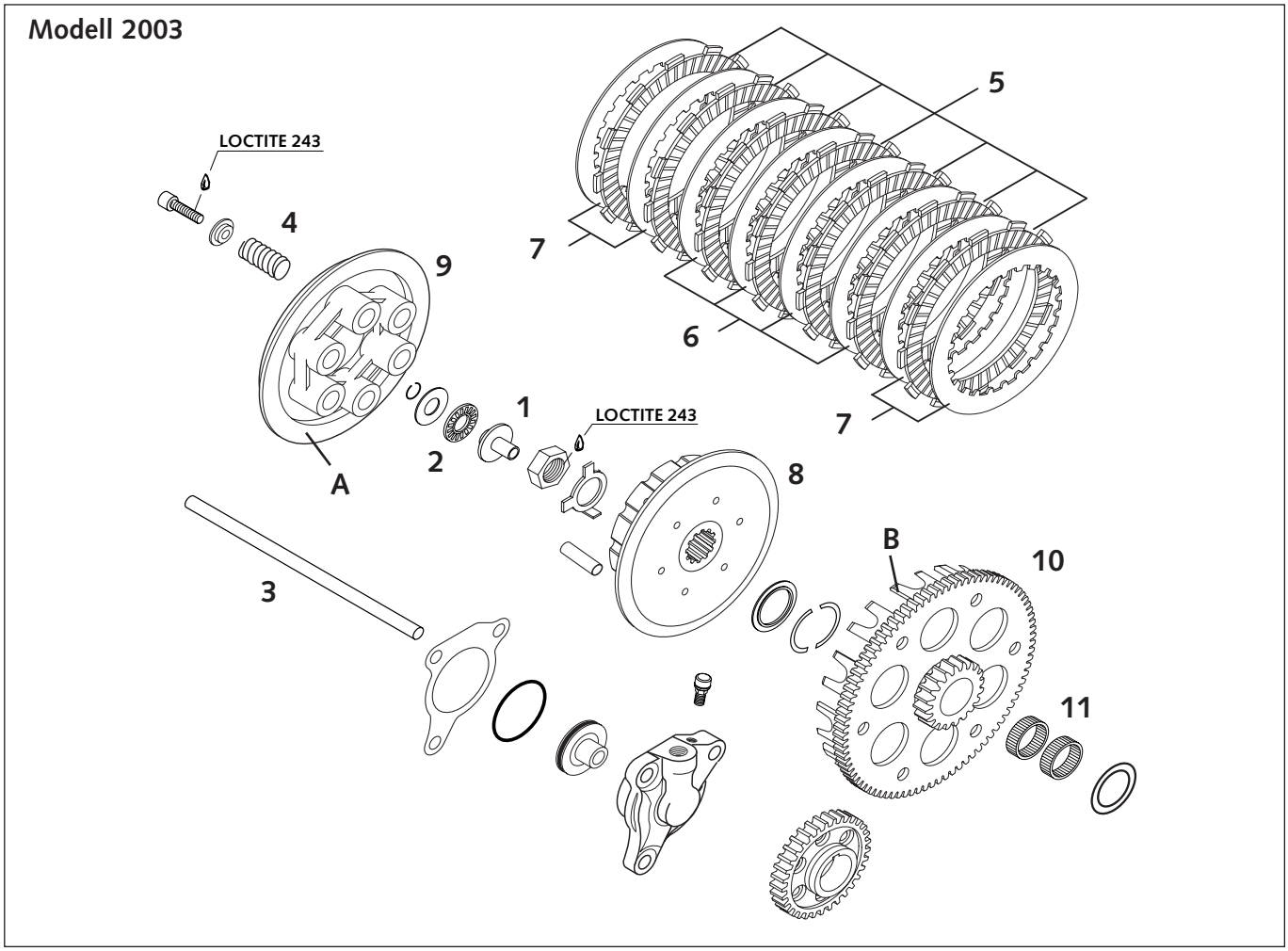
Inner clutch hub ❽
Check the outer toothing Ⓐ on the inner clutch hub. If the depressions are greater than 0.5mm (0.0196 in), the inner clutch hub must be replaced. A modified driver with sleeves ❾ is installed starting with the 2002 model.

Pressure cap ❿
Check the seating surface Ⓑ of the steel disc for damage.

Outer clutch hub ⓫
Check the stop surfaces Ⓒ of the lining disk and the clutch cage for wear. If the depressions are greater than 0.5 mm (0.0196 in) the lining disk and clutch hub must be replaced.

Bearing bush ⓬
Slip the bearing bush and the outer clutch hub on the main shaft and check the bearing for clearance. If necessary, replace the bearing bush.

NOTE:
– Every time the inner clutch hub is replaced, the bearing bush should be exchanged as well (Model 2000).
– from Model 2001 onwards two needle bearings ⓬ are mounted instead of the bearing bush ⓮, the outer clutch hub is replaced with a hardened version, the support washer ⓭ is replaced with a step washer ⓯ and the mesh of the shaft is different.



Checking the clutch for wear

Pressure piece ❶
Check it for seizing marks and unobstructed movability.

Axial needle bearing ❷
Check for damage.

Push rod ❸
Place it on a planar surface and check it for eccentricity.

Clutch springs ❹
Minimum length: 42 mm (1.6535 in) - new: 43 mm (1.6929 in); if necessary, replace all 6 springs.

7 lining discs ❺
Minimum thickness: 1.7 mm (0.0669 in) - new: 1.8 mm (0.0708 in). The lining discs must be planar.

Four 1.4 mm (0.0551 in) ❻ clutch disks
Must be planar. Check for mechanical damage. Replace clutch disks if localized points are broken off.

Four 1.0 mm (0,03937 in) ❼ clutch disks
Must be planar. Check for mechanical damage. Replace clutch disks if localized points are broken off.

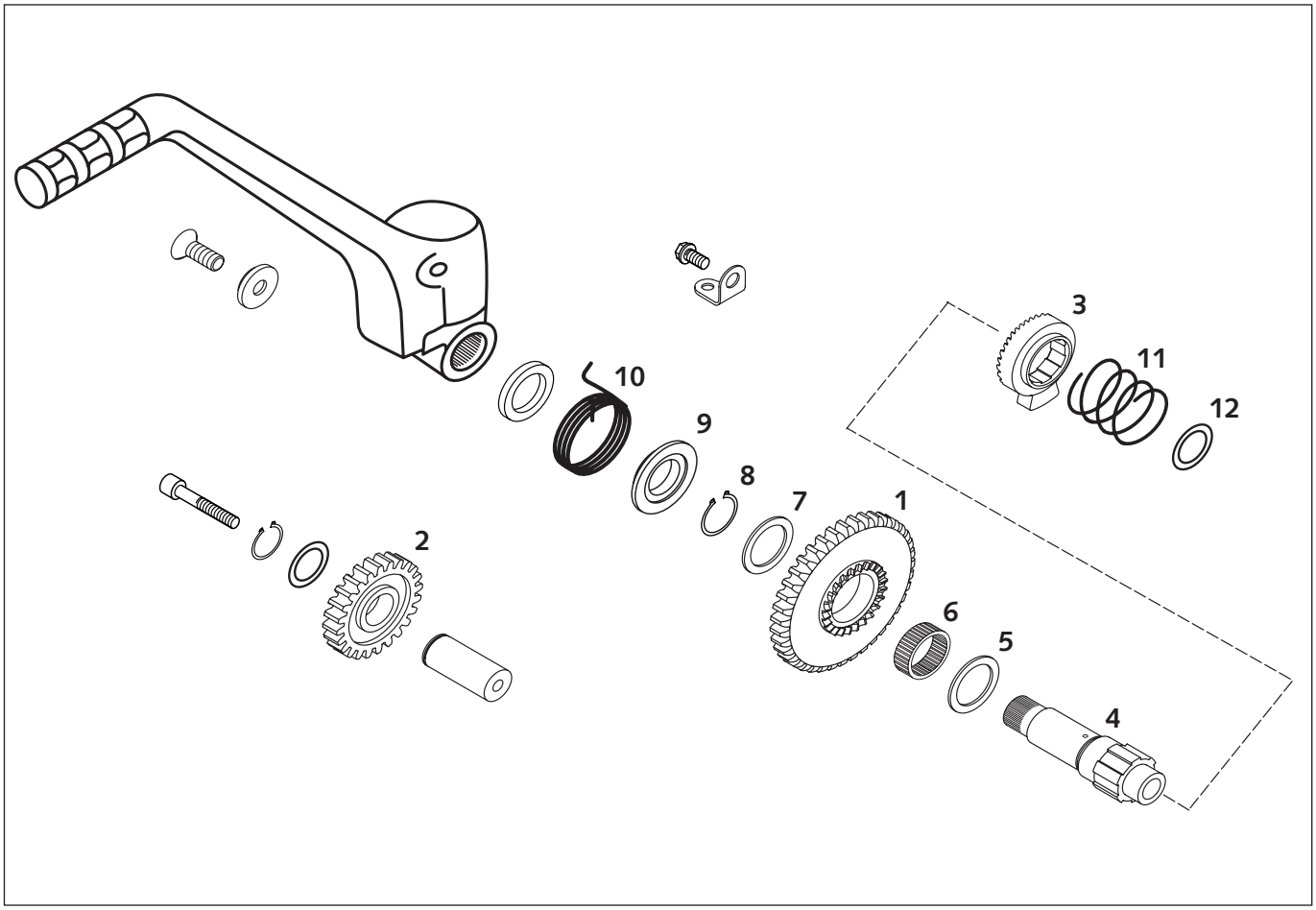
Inner clutch hub ❽
Check for seizing marks and damage.

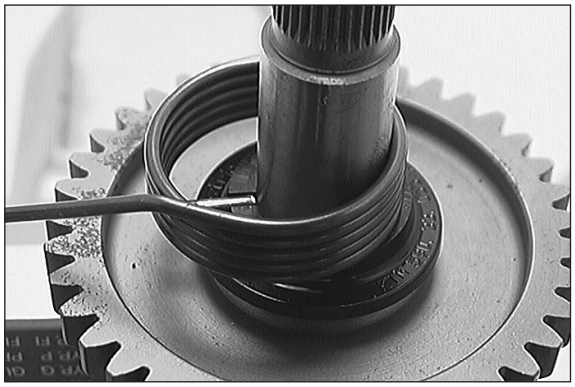
Pressure cap ❾
Check the seating surface Ⓐ of the steel disc for damage.

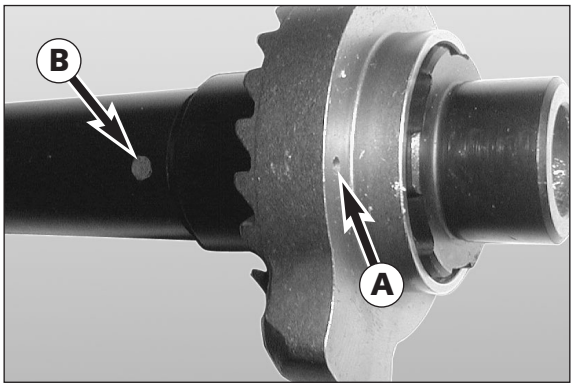
Outer clutch hub ❿
Check the stop surfaces Ⓑ of the lining disk and the clutch cage for wear. If the depressions are greater than 0.5 mm (0.0196 in) the lining disk and clutch hub must be replaced.

Needle bearing ⓫
Check for seizing marks and damage.

Art.-No. 3206007 -E







Checking the kickstarter for wear

Take all components off the kickstarter shaft and clean them.

Kickstarter gear ❶
Check the toothing for wear and the bearing for clearance.

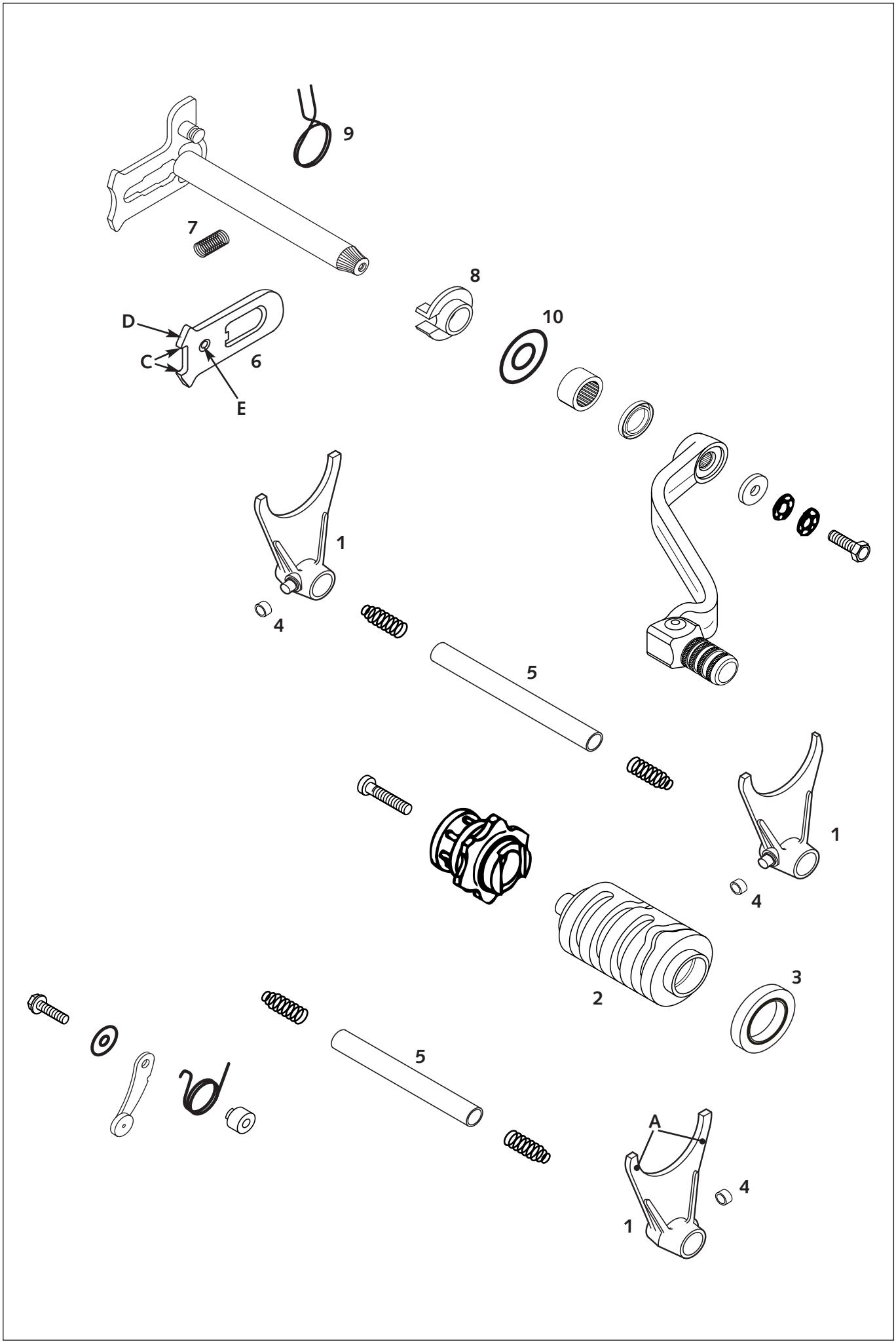
Kickstarter idler gear ❷
Check the bearing for clearance and seizing marks. Check the toothing for wear. It is constantly engaged with the outer clutch hub.

Kickstarter ratchet gear ❸
Check the inclined surface and the toothings for wear.

Kickstarter shaft ❹
Check bearing positions and toothings for wear and damage. Check the oil bore for the kickstarter gear for unobstructed passage.

Preassembling the kickstarter shaft

- Clamp the kickstarter shaft ❹ with the toothed end facing upward into a vise (use protection jaws).
- Mount stop disc ❺, needle bearing ❻ and kickstarter gear ❶ with the locking teeth facing downward.
- Slip on the stop disc ❼ and mount the circlip ❽ with the sharp edge facing upward.
- Mount the driving hub ❾ such that the recess is located above the bore in the kickstarter shaft.
- Mount kickstarter spring ❿ and hook starter spring leg into kickstarter shaft bore.
- Unclamp the kickstarter shaft.
- Slip the kickstarter ratchet gear ❸ on the kickstarter shaft such that the marks Ⓐ mates with the oil duct Ⓑ in the kickstarter shaft.
- Mount the ratchet gear spring ⓫ and the stop disc ⓬ on the kickstarter shaft.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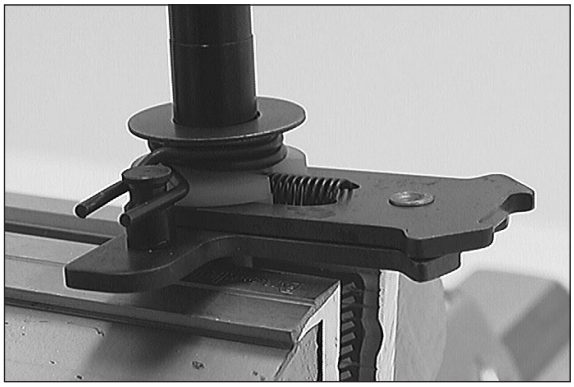


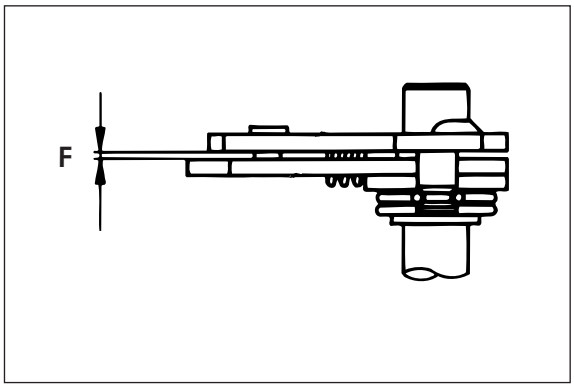
Shift mechanism

Shift forks ❶
Check plate Ⓐ for wear. The forks are 4.8mm - 4.9 mm (0.1889 in - 0.1929 in) thick in a new condition. The wear limit is at 4.6 mm (0.1811 in).

Shift roller ❷
Check the shift grooves Ⓑ for wear.
Check the fit of the shift roller in the grooved ball bearing ❸.

Grooved ball bearing ❸
Check it for smooth movability.

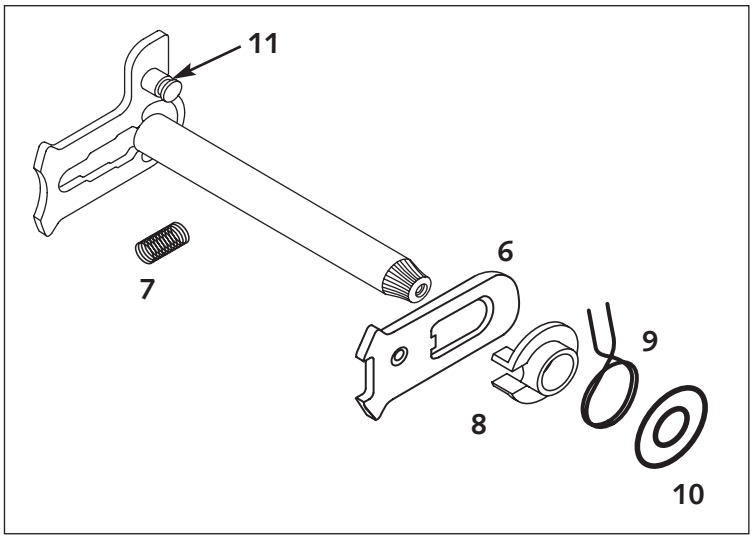
Shift rolls ❹
Check the shift rolls for pressure marks and cracks.



Shift rails ❺
Check the shift rails for eccentricity on a planar surface. Check the shift rails for score and seizing marks. The smooth movability of the shift forks on the shift rails must be ensured.

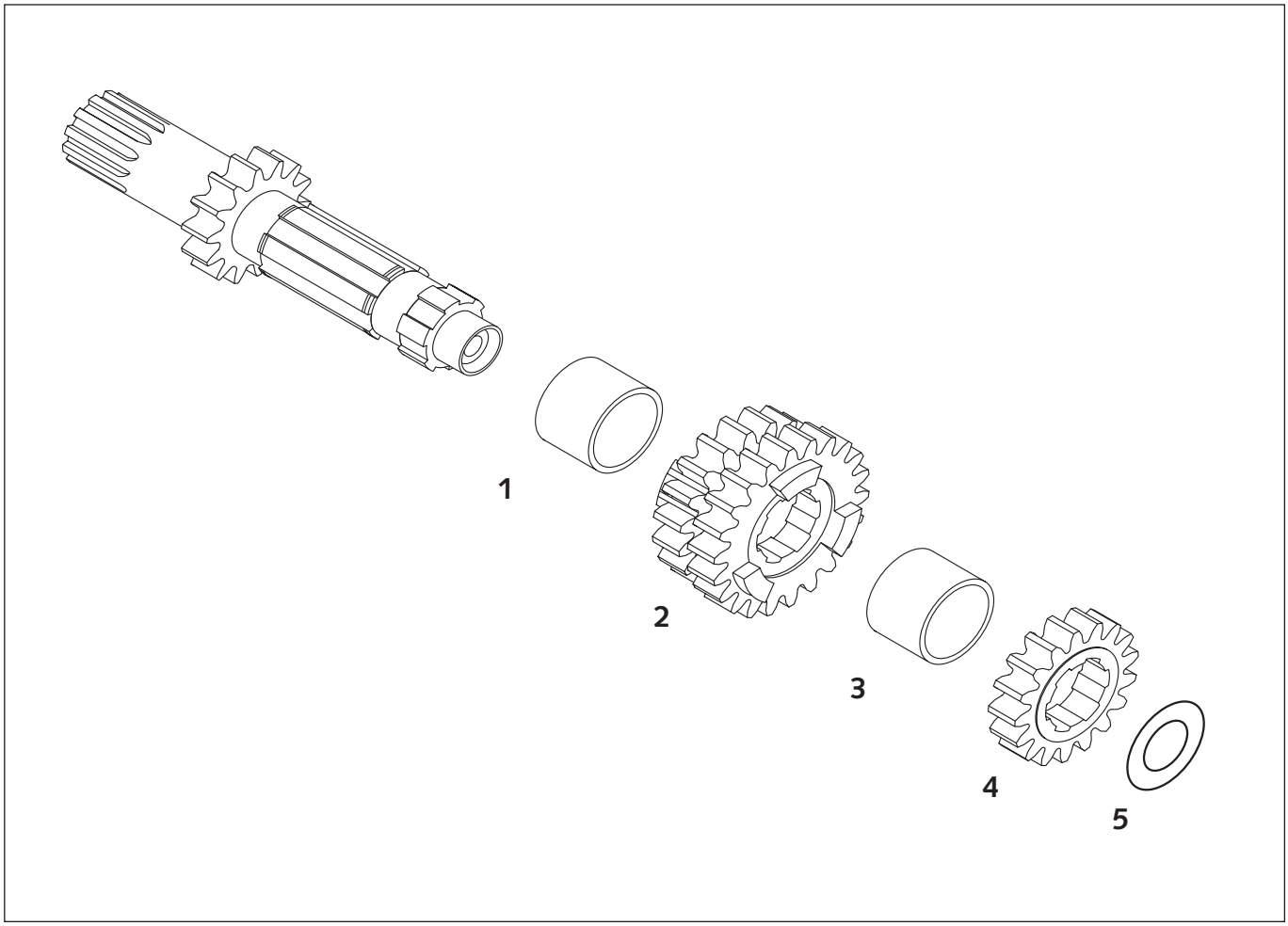
Sliding plate ❻
Check it for wear at the points of engagement Ⓒ.
Check the return surface Ⓓ on the sliding plate for wear (replace it in case of severe notching).
Check the guide bolts Ⓔ for tight fit and wear.

Shift mechanism
Preassemble the shift shaft and check the clearance Ⓕ between the sliding plate ❻ and the shift element. The clearance must be 0.40 - 0.80 mm (0.0157 - 0.0315 in).



Preassembling the shift shaft

- Secure the short end of the shift shaft in a vise (use protection jaws).
- Mount the sliding plate ❻ with the guide bolt facing downward and engage the guide bolt at the shift element.
- Mount the pressure spring ❼.
- Slide on the spring guide ❽, slide the return spring ❾ with its dropped end facing upward over the spring guide and lift the dropped end over the counterbearing bolt ⓫ (see photo).
- Mount the stop disc ❿.

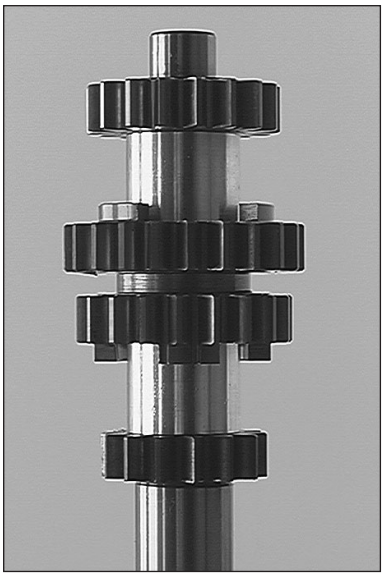


Transmission

Clamp the main shaft or counter shaft, respectively, into the vise (use protective jaws). Remove the gears and check the following parts for wear and grooves:

- Bearings
- Pivot points of the main shaft and countershaft and pivot points of the idler gears
- Shift dogs of the gears
- Tooth faces of all gears
- Tooth profiles of the main shaft and countershaft as well as of the corresponding gears
- Check the profiles of all control gears for smooth operation

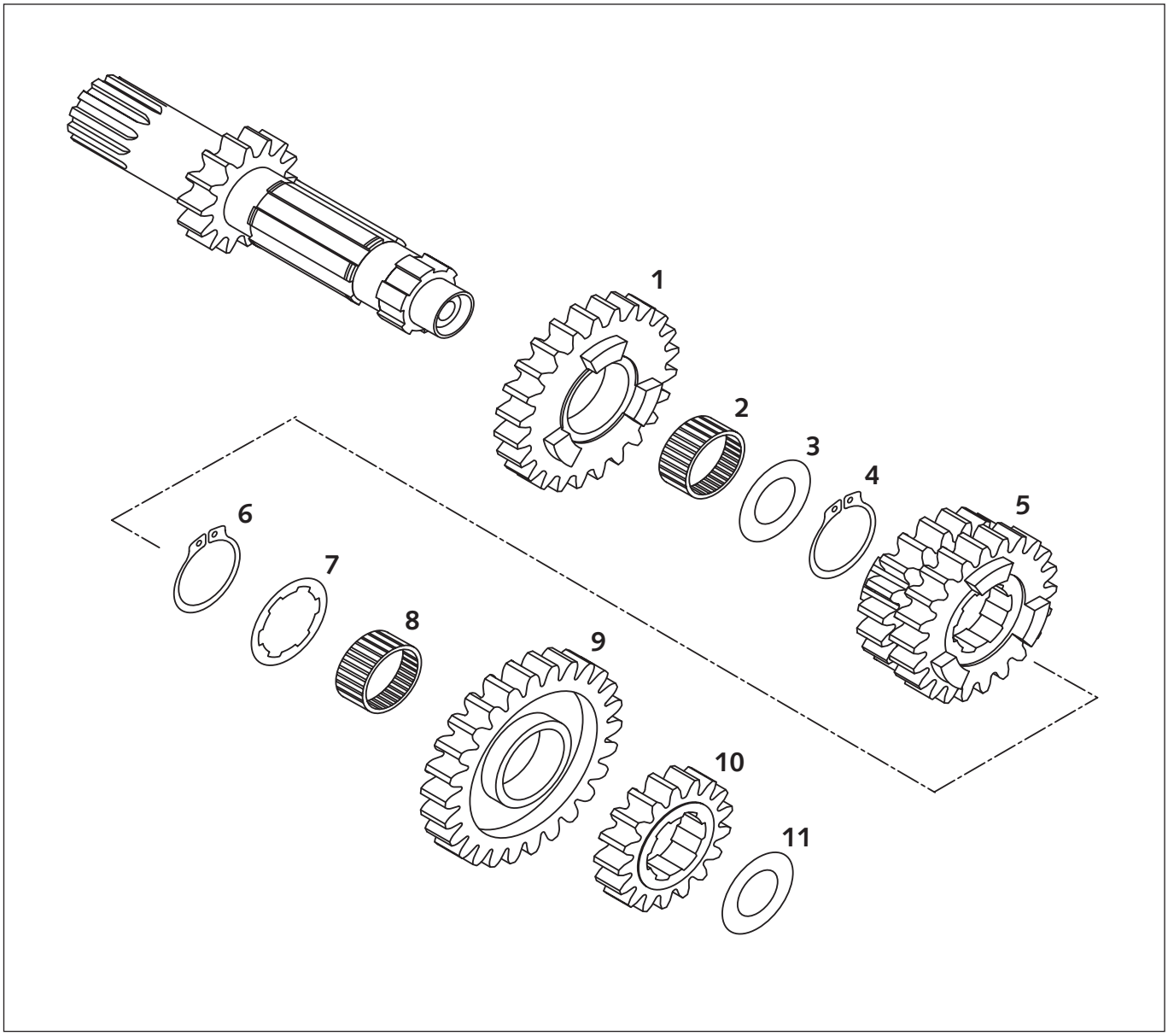
Thoroughly clean all parts, exchange damaged components. New axial securing elements should be mounted whenever repair work is performed.



Assembling the main shaft (4-speed)

– Secure the main shaft with the toothed end facing downward in a vise (use protection jaws).
– Prior to assembly, oil all components thoroughly.
– Mount the spacer bushing ❶ and the 3rd/4th speed sliding gear ❷ with the small gear facing downward.
– Mount the spacer bushing ❸ and the 2nd speed fixed gear ❹ with the collar facing downward.
– Slip on the stop disc ❺ (17.2x30x1 mm).
– Then, check all gear wheels for smooth movability.

NOTE: From Model 2001 onwards the spacer bushings ❶ and ❸ are made of steel (before they were made of aluminium), the steel version can be used in Model 2000 gearboxes.

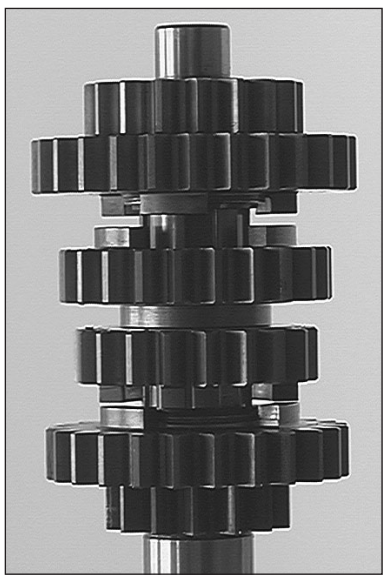


Transmission

Clamp the main shaft or counter shaft, respectively, into the vise (use protective jaws). Remove the gears and check the following parts for wear and grooves:

- Bearings
- Pivot points of the main shaft and countershaft and pivot points of the idler gears
- Shift dogs of the gears
- Tooth faces of all gears
- Tooth profiles of the main shaft and countershaft as well as of the corresponding gears
- Check the profiles of all control gears for smooth operation

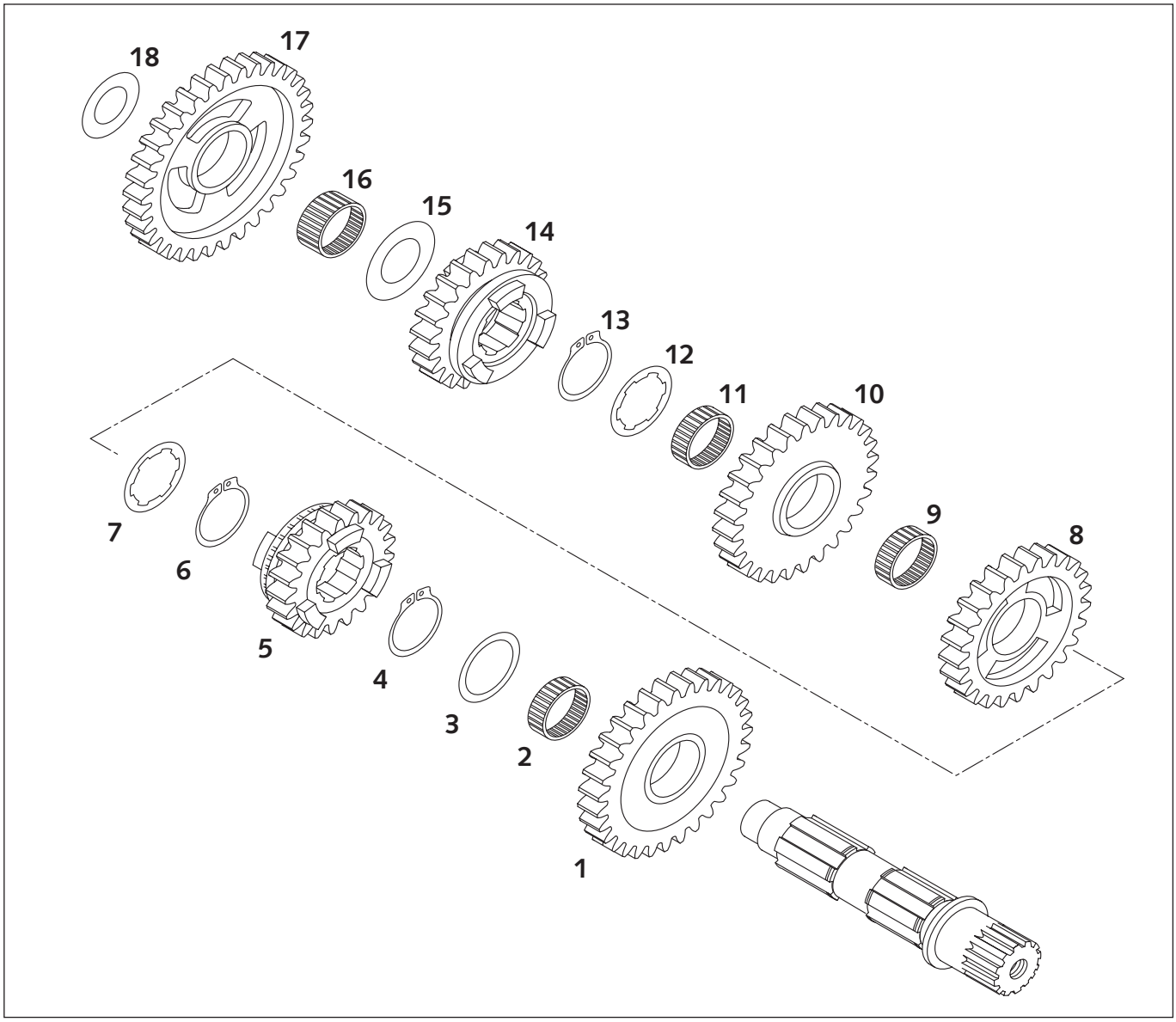
Thoroughly clean all parts, exchange damaged components. New axial securing elements should be mounted whenever repair work is performed.



Assembling the main shaft (6-speed)

– Secure the main shaft with the toothed end facing downward in a vise (use protection jaws).
– Prior to assembly, oil all components thoroughly.
– Mount the split needle bearing ❷, slip on the 5th speed idler gear ❶ with the shift dogs facing upward.
– Mount the stop disc ❸ (25.2x32x1.5 mm) and the circlip ❹ with the sharp edge pointing upward.
– Slip on the 3rd/4th speed sliding gear ❺ with the small gear facing downward and mount the circlip ❻.
– Slip on the stop disc ❼ (25.2x32x1.5 mm) and the split needle bearing ❽.
– Slip on the 6th speed idler gear ❾ with the recess pointing upward.
– Slip on the 2nd speed fixed gear ❿ with the collar facing downward and the stop disc ⓫ (17.2x30x1 mm).

– Then, check all gear wheels for smooth movability.



Transmission

Clamp the main shaft or countershaft, respectively, into the vise (use protective jaws). Remove the gears and check the following parts for wear and grooves:

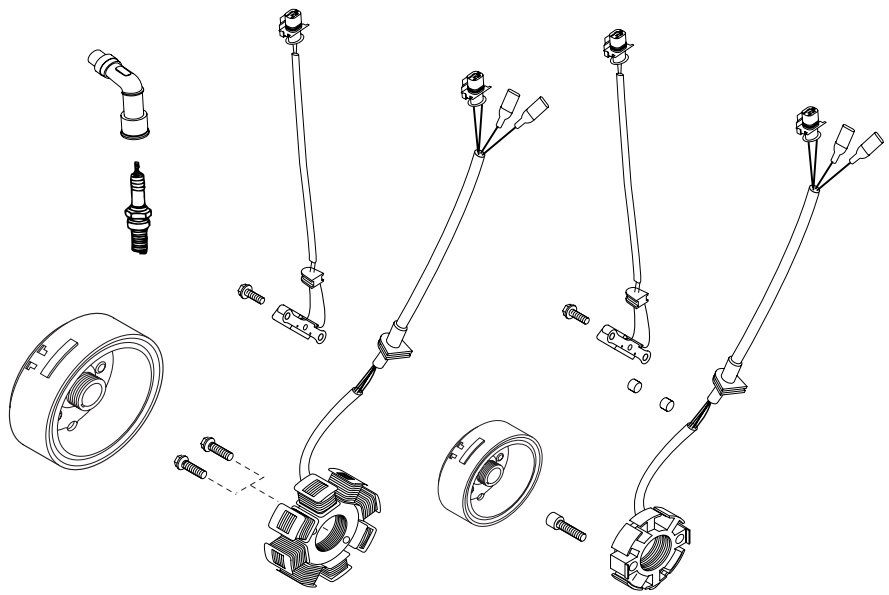
- Bearings
- Pivot points of the main shaft and countershaft and pivot points of the idler gears
- Shift dogs of the gears
- Tooth faces of all gears
- Tooth profiles of the main shaft and countershaft as well as of the corresponding gears
- Check the profiles of all control gears for smooth operation

Thoroughly clean all parts, exchange damaged components. New axial securing elements should be mounted whenever repair work is performed.

Assembling the countershaft (4 and 6-speed)

– Secure the countershaft with the toothed end facing downward in a vise (use protection jaws).
– Prior to assembly, oil all components thoroughly.
– Mount the split needle bearing ❷ and the 2nd speed idler gear ❶ - with the recess for shift dogs facing upward - on the countershaft.
– Mount the stop disc ❸ (25.2x32x1.5mm) and circlip ❹ with the sharp edge facing upward.
– Mount the 6th speed sliding gear ❺ with the shift groove facing upward.
– Mount the circlip ❻ and the stop disc ❼ (25.2x32x1.5mm).
– Mount the 2 split needle bearings ❾ + ⓫ and the 4th speed idler gear ❽ with the recess for shift dogs facing downward.
– Mount the 3rd speed idler gear ❿ with the recess for shift dogs facing upward.
– Mount the stop disc ⓬ (25.2x32x1.5mm) and the circlip ⓭.
– Slip on the 5th speed sliding gear ⓮ with the shift groove facing downward and the stop disc ⓯ (20x32x1mm).
– Mount the needle bearing ⓰, the 1st speed idler gear ⓱ with the recess facing downward and the stop disc ⓲ (17.2x30x1.5mm).

Art.-No. 3206007 -E



Ignition

General information

The measurements described below will only reveal severe problems. Coil short circuits leading to weak ignition sparks or low generator output, respectively, can only be detected with the help of an ignition test bench. In the case of malfunction always check the cables and the plug and socket connections of the ignition system first.

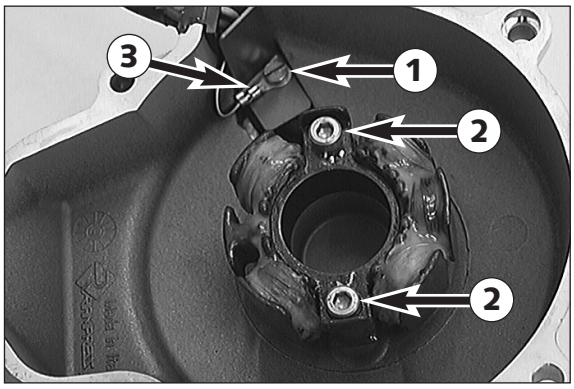
Make sure to select the correct measuring range when performing measurements.
The CDI unit can only be checked on the ignition test bench.

Ignition	Measure	cable colours	Resistance
4K-3A	Pulser coil	red – green	100 Ω ± 20%
	Exciter	black/red– red/white	24,8 Ω ± 20%
	Charge coil	ground – yellow	0,74 Ω ± 20%
4K-3B	Pulser coil	red – green	100 Ω ± 20%
	Exciter	black/red – red/white	12,7 Ω ± 20%
	Charge coil	ground – yellow	0,65 Ω ± 20%
		white – yellow	0,16 Ω ± 20%

Check stator and pulse generator

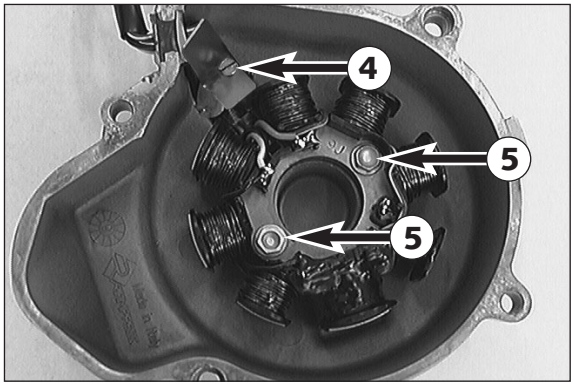
Use an ohmmeter to perform the following measurements:

NOTE: The measuring must be performed at a temperature of 20° C. Otherwise significant deviations must be expected.
Replace the stator and/or the pulse generator if the measured values deviate significantly from the setpoint values.



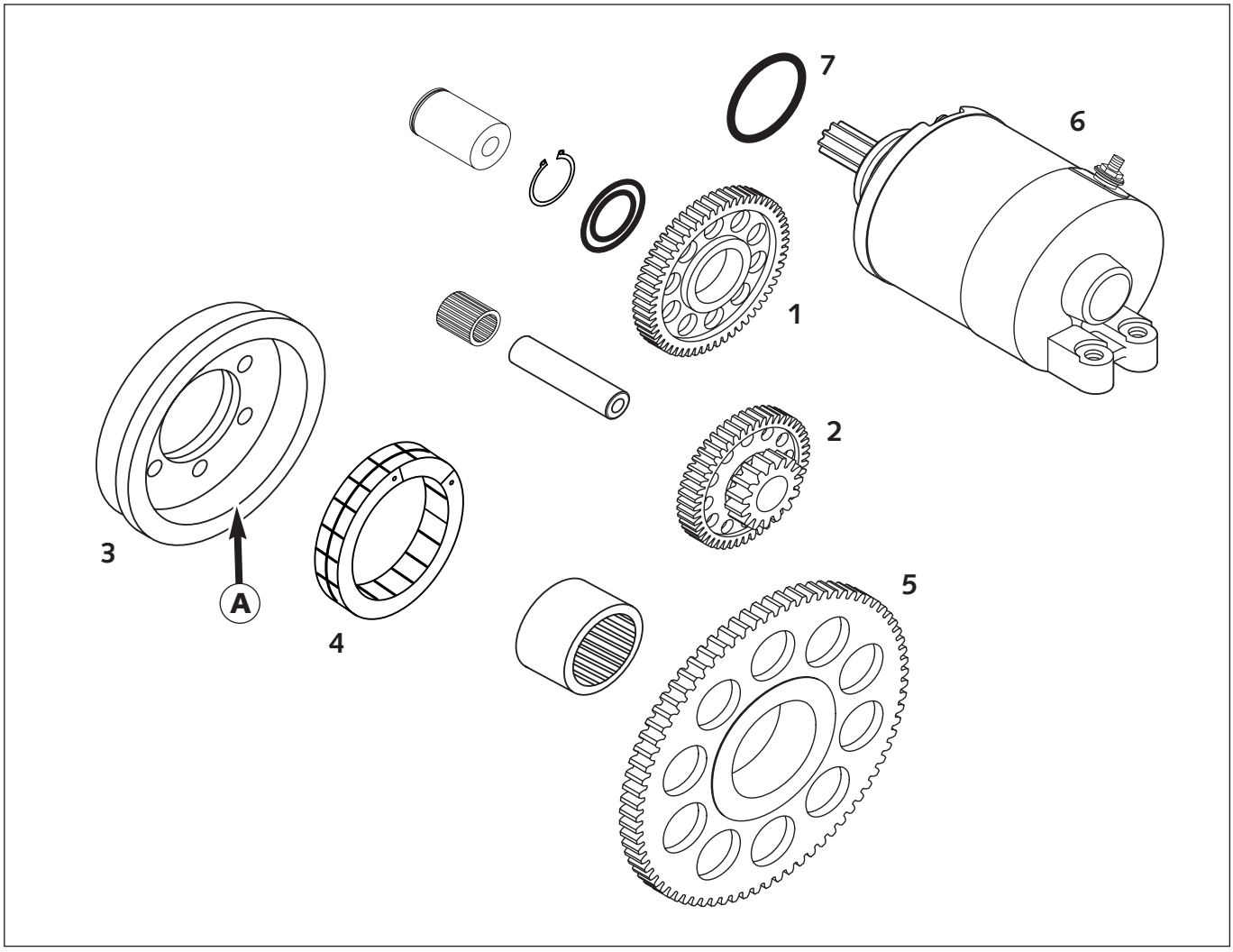
Replacing the stator 400/450/525 SX (4K-3A)

- Remove the bolt ❶ and dismount the retaining plate.
- Remove the 2 bolts ❷ and take the stator out from the ignition cover.
- Place a new stator in the ignition cover. Degrease the threads of all 3 bolts and apply Loctite 243.
- Mount the bolts and tighten them to 6 Nm/5 ft.lb.
- Place the wire harness in a non-energized condition and secure it with the retaining plate. Do not forget the cable socket ❸.



Replacing the stator 250/400/450 MXC, EXC, 520 SX, MXC, EXC, 525 MXC, EXC (4K-3B)

- Remove the bolt ❹ and dismount the retaining plate.
- Remove the 2 bolts ❺ and take the stator out from the ignition cover.
- Place a new stator in the ignition cover. Degrease the threads of all 3 bolts and apply Loctite 243.
- Mount the bolts and tighten them to 8 Nm/6 ft.lb.
- Place the wire harness in a non-energized condition and secure it with the retaining plate.



E-starter drive gear

Idler gear ❶
Check toothing and bearing position of the idler gear for wear. Check the bearing bolts of the idler gear for score marks, as well.

Reduction gear ❷
Check toothing and bearing position of the idler gear for wear. Check the bearing bolts of the idler gear for score marks, as well. Slip the reduction gear together with the needle cage onto the bearing bolt and check the clearance.

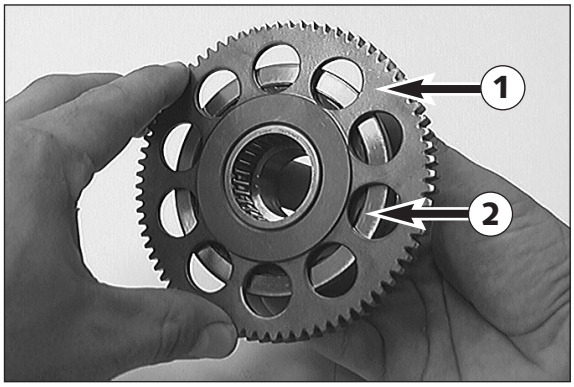
Free wheel hub ❸
Take the free wheel out of the free wheel hub and check the contact surface Ⓐ for pressure marks. Clean the free wheel hub thoroughly.

Free wheel ❹
Thoroughly clean the free wheel with petroleum and compressed air. Check the segments of the free wheel for wear. Then, oil the free wheel thoroughly.

Free wheel gear ❺
Slip the free wheel gear onto the crankshaft and check for clearance. If necessary, replace the needle bush. Check the contact surface to the free wheel for pressure marks.

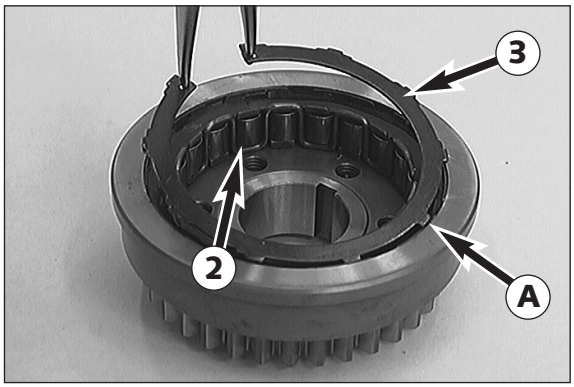
NOTE: If damage is found on the reduction gear ❷ or on the free wheel gear ❺ forcing you to change parts, then ❷ and ❺ are only available as a set.

E-starter motor ❻
Renew the O-ring ❼ at the flange.



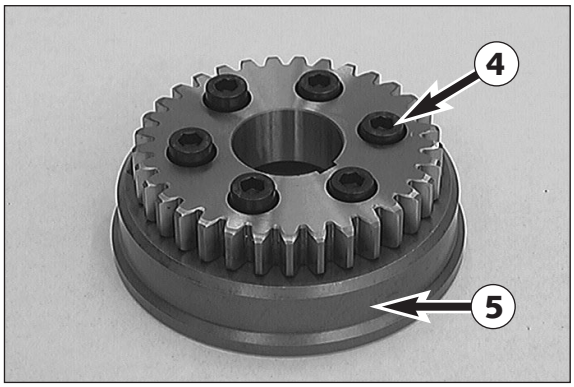
Checking the free wheel

– Insert the free wheel gear ❶ into the free wheel ❷.
– It must be possible to turn the free wheel gear clockwise.
– Counterclockwise, the free wheel gear must be blocked without backlash.

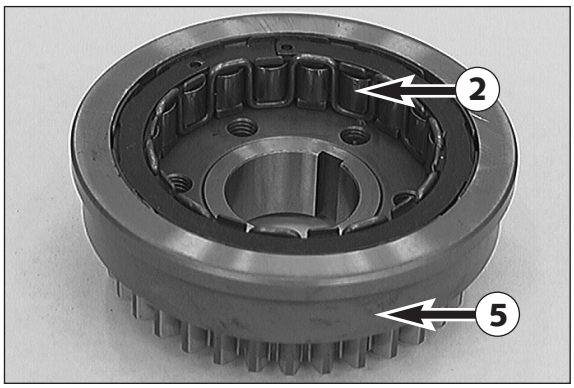


Replacing the free wheel hub

– Use the circlip pliers to compress the spreader ring ❸ and remove it together with the free wheel ❷.



– Remove the 6 bolts ❹.
– Use a plastic hammer to tap on the free wheel hub ❺ from the side and dismount the free wheel hub.
– Mount the new free wheel hub on the primary wheel.
– Degrease the threads of the bolts, apply Loctite 648 and tighten the bolts in a crosswise order to 16 Nm/12 ft.lb.



– Oil the free wheel ❷ thoroughly and insert it into the free wheel hub ❺.
– Use circlip pliers to insert the spreader ring into the groove and check its proper fit. It is best to use a punch to carefully tap on the mounted spreader ring.

NOTE: The noses Ⓐ on the spreader ring must engage the groove of the free wheel hub.

ASSEMBLING THE ENGINE 6

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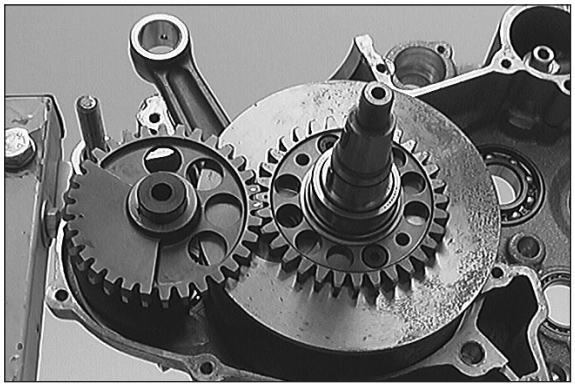
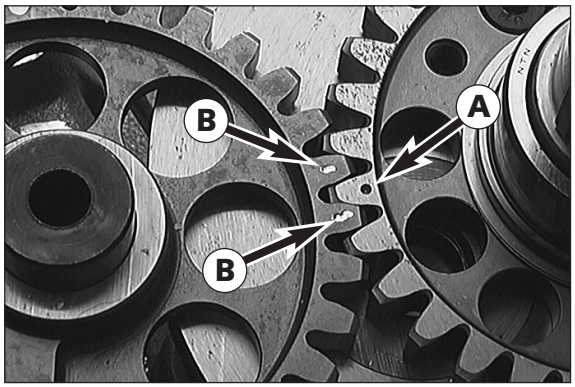
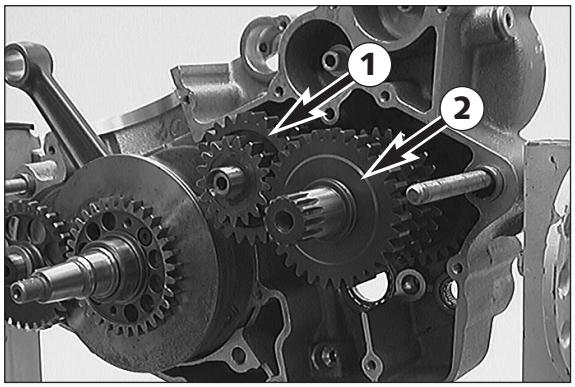


Mounting the crankshaft and balancer shaft

– Secure the right half of the casing in the work stand.
– Thoroughly oil the cylinder roller bearings of the crankshaft and grease the shaft seal ring of the crankshaft.
– Carefully, insert the crankshaft into the bearing seat.

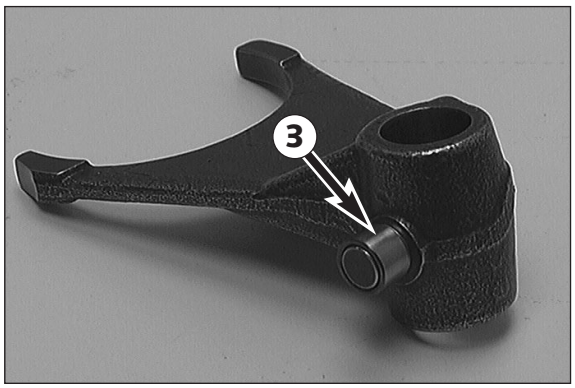


– Turn the crankshaft such that the mark Ⓐ is in front and insert the balancer shaft into the bearing seat. Make sure that the mark Ⓐ on the crankshaft is between the 2 marks Ⓑ on the balancer shaft.

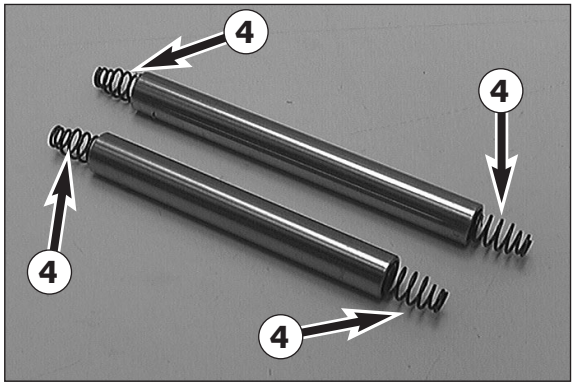


Mounting the shift mechanism and transmission

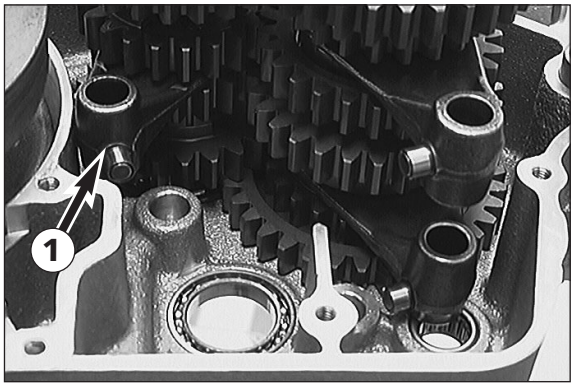
– Turn the engine sideward.
– Insert main shaft ❶ and countershaft ❷ into the bearing seats simultaneously.



– Apply grease to secure the shift rolls ❸ to the shift forks.



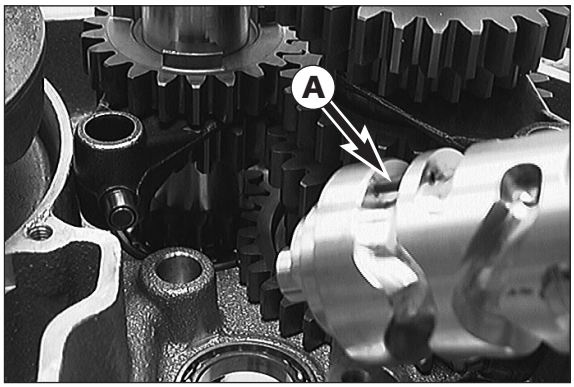
– Apply grease to secure the 4 springs ❹ in the shift rails.



– Oil the shift forks at their flat sides and engage them in the sliding gears.

ONLY ENGINES WITH 4-SPEED-SHIFTING:

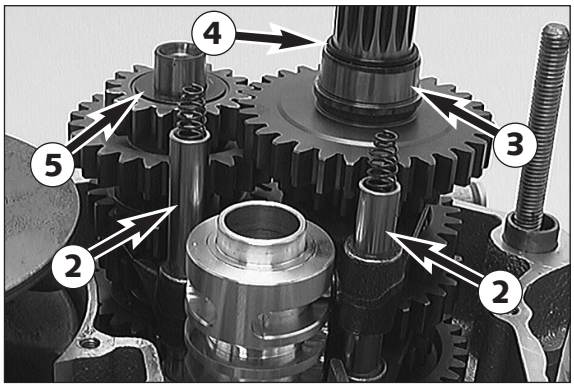
NOTE: The shift fork ❶ and the short shift rail is not mounted in these engines.



– Insert shift roller into bearing seat.

ONLY ENGINES WITH 4-SPEED-SHIFTING:

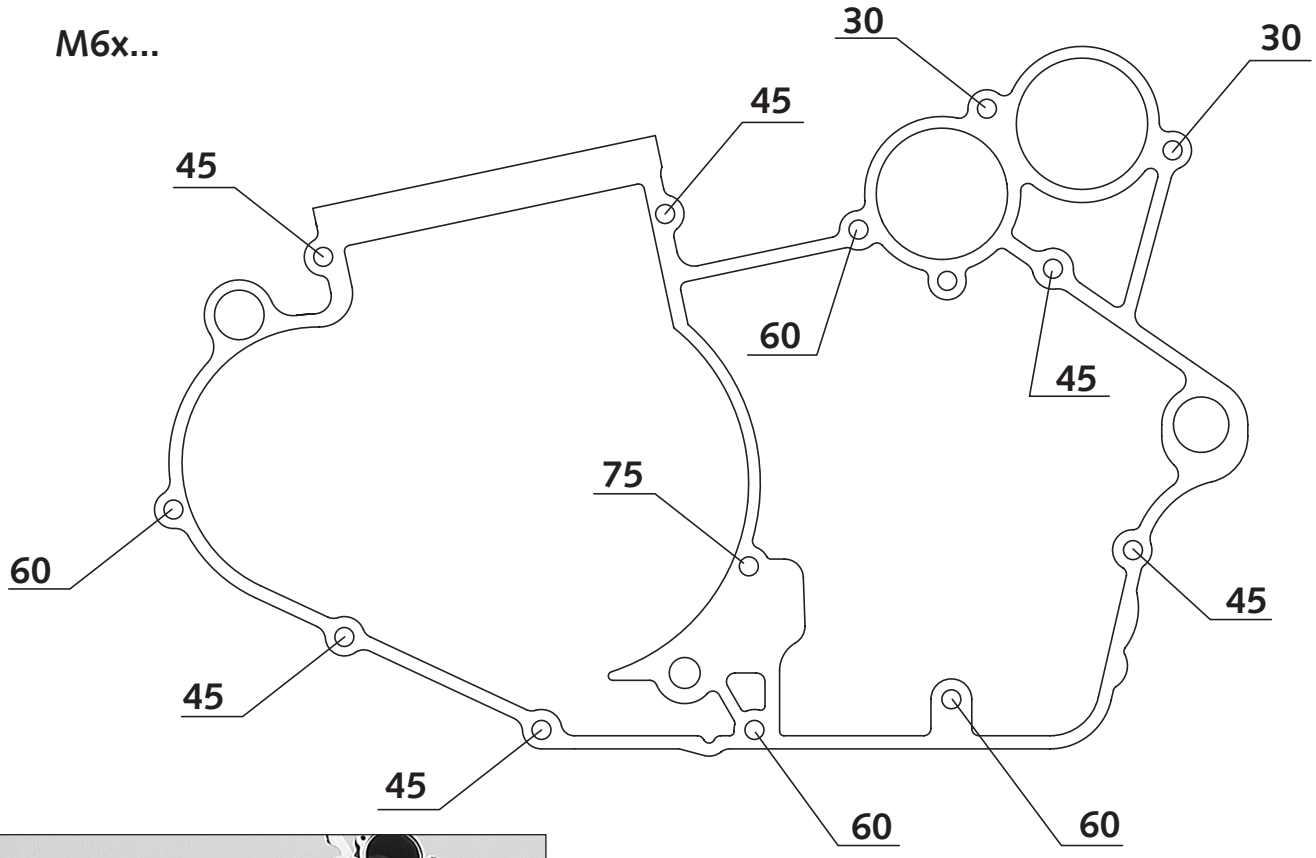
NOTE: The shift roller must be turned with the shift roller mounted such that the pin Ⓐ faces vertically downward.

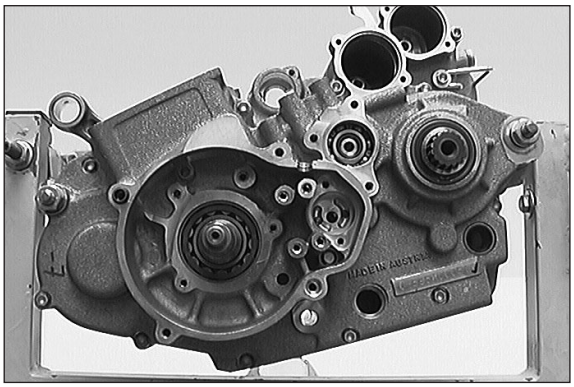


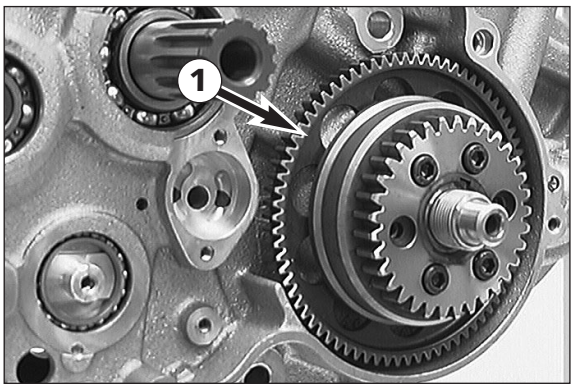
– Engage the shift forks in the shift roller and mount the two shift rails ❷ together with the springs.

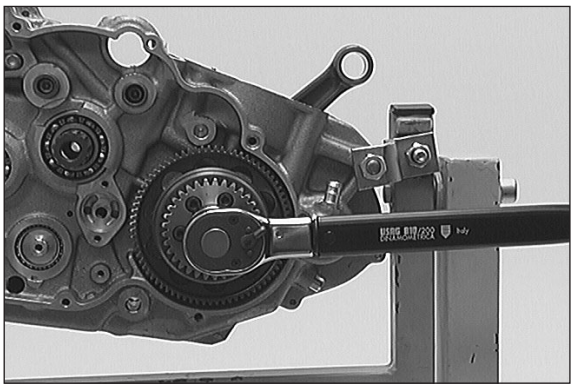
– Make sure that the following parts were mounted:

inner bearing ring ❸
O-ring ❹
stop disc ❺
2 dowels in the engine casing









Assembling the engine casing

- Remove the engine fixture at the work stand.
- Slightly coat the casing sealing surface with grease and apply a new gasket to it.
- Put on the left half of the casing and tap on it lightly with a plastic hammer until it reaches its proper fit.
- Check the casing gasket for proper fit.
- Grease the casing bolts in the area of their threads and at the seating surfaces of their heads. Insert the bolts and tighten them (the bolt length is indicated in the drawing).
- Prior to and after tightening the casing bolts to 10 Nm/7 ft.lb, check whether all shafts move smoothly.
- Fix the engine to the work stand.
- Cut the projecting casing gasket at the cylinder base away neatly at the sealing surfaces.

Mounting the primary gear and the freewheel

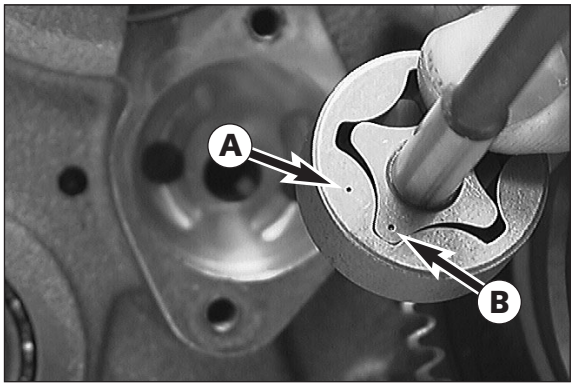
400/520 models until 2002:

- Turn the crankshaft to TDC and mount the crankshaft fixing bolt without a sealing ring.
- Check if the Woodruff key has been mounted in the crankshaft.
- Thoroughly oil the free wheel and the needle cage in the free wheel gear.
- Insert the free wheel gear ❶ into the free wheel hub and push all parts onto the crankshaft simultaneously.
- Degrease the thread of the crankshaft and coat it with Loctite 243. Mount the collar nut and tighten to 150 Nm/110 ft.lb.

250 EXC models from 2002 and all models after 2003:

- Check if the Woodruff key has been mounted in the crankshaft.
- Thoroughly oil the free wheel and the needle cage in the free wheel gear.
- Insert the free wheel gear ❶ into the free wheel hub and push all parts onto the crankshaft simultaneously.

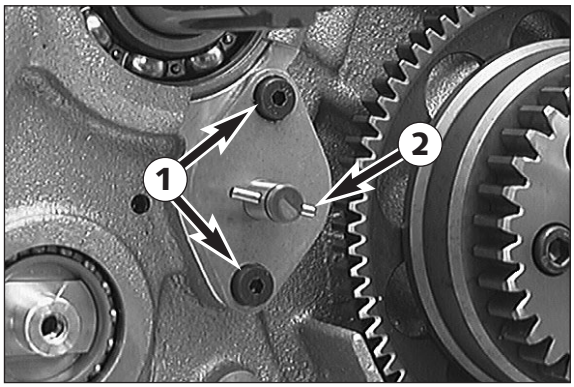
NOTE: The collar nut on the primary gear will be mounted later.



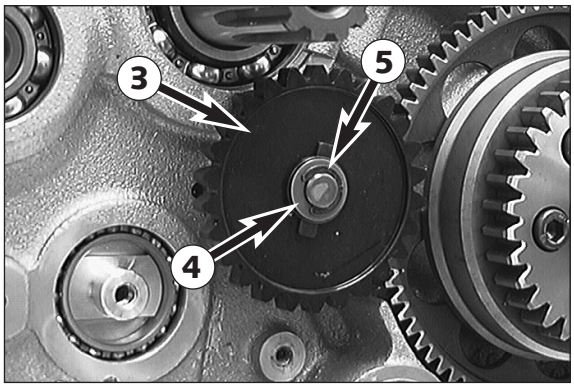
Mounting the oil pumps

– Thoroughly clean the seating surface of the oil pump cover.
– Insert the needle roller into the oil pump shaft.
– Slide inner rotor and outer rotor onto the oil pump shaft such that the 2 center points Ⓐ and Ⓑ are located next to one another and insert all components into the engine casing.

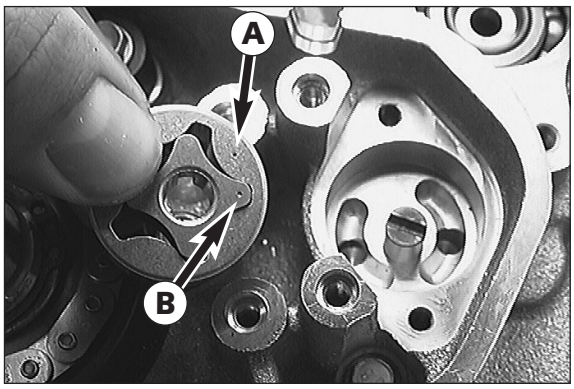
NOTE: The inner and outer rotor must be mounted with the center points facing the casing.



– Fill the oil pump casing with engine oil.
– Degrease the threads of the 2 bolts ❶ (M5x12), apply Loctite 222 mount the oil pump cover and tighten the bolts to 6 Nm/5 ft.lb.
– Insert the needle roller ❷ into the bore of the oil pump shaft.

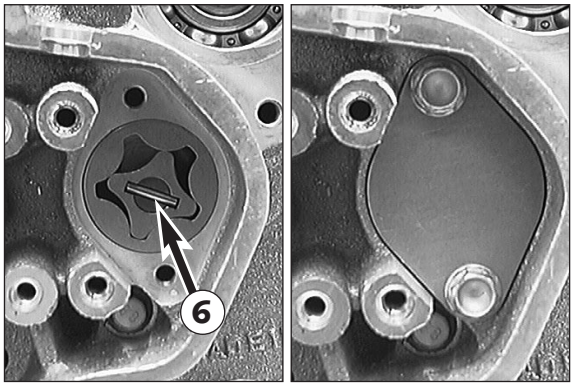


NOTE: If the shift lock has been removed, it can easily be mounted at this point (see page 6-6).
– Slide on the oil pump wheel ❸, mount the stop disc ❹ and the tab washer ❺.
– By turning the oil pump wheel, check whether the oil pump shaft moves smoothly.

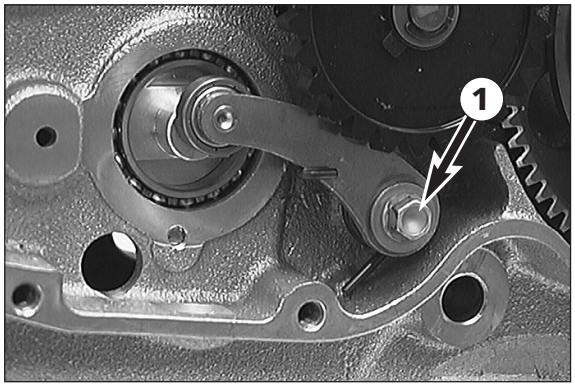


– Wipe the seating surface of the oil pump cover clean.
– Insert the outer and inner rotors into the engine casing such that the two marks Ⓐ and Ⓑ are located adjacent to one another.

NOTE: The inner and outer rotor must be mounted with the center points facing the casing.

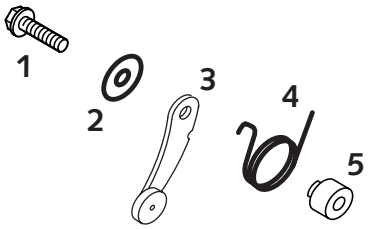


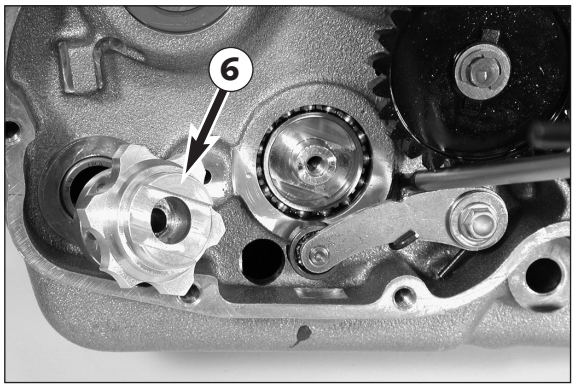
– Mount the needle roller ❻.
– Degrease the threads of the 2 bolts (M5x16) and coat them with Loctite 222.
– Fill the oil pump casing with engine oil.
– Use the 2 bolts to fix the oil pump cover and tighten to 6 Nm/5 ft.lb.
– After mounting check the oil pumps for easy operation. For this purpose turn the oil pump wheel.



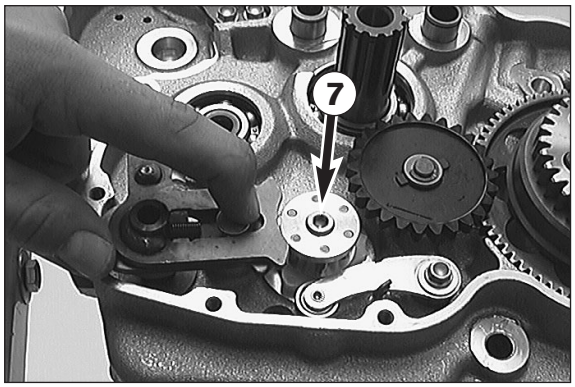
Mounting the shift arrester

– Slip the disc ❷, the locking lever ❸, the locking spring sleeve ❹ and the locking lever spring ❺ onto the bolt ❶ (M5x20).
– Apply Loctite 243 to the bolt's thread and tighten the bolt to 6 Nm/5 ft.lb.

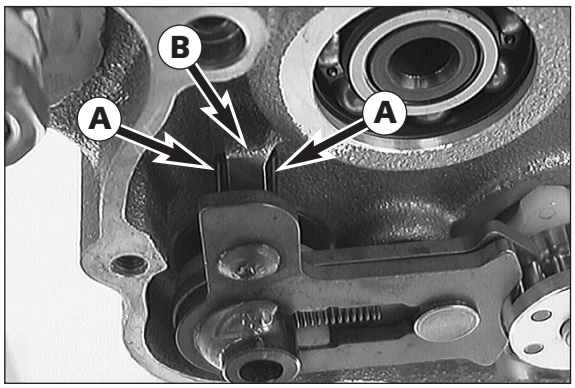




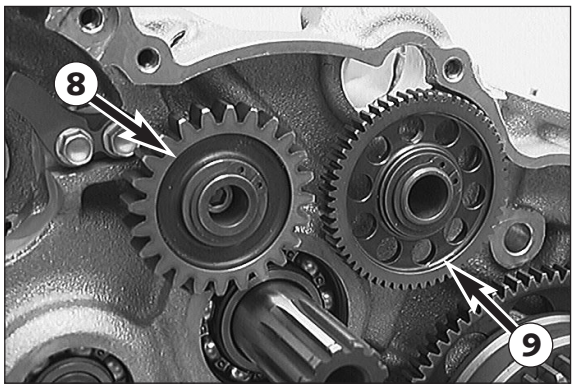
– Slide the shift locating drum ❻ onto the shift roller. Please note that the flat portions are eccentric. Here, the locking lever has be drawn away from the shift roller.
– Apply Loctite 243 to the thread of the bolt ❼ (M6x30) and tighten the bolt to 10 Nm/7 ft.lb.



– Grease the preassembled shift shaft and, together with the stop disc, slide it into the bearings until the sliding plate abuts the roller driving pin.
– Push back the sliding plate and push the shift shaft in up to the stop.

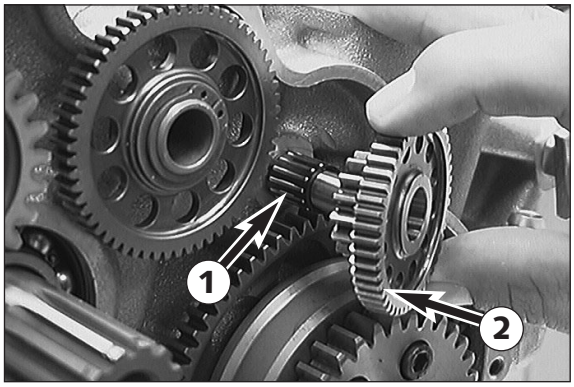


– Check whether the legs Ⓐ of the return spring abut the casing nose Ⓑ on both the left and right sides.
– Slip on the shift lever and shift through all gears. Turn the main shaft as you shift through the gears. Then, dismount the shift lever again.

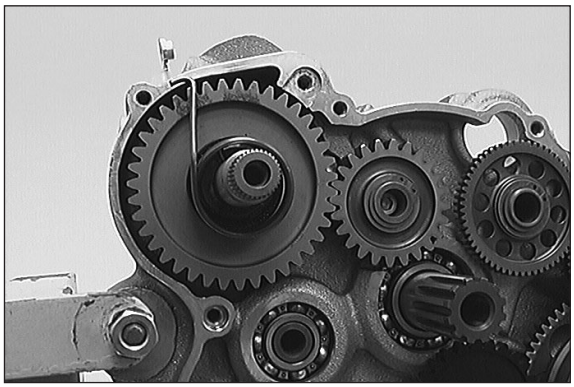


Mounting E-starter drive gear and kickstarter

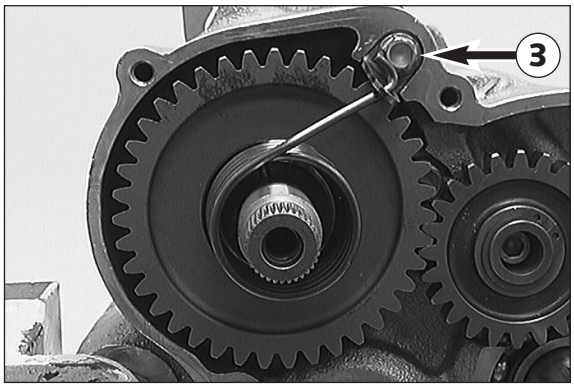
– Oil the kickstarter idler gear ❽ and the E-starter idler gear ❾ at the bearing positions and slide them onto the bearing bolts.
– Mount stop discs and circlips with the sharp edge facing outwards.



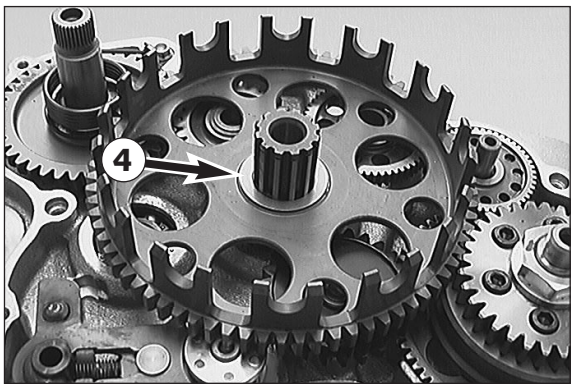
– Insert the bearing bolt into the casing bore. Mount the needle bearing ❶ and the reduction gear ❷.



– Insert the preassembled kickstarter shaft into the bearing bore such that the ratchet gear is positioned behind the release plate.



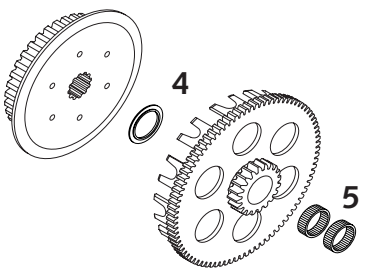
– Mount the spring shackle to the starter spring, coat the thread of the bolt ❸ (M6x12) with Loctite 243, tighten to 10 Nm/7 ft.lb, preload the starter spring around approx. 45° clockwise and fix the spring shackle by means of the bolt.
– Align the starter spring such that the distance to the kickstarter shaft is the same all around.

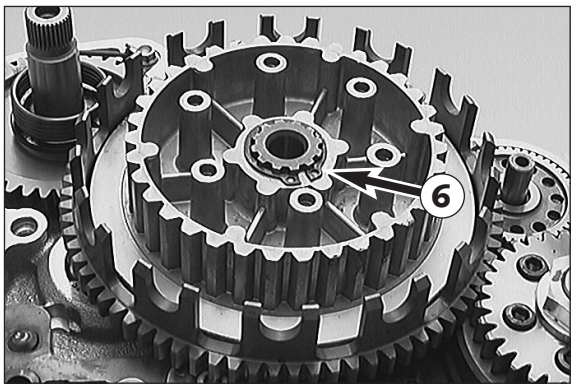


Mounting the outer clutch hub and driver up to the 2002 model

– Mount the stop disc and the bearing bush.
– Oil the bearing bush, slip the outer clutch hub and the stop disc ❹ onto the main shaft.

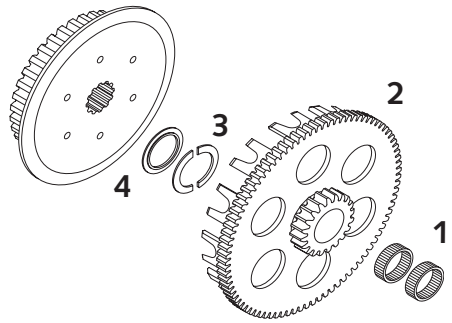
NOTE: From Model 2001 onwards the support washer ❹ is replaced by a step washer and two needle bearings ❺ are mounted instead of the bearing bush (see drawing below).
These parts cannot be used for Model 2000 engines.





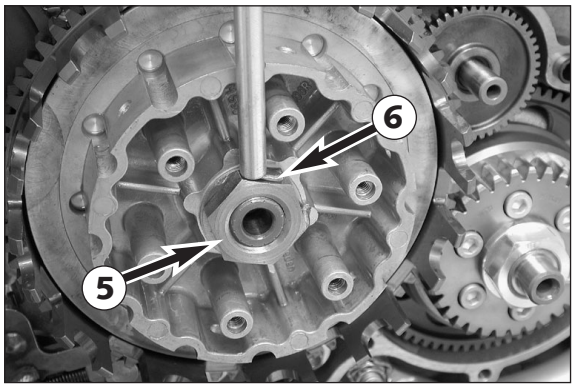
– Heat the driving pin to approx. 150°C and slide it onto the main shaft.
– Mount the circlip ❻ with its sharp edge facing upwards.

NOTE: A used driving pin can usually be mounted without being heated.



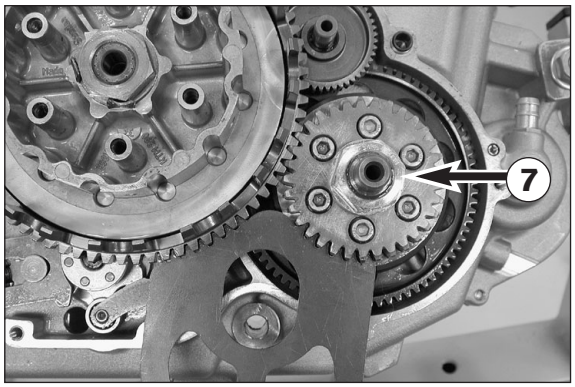
Mounting the outer clutch hub and driver from the 2003 model onwards

– Mount the supporting plate and the oiled needle bearing ❶.
– Mount the outer clutch hub ❷ together with the half disks ❸ and stepped disk ❹ on the main shaft.



– Heat the driver to approx. 150°C and mount on the main shaft.
– Mount a new lock washer.
– Degrease the main shaft thread and apply Loctite 243.
– Apply the special tool (see dismounting), mount the collar nut ❺ and tighten to 150 Nm.
– Secure the collar nut with the lock washer ❺ as illustrated.

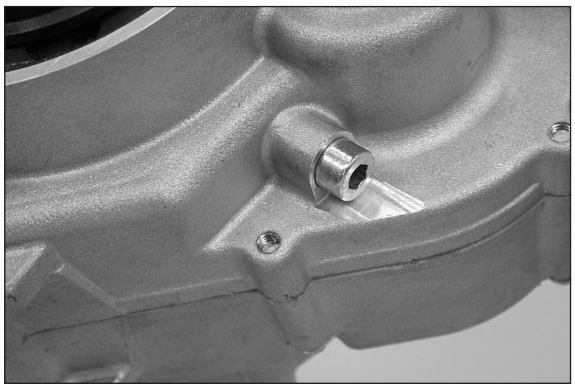
NOTE: A used driving pin can usually be mounted without being heated.



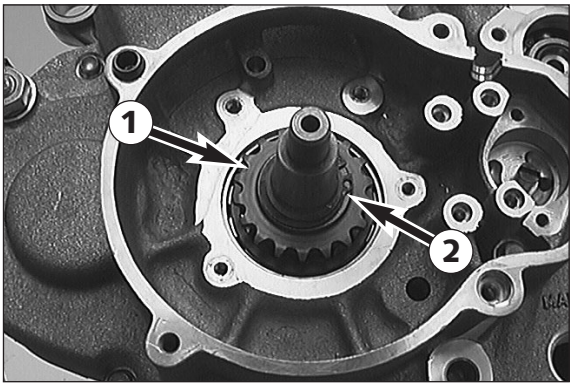
Mounting the primary gear nut (250 EXC models after 2002 and all models after 2003)

– Apply the special tool as illustrated.
– Degrease the thread of the crankshaft and coat it with Loctite 243. Mount the collar nut ❼ and tighten to 150 Nm/110 ft.lb.

NOTE: The nut was already mounted on the models up to 2002.

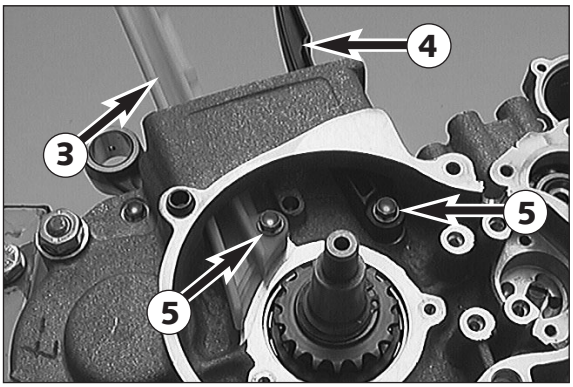


– Turn the crankshaft to TDC and mount the crankshaft fixing bolt without a sealing ring.

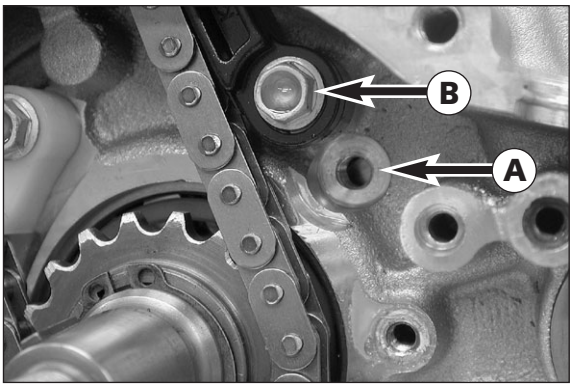


Mounting the timing gear

– Check the Woodruff key in the crankshaft for its correct fit.
– Warm the timing gear ❶ and position on the crankshaft with the high collar facing inwards. Tap carefully with a suitable pipe if necessary.
– Mount circlip ❷ with the sharp edge facing outwards.



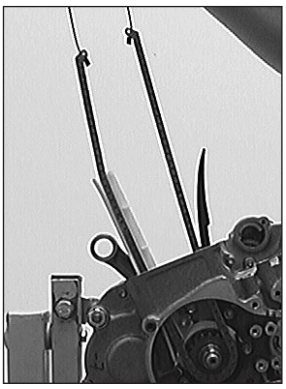
– Degrease the threads of the 2 bolts and apply Loctite 243. Use the 2 bolts ❺ (M6x25) to fix the timing chain guide ❸ and the tensioning rail ❹ , tighten the bolts to 8 Nm/6 ft.lb. Do not forget the 2 bushings.

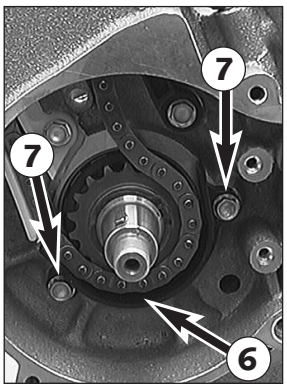


NOTE: 2 mounting points for the tensioning rail are provided for models from 2003. The tensioning rail is attached to point Ⓐ on the 450 SX model.
The tensioning rail is attached to point Ⓑ on all other models.

! CAUTION !

AFTER TIGHTENING, CHECK THE TENSIONING RAIL FOR SMOOTH OPERATION.

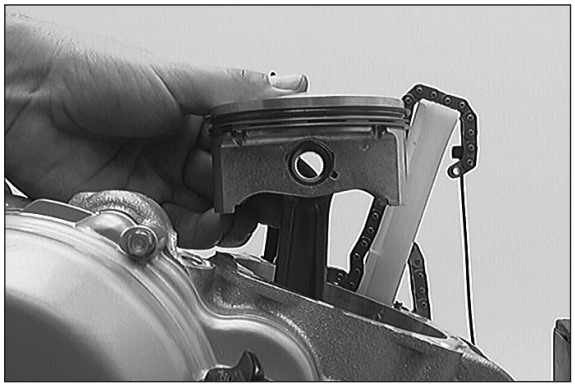




– Place the timing chain such that both ends are of equal length.

NOTE: The timing chain can also be pulled in after the cylinder and cylinder head are mounted.

– Degrease the threads of the 2 bolts (M5x16) and coat them with Loctite 243. Mount the fall-out protection element ❻ and tighten the bolts ❼ to 6 Nm/5 ft.lb.
– Stick one cable strap each through the 2 ends of the timing chain (see photo).

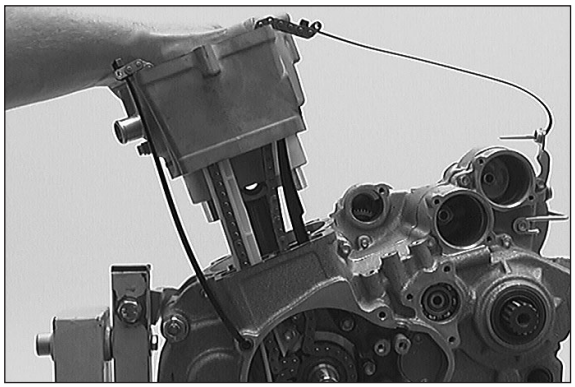


Mounting piston and cylinder

– Apply a new cylinder-base gasket.
– Oil the piston pin boss in the conrod and the piston pin.
– Mount the piston and secure the piston pin with 2 new wire circlips.

! CAUTION !

THE ARROW AT THE PISTON HEAD MUST POINT IN THE TRAVEL DIRECTION.



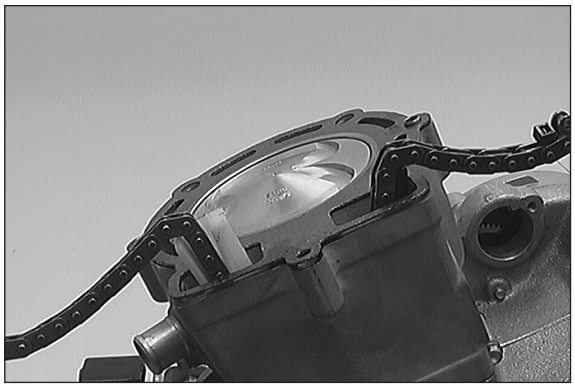
– Oil the piston and align the piston rings.

NOTE: The open end of the oil scraper ring must be in the back. The open end of the compression ring must be offset from it around 90°.

– Pull the timing chain upward through the chain tunnel.
– Slide the cylinder over the piston and remove the piston mounting ring.

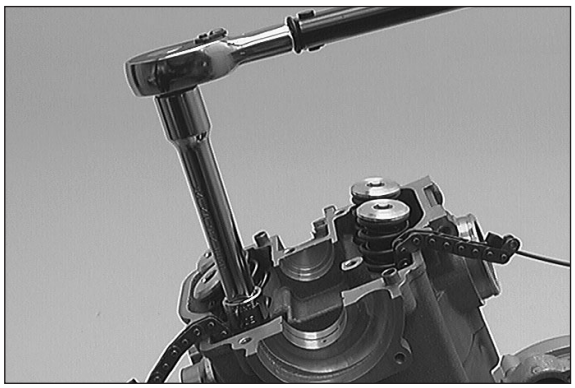
! CAUTION !

EXERCISE EXTREME CAUTION WHEN MOUNTING THE CYLINDER! THE OIL SCRAPER RING CAN BREAK EASILY.

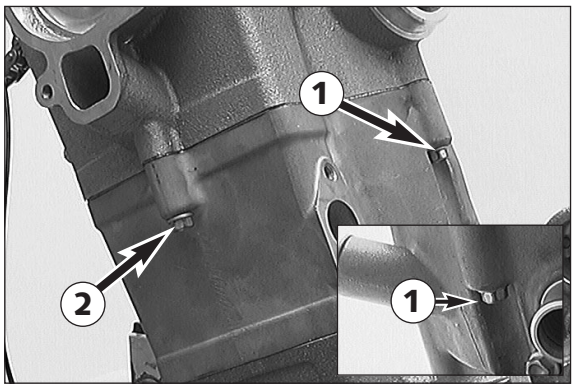


Mounting the cylinder head

– Check the two dowels in the cylinder for perfect fit.
– Apply a new cylinder-head gasket (the labeling "ALTO" facing upward) and mount the cylinder head. At the same time, insert the timing chain.

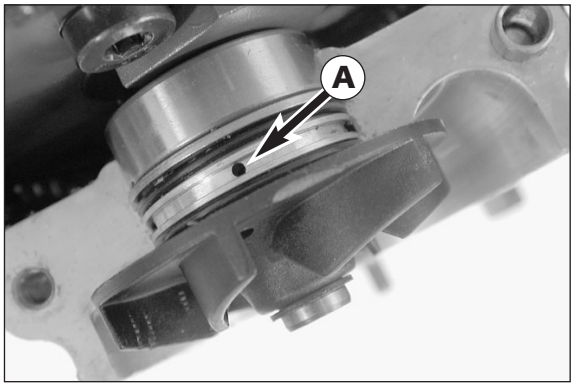


– Oil the 4 collar bolts at their threads and their seating surfaces and mount them together with the washers.
– Tighten the collar bolts in a crosswise order as follows.
– At first, tighten them only until you feel a light resistance.
– The second time around, tighten the bolts to 40 Nm/30 ft.lb.
– The third time, tighten them to 50 Nm/38 ft.lb.

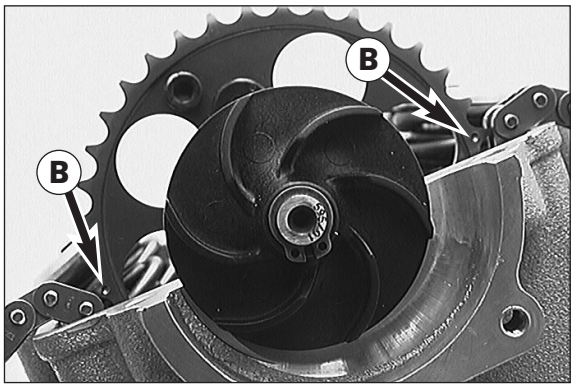


– Mount and tighten bolts ❶ (M6x45) and ❷ (M6x40) and tighten to 10 Nm/7 ft.lb.

NOTE: The shorter bolt ❷ (M6x40) must be mounted on the left, in the region of the water pump with a new copper seal ring(6x10x1).

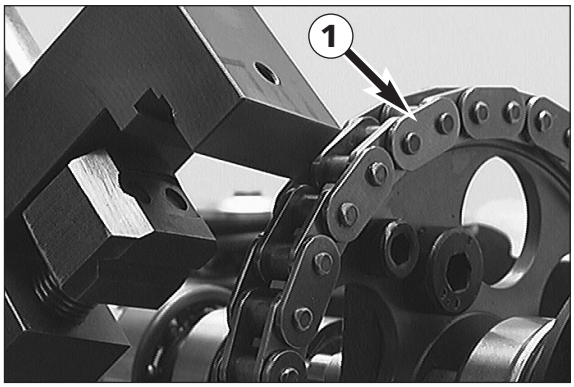


NOTE: The gasket carrier has a drain bore Ⓐ from the 2003 model. Make sure the bore faces up when mounting.

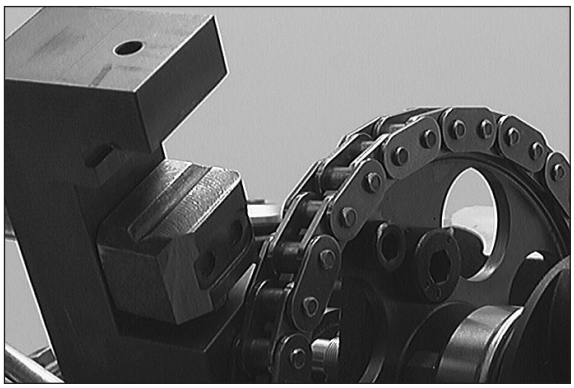


– Place the camshaft into the cylinder head such that the marks Ⓑ at the camshaft gear are aligned with the upper edge of the cylinder head (see photo). The stop bolt of the automatic decompressor must be on top.

NOTE: When mounting the camshaft, you have to use the crankshaft fixing bolt to block the crankshaft in the TDC position.

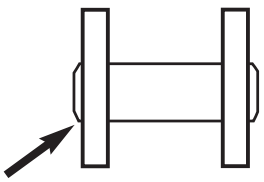


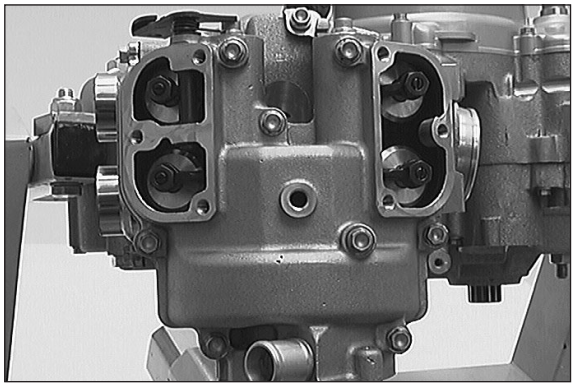
– Place the timing chain onto the camshaft gear and mount a new rivet link ❶.
– At first, mount the socket of the special tool as shown and then compress the rivet link.



– Mount the socket of the special tool as shown and rivet on the rivet link.

NOTE: The rivet member must be riveted on so tightly that the ends of the inserting member have a trapezoid-shaped cross-section (see drawing).

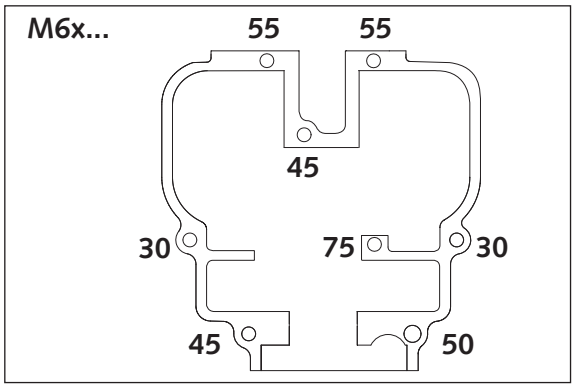


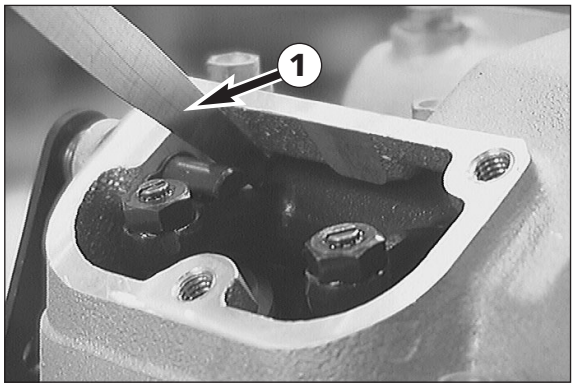


Mounting cylinder head top portion

– Clean and degrease the sealing surface.
– Fit dowels.
– Apply a thin layer of sealing compound (Three Bond).
– Carefully position cylinder head top section and tighten bolts to 10 Nm/7 ft.lb.

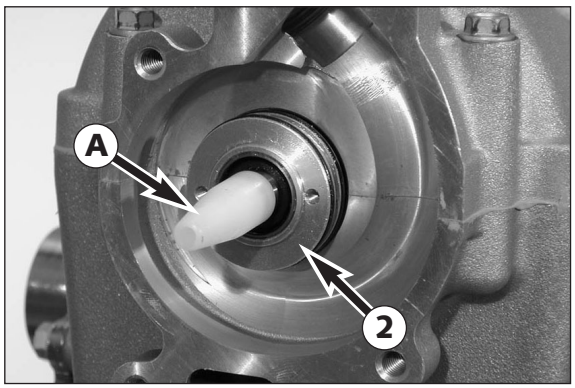
NOTE:
– The bolt M6x75 is to be mounted with a new copper seal ring (6x10x1)





– Prior to fastening the bolts, it is necessary to check and, if necessary, adjust the clearance play of the rocker arms.
– For this purpose, insert a feeler gauge ❶ (0.05 mm) between the end piece and rocker arm. Press the end piece inwards and tighten the bolt in the area of the end piece.
– Tighten the remaining bolts in a crosswise order to 10 Nm/7 ft.lb.

Axial clearance rocker arms 0.02 - 0.10 mm / 0.0008 - 0.0039 in



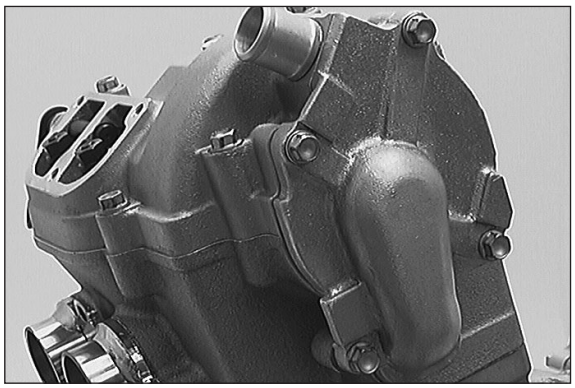
The following steps only apply to models from 2002 onwards:
– Slip on the assembling sleeve Ⓐ. Grease the O-rings and mount the gasket carrier ❷ without canting, the collar facing the camshaft gear.

! CAUTION !

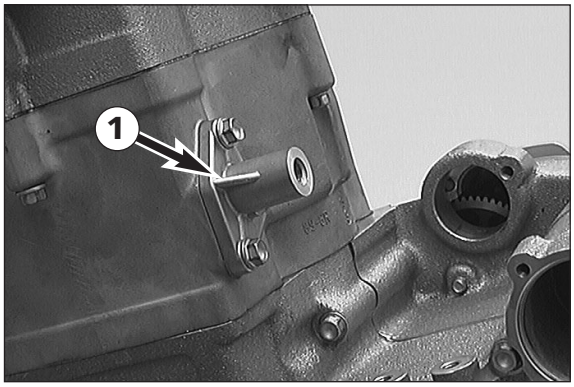
ALWAYS USE THE ASSEMBLING SLEEVE TO PREVENT THE SHAFT SEALING RINGS FROM BEING DAMAGED.

NOTE: The gasket carrier has a drain bore from the 2003 model (see page 6-11). Make sure the bore faces up when mounting.

– Remove the assembling sleeve, insert the needle roller in the camshaft and mount the water pump wheel with the Seeger circlip ring.

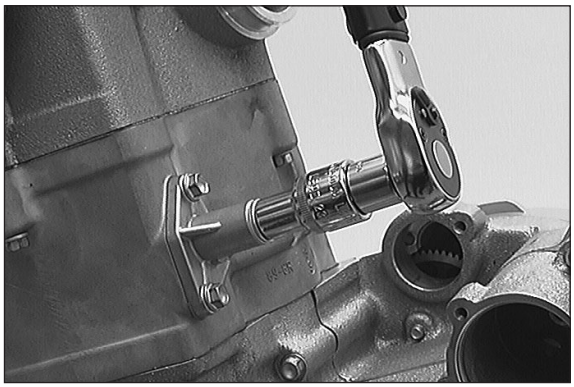


– Mount the water pump cover with a new gasket. Tighten the bolts (M6x20) crosswise to 8 Nm/6 ft.lb.

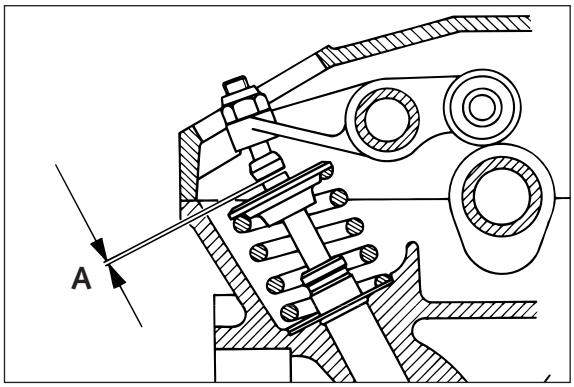


Mounting the timing chain tensioner

– Mount the preassembled timing chain tensioner ❶ with a new gasket.
– Mount the 2 bolts (M6x20) with copper seal rings 6x10x1 and tighten to 8 Nm/6 ft.lb.



– Use a screwdriver to push the pressure pin in until you feel a slight resistance. Then, push it in one notch further.
– Mount the pressure spring and the plug with a new sealing ring and tighten to 10 Nm/7 ft.lb.



Adjusting the valve clearance

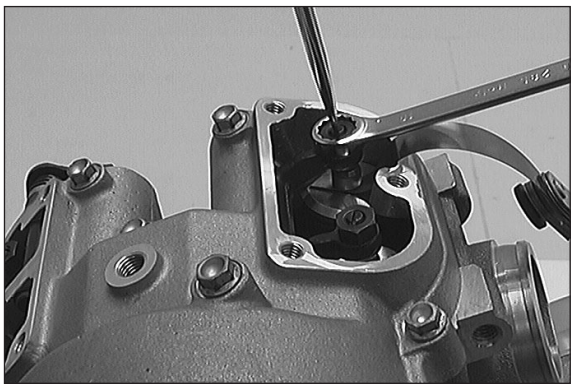
– The valve clearance Ⓐ is measured on a cold engine between the valve stem and the adjusting screw.

Valve clearance: 0.12 mm (0.0047 in)

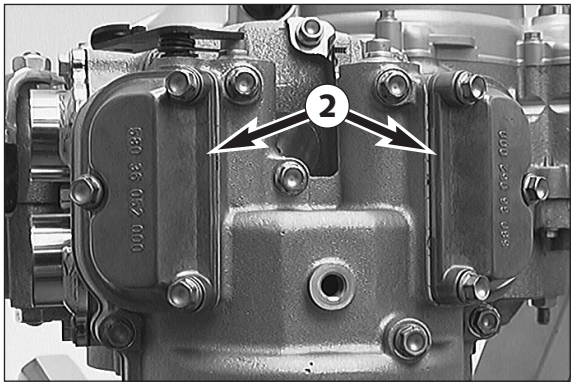
! CAUTION !

IF THE PISTON IS NOT IN THE IGNITION TDC POSITION THE VALVES WILL BE ACTUATED BY THE ROCKER ARMS AND IT WILL NOT BE POSSIBLE TO ADJUST THE VALVE CLEARANCE CORRECTLY. IN THIS CASE THE ENGINE MUST BE TURNED ONE REVOLUTION FURTHER AND BLOCKED AGAIN.

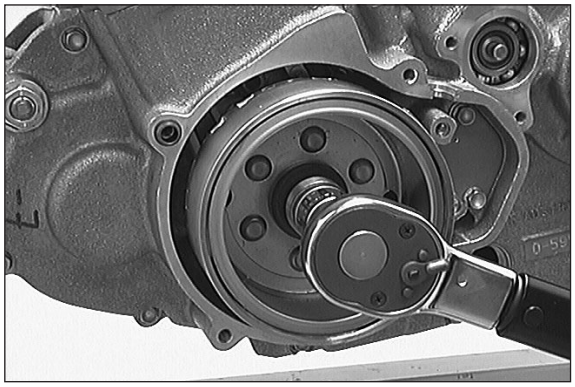
NOTE: The feeler gauge must be pointed and bent slightly to adjust the valve clearance for the 450/525 SX 2003 models.



– Having set the clearance, tighten the counter nuts to 11 Nm/8 ft.lb and check valve clearance once again.



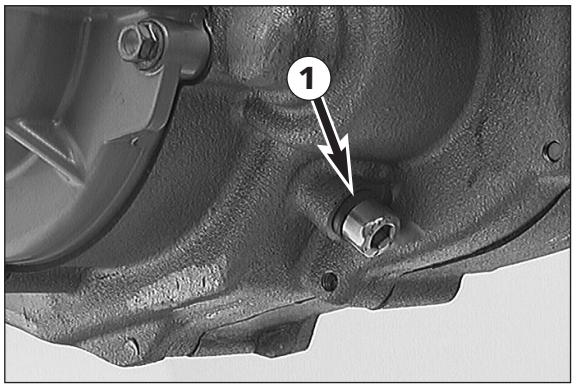
– Mount 2 valve covers ❷ with new gaskets and bolts (M6x20) together with new copper seal rings (6x10x1). Tighten the bolts to 8 Nm/6 ft.lb.
– Screw in the spark plug and tighten to 12 Nm/10 ft.lb.



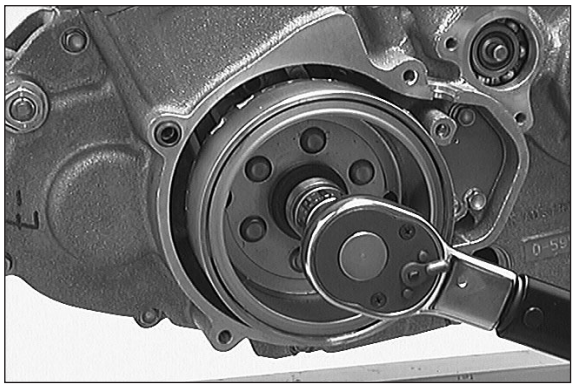
Mounting the flywheel (400/520 models up to 2002)

– Check the Woodruff key in the crankshaft for proper fit and slip the flywheel onto the crankshaft.
– Mount wave washer and collar nut, tighten to 60 Nm/44 ft.lb.

NOTE: When ordering a new part, a forged rotor will be supplied, this part is produced without rivets and is interchangeable.

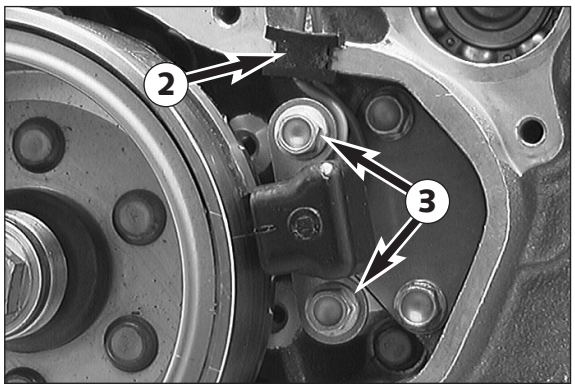


– Unscrew the crankshaft fixing bolt, mount the sealing ring ❶ and tighten the crankshaft fixing bolt again to 25 Nm/18 ft.lb.



Mounting the flywheel (250 EXC models after 2002, all models after 2003)

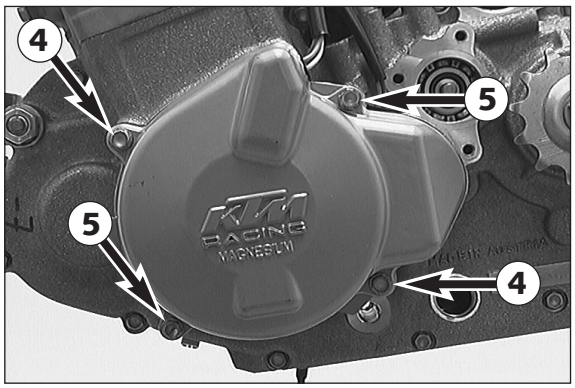
– Unscrew the crankshaft fixing screw, mount the seal ring ❶ and tighten the crankshaft fixing screw to 25 Nm (see above).
– Check the Woodruff key in the crankshaft for proper fit and slip the flywheel onto the crankshaft.
– Mount the shaft disk and collar nut. Counteracting with the clutch holder, tighten the and collar nut to 60 Nm.



Mounting the pulse generator and the ignition cover

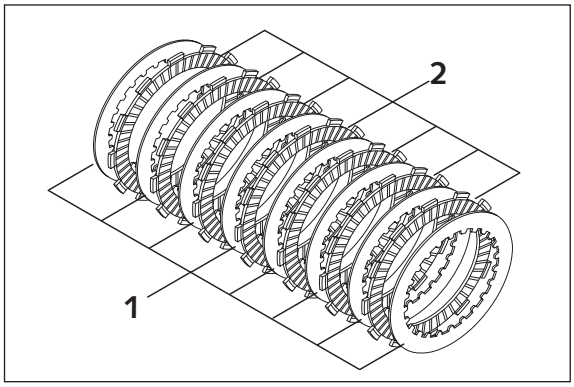
– Position the pulse generator in the engine casing and insert the cable grommet ❷ into the aperture of the casing.
– Degrease the threads of the 2 bolts ❸ (M5x16), coat them with Loctite 243 and tighten to 6 Nm/5 ft.lb.

NOTE:
– For the 400 SX engines equipped with the 4K-3A ignition, 2 spacer bushings must be added behind the pulse generator.
– The gap between rotor and pulse generator must be 0.55 - 0.85 mm (0.022 - 0.033) in, but is only adjustable on 400 SX engines (measurement 0.7 mm / 0.027 in).



– Apply a new gasket and fix the ignition cover with the 4 bolts (❹ and ❺), tightening torque 10 Nm/7 ft.lb.

NOTE: The 2 longer bolts ❹ (M6x35) are mounted at the dowels.

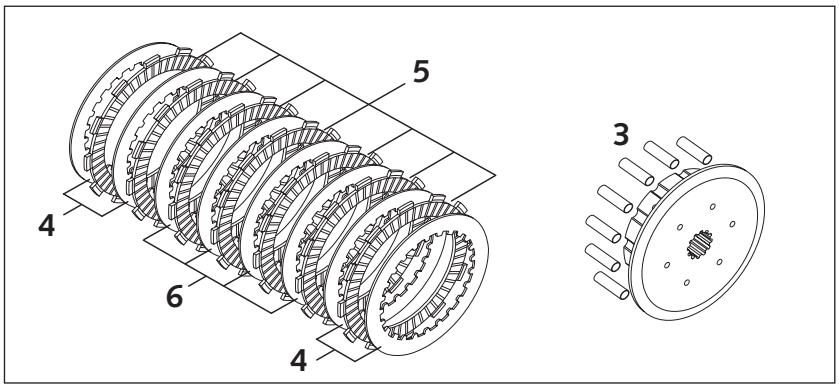


Mounting the clutch

– Prior to assembly, thoroughly oil all lining discs.

Clutch disks up to the 2001 model:

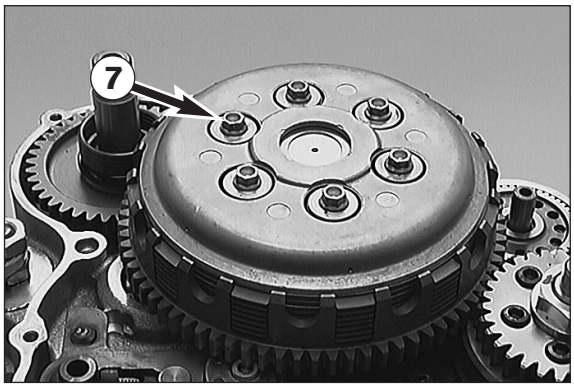
– Starting with an intermediate disc ❶, alternatingly insert a total of 8 intermediate discs and 7 lining discs ❷. An intermediate disc must be on top.



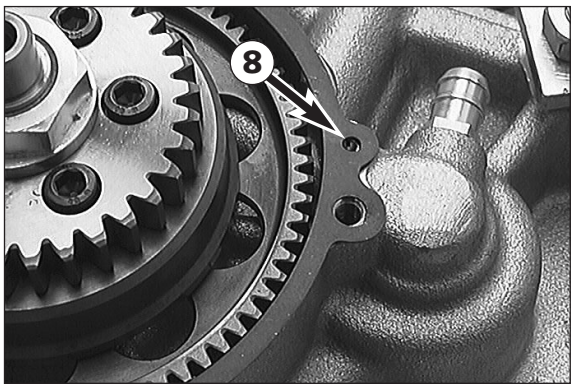
Clutch disks from the 2002 model onwards:

– Position the 12 driving pin sleeves ❸ on the driver; fix with grease if necessary.
– Starting with a thin clutch disk ❹, alternately insert 8 clutch disks and 6 lining disks ❺, finishing with a thin clutch disk ❹ on top.

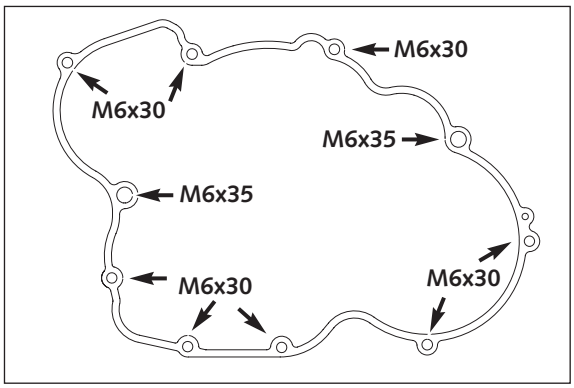
NOTE: the two outer clutch disks ❹ are 1 mm (0.03937 in) thick, the thicker clutch disks ❻ (1.4 mm/0.00551 in) are positioned on the inside (see drawing).



– Mounting the pressure piece.
– Apply the pressure cap and mount the clutch springs, the spring retainers, and the collar bolts.
– Fasten the collar bolts ❼ in a crosswise order to 10 Nm/7 ft.lb.

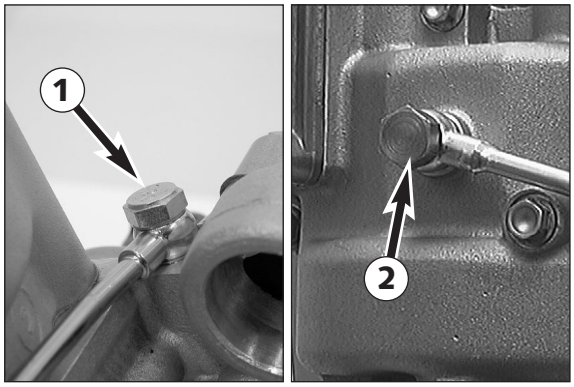


– Verify that the two dowels have been mounted in the engine casing.
– Grease all shaft seal rings in the clutch cover and fix the clutch cover gasket with some grease.
– Pay special attention to ensuring that the gasket does not close off the oil jet ❽ in the engine casing.
– Fill in app. 30 ml engine oil into the bore of the crankshaft.



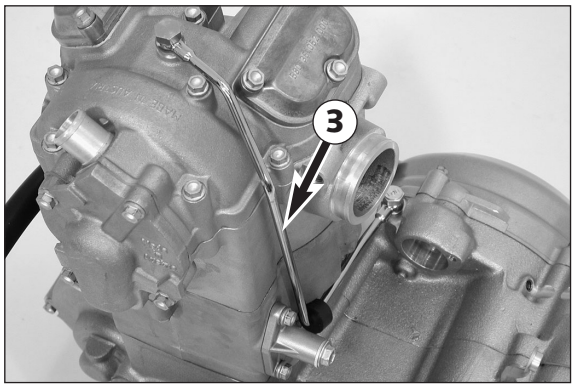
– Carefully mount the preassembled clutch cover and press it on.
– Mount the bolts (bolt lengths M6x30 and M6x35 – see drawing) and tighten them to 10 Nm//7 ft.lb.

NOTE: If the clutch cover cannot be mounted, check whether the kickstarter spring has been positioned correctly.

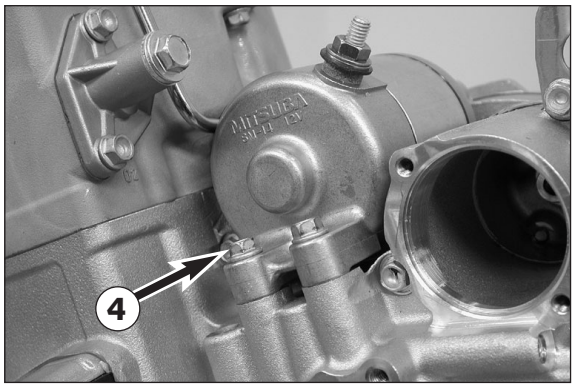


Mounting the oil line

– Position the oil line ❸ and secure it with the jet screw ❶ and the hollow screw ❷. Use new sealing rings, tighten the screws to 10 Nm/8 ft.lb.

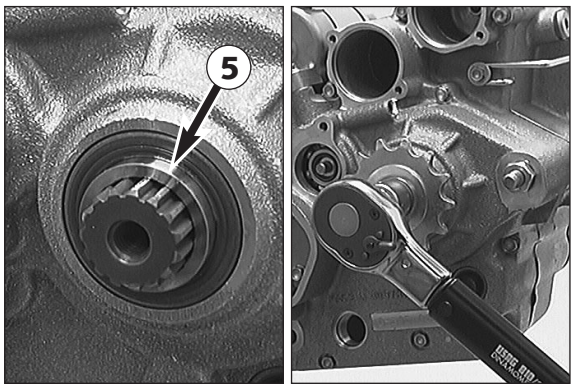


NOTE: Place the oil line such that it does not touch the engine. The oil line must not be twisted during tightening.



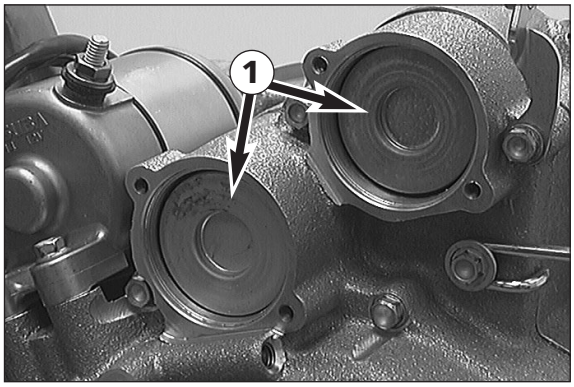
Mounting the electric starter

– Oil the O-ring of the E-starter motor and insert the E-starter motor into the engine casing. Mount the 2 screws ❹ (M6x20) and tighten to 8 Nm/6 ft.lb.



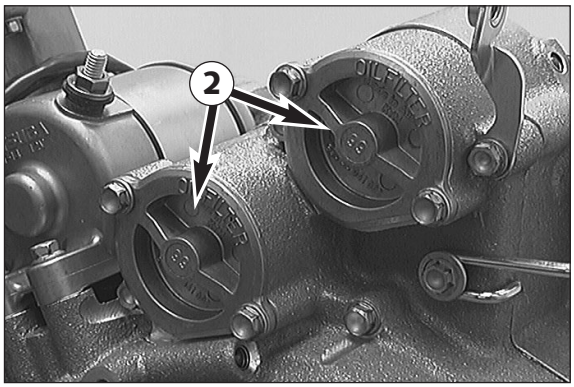
– Oil the spacer bushing ❺ and slip it onto the countershaft with the recess for the O-ring facing inward.
– Slide the sprocket on with the high collar facing inward.
– Degrease the thread of the collar screw, coat it with Loctite 243 and mount it together with the spring retainer, tighten to 60 Nm/45 ft.lb.

NOTE: To tighten the screw, shift into 1st gear with the crankshaft being blocked.



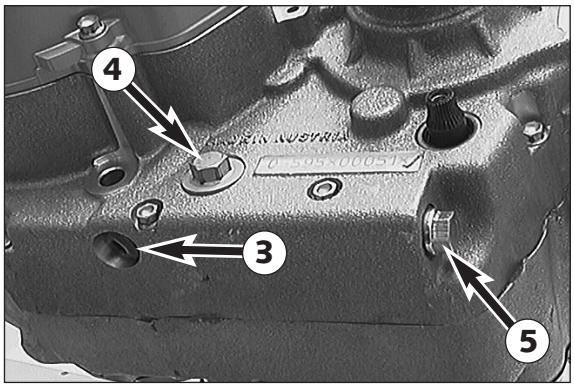
Mounting the oil filters

– Fill the oil filter housing with engine oil to approx. 1/4 of its capacity.
– Insert both oil filters ❶ into the engine casing.



– Oil the O-rings at the oil filter cover and secure the oil filter cover ❷ by means of the 4 bolts (M5x16), tighten to 6 Nm/5 ft.lb..

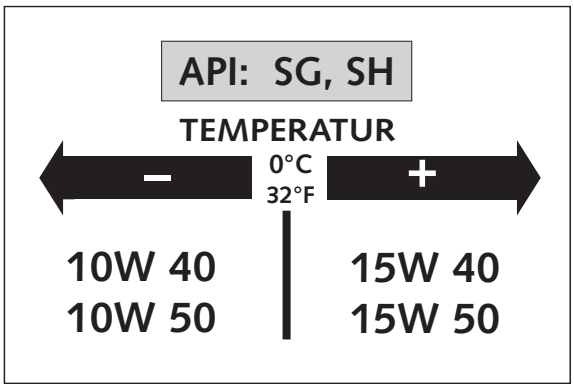
– Mount kickstart and shift lever.



How to fill in engine oil

– Mount the plugs ❸ and ❹ and the oil drain plug ❺ and tighten them.

NOTE: Tightening torque ❸ 10 Nm/0.4 ft.lb, ❹ 15 Nm/0.6 ft.lb and ❺ 20 Nm/0.78 ft.lb.



– Remove the oil dipstick at the clutch cover and fill in 1.20 liter of synthetic 10W-50 engine oil (e.g. Motorex Power Synt. 4T).
– Reattach the plug and check the engine for leaks.

NOTE: The engine oil level must be checked once more after the engine has been mounted on the vehicle.

! CAUTION !

– USE ONLY BRAND SYNTHETIC OILS MEETING OR SURPASSING THE QUALITY REQUIREMENTS OF API CLASSES SG OR SH (SPECIFICATIONS ON THE CONTAINER).
– INSUFFICIENT AMOUNTS OR LOW-GRADE ENGINE OIL WILL LEAD TO PREMATURE WEAR IN THE ENGINE.

ELECTRICAL SYSTEM 7

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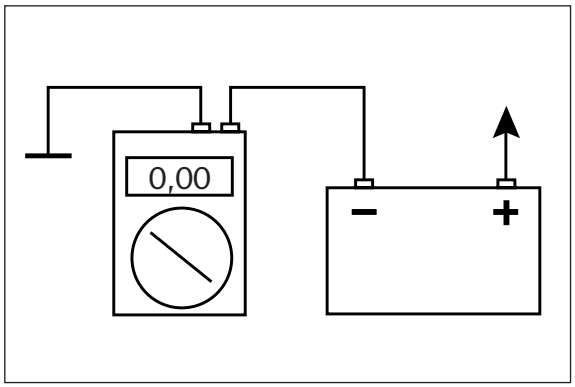


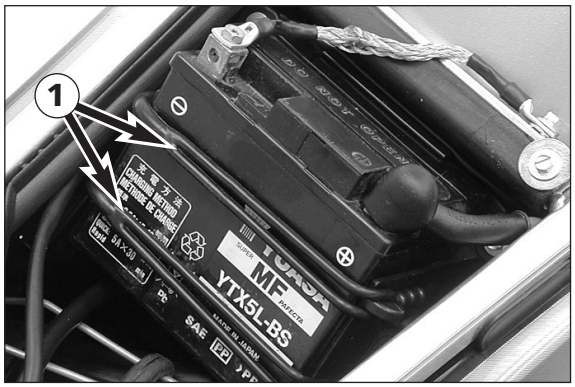
Leakage inspection

The drop test must be performed before checking the voltage regulator/rectifier

– Turn off the ignition and disconnect the ground wire from the battery.
– Insert an amperemeter between the ground wire and the negative pole of the battery.

Setpoint value: max. 1 mA

– Check for power consumers, should the measured value exceed the indicated maximum value.
  Example:
- defective voltage regulator-rectifier
- defective capacitor
- leak currents in the socket connectors, in the ignition lock or in the starter relay.

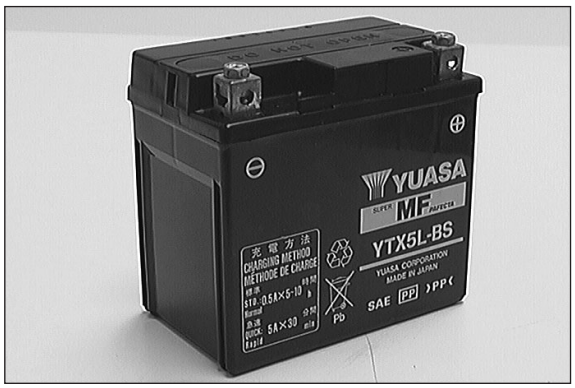


Removing the battery

– Remove the seat.
– Disconnect first the negative and then the positive pole of the battery.
– Unhitch the two rubber fixtures ❶ and lift the battery out of the battery holder.
– When reinstalling the battery, connect the negative pole last.

! CAUTION !

THE BATTERY POLES MUST FACE THE FRONT, OTHERWISE ACID MAY ESCAPE.



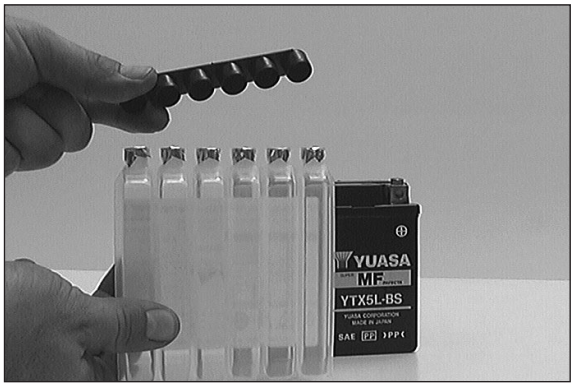
Charging the battery

– Remove the battery and check the charging level. Use a voltmeter to measure the voltage between the battery poles (off-load voltage).
– Accurate results can only be obtained if the battery has neither been charged nor discharged during a period of 30 minutes preceding the measuring.
– If the battery is empty, it can be recharged for a maximum period of 10 hours at 0.5 A and a maximum of 14.4 V.

! CAUTION !

– TO AVOID DAMAGE, DO NOT REMOVE THE LOCKING BAR
– ALWAYS CONNECT THE BATTERY TO THE CHARGING UNIT BEFORE TURNING THE CHARGING UNIT ON.
– WHEN RECHARGING THE BATTERY IN CLOSED ROOMS PROVIDE SUFFICIENT VENTILATION. EXPLOSIVE GASES ARE RELEASED DURING THE BATTERY CHARGING PROCESS.
– CHARGING TIME AND CHARGING VOLTAGE SHOULD NOT EXCEED THE STATED VALUES. OTHERWISE ELECTROLYTE WILL BE RELEASED THROUGH THE SAFETY VALVES.
– AVOID QUICK CHARGING IF POSSIBLE.

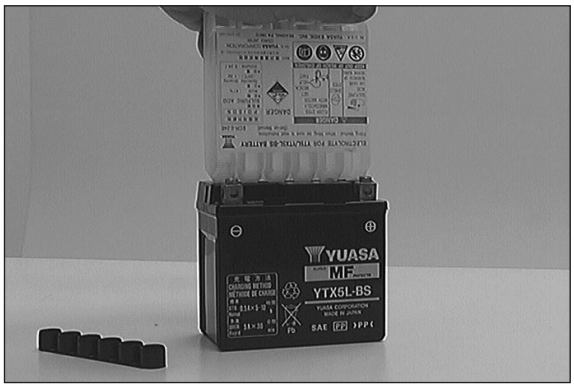
off-load voltage Volt	charging level %	charging time 0.5 A	charging voltage
>12.7	100	—	max. 14.4 V
~12.5	75	4 h	
~12.2	50	7 h	
~12.0	25	11 h	
~11.8	0	14 h	



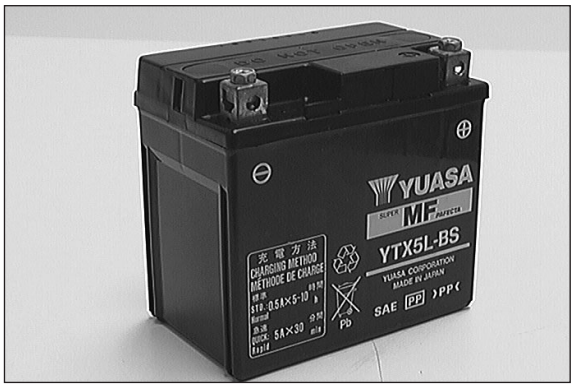
Filling the battery

– Take the battery and the electrolyte container out of the packaging. Before you start filling the battery, please read the enclosed instructions carefully.

– Take the cover off the electrolyte container.
– Apply the electrolyte container to the filling apertures of the battery and push it down tight.



– Once all chambers of the electrolyte container are empty, withdraw it from the battery.



– Close the filling apertures tightly by means of the cover.

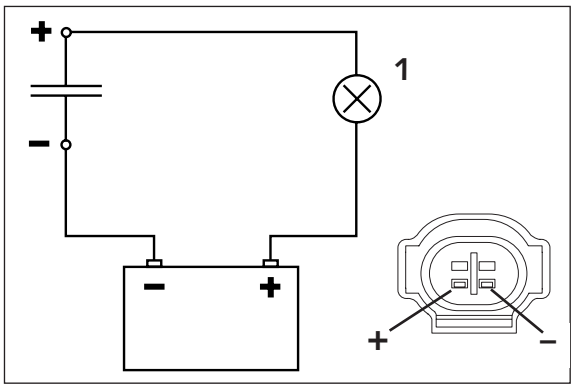
NOTE: After filling, let the battery sit for at least another 30 minutes without charging or loading it.

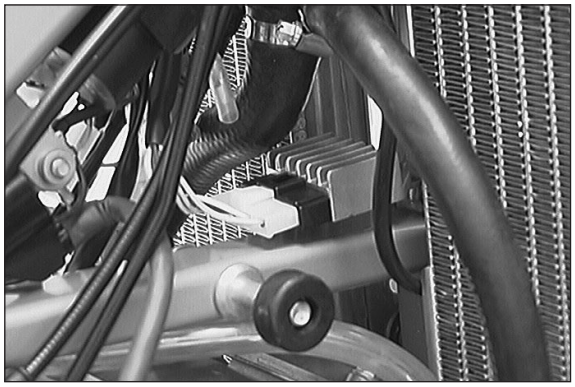
! CAUTION !

FOLLOW THE INSTRUCTIONS OF THE MANUFACTURER WHEN FILLING A NEW BATTERY. THE RELEVANT SAFETY INSTRUCTIONS ARE ALSO CONTAINED IN THE USER MANUAL SUPPLIED WITH THE BATTERY. FAILURE TO OBSERVE THESE INSTRUCTIONS CAN RESULT IN SEVERE INJURIES.

Checking the capacitor

– Discharge the capacitor by bridging the two connections with a cable bridge and dismount it.
– Connect the negative pole of a 12V battery with the negative terminal of the capacitor. The connection between the positive pole of the battery and the positive terminal of the capacitor is made with a test lamp ❶.
– When the power circuit is closed, the test lamp must light up briefly and return to its dark state after 1 second at the latest.
– If the test lamp does not go out or does not light up at all, the capacitor is faulty.





Checking the voltage regulator-rectifier

A defect voltage regulator can cause different kinds of trouble:

- No voltage in the circuit
  In this case, the voltage regulator must be disconnected at idle speed. The voltage regulator is defect if the power consumers now work properly.
  If the power consumers are still not supplied with power, the switch, the wiring harness or the ignition system must be checked for defects.
- Excessive voltage in the circuit
  The bulbs burn out. In this case the voltage regulator must be replaced.

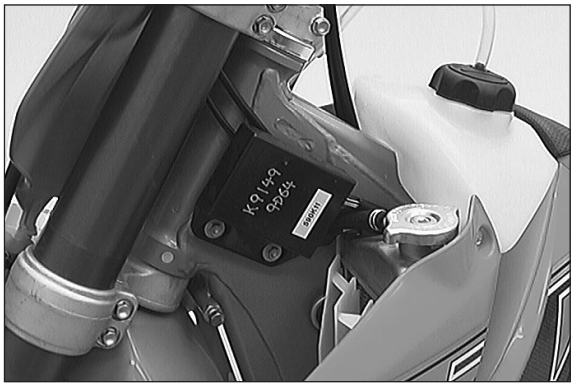
Checking the charging voltage

NOTE: The values stated below only apply to fully charged batteries (minimum charging level 90%).

– Start the engine and switch on the low beam.
– Connect a voltmeter to both battery connections.
– Accelerate the engine to a speed of 5000 rpm and read the voltage.

Nominal value: 14.0 - 15.0 V

In the case of a significant deviation from the nominal value:
– Check the connector between the stator and the voltage regulator-rectifier and the connector between the voltage regulator-rectifier and the cable tree.
– Check the stator.
– Replace the voltage regulator-rectifier.

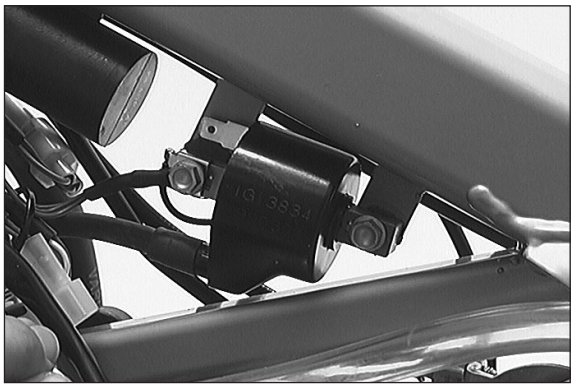


CDI unit

Check the cables and plug and socket connections of the CDI unit.
The CDI unit function can only be checked on an ignition test bench.

! CAUTION !

NEVER USE A COMMERCIAL MEASURING DEVICE TO CHECK THE CDI UNIT. COMMERCIAL MEASURING DEVICES CAN DESTROY HIGHLY SENSITIVE ELECTRONIC COMPONENTS.



Ignition coil

– Disconnect all cables and remove the spark plug connector.
– Use an ohmmeter to measure the following values.

NOTE: The indicated setpoint values correspond to a temperature of 20° C.
Replace the ignition coil if the measured values deviate significantly from the setpoint values.

Measure	Cable colours	Resistance
primary coil	blue/white – ground	0.30 Ω ±15%
secondary coil	blue/white – ignition wire	6.30 kΩ ±20%

Troubleshooting in the ignition system

Before checking the ignition system check:

- if the emergency off switch is switched on
- if the battery is charged
- the main fuse

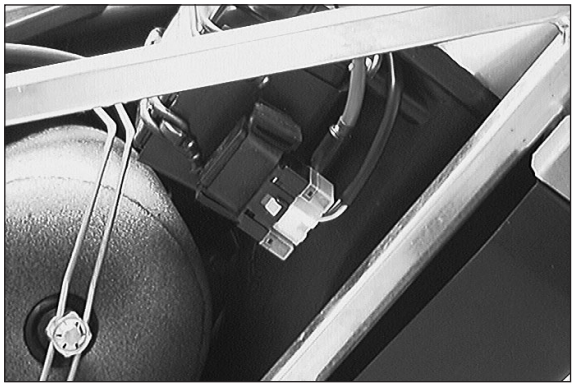
Check if an ignition spark is produced when the starter is operated. Proceed as follows:
– Pull off the spark plug connector.
– Disconnect the spark plug connector from the ignition cable.
– Hold the free end of the ignition cable approximately 5 mm (0.1968 in) from the ground.
– A strong spark should be visible when the electric starter is operated. If the battery level is low, turn off the light, and use the kick starter.

– If a spark is visible, replace the spark plug connector.
– Twist out the spark plug and insert it into the spark plug connector.
– Connect the spark plug to the ground. A strong spark should be visible at the electrode when the electric starter is operated. If this is not the case, the spark plug connector or the spark plug is defective.

– If no spark is produced during the first test, perform the following checks:
- emergency off switch and
- corresponding parts of the cable tree

– If the ignition is sufficiently supplied with power and no spark is produced, check:
- the ground connection of CDI unit and ignition coil
- the cable between the CDI unit and 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 replaced. It can only be tested on an ignition test bench.



Main fuse

NOTE: The fuse ❶ is positioned in the starter relay of the E-starter underneath the left side paneling.

The following loads are connected to it:
– E-starter system
– horn
– flasher lights

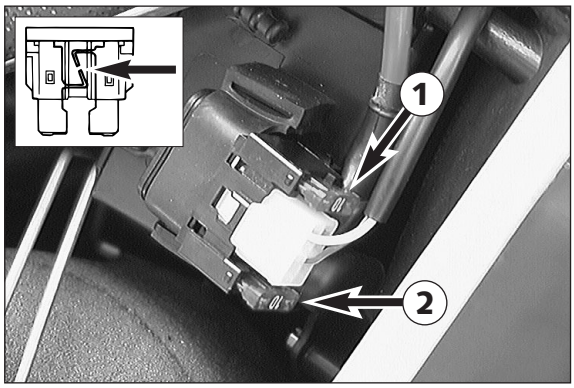
The fuse ❷ serves as a spare fuse.

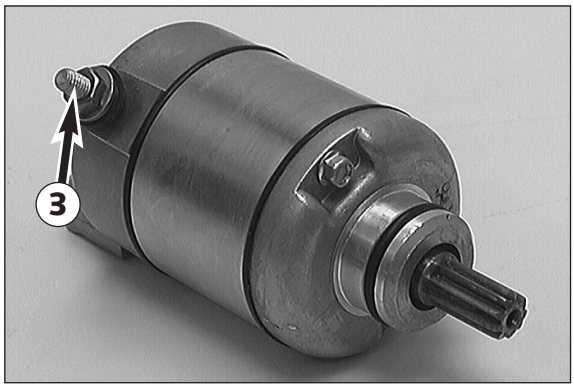
– To replace it, remove the left trim panel and pull the cover off the start relay.
– Pull out the fuse and replace it with a new one.

! CAUTION !

NEVER INSERT A STRONGER FUSE OR "MEND" THE FUSE. IMPROPER HANDLING MAY DESTROY THE ENTIRE ELECTRIC SYSTEM!

– In case you use the spare fuse to replace the installed one while using your motorcycle, you should remember to replace it as soon as possible.



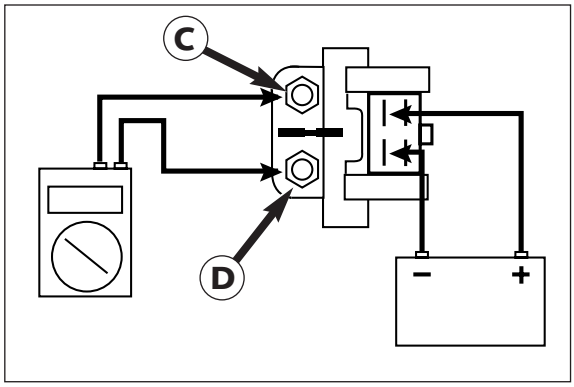


Checking the electric starter motor

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

Checking the starter relay

– Remove the seat and the left side cover and disconnect the combination connector of the starter relay.
– Disconnect the negative terminal at the battery and the two cables at the starter relay.



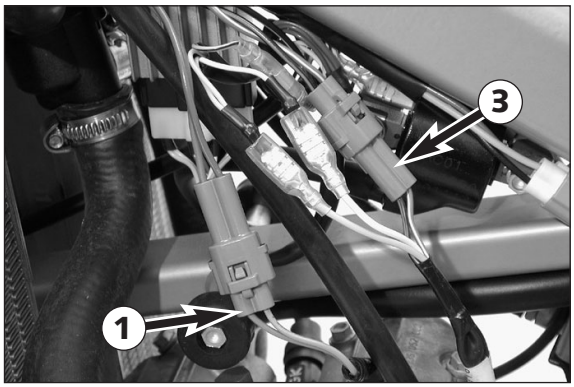
– Connect the starter relay to a 12 V battery as indicated in the diagram.
– Check continuity between terminals ❻ and ❹ using an ohmmeter.

Reading: 0 Ω OK
Reading: ∞ Ω defective

NOTE: The response of the starter relay is accompanied by a faint clicking sound.

STATIC IGNITION VALUES 250-525 SX, MXC, EXC RACING (KOKUSAN 4K-3A, B)

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**
- **the gap between the rotor and pulse generator must be set to 0.75 mm**
- **compression release lever pulled**
- **kick the kick starter forcefully at least 5 times for each measurement**



Check the **pulse generator** for an output signal – two-pin connector ❶ with green and red cable colors (also see circuit diagram on opposite page):

– Apply the red measuring lead of the peak voltage adapter to the green cable and the black measuring lead to the red cable, disconnect connector ❶ to disconnect the CDI unit ❷

Multimeter display: 4.5 volts +/- 0.5 volt

– Same measurement with CDI unit connected

Multimeter display: 3 volts +/- 0.5 volt

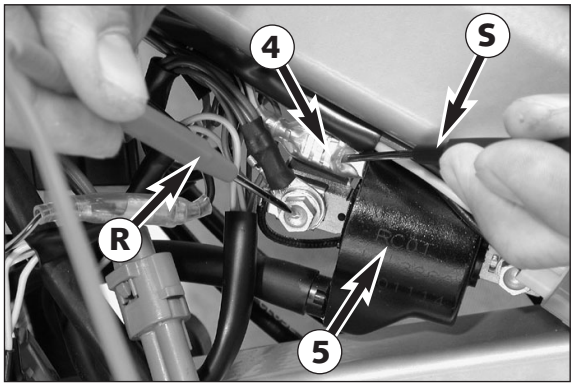
Check the **generator charging coil** for ignition capacitor charge – two-pin connector ❸ with black/red and red/white cable colors (also see circuit diagram on opposite page):

– Apply the red measuring lead of the peak voltage adapter to the black/red cable and the black measuring lead to the red/white cable, disconnect connector ❸ to disconnect the CDI unit ❷

Multimeter display: 30 volts (35 volts for 400 SX) +/- 5 volts

– Same measurement with connectors CDI unit connected

Multimeter display: 200 volts +/- 10 volts

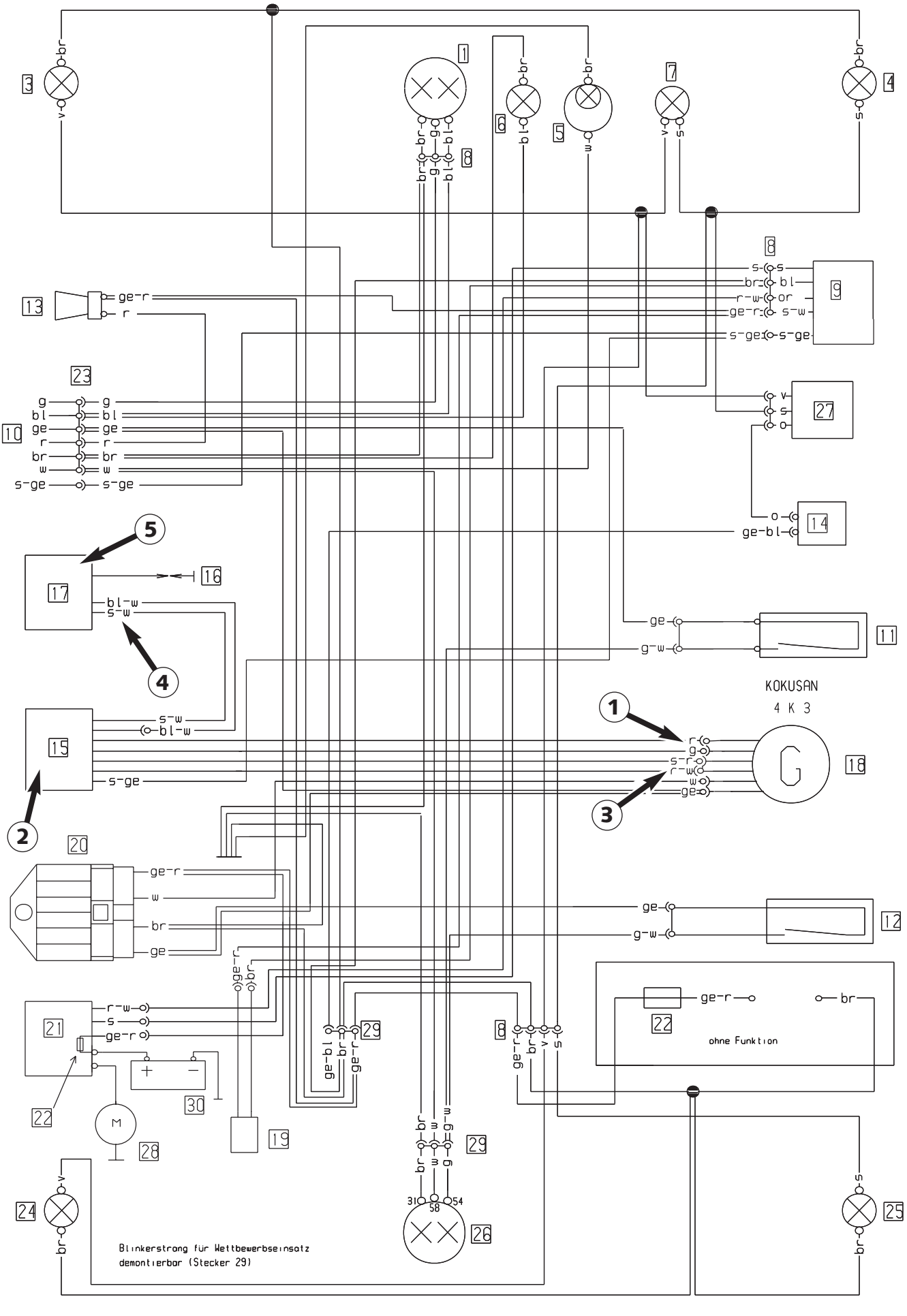


Check the **primary voltage output** ❹ for ignition coil control (also see circuit diagram on opposite page) for output voltage (blue/white cable color):

– Apply the red measuring lead Ⓡ of the peak voltage adapter to the black/white cable (ground) and the black measuring lead Ⓢ to the blue/white cable, CDI unit ❷ and ignition coil ❺ connected

Multimeter display: 200 volts +/- 10 volts

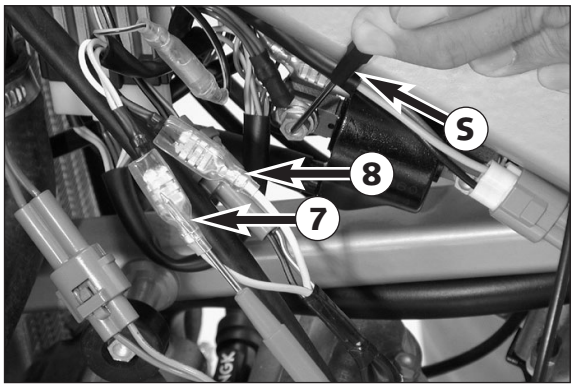
KTM SPORTMOTORCYCLES SERVICE	Modell	Kabelstrangnummer	Land	Datum, Name
	250/400/520 EXC RACING	vorne 590 11 075 200 hinten 503 14 040 100 Blinker vorne 503 11 080 100 Blinker hinten 503 11 081 000	Europa	11 10 1999 Hasl



Art.-No. 3206007 -E

STATIC GENERATOR VALUES 250-525 MXC, EXC RACING (KOKUSAN 4K-3B)

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 (also see circuit diagram on opposite page) for voltage between the following cable colors:

– between yellow and brown (ground), connector ❼ disconnected
Multimeter display: 15 volts +/- 1 volt

– same measurement with connector ❼ connected

Multimeter display: 12 volts +/- 1 volt

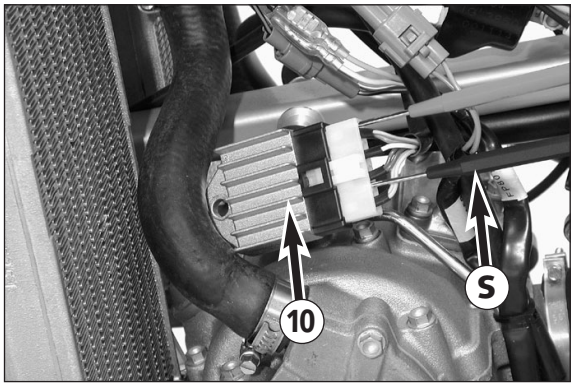
– between white and brown (ground), connector ❽ disconnected

Multimeter display: 19 volts +/- 1 volt

– same measurement with connector ❽ connected

Multimeter display: 14 volts +/- 1 volt

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



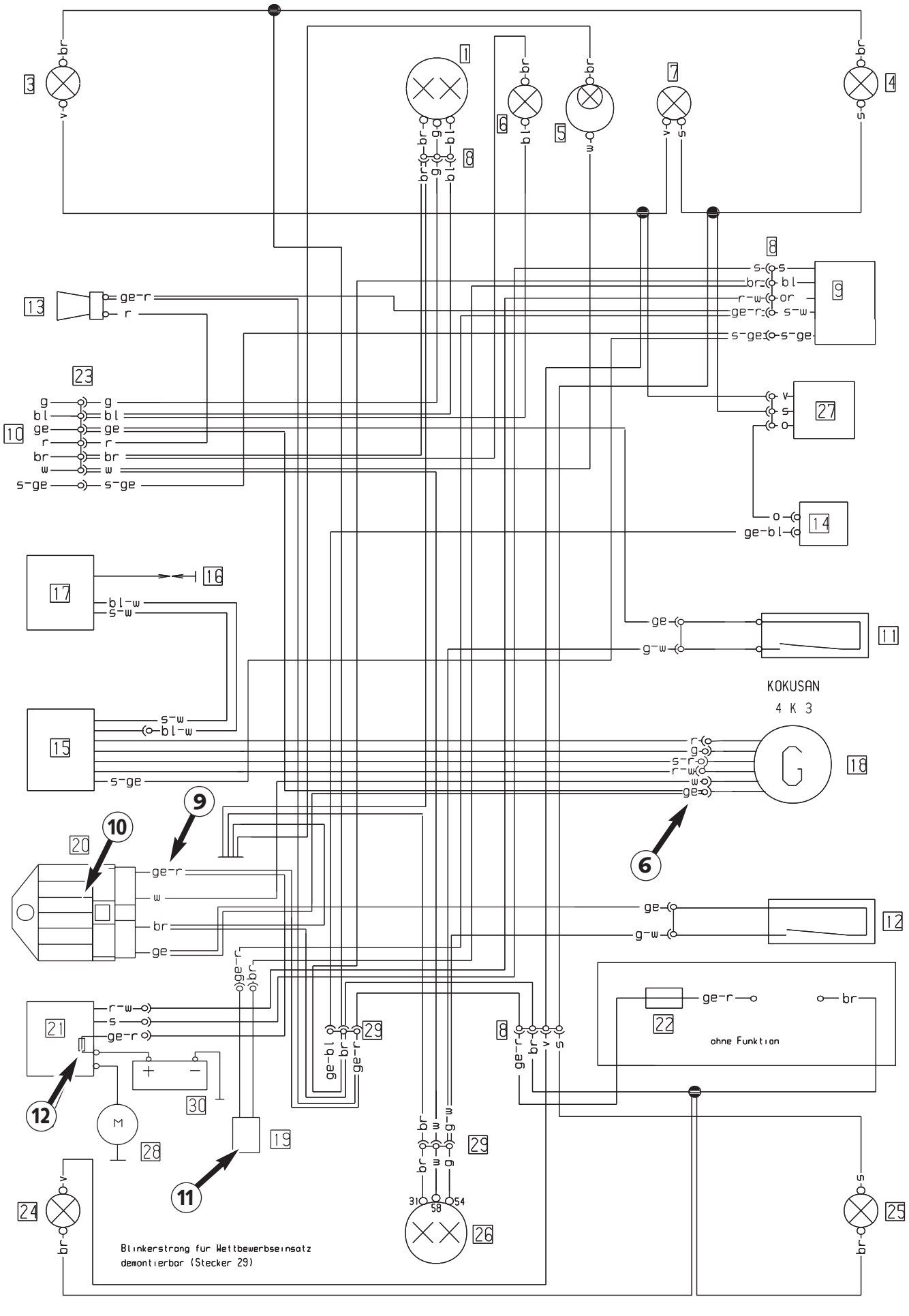
Check **regulator rectifier output voltage** ❾ (also see circuit diagram on opposite page) cable colors yellow/red, regulator rectifier ❿ connected, capacitor ⓫ disconnected (if installed) and fuse ⓬ removed:

– between yellow/red and brown (ground)

Multimeter display: 14 volts +/- 1 volt

NOTE:
– the black measuring lead ❾ of the peak voltage adapter must be applied to the ground.
– for facilitation of work, the regulator rectifier ❿ can be detached from the frame.

KTM SPORTMOTORCYCLES SERVICE	Modell	Kabelstrangnummer	Land	Datum, Name
	250/400/520 EXC RACING	vorne 590 11 075 200 hinten 503 14 040 100 Blinker vorne 503 11 080 100 Blinker hinten 503 11 081 000	Europa	11 10 1999 Hasl



Art.-No. 3206007 -E

DYNAMIC GENERATOR VALUES 250-525 MXC, EXC RACING (KOKUSAN 4K-3B)

Measuring conditions:
- **remove seat, side trim and left side cover**
- **all connectors and the ground connection in a non-corroding condition, connectors tightly connected**
- **battery in a startable condition, not fully loaded (start several times for fully loaded battery)**
- **start engine, the measurement must be taken right after starting**

Regulator rectifier output – measure the voltage with the measuring leads of the peak voltage adapter directly on the poles of the vehicle battery:

– Unstressed (no electric consumer switched on), engine running at idle speed (1400 +/-50 rpm)

Multimeter display: 14 volts +/- 1 volt

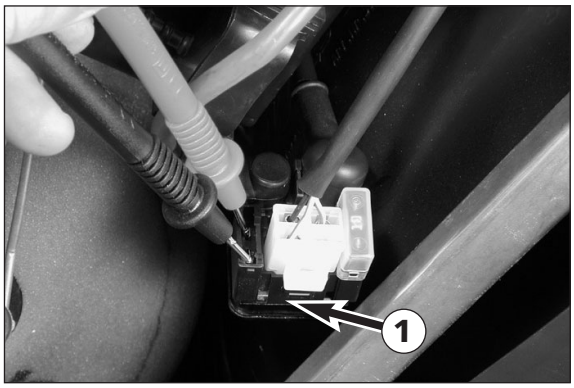
– Stressed (light switched on, horn and brake actuated), engine running at idle speed

Multimeter display: 12 volts +/- 1 volt

– Stressed (light switched on, horn and brake actuated), engine running at increasing speed (up to 8000 rpm)

Multimeter display: 13 volts +/- 1 volt

NOTE: the black measuring lead on the peak voltage adapter should be applied to the ground (negative terminal).



Check the **charge current** – remove main fuse, apply the multimeter measuring leads (without the peak voltage adapter) to both connectors on the fuse carrier ❶ and measure the current (set the multimeter DCA to 10 amperes):

– Unstressed (no electric consumer switched on), engine running at idle speed

Multimeter display: 1.3 amperes +/- 0.1 ampere

– Stressed (light switched on, horn and brake actuated), engine running at idle speed

Multimeter display: -0.6 amperes +/- 0.1 ampere

– Stressed (light switched on, horn and brake actuated), engine running at increasing speed

Multimeter display: 0.0 amperes +/- 0.1 ampere

FUEL SYSTEM 8

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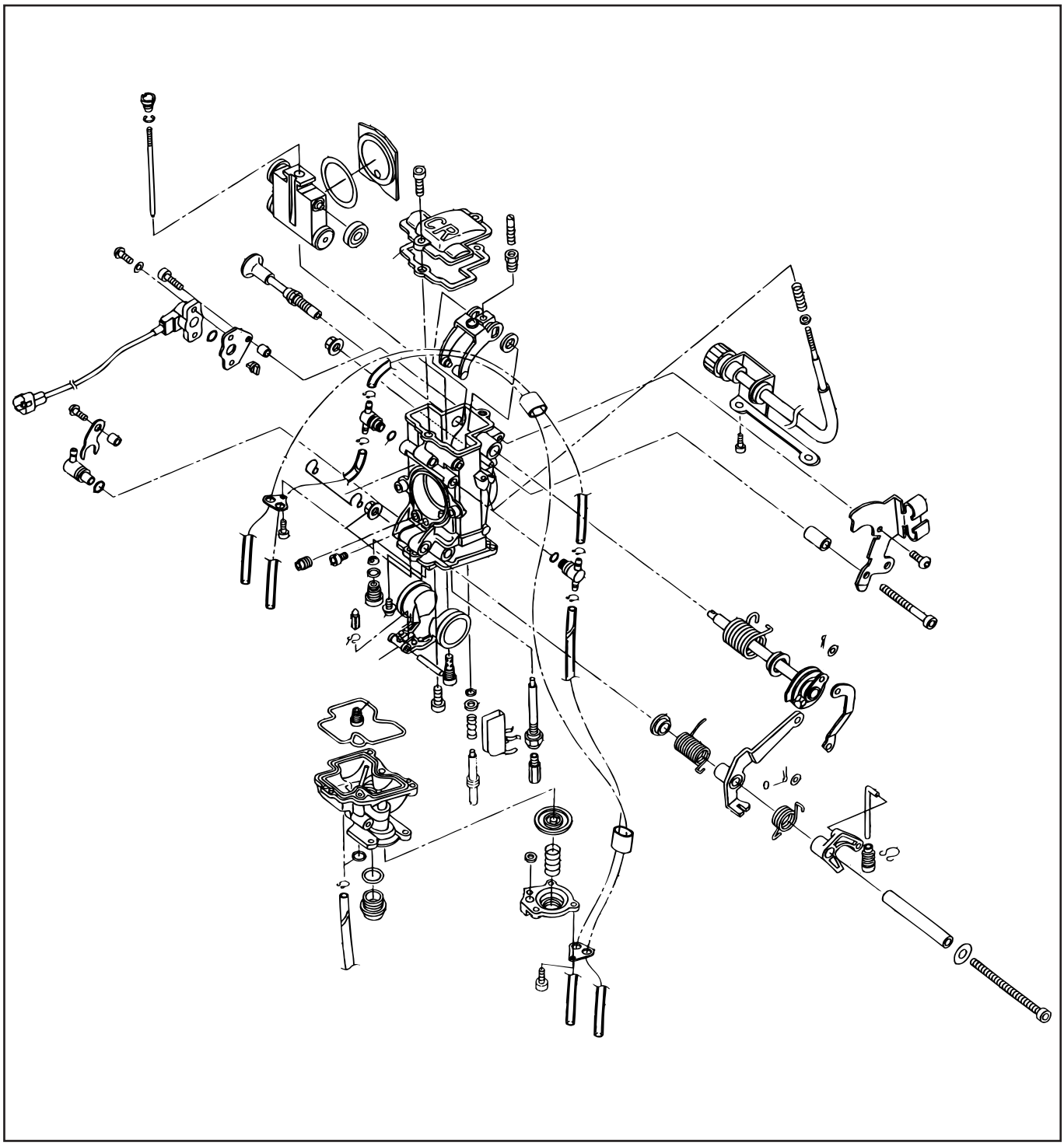
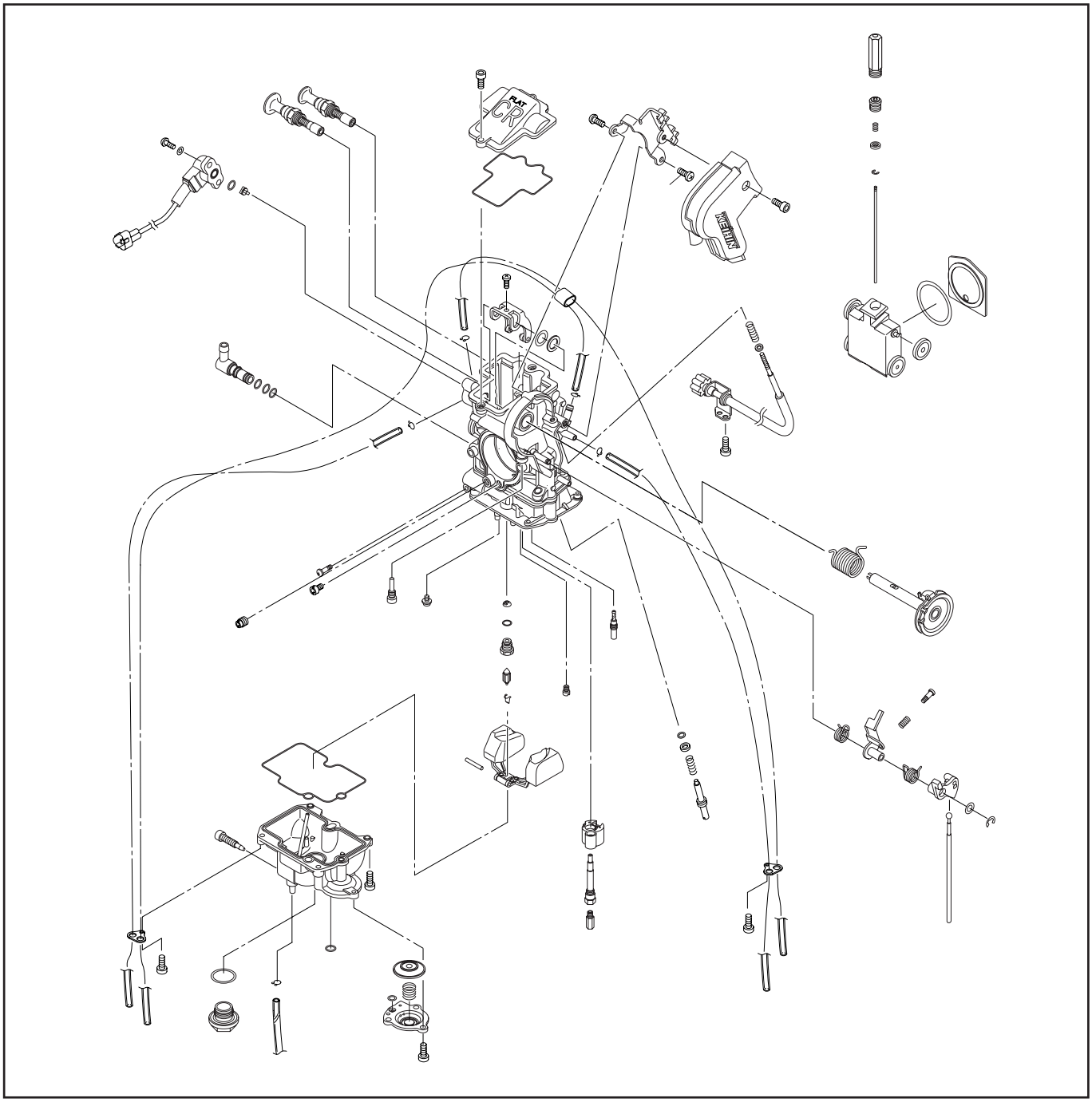
Art.-No. 3206007 -E

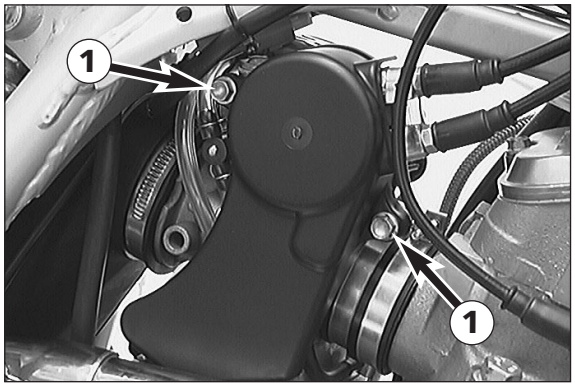
CARBURETOR - KEIHIN FCR 35 / 39



NOTE: the Keihin FCR 39 carburetor (400/520 Racing) has a larger air trumpet and a different carburetor jets than the Keihin 35 carburetor (250 Racing). The FCR 39 carburetor is also equipped with a throttle sensor.

CARBURETOR - KEIHIN FCR-MX 37 / 39 / 41

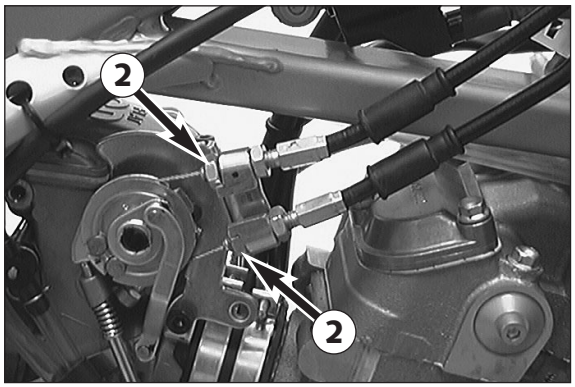




Dismounting and installing the carburetor

NOTE: Before you start working on the carburetor, you should clean the motorcycle thoroughly.

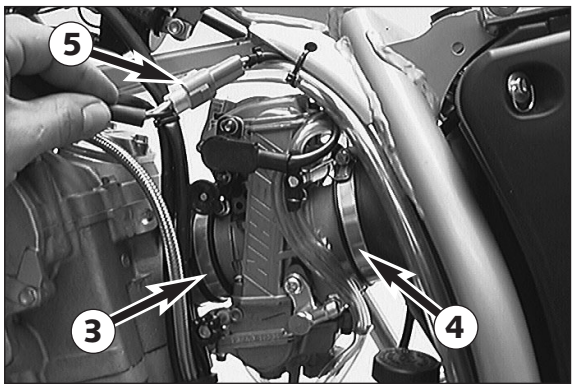
– Dismount the seat and the tank with spoilers.
– Unfasten the 2 bolts ❶ and remove the cover.



– Unfasten the 2 nuts ❷ and unhitch both throttle cables at the carburetor.

– Loosen the plug at the float chamber and drain the fuel into a suitable receptacle. Then, retighten the plug.
– Disconnect the plug-and-socket connection of the throttle valve sensor.

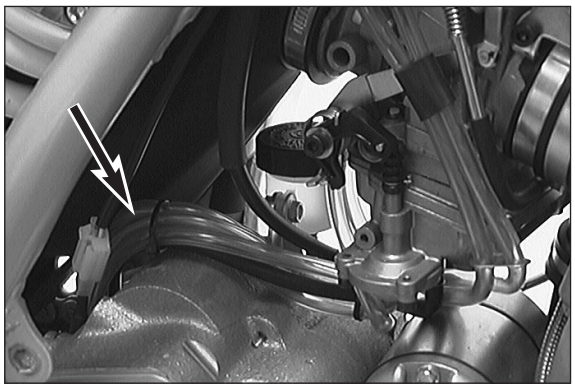
– Loosen the 2 hose clamps ❸ + ❹ and pull the carburetor out of the connection boot.



– To install the carburetor, insert it into the connection boot and secure it with the 2 hose clamps. Make sure that the carburetor is installed vertically in relation to the vehicle.

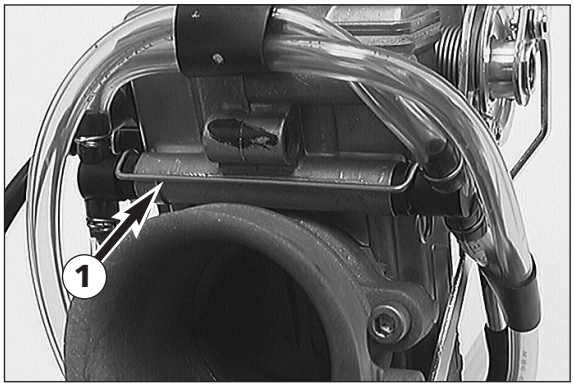
– Mount and adjust both throttle cables and check whether the throttle grip moves smoothly.

– Connect the plug ❺ of the throttle-valve sensor.
– Mount the tank and the seat.



– Place the carburetor ventilation hoses correctly.

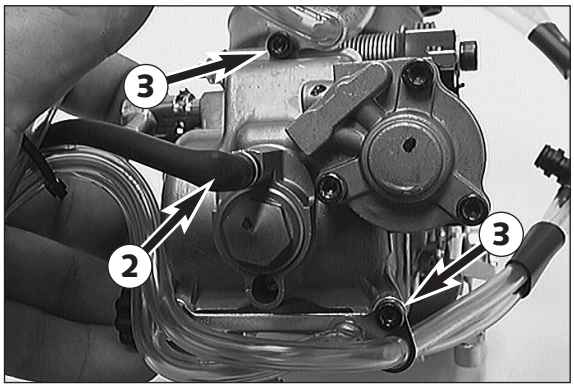
– Start the engine and check the carburetor for proper functioning. Turn the handlebars all the way to the left and right. While doing so, the engine speed must not change. Otherwise, check if the throttle cables were placed correctly.



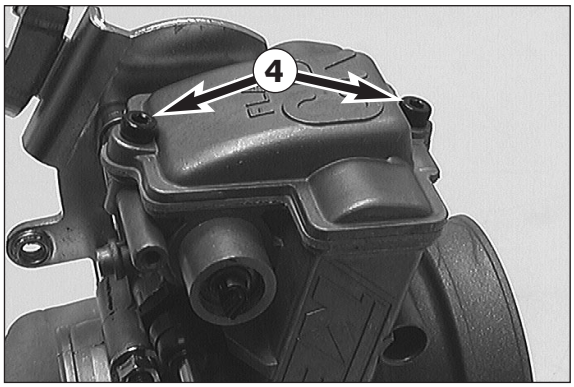
Disassembling the carburetor FCR 35/39

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.

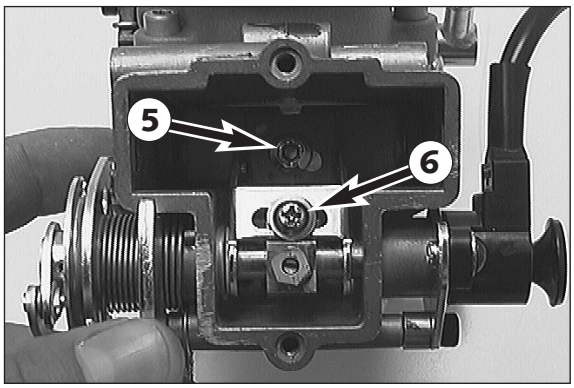
– Dismount the carburetor and remove any coarse dirt.



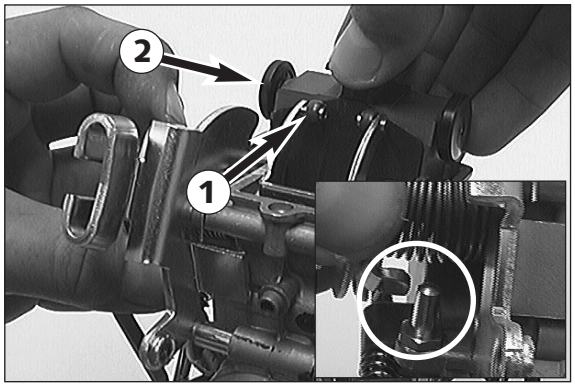
– Remove the wire clip ❶ and pull the ventilation hoses out of the carburetor.
– Disconnect the hose ❷.
– Loosen the 2 bolts ❸ and dismount all ventilation hoses from the carburetor.



– Remove the 2 bolts ❹ and dismount the slide cover together with its gasket.

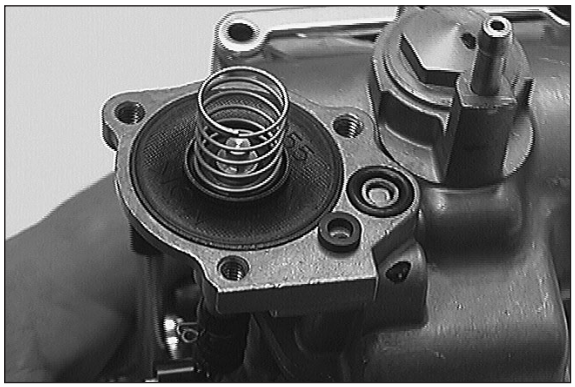


– Remove the bolt ❺ and take the jet needle out of the throttle valve.
– Remove the bolt ❻.



– Now, pull the cable disc approx. 5 mm (0.1968 in) outward and turn it until the throttle valve can be lifted out of the carburetor and detach the rollers ❶ at the throttle valve.
– Take the throttle valve together with the 4 rollers ❷ and the valve paddle out of the carburetor.

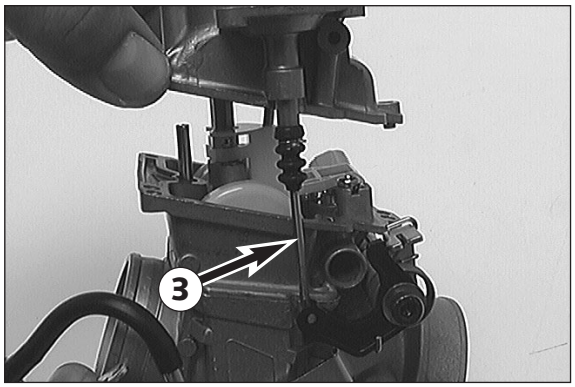
NOTE: When you turn the cable disc, it must not be blocked by the stop screw (see photo). Otherwise, pull the shaft further outward.



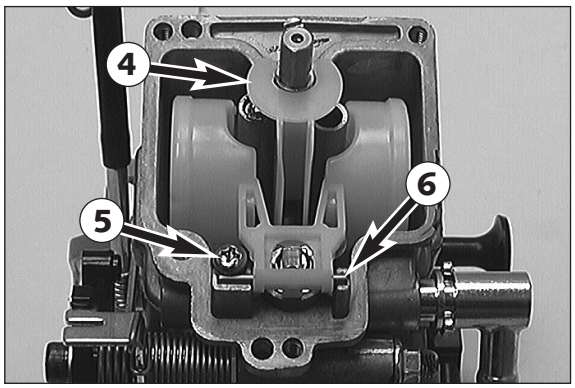
– Turn the carburetor around, remove the 3 screws and remove the cover of the accelerator pump.

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

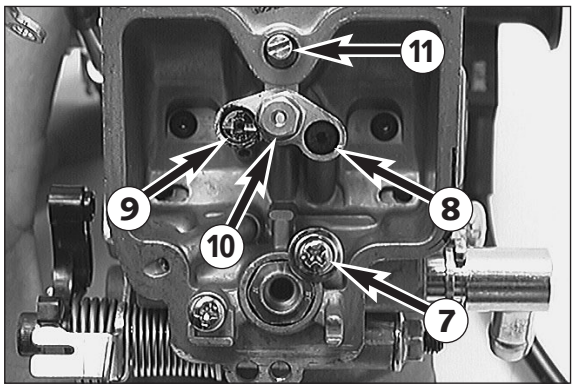
– Remove the 2 sealing rings, the spring and the diaphragm from the pump housing.



– Remove the screw and dismount the float chamber.
– Unhitch the push rod ❸ of the accelerator pump and dismount it.



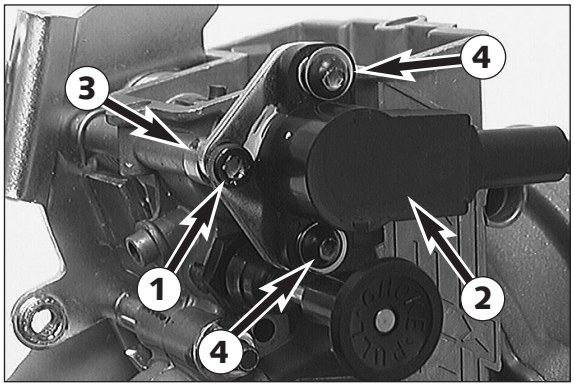
– Take the plastic part ❹ off the needle jet.
– Loosen the screw ❺, pull out the float hinge pin ❻ and dismount the float together with the float needle valve.



– Remove the screw ❼ and use pliers to carefully extract the seat of the float needle valve from the carburetor.
– Turn out the idling jet ❽, the starting jet ❾ and the needle jet together with the main jet ❿.

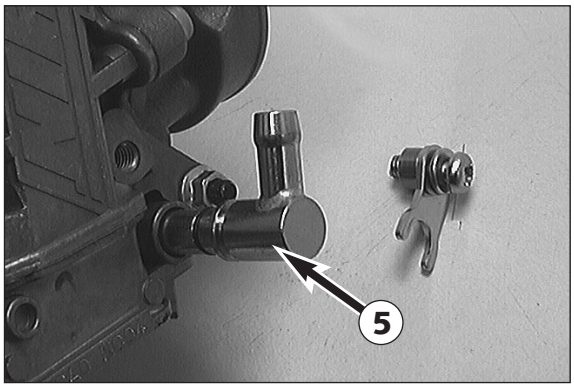
– Turn in the mixture control screw ⓫ down to the stop, count the number of turns and write it down.
– Turn out the mixture control screw and dismount it together with the spring, the washer, and the O-ring.

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.

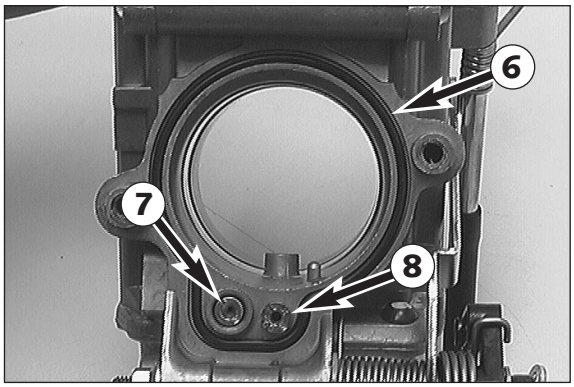


– Remove the screw ❶ and dismount the throttle-valve sensor ❷. When unfastening the screw, be sure to watch out for the bushing ❸.

NOTE: To dismount the throttle-valve sensor, always remove the screw ❶. After the screws ❹ were loosened, the throttle-valve sensor must be adjusted again.



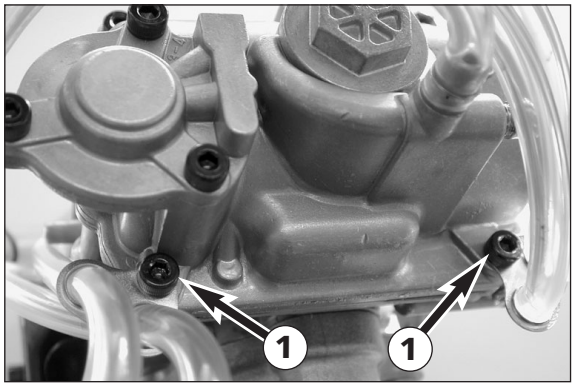
– Remove the screw and the clip together with the bushing and pull the connection piece ❺ out of the carburetor.



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

– 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.

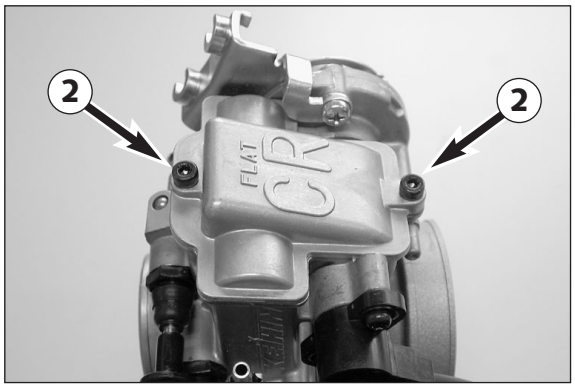


Disassembling the carburetor Keihin FCR - MX 37/39/41

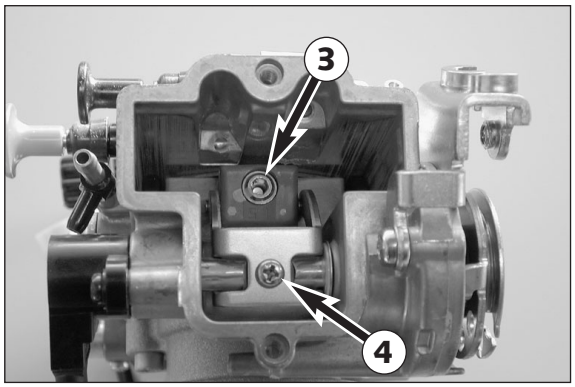
NOTE: Before you start disassembling the carburetor, you should look for a clean workplace. It should offer you enough space to lay out all individual components of the carburetor in perfect order.

– Dismount the carburetor and remove any coarse dirt.

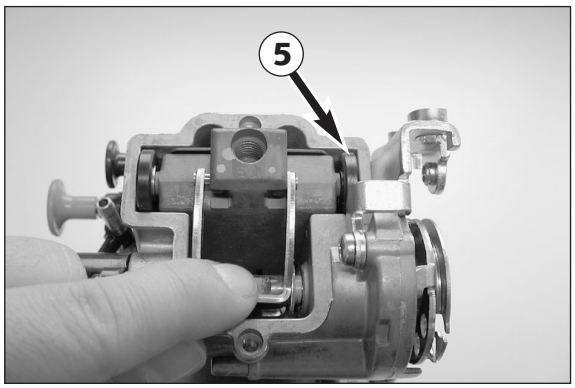
– Loosen both screws ❶ and remove all of the vent hoses from the carburetor.



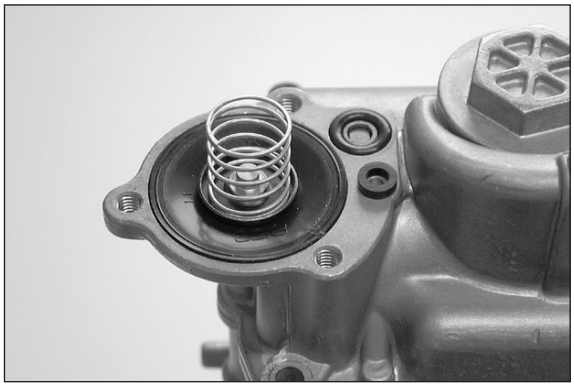
– Remove both screws ❷ and remove the slide cover and gasket from the carburetor.



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



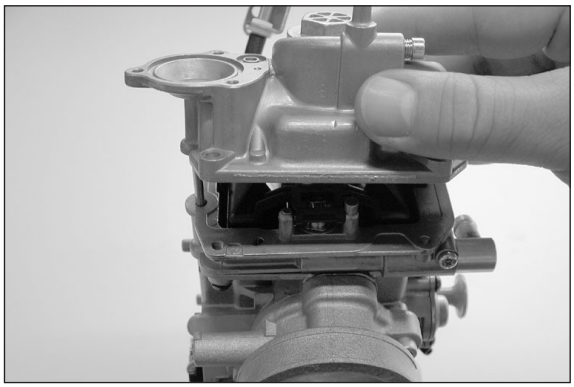
– Pull the throttle slide arm up and take the throttle slide roller ❺ and the slide shim out of the carburetor.



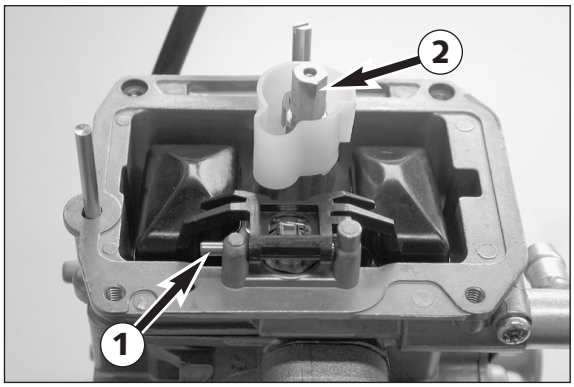
– Turn the carburetor around, remove the 3 screws and remove the cover of the accelerator pump.

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

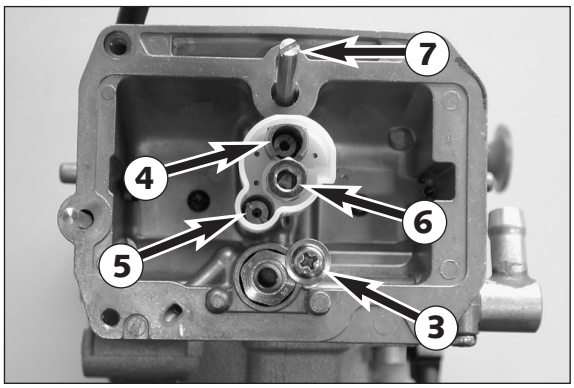
– Remove the 2 sealing rings, the spring and the diaphragm from the pump housing.



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



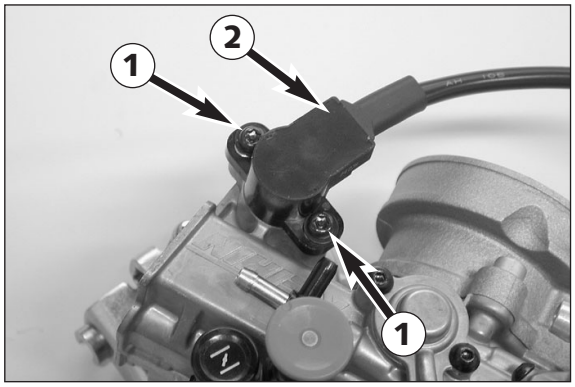
– Pull out the float hinge pin ❶ and remove the float together with the float needle valve.
– Remove the main jet ❷.



– 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.

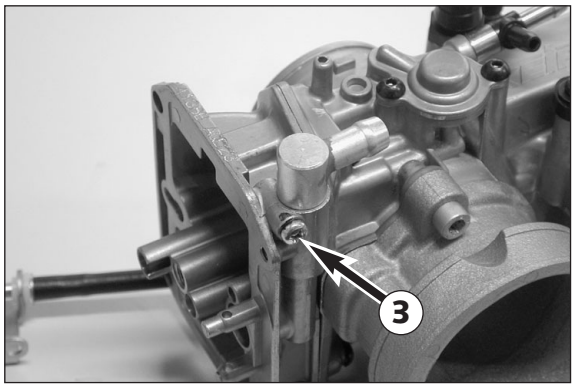
– Turn in the mixture control screw ❼ down to the stop, count the number of turns and write it down.
– Turn out the mixture control screw and dismount it together with the spring, the washer, and the O-ring.

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.

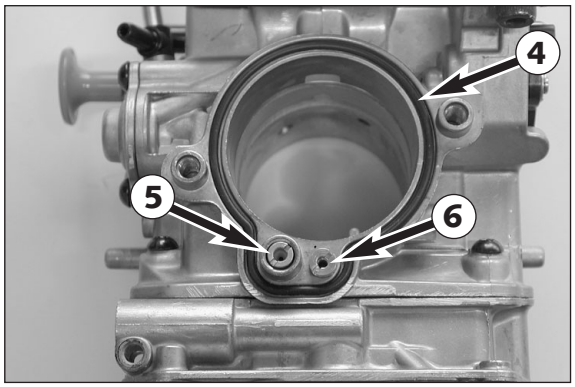


– Remove screws ❶ and the throttle sensor ❷.

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



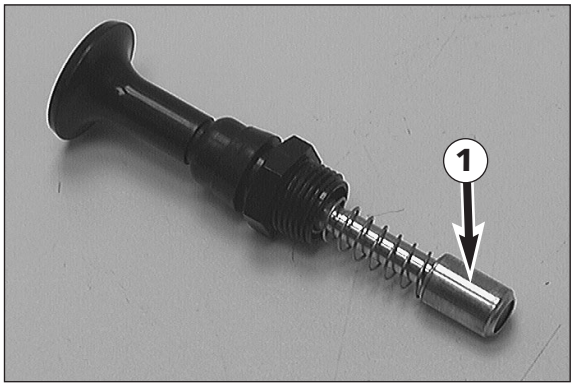
– Remove screw ❸ and pull the connecting piece out of the carburetor.



– 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.

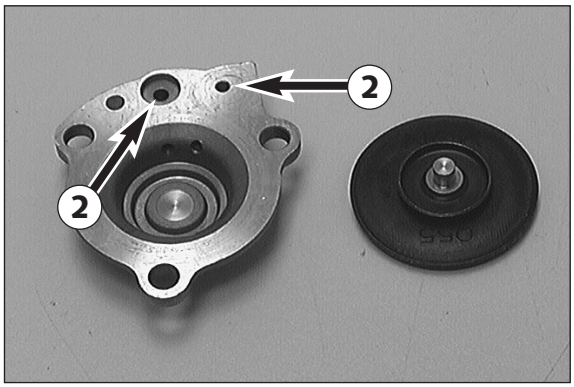
– Check all gaskets for damage and, if necessary, replace them.



Checking the choke slide and hot start knob

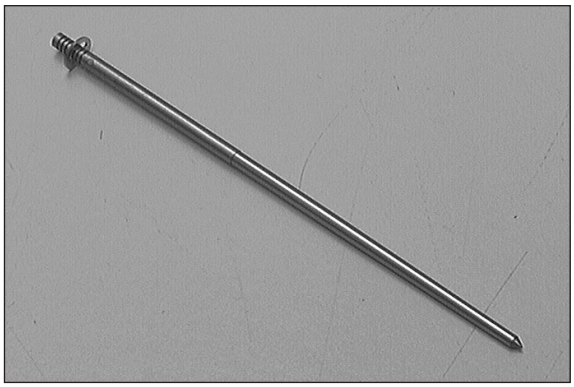
Choke slide:
The choke slide must be easy to actuate .
The piston ❶ of the choke slide must not have any pronounced score marks or deposits.

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



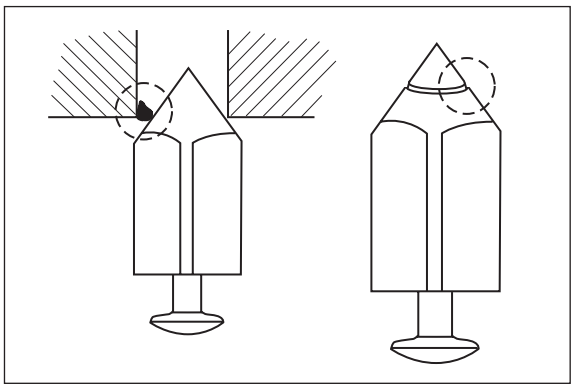
Checking the accelerator pump

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



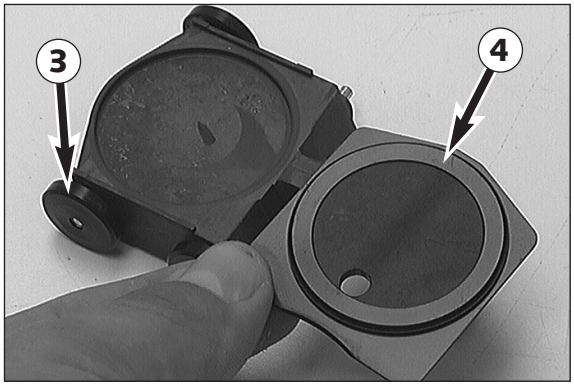
Checking the jet needle

Check the jet needle for bending and wear.



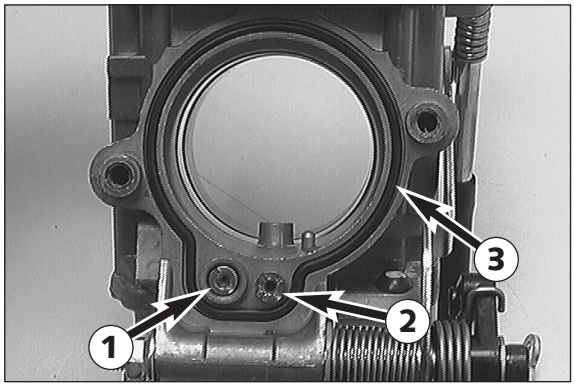
Checking the float needle valve

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



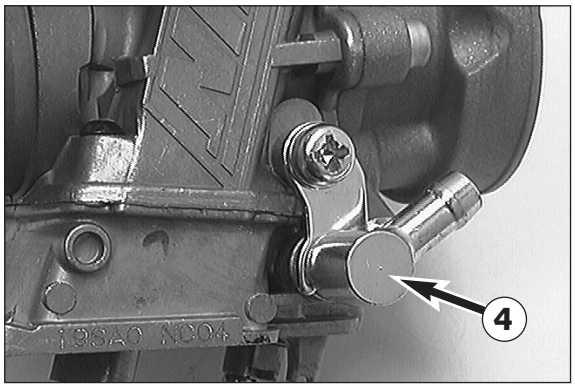
Checking the throttle valve

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.



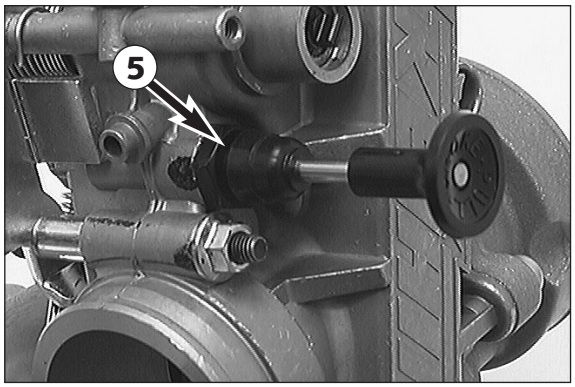
Assembling the carburetor FCR 35/39

– 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.

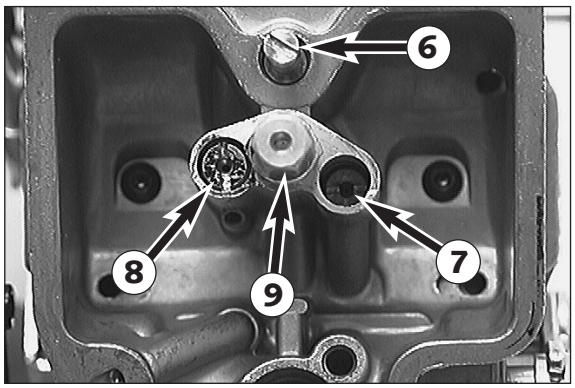


– Insert the fuel connection ❹ into the carburetor and secure it with the clip.

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



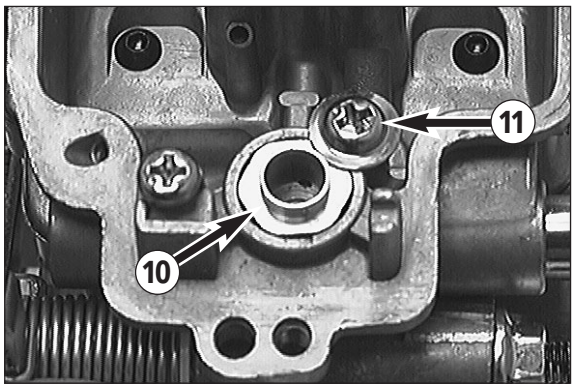
– Mount the choke slide ❺ and actuate it several times, checking whether it can be moved smoothly. In addition, check whether the choke locks properly.



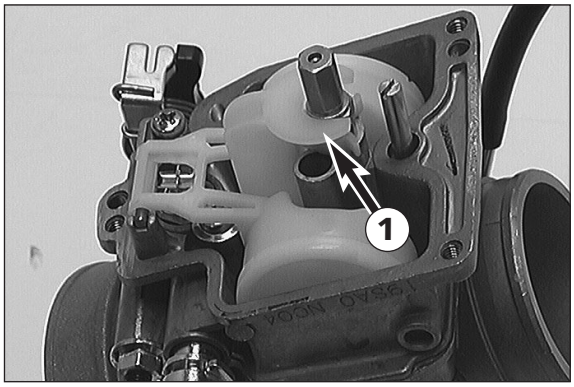
– Thread the spring, the washer and the O-ring onto the mixture control screw ❻ and screw the mixture control screw in as far as it will go.
– Now, unscrew the mixture control screw the number of turns written down during disassembly.

Basic setting: see technical specification

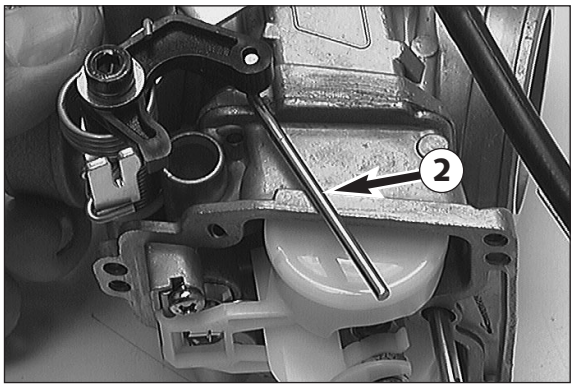
– Mount idling jet ❼, starting jet ❽ and needle jet together with main jet ❾.



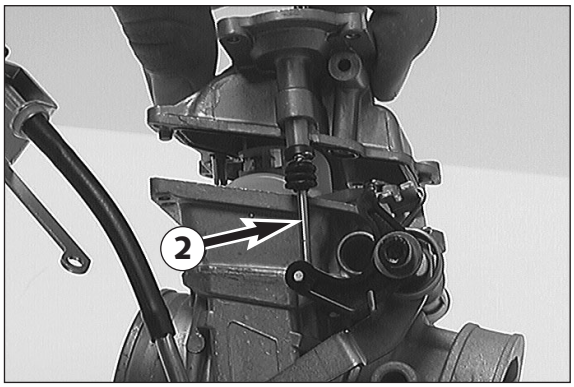
– Insert the needle jet ❿ into bore and secure it by means of the screw ⓫.



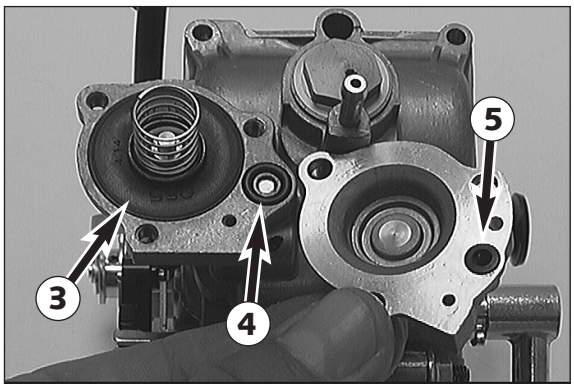
– Position the float, mount the float hinge pin and secure it by means of the screw.
– Check the float level (see page 8-13).
– Stick the plastic component ❶ on the needle jet.



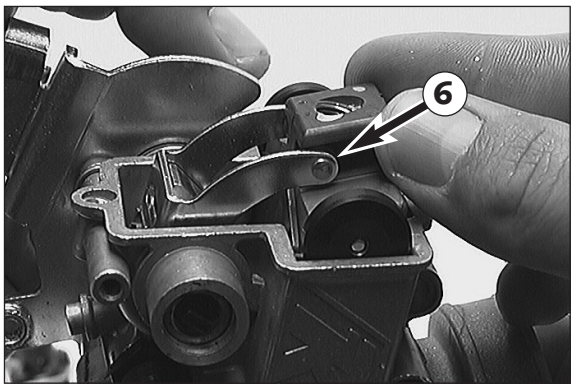
– Engage the push rod ❷ of the accelerator pump at the lever.



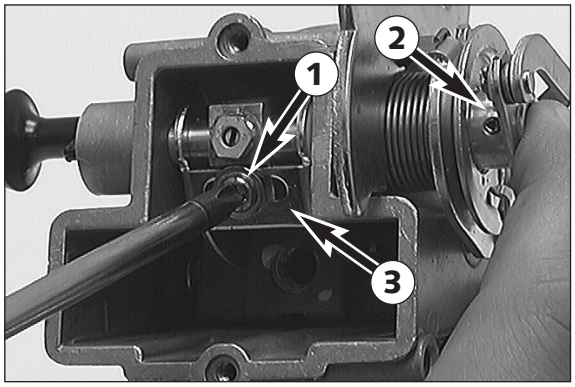
– Mount the float chamber and at first secure it with only 1 screw. When positioning the float chamber, make sure that the push rod ❷ of the accelerator pump slides into the bore.



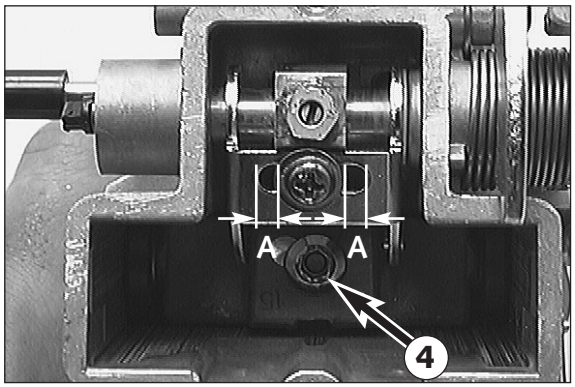
– Place the membrane ❸ with the labeling facing upwards and the spring into the pump housing.
– Place the O-ring ❹ into the groove. Secure the sealing ring ❺ with some grease in the cover and fasten the cover by means of 3 screws.



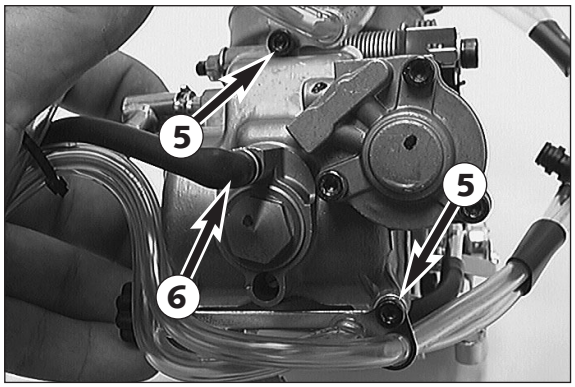
– Turn the cable disc and push the throttle valve into the carburetor such that the rollers ❻ engage the throttle valve (see photo). Push the throttle valve all the way into the carburetor.
– Turn the cable disc several times and while doing so check whether the throttle valve moves smoothly.



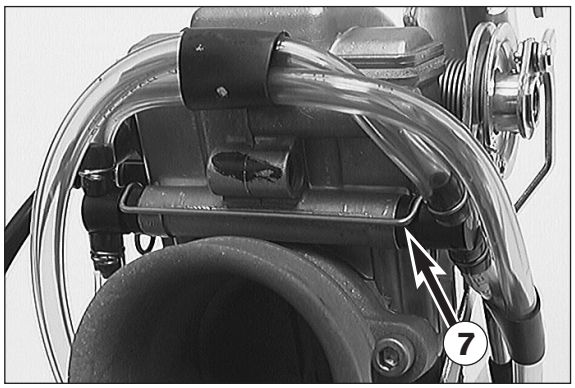
– Coat the thread of the screw ❶ with Loctite 243 and mount the screw, however, do not tighten it yet.
– Push the slide pin ❷ inward. At the same time, push the slide lever ❸ to the extreme right and tighten the screw ❶.



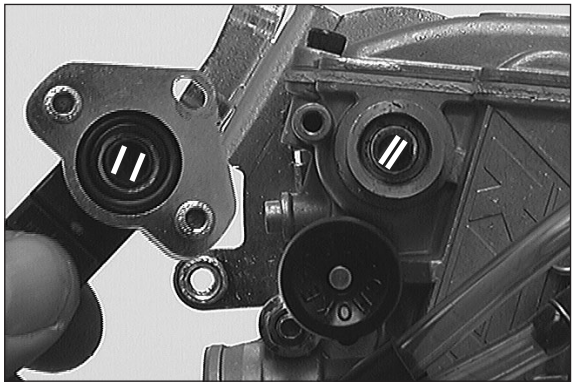
– Now, the distances Ⓐ on the left and on the right should be identical. Then, turn the cable disc and check if the throttle valve moves smoothly.
– Mount the jet needle and secure it with the screw ❹.
– Position the slide cover and gasket and fasten with 2 screws.



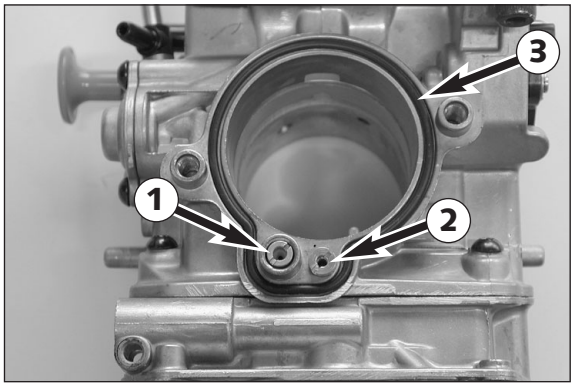
– Secure the ventilation hoses with the 2 screws ❺ of the float chamber and connect the hose ❻.



– Insert the 2 hose connections into the bores and fasten them with the retaining clip ❼.

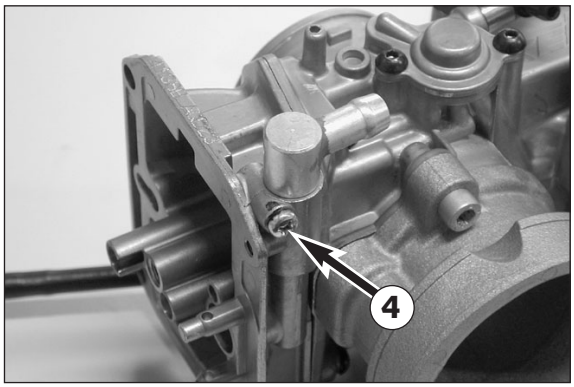


– Mount the throttle valve sensor such that the flat spot at the carburetor engages the groove of the throttle valve sensor and secure it by means of the screw.



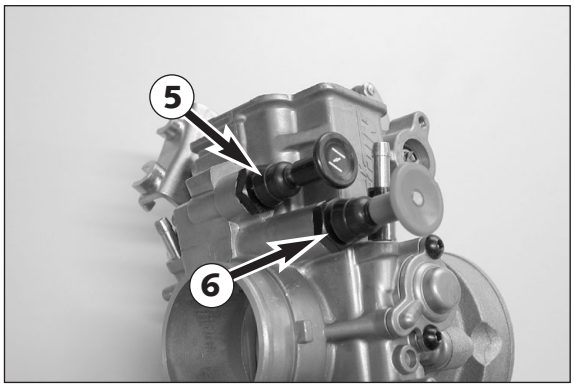
Assembling the carburetor Keihin FCR - MX 37/39/41

– 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.

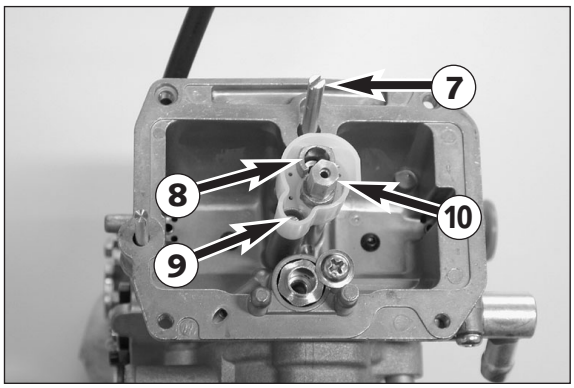


– Insert the fuel port in the carburetor and fix with screw ❹.

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



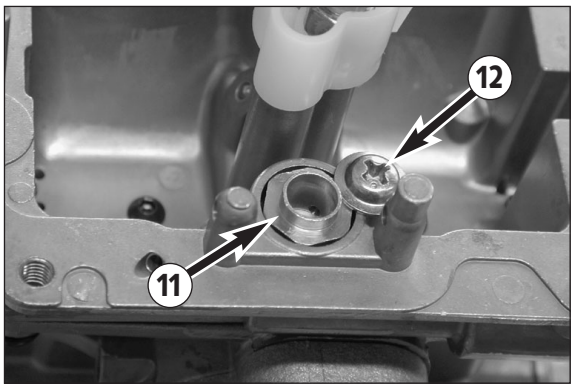
– Mount the choke slide ❺, the hot start knob ❻ and actuate several times, checking for smooth operation. Also make sure the choke and the hot start knob lock into place.



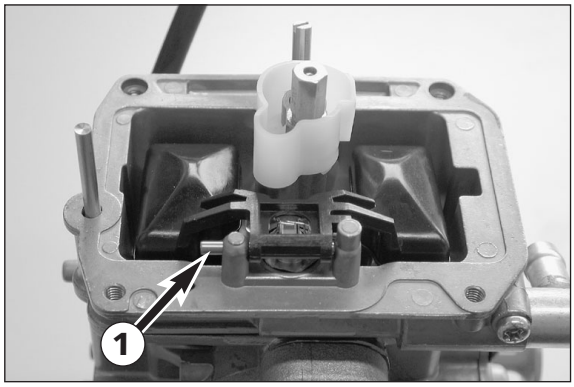
– Thread the spring, the washer and the O-ring onto the mixture control screw ❼ and screw the mixture control screw in as far as it will go.
– Now, unscrew the mixture control screw the number of turns written down during disassembly.

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

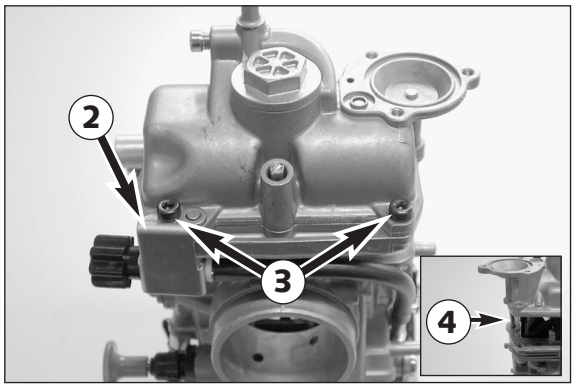
– Mount idling jet ❽, starting jet ❾ and needle jet together with main jet ❿.



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

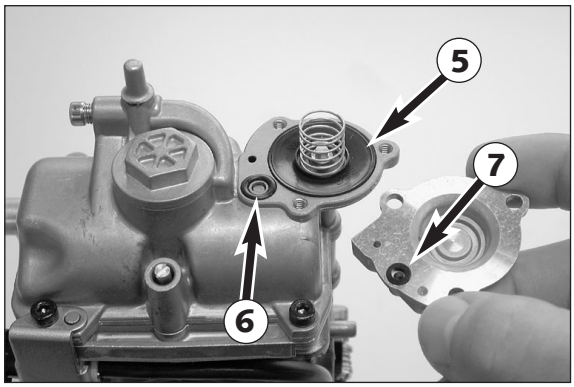


– Position the float and the float needle valve and mount the float hinge pin ❶.
– Check the float level (see page 8-21).

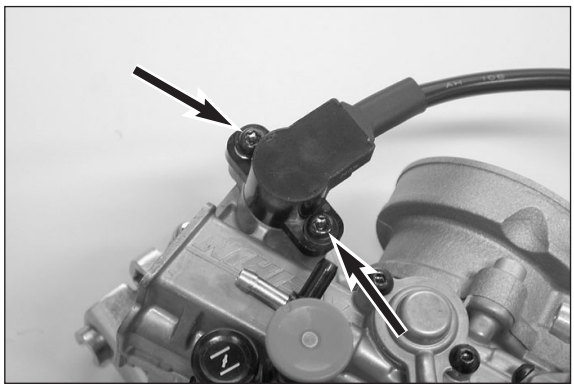


– Mount the float chamber and the gasket, position the bracket for the adjustment screw ❷ and fix the float chamber with the screws ❸.

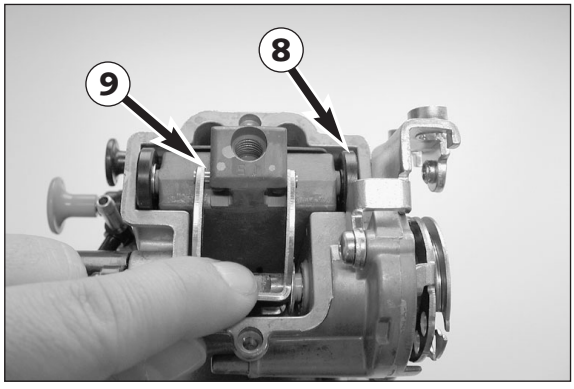
NOTE: When positioning the float chamber, make sure that the push rod ❹ of the accelerator pump slides into the bore.



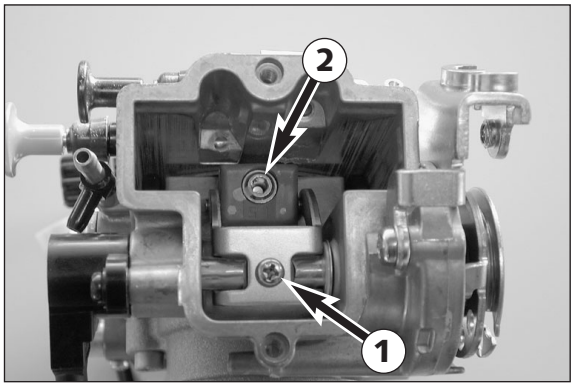
– Place the membrane ❺ with the labeling facing upwards and the spring into the pump housing.
– Place the O-ring ❻ into the groove. Secure the sealing ring ❼ with some grease in the cover and fasten the cover by means of 3 screws.



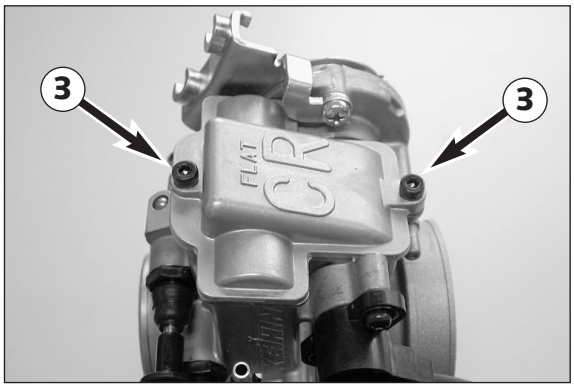
– Mount the throttle valve sensor such that the flat spot at the carburetor engages the groove of the throttle valve sensor and secure it by means of the screw.



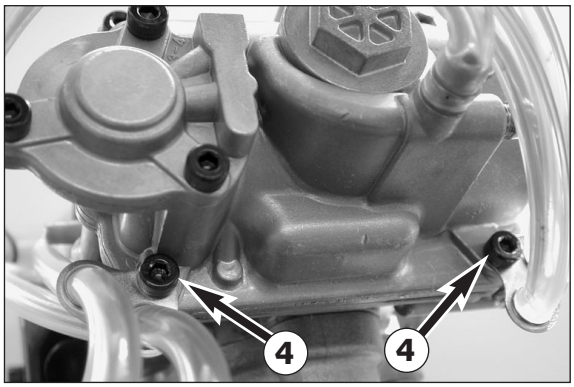
– Pull up the throttle slide arm, push the throttle slide together with roll ❽ and the slide shim into the carburetor so that the rolls ❾ engage in the throttle slide (see illustration).
– Check the throttle slide for smooth operation.



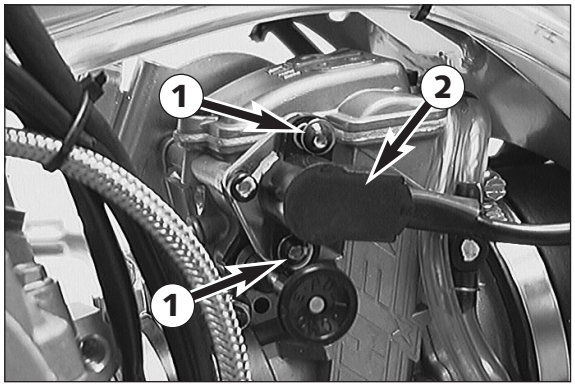
– Apply Loctite 243 to the screw ❶ and tighten.
– Mount the jet needle and fix with the screw ❷.

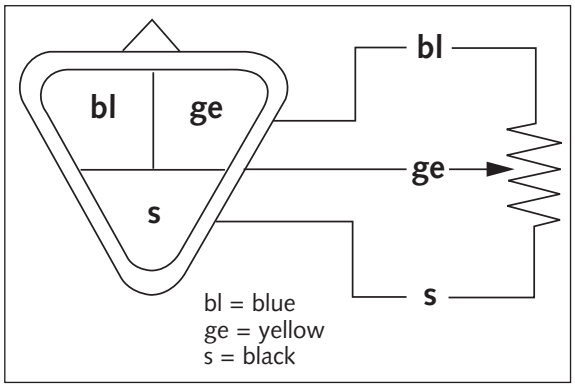


– Position the slide cover with the gasket and fasten with the 2 screws ❸.



– 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) = 5kΩ

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

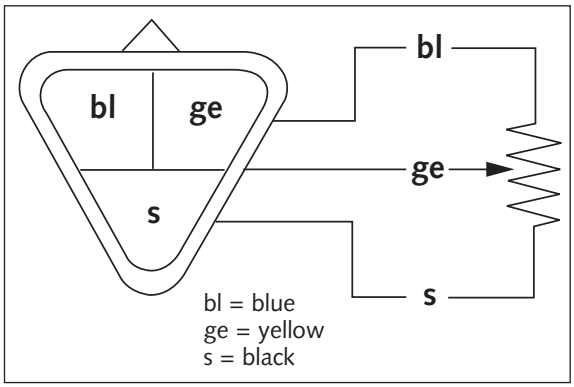
– Connect the multimeter (measuring range Ωx100) to the **yellow (+)** and the **black (-)** cable of the throttle valve sensor and measure the throttle valve sensor resistance with the throttle grip closed. According to the above example, this value should be 750Ω ± 50Ω.
– If the value measured does 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.

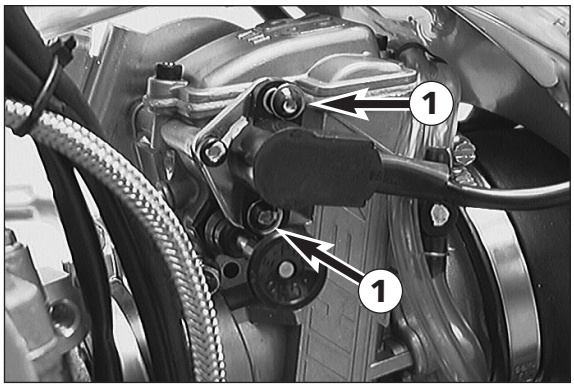
– Open the plug-and-socket connection of the throttle valve sensor.
– Connect a multimeter (measuring range Ω x 1k) to the **blue (+)** and the **black (-)** cable of the throttle valve sensor.

Resistance of throttle valve sensor: 4 - 6 kΩ



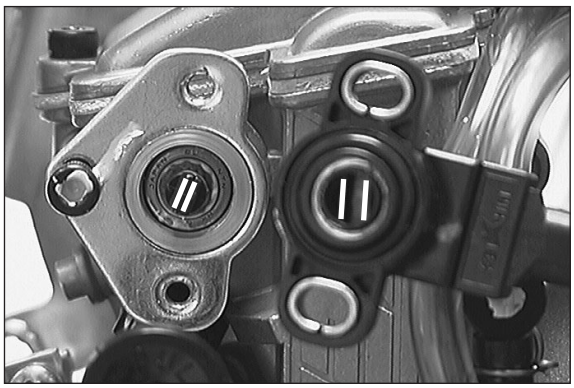
– Now, connect the multimeter to the **yellow (+)** and the **black (-)** cable of the throttle valve sensor.
– As you open the throttle grip slowly, the resistance must change evenly.

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

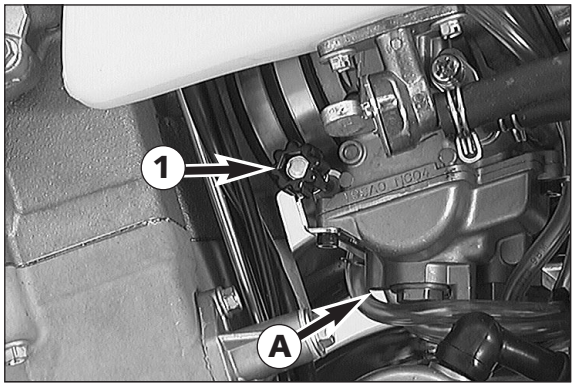


Dismounting and installing the throttle valve sensor

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



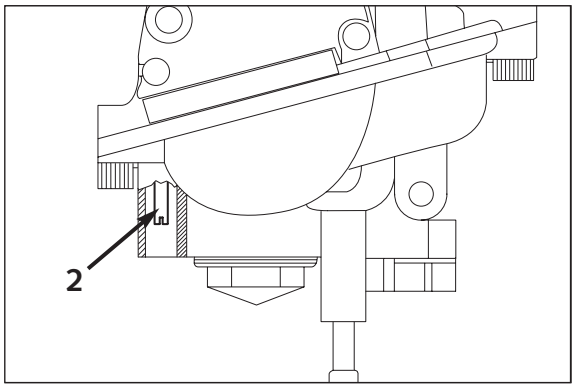
– When mounting the throttle valve sensor, make sure that the flat spot at the throttle valve pin engages the groove on the throttle valve sensor.
– Mount the 2 screws, however, do not yet tighten them fully and adjust the position of the throttle valve sensor. Secure the 2 screws with Loctite 243.



CARBURETOR – Adjust idling FCR 35/39

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

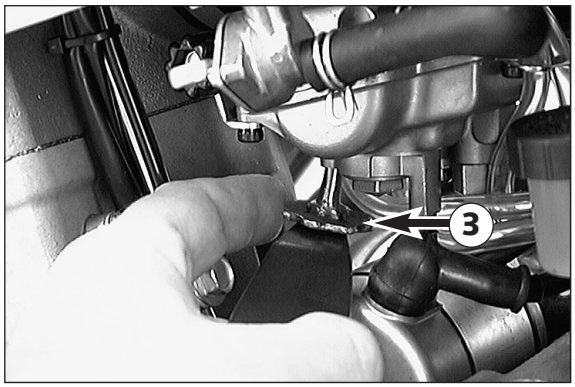
The idle speed is controlled by means of the adjusting wheel ❶ and the mixture control screw ❷. The adjusting wheel is used to adjust the basic setting of the slide. The mixture control screw is used to control the idle mixture which arrives at the engine by way of the idle system. Clockwise turning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



TO ADJUST IDLING CORRECTLY, PROCEED AS FOLLOWS:

1 Turn in the mixture control screw ❷ up to the stop, and turn it back out to the basic position (see technical data for 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 the 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. In this case:

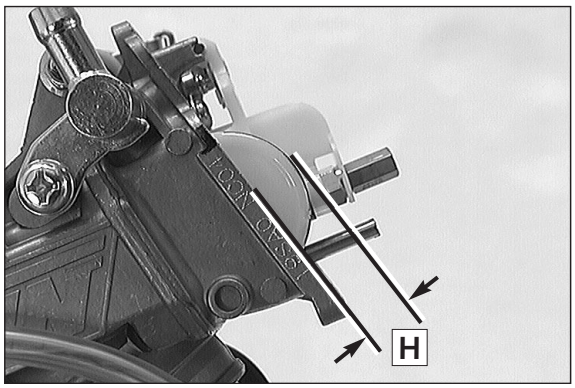


a) the mixture control screw has been screwed in up to the stop without causing any change in rotational speed, a smaller idling jet has to be installed;

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

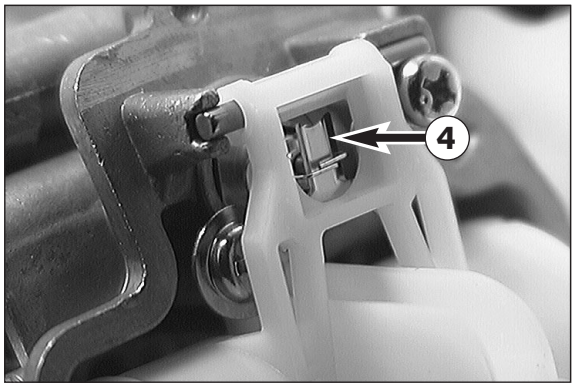
Naturally, in cases of jet changes, you have to start adjusting from the beginning.

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



Adjusting the mixture control screw

Especially on the EXC models, accessing the mixture control screw is difficult. For this reason, we have created an appropriate special tool.
Introduce the special tool into the bore Ⓐ 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 ❷.
Now, you can go about adjusting the screw. Marks were provided on the adjusting wheel, making it easier to keep track of the turns.

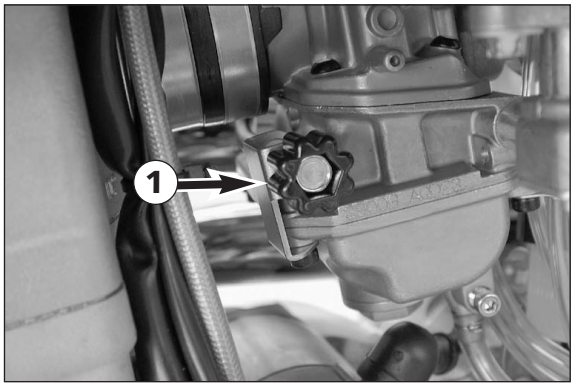


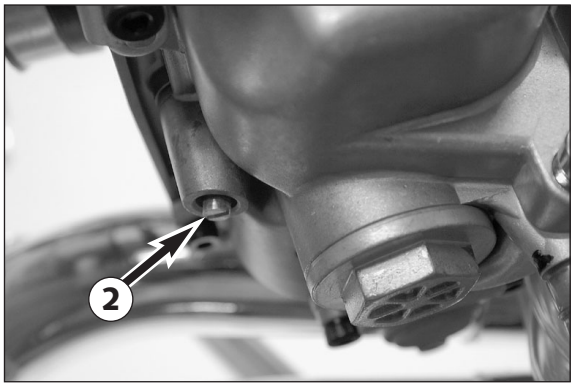
Checking the float level (float height)

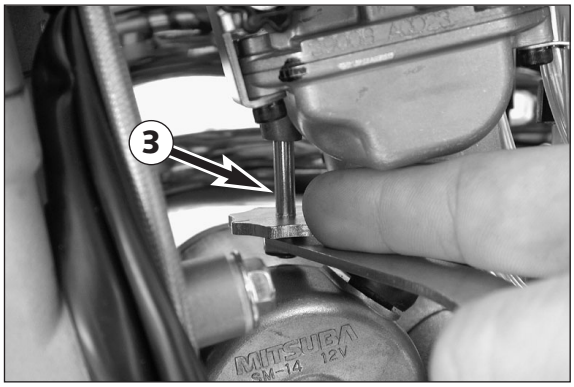
For this purpose, dismount the carburetor and remove the float chamber. Hold the carburetor in a slanted position such that the float will abut the float needle valve but not compress it (see photo).
Now, use a sliding caliper to measure the distance Ⓗ between the casing edge and the float's upper edge.
The float height Ⓗ should be **9 mm** (0.3543 in).
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 ❹.

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







CARBURETOR – Adjust idling (Keihin-FCRMX 37/39/41)

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.

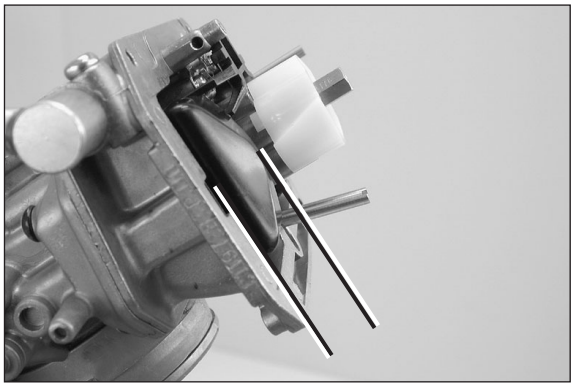
The idle speed is controlled by means of the adjusting wheel ❶ and the mixture control screw ❷. The adjusting wheel is used to adjust the basic setting of the slide. The mixture control screw is used to control the idle mixture which arrives at the engine by way of the idle system. Clockwise turning 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

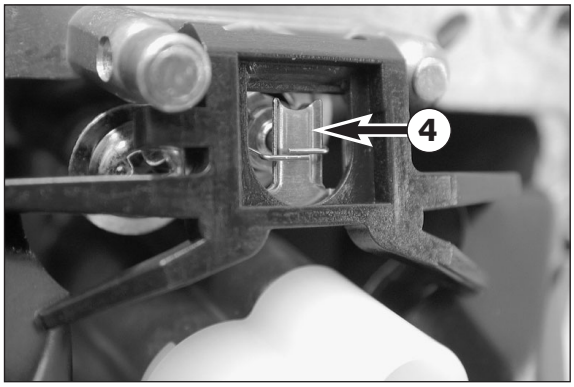
As a result of engine vibrations, the throttle valve, jet needle, and needle jet are subjected to increased wear. This wear may cause the carburetor to malfunction (e.g., overly rich mixture). Therefore, these parts should be replaced after 200 hours.



Adjusting the mixture control screw

Especially on the EXC models, accessing the mixture control screw is difficult. For this reasons, we have created an appropriate special tool.

Introduce the special tool 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 ❹.

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

TECHNICAL SPECIFICATIONS 9

INDEX

Art.-No. 3206007 -E

TECHNICAL DATA – ENGINE 400/520 SX, EXC RACING 2000

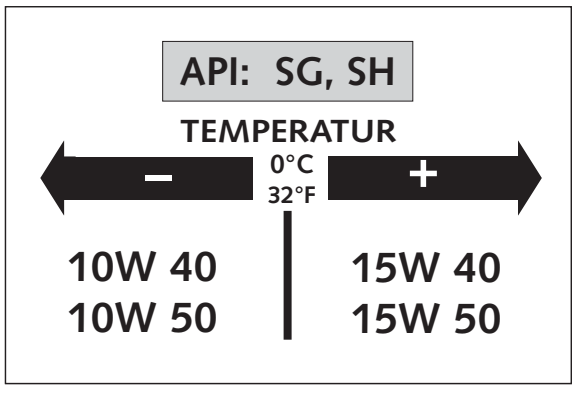
Type	400 SX RACING	400 EXC RACING	520 SX RACING	520 EXC RACING
Design	Liquid-cooled single cylinder 4-stroke engine with balancer shaft			
Displacement	398 cm³		510 cm³	
Bore/Stroke	89 / 64 mm		95 / 72 mm	
Ratio	11 : 1			
Fuel	unleaded premium gasoline with at least RON 95			
Valve timing	4 valves over rocker arm and 1 overhead camshaft, camshaft drive through single chain			
Camshaft	01		55	
Valve diameter	Intake: 35 mm Exhaust: 30 mm			
Valve clearance cold	0.12 mm (feeler gage 0.10 mm light, feeler gage 0.15 mm should not be inserted)			
Crankshaft bearing	2 cylinder roller bearing			
Conrod bearing	needle bearing			
Top end bearing	bronce bushing			
Piston	alluminium alloy cast		alluminium alloy forged	
Piston rings	1 compression ring, 1 oil scraper ring			
Engine lubrication	pressure circulation lubrication with 2 rotorpumps			
Engine oil	fullsynthetic oil (Shell Advance Ultra4 SAE 10W40)			
Quantity of engine oil	1.25 liters			
Primary ratio	straight geared spur wheels 33:76 Z			
Clutch	multi disc clutch in oil bath			
Transmission	4-speed claw shafted	6-speed claw shafted	4-speed claw shafted	6-speed claw shafted
Gear ratio				
1st Gear	14:34	14:34	14:34	14:34
2nd Gear	18:30	17:31	18:30	17:31
3rd Gear	20:28	19:28	20:28	19:28
4th Gear	22:26	22:26	22:26	22:26
5th Gear	–	24:23	–	24:23
6th Gear	–	26:21	–	26:21
Iginition system	contactless DC-CDI ignition with digital advanced system by KOKUSAN			
Generator	12V 40W	12V 110W		
Spark plug	NGK CR8 EK			
Spark plug gap	0.60 mm			
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanic driven water pump			
Cooling liquid	1 liter, 40% antifreeze, 60% water, at least -25° C (-13° F)			
Starting equipment	kickstarter	kick - electric starter	kickstarter	kick - electric starter

BASIC CARBURETOR SETTING

	520 SX RACING 400 EXC RACING	400 EXC RACING (12kW) 520 EXC RACING (12,5kW)	520 EXC RACING	400 SX RACING
Type	MX-FCR39	MX-FCR39	MX-FCR39	MX-FCR39
Carb.-setting number	250899	130799	100699	031299
Main jet	175	175	175	175
Jet needle	OBDTM	OBDVR (OBDTM)	OBDTM	OBDTM
Idling jet	52	48	48	48
Main air jet	200	200	200	200
Idling air jet	100	100	100	100
Needle clip position	2. from top	3. from top	2. from top	4. from top
Starting jet	85	85	85	85
Mixture control screw open	2	1,25	2,5	2,25
Throttle valve	15	15	15	15
Performance restrictor	–	slide stop 24,5 mm	–	–
Stop pump membrane	055	055	055	055

Art.-No. 3206007 -E

TIGHTENING TORQUES - ENGINE			
Hexagon collar screw engine case, clutch cover, ignition cover	M6	8 Nm	(6 ft.lb)
Oil drain plug	M12x1,5	20 Nm	(15 ft.lb)
Allan head plug oil screen short	M16x1,5	10 Nm	(7 ft.lb)
Hexagon plug oil screen long	M20x1,5	15 Nm	(11 ft.lb)
Plug pressure valve	M12x1,5	20 Nm	(15 ft.lb)
Jet screw and hollow screw oil line	M8	10 Nm	(7 ft.lb)
Screws oil pump cover	M5	Loctite 243 + 6 Nm	(5 ft.lb)
Hex.collar screw cylinderhead top section, water pump cover	M6	8 Nm	(6 ft.lb)
Hexagon collar screw exhaust flange	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Cylinder head screw	M10	40/50 Nm	(30/35 ft.lb)
Allan head screw camshaft gear	M8	Loctite 243 + 28 Nm	(21 ft.lb)
Stop screw autodecompression	M5	Loctite 243 + 6 Nm	(5 ft.lb)
Allan head screw cap rocker arm	M5	5 Nm	(4 ft.lb)
Counter nuts valve adjustment screw	M6x0,75	13 Nm	(10 ft.lb)
Allan head screw primary gear, free wheel	M6	Loctite 243 + 18 Nm	(13 ft.lb)
Hexagon nut primary gear	M20x1,5	Loctite 243 + 150 Nm	(132 ft.lb)
Allan head screw balancer shaft gear	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Hexagon collar screw clutch spring	M6	8 Nm	(6 ft.lb)
Allan head screw shift roller locking piece	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Hexagon collar screw locking lever	M5	Loctite 243 + 6 Nm	(6 ft.lb)
Hexagon collar screw securing guide, chain guide, chain tensioner	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Hexagon collar screw chain adjuster	M6	8 Nm	(6 ft.lb)
Hexagon collar screw stator EXC	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Hexagon collar screw stator SX	M5	Loctite 243 + 6 Nm	(5 ft.lb)
Hexagon collar screw pulser coil	M5	Loctite 243 + 6 Nm	(5 ft.lb)
Hexagon collar nut flywheel	M12x1	60 Nm	(44 ft.lb)
Hexagon collar screw bump part kickstarter	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Hexagon collar screw spring hanger kickstarter	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Hexagon collar screw cover E-starter, only SX	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Hexagon collar screw hanger vent hose	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Allan head screw kickstarter	M8	Loctite 243 + 25 Nm	(19 ft.lb)
Hexagon collar screw shift lever	M6	Loctite 243 + 8 Nm	(6 ft.lb)
Hexagon screw engine sprocket	M10	Loctite 243 + 60 Nm	(44 ft.lb)



Engine oil

Use only oil brands, which meet quality requirements (Shell Advance Ultra 4) of API-classes SG or SH (informations on bottles) or higher.

! CAUTION !

POOR OIL QUALITY OR MINOR QUANTITY EFFECT EARLY ENGINE-WEAR.

ASSEMBLY CLEARANCE, WEAR LIMIT		
Crankshaft	axial play	.0.03 - 0.15 mm
	run out of crank stud	.max. 0.08 mm
Conrod bearing	radial play	.max. 0.05 mm
	axial play	.max. 1.10 mm
Cylinder 400	bore diameter	.max. 89.04 mm
Cylinder 520	bore diameter	.max. 95.04 mm
Piston forged	assembly clearance	.max. 0.08 mm (new 0.05 mm)
Piston cast	assembly clearance	.max. 0.1 mm (new 0.07 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. 2.00 mm
	run out of valve heads	.max. 0.05 mm
	valve guides diameter	.max. 6.05 mm
Oil pumps	clearance outer rotor - housing	.max. 0.20 mm
	clearance outer rotor - inner rotor	.max. 0.20 mm
Bypaß valve	minimum spring length	.25.00 mm
Clutch	Length of springs	.min. 41,5 mm (new 43 mm)
	wear limit organic	.min. 1.70 mm
Transmission shafts	axial play	.0.10 - 0.40 mm

TECHNICAL DATA – CHASSIS 400/520 SX, EXC RACING 2000

	400 SX RACING	520 SX RACING	400/520 EXC RACING	400/520 EXC RACING USA
Frame	Central chrom-moly-steel frame			
Fork	**W**hite **P**ower – **U**p **S**ide **D**own 43 MA			
Wheel travel front/rear	295/320 mm			
Rear suspension	WP **P**rogressive **D**amping **S**ystem shock absorber, aluminium swingarm			
Front brake	Disc brake with carbon-steel brake disc Ø 260 mm (10.2 in), brake caliper floated			
Rear brake	Disc brake with carbon-steel brake disc Ø 220 mm (8.7 in), brake caliper floated			
Brake disc	Wear limit max. 0,40 mm (0,016 in)			
Front tires Air pressure offroad Air pressure road driver only	80/100 - 21" 1,0 bar (14 psi) –		90/90 - 21" 1,0 bar (14 psi) 1,5 bar (21 psi)	80/100 - 21" 1,0 bar (14 psi) 1,5 bar (21 psi)
Rear tires Air pressure offroad Air pressure road driver only	110/90 - 19" 1,0 bar (14 psi) –		140/80 - 18" 1,0 bar (14 psi) 2,0 bar (28 psi)	110/100 - 18" 1,0 bar (14 psi) 2,0 bar (28 psi)
Fuel tank capacity	7,5 Liter (2 US Gallons)		9 Liter (2,3 US gallons)	
Final drive ratio	14:50	14:48	400-15:45 / 520-15:40	400-14:50 / 520-14:48
Chain	O-ring 5/8 x 1/4 "			
Available final sprockets	38, 40, 42, 45t 48, 50, 52			
Steering head angle	63,5°			
Wheel base	1481 ± 10 mm (58,3 ± 0,4 in)			
Seat height, unloaded	925 mm (36,5 in)			
Ground clearance, unloaded	380 mm (15,1 in)			
Dead-weight *	107 kg (236 lbs)		112 kg (247 lbs)	

* Dead-weight without fuel

STANDARD ADJUSTMENT-FORK

	WP 0518U782	WP 0518U791
Compression adjuster	14	14
Rebound adjuster	14	14
Spring	4,2 N/mm	4,2 N/mm
Spring preload	7 mm (0.27in)	6,5 mm (0.26in)
Air chamber length	120 mm (5.2in)	140 mm (5.5in)
Capacity per fork leg	approx. 450 ccm	approx. 450 ccm
Fork oil	SAE 5	SAE 5

STANDARD ADJUSTMENT - SHOCK ABSORBER

	WP 1218U721	WP 1218U716
Compression adjuster	5	5
Rebound adjuster	20	18
Spring	PDS2–250	PDS3-250
Spring preload	6 mm (0.24 in)	6 mm (0.24 in)

TIGHTENING TORQUES - CHASSIS

Collar nut front wheel spindle	M 16x1,5	40 Nm (30ft.lb)
Brake caliper front	M 8	Loctite 243 + 25 Nm (19ft.lb)
Brake disc front	M 6	Loctite 243 + 15 Nm (11ft.lb)
Brake disc rear	M 6	Loctite 243 + 15 Nm (11ft.lb)
Clamping screws upper fork bridge	M 8	20 Nm (15ft.lb)
Clamping screws lower fork bridge	M 8	15 Nm (11ft.lb)
Clamping screws fork stubs	M 8	10 Nm (7ft.lb)
Collar nut rear wheel spindle	M 20x1,5	80 Nm (59ft.lb)
Hexagon nut swingarm bolt	M 14x1,5	100 Nm (74ft.lb)
Hexagon collar screw handlebar clamp	M 8	20 Nm (15ft.lb)
Allan head screw handlebar support	M 10	Loctite 243 + 40 Nm (30ft.lb)
Shock absorber top	M 12	60 Nm (44ft.lb)
Shock absorber bottom	M 12	60 Nm (44ft.lb)
Sprocket screws	M 8	Loctite 243 + 35 Nm (25ft.lb)
Ball joint for push rod	M 6	Loctite 243 + 10 Nm (7ft.lb)
Engine mounting bolt	M 10	45 Nm (33ft.lb)
Engine brace	M 8	33 Nm (24ft.lb)
Other screws on chassis	M 6 M 8 M 10	10 Nm (7ft.lb) 25 Nm (19ft.lb) 45 Nm (33ft.lb)
Other collar nuts on chassis	M 6 M 8 M 10	15 Nm (11ft.lb) 30 Nm (22ft.lb) 50 Nm (37ft.lb)

TECHNICAL DATA – ENGINE 400/520 SX, MXC, EXC RACING 2001

Type	400 SX	400 MXC	400 EXC	520 SX	520 MXC	520 EXC
Design	Liquid-cooled single cylinder 4-stroke engine with balancer shaft					
Displacement	398 cc			510 cc		
Bore/Stroke	89 / 64 mm			95 / 72 mm		
Ratio	11 : 1					
Fuel	unleaded premium gasoline with at least RON 95					
Valve timing	4 valves over rocker arm and 1 overhead camshaft, camshaft drive through single chain					
Camshaft	0121			5521		
Valve diameter	Intake: 35 mm Exhaust: 30 mm					
Valve clearance cold	0,12 mm (0.0047 in)					
Crank shaft bearing	2 cylinder roller bearing					
Connecting rod bearing	needle bearing					
Top end bearing	bronze bushing					
Piston	aluminium alloy cast			aluminium alloy forged		
Piston rings	1 compression ring, 1 oil scraper ring					
Engine lubrication	pressure circulation lubrication with two rotor pumps					
Engine oil	full synthetic oil (Shell Advance Ultra 4 SAE 10W40)					
Quantity of engine oil	1.25 liters					
Primary ratio	straight geared spur wheels 33:76 Z					
Clutch	multidisc clutch in oil bath					
Transmission claw shifted	6-speed	6-speed	6-speed	4-speed	6-speed	6-speed
Gear ratio						
1st Gear	16:32	16:32	14:34	16:32	16:32	14:34
2nd Gear	18:30	18:30	17:31	18:30	18:30	17:31
3rd Gear	20:28	20:28	19:28	20:28	20:28	19:28
4th Gear	22:26	22:26	22:26	22:26	22:26	22:26
5th Gear	24:24	24:24	24:23	-	24:24	24:23
6th Gear	21:18	21:18	26:21	-	21:18	26:21
Ignition system	contactless DC-CDI ignition with digital advanced system by KOKUSAN					
Generator	12V 40W	12V 150W				
Spark plug	NGK CR8 EK					
Spark plug gap	0.6 mm (0.0236 in)					
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanically driven water pump					
Cooling liquid	1 liter, 40% antifreeze, 60% water, at least -25° (-13° F)					
Starting equipment	kickstarter	kick - electric starter		kickstarter	kick - electric starter	

BASIC CARBURETOR SETTING				
	400 SX RACING 400 MXC/EXC RACING	400 EXC RACING (12kW) 520 EXC RACING (12,5kW)	520 MXC/EXC RACING	520 SX RACING
Type	MX-FCR39	MX-FCR39	MX-FCR39	MX-FCR39
Carb.-setting number	031299	130799	100699	250899
Main jet	175	175	175	175
Jet needle	OBDTM	OBDVR (OBDTM)	OBDTM	OBDTM
Idling jet	48	48	48	48
Main air jet	200	200	200	200
Idling air jet	100	100	100	100
Needle clip position	4th from top	3rd from top	2nd from top	3rd from top
Starting jet	85	85	85	85
Mixture control screw open	1	1,25	2,5	1
Slide	15	15	15	15
Performance restrictor	–	slide stop 24,5 mm	–	-
Stop pump membrane	055	055	055	055

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TECHNICAL DATA – CHASSIS 400/520 SX, MXC, EXC RACING 2001

	400 SX RACING	520 SX RACING	400/520 EXC RACING	400/520 EXC USA, MXC
Frame	Central tube chrome-moly-steel frame			
Fork	**W**hite **P**ower – **U**p **S**ide **D**own 43 MA			
Wheel travel front/rear	295/320 mm			
Rear suspension	WP **P**rogressive **D**amping **S**ystem shock absorber, 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. 0,4 mm (0,016 in)			
Front tires	80/100 - 21“		90/90 - 21“	80/100 - 21“
Air pressure offroad	1.0 bar (14 psi)		1.0 bar (14 psi)	1.0 bar (14 psi)
Air pressure road driver only	–		1.5 bar (21 psi)	1.5 bar (21 psi)
Rear tires	110/90 - 19“		140/80 - 18“	110/100 - 18“
Air pressure offroad	1.0 bar (14 psi)		1.0 bar (14 psi)	1.0 bar (14 psi)
Air pressure road driver only	–		2.0 bar (28 psi)	2.0 bar (28 psi)
Fuel tank capacity	7.5 liters (2 US gallons)		EXC 8.5 liters (2.1 US gallons)	MXC13 liters (3.25 US gallons)
Final drive ratio	14:50t	14:48t	400-15:45t / 520-15:40t	400-14:50t / 520-14:48t
Chain	O-ring 5/8 x 1/4 "			
Available final sprockets	38t, 40t, 42t, 45t, 48t, 50t, 52t			
Steering head angle	63.5°			
Wheel base	1481 ± 10 mm (58.3 ± 0.4 in)			
Seat height, unloaded	925 mm (36.5 in)			
Ground clearance, unloaded	380 mm (15.1 in)			
Dead-weight *	107 kg (236 lbs)		112 kg (247 lbs)	

* Dead-weight without fuel

STANDARD ADJUSTMENT-FORK		
	WP 0518V705	**WP 0518V706**
Compression adjuster	14	14
Rebound adjuster	12	12
Spring	4,2 N/mm	4,2 N/mm
Spring preload	6 mm	6 mm
Air chamber length	130 mm	150 mm
Fork oil	SAE 5	SAE 5

STANDARD ADJUSTMENT - SHOCK ABSORBER		
	WP 1218V732	**WP 1218V733**
Compression adjuster	5	5
Rebound adjuster	25	25
Spring	PDS6–250	PDS2-250
Spring preload	6 mm	6 mm

TECHNICAL DATA – ENGINE 250/400/520 SX, MXC, EXC RACING 2002

Type	250 EXC	400 SX	400 MXC	400 EXC	520 SX	520 MXC	520 EXC
Design	Liquid-cooled single cylinder 4-stroke engine with balancer shaft						
Displacement	249.6 cc	398 cc			510 cc		
Bore/Stroke	75 / 56.5 mm	89 / 64 mm			95 / 72 mm		
Ratio	12 : 1	11 : 1					
Fuel	unleaded premium gasoline with at least RON 95						
Valve timing	4 valves over rocker arm and 1 overhead camshaft, camshaft drive through single chain						
Camshaft	5532	0121			5521		
Valve diameter Intake	28 mm	35 mm					
Valve diameter Exhaust	24 mm	30 mm					
Valve clearence cold Intake	0.12 mm (0.0047 in)						
Valve clearence cold Exhaust	0.12 mm (0.0047 in)						
Crank shaft bearing	2 cylinder roller bearing						
Connecting rod bearing	needle bearing						
Top end bearing	bronze bushing						
Piston	alluminium alloy cast				alluminium alloy forged		
Piston rings	1 compression ring, 1 oil scraper ring						
Engine lubrication	pressure circulation lubrication with two rotor pumps						
Engine oil	full synthetic oil (Shell Advance Ultra 4 SAE 10W40)						
Quantity of engine oil	1.25 liters						
Primary ratio	straight geared spur wheels 33:76 Z						
Clutch	multi disc clutch in oil bath						
Transmission claw shifted	6-speed	6-speed	6-speed	6-speed	4-speed	6-speed	6-speed
Gear ratio							
1st Gear	14:38	16:32	16:32	14:34	16:32	16:32	14:34
2nd Gear	16;36	18:30	18:30	17:31	18:30	18:30	17:31
3rd Gear	19:34	20:28	20:28	19:28	20:28	20:28	19:28
4th Gear	21:32	22:26	22:26	22:26	22:26	22:26	22:26
5th Gear	23:30	24:24	24:24	24:23	-	24:24	24:23
6th Gear	22:25	21:18	21:18	26:21	-	21:18	26:21
Ignition system	contactless DC-CDI ignition with digital advanced system by KOKUSAN						
Generator	12V 150W	12V 40W	12V 150W				
Spark plug	NGK CR8 EK						
Spark plug gap	0.6 mm (0.02367 in)						
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanically driven water pump						
Cooling liquid	1 liter, 40% antifreeze, 60% water, at least -25° (-13° F)						
Starting equipment	kick-electric starter	kickstarter	kick - electric starter		kickstarter	kick - electric starter	

BASIC CARBURATOR SETTING				
	250 EXC RACING	250 EXC RACING 8,3 kW	400 SX RACING 400 MXC/EXC RACING	400 EXC RACING 12 kW 520 EXC RACING 12,5 kW
Type	Keihin CR35	Keihin CR35	Keihin CR39	Keihin CR39
Carburator-setting number	170401	041200	031299	130799
Main jet	160	160	175	175
Jet needle	OBEVP	OBEVR	OBDTM	OBDVR
Idling jet	48	45	48	48
Main air jet	200	200	200	200
Idling air jet	100	100	100	100
Needle position	6. th from top	6. th from top	4. th from top	3. rd from top
Starting jet	85	85	85	85
Mixture control screw open	1,25	1,0	1	1,25
Slide	15	15	15	15
Performance restrictor	–	Slide stop 24,5 mm	–	Slide stop 24,5 mm
Stop pump membrane	0	0	3,2 mm	3,2 mm

BASIC CARBURATOR SETTING				
	520 SX RACING	520 MXC/EXC RACING	400 EXC-Green	520 EXC-Green
Type	Keihin CR39	Keihin CR39	Keihin CR39	Keihin CR39
Carburator-setting number	250899	100699	250401	240401
Main jet	175	175	175	175
Jet needle	OBDTM	OBDTM	OBDVR	OBDVR
Idling jet	48	48	48	45
Main air jet	200	200	200	200
Idling air jet	100	100	100	100
Needle position	3. rd from top	2. nd from top	6. th from top	3. rd from top
Starting jet	85	85	85	85
Mixture control screw open	1	2,5	1,25	1
Slide	15	15	15	15
Performance restrictor	–	–	–	–
Stop pump membrane	3,2 mm	3,2 mm	3,2 mm	3,2 mm

ASSEMBLY CLEARANCE, WEAR LIMIT UP TO THE 2002 MODEL	
Crankshaft	axial clearance .....0.1 - 0.2 mm/0.0039 - 0.0078 in
	run out of crank stud .....max. 0.08 mm/0.003 in
Conrod bearing	radial clearance .....max. 0.05 mm/0.002 in
	axial clearance .....max. 1.10 mm/0.043 in
Cylinder 250	bore diameter size I .....75.000 - 75.012 mm/2.9527 - 2.9532 in
	bore diameter size II .....75.013 - 75.025 mm/2.9532 - 2.9537 in
Cylinder 400	bore diameter size I .....89.000 - 89.012 mm/3.5039 - 3.5044 in
	bore diameter size II .....89.013 - 89.025 mm/3.5039 - 3.5049 in
Cylinder 520	bore diameter size I .....95.000 - 95.012 mm/3.7401 - 3.7406 in
	bore diameter size II .....95.013 - 95.025 mm/3.7406 - 3.7411 in
Piston 250	diameter size I .....74.960 - 74.970 mm/2.9511 - 2.9515 in
	diameter size II .....74.971 - 74.980 mm/2.9515 - 2.9519 in
	assembly clearance size I .....0.030 - 0.052 mm/0.0012 - 0.0020 in
	assembly clearance size II .....0.032 - 0.055 mm/0.0012 - 0.0021 in
	wear limit .....0.12 mm/0.0047 in
Piston 400	diameter size I .....88.930 - 88.940 mm/3.5019 - 3.5015 in
	diameter size II .....88.941 - 88.950 mm/3.5015 - 3.5019 in
	assembly clearance size I .....0.060 - 0.082 mm/0.0023 - 0.0032 in
	assembly clearance size II .....0.062 - 0.085 mm/0.0024 - 0.0033 in
	wear limit .....0.12 mm/0.0047 in
Piston 520	diameter size I .....94.942 - 94.950 mm/3.7378 - 3.7382 in
	diameter size II .....94.951 - 94.958 mm/3.7382 - 3.7385 in
	assembly clearance size I .....0.050 - 0.070 mm/0.0019 - 0.0027 in
	assembly clearance size II .....0.054 - 0.075 mm/0.0021 - 0.0029 in
	wear limit .....0.12 mm/0.0047 in
Piston ring end gap	compression ring .....max. 0.80 mm/0.03 in
	oil scraper ring .....max. 1.00 mm/0.04 in
Valves	seat sealing intake .....max. 1.50 mm/0.06 in
	seat sealing exhaust .....max. 2.00 mm/0.078 in
	run out of valve heads .....max. 0.05 mm/0.002 in
	valve guides diameter .....max. 6.05 mm/0.238 in
Valve springs	minimum length of the outer spring .....39.20 mm/1.5433 in
	minimum length of the inner spring .....36.45 mm/1.4350 in
Oil pumps	clearance outer rotor - housing .....max. 0.20 mm/0.0078 in
	clearance outer rotor - inner rotor .....max. 0.20 mm/0.0078 in
Bypass valve	minimum spring length .....23.50 mm/0.9252 in
Clutch	length of springs .....min. 41.5 mm/1.63 in (new 43 mm/1.693 in)
	wear limit organic .....min. 1.70 mm/0.067 in
Transmission shafts	axial clearance .....0.10 - 0.40 mm/0.004 - 0.016 in
Rocker arms	axial clearance .....0.02 - 0.10 mm/0.0007 - 0.0039 in

TECHNICAL DATA – CHASSIS 250/400/520 SX, MXC, EXC RACING 2002

	400/520 SX RACING	250/400/520 EXC RACING	400/520 MXC, EXC USA
Frame	Central tube chrome-moly-steel frame		
Fork	WP **USD** 4860 MXMA	WP **U**p **S**ide **D**own 4357 MXMA	
Wheel travel front/rear	295/320 mm		
Rear suspension	WP **P**rogressive **D**amping **S**ystem shock absorber, 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. 0,4 mm (0,016 in)		
Front tires	80/100 - 21“	90/90 - 21“	80/100 - 21“
Air pressure offroad	1.0 bar (14 psi)	1.0 bar (14 psi)	1.0 bar (14 psi)
Air pressure road driver only	–	1.5 bar	1.5 bar (21 psi)
Rear tires	110/90 - 19“	140/80 - 18“	110/100 - 18“
Air pressure offroad	1.0 bar (14 psi)	1.0 bar (14 psi)	1.0 bar (14 psi)
Air pressure road driver only	–	2.0 bar (28 psi)	2.0 bar (28 psi)
Fuel tank capacity	7.5 liters (2 US gallons)	EXC 8.5 liters (2.1 US gallons)	MXC 13 Liter (3.5 gallons)
Final drive ratio	400-14:50t / 520-14:48t	250-12:52t / 400-15:45t / 520-15:40t	400-14:50t / 520-14:48t
Chain	O-Ring 5/8 x 1/4 "		
Available final sprockets	38t, 40t, 42t, 45t, 48t, 50t, 52t		
Bulbs	headlight	HS1 12V 35/35W	
	parking light	12V 5W (Sockel W2, 1x9,5d)	
	instrument lights	12V 1,2W (Sockel W2, 1x4,6d)	
	brake - rear light	12V 21/5W (Sockel BaY15d)	
	flasher light	12V 10W (Sockel Ba15s)	
	license plate illmination	12V 1,2W (Sockel 1x4,6d)	
Battery	maintenance-free battery 12V 8Ah		
Steering head angle	63.5°		
Wheel base	1481 ± 10 mm (58.3 ± 0.4 in)		
Seat height, unloaded	925 mm (36.5 in)		
Ground clearance, unloaded	380 mm (15.1 in)		
Dead-weight *	107 kg (236 lbs)	112 kg (247 lbs)	

* Dead-weight without fuel

STANDARD ADJUSTMENT-FORK		
	WP 1418W710	**WP 0518W712**
Compression adjuster	20	20
Rebound adjuster	16	12
Spring	4.4 N/mm	4.2 N/mm
Spring preload	5 mm	5 mm
Air chamber length	100 mm	130 mm
Fork oil	SAE 5	SAE 5

STANDARD ADJUSTMENT - SHOCK ABSORBER		
	WP 5018 PDS DCC 1218W738	**WP 5018 PDS MCC 1218W739**
Compression adjuster	15 LS (Low speed) 2 HS (high speed)	15
Rebound adjuster	25	25
Spring	PDS7–260	PDS6-260
Spring preload	4 mm	5 mm

TECHNICAL DATA – ENGINE 250/450/525 SX, MXC, EXC RACING 2003

Type	250 EXC	450 SX	450 MXC	450 EXC	525 SX	525 MXC	525 EXC
Design	Liquid-cooled single cylinder 4-stroke engine with balancer shaft						
Displacement	250 cc	449 cc	448 cc		510 cc		
Bore/Stroke	75 / 56.5 mm	95 / 63.4 mm	89 / 72 mm		95 / 72 mm		
Ratio	12 : 1		11 : 1				
Fuel	unleaded premium gasoline with at least RON 95						
Valve timing	4 valves over rocker arm and 1 overhead camshaft, camshaft drive through single chain						
Camshaft	5532	594/55	590/5521		8/06	590/5521	
Valve diameter Intake	28 mm	35 mm (Titan)	35 mm				
Valve diameter Exhaust	24 mm	30 mm (Titan)	30 mm				
Valve clearence cold Intake	0.12 mm (0.0047 in)						
Valve clearence cold Exhaust	0.12 mm (0.0047 in)						
Crank shaft bearing	2 cylinder roller bearing						
Connecting rod bearing	needle bearing						
Top end bearing	bronze bushing						
Piston	alluminium alloy cast				alluminium alloy forged		
Piston rings	1 compression ring, 1 oil scraper ring						
Engine lubrication	pressure circulation lubrication with two rotor pumps						
Engine oil	full synthetic oil (Shell Advance Ultra 4 SAE 10W40)						
Quantity of engine oil	1.25 liters						
Primary ratio	straight geared spur wheels 33:76 Z						
Clutch	multi disc clutch in oil bath						
Transmission claw shifted	6-speed	4-speed	6-speed	6-speed	4-speed	6-speed	6-speed
Gear ratio							
1st Gear	14:38	16:32	16:32	14:34	16:32	16:32	14:34
2nd Gear	16:36	18:30	18:30	17:31	18:30	18:30	17:31
3rd Gear	19:34	20:28	20:28	19:28	20:28	20:28	19:28
4th Gear	21:32	22:26	22:26	22:26	22:26	22:26	22:26
5th Gear	23:30	-	24:24	24:23	-	24:24	24:23
6th Gear	22:25	-	21:18	26:21	-	21:18	26:21
Ignition system	contactless DC-CDI ignition with digital advanced system by KOKUSAN						
Generator	12V 150W	12V 40W	12V 150W		12V 40W	12V 150W	
Spark plug	NGK DCPR 8 E						
Spark plug gap	0.6 mm (0.02367 in)						
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanically driven water pump						
Cooling liquid	1 liter, 40% antifreeze, 60% water, at least -25° (-13° F)						
Starting equipment	kick-electric starter	kickstarter	kick - electric starter		kickstarter	kick - electric starter	

BASIC CARBURATOR SETTING				
	250 EXC RACING Six Days	**250 EXC RACING 11 kW**	**450 EXC RACING 12 kW**	**450 SX RACING**
Type	Keihin FCR-MX 37	Keihin FCR-MX 37	Keihin FCR-MX 39	Keihin FCR-MX 41
Carburator-setting number	3700A	3700A	3900A	4122A
Main jet	160	160	178	185
Jet needle	OBETP	OBEKT	OBDVR	OBDTP
Idling jet	42	42	42	40
Main air jet	200	200	200	200
Idling air jet	100	100	100	100
Needle position	3. rd from top	3. rd from top	3. rd from top	4. rd from top
Starting jet	85	85	85	85
Mixture control screw open	1,25	0,75	1,25	1
Slide	15	15	15	15
Performance restrictor	–	Slide stop	Slide stop	–
Stop pump membrane	858 / 2,15 mm	858 / 2,15 mm	858 / 2,15 mm	858 / 2,15 mm
Hot start device	–	–	–	2,2 mm

BASIC CARBURATOR SETTING			
	525 EXC RACING Six Days	**525 EXC RACING 525 MXC RACING 12 kW**	**525 SX RACING**
Type	Keihin FCR-MX 39	Keihin FCR-MX 39	Keihin FCR-MX 41
Carburator-setting number	3900A	3900B	4125A
Main jet	178	178	185
Jet needle	OBDTN	OBDVT	OBDTP
Idling jet	42	42	42
Main air jet	200	200	200
Idling air jet	100	100	100
Needle position	2. rd from top	3. rd from top	4. rd from top
Starting jet	85	85	85
Mixture control screw open	1,5	1,25	1,5
Slide	15	15	15
Performance restrictor	–	Slide stop	–
Stop pump membrane	858 / 2,15 mm	858 / 2,15 mm	858 / 2,15 mm
Hot start device	–	–	2,5 mm

TIGHTENING TORQUES		
Hexagon collar screw, engine case, clutch cover, ignition cover	M6	10 Nm
Oil drain plug	M12x1,5	20 Nm
Allan head plug oil, screen short	M16x1,5	10 Nm
Hexagon plug, oil screen long	M20x1,5	15 Nm
Collar screw for oil filter cover	M5	6 Nm
Plug pressure valve	M12x1,5	20 Nm
Jet screw and hollow screw, oil line	M8	10 Nm
Screws, oil pump cover	M5	Loctite 222 + 6 Nm
Hexagon collar screw, cylinder head top section	M6	10 Nm
Hex.collar screw, cylinder head top section, water pump cover	M6	8 Nm
Hexagon collar screw, exhaust flange	M6	Loctite 243 + 8 Nm
Cylinder head screw	M10	40/50 Nm
Allan head screw, camshaft gear	M8	Loctite 243 + 28 Nm
Stop screw, autodecompression	M5	Loctite 222 + 8 Nm
Allan head screw, cap rocker arm	M5	5 Nm
Counter nuts, valve adjustment screw	M6x0,75	11 Nm
Allan head screw, primary gear, free wheel	M6	Loctite 648 + 16 Nm
Hexagon nut, primary gear	M20x1,5	Loctite 243 + 150 Nm
Allan head screw, balancer shaft gear	M6	Loctite 243 + 8 Nm
Hexagon nut for clutch drive	M18x1,5	Loctite 243 + 150 Nm
Hexagon collar screw, clutch spring	M6	8 Nm
Allan head screw, shift roller locking piece	M6	Loctite 243 + 10 Nm
Hexagon collar screw, locking lever	M5	Loctite 243 + 6 Nm
Hexagon collar screw, shift roller	M5	Loctite 243 + 6 Nm
Hexagon collar screw securing guide, chain guide, chain tensioner	M6	Loctite 243 + 8 Nm
Hexagon collar screw, clip	M5	Loctite 243 + 6 Nm
Hexagon collar screw, chain adjuster	M6	8 Nm
Hexagon collar screw, stator MXC/EXC	M6	Loctite 243 + 8 Nm
Hexagon collar screw, stator SX	M5	Loctite 243 + 6 Nm
Hexagon collar screw, pulser coil	M5	Loctite 243 + 6 Nm
Hexagon collar nut, flywheel	M12x1	60 Nm
Hexagon collar screw, bump part kickstarter	M6	Loctite 243 + 8 Nm
Hexagon collar screw, spring hanger kickstarter	M6	Loctite 243 + 10 Nm
Hexagon collar screw, cover E-starter, only SX	M6	Loctite 243 + 8 Nm
Hexagon collar screw, hanger vent hose	M6	Loctite 243 + 8 Nm
Allan head screw, kickstarter	M8	Loctite 243 + 25 Nm
Hexagon collar screw, shift lever	M6	Loctite 243 + 10 Nm
Hexagon screw, engine sprocket	M10	Loctite 243 + 60 Nm
Spark plug	M10	10 - 12Nm
Spark plug	M12x1,25	20 Nm

ASSEMBLY CLEARANCE, WEAR LIMIT FROM THE 2003 MODEL	
Crankshaft	axial clearance . . . . . .0.1 - 0.2 mm/0.0039 - 0.0078 in
	run out of crank stud . . . . . .max 0.12 mm/0.0047 in
Conrod bearing	radial clearance . . . . . .max. 0.05 mm/0.002 in
	axial clearance . . . . . .max. 1.10 mm/0.043 in
Cylinder 250	bore diameter size I . . . . . .75.000 - 75.012 mm/2.9527 - 2.9532 in
	bore diameter size II . . . . . .75.013 - 75.025 mm/2.9532 - 2.9537 in
Cylinder 450 EXC/MXC	bore diameter size I . . . . . .89.000 - 89.012 mm/3.5039 - 3.5044 in
	bore diameter size II . . . . . .89.013 - 89.025 mm/3.5044 - 3.5049 in
Cylinder 450 SX / 525	bore diameter size I . . . . . .95.000 - 95.012 mm/3.7401 - 3.7406 in
	bore diameter size II . . . . . .95.013 - 95.025 mm/3.7406 - 3.7411 in
Piston 250	diameter size I . . . . . .74.960 - 74.970 mm/2.9511 - 2.9515 in
	diameter size II . . . . . .74.971 - 74.980 mm/2.9516 - 2.9519 in
	assembly clearance size I . . . . . .0.030 - 0.052 mm/0.0012 - 0.0020 in
	assembly clearance size II . . . . . .0.032 - 0.055 mm/0.0012 - 0.0021 in
	wear limit . . . . . .0.12 mm/0.0047 in
Piston 450 EXC/MXC	diameter size I . . . . . .88.916 - 88.946 mm/3.5006 - 3.5018 in
	diameter size II . . . . . .88.926 - 88.956 mm/3.5010 - 3.5021 in
	assembly clearance size I . . . . . .0.054 - 0.096 mm/0.0021 - 0.0037 in
	assembly clearance size II . . . . . .0.056 - 0.099 mm/0.0022 - 0.0038 in
	wear limit . . . . . .0.12 mm/0.0047 in
Piston 450 SX / 525	diameter size I . . . . . .94.932 - 94.960 mm/3.7374 - 3.7385 in
	diameter size II . . . . . .94.940 - 94.968 mm/3.7377 - 3.7388 in
	assembly clearance size I . . . . . .0.040 - 0.080 mm/0.0015 - 0.0031 in
	assembly clearance size II . . . . . .0.044 - 0.085 mm/0.0017 - 0.0033 in
	wear limit . . . . . .0.12 mm/0.0047 in
Piston ring end gap	compression ring . . . . . .max. 0.80 mm/0.03 in
	oil scraper ring . . . . . .max. 1.00 mm/0.04 in
Valves	seat sealing intake . . . . . .max. 1.50 mm/0.06 in
	seat sealing exhaust . . . . . .max. 2.00 mm/0.078 in
	run out of valve heads . . . . . .max. 0.05 mm/0.002 in
	valve guides diameter . . . . . .max. 6.2 mm/0.244 in
	spring washer . . . . . .min. 0.4 mm/0.015 (new 0.5 mm/0.019)
Valve springs 450/525 EXC/MXC	minimum length of the outer spring . . . . . .39.20 mm/1.5433 in
	minimum length of the inner spring . . . . . .36.45 mm/1.4350 in
Valve springs conical 250 EXC	minimum length . . . . . .37.70 mm/1.484 in
Valve springs conical 450/525 SX	minimum length . . . . . .38.30 mm/1.507 in
Oil pumps	clearance outer rotor - housing . . . . . .max. 0.20 mm/0.0078 in
	clearance outer rotor - inner rotor . . . . . .max. 0.20 mm/0.0078 in
	axial clearance . . . . . .0.15 mm/0.005 in
Bypass valve	minimum spring length . . . . . .23.50 mm/0.9252 in
Clutch	length of springs . . . . . .min. 41.5 mm/1.63 in (new 43 mm/1.693 in)
	wear limit organic . . . . . .min. 1.70 mm/0.067 in
Transmission shafts	axial clearance . . . . . .0.10 - 0.40 mm/0.004 - 0.016 in
	eccentricity . . . . . .0.06 mm/0.002 in
Rocker arms	axial clearance . . . . . .0.02 - 0.10 mm/0.0007 - 0.0039 in
Balancer shaft	journal eccentricity . . . . . .0.06 mm/0.002 in

TECHNICAL DATA – CHASSIS 250/450/525 SX, MXC, EXC RACING 2003

	450/525 SX RACING	250/450/525 EXC RACING	450/525 MXC, EXC USA
Frame	Central tube chrome-moly-steel frame		
Fork	WP **U**p **S**ide **D**own 4860 MXMA		
Wheel travel front/rear	300/335 mm		
Rear suspension	WP **P**rogressive **D**amping **S**ystem shock absorber, 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. 0,4 mm (0,016 in)		
Front tires	80/100 - 21"	90/90 - 21"	80/100 - 21"
Air pressure offroad	1.0 bar (14 psi)	1.0 bar (14 psi)	1.0 bar (14 psi)
Air pressure road driver only	–	1.5 bar	1.5 bar (21 psi)
Rear tires	110/90 - 19"	140/80 - 18"	110/100 - 18"
Air pressure offroad	1.0 bar (14 psi)	1.0 bar (14 psi)	1.0 bar (14 psi)
Air pressure road driver only	–	2.0 bar (28 psi)	2.0 bar (28 psi)
Fuel tank capacity	7 liters (2 US gallons)	EXC 8 liters (2.1 US gallons)	MXC 13 Liter (3.5 gallons)
Final drive ratio	450-14:50t / 525-14:48t	250-12:52t / 450-15:45t / 525-15:40t	450-14:50t / 525-14:48t
Chain	X-Ring 5/8 x 1/4 "		
Available final sprockets	38t, 40t, 42t, 45t, 48t, 50t, 52t		
Bulbs	headlight	HS1 12V 35/35W	
	parking light	12V 5W (Sockel W2, 1x9,5d)	
	brake - rear light	12V 21/5W (Sockel BaY15d)	
	flasher light	12V 10W (Sockel Ba15s)	
	license plate illmination	12V 1,2W (Sockel 1x4,6d)	
Battery	maintenance-free battery 12V 8Ah		
Steering head angle	63.5°		
Wheel base	1481 ± 10 mm (58.3 ± 0.4 in)		
Seat height, unloaded	925 mm (36.5 in)		
Ground clearance, unloaded	380 mm (15.1 in)		

STANDARD ADJUSTMENT - FORK	WP4860MXMA 1418X727	WP4860MXMA 1418X737
Compression adjuster	18	21
Rebound adjuster	19	20
Spring	4.4 N/mm	4.2 N/mm
Spring preload	5 mm (0.20 in)	5 mm (0.20 in)
Air chamber length	90 mm (3.6 in)	110 mm (4.4 in)
Fork oil	SAE 5	SAE 5

STANDARD ADJUSTMENT-SHOCK ABSORBER	WP 5018 PDS DCC 1218X760	WP 5018 PDS MCC 1218X761
Compression adjuster	15 LS (low speed) 2 HS (high speed)	17
Rebound adjuster	26	26
Spring	76-95/260	71-90/260
Spring preload	6 mm (0.24 in)	8 mm (0.32 in)

TIGHTENING TORQUES - CHASSIS		
Collar screw, front wheel spindle	M24x1,5	40 Nm
Brake caliper, front	M8	Loctite 243 + 25 Nm
Brake disk, front	M6 10.9	Loctite 243 + 15 Nm
Brake disk, rear	M6	Loctite 243 + 15 Nm
Clamping screws, upper fork bridge	M8	20 Nm
Clamping screws, lower fork bridge	M8	15 Nm
Clamping screws, fork stubs	M8	10 Nm
Collar nut, rear wheel spindle	M20x1,5	80 Nm
Hexagon nut, swing arm bolt	M14x1,5	100 Nm
Hexagon collar screw, handlebar clamp	M8	20 Nm
Allan head screw, handlebar support	M10	Loctite 243 + 40 Nm
Shock absorber, top	M12	60 Nm
Shock absorber, bottom	M12	60 Nm
Sprocket screws	M8	Loctite 243 + 35 Nm
Ball joint for push rod	M6	Loctite 243 + 10 Nm
Engine mounting bolt	M10	45 Nm
Engine brace	M8	33 Nm
Screw adjusting ring spring preload shock abs.	M6	8 Nm
Spoke nipple	M4,5 / M5	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

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PERIODIC MAINTENANCE SCHEDULE 10

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PERIODIC MAINTENANCE SCHEDULE

11.99
400/520 SX RACING
400/520 EXC RACING

IF THE MOTORCYCLE IS USED PRIMARILY FOR OFF-ROAD RIDING OR COMPETITIVE RACING, THE 15 HOUR SERVICE NEEDS TO BE CARRIED OUT AFTER EACH RACE

	KTM rider		KTM dealer			
	before each start	after washing	1st service, after 3 hours or 20 l fuel consumption	after 15 hours or 100 l fuel consumption	after 30 hours or 200 l fuel consumption	at least once a year
Check engine oil level	●					
Change engine oil			●	●		●
Clean short and long oil screen and magnet of the drain plug whenever you exchange the engine oil			●	●		
Change short and long oil filter unit			●	●		●
Check oil line for leakage and proper installation			●	●		
Check valve clearance and adjust if necessary			●	●		
Change spark plug					●	
Drain and clean carburetor float bowl		●			●	●
Adjust idling						●
Check breather hoses of engine case, gas tank and carburetor for correct position without buckles			●	●		
Clean air filter and air filter box		●		●		●
Check sprockets, chain guides and chain for wear	●		●	●		
Clean and lube chain	●	●		●		
Check chain tension	●		●	●		
Check cooling liquid level	●		●	●		
Check quality of antifreeze						●
Check cooling system for leaks	●		●	●		
Check exhaust system for leakage						●
Change exhaust muffler packing					●	
Clean spark arrestor (EXC USA)					●	●
Check exhaust brackets				●		●
Check brake fluid level front and rear	●		●	●		
Change brake fluid						●
Check brake pad thickness	●			●		
Check brake discs for wear and damage				●		
Check condition and correct installation of brake hoses	●		●	●		
Check free play and easy operation of hand brake lever and foot brake lever	●		●	●		
Check oil level of the master cylinder of the hydraulic clutch				●		
Change the oil of the hydraulic clutch						●
Check adjustment and function of telescopic fork	●			●		
Check telescopic fork for leaks				●		
Loosen breather bolts at fork legs (overpressure)		●		●		
Change fork oil						●
Perform a full maintenance job for the telescopic fork						●
Clean dust bellows on telescopic fork		●		●		●
Check steering head bearing clearance and adjust if necessary			●	●		
Clean and grease steering head bearings and its seals						●
Check adjustment and function of shock absorber	●			●		
Perform a full maintenance job for the shock absorber						●
Servicing swing arm pivots						●
Check tightness of spokes and rim joint	●		●	●		
Check wheel bearings for clearance	●			●		
Check tire condition and air pressure	●			●		●
Check cables for damage and easy working	●			●		●
Lube and adjust cables		●	●	●		●
Check the electrical system	●		●	●		
Check adjustment of headlight				●		
Spray emergency OFF switch, short circuit button and light switch with contact spray		●		●		
Check all bolts, nuts and hose clamps for proper tightness	●		●	●		
Grease or lube all pivot points and sliding components		●	●	●		

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SUPPLEMENTARY MAINTENANCE INSTRUCTIONS FOR THE 400/520 RACING ENGINE MODEL 2000 (ADDITIONAL ORDER FOR KTM WORKSHOP)

Hours	400 SX	400 MXC/EXC	520 SX	520 MXC/EXC
15	Small Maintenance Kit	–	Small Maintenance Kit	–
30	Small Maintenance Kit	Small Maintenance Kit	Small Maintenance Kit	Small Maintenance Kit
45	Large Maintenance Kit	–	Large Maintenance Kit	–
60	Small Maintenance Kit	Large Maintenance Kit	Small Maintenance Kit	Large Maintenance Kit
75	Small Maintenance Kit	–	Small Maintenance Kit	–
90	Large Maintenance Kit	Small Maintenance Kit	Large Maintenance Kit	Small Maintenance Kit
105	Small Maintenance Kit	–	Small Maintenance Kit	–
120	Small Maintenance Kit	Large Maintenance Kit	Small Maintenance Kit	Large Maintenance Kit

Spare Part Numbers of the Maintenance Kits - Model 2000

Maintenance Kit Small 400/520: 590.12.099.044
Maintenance Kit Large 400: 595.12.099.144
Maintenance Kit Large 520: 590.12.099.144

Please observe KTM TECHNICAL INFORMATION No: 0003/30/02-E !!!

PERIODIC MAINTENANCE SCHEDULE 2001

400/520 SX/MXC/EXC RACING

	A washed motorcycle can be checked more quickly which saves money!	1st service after 3 hours or 20 l fuel	after/every 15 hours or 100 l fuel
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	●	●
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 beams, brake light, indicator 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 smooth operation and adjust free travel of handbrake/foot brake lever	●	●
	Check tightness of brake system bolts	●	●
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 bolts (triple clamps, fork leg axle passage)	●	●
WHEELS	Check spoke tension and rim joint		●
	Check tires and air pressure	●	●
	Check chain, rear sprockets and chain guides for wear, fit and tension	●	●
	Lubricate chain	●	●
	Check clearance of wheel bearings	●	●

IMPORTANT RECOMMENDED MAINTENANCE WORK THAT CAN BE CARRIED OUT BY SPECIAL REQUEST

	at least once a year
Complete maintenance of fork	●
Complete maintenance of shock absorber	●
Clean and grease steering head bearings and gasket elements	●
Clean and adjust carburetor	●
Replace glass fibre yarn filling of the exhaust main silencer	●
Treat electric contacts and switches with contact spray	●
Treat battery connections with contact grease	●
Change hydraulic clutch fluid	●
Change brake fluid	●

IF MOTORCYCLE IS USED FOR COMPETITION A 15 HOUR SERVICE SHOULD BE CARRIED OUT AFTER EVERY RACE!
SERVICE INTERVALS 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 THE CARE AND CHECKS BY THE RIDER!

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IMPORTANT CHECKS AND MAINTENANCE TO BE CARRIED OUT BY THE RIDER

	Before each start	After every cleaning	For cross-country use
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 anticorrosion agent		●	
Treat ignition and steering locks and light switches with contact spray		●	
Check tightness of bolts, nuts and hose clamps regularly			●

SUPPLEMENTARY MAINTENANCE INSTRUCTIONS FOR THE 400/520 RACING ENGINE MODEL 2001 (ADDITIONAL ORDER FOR KTM WORKSHOP)

Hours	400 SX	400 MXC/EXC	520 SX	520 MXC/EXC
15	Small Maintenance Kit	–	Small Maintenance Kit	–
30	Small Maintenance Kit	Small Maintenance Kit	Small Maintenance Kit	Small Maintenance Kit
45	Small Maintenance Kit	–	Small Maintenance Kit	–
60	Large Maintenance Kit	Small Maintenance Kit	Large Maintenance Kit	Small Maintenance Kit
75	Small Maintenance Kit	–	Small Maintenance Kit	–
90	Small Maintenance Kit	Large Maintenance Kit	Small Maintenance Kit	Large Maintenance Kit
105	Small Maintenance Kit	–	Small Maintenance Kit	–
120	Large Maintenance Kit	Small Maintenance Kit	Large Maintenance Kit	Small Maintenance Kit

Spare Part Numbers of the Maintenance Kits - Model 2001

Maintenance Kit Small 400/520: 590.12.199.044
Maintenance Kit Large 400/520: 590.12.199.144

Please observe KTM TECHNICAL INFORMATION No: 0011/30/05-E !!!

PERIODIC MAINTENANCE SCHEDULE 2002

250/400/520 SX/MXC/EXC RACING

	A washed motorcycle can be checked more quickly which saves money!	1st service after 3 hours or 20 l fuel	after/every 15 hours or 100 l fuel
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	●	●
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 beams, brake light, indicator 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 smooth operation and adjust free travel of handbrake/foot brake lever	●	●
	Check tightness of brake system screws	●	●
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)	●	●
WHEELS	Check spoke tension and rim joint		●
	Check tires and air pressure	●	●
	Check chain, rear sprockets and chain guides for wear, fit and tension	●	●
	Lubricate chain	●	●
	Check clearance of wheel bearings	●	●

IMPORTANT RECOMMENDED MAINTENANCE WORK THAT CAN BE CARRIED OUT BY SPECIAL REQUEST

	at least once a year
Complete maintenance of fork	●
Complete maintenance of shock absorber	●
Clean and grease steering head bearings and gasket elements	●
Clean and adjust carburetor	●
Replace glass fibre yarn filling of the exhaust main silencer	●
Treat electric contacts and switches with contact spray	●
Treat battery connections with contact grease	●
Change hydraulic clutch fluid	●
Change brake fluid	●

IF MOTORCYCLE IS USED FOR COMPETITION,A 15-HOURS SERVICE SHOULD BE CARRIED OUT AFTER EVERY RACE!
SERVICE INTERVALS 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 THE CARE AND CHECKS BY THE RIDER!

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IMPORTANT CHECKS AND MAINTENANCE TO BE CARRIED OUT BY THE RIDER	Before each start	After every cleaning	For cross-country use
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 regulary			●
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			●

CONTINUED TESTS OF THE 250/400/520 RACING MOTOR FOR KTM'S SPECIALIZED WORKSHOP (ADDITIONAL ORDER FOR KTM'S SPECIALIZED WORKSHOP)	30 hours 200 l	45 hours 300 l	60 hours 400 l	90 hours 600 l	120 hours 800 l	135 hours 900 l
a 100 l fuel consumption is equivalent to approx. 15 operating hours						
Force fit of clutch drive shaft		●		●		●
Clutch disk wear	●	●	●	●	●	●
Cylinder and piston wear		●		●		●
Groove piston-pin retainer wear		●		●		●
Camshaft wear		●		●		●
Radial clearance of camshaft bearing		●		●		●
Valve spring length		●		●		●
Spring washer wear		●		●		●
Valve disk slack		●		●		●
Valve guide wear		●		●		●
Radial clearance of rocker-arm roller		●		●		●
Elongation of timing chain		●		●		●
Wear of toothing on chain tensioner	●	●	●	●	●	●
Crankshaft journal/crankshaft wear		●		●		●
Radial clearance of conrod bearing		●		●		●
Radial clearance of piston pin bearing		●		●		
Wear of balancing shaft bearing		●		●		●
Wear of crankshaft bearing		●		●		●
Transmission wear		●		●		●
Flection of transmission shafts		●		●		●
Length of bypass valve spring		●		●		●

PERIODIC MAINTENANCE SCHEDULE 2003

250/450/525 SX/MXC/EXC RACING

	A clean motorcycle can be checked more quickly which saves money!	1. service after 3 hours or 20 l fuel	after/every 15 hours or 100 l fuel
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	●	●
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 tightness of brake system screws	●	●
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)	●	●
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	●	●
	Check clearance of wheel bearings	●	●

IMPORTANT RECOMMENDED MAINTENANCE WORK THAT CAN BE CARRIED OUT BY EXTRA ORDER

	at least once a year
Complete maintenance of fork	●
Complete maintenance of shock absorber	●
Clean and grease steering head bearings and gasket elements	●
Clean and adjust carburetor	●
Replace glass fibre yarn filling of the exhaust main silencer	●
Treat electric contacts and switches with contact spray	●
Treat battery connections with contact grease	●
Change hydraulic clutch fluid	●
Change brake fluid	●

IF MOTORCYCLE IS USED FOR COMPETITION 15 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.

Art.-No. 3206007 -E

IMPORTANT CHECKS AND MAINTENANCE TO BE CARRIED OUT BY THE RIDER			
	Before each start	After every cleaning	For cross-country use
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			●

RECOMMENDED INSPECTION OF THE 250/450/525 SX AND EXC ENGINE USED FOR ENDURO COMPETITIONS BY YOUR KTM WORKSHOP (ADDITIONAL ORDER FOR THE KTM WORKSHOP)

a 100 liter fuel consumption is equivalent to approx. 15 operating hours	30 hours 200 liter	45 hours 300 liter	60 hours 400 liter	90 hours 600 liter	120 hours 800 liter	135 hours 900 liter
Check the clutch disks for wear	●	●	●	●	●	●
Check the length of the clutch springs	●	●	●	●	●	●
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)		●		●		●
Replace the camshaft bearings		●		●		●
Check the length of the valve springs		●		●		●
Check the spring cap for wear		●		●		●
Check the eccentricity of the valve disk		●		●		●
Check the valve guides for wear		●		●		●
Check the radial clearance of the rocker arm rollers		●		●		●
Check the elongation of the timing chain		●		●		●
Check the chain tensioner tooting for damage (visual check)	●	●	●	●	●	●
Check the eccentricity of the crankshaft journal		●		●		●
Replace the conrod bearings		●		●		●
Check piston pin bearing		●		●		●
Replace the balancer shaft bearings		●		●		●
Replace the crankshaft main bearings		●		●		●
Check the entire transmission including the roller and bearings for wear		●		●		●
Check the length of the bypass valve spring		●		●		●

NOTE: IF THE INSPECTION ESTABLISHES THAT PERMISSIBLE TOLERANCES ARE EXCEEDED, THE RESPECTIVE COMPONENTS MUST BE REPLACED.

Art.-No. 3206007 -E

RECOMMENDED INSPECTION OF THE 250/450/525 EXC ENGINE USED FOR HOBBY - ENDURO COMPETITIONS BY YOUR KTM WORKSHOP (ADDITIONAL ORDER FOR THE KTM WORKSHOP)						
a 100 liter fuel consumption is equivalent to approx. 15 operating hours	60 hours 400 liter	90 hours 600 liter	120 hours 800 liter	180 hours 1200 liter	240 hours 1600 liter	270 hours 1800 liter
Check the clutch disks for wear	●	●	●	●	●	●
Check the length of the clutch springs	●	●	●	●	●	●
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)		●		●		●
Replace the camshaft bearings		●		●		●
Check the length of the valve springs		●		●		●
Check the spring cap for wear		●		●		●
Check the eccentricity of the valve disk		●		●		●
Check the valve guides for wear		●		●		●
Check the radial clearance of the rocker arm rollers		●		●		●
Check the elongation of the timing chain		●		●		●
Check the chain tensioner tooting for damage (visual check)	●	●	●	●	●	●
Check the eccentricity of the crankshaft journal		●		●		●
Replace the conrod bearings		●		●		●
Check piston pin bearing		●		●		●
Replace the balancer shaft bearings		●		●		●
Replace the crankshaft main bearings		●		●		●
Check the entire transmission including the roller and bearings for wear		●		●		●
Check the length of the bypass valve spring		●		●		●

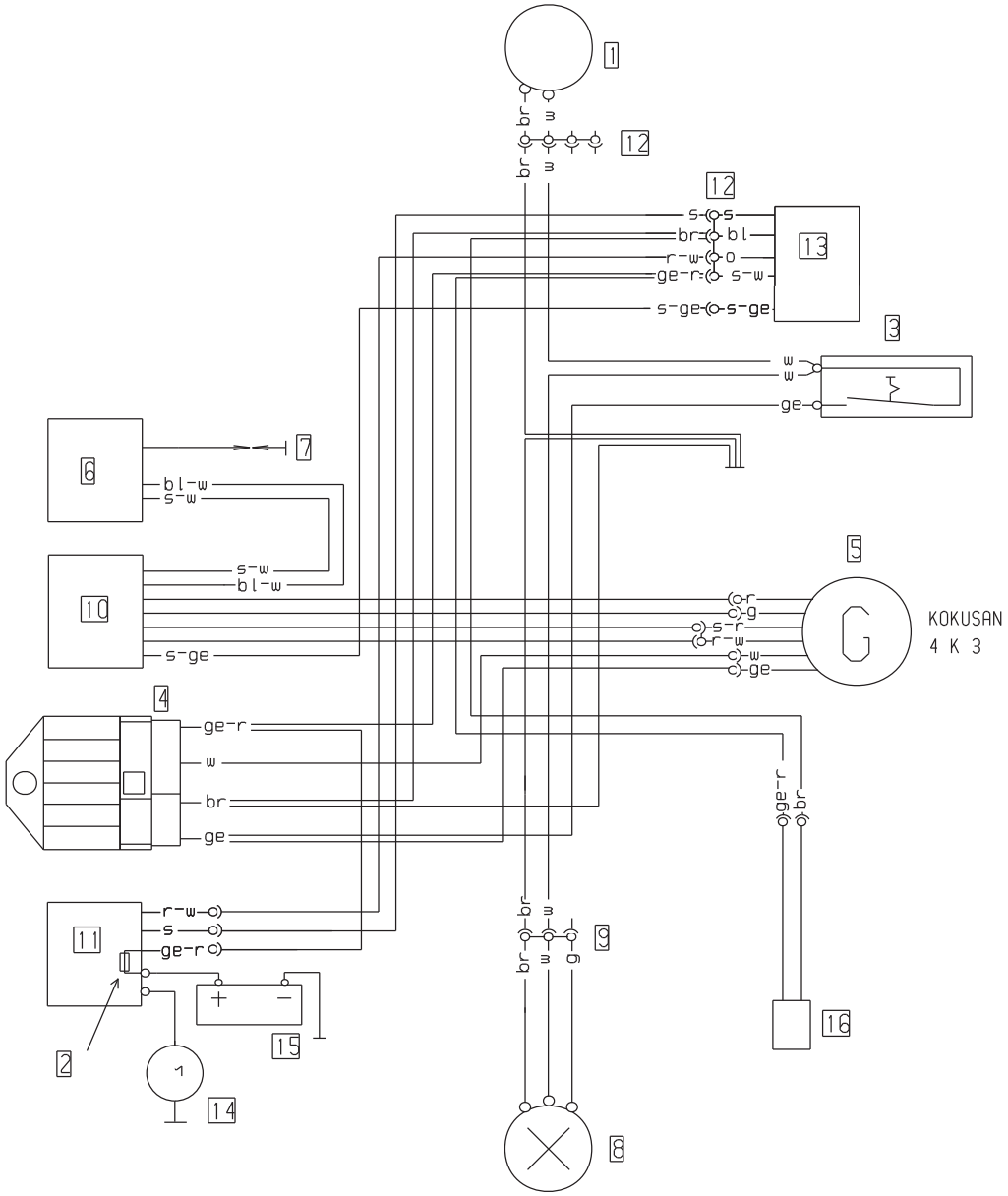
NOTE: IF THE INSPECTION ESTABLISHES THAT PERMISSIBLE TOLERANCES ARE EXCEEDED, THE RESPECTIVE COMPONENTS MUST BE REPLACED.

WIRING DIAGRAMS 11

INDEX

Art.-No. 3206007 -E

SERVICE	Modell	Kabelstrangnummer	Land	Datum, Name	Zeichnungsnr	Änderungsstand	Kabelstrangbez
	400/520 EXC RACING 2000	vorne 590 11 075 100 hinten 503 11 076 000	USA	13 10 99 TH	RACOOUSA		vo 4T-Racing 2000 hi 125-380 EXC '98



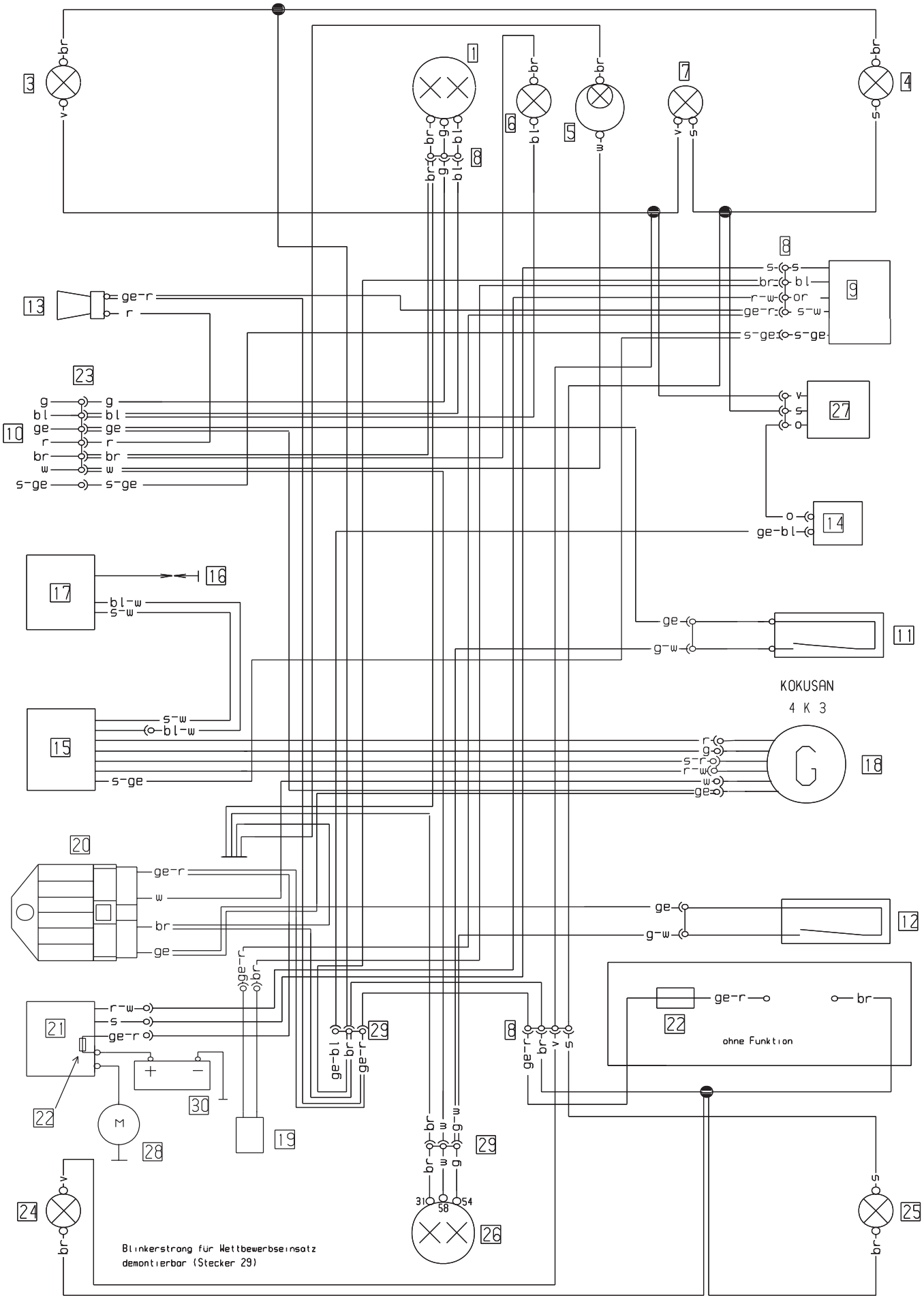
Deutsch	Englisch	Italienisch	Französisch
1 Scheinwerfer	1 headlight	1 faro	1 phare
2 Stecksicherung 10A	2 fuse 10 A	2 fusibile 10A	2 fusible 10A
3 Lichtschalter	3 light switch	3 interr della luce	3 interr d' eclairage
4 Spannungsbegrenzer	4 voltage limiter	4 regol di tens	4 regulateur
5 Generator	5 generator	5 dinamo	5 generateur
6 Zündspule	6 ignition coil	6 bobina d'accens	6 bobine d'allumage
7 Zündkerze	7 spark plug	7 candela	7 bougie
8 Schlußlicht	8 rearlight	8 fanale posteriore	8 feu arriere
9 3-pol Stecker	9 multip cont plug (3)	9 connettore a 3 poli	9 connect multiple (3)
10 CDI-Einheit	10 CDI-unit	10 CDI-seatola	10 CDI-unite
11 Startrelais	11 starter relay	11 rele d'avviamento	11 relais de demarreur
12 4-pol Stecker	12 multip cont plug (4)	12 connettore a 4 poli	12 connect multiple (4)
13 Start/Not Aus	13 startsw /run off	13 disinteritor/partire	13 ba de dem/arr d'urg
14 Startermotor	14 starter engine	14 mot d'avviamento	14 demarreur electrique
15 Batterie 12V 4Ah	15 battery 12V 4Ah	15 batteria 12V 4Ah	15 batterie 12V 4Ah
16 Kondensator	16 capacitor	16 condensatore	16 condensateur
bl blau	bl blue	bl blu	bl bleu
br braun	br brown	br marrone	br brun
ge gelb	ge yellow	ge giallo	ge jaune
gr grau	gr grey	gr grigio	gr gris
g grün	g green	g verde	g vert
o orange	o orange	o arancione	o orange
r rot	r red	r rosso	r rouge
s schwarz	s black	s nero	s noir
v violett	v violet	v violetto	v violet
w weiß	w white	w bianco	w blanc

Start- Notaus- Schalter

Domino	o	s-ge	bl	s	s-w
			o—o		
		o—o			
	o—o				o

Spanisch
1 faro
2 fusible prin 10A
3 interruptor d'luz
4 regulador de tension
5 generador
6 bobina de encendido
7 bujia
8 luz de trasera
9 conect multiple (3)
10 unidad cdi
11 rele de arranque
12 conect multiple (4)
13 bott de arr par de u
14 motor de arranque
15 bateria 12V 4Ah
16 condensador
bl azul
br marron
ge amarillo
gr gris
g verde
o naranja
r rojo
s negro
v violeta
w blanco

KTM SPORTMOTORCYCLES SERVICE	Modell	Kabelstrangnummer	Land	Datum, Name
	400/520 EXC RACING	vorne 590 11 075 200 hinten 503 14 040 100 Blinker vorne 503 11 080 100 Blinker hinten 503 11 081 000	Europa	11 10 1999 Hasl



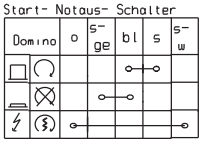
400/520 EXC RACING 2000

Deutsch	Englisch	Italienisch	Französisch
1 Scheinwerfer	1 headlight	1 faro	1 phare
3 Blinker li vo	3 turn indic left fr	3 lampegg ant sn	3 clignoteur av gauche
4 Blinker re vo	4 turn indic right fr	4 lampegg ant dx	4 clignoteur av droit
5 Tachobeleuchtung	5 speedometer light	5 luce di tachimetro	5 eclair comp vitesse
6 Fernlichtkontrolle	6 high beam indicator	6 spia abbagliante	6 temoin feu route
7 Blinkerkontrolle	7 turn indicator	7 spia lampeggiatori	7 temoin de clignoteur
8 4-pol Stecker	8 multip cont plug (4)	8 connettore a 4 poli	8 connect multiple (4)
9 Start / Not Aus	9 startsw /run-off	9 disinteritor/partire	9 ba de dem /arr d'urg
10 zum Kombischalter	10 to combinat switch	10 multicomando	10 commodo
11 Bremslichtsch vo	11 stoplight switch f	11 int luce arresto ant	11 contact de stop av
12 Bremslichtsch hi	12 stoplight switch r	12 int luce arresto post	12 contact Harr de stop
13 Horn	13 horn	13 clacson	13 klaxon
14 Blinkgeber	14 turn indicator	14 trasmett di lampeg	14 centrale clignot
15 CDI-Einheit	15 CDI-unit	15 CDI-seatola	15 boitier CDI
16 Zündkerze	16 spark plug	16 candela	16 bougie
17 Zündspule	17 ignition coil	17 bobina d'accens	17 bobine d'allumage
18 Generator	18 generator	18 dinamo	18 generateur
19 Kondensator	19 capacitor	19 condensatore	19 condensateur
20 Spannungsregler	20 voltage regulator	20 regol di tens	20 regulateur
21 Startrelais	21 starter relay	21 rele d'avviamento	21 relais de demarreur
22 Stecksicherung 10A	22 fuse 10A	22 fusibile 10A	22 fusible 10A
23 6-pol Stecker	23 multip cont plug (6)	23 connettore a 6 poli	23 connect multiple (6)
24 Blinker li hi	24 blinker left rear	24 lampegg post sn	24 clign arr gauche
25 Blinker re hi	25 blinker right rear	25 lampegg post dx	25 clign arr droite
26 Brems-Schlußlicht	26 rear-stoplight	26 fanal post di freno	26 feu arr et de stop
27 Blinkerschalter	27 blink switch	27 int lampeggiatori	27 contact d clignoteur
28 Startermotor	28 starter engine	28 mot d'avviamento	28 demrreur electrique
29 3-pol Stecker	29 multip cont plug (3)	29 connettore a 3 poli	29 connect multiple (3)
30 Batterie 12V 4Ah	30 battery 12V 4Ah	30 batteria 12V 4Ah	30 batterie 12V 4Ah

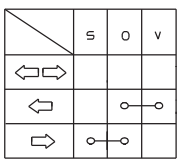
Deutsch	Englisch	Italienisch	Französisch	Spanisch
bl blau	bl blue	bl blu	bl bleu	bl azul
br braun	br brown	br marrone	br brun	br marron
ge gelb	ge yellow	ge giallo	ge jaune	ge amarillo
gr grau	gr grey	gr grigio	gr gris	gr gris
g grün	g green	g verde	g vert	g verde
o orange	o orange	o arancione	o orange	o naranja
r rot	r red	r rosso	r rouge	r rojo
s schwarz	s black	s nero	s noir	s negro
v violett	v violet	v violetto	v violet	v violeta
w weiß	w white	w bianco	w blanc	w blanco

Spanisch
1 faro
3 interm izquierdo delantero
4 intermitente derecho delantero
5 luz tacometro
6 lampara aviso luces largas
7 lampara aviso intermitentes
8 conector multiple (4)
9 boton de arr par de urg
10 interruptor combinado
11 interr luz de freno del
12 interr luz de fren tras
13 claxon
14 conjunto del intermintente
15 unidad cdi
16 bujia
17 bobina de encendido
18 generador
19 condensador
20 regulador de tension
21 rele de arranque
22 fusible principal 10A
23 conector multiple (6)
24 intermitente izquierdo trasero
25 intermitente derecho trasero
26 luz de freno trasero
27 interuptor clignoteur
28 motor de arrranque
29 conector multiple (3)
30 batteria 12V 4Ah

Start- Notaus- Schalter



Blinkerschalter

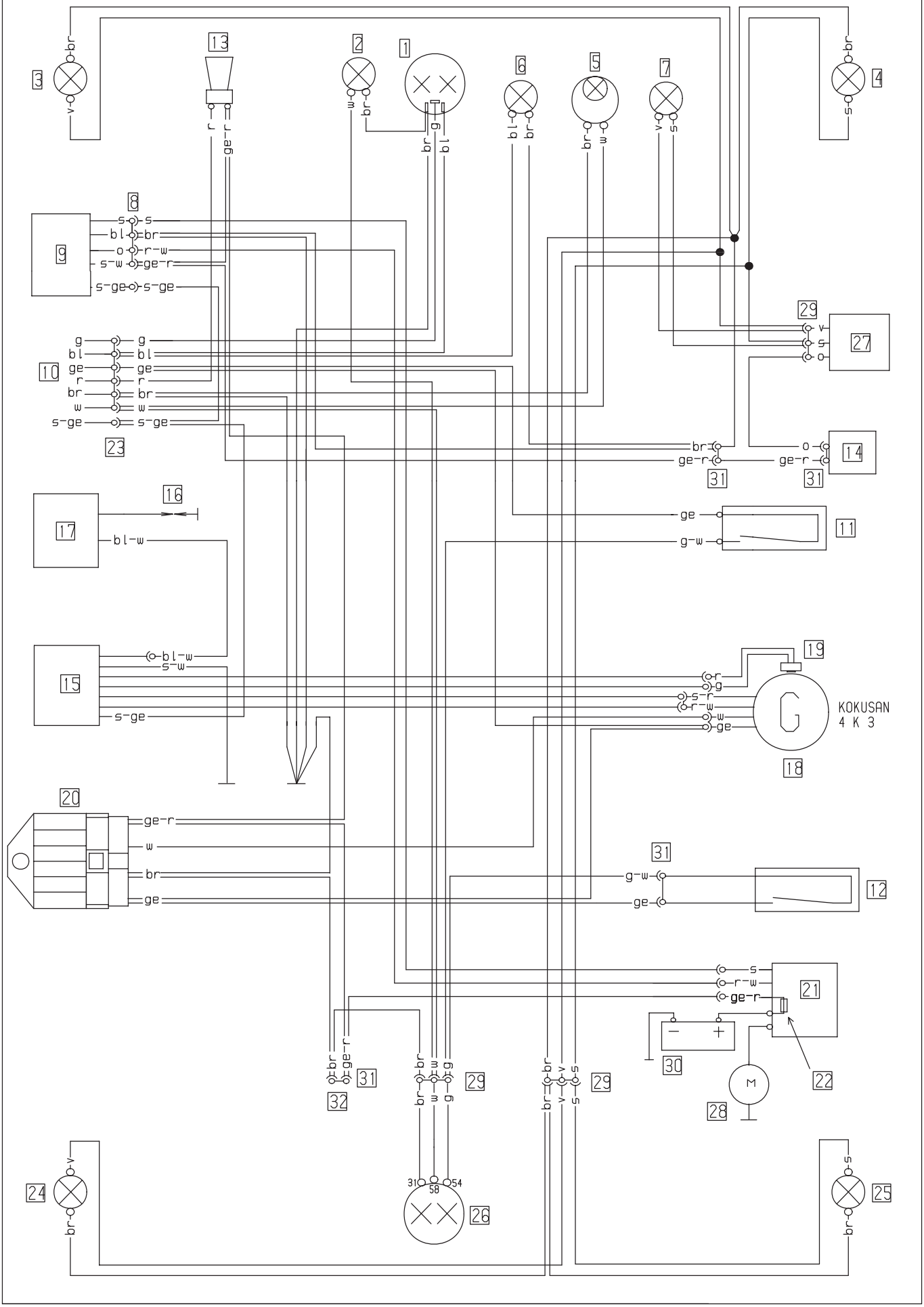


Kontaktbelegung -
Lichtschalter (Typ CEV 9610)

	g	bl	ge	w	s/ge	r	br
LICHT =							
Abblendl	o		o	o			
Fernlicht		o	o	o			
HUPE						o	o
ZÜNDUNG AUS					o		o
	5	2	1	3	6	4	

Art.-No. 3206007 -E

SERVICE	Modell 2001 400/520 EXC Racing	Kabelstrangnummer vorne 590 11 075 400 hinten 503 14 040 100 Blinkerstrang vorne 590 11 080 000 Blinkerstrang hinten 590 11 081 000	Land EU, AUS	Datum, Name 04 05 00 KE	Dateiname RAC01AUS



400/520 EXC RACING 2001 EU, AUS

Deutsch	Englisch	Italienisch	Französisch
1 Scheinwerfer	1 headlight	1 faro	1 phare
2 Standlicht	2 position light	2 luce di posizione	2 feu de position
3 Blinker li vo	3 turn indic left fr	3 lampegg ant sn	3 clignoteur av gauche
4 Blinker re vo	4 turn indic right fr	4 lampegg ant dx	4 clignoteur av droit
5 Tachobeleuchtung	5 speedometer light	5 luce di tachimetro	5 eclair comp vitesse
6 Fernlichtkontrolle	6 high beam indicator	6 spia abbagliante	6 temoin feu route
7 Blinkerkontrolle	7 turn indicator	7 spia lampeggiatori	7 temoin de clignoteur
8 4-pol Stecker	8 multip cont plug (4)	8 connettore a 4 poli	8 connect multiple (4)
9 Start / Not Aus	9 startsw /run-off	9 disinteritor/partire	9 ba de dem /arr d'urg
10 zum Kombischalter	10 to combinat switch	10 multicomando	10 commodo
11 Bremslichtsch vo	11 stoplight switch f	11 int luce arresto ant	11 contact de stop av
12 Bremslichtsch hi	12 stoplight switch r	12 int luce arresto post	12 contact Harr de stop
13 Horn	13 horn	13 clacson	13 klaxon
14 Blinkgeber	14 turn indicator	14 trasmett di lampeg	14 centrale clignot
15 CDI-Einheit	15 CDI-unit	15 CDI-seatola	15 boitier CDI
16 Zündkerze	16 spark plug	16 candela	16 bougie
17 Zündspule	17 ignition coil	17 bobina d'accens	17 bobine d'allumage
18 Generator	18 generator	18 dinamo	18 generateur
19 Impulsgeber	19 pulser coil	19 trasmett d'impulsi	19 generateur d'impuls
20 Spannungsregler	20 voltage regulator	20 regol di tens	20 regulateur
21 Startrelais	21 starter relay	21 rele d'avviamento	21 relais de demarreur
22 Stecksicherung 10A	22 fuse 10A	22 fusibile 10A	22 fusible 10A
23 6-pol Stecker	23 multip cont plug (6)	23 connettore a 6 poli	23 connect multiple (6)
24 Blinker li hi	24 blinker left rear	24 lampegg post sn	24 clign arr gauche
25 Blinker re hi	25 blinker right rear	25 lampegg post dx	25 clign arr droite
26 Brems-Schlußlicht	26 rear-stoplight	26 fanal post di freno	26 feu arr et de stop
27 Blinkerschalter	27 blink switch	27 int lampeggiatori	27 contact d clignoteur
28 Startermotor	28 starter engine	28 mot d'avviamento	28 demrreur electrique
29 3-pol Stecker	29 multip cont plug (3)	29 connettore a 3 poli	29 connect multiple (3)
30 Batterie 12V 4Ah	30 battery 12V 4Ah	30 batteria 12V 4Ah	30 batterie 12V 4Ah
31 2-pol Stecker	31 multip cont plug (2)	31 connettore a 2 poli	31 connect multiple (2)
32 Lüfteranschluss	32 fan connection	32 connett ventilatore	32 connect ventilateur

Deutsch	Englisch	Italienisch	Französisch	Spanisch
bl blau	bl blue	bl blu	bl bleu	bl azul
br braun	br brown	br marrone	br brun	br marron
ge gelb	ge yellow	ge giallo	ge jaune	ge amarillo
gr grau	gr grey	gr grigio	gr gris	gr gris
g grün	g green	g verde	g vert	g verde
o orange	o orange	o arancione	o orange	o naranja
r rot	r red	r rosso	r rouge	r rojo
s schwarz	s black	s nero	s noir	s negro
v violett	v violet	v violetto	v violet	v violeta
w weiß	w white	w bianco	w blanc	w blanco

Spanisch
1 faro
2 luz de posicion
3 interm izquierdo delantero
4 intermitente derecho delantero
5 luz tacometro
6 lampara aviso luces largas
7 lampara aviso intermitentes
8 conector multiple (4)
9 boton de arr par de urg
10 interruptor combinado
11 interr luz de freno del
12 interr luz de fren tras
13 claxon
14 conjunto del intermintente
15 unidad cdi
16 bujia
17 bobina de encendido
18 generador
19 generado de impulsos
20 regulador de tension
21 rele de arranque
22 fusible principal 10A
23 conector multiple (6)
24 intermitente izquierdo trasero
25 intermitente derecho trasero
26 luz de freno trasero
27 interuptor clignoteur
28 motor de arrranque
29 conector multiple (3)
30 batteria 12V 4Ah
31 conector multiple (2)
32 conector ventilador

Start- Notaus- Schalter

Domino		o	s-ge	bl	s	s-w
□	↻			●	●	
▭	⊗		●	●		
ϟ	⚷	●				●

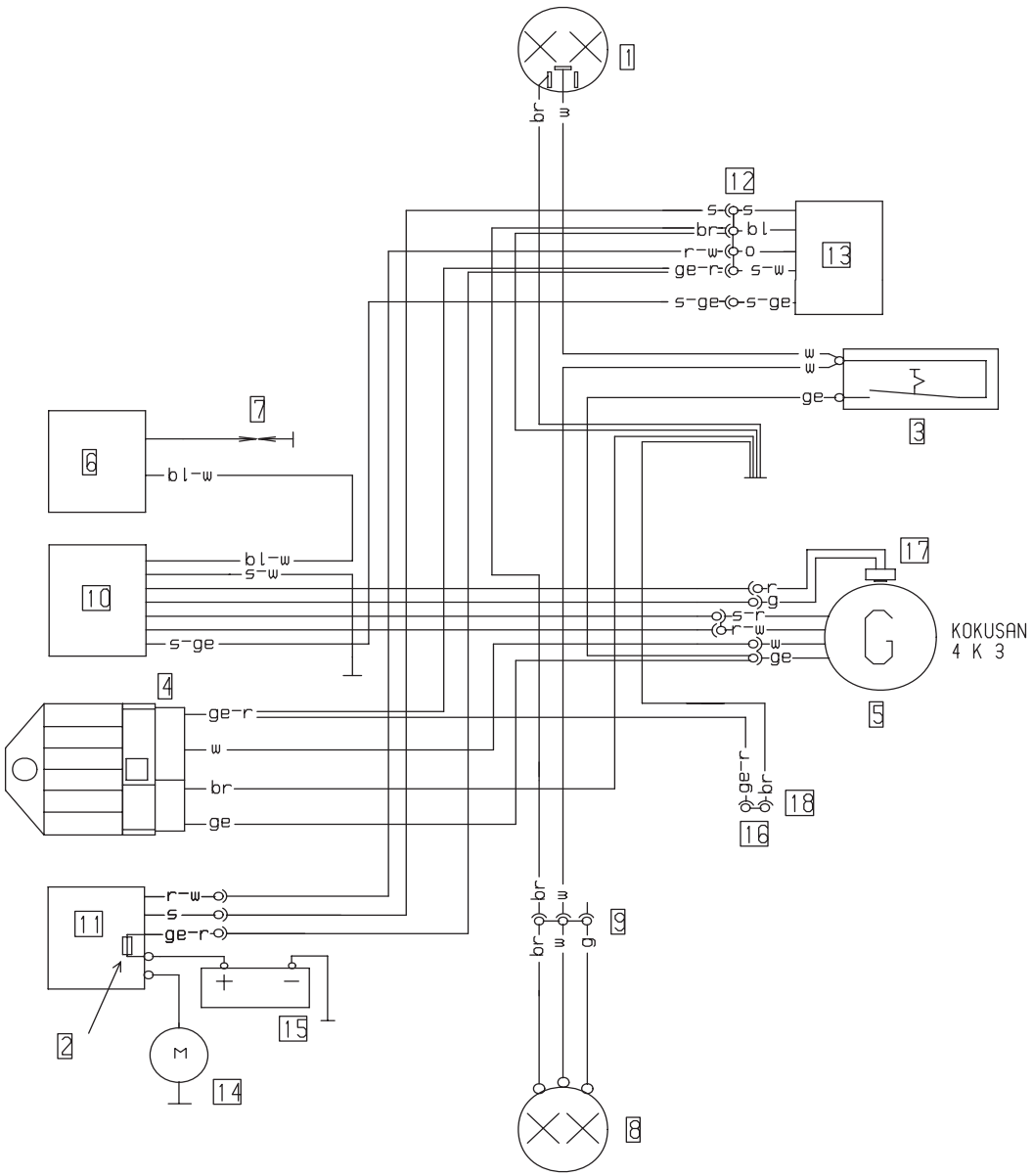
Blinkerschalter

	s	o	v
⇦⇨			
⇦		●	●
⇨	●	●	

Kontaktbelegung – Lichtschalter (Typ CEV 9610)

	g	bl	ge	w	s/ge	r	br
Lights ○							
LO beam	●		●	●			
Hi beam		●	●	●			
Horn						●	●
Engine off ⊗					●		●
	5	2	1	3	6	4	

SERVICE	Modell	Kabelstrangnummer	Land	Datum, Name	Zeichnungsnr	Änderungsstand	Kabelstrangbez
KTM SPORTMOTORCYCLES	400/520 MXC/EXC RACING 2001	vorne 590 11 075 300 hinten 503 11 076 000	USA	08 05 00 KE	RAC01USA		vo 4T-Racing 2001 hi 125-380 EXC '98



Deutsch	Englisch	Italienisch	Französisch
1 Scheinwerfer	1 headlight	1 faro	1 phare
2 Stecksicherung 10A	2 fuse 10 A	2 fusibile 10A	2 fusible 10A
3 Lichtschalter	3 light switch	3 interr della luce	3 interr d' eclairage
4 Spannungsbegrenzer	4 voltage limiter	4 regol di tens	4 regulateur
5 Generator	5 generator	5 dinamo	5 generateur
6 Zündspule	6 ignition coil	6 bobina d'accens	6 bobine d'allumage
7 Zündkerze	7 spark plug	7 candela	7 bougie
8 Schlußlicht	8 rearlight	8 fanale posteriore	8 feu arriere
9 3-pol Stecker	9 multip cont plug (3)	9 connettore a 3 poli	9 connect multiple (3)
10 CDI-Einheit	10 CDI-unit	10 CDI-scatola	10 CDI-unite
11 Startrelais	11 starter relay	11 rele d'avviamento	11 relais de demarreur
12 4-pol Stecker	12 multip cont plug (4)	12 connettore a 4 poli	12 connect multiple (4)
13 Start/Not Aus	13 startsw /run off	13 disinteritor/partire	13 ba de dem/arr d'urg
14 Startermotor	14 starter engine	14 mot d'avviamento	14 demarreur electrique
15 Batterie 12V 4Ah	15 battery 12V 4Ah	15 batteria 12V 4Ah	15 batterie 12V 4Ah
16 Lüfteranschluss	16 fan connection	16 connett ventilatore	16 connect ventilateur
17 Impulsgeber	17 pulser coil	17 trasmett d'impulsi	17 generateur d'impuls
18 2-pol Stecker	18 multip cont plug (2)	18 connettore a 2 poli	18 connect multiple (2)
bl blau	bl blue	bl blu	bl bleu
br braun	br brown	br marrone	br brun
ge gelb	ge yellow	ge giallo	ge jaune
gr grau	gr grey	gr grigio	gr gris
g grün	g green	g verde	g vert
o orange	o orange	o arancione	o orange
r rot	r red	r rosso	r rouge
s schwarz	s black	s nero	s noir
v violett	v violet	v violetto	v violet
w weiß	w white	w bianco	w blanc

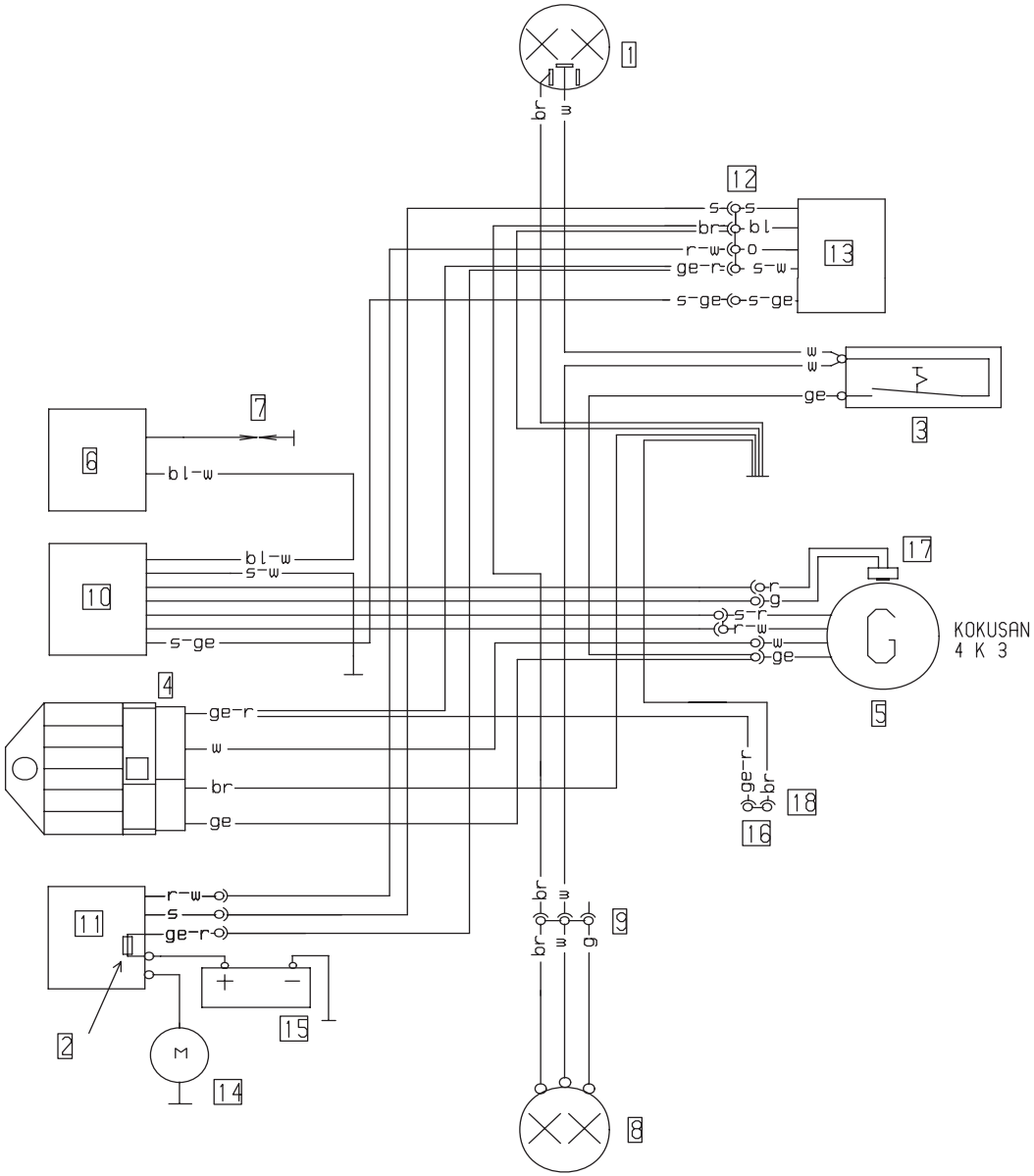
Start- Notaus- Schalter

Domino	o	s-ge	bl	s	s-w
			•		
		•			
	•				•

Spanisch
1 faro
2 fusible prin 10A
3 interruptor d'luz
4 regulador de tension
5 generador
6 bobina de encendido
7 bujia
8 luz de trasera
9 conect multiple (3)
10 unidad cdi
11 rele de arranque
12 conect multiple (4)
13 bott de arr par de u
14 motor de arranque
15 batteria 12V 4Ah
16 conector ventilador
17 generado de tension
18 conector multiple(2)
bl azul
br marron
ge amarillo
gr gris
g verde
o naranja
r rojo
s negro
v violeta
w blanco

MXC without lights

SERVICE	Modell	Kabelstrangnummer	Land	Datum, Name	Zeichnungsnr	Änderungsstand	Kabelstrangbez
	250/400/520 MXC, EXC RACING 2002	vorne 590 11 075 300 hinten 503 11 076 000	USA	08 05 00 KE	RAC01USA		vo 4T-Racing 2001 hi 125-380 EXC '98



Deutsch	Englisch	Italienisch	Französisch
1 Scheinwerfer	1 headlight	1 faro	1 phare
2 Stecksicherung 10A	2 fuse 10 A	2 fusibile 10A	2 fusible 10A
3 Lichtschalter	3 light switch	3 interr della luce	3 interr d' eclairage
4 Spannungsbegrenzer	4 voltage limiter	4 regol di tens	4 regulateur
5 Generator	5 generator	5 dinamo	5 generateur
6 Zündspule	6 ignition coil	6 bobina d'accens	6 bobine d'allumage
7 Zündkerze	7 spark plug	7 candela	7 bougie
8 Schlußlicht	8 rearlight	8 fanale posteriore	8 feu arriere
9 3-pol Stecker	9 multip cont plug (3)	9 connettore a 3 poli	9 connect multiple (3)
10 CDI-Einheit	10 CDI-unit	10 CDI-scatola	10 CDI-unite
11 Startrelais	11 starter relay	11 rele d'avviamento	11 relais de demarreur
12 4-pol Stecker	12 multip cont plug (4)	12 connettore a 4 poli	12 connect multiple (4)
13 Start/Not Aus	13 startsw /run off	13 disinteritor/partire	13 ba de dem/arr d'urg
14 Startermotor	14 starter engine	14 mot d'avviamento	14 demarreur electrique
15 Batterie 12V 4Ah	15 battery 12V 4Ah	15 batteria 12V 4Ah	15 batterie 12V 4Ah
16 Lüfteranschluss	16 fan connection	16 connett ventilatore	16 connect ventilateur
17 Impulsgeber	17 pulser coil	17 trasmett d'impulsi	17 generateur d'impuls
18 2-pol Stecker	18 multip cont plug (2)	18 connettore a 2 poli	18 connect multiple (2)
bl blau	bl blue	bl blu	bl bleu
br braun	br brown	br marrone	br brun
ge gelb	ge yellow	ge giallo	ge jaune
gr grau	gr grey	gr grigio	gr gris
g grün	g green	g verde	g vert
o orange	o orange	o arancione	o orange
r rot	r red	r rosso	r rouge
s schwarz	s black	s nero	s noir
v violett	v violet	v violetto	v violet
w weiß	w white	w bianco	w blanc

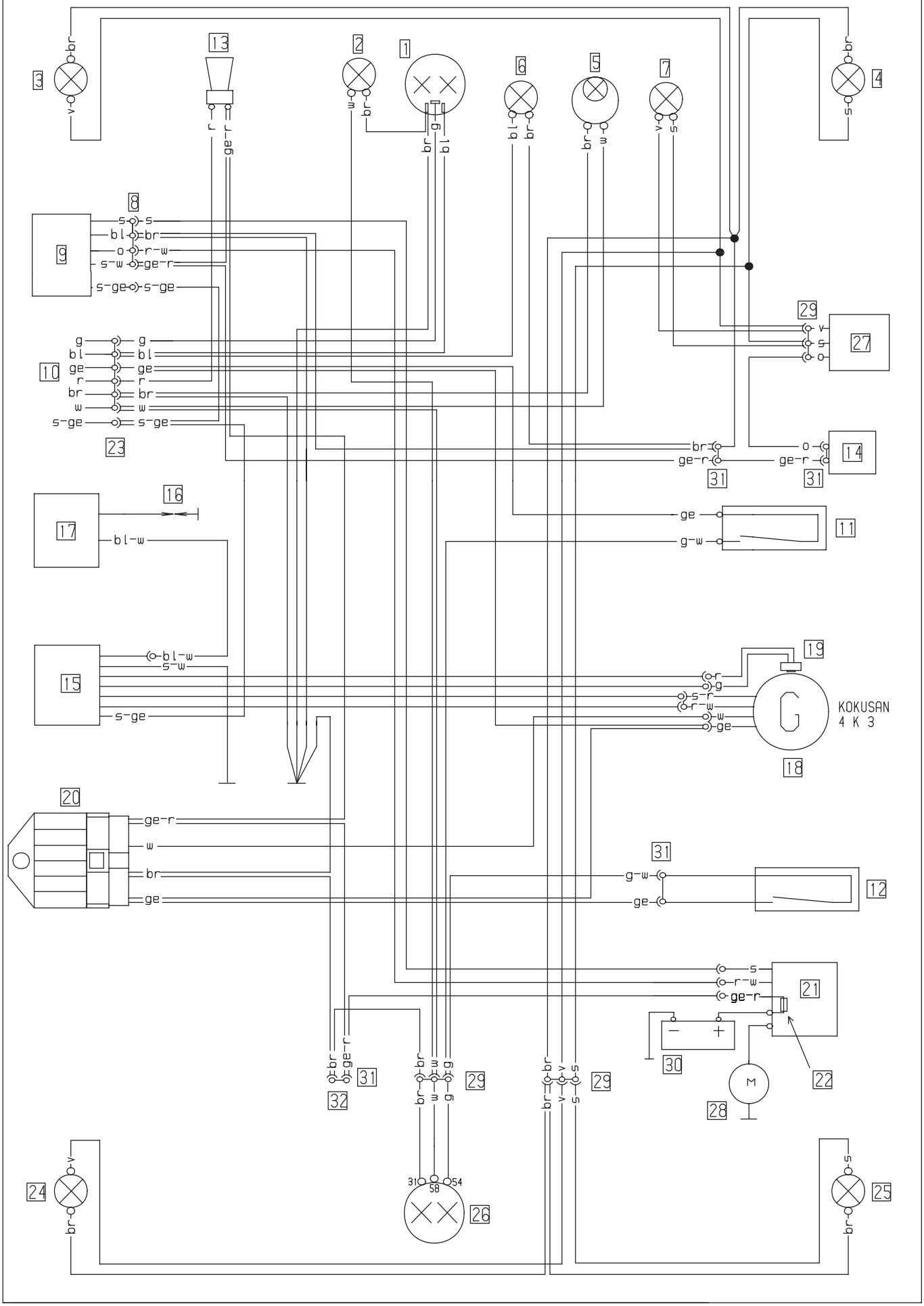
Start- Notaus- Schalter

Domino	o	s-ge	bl	s	s-w
			•		
		•			
	•				•

Spanisch
1 faro
2 fusible prin 10A
3 interruptor d'luz
4 regulador de tension
5 generador
6 bobina de encendido
7 bujia
8 luz de trasera
9 conect multiple (3)
10 unidad cdi
11 rele de arranque
12 conect multiple (4)
13 bott de arr par de u
14 motor de arranque
15 batteria 12V 4Ah
16 conector ventilador
17 generado de tension
18 conector multiple(2)
bl azul
br marron
ge amarillo
gr gris
g verde
o naranja
r rojo
s negro
v violeta
w blanco

MXC without lights

SERVICE	Modell: 250/400/520 EXC RACING	Kabelstrangnummer vorne 590 11 075 400 hinten 503 14 040 100 Blinkerstrang vorne 590 11 080 000 Blinkerstrang hinten 590 11 081 000	Land EU, AUS	Datum, Name 04 05 00 KE	Dateiname RAC01AUS



250/400/520 EXC RACING 2002

Deutsch	Englisch	Italienisch	Französisch
1 Scheinwerfer	1 headlight	1 faro	1 phare
2 Standlicht	2 position light	2 luce di posizione	2 feu de position
3 Blinker li vo	3 turn indic left fr	3 lampegg ant sn	3 clignoteur av gauche
4 Blinker re vo	4 turn indic right fr	4 lampegg ant dx	4 clignoteur av droit
5 Tachobeleuchtung	5 speedometer light	5 luce di tachimetro	5 eclair comp vitesse
6 Fernlichtkontrolle	6 high beam indicator	6 spia abbagliante	6 temoin feu route
7 Blinkerkontrolle	7 turn indicator	7 spia lampeggiatori	7 temoin de clignoteur
8 4-pol Stecker	8 multip cont plug (4)	8 connettore a 4 poli	8 connect multiple (4)
9 Start / Not Aus	9 startsw /run-off	9 disinteritor/partire	9 ba de dem /arr d'urg
10 zum Kombischalter	10 to combinat switch	10 multicomando	10 commodo
11 Bremslichtsch vo	11 stoplight switch f	11 int luce arresto ant	11 contact de stop av
12 Bremslichtsch hi	12 stoplight switch r	12 int luce arresto post	12 contact Harr de stop
13 Horn	13 horn	13 clacson	13 klaxon
14 Blinkgeber	14 turn indicator	14 trasmett di lampeg	14 centrale clignot
15 CDI-Einheit	15 CDI-unit	15 CDI-seatola	15 boitier CDI
16 Zündkerze	16 spark plug	16 candela	16 bougie
17 Zündspule	17 ignition coil	17 bobina d'accens	17 bobine d'allumage
18 Generator	18 generator	18 dinamo	18 generateur
19 Impulsgeber	19 pulser coil	19 trasmett d'impulsi	19 generateur d'impuls
20 Spannungsregler	20 voltage regulator	20 regol di tens	20 regulateur
21 Startrelais	21 starter relay	21 rele d'avviamento	21 relais de demarreur
22 Stecksicherung 10A	22 fuse 10A	22 fusibile 10A	22 fusible 10A
23 6-pol Stecker	23 multip cont plug (6)	23 connettore a 6 poli	23 connect multiple (6)
24 Blinker li hi	24 blinker left rear	24 lampegg post sn	24 clign arr gauche
25 Blinker re hi	25 blinker right rear	25 lampegg post dx	25 clign arr droite
26 Brems-Schlußlicht	26 rear-stoplight	26 fanal post di freno	26 feu arr et de stop
27 Blinkerschalter	27 blink switch	27 int lampeggiatori	27 contact d clignoteur
28 Startermotor	28 starter engine	28 mot d'avviamento	28 demrreur electrique
29 3-pol Stecker	29 multip cont plug (3)	29 connettore a 3 poli	29 connect multiple (3)
30 Batterie 12V 4Ah	30 battery 12V 4Ah	30 batteria 12V 4Ah	30 batterie 12V 4Ah
31 2-pol Stecker	31 multip cont plug (2)	31 connettore a 2 poli	31 connect multiple (2)
32 Lüfteranschluss	32 fan connection	32 connett ventilatore	32 connect ventilateur

Deutsch	Englisch	Italienisch	Französisch	Spanisch
bl blau	bl blue	bl blu	bl bleu	bl azul
br braun	br brown	br marrone	br brun	br marron
ge gelb	ge yellow	ge giallo	ge jaune	ge amarillo
gr grau	gr grey	gr grigio	gr gris	gr gris
g grün	g green	g verde	g vert	g verde
o orange	o orange	o arancione	o orange	o naranja
r rot	r red	r rosso	r rouge	r rojo
s schwarz	s black	s nero	s noir	s negro
v violett	v violet	v violetto	v violet	v violeta
w weiß	w white	w bianco	w blanc	w blanco

Spanisch
1 faro
2 luz de posicion
3 interm izquierdo delantero
4 intermitente derecho delantero
5 luz tacometro
6 lampara aviso luces largas
7 lampara aviso intermitentes
8 conector multiple (4)
9 boton de arr par de urg
10 interruptor combinado
11 interr luz de freno del
12 interr luz de fren tras
13 claxon
14 conjunto del intermintente
15 unidad cdi
16 bujia
17 bobina de encendido
18 generador
19 generado de impulsos
20 regulador de tension
21 rele de arranque
22 fusible principal 10A
23 conector multiple (6)
24 intermitente izquierdo trasero
25 intermitente derecho trasero
26 luz de freno trasero
27 interuptor clignoteur
28 motor de arrranque
29 conector multiple (3)
30 batteria 12V 4Ah
31 conector multiple (2)
32 conector ventilador

Start- Notaus- Schalter

Domino	o	s-ge	bl	s	s-w
			●	●	
		●			
	●				●

Blinkerschalter

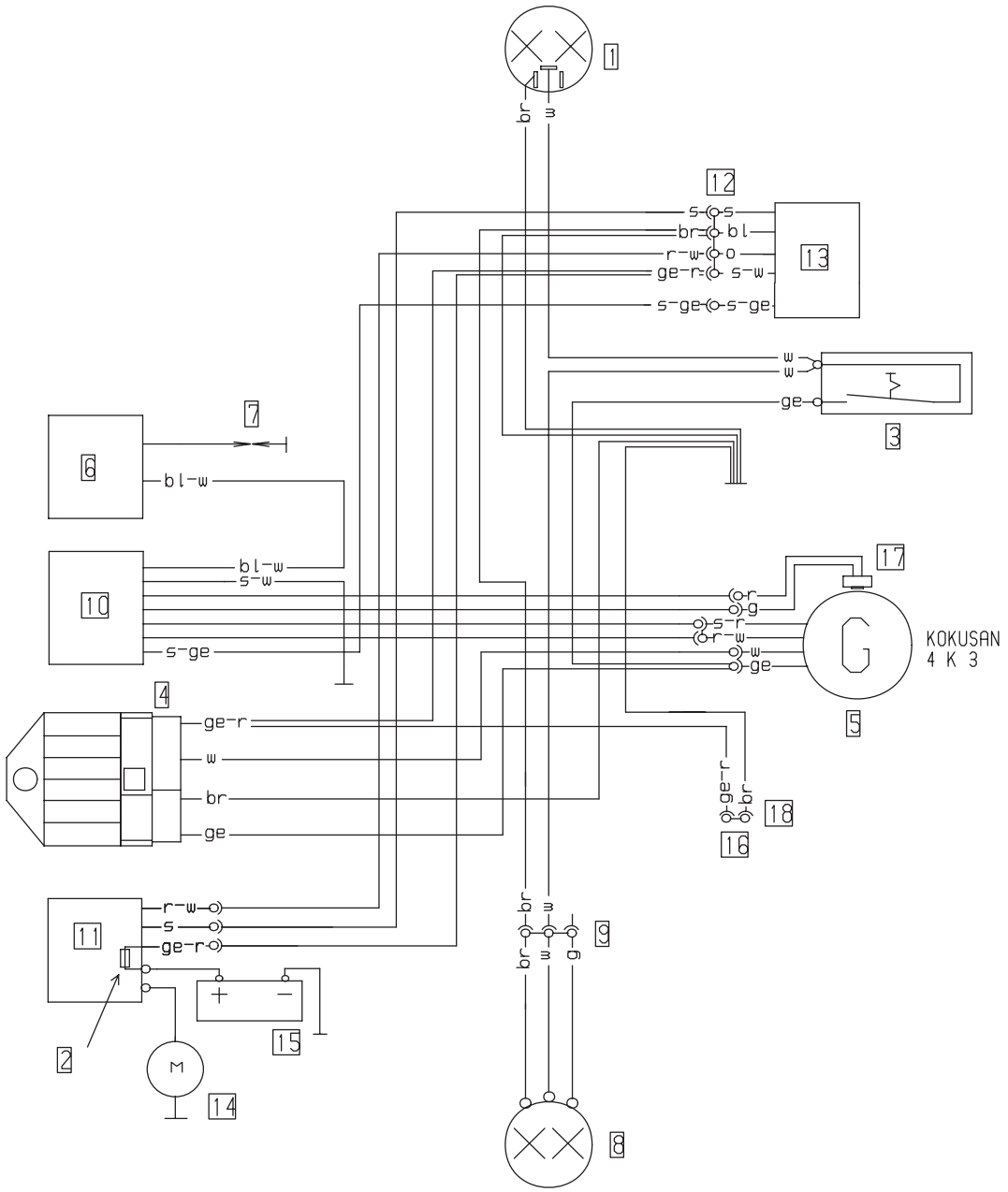
	s	o	v
⇦⇨			
⇦		●	●
⇨	●		

Kontaktbelegung – Lichtschalter (Typ CEV 9610)

	g	bl	ge	w	s/ge	r	br
Lights ○							
LO beam	●		●	●			
Hi beam		●	●	●			
Horn						●	●
Engine off					●		●
	5	2	1	3	6	4	

Art.-No. 3206007 -E

KTM SPORTMOTORCYCLES SERVICE	Modell	Kabelstrangnummer	Land	Datum, Name	Zeichnungsnr	Änderungsstand	Kabelstrangbez
	250/450/525 MXC / EXC 01/02/03	vorne 590 11 075 300 hinten 503 11 076 000	USA	08 05 00 KE	RAC01USA		vo 4T-Racing 2001 hi 125-380 EXC '98



Deutsch	Englisch	Italienisch	Französisch
1 Scheinwerfer	1 headlight	1 faro	1 phare
2 Stecksicherung 10A	2 fuse 10 A	2 fusibile 10A	2 fusible 10A
3 Lichtschalter	3 light switch	3 interr della luce	3 interr d' eclairage
4 Spannungsbegrenzer	4 voltage limiter	4 regol di tens	4 regulateur
5 Generator	5 generator	5 dinamo	5 generateur
6 Zündspule	6 ignition coil	6 bobina d'accens	6 bobine d'allumage
7 Zündkerze	7 spark plug	7 candela	7 bougie
8 Schlußlicht	8 rearlight	8 fanale posteriore	8 feu arriere
9 3-pol Stecker	9 multip cont plug (3)	9 connettore a 3 poli	9 connect multiple (3)
10 CDI-Einheit	10 CDI-unit	10 CDI-seatola	10 CDI-unite
11 Startrelais	11 starter relay	11 rele d'avviamento	11 relais de demarreur
12 4-pol Stecker	12 multip cont plug (4)	12 connettore a 4 poli	12 connect multiple (4)
13 Start/Not Aus	13 startsw /run off	13 disinteritor/partire	13 ba de dem/arr d'urg
14 Startermotor	14 starter engine	14 mot d'avviamento	14 demarreur electrique
15 Batterie 12V 4Ah	15 battery 12V 4Ah	15 batteria 12V 4Ah	15 batterie 12V 4Ah
16 Lüfteranschluss	16 fan connection	16 connett ventilatore	16 connect ventilateur
17 Impulsgeber	17 pulser coil	17 trasmett d'impulsi	17 generateur d'impuls
18 2-pol Stecker	18 multip cont plug (2)	18 connettore a 2 poli	18 connect multiple (2)
bl blau	bl blue	bl blu	bl bleu
br braun	br brown	br marrone	br brun
ge gelb	ge yellow	ge giallo	ge jaune
gr grau	gr grey	gr grigio	gr gris
g grün	g green	g verde	g vert
o orange	o orange	o arancione	o orange
r rot	r red	r rosso	r rouge
s schwarz	s black	s nero	s noir
v violett	v violet	v violetto	v violet
w weiß	w white	w bianco	w blanc

Start- Notaus- Schalter

Domino	o	s-ge	bl	s	s-w
			•		
		•			
•					•

Spanisch
1 faro
2 fusible prin 10A
3 interruptor d'luz
4 regulador de tension
5 generador
6 bobina de encendido
7 bujia
8 luz de trasera
9 conect multiple (3)
10 unidad cdi
11 rele de arranque
12 conect multiple (4)
13 bott de arr par de u
14 motor de arranque
15 batteria 12V 4Ah
16 conector ventilador
17 generado de tension
18 conector multiple(2)
bl azul
br marron
ge amarillo
gr gris
g verde
o naranja
r rojo
s negro
v violeta
w blanco

MXC without lights

250/450/525 EXC RACING 2003 EU, AUS

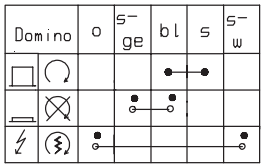
Deutsch	Englisch	Italienisch	Französisch
1 Scheinwerfer	1 headlight	1 faro	1 phare
2 Standlicht	2 position light	2 luce di posizione	2 feu de position
3 Blinker li vo	3 turn indic.left fr.	3 lampegg.ant.sn.	3 clignoteur av gauche
4 Blinker re vo	4 turn indic.right fr.	4 lampegg.ant.dx.	4 clignoteur av.droit
5 Tacho	5 speedometer	5 tachimetro	5 compteur vitesse
6 Fernlichtkontrolle	6 high beam indicator	6 spia abbagliante	6 temoin feu route
7 Blinkerkontrolle	7 turn indicator	7 spia lampeggiatori	7 temoin de clignoteur
8 4-pol.Stecker	8 multip.cont.plug (4)	8 connettore a 4 poli	8 connect.multiple (4)
9 Start / Not Aus	9 startsw./run-off	9 disinteritor/partire	9 ba.de.dem./arr.d'urg
10 zum Kombischalter	10 to combinat. switch	10 multicomando	10 commodo
11 Bremslichtsch. vo	11 stoplight switch f.	11 int.luce arresto ant	11 contact de stop av.
12 Bremslichtsch. hi	12 stoplight switch r.	12 int.luce arresto post	12 contact Harr.de stop
13 Horn	13 horn	13 clacson	13 klaxon
14 Blinkgeber	14 turn indicator	14 trasmett. di lampeg.	14 centrale clignot.
15 CDI-Einheit	15 CDI-unit	15 CDI-seatola	15 boitier CDI
16 Zündkerze	16 spark plug	16 candela	16 bougie
17 Zündspule	17 ignition coil	17 bobina d'accens.	17 bobine d'allumage
18 Generator	18 generator	18 dinamo	18 generateur
19 Impulsgeber	19 pulser coil	19 trasmett d'impulsi	19 generateur d'impuls
20 Spannungsregler	20 voltage regulator	20 regol. di tens.	20 regulateur
21 Startrelais	21 starter relay	21 rele d'avviamento	21 relais de demarreur
22 Stecksicherung 10A	22 fuse 10A	22 fusibile 10A	22 fusible 10A
23 6-pol.Stecker	23 multip.cont.plug (6)	23 connettore a 6 poli	23 connect.multiple (6)
24 Blinker li hi	24 blinker left rear	24 lampegg.post.sn	24 clign.arr.gauche
25 Blinker re hi	25 blinker right rear	25 lampegg.post.dx.	25 clign.arr.droite
26 Brems-Schlußlicht	26 rear-stoplight	26 fanal.post.di freno	26 feu arr.et de stop
27 Blinkerschalter	27 blink switch	27 int. lampeggiatori	27 contact.d.clignoteur
28 Startermotor	28 starter engine	28 mot.d'avviamento	28 demrreur electrique
29 3-pol. Stecker	29 multip.cont.plug (3)	29 connettore a 3 poli	29 connect.multiple (3)
30 Batterie 12V 4Ah	30 battery 12V 4Ah	30 batteria 12V 4Ah	30 batterie 12V 4Ah
31 2-pol.Stecker	31 multip.cont.plug (2)	31 connettore a 2 poli	31 connect.multiple (2)
32 Lüfteranschluss	32 fan connection	32 connett.ventilatore	32 connect.ventilateur

19.03.2002

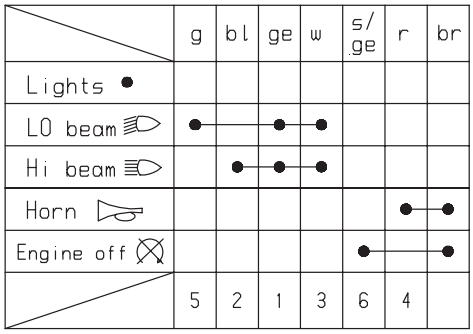
Deutsch	Englisch	Italienisch	Französisch	Spanisch
bl blau	bl blue	bl blu	bl bleu	bl azul
br braun	br brown	br marrone	br brun	br marron
ge gelb	ge yellow	ge giallo	ge jaune	ge amarillo
gr grau	gr grey	gr grigio	gr gris	gr gris
g grün	g green	g verde	g vert	g verde
o orange	o orange	o arancione	o orange	o naranja
r rot	r red	r rosso	r rouge	r rojo
s schwarz	s black	s nero	s noir	s negro
v violett	v violet	v violetto	v violet	v violeta
w weiß	w white	w bianco	w blanc	w blanco

Spanisch
1 faro
2 luz de posicion
3 interm. izquierdo delantero
4 intermitente derecho delantero
5 tacometro
6 lampara aviso luces largas
7 lampara aviso intermitentes
8 conector multiple (4)
9 boton de arr.par.de.urg.
10 interruptor combinado
11 interr. luz de freno del.
12 interr. luz. de fren tras.
13 claxon
14 conjunto del intermintente
15 unidad cdi
16 bujia
17 bobina de encendido
18 generador
19 generado de impulsos
20 regulador de tension
21 rele de arranque
22 fusible principal 10A
23 conector multiple (6)
24 intermitente izquierdo trasero
25 intermitente derecho trasero
26 luz de freno trasero
27 interuptor clignoteur
28 motor de arrranque
29 conector multiple (3)
30 batteria 12V 4Ah
31 conector multiple (2)
32 conector ventilador

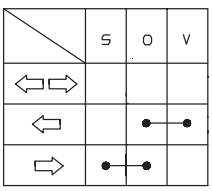
Start- Notaus- Schalter



Kontaktbelegung - Lichtschalter (Typ CEV 9610)



Blinkerschalter



Art.-Nr. 321044-D
Reparaturanleitung KTM 250/400/520 SX, MXC, EXC Racing

SERVICE	Modell 2003 250/450/525 EXC Racing	Kabelstrangnummer: vorne: 590.11.075.500 hinten: 503.14.040.100 Blinkerstrang vorne: 590.11.080.000 Blinkerstrang hinten: 590.11.081.000	Land: EU, AUS	Datum, Name: 19.03.02 KE	Dateiname: RAC03AUS