REPAIR MANUAL 2009

400 EXC EU
400 EXC AUS
400 XC-W USA
450 EXC EU
450 EXC AUS
450 EXC SIX DAYS EU
450 XC-W USA
450 XC-W ZA
530 EXC EU
530 EXC AUS
530 EXC SIX DAYS EU
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450 EXC USA
530 EXC USA

Article no. 3206064en

It is important that you read this owner's manual carefully and completely before the start of work.

Only use **ORGINAL KTM SPARE PARTS**.

This vehicle can only fulfill the demands placed on it in the long run if the specified service work is performed regularly by qualified experts.

The repair manual was written to correspond to the most current state of this model series. We reserve the right to make changes in the interest of technical advancement without, at the same time, updating this repair manual.
We shall not provide a description of general workshop methods. Likewise, safety rules that apply in a workshop are not specified here. It is assumed that repair work will be performed by a fully trained mechanic.

All specifications are non-binding. KTM Sportmotorcycle AG specifically reserves the right to modify or delete technical specifications, prices, colors, forms, materials, services, designs, equipment, etc., without prior notice and without specifying reasons, to adapt these to local conditions, as well as to stop production of a particular model without prior notice. KTM accepts no liability for delivery options, deviations from illustrations and descriptions, as well as printing and other errors. The models portrayed partly contain special equipment that does not belong to the regular scope of delivery.

ISO 9001(12 100 6061)
According to the international quality management standard ISO 9001, KTM uses quality assurance processes that lead to the maximum possible quality of the products.
Issued by: TÜV Management Service

REG.NO. 12 100 6061

KTM-Sportmotorcycle AG
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CONTENTS

Symbols used

The symbols used are explained in the following.

✓	Indicates an expected reaction (e.g. of a work step or a function).
✗	Indicates an unexpected reaction (e.g. of a work step or a function).
☞	Identifies a page reference (more information is provided on the specified page).

Formats used

The typographical and other formats used are explained in the following.

Own name	Indicates a proprietary name.
Name®	Identifies a protected name.
Brand™	Identifies a brand in merchandise traffic.

Warranty

The work prescribed in the service schedule must be carried out by an authorized KTM workshop only and confirmed in the customer's service record; otherwise, all warranty claims will be void. No warranty claim can be honored for damage resulting from manipulation and/or other changes to the vehicle.

Fuel, oils, etc.

The fuels and lubricants named in the owner's manual must be used according to specifications.

Spare parts, accessories

Only use spare parts and accessories approved and/or recommended by KTM. KTM accepts no liability for other products and any resulting damage or loss.

You will find the current **KTM PowerParts** for your vehicle on the KTM website.
International KTM Website: http://www.ktm.com

Work rules

Special tools are necessary for some of the work. These are not included with the vehicle and can be ordered under the number in parentheses. Ex: valve spring compressor (59029019000)
During assembly, non-reusable parts (e.g. self-locking screws and nuts, seals and seal rings, O-rings, pins, lock washers) must be replaced by new parts.
If thread lock (e.g. **Loctite®**) is used for screw connections, be sure to comply with the manufacturer's specific instructions on its usage.
Parts that you want to reuse following repairs and servicing should be cleaned and checked for damage and wear. Change damaged or worn parts.
Following repairs or servicing, the vehicle must be checked for roadworthiness.

notes/warnings

Be sure to pay attention to the notes and warnings given here.

Info
Various notes and warning stickers are attached to the vehicle. Do not remove any notes and warning stickers. If they are missing, you or others may not recognize sources of danger and may therefore be injured.

Grades of risks

Danger
Indicates immediate danger that will invariably lead to severe or even fatal injury if the appropriate measures are not taken.

Warning
Indicates immediate danger that may lead to severe or even fatal injury if the appropriate measures are not taken.

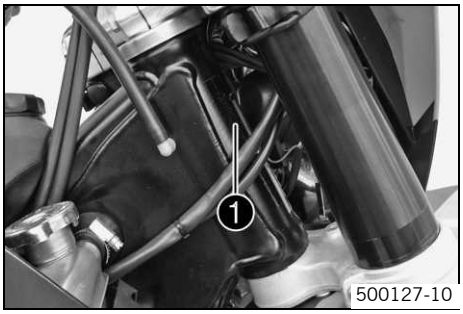
Note
Identifies a danger that will lead to considerable machine and material damage if the appropriate measures are not taken.

Warning
Indicates immediate danger that will invariably lead to environmental damage if the appropriate measures are not taken.

Repair manual

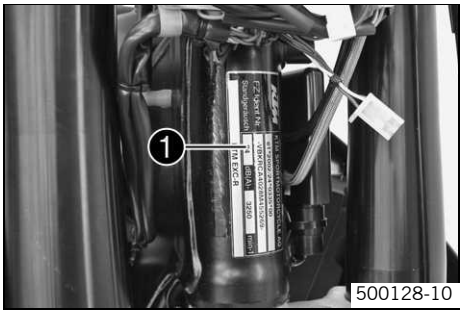
- It is imperative that you read this owner's manual carefully and completely before the start of work. It contains useful information and many tips on how to repair and maintain your vehicle.
- This manual assumes that the necessary special KTM tools and workplace and workshop equipment are available.

Chassis number

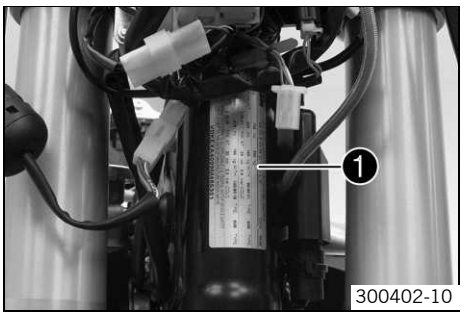


The chassis number ❶ is stamped on the steering head on the right.

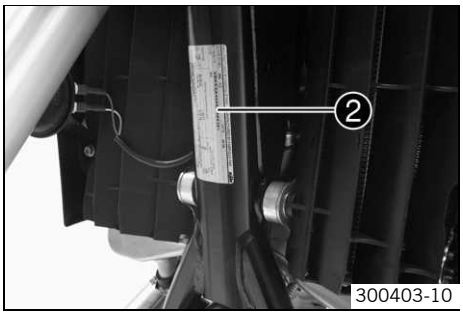
Type label



(EXC EU, EXC AUS, EXC SIX DAYS, XCR-W)
The type label ❶ is fixed to the front of the steering head.

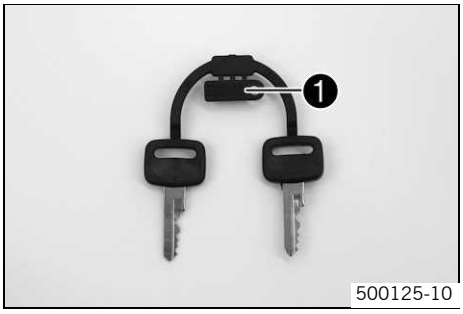


(EXC USA)
The type label USA ❶ is fixed to the front of the steering head.

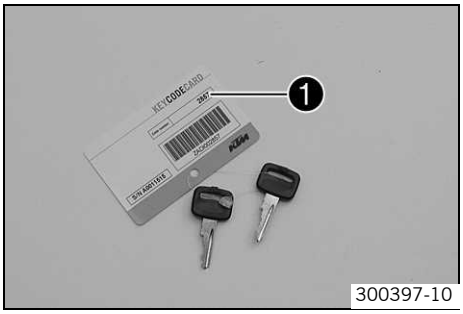


(EXC USA)
The type label Canada ❷ is fixed to the front of the front pipe.

Key number (all EXC models)



(EXC EU, EXC AUS, EXC-R SIX DAYS)
The key number ❶ is stamped on the key strap.



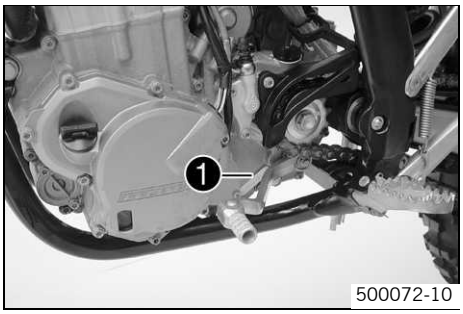
(EXC USA)

The key number ❶ is provided on the **KEYCODECARD**.

Info

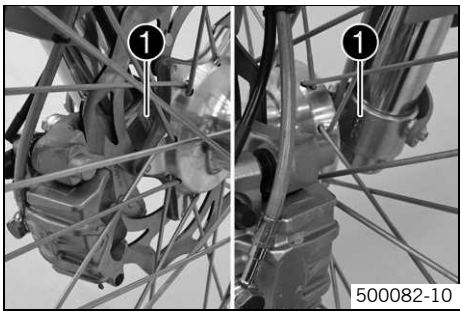
You need the key number to order a spare key. Keep the **KEYCODECARD** in a safe place.

Engine number



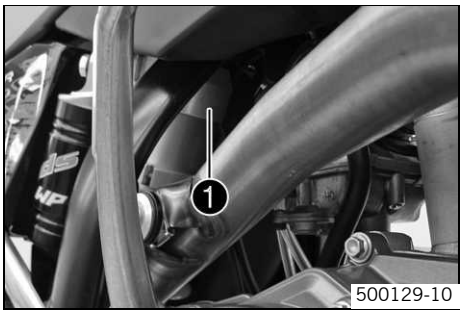
The engine number ❶ is stamped on the left side of the engine under the engine sprocket.

Fork part number



The fork part number ❶ is stamped on the inner side of the fork stub.

Shock absorber part number



The shock absorber part number ❶ is stamped on the top of the shock absorber above the adjusting ring on the engine side.

Jacking up the motorcycle

Note

Danger of damage The parked vehicle can roll away or fall over.

– Always place the vehicle on a firm and even surface.

– Jack up the motorcycle underneath the engine. The wheels must no longer touch the ground.

Work stand (54829055000) (☛ p. 229)

– Secure the motorcycle against falling over.

Removing the motorcycle from the work stand

Note

Danger of damage The parked vehicle can roll away or fall over.

– Always place the vehicle on a firm and even surface.

– Remove the motorcycle from the work stand.
– Remove the work stand.

Starting

Danger

Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.

Note

Engine failure High engine speeds in cold engines have a negative effect on the service life of the engine.

– Always warm up the engine at low engine speeds.

Info

If the motorcycle is unwilling to start, the cause can be old fuel in the float chamber. The flammable elements of the fuel evaporate after a long time of standing.
If the float chamber is filled with fresh fuel, the engine starts immediately.
Press the starter for a maximum of 5 seconds. Wait for a least 5 seconds until trying again.

Motorcycle has been out of use for more than 1 week

– Empty the carburetor float chamber. (☛ p. 170)

– Turn handle ❶ of the fuel tap to the **ON** position. (Figure 500137-10☛ p. 65)

✓ Fuel can flow from the fuel tank to the carburetor.

– Remove the motorcycle from the stand.
– Shift gear to neutral.

(EXC USA)

– Turn the key in the ignition switch to the position ❍.

(EXC USA)

– Turn the emergency OFF switch to the position ❍.

(EXC AUS)

– Turn the emergency OFF switch to the position ❍.

Engine cold

(EXC AUS, XC-W, EXC USA)

– Pull the choke lever out as far as possible.

(EXC EU, EXC SIX DAYS)

– Pull the choke lever to the stop.

– Press the electric starter button or press the kickstarter robustly through its full range.

Info

Don't open the throttle.

Starting the motorcycle for checking

Danger

Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.

Info

Press the starter for a maximum of 5 seconds. Wait for a least 5 seconds before trying again.

– Shift gear to neutral.

(EXC USA)

– Turn the key in the ignition switch to the position ⚆.
– Turn the emergency OFF switch to the position ⚆.

(EXC AUS)

– Turn the emergency OFF switch to the position ⚆.

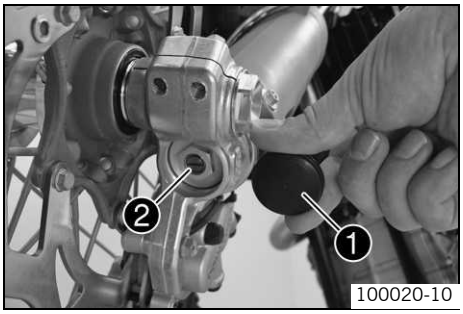
– Press the electric starter button or press the kickstarter robustly through its full range.

Info

Do not open the throttle.

Adjusting compression damping of fork

Info
The hydraulic compression damping determines the fork suspension behavior.



– Remove protection covers ❶.
– Turn adjusting screws ❷ clockwise until they stop.

Info
The adjusting screws ❷ are located at the bottom end of the fork legs.
Make the same adjustment on both fork legs.

– Turn back counterclockwise the number of clicks corresponding to the fork type.

Guideline

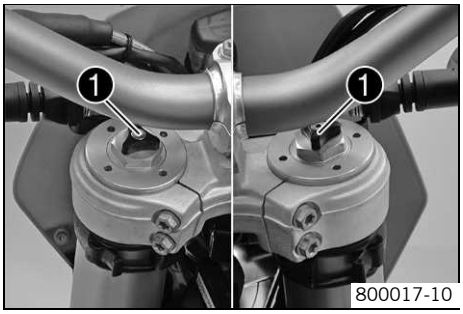
Compression damping	
Comfort	26 clicks
Standard	22 clicks
Sport	20 clicks

Info
Turn clockwise to increase damping, turn counterclockwise to reduce suspension damping.

– Mount protection covers ❶.

Adjusting rebound damping of fork

Info
The hydraulic rebound damping determines the fork suspension behavior.



– Turn adjusting screws ❶ clockwise until they stop.

Info
The adjusting screws ❶ are located at the top end of the fork legs.
Make the same adjustment on both fork legs.

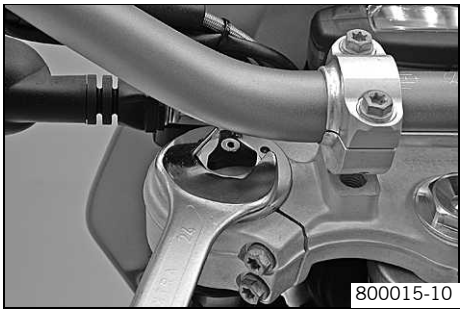
– Turn back counterclockwise the number of clicks corresponding to the fork type.

Guideline

Rebound damping	
Comfort	24 clicks
Standard	22 clicks
Sport	22 clicks

Info
Turn clockwise to increase damping, turn counterclockwise to reduce suspension damping.

Adjusting spring preload of the fork



– Turn adjusting screws counterclockwise until they stop.

Info
Make the same adjustment on both fork legs.

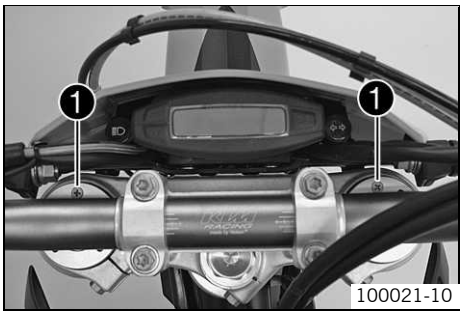
– Turn back clockwise the number of turns corresponding to the fork type.

Guideline

Spring preload - **Preload Adjuster**	
Comfort	2 turns
Standard	2 turns
Sport	4 turns

Info
Turn clockwise to increase spring preload, turn counterclockwise to reduce spring preload.
Adjusting the spring preload has no influence on the absorption setting of the rebound damping.
Basically, however, you should set the rebound damping higher with a higher spring preload.

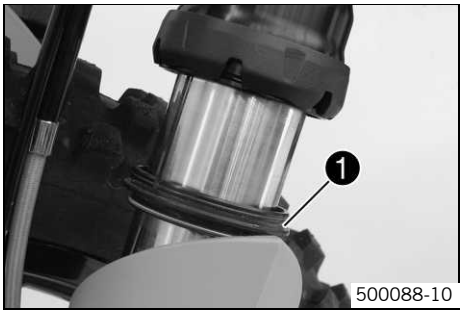
Bleeding fork legs



- Jack up the motorcycle. (☛ p. 10)
- Remove bleeder screws ❶ briefly.

  ✓ Any excess pressure escapes from the interior of the fork.
- Mount and tighten bleeder screws.
- Remove the motorcycle from the work stand. (☛ p. 10)

Cleaning the dust boots of the fork legs



- Jack up the motorcycle. (☛ p. 10)
- Loosen the fork protection. (☛ p. 13)
- Push dust boots ❶ of both fork legs downwards.

Info
The dust boots should remove dust and coarse dirt particles from the fork tubes. Over time, there is an ingress of dirt inside the boots. If this dirt is not removed, it may cause the oil seals to leak.

Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.

- Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.

- Clean and oil the dust boots and inner fork tube of both fork legs.

Universal oil spray (☛ p. 227)

- Press the dust boots back into their normal position.
- Remove excess oil.
- Position the fork protection. (☛ p. 14)
- Remove the motorcycle from the work stand. (☛ p. 10)

Loosening the fork protection

- Remove screws ❶ and take off clamp.
- Remove screws ❷ on left fork leg. Push the fork protection downwards.
- Remove the screws on the right fork leg. Push the fork protection downwards.

Positioning the fork protection

– Position the fork protection on the left fork leg. Mount and tighten screws ❶.

Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

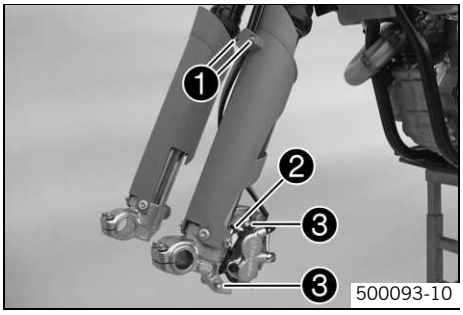
– Position the brake line and cable harness. Put the clamp on, mount and tighten screws ❷.
– Position the fork protection on the right fork leg. Mount and tighten screws.

Guideline

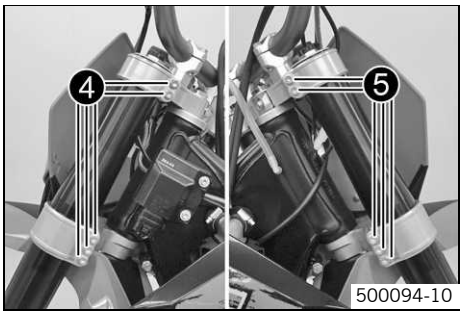
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

Removing the fork legs

– Remove the front wheel. (☛ p. 68)

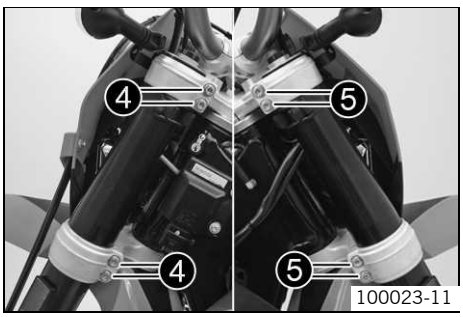


– Remove screws ❶ and take off clamp.
– Remove cable clip ❷, remove screw ❸ and take off the brake caliper.
– Hang the brake caliper and the brake line loosely to the side.



(EXC SIX DAYS, XC-W USA, EXC USA)

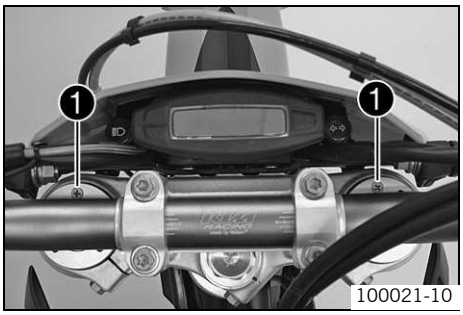
– Loosen screw ❹. Remove the fork leg on the left.
– Loosen screw ❺. Remove the fork leg on the right.



(EXC EU, EXC AUS, XC-W ZA)

– Loosen screw ❹. Remove the fork leg on the left.
– Loosen screw ❺. Remove the fork leg on the right.

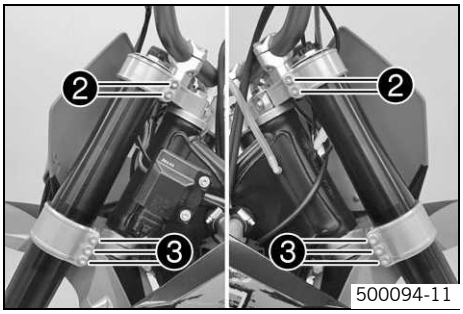
Installing fork legs



– Position the fork legs.

Info

The topmost milled groove in the fork leg must be flush to the upper edge of the upper triple clamp.
Position bleeder screws ❶ toward the front.



500094-11

(EXC SIX DAYS, XC-W USA, EXC USA)

– Fully tighten screw ❷.

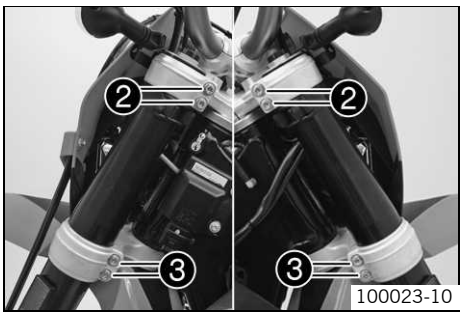
Guideline

Screw, top triple clamp	M8	17 Nm (12.5 lbf ft)

– Tighten screws ❸.

Guideline

Screw, bottom triple clamp	M8	12 Nm (8.9 lbf ft)



100023-10

(EXC EU, EXC AUS, XC-W ZA)

– Fully tighten screw ❷.

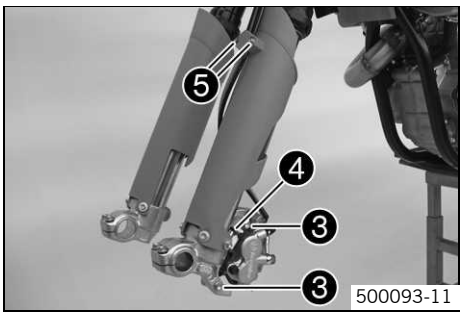
Guideline

Screw, top triple clamp	M8	20 Nm (14.8 lbf ft)

– Tighten screws ❸.

Guideline

Screw, bottom triple clamp	M8	15 Nm (11.1 lbf ft)



500093-11

– Position brake caliper, mount and tighten screws ❸.

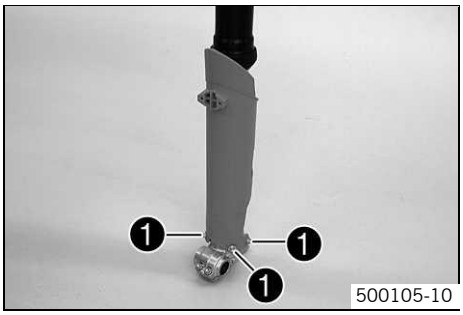
Guideline

Screw, front brake caliper	M8	25 Nm (18.4 lbf ft)	**Loctite® 243™**

– Mount cable clip ❹.
– Position the brake line and wiring harness. Put the clamp on, mount and tighten screws ❺.
– Install the front wheel. (☛ p. 68)

Removing the fork protector

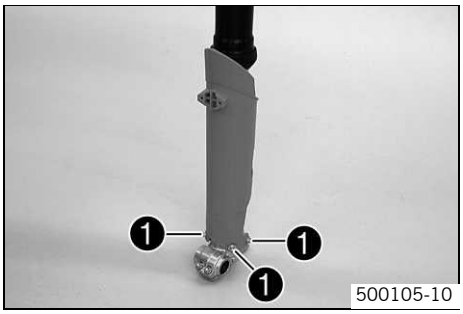
– Remove the fork legs. (☛ p. 14)



500105-10

– Remove screws ❶ on the left fork leg. Remove the fork protector upwards.
– Remove the screws on the right fork leg. Remove the fork protector upwards.

Installing the fork protector



500105-10

– Position the fork protection on the left fork leg. Mount and tighten screws ❶.

Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Position the fork protection on the right fork leg. Mount and tighten the screws.

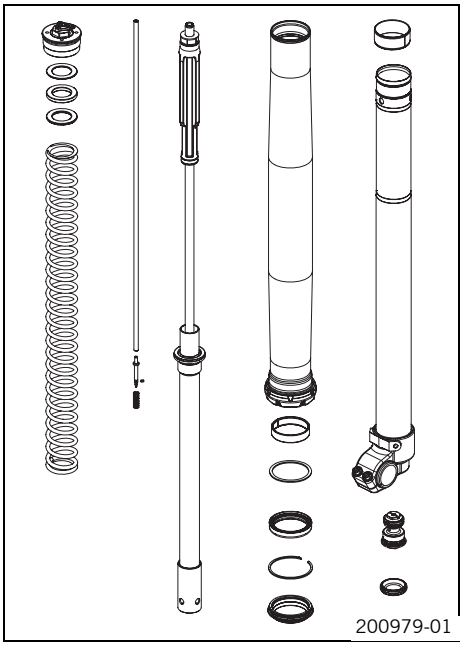
Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Install the fork legs. (☛ p. 14)

Performing a fork service

Info
These operations are the same on both fork legs.


200979-01

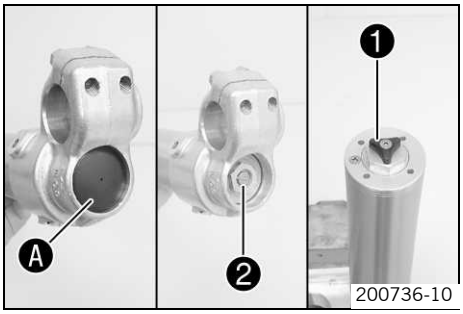
Condition
The fork legs have been removed.

– Disassemble the fork legs. (☛ p. 16)
– Disassemble the cartridge. (☛ p. 19)
– Check the fork legs. (☛ p. 21)
– Assemble the cartridge. (☛ p. 23)
– Assemble the fork legs. (☛ p. 25)

Disassembling the fork legs

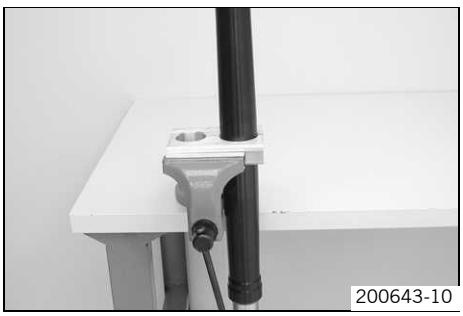
Info
The steps are identical for both fork legs.

Condition
The fork legs are disassembled.



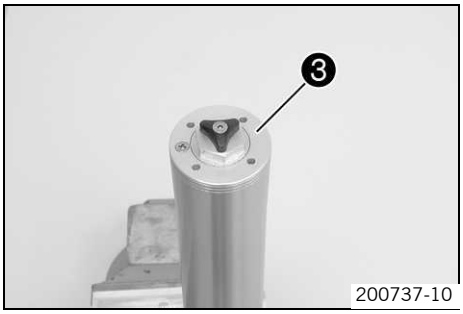
200736-10

– Remove protective cover Ⓐ.
– Take note of the present state of the rebound damping ❶ and compression damping ❷.
– Take note of the present state of the spring preload.
– Completely open the adjustment elements of the rebound damping and compression damping.


200643-10

– Clamp the fork leg in the area of lower triple clamp.

Clamping stand (T1403S) (☛ p. 239)



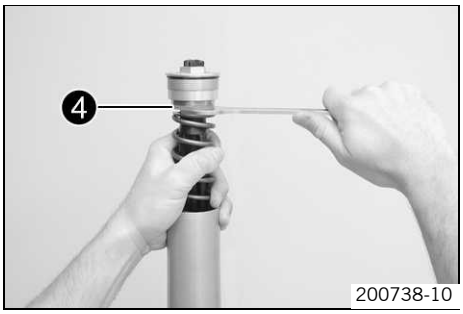
– Loosen **Preload Adjuster** ❸.

Pin wrench (T103) (☛ p. 235)

Info
The **Preload Adjuster** cannot be taken off yet.

– Take out the fork leg and clamp in with the axle clamp.

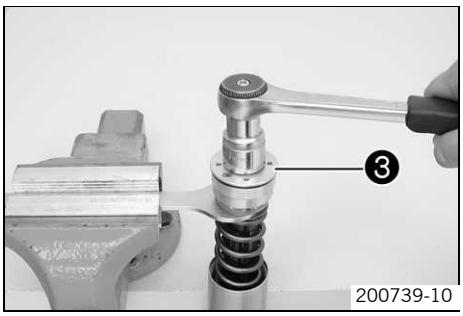
Info
Use soft jaws.



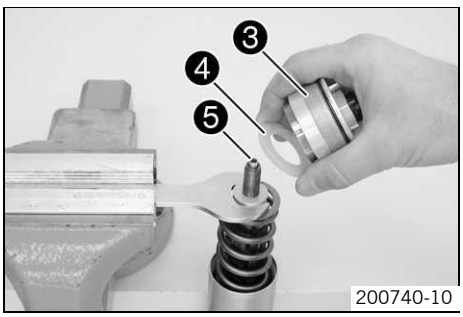
– Push the outer tube downward.
– Pull the spring downward. Place the special tool on the hexagonal part.

Open-end wrench (T14032) (☛ p. 238)

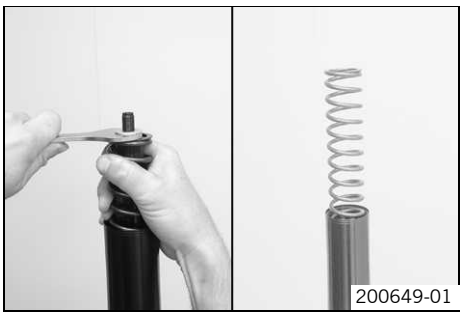
Info
The preload spacers ❹ should be above the special tool.



– Clamp the special tool in the bench vise. Loosen **Preload Adjuster** ❸.



– Remove **Preload Adjuster** ❸ with the preload spacers ❹.
– Remove adjustment tube ❺.

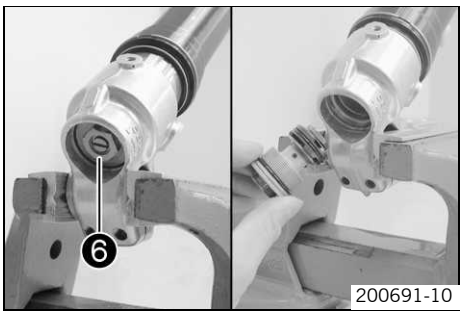


– Pull the spring downward. Remove the special tool.
– Remove the spring.


200650-01

– Drain the fork oil.

Info
Pull out and push in the piston rod several times in order to pump out the cartridge until it is empty.



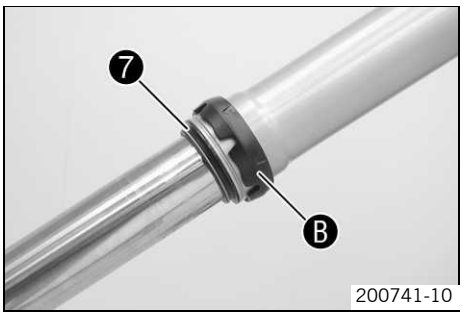
200691-10

– Clamp in the fork leg with the axle clamp.
– Unscrew and remove the compression damping fitting ❻.

Info
Place a fluid collector beneath it, as usually some oil will drain out.


200653-01

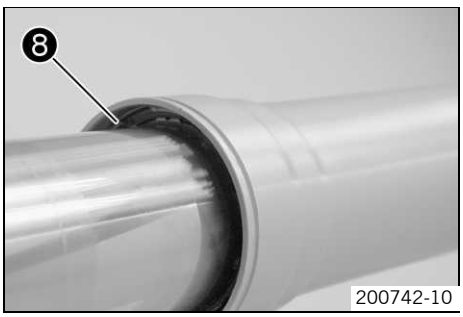
– Remove the cartridge.



200741-10

– Remove dust boot ❼.
– Remove fork protector ring ❽.

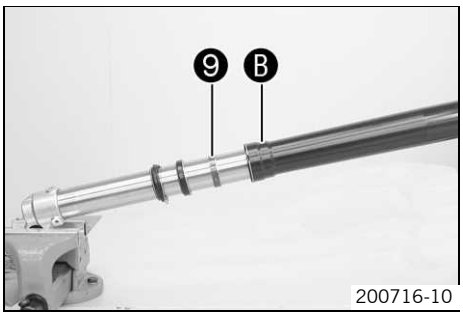
Info
Disassembly of the fork protector ring is not necessarily required for the further repair.



200742-10

– Remove lock ring ❽.

Info
The lock ring has a coarsely finished end against which the screwdriver can be placed.



200716-10

– Warm up the outer tube in the lower sliding bushing area of ❽.

Guideline

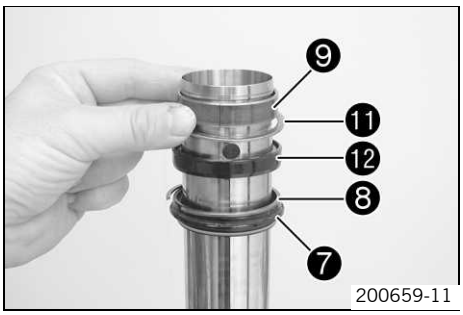
50 °C (122 °F)

– Jerk the outer tube out of the inner tube.

Info
The lower sliding bushing ❾ must be pulled out of its bearing seat when doing this.

– Remove upper sliding bushing ❿.

Info
Gently pull them apart without using any tool.

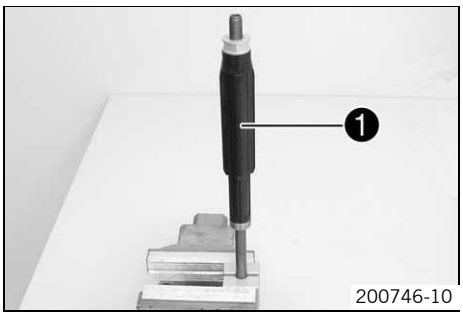


– Take off the lower sliding bushing ❾.
– Take off support ring ⓫.
– Take off seal ring ⓬.
– Take off lock ring ❽.
– Take off dust boot ❼.
– Take out the fork leg.

cartridge, disassembling

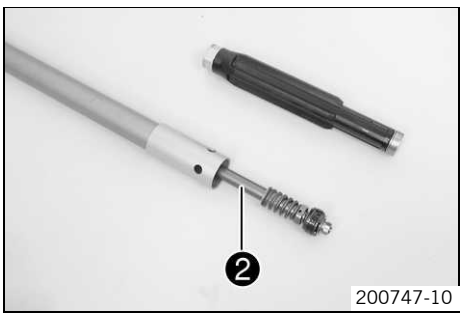
Info
The steps are identical for both fork legs.

– Disassemble the fork legs. (☛ p. 16)

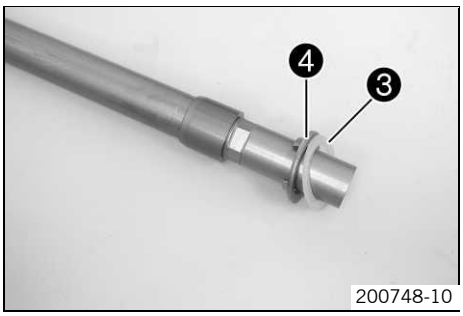


– Remove fluid barrier ❶ from the piston rod.

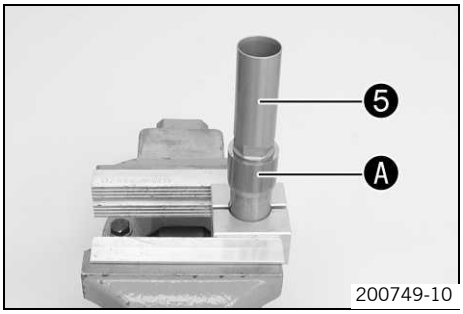
Clamping stand (T14016S) (☛ p. 238)



– Remove piston rod ❷ from the cartridge.



– Remove washer ❸ and spring seat ❹ from the cartridge.



– Degrease the cartridge and clamp using the special tool.

Clamping stand (T14015S) (☛ p. 238)

– Warm up the cartridge in the area of ❹.

Guideline

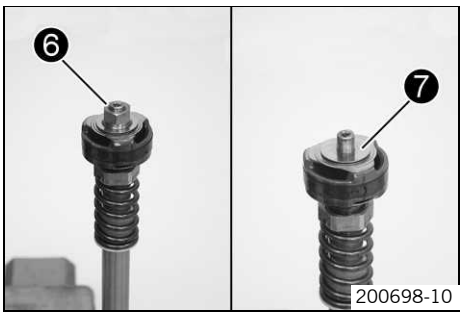
50 °C (122 °F)

– Unscrew and remove screwsleeve ❺.

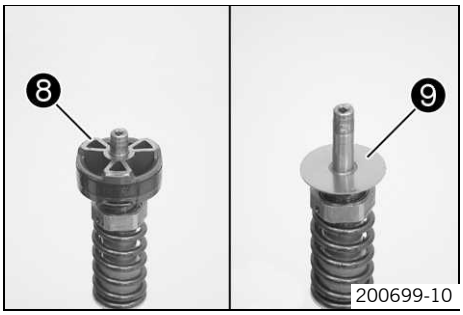
Info
This step is unnecessary for the further disassembly.

– Degrease the piston rod.
– Clamp the piston rod with the special tool.

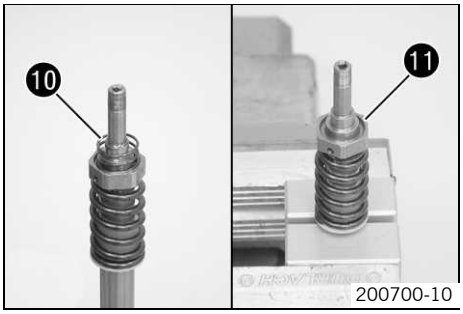
Clamping stand (T14016S) (☛ p. 238)



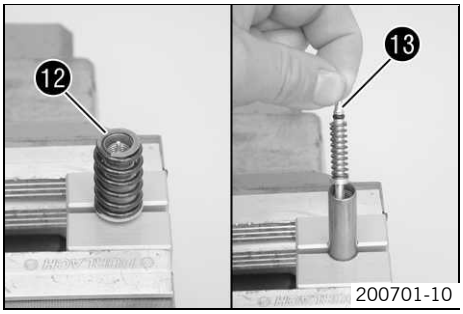
– Remove nut ❻.
– Remove shim stack ❼ completely.



– Remove piston ❽.
– Remove shim stack ❾ completely.



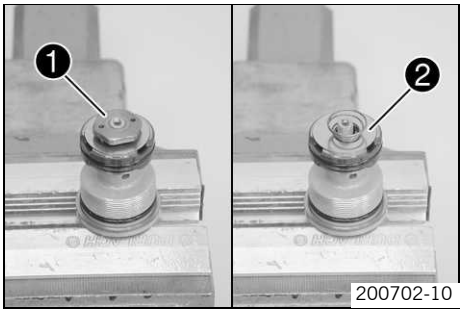
– Remove spring ❿.
– Remove tap rebound ⓫.



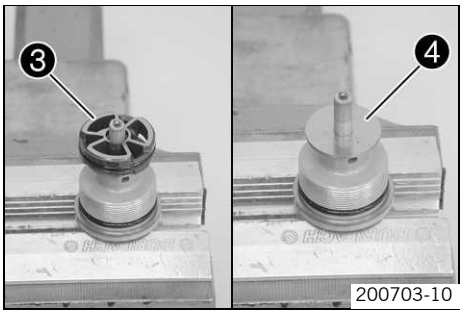
– Remove spring ⓬.
– Remove valve ⓭ of the rebound damping together with the spring.
– Take out the piston rod.

Disassembling the compression damping fitting

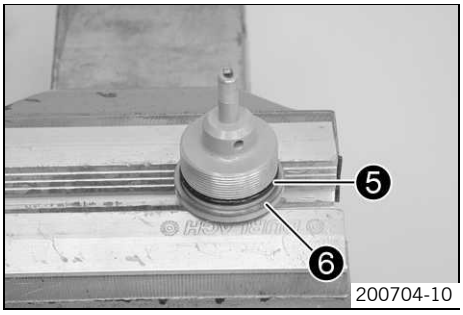
Info
The steps are identical for both fork legs.



– Disassemble the fork legs. (☛ p. 16)
– Clamp the compression damping fitting in a bench vise using soft jaws.
– Remove nut ❶.
– Remove the spring.
– Remove washer ❷.



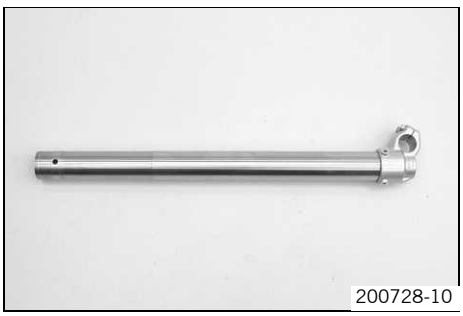
– Remove piston ❸.
– Remove shim stack ❹.



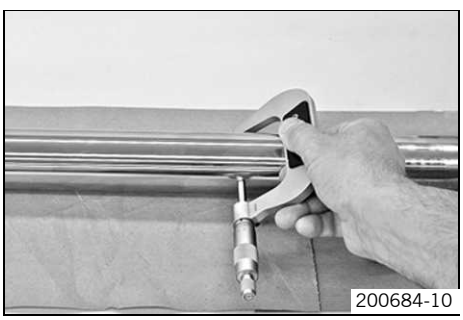
– Remove O-ring ❺ and seal ring ❻ from the compression damping fitting.
– Extract the compression damping fitting.

Checking the fork legs

Condition
The fork legs must be disassembled.



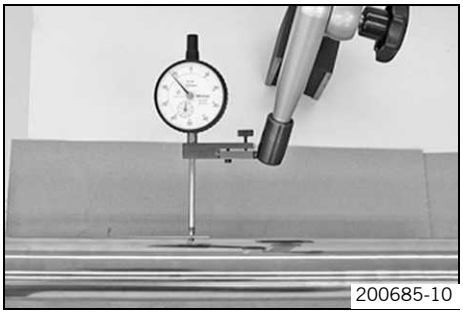
– Check the inner tube and axle clamp for damage.
  » If there is damage:
    – Change the inner tube.



– Measure the outside diameter at several locations on the inner tube.

Outside diameter of the inner tube	47.975... 48.005 mm (1.88878... 1.88996 in)

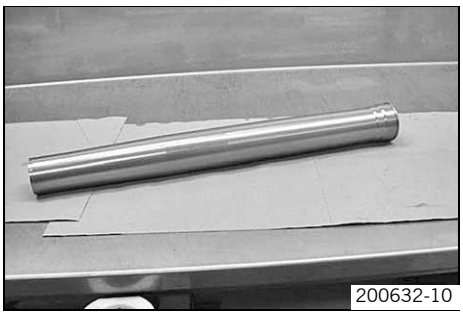
  » If the measured value is below the specified value:
    – Change the inner tube.


200685-10

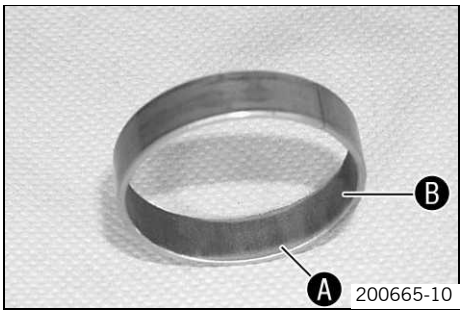
– Measure the run-out of the inner tube.

Inner tub run-out	≤ 0.20 mm (≤ 0.0079 in)

» If the measured value is greater than the specified value:
– Change the inner tube.

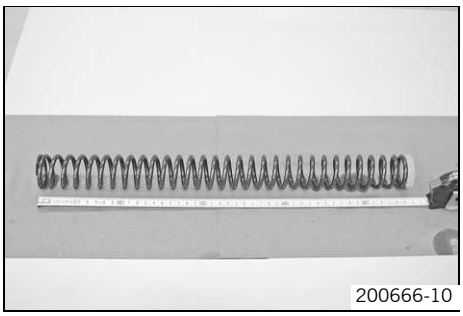

200632-10

– Check the outer tube for damage.
» If there is damage:
– Change the outer tube.



200665-10

– Check the surface of the sliding bushing.
» If the bronze-colored layer ❹ under the sliding layer ❸ is visible:
– Replace the sliding bushing.


200666-10

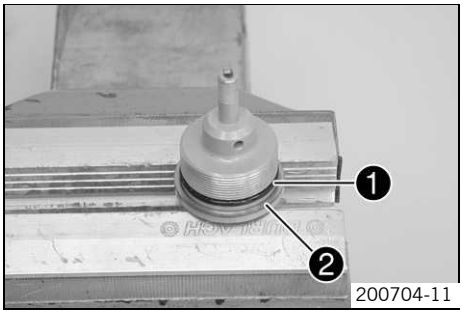
– Check the spring length.
Guideline

Spring length with preload spacer(s)	510 mm (20.08 in)

» If the measured value is greater than the specified value:
– Reduce the thickness of the preload spacer.
» If the measured value is less than the specified value:
– Increase the thickness of the preload spacer.

Assembling the compression damping fitting

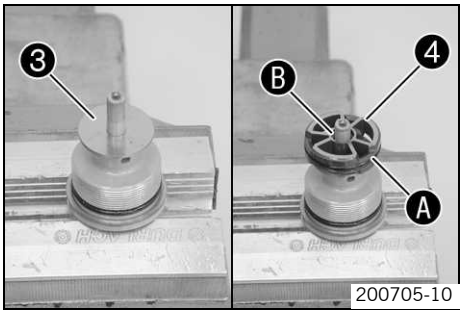
Info
The steps are identical for both fork legs.



200704-11

– Clamp the compression damping fitting in a bench vise using soft jaws.
– Mount O-ring ❶ and seal ring ❷.
– Grease the O-ring.

Lubricant (T158) (☛ p. 226)



– Mount shim stack ❸.

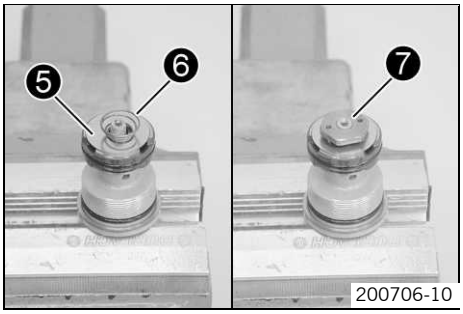
Info
Mount the smaller shims below.

– Mount pistons ❹ with O-ring Ⓐ.

Info
The side with the largest inside diameter Ⓑ faces upward.

– Grease the piston O-ring.

Fork oil (SAE 5) (☛ p. 224)



– Mount washer ❺.
– Mount spring ❻ with the tighter coil facing downward.
– Mount and tighten nut ❼.

Guideline

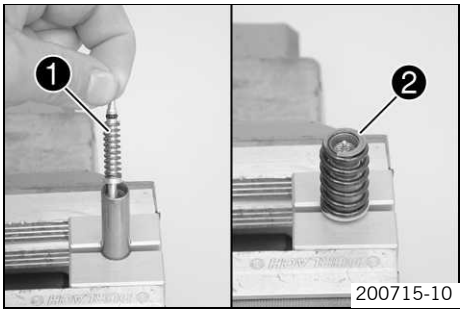
Compression damping fitting nut	M6x0.5	3 Nm (2.2 lbf ft)

Info
The washer ❺ must have freedom of movement relative to the spring force.

– Secure the nut by locking.
– Extract the compression damping fitting.

Assembling the cartridge

Info
The steps are identical for both fork legs.



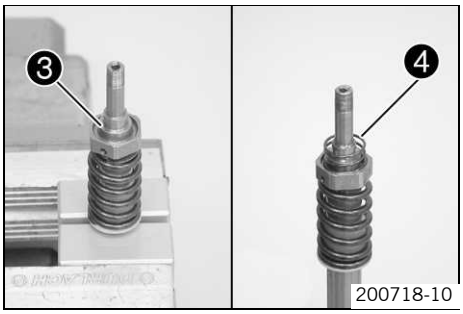
– Clamp in the piston rod.

Clamping stand (T14016S) (☛ p. 238)

– Mount valve ❶ of the rebound damping, with the spring and O-ring.
– Grease the O-ring.

Lubricant (T158) (☛ p. 226)

– Mount spring ❷.



– Grease tap rebound ❸ O-ring.

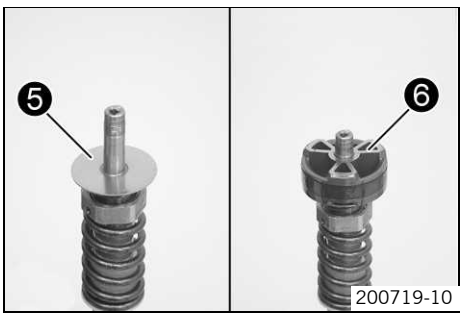
Lubricant (T158) (☛ p. 226)

– Mount and tighten the tap rebound.

Guideline

Tap rebound	M9x1	18 Nm (13.3 lbf ft)	**Loctite® 2701**

– Position spring ❹.



– Mount shim stack ❺.

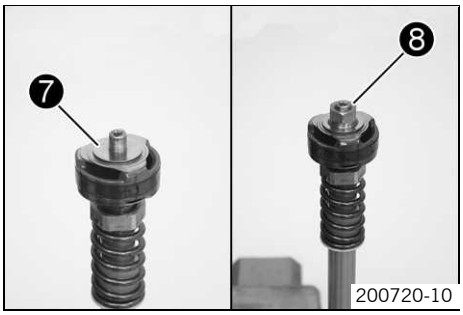
Info
Mount the smaller shims below.

– Press the shim stack downward against the spring force.

Info
The shim stack must be pressed downward over the collar.

– Mount piston ❻ with the piston ring.

Info
The side with the largest inside diameter faces downward.



– Mount shim stack ❼.

Info
Align the triangular plate exactly with the piston opening.

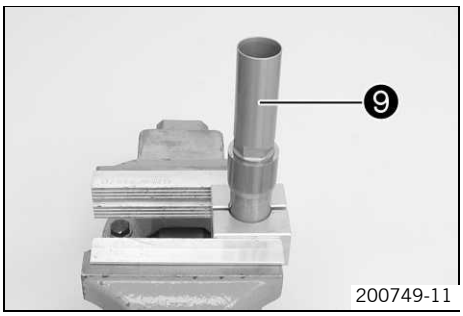
– Mount and tighten nut ❽.

Guideline

Tap rebound nut	M6x0.5	5 Nm (3.7 lbf ft)

Info
Mount the nut with the collar facing downward.

– Secure the nut by locking.



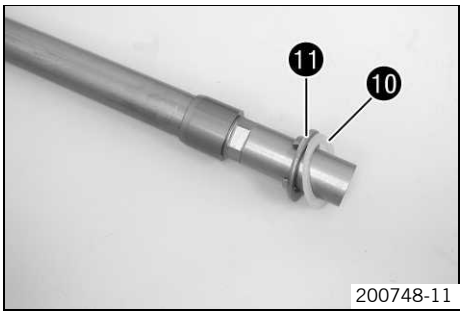
– Degrease the cartridge and clamp using the special tool.

Clamping stand (T14015S) (☛ p. 238)

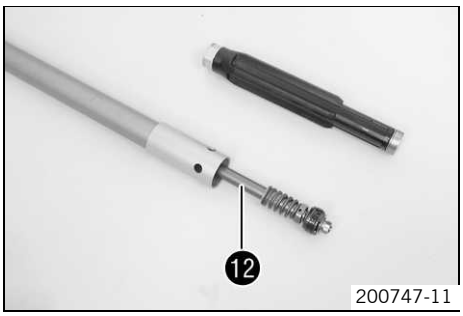
– Mount and tighten screwsleeve ❾.

Guideline

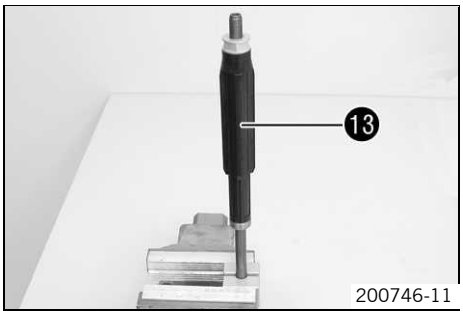
Screwsleeve	M29x1	46 Nm (33.9 lbf ft)	**Loctite® 241**



– Mount washer ❿ and spring seat ⓫.



– Push piston rod ⓬ into the cartridge.



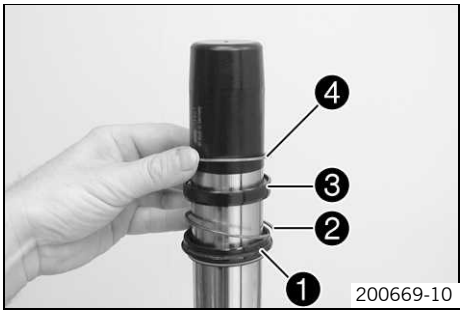
– Screw on fluid barrier ⓭ to the stop.

Info
The fluid barrier must be screwed on tightly against the stop. Do not use a tool.

Assembling the fork legs

Info
The steps are identical for both fork legs.

– Check the fork legs. (☛ p. 21)
– Assemble the cartridge. (☛ p. 23)
– Assemble the compression damping fitting. (☛ p. 22)



– Clamp in the inner tube with the axle clamp.
– Mount the special tool.

Protecting sleeve (T1401) (☛ p. 237)

– Grease and slide on dust boot ❶.

Lubricant (T511) (☛ p. 227)

Info
Always change the dust boot, seal ring, lock ring and support ring.
Mount the sealing lip with the spring expander facing downward.

– Slide on lock ring ❷.
– Grease and slide on seal ring ❸.

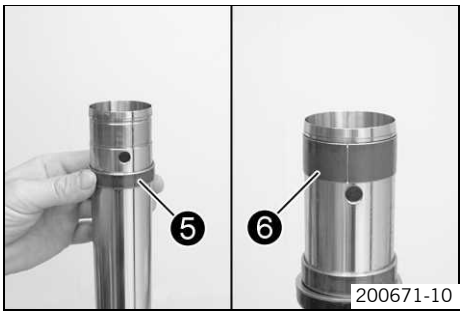
Lubricant (T511) (☛ p. 227)

Info
The sealing lip should face downward and open side upward.

– Slide on support ring ❹.
– Remove the special tool.

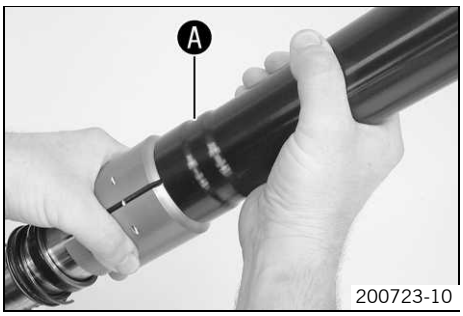
– Roughen, clean and grease the edges of the sliding bushings using 600 grit sandpaper.

Fork oil (SAE 5) (☛ p. 224)



– Slide on lower sliding bushing ❺.
– Mount upper sliding bushing ❻.

Info
Gently pull them apart without using a tool.



– Slide on the outer tube.
– Warm up the outer tube in the lower sliding bushing area Ⓐ.
Guideline

50 °C (122 °F)

– Hold the lower sliding bushing with the longer shoulder of the special tool.

Assembly tool (T1402S) (☛ p. 238)

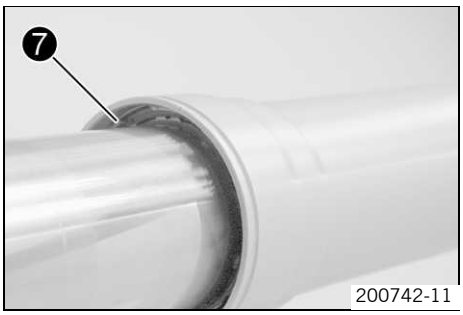
– Press the outer tube all the way in.


200724-10

– Position the support ring.
– Hold the seal ring with the shorter shoulder of the special tool.

Assembly tool (T1402S) (☛ p. 238)

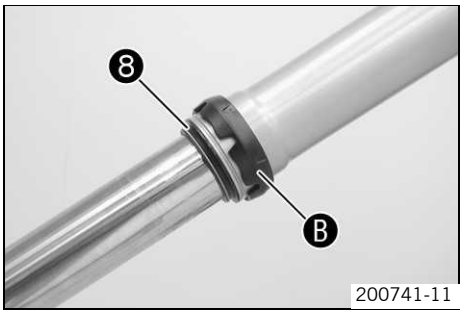
– Press the outer tube all the way in.



200742-11

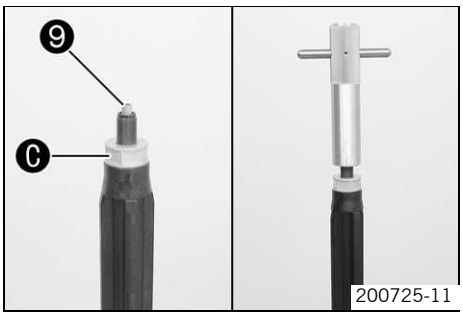
– Mount lock ring ❼.

Info
The lock ring must audibly lock into place.



200741-11

– Mount dust boot ❽.
– Mount fork protector ring Ⓑ.



200725-11

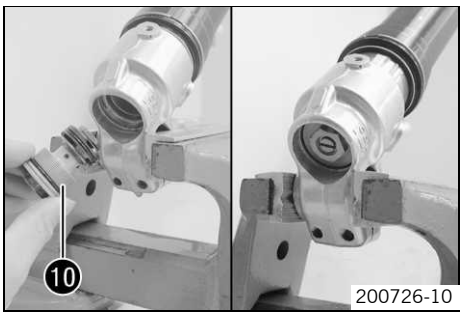
– Mount adjustment tube ❾ of the rebound damping in the cartridge.
  ✓ The adjustment tube extends 5 mm out from the cartridge and can be pressed inward against the spring force.
  ✗ The adjustment tube extends more than 7 mm out from the cartridge and cannot be pressed inward against the spring force.
– Screw on water excluder Ⓒ to the stop.

Info
The water excluder must be screwed on tightly against the stop. Do not use a tool.

– Mount the special tool on the cartridge.

Gripping tool (T14026S1) (☛ p. 238)

Info
The special tool must be used in order that the adjustment tube is not raised. Otherwise, oil will reach the piston rod.



200726-10

– Push the cartridge into the inner tube.
– Mount and tighten compression damping fitting ❿.

Guideline

Compression damping fitting	M29x1	35 Nm (25.8 lbf ft)

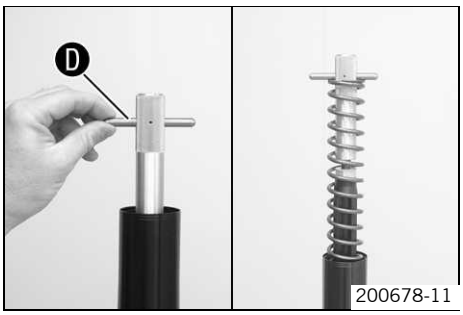
Info
If the cartridge turns as well, press the piston rod slightly to the side.


200677-10

– Clamp in the fork vertically.
– Fill with fork oil.

Fork oil per fork leg	626 ml (21.17 fl. oz.)	Fork oil (SAE 5) (☛ p. 224)

Info
Pull out and push in the piston rod several times to bleed air from the cartridge.



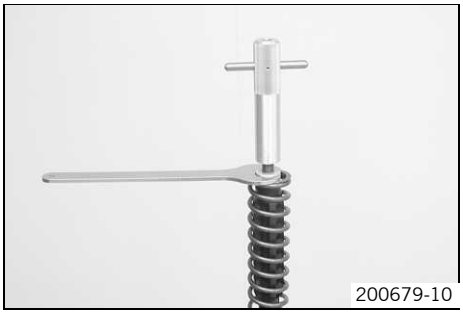
200678-11

– Remove pin Ⓓ of the special tool.

Gripping tool (T14026S1) (☛ p. 238)

– Pull out the piston rod. Install the spring. Reinstall the pin.
Guideline

Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	4.4 N/mm (25.1 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	4.6 N/mm (26.3 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	4.8 N/mm (27.4 lb/in)


200679-10

– Pull the spring downward. Place the special tool on the hex drive.

Open-end wrench (T14032) (☛ p. 238)

– Remove the special tool.

Gripping tool (T14026S1) (☛ p. 238)

200743-10

– Clamp the special tool in the bench vise.
– Grease the threads of the piston rod.

Lubricant (T159) (☛ p. 227)

– Grease the upper edge Ⓔ of the piston rod.

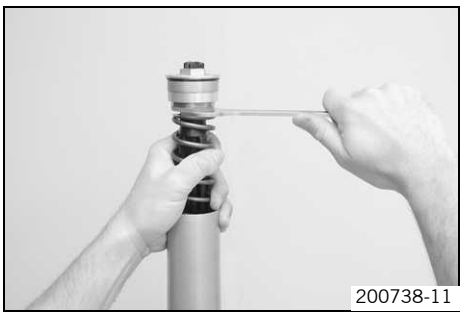
Lubricant (T158) (☛ p. 226)

– Screw the **Preload Adjuster** with preload spacer onto the piston rod.

Info
The **Preload Adjuster** must be screwed in all the way before the piston rod also begins to turn. In case of tight piston rod threads, it must be held to keep it from turning. If the **Preload Adjuster** is not screwed in all the way, the rebound adjustment will not function.

– Tighten the **Preload Adjuster**.
Guideline

Preload Adjuster on the piston rod	M12x1	25 Nm (18.4 lbf ft)


200738-11

– Unclamp the special tool. Pull the spring downward and remove the special tool.


200744-10

– Push the outer tube upward.
– Clamp the outer tube in the area of the lower triple clamp.

Clamping stand (T1403S) (☛ p. 239)

– Grease the **Preload Adjuster** O-ring.

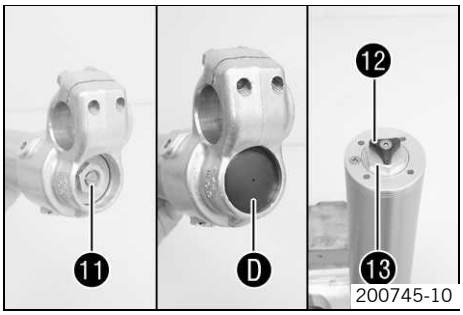
Lubricant (T158) (☛ p. 226)

– Screw on and tighten the **Preload Adjuster**.

Guideline

Preload Adjuster on the outer tube	M51x1.5	50 Nm (36.9 lbf ft)

Pin wrench (T103) (☛ p. 235)



200745-10

Alternative 1

– Turn the compression damping adjusting screw ⓫ and the rebound damping adjusting screw ⓬ clockwise all the way.
– Turn back counterclockwise by the number of clicks corresponding to the fork type.

Guideline

Rebound damping	
Comfort	24 clicks
Standard	22 clicks
Sport	22 clicks
Compression damping	
Comfort	26 clicks
Standard	22 clicks
Sport	20 clicks

– Turn the adjusting screw of spring preload ⓭ counterclockwise all the way.
– Turn back clockwise by the number of turns corresponding to the fork type.

Guideline

Spring preload - **Preload Adjuster**	
Comfort	2 turns
Standard	2 turns
Sport	4 turns

Alternative 2

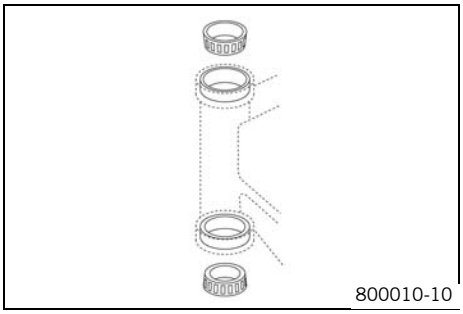
Warning

Danger of accidents Modifications to the suspension settings can seriously alter the vehicle's ride behavior.

– Extreme modifications to the adjustment of the spring elements can cause a serious deterioration in the handling characteristics and overload some components.
– Only make adjustments within the recommended range.
– After making adjustments, ride slowly at first to get the feel of the new ride behavior.

– Set the adjusting screws to the position determined before removal.
– Mount protective cover Ⓓ.

Greasing the steering head bearing


800010-10

(EXC SIX DAYS, XC-W USA, EXC USA)
- Remove the lower triple clamp. (☛ p. 29)
- Install the lower triple clamp. (☛ p. 30)

(EXC EU, EXC AUS, XC-W ZA)
- Remove the lower triple clamp. (☛ p. 30)
- Install the lower triple clamp. (☛ p. 31)

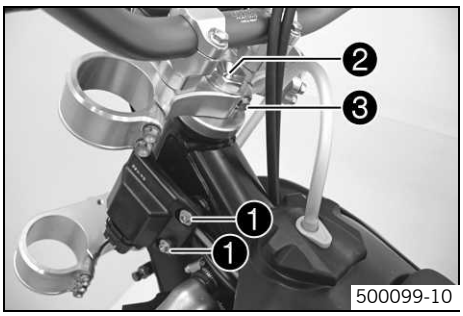
Removing the lower triple clamp (EXC SIX DAYS, XC-W USA, EXC USA)

- Remove the fork legs. (☛ p. 14)

(XC-W USA)
- Remove the start number plate. (☛ p. 67)

(EXC SIX DAYS, EXC USA)
- Remove the headlight mask with the headlight. (☛ p. 66)

- Remove the front fender. (☛ p. 66)
- Remove screws ❶ and hang the CDI control unit to the side.

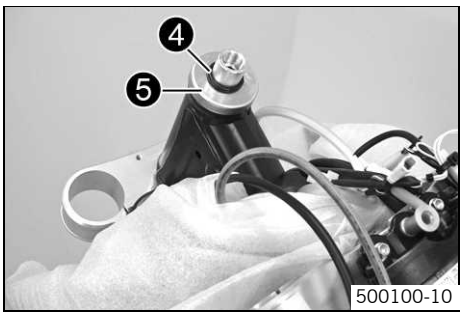


500099-10

Info
Do not unplug the CDI control unit.

- Remove screw ❷. Remove screw ❸, take off top triple clamp with the handlebar and place it on one side.

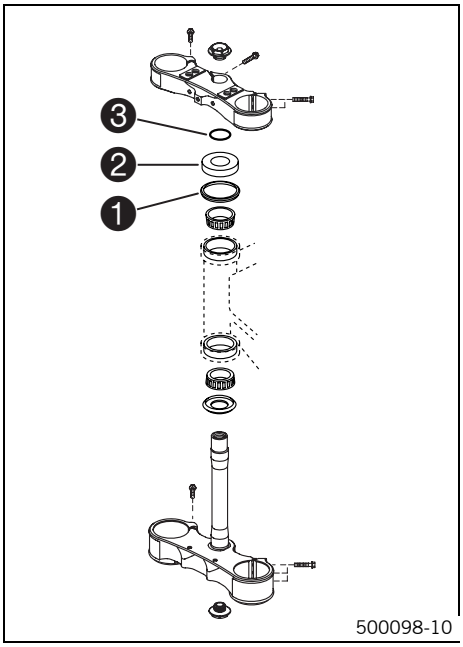
Info
Protect the motorcycle and its attachments from damage by covering them. Do not bend the cables and lines.



500100-10

- Remove o-ring ❹. Remove protector ring ❺.
- Remove the lower triple clamp with the steering stem.
- Remove the upper steering head bearing.

Installing the lower triple clamp (EXC SIX DAYS, XC-W USA, EXC USA)



500098-10

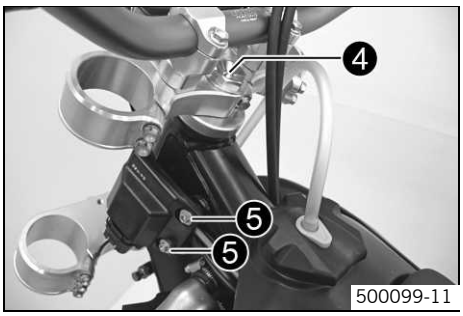
– Clean the bearing and sealing elements, check for damage, and grease.

Long-life grease (☛ p. 226)

– Insert the lower triple clamp with the steering stem. Mount the upper steering head bearing.

Info
Check whether the top steering head seal ❶ is correctly positioned.

– Push up protective ring ❷ and o-ring ❸.



500099-11

– Position the upper triple clamp with the steering.
– Mount and tighten screw ❹.

Guideline

Screw, top steering head	M20x1.5	10 Nm (7.4 lbf ft)

– Position the clutch line, wiring harness and CDI control unit. Mount and tighten screws ❺.

Guideline

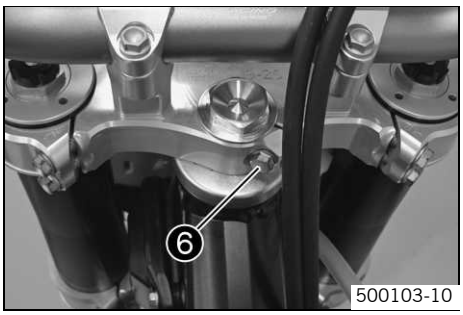
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Install the front fender. (☛ p. 66)

(XC-W USA)
– Install the start number plate. (☛ p. 67)

(EXC SIX DAYS, EXC USA)
– Refit the headlight mask with the headlight. (☛ p. 66)

– Install the fork legs. (☛ p. 14)



500103-10

– Mount and tighten screw ❻.

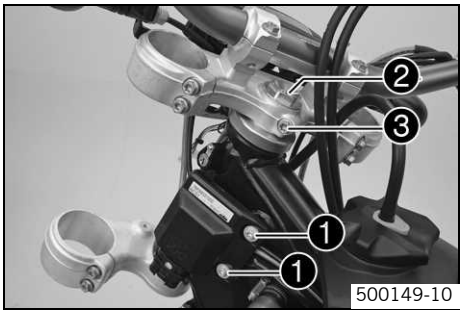
Guideline

Screw, top steering stem	M8	17 Nm (12.5 lbf ft)	**Loctite® 243™**

– Check the cable harness, cable, brake and clutch line for free movement and free laying.
– Check the play of the steering head bearing. (☛ p. 32)

Removing the lower triple clamp (EXC EU, EXC AUS, XC-W ZA)

– Remove the fork legs. (☛ p. 14)
– Remove the headlight mask with the headlight. (☛ p. 66)
– Remove the front fender. (☛ p. 66)

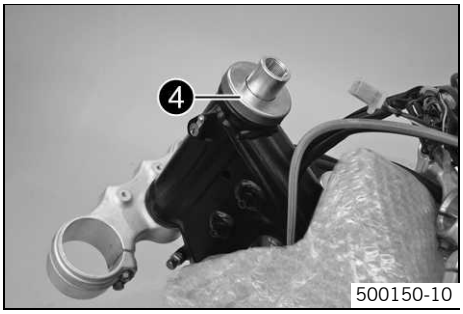


– Remove screws ❶ and hang the CDI control unit to the side.

Info
Do not unplug the CDI control unit.

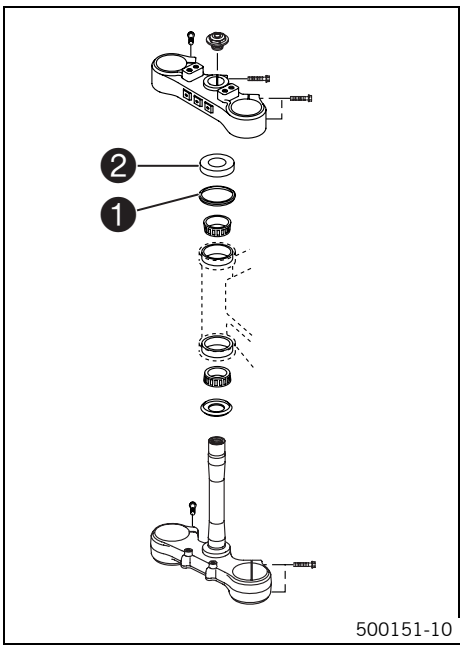
– Remove screw ❷. Loosen screw ❸. Take off top triple clamp with the handlebar and place it on one side.

Info
Protect the motorcycle and its attachments from damage by covering them. Do not bend the cables and lines.



– Remove protector ring ❹.
– Remove the lower triple clamp with the steering stem.
– Remove the upper steering head bearing.

Installing the lower triple clamp (EXC EU, EXC AUS, XC-W ZA)



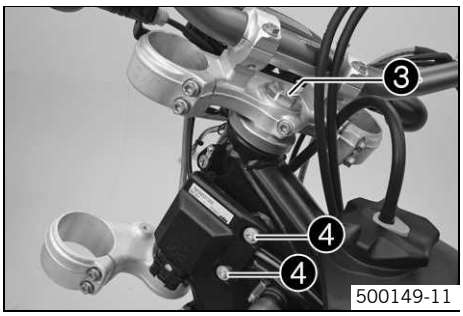
– Clean the bearing and sealing elements, check for damage, and grease.

Long-life grease (☛ p. 226)

– Insert the lower triple clamp with the steering stem. Mount the upper steering head bearing.

Info
Check whether the top steering head seal ❶ is correctly positioned.

– Push on protective ring ❷.



– Position the upper triple clamp with the steering.
– Mount and tighten screw ❸.

Guideline

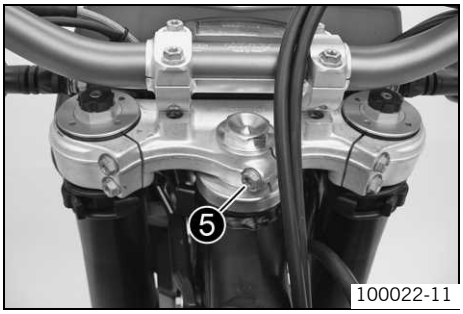
Screw, top steering head	M20x1.5	10 Nm (7.4 lbf ft)

– Position the clutch line, wiring harness and CDI control unit. Mount and tighten screws ❹.

Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Install the front fender. (☛ p. 66)
– Refit the headlight mask with the headlight. (☛ p. 66)
– Install the fork legs. (☛ p. 14)



– Tighten screw ❺.

Guideline

Screw, top steering stem	M8	20 Nm (14.8 lbf ft)

– Check the cable harness, cable, brake and clutch line for free movement and free laying.
– Check the play of the steering head bearing. (☛ p. 32)

Checking the play of the steering head bearing

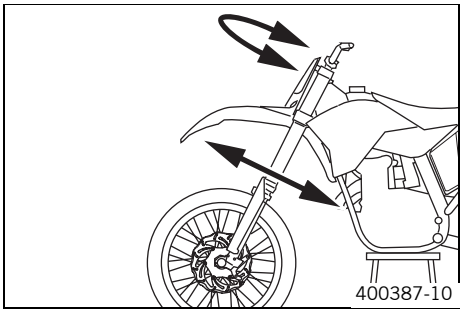
Warning

Danger of accidents Unstable vehicle handling from incorrect steering head bearing play.

– Adjust the steering head bearing play without delay.

Info

If the bike is driven for a longer time with play in the steering head bearing, the bearing and the bearing seats in the frame can be damaged after time.



– Jack up the motorcycle. (☛ p. 10)
– Move the handlebar to the straight-ahead position. Move the fork legs to and fro in the direction of travel.

No play should be noticeable in the steering head bearing.

» If there is noticeable play present:

(EXC SIX DAYS, XC-W USA, EXC USA)

– Adjust play of the steering head bearing. (☛ p. 32)

(EXC EU, EXC AUS, XC-W ZA)

– Adjust play of the steering head bearing. (☛ p. 33)

– Move the handlebar to and fro over the entire steering range.

The handlebars must move freely and without binding over the full range of movement. There should be no trace of artificial rest positions (due to binding).

» If artificial rest positions:

(EXC SIX DAYS, XC-W USA, EXC USA)

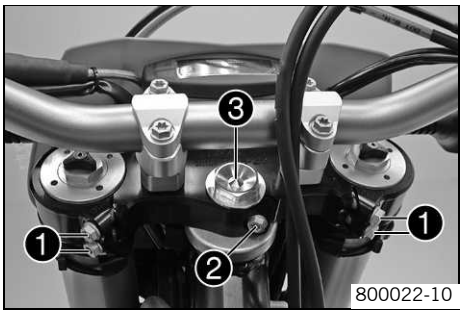
– Adjust play of the steering head bearing. (☛ p. 32)

(EXC EU, EXC AUS, XC-W ZA)

– Adjust play of the steering head bearing. (☛ p. 33)
– Check the steering head bearing and replace if required.

– Remove the motorcycle from the work stand. (☛ p. 10)

Adjusting play of steering head bearing (EXC SIX DAYS, XC-W USA, EXC USA)



– Jack up the motorcycle. (☛ p. 10)
– Loosen screw ❶. Remove screw ❷.
– Loosen and retighten screw ❸.

Guideline

Screw, top steering head	M20x1.5	10 Nm (7.4 lbf ft)

– Using a plastic hammer, tap lightly on the upper triple clamp to avoid strains.
– Fully tighten screw ❶.

Guideline

Screw, top triple clamp	M8	17 Nm (12.5 lbf ft)

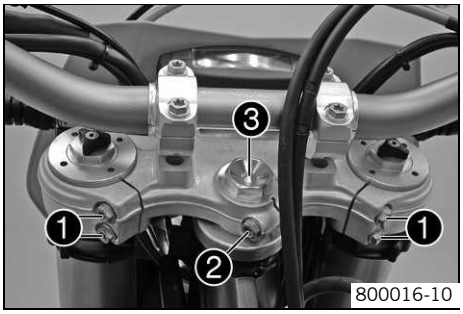
– Mount and tighten screw ❷.

Guideline

Screw, top steering stem	M8	17 Nm (12.5 lbf ft)	**Loctite® 243™**

– Check the play of the steering head bearing. (☛ p. 32)

Adjusting play of steering head bearing (EXC EU, EXC AUS, XC-W ZA)



– Jack up the motorcycle. (☛ p. 10)
– Loosen screws ❶ and ❷.
– Loosen and retighten screw ❸.

Guideline

Screw, top steering head	M20x1.5	10 Nm (7.4 lbf ft)

– Using a plastic hammer, tap lightly on the upper triple clamp to avoid strains.
– Fully tighten screw ❶.

Guideline

Screw, top triple clamp	M8	20 Nm (14.8 lbf ft)

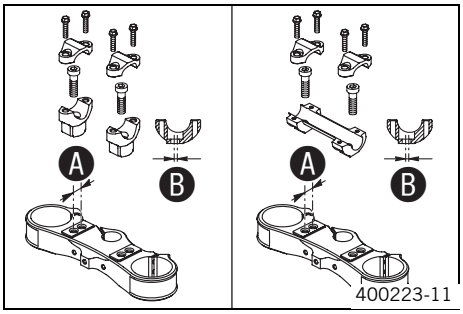
– Tighten screw ❷.

Guideline

Screw, top steering stem	M8	20 Nm (14.8 lbf ft)

– Check the play of the steering head bearing. (☛ p. 32)

Handlebar position



On the upper triple clamp, there are 2 holes at a distance of Ⓐ to each other.

Distance Ⓐ between holes	15 mm (0.59 in)

The holes on the handlebar support are placed at a distance of Ⓑ from the center.

Distance Ⓑ between holes	3.5 mm (0.138 in)

The handlebar supports can be mounted in 4 different positions.

(EXC SIX DAYS)

The handlebar supports can also be mounted at 2 different heights (with and without spacer).

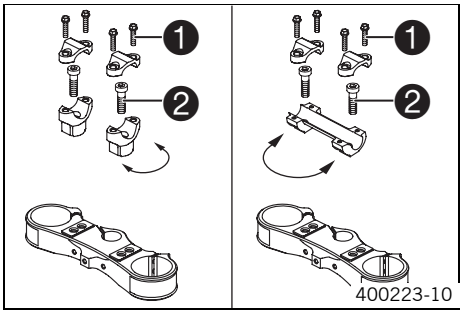
Thick spacer	9 mm (0.35 in)

Adjusting handlebar position

Warning

Danger of accidents Handlebar breakage.

– If the handlebar is bent or straightened it will cause material fatigue, and the handlebar can break. Always replace handlebar.



(EXC EU, EXC AUS, EXC USA, XC-W)

– Remove the four screws ❶. Remove the handlebar clamps. Remove the handlebar and lay it to one side.

Info

Protect the motorcycle and its attachments against damage by covering them.
Do not bend the cables and lines.

– Remove the two screws ❷. Remove the handlebar support.

– Place the handlebar support in the required position. Fit and tighten the two screws ❷.

Guideline

Screw, handlebar support	M10	40 Nm (29.5 lbf ft)	**Loctite® 243™**

Info

Position the left and right handlebar supports evenly.

– Position the handlebars.

Info

Make sure cables and wiring are positioned correctly.

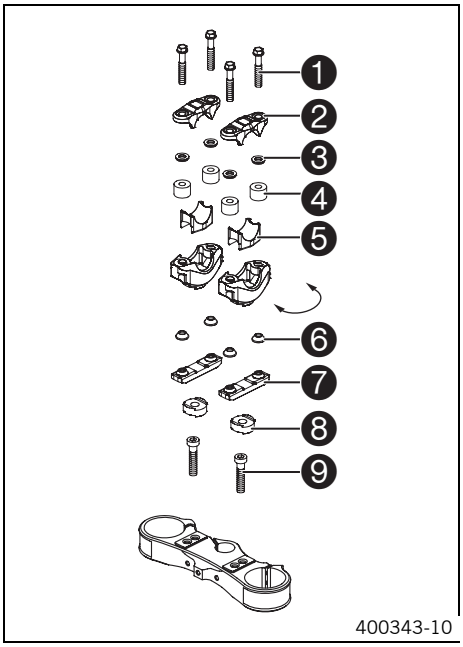
– Position the handlebar clamps. Fit and evenly tighten the four screws ❶.

Guideline

Screw, handlebar clamp	M8	20 Nm (14.8 lbf ft)

Info

Make sure the gap width is even.



(EXC SIX DAYS)

– Remove the four screws ❶. Remove the handlebar clamps ❷ with rubber washers ❸ and elastomer bushes ❹.

– Remove the handlebar and lay it to one side.

Info
Protect the motorcycle and its attachments against damage by covering them.
Do not bend the cables and lines.

– Remove the lower shells ❺.

– Remove the clamp bar ❼ with the rubber cones ❻.

– Remove the two screws ❾. Remove the handlebar support.

– Place the handlebar support in the required position. Fit and tighten the two screws ❾.

Guideline

Screw, handlebar support	M10	40 Nm (29.5 lbf ft)	**Loctite® 243™**

Condition
❽ Spacer fitted:

Use a M10x35 screw

Condition
without a spacer ❽:

Use a M10x25 screw

Info
Position the left and right handlebar supports evenly.

– Fit the rubber cones ❻ and clamp bar ❼.

– Fit the lower shells ❺.

– Position the handlebars.

Info
Make sure cables and wiring are positioned correctly.

– Position the handlebar clamps ❷ with rubber washers ❸ and elastomer bushes ❹.

Elastomer kit green - soft quality (SXS05125203)
Elastomer kit yellow - medium quality (standard) (SXS05125204)
Elastomer kit red - hard quality (SXS05125205)

Info
The elastomeres are available in different versions.

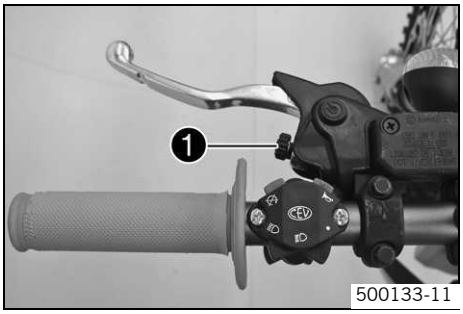
– Fit and evenly tighten the four screws ❶.

Guideline

Screw, handlebar clamp	M8	16 Nm (11.8 lbf ft)

Info
Make sure the gap width is even.

Adjusting basic position of clutch lever

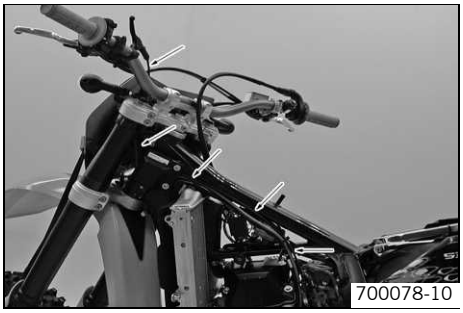


– Adjust the basic setting of the clutch lever to your hand size by turning adjusting screw ❶.

Info

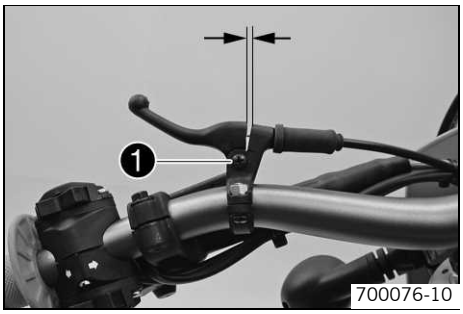
Turn the adjusting screw clockwise to increase the distance between the clutch lever and the handlebar.
Turn the adjusting screw counterclockwise to decrease the distance between the clutch lever and the handlebar.
The range of adjustment is limited.
Turn the adjusting screw by hand only, and do not apply any force.
Do not make any adjustments while riding!

Checking the choke cable routing (EXC EU, EXC SIX DAYS)



– The choke cable must run behind the handlebar down to the frame. The choke cable runs to the carburetor behind the CDI controller directly on the left side of the frame.

Checking the choke cable play (EXC EU, EXC SIX DAYS)

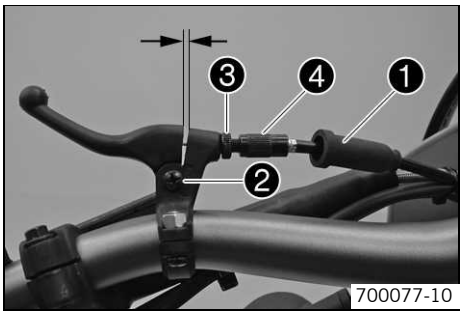


– Move the handlebar to the straight-ahead position.
– Loosen screw ❶ but do not remove it. The choke lever must move easily.
– Move the choke lever back and forth to ascertain the play in the choke cable.

Choke cable play	2... 3 mm (0.08... 0.12 in)

» If the choke cable play does not meet specifications:
– Adjust the choke cable play. (☛ p. 36)

Adjusting the choke cable play (EXC EU, EXC SIX DAYS)



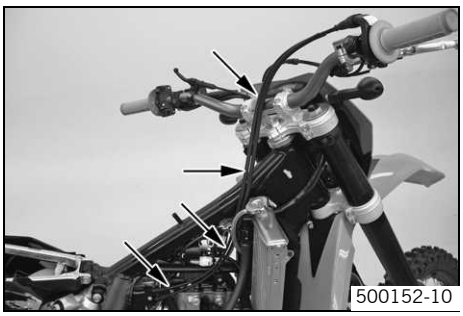
– Move the handlebar to the straight-ahead position.
– Check the choke cable routing. (☛ p. 36)
– Push back bellows ❶.
– Loosen screw ❷ but do not remove it. It must be possible to move the choke lever slightly.
– Turn nut ❸ in as far as possible. Turn adjusting screw ❹ until the choke lever exhibits the required choke cable play.

Guideline

Choke cable play	2... 3 mm (0.08... 0.12 in)

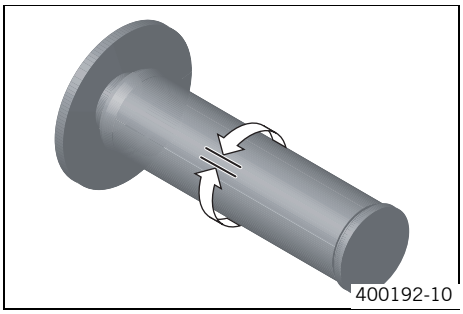
– Tighten nut ❸.
– Tighten screw ❷. The choke lever must remain in position when it is activated.
– Push bellows ❶ on.

Checking of the routing of the throttle cable


500152-10

– The two throttle cables must run parallel behind the handlebar down to the frame. They must be routed directly on the frame above the tank bearing to the carburetor.

Checking the play in the throttle cable


400192-10

– Move the handlebar to the straight-ahead position. Move the throttle grip backwards and forwards to ascertain the play in the throttle cable.

Play in throttle cable	3... 5 mm (0.12... 0.2 in)

» If the throttle cable play does not meet specifications:
  – Adjust the play in the throttle cable. (☛ p. 37)

Danger

Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

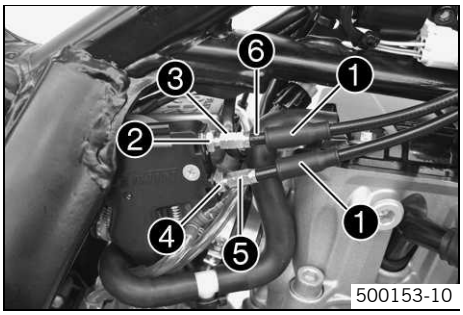
  – When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.

– Start the engine and let it run idle. Move the handlebar to and fro over the entire steering range.

The idle speed must not change.

» If the idle speed changes:
  – Adjust the play in the throttle cable. (☛ p. 37)

Adjusting the play in the throttle cable



500153-10

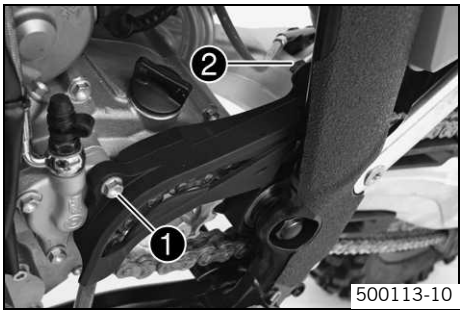
– Dismount the fuel tank. (☛ p. 63)
– Check the routing of the throttle cable. (☛ p. 37)
– Move the handlebar to the straight-ahead position.
– Push back bellows ❶.
– Loosen nut ❷. Turn adjusting screw ❸ in as far as possible.
– Loosen nut ❹. Turn adjusting screw ❺ so that there is play in the gas throttle cable at the throttle grip.

  Guideline

Play in throttle cable	3... 5 mm (0.12... 0.2 in)

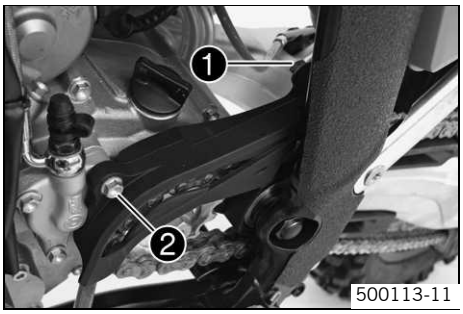
– Tighten nut ❹.
– Press and hold the throttle grip in the closed setting. Turn adjusting screw ❸ out until there is no play in the throttle cable ❻.
– Tighten nut ❷.
– Push bellows ❶ on. Check the throttle grip for smooth operation.
– Install the fuel tank. (☛ p. 64)
– Check the play in the throttle cable. (☛ p. 37)

Removing the engine sprocket cover



– Remove screw ❶.
– Remove screw ❷. Take off the engine sprocket cover.

Installing the engine sprocket cover



– Position the engine sprocket cover. Mount and tighten screw ❶.

Guideline

Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)

– Mount and tighten screw ❷.

Guideline

Screw, clutch slave cylinder	M6	10 Nm (7.4 lbf ft)

Adjusting high-speed compression damping of the shock absorber

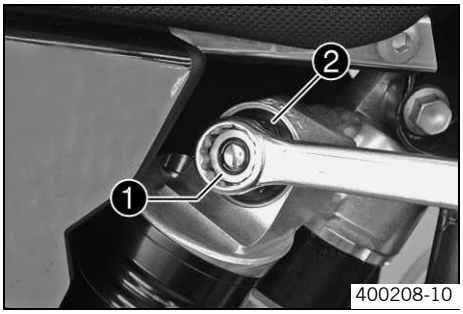
Danger

Danger of accidents Disassembly of pressurized parts can lead to injury.

– The shock absorber is filled with high density nitrogen. Adhere to the description provided.

Info

The high-speed setting can be seen during the fast compression of the shock absorber.



– Turn the adjusting screw ❶ clockwise with a ring wrench until it stops.

Info

Do not loosen nut ❷!

– Turn back counterclockwise the number of turns corresponding to the shock absorber type.

Guideline

Compression damping, high-speed	
Comfort	2 turns
Standard	1.5 turns
Sport	1 turn

Info

Turn clockwise to increase damping, turn counterclockwise to reduce suspension damping.

Adjusting the low-speed compression damping of the shock absorber

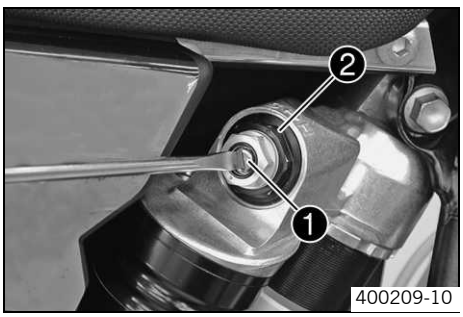
Danger

Danger of accidents Disassembly of pressurized parts can lead to injury.

– The shock absorber is filled with high density nitrogen. Adhere to the description provided.

Info

The low-speed setting can be seen during the slow to normal compression of the shock absorber.



– Turn adjusting screw ❶ clockwise with a screwdriver up to the last perceptible click.

Info

Do not loosen nut ❷!

– Turn back counterclockwise by the number of clicks corresponding to the shock absorber type.

Guideline

Compression damping, low-speed	
Comfort	18 clicks
Standard	15 clicks
Sport	12 clicks

Info

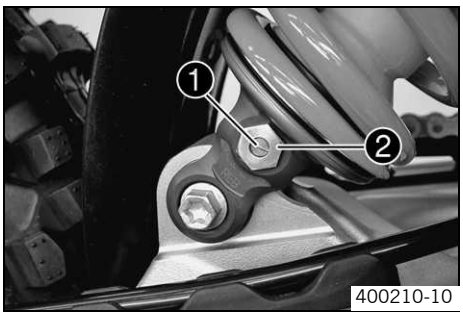
Turn clockwise to increase damping, turn counterclockwise to reduce suspension damping.

Adjusting rebound damping of shock absorber

Danger

Danger of accidents Disassembly of pressurized parts can lead to injury.

– The shock absorber is filled with high density nitrogen. Adhere to the description provided.



– Turn adjusting screw ❶ clockwise up to the last perceptible click.

Info

Do not loosen nut ❷!

– Turn back counterclockwise by the number of clicks corresponding to the shock absorber type.

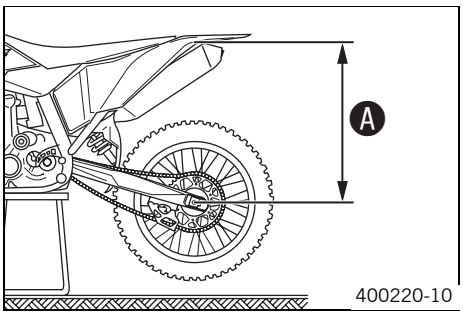
Guideline

Rebound damping	
Comfort	26 clicks
Standard	24 clicks
Sport	22 clicks

Info

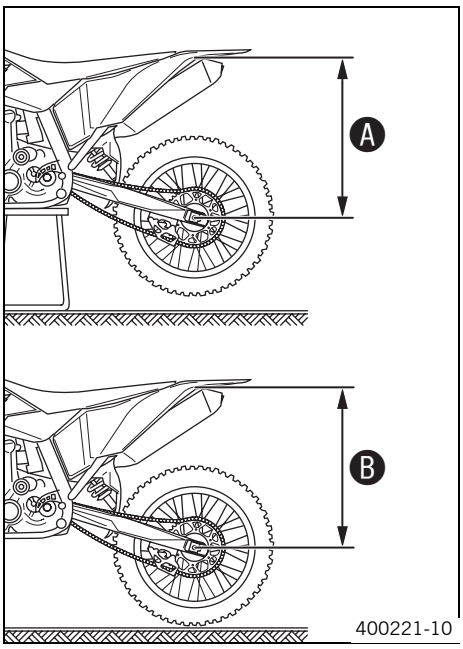
Turn clockwise to increase damping, turn counterclockwise to reduce suspension damping.

Measuring rear wheel sag unloaded



– Jack up the motorcycle. (☛ p. 10)
– Measure the distance – as vertical as possible – between the rear axle and a fixed point, for example, a mark on the side cover.
– Make a note of the value as measurement ❹.
– Remove the motorcycle from the work stand. (☛ p. 10)

Checking static sag of shock absorber



– Measure distance ❹ of rear wheel unloaded. (☛ p. 40)
– Ask someone to help you by holding the motorcycle upright.
– Measure the distance between the rear axle and the fixed point again.
– Make a note of the value as measurement ❺.

Info

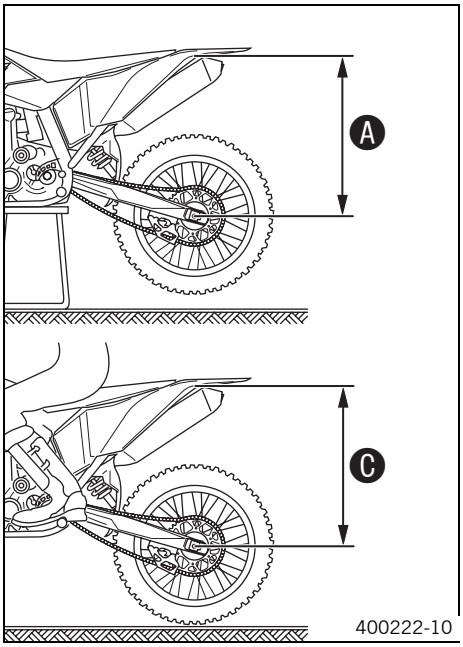
The static sag is the difference between measurements ❹ and ❺.

– Check the static sag.

Static sag	35 mm (1.38 in)

» If the static sag is less or more than the specified value:
– Adjust the spring preload of the shock absorber. (☛ p. 41)

Checking riding sag of shock absorber



– Measure distance ❹ of rear wheel unloaded. (☛ p. 40)
– With another person holding the motorcycle, the rider should sit on the saddle with full protective clothing in a normal sitting position (feet on footrests) and bounce up and down a few times until the rear suspension levels out.
– The other person now has to measure the distance between the rear axle and a fixed point.
– Make a note of the value as measurement ❻.

Info
The riding sag is the difference between measurements ❹ and ❻.

– Check the riding sag.

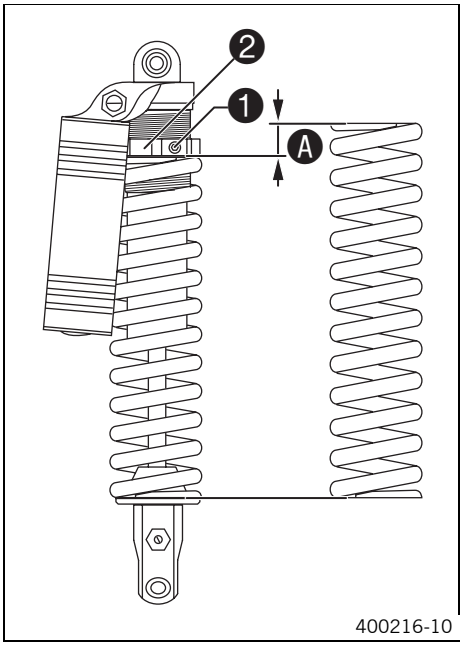
Riding sag	105 mm (4.13 in)

» If the riding sag differs from the specified measurement:
– Adjust the riding sag. (☛ p. 42)

Adjusting spring preload of the shock absorber

Danger
Danger of accidents Disassembly of pressurized parts can lead to injury.
– The shock absorber is filled with high density nitrogen. Adhere to the description provided.

Info
Before changing the spring preload, make a note of the present setting, e.g., by measuring the length of the spring.



– Remove shock absorber. (☛ p. 42)
– After removing the shock absorber, clean it thoroughly.
– Loosen screw ❶.
– Turn adjusting ring ❷ until the spring is no longer under tension.

Combination wrench (50329080000)
Hook wrench (T106S) (☛ p. 236)

– Measure the overall spring length when not under tension.
– Tighten the spring by turning adjusting ring ❷ to measurement ❹.
Guideline

Spring preload	9 mm (0.35 in)

Info
Depending on the static sag and/or the riding sag, it may be necessary to increase or decrease the spring preload.

– Tighten screw ❶.
Guideline

Screw, shock absorber adjusting ring	M6	5 Nm (3.7 lbf ft)

– Install the shock absorber. (☛ p. 42)

Adjusting riding sag

– Remove shock absorber. (☛ p. 42)
– After removing the shock absorber, clean it thoroughly.
– Choose and mount a suitable spring.

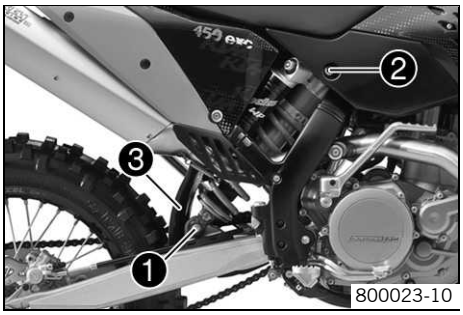
Guideline

Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	69 N/mm (394 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	72 N/mm (411 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	76 N/mm (434 lb/in)

Info
The spring rate is shown on the outside of the spring.
Smaller weight differences can be compensated by changing the spring preload.

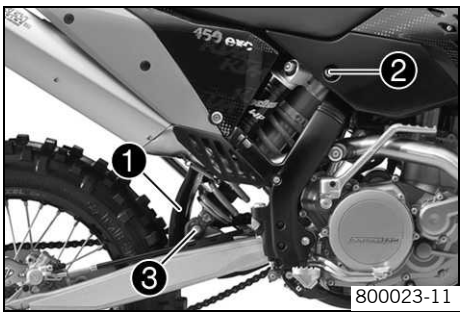
– Install the shock absorber. (☛ p. 42)
– Check the static sag of the shock absorber. (☛ p. 40)
– Check the riding sag of the shock absorber. (☛ p. 41)
– Adjust the rebound damping of the shock absorber. (☛ p. 40)

Removing the shock absorber



– Jack up the motorcycle. (☛ p. 10)
– Remove screw ❶ and lower the rear wheel with the swing arm as far as possible without blocking the rear wheel. Fix the rear wheel in this position.
– Remove screw ❷, push splash protector ❸ to the side, and remove the shock absorber.

Installing the shock absorber



– Push splash protector ❶ to the side and position the shock absorber. Mount and tighten screw ❷.

Guideline

Screw, top shock absorber	M12	80 Nm (59 lbf ft)	**Loctite® 243™**

– Mount and tighten screw ❸.

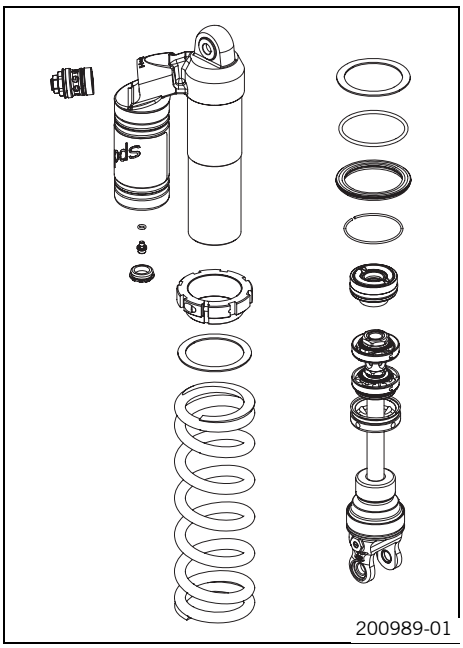
Guideline

Screw, bottom shock absorber	M12	80 Nm (59 lbf ft)	**Loctite® 243™**

Info
The heim joint for the shock absorber at the swing arm is Teflon coated. It must not be greased with grease or with other lubricants. Lubricants dissolve the Teflon coating, thereby drastically reducing the service life.

– Remove the motorcycle from the work stand. (☛ p. 10)

Performing a shock absorber service


200989-01

Condition

The shock absorber has been removed.

- Remove the spring. (☛ p. 43)
- Disassemble the shock absorber. (☛ p. 44)
- Disassemble the piston rod. (☛ p. 45)
- Disassemble the seal ring retainer. (☛ p. 46)
- Check the shock absorber. (☛ p. 47)
- Disassemble the rebound adjuster. (☛ p. 48)
- Remove the heim joint. (☛ p. 49)
- Install the heim joint. (☛ p. 49)
- Assemble the rebound adjuster. (☛ p. 50)
- Assemble the seal ring retainer. (☛ p. 51)
- Assemble the piston rod. (☛ p. 51)
- Assemble the damper. (☛ p. 53)
- Install the spring. (☛ p. 58)

Removing the spring

Condition

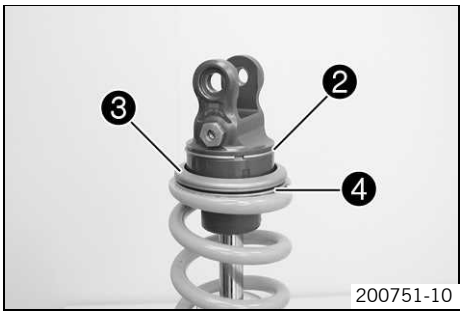
The shock absorber has been demounted.

- Clamp the shock absorber in a bench vise using soft jaws.
- Measure and note the spring length in its pre-compressed state.
- Unscrew screw ❶.
- Rotate the adjusting ring until the spring is no longer under tension.

Hook wrench (T106S) (☛ p. 236)

200750-10

- Remove O-ring ❷.
- Remove spring retainer ❸ and intermediate washer ❹.
- Remove the spring.



200751-10

- Rotate adjusting ring ❺ with the intermediate washer toward the top.

Info

Both cannot be taken off yet.

200752-10

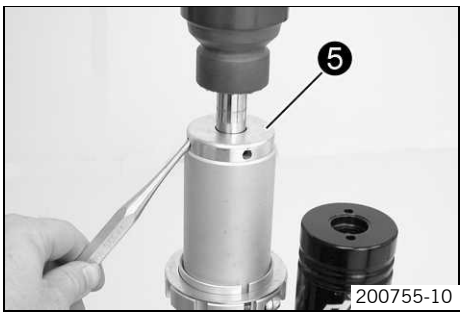
Disassembling the shock absorber

– Remove the spring. (☛ p. 43)

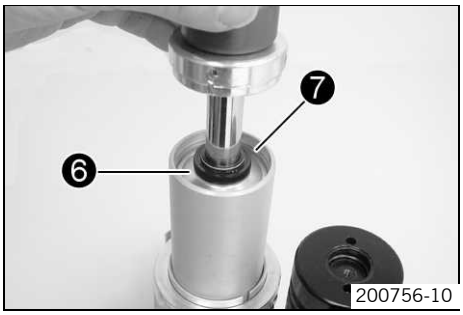
– Take note of the present state of rebound damping ❶ and compression damping ❷.
– Completely open the adjustment elements of the rebound damping and compression damping.
– Remove rubber cap ❸ of the reservoir.

– Slowly unscrew screw ❹.

✓ The pressurized nitrogen is bled off.



– Remove locking cap ❺.



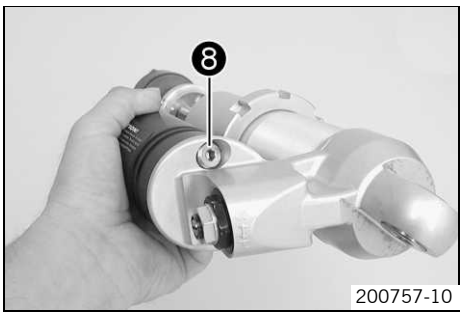
– Press seal ring retainer ❻ all the way in with the special tool.

Disassembly tool (T1216) (☛ p. 237)

– Remove lock ring ❼.

Info
Do not scratch the inner surface.

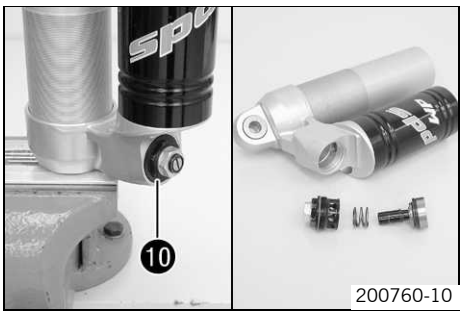
– Take out the shock absorber.



– Remove screw ❽. Drain the oil.

– Remove the piston rod. Drain the remaining oil.

– Remove adjusting ring ❾ with the intermediate washer.



– Remove compression damping adjuster ❿. Remove the spring and piston.

Disassembling the piston rod

– Disassemble the shock absorber. (☛ p. 44)
– Clamp the piston rod with the fork in a bench vise.

– Remove nut ❶.

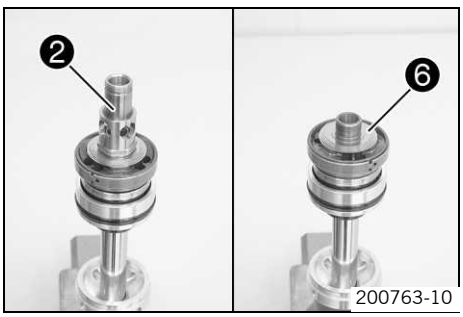
Info
If mount ❷ is loosened, apply counteractive force.

– Remove rebound damping shim stack ❸.

Info
Guide the rebound damping shim stack onto a screwdriver and put them aside together.

– Remove piston ❹.
– Remove compression damping shim stack ❺.

Info
Guide the compression damping shim stack onto a screwdriver and put them aside together.

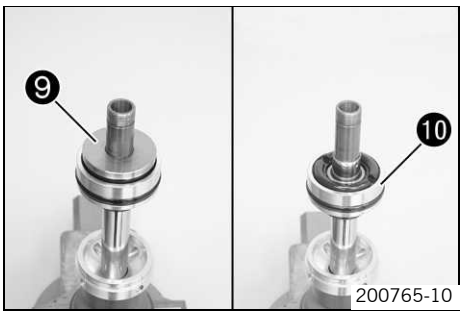


– Unscrew and remove mount ❷.
– Remove rebound damping shim stack ❻.

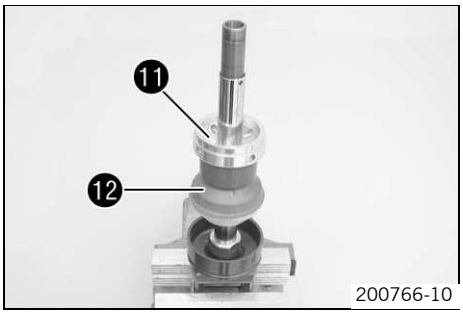
Info
Guide the rebound damping shim stack onto a screwdriver and put them aside together.

– Remove piston ❼.
– Remove compression damping shim stack ❽.

Info
Guide the compression damping shim stack onto a screwdriver and put them aside together.



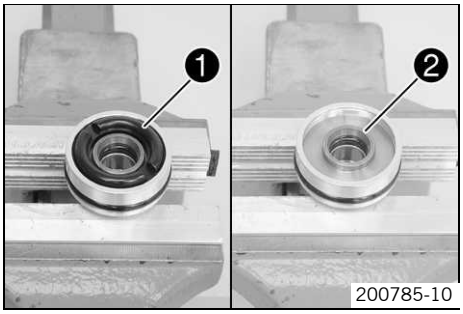
– Remove rebound damping washer ❾.
– Remove seal ring retainer ❿.



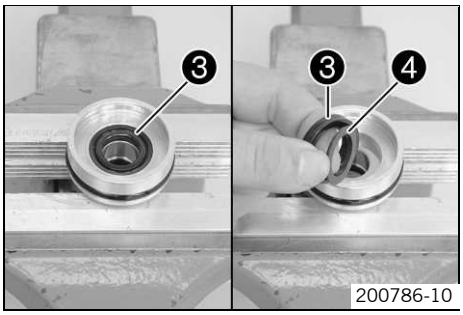
– Remove locking cap ⓫ and bump rubber ⓬.

Disassembling the seal ring retainer

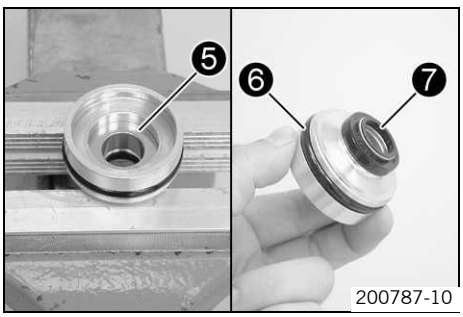
– Disassemble the piston rod. (☛ p. 45)
– Remove rebound rubber ❶.
– Remove centering disk ❷.



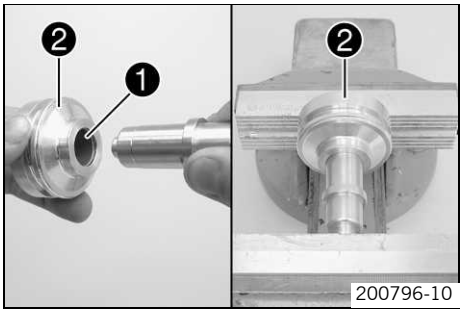
– Remove seal ring ❸.
– Remove washer ❹ from seal ring ❸.



– Remove washer ❺.
– Remove O-ring ❻.
– Remove dust boot ❼.

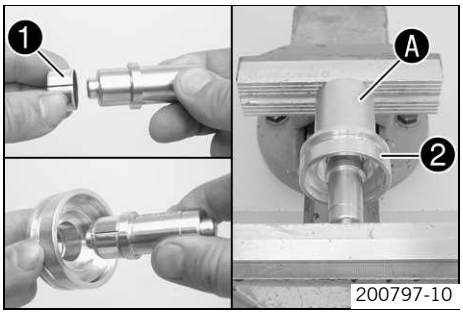


Replacing the pilot bushing



– Disassemble the seal ring retainer. (☛ p. 46)
– Press pilot bushing ❶ out of seal ring retainer ❷ using the special tool.

Press drift (T1504) (☛ p. 239)



– Slide the new pilot bushing ❶ onto the special tool.

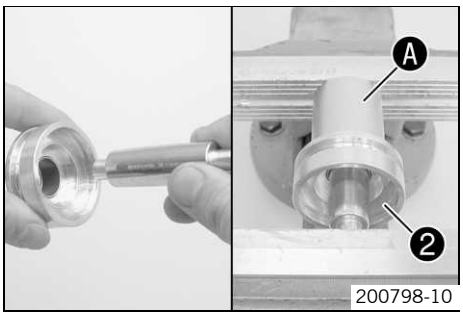
Press drift (T1504) (☛ p. 239)

– Position the pilot bushing in the seal ring retainer using the special tool.

Press drift (T1504) (☛ p. 239)

– Support seal ring retainer ❷ with the sleeve Ⓐ of the special tool. Press the pilot bushing all the way in.

Assembly tool (T150S) (☛ p. 239)



– Lubricate the special tool.

Fork oil (SAE 5) (☛ p. 224)
Calibration pin (T1205) (☛ p. 236)

– Support seal ring retainer ❷ with the sleeve Ⓐ of the special tool.

Assembly tool (T150S) (☛ p. 239)

– Press the special tool through the new pilot bushing.

Calibration pin (T1205) (☛ p. 236)

✓ The pilot bushing is to be calibrated.
– Assemble the seal ring retainer. (☛ p. 51)

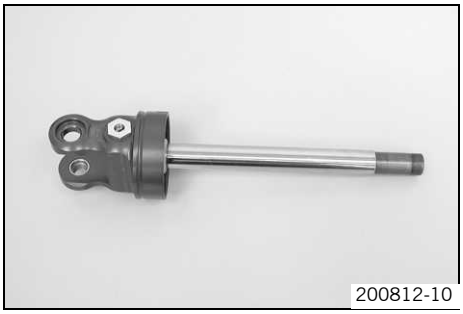
Checking the shock absorber

Condition
The shock absorber has been disassembled.

– Measure the inside diameter on both ends and in the middle of the shock absorber tube.

Shock absorber tube	
Minimum diameter	50.08 mm (1.9716 in)

» If the measured value is greater than the specified value:
  – Replace the shock absorber tube.
– Check the shock absorber tube for damage and wear.
» If there is damage or wear:
  – Replace the shock absorber tube.
– Check the heim joint for damage and wear.
» If there is damage or wear:
  – Replace the heim joint.


200812-10

– Measure the diameter of the piston rod.

Piston rod	
Diameter	≥ 17.95 mm (≥ 0.7067 in)

» If the specified value was not attained:
– Replace the piston rod.

– Measure the run-out of the piston rod.

Piston rod	
Run-out	≤ 0.02 mm (≤ 0.0008 in)

» If the measured value is greater than the specified value:
– Replace the piston rod.

– Check the piston rod for damage and wear.

» If there is damage or wear:
– Replace the piston rod.


200813-10

– Check the piston rings for damage and wear.

» If damage or a bronze-colored surface is visible:
– Replace the piston rings.

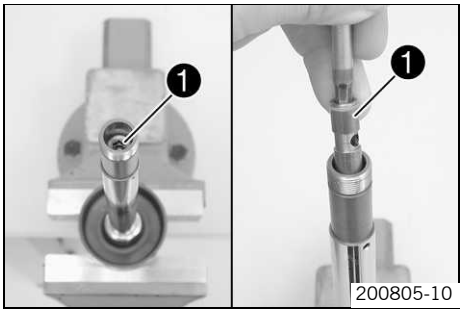
Disassembling the rebound adjuster

– Disassemble the piston rod. (☛ p. 45)
– Warm up the piston rod in the area of the rebound damping valve seat.

Guideline

80 °C (176 °F)

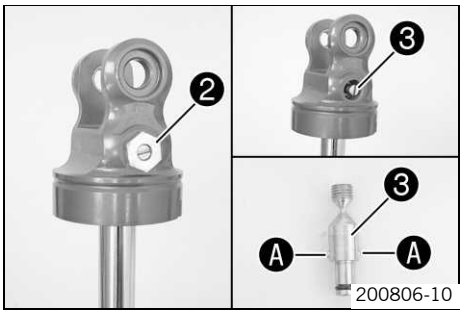
– Remove rebound damping valve seat ❶.



200805-10

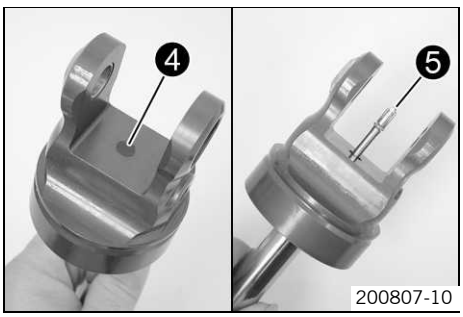
– Remove screwsleeve ❷.
– Remove adjusting screw ❸.

Info
Do not lose balls Ⓐ and spring.



200806-10

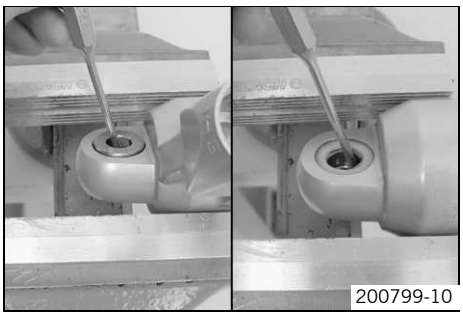
– Remove rubber plug ❹.
– From the opposite side, press rebound needle ❺ out of the piston rod.



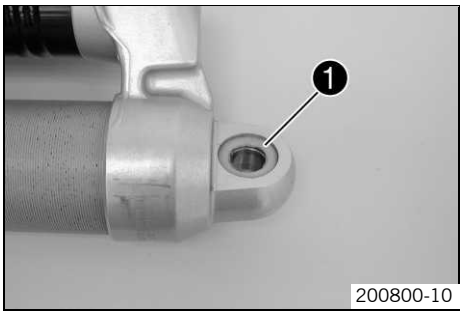
200807-10

Removing the heim joint

Condition
The shock absorber has been demounted.

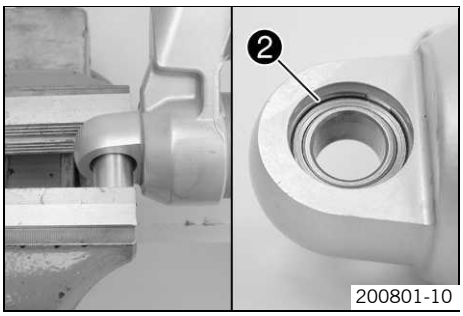

200799-10

– Clamp shock absorber in a bench vise using soft jaws.
– Remove the collar bushing of the heim joint with a punch.
– Turn the shock absorber around and remove the second heim joint collar bushing with a punch.



200800-10

– Remove seal ring ❶ on both sides.

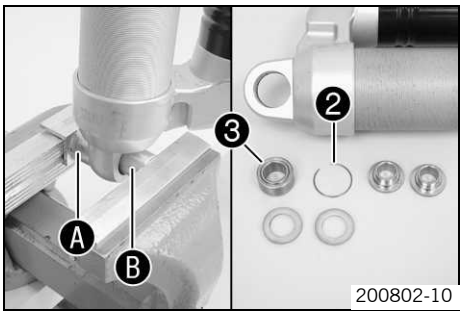


200801-10

– Press the heim joint against a lock ring using the special tool.

Pressing tool (T1207S) (☛ p. 237)

– Remove the second lock ring ❷.

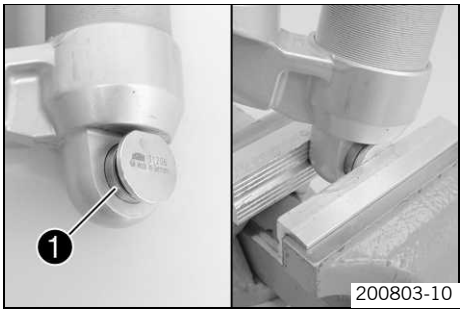


200802-10

– Place special tool Ⓐ below and press out heim joint ❸ using special tool Ⓑ.

Pressing tool (T1207S) (☛ p. 237)

Installing the heim joint

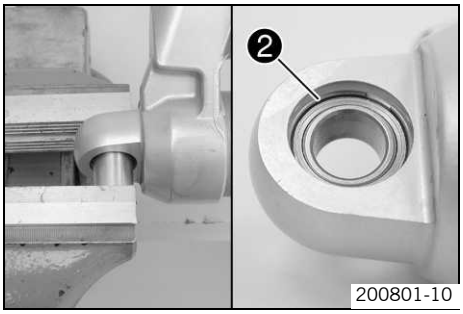


200803-10

– Position new heim joint ❶ and special tool.

Pressing tool (T1206) (☛ p. 236)

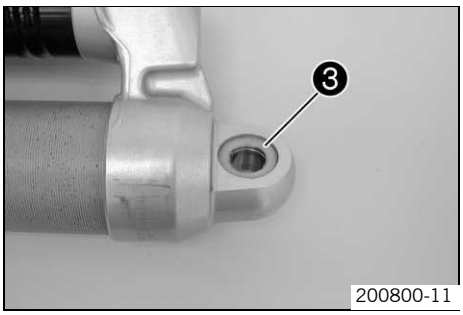
– Press in the heim joint all the way.



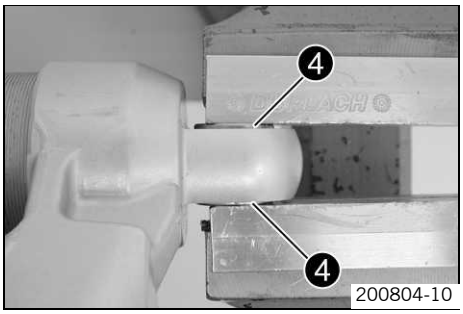
– Press the heim joint against the lock ring using the special tool.

Pressing tool (T1207S) (☛ p. 237)

– Mount the second lock ring ❷.

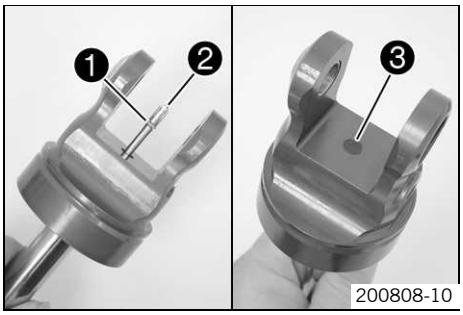


– Mount seal ring ❸ on both sides.



– Position both collar bushings ❹ and press in.

Assembling the rebound adjuster



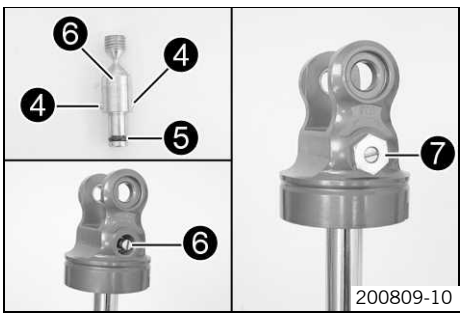
– Grease O-ring ❶ of the rebound needle.

Lubricant (T158) (☛ p. 226)

– Mount rebound needle ❷ in the piston rod.

Info
Push in the rebound needle to the point where it is possible to mount the rebound damping adjusting screw.

– Mount rubber plug ❸.



– Lubricate spring, balls ❹ and O-ring ❺.

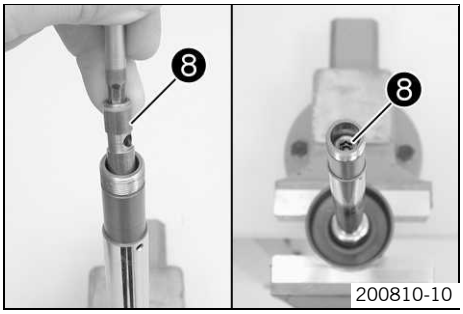
Lubricant (T159) (☛ p. 227)

– Screw in the rebound damping adjusting screw ❻ all the way.
– Mount and tighten screwsleeve ❼.

Guideline

Screwsleeve	M14x1	18 Nm (13.3 lbf ft)

– Screw out the rebound damping adjusting screw ❻ to the stop.



– Grease the O-ring of the rebound damping seat.

Lubricant (T159) (☛ p. 227)

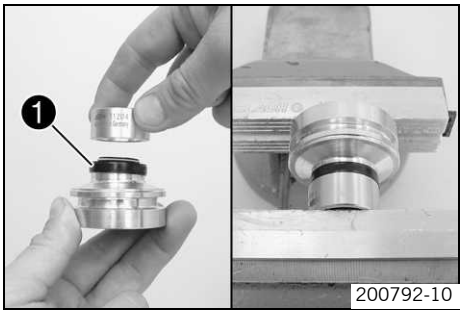
– Mount and tighten rebound damping valve seat ❽.

Guideline

Rebound damping valve seat	M8x1	6 Nm (4.4 lbf ft)	**Loctite® 2701**

Info
The rebound damping valve seat must be pressed inward before tightening.

Assembling the seal ring retainer

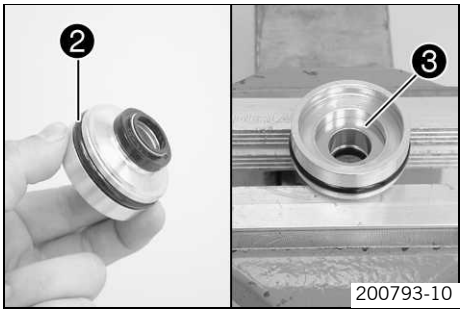


– Mount dust boot ❶ with the special tool.

Mounting sleeve (T1204) (☛ p. 236)

– Grease the sealing lip of the dust boot.

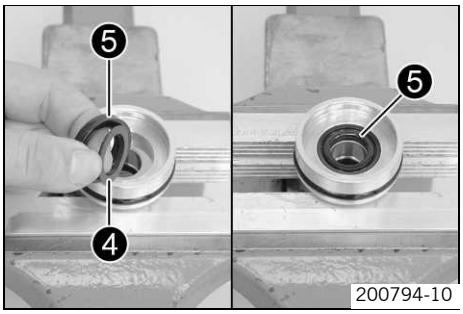
Lubricant (T625) (☛ p. 227)



– Grease the O-ring groove.

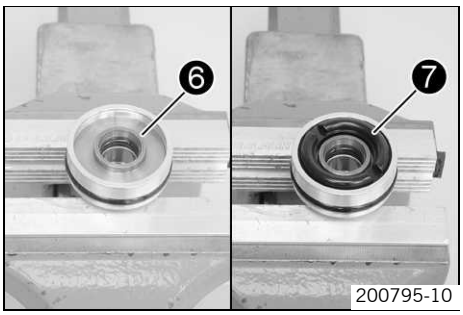
Lubricant (T158) (☛ p. 226)

– Mount O-ring ❷.
– Mount washer ❸.



– Position washer ❹ on seal ring ❺.
– Grease the seal ring and mount with the washer facing downward.

Lubricant (T511) (☛ p. 227)

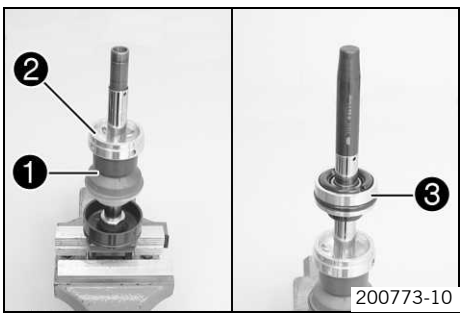


– Mount centering disk ❻.
– Mount rebound rubber ❼.

piston rod, assembling

– Assemble the seal ring retainer. (☛ p. 51)
– Assemble the rebound adjuster. (☛ p. 50)
– Clamp the piston rod with the fork in a bench vise.
– Mount bump rubber ❶ and locking cap ❷.
– Position the special tool on the piston rod.

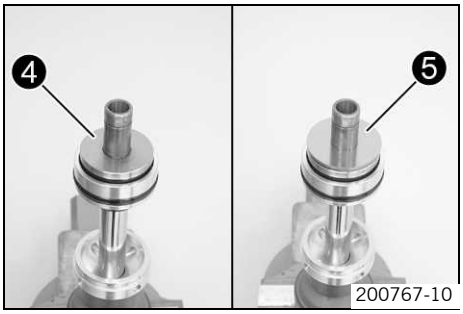
Mounting sleeve (T1215) (☛ p. 237)



– Grease the dust boot and slide seal ring retainer ❸ onto the piston rod.

Lubricant (T625) (☛ p. 227)

– Remove the special tool.

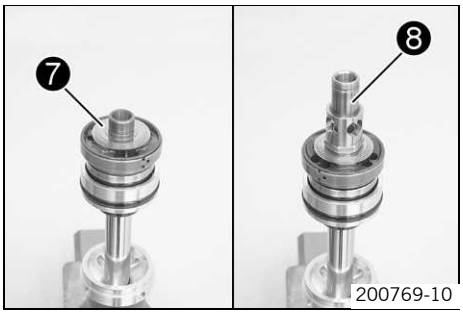


– Mount rebound damping washer ❹.
– Mount compression damping shim stack ❺ with the smaller shims facing downward.

– Grind piston ❻ on both sides, using 1200 grit sandpaper on a surfacing plate.
– Clean the piston.
– Mount the piston.

Guideline

View Ⓐ	Top view of piston
View Ⓑ	Bottom view of piston



– Mount rebound damping shim stack ❼ with the smaller shims at the top.
– Apply thread locker to the threads of the piston rod.

Loctite® 2701

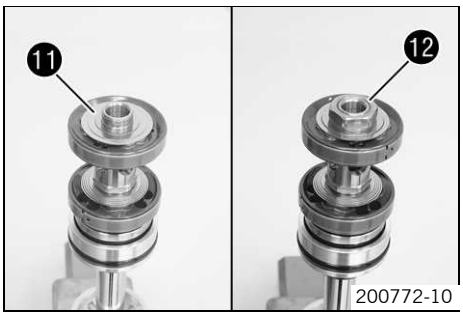
– Screw on mount ❽ to the point where the piston can still be turned.

– Mount compression damping shim stack ❾ with the smaller shims at the bottom.

– Grind piston ❿ on both sides on a surface plate using 1200 grit sandpaper.
– Clean the piston.
– Mount the piston.

Guideline

View Ⓐ	Top view of piston
View Ⓑ	Bottom view of piston



– Mount rebound damping shim stack ⓫ with the smaller shims facing upward.
– Grease the threads of the mount.

Lubricant (T152) (☛ p. 227)

– Mount nut ⓬ but do not tighten yet.


200776-10

– Align both pistons using the special tool.

Centering sleeve (T1214) (☛ p. 237)

– Tighten the nut.

Guideline

Piston rod nut	M16x1	40 Nm (29.5 lbf ft)

– Remove the special tool.

Assembling the damper

– Assemble the piston rod. (☛ p. 51)

200774-10

– Slide the spring and piston onto the compression damping adjuster ❶.
– Grease the O-ring.

Lubricant (T158) (☛ p. 226)

– Grease the threads.

Lubricant (T159) (☛ p. 227)

– Mount and tighten the compression damping adjuster.

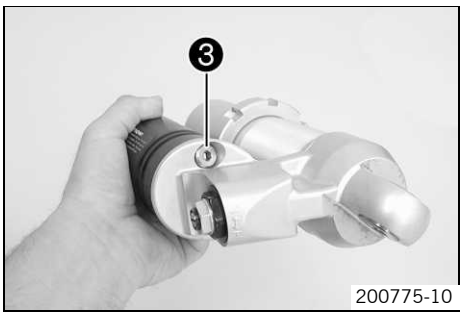
Guideline

Compression damping adjuster	M31x1	50 Nm (36.9 lbf ft)

200759-11

– Install adjusting ring ❷ with an intermediate washer.

Info
The adjusting ring cannot be mounted after the piston rod has been assembled!



200775-10

– Mount screw ❸ but do not tighten yet.


200758-10

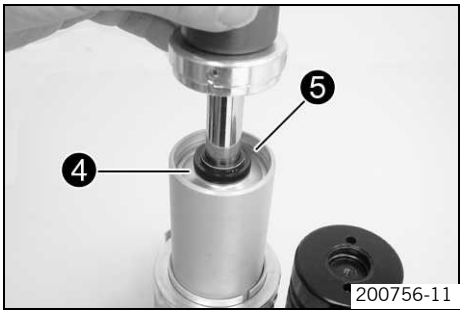
– Grease the O-ring of the seal ring retainer.

Lubricant (T158) (☛ p. 226)

– Fill the damper cartridge approximately half way.

Shock absorber oil (SAE 2.5) (50180342S1) (☛ p. 224)

– Carefully mount the piston rod.

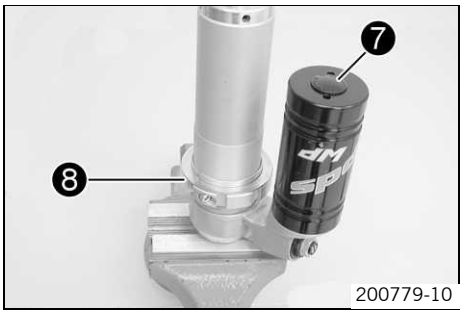


– Mount seal ring retainer ❹ and slide it under the ring groove.
– Mount lock ring ❺.

Info
Do not scratch the inner surface.

– Pull out the piston rod in order that the seal ring retainer fits closely against the lock ring.

– Mount locking cap ❻ of the damper cartridge.
– Bleed and fill the damper. (☛ p. 55)
– Fill the damper with nitrogen. (☛ p. 57)



– Mount rubber cap ❼ of the reservoir.
– Turn adjusting ring ❽ completely down toward the bottom.

Alternative 1

– Turn adjusting screw ❾ clockwise with a screwdriver up to the last perceptible click.
– Turn back counterclockwise by the number of clicks corresponding to the shock absorber type.

Guideline

Compression damping, low-speed	
Comfort	18 clicks
Standard	15 clicks
Sport	12 clicks

– Turn adjusting screw ❿ clockwise with an open end wrench until it stops.
– Turn back counterclockwise by the number of turns corresponding to the shock absorber type.

Guideline

Compression damping, high-speed	
Comfort	2 turns
Standard	1.5 turns
Sport	1 turn

– Turn adjusting screw ⓫ clockwise up to the last perceptible click.
– Turn back counterclockwise by the number of clicks corresponding to the shock absorber type.

Guideline

Rebound damping	
Comfort	26 clicks
Standard	24 clicks
Sport	22 clicks

Alternative 2

Warning

Danger of accidents Modifications to the suspension settings can seriously alter the vehicle's ride behavior.

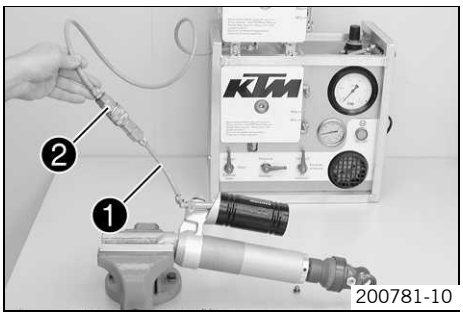
- Extreme modifications to the adjustment of the spring elements can cause a serious deterioration in the handling characteristics and overload some components.
- Only make adjustments within the recommended range.
- After making adjustments, ride slowly at first to get the feel of the new ride behavior.

– Mount adjusting screws ❾, ❿ and ⓫ in the positions determined when disassembling.

Bleeding and filling the damper

Info

Before working with the vacuum pump, carefully read the operating manual included with the vacuum pump.
Completely open the adjusting elements of the rebound and compression damping.



200781-10

– Remove the screw from the filling port.
– Mount adapter ❶ on the damper.

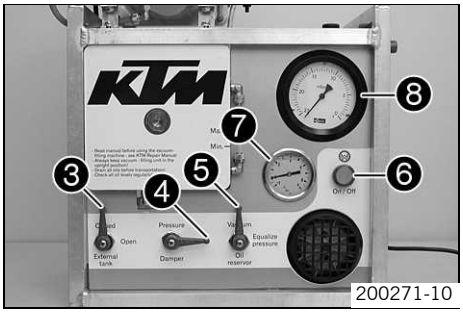
Info

Hand-tighten only without using a tool.

– Connect adapter ❶ to connector ❷ of the vacuum pump.
– Clamp the damper with soft jaws or hold it as shown in the photo.

Info

Clamp the damper only lightly.
The filling port must be located at the highest position.
The piston rod moves in and out during filling; do not immobilize it by holding it with your hand.



200271-10

– Position the control lever as shown in the photo.

✓ Control lever **External tank** ❸ is set to **Closed**, **Damper** ❹ is set to **Vacuum** and **Oil reservoir** ❺ is set to **Vacuum**.

– Activate **On/Off** switch ❻.

✓ The suction process begins.

✓ Pressure gauge ❼ drops to the required value.

< 0 bar

✓ Vacuum gauge ❽ drops to the required value.

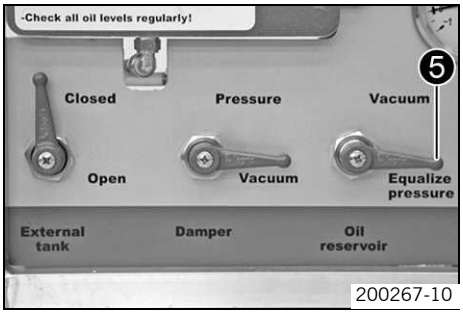
4 mbar

200782-10

– Determine distance Ⓐ between the floating piston and reservoir hole with the special tool.

Depth micrometer (T107S) (☛ p. 236)

✓ The floating piston is positioned in the lowermost position.



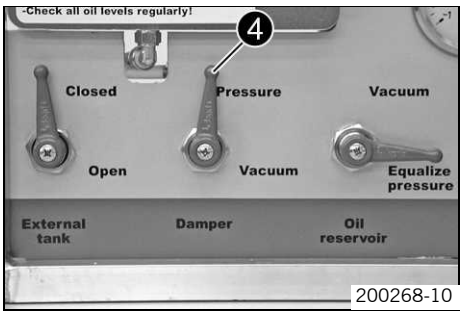
– When the vacuum gauge reaches the required value, turn control lever **Oil reservoir ❺** to **Equalize pressure**.

Guideline

4 mbar

✔ The pressure gauge increases to the required value.

0 bar



– When the pressure gauge reaches the required value, turn control lever **Damper ❹** to **Pressure**.

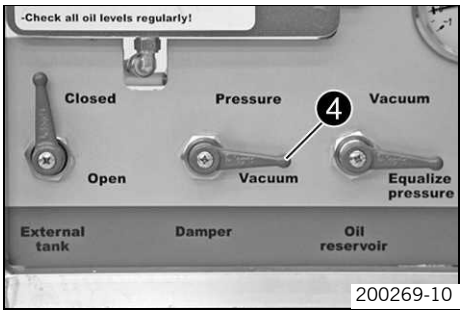
Guideline

0 bar

✔ Oil is pumped into the damper.

✔ The pressure gauge increases to the required value.

3 bar



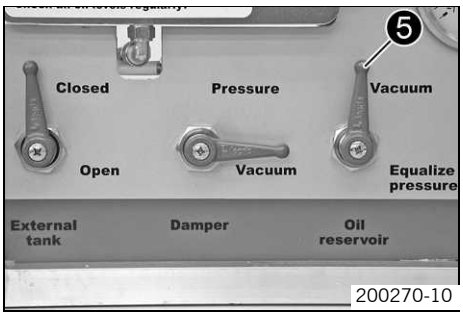
– When the pressure gauge reaches the required value, turn control lever **Damper ❹** to **Vacuum**.

Guideline

3 bar

✔ The pressure gauge drops to the required value.

0 bar



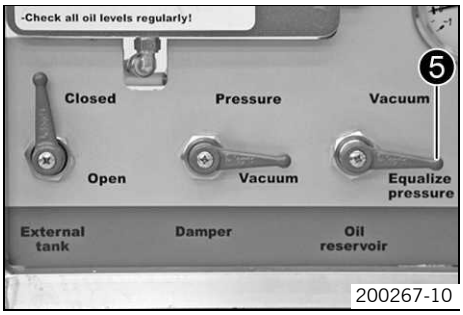
– When the pressure gauge reaches the required value, turn control lever **Oil reservoir ❺** to **Vacuum**.

Guideline

0 bar

✔ The vacuum gauge drops to the required value.

8 mbar



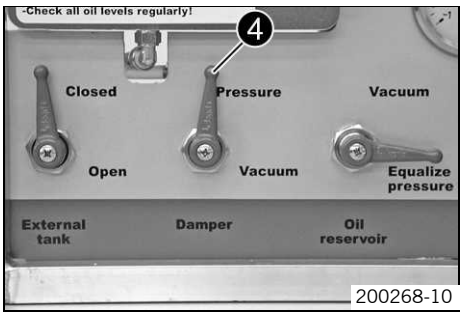
– When the vacuum gauge reaches the required value, turn control lever **Oil reservoir ❺** to **Equalize Pressure**.

Guideline

8 mbar

✔ The pressure gauge drops to the required value.

0 bar



– When the pressure gauge reaches the required value, turn control lever **Damper ❹** to **Pressure**.

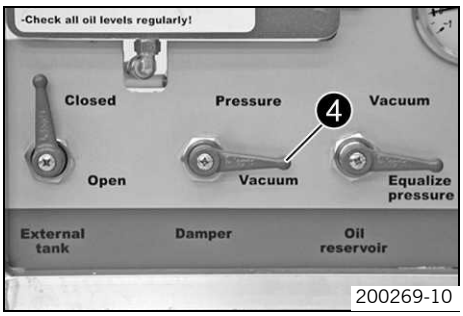
Guideline

0 bar

✔ Oil is pumped into the damper.

✔ The pressure gauge increases to the required value.

3 bar



200269-10

– When the pressure gauge reaches the required value, turn control lever **Damper** ❹ to **Vacuum**.

Guideline

3 bar

✔ The pressure gauge drops to the required value.

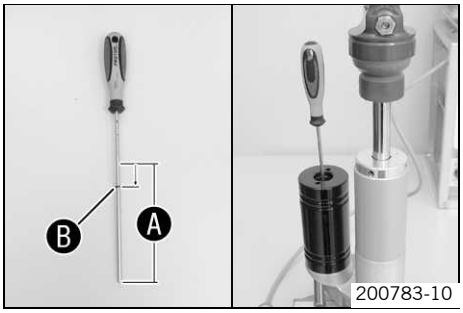
0 bar

– When the pressure gauge reaches the required value, activate the **On/Off** switch.

Guideline

0 bar

✔ The vacuum pump is switched off.



200783-10

– Slide O-ring ❸ to the end of the special tool by the specified value (distance ❹ minus specified value).

Guideline

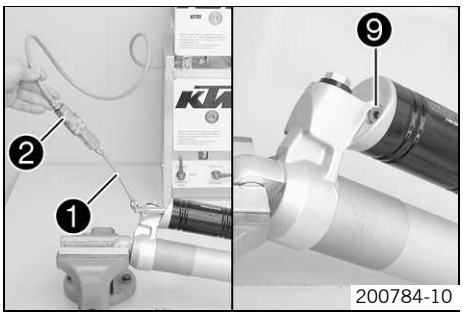
10 mm

Depth micrometer (T107S) (☛ p. 236)

– Push the floating piston into the reservoir to the distance described above using the special tool.

Info
When the piston rod is fully extended, the floating piston must be at precisely this position; otherwise, damage will occur when the shock absorber compresses and rebounds.

– Remove the special tool.



200784-10

– Remove adapter ❶ from connector ❷ of the vacuum pump.

Info
Hold the damper so that the filling port is at the highest location.

– Remove the adapter.
– Mount and tighten screw ❾.

Guideline

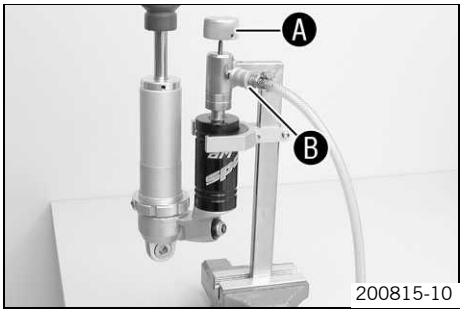
Filling port screw	M10x1	14 Nm (10.3 lbf ft)

Filling the damper with nitrogen

200814-10

– Screw in screw ❶ by approx. 2 turns but do not tighten.

Info
The piston rod is fully extended.



200815-10

– Fix the special tool in the vise.

Nitrogen filling tool (T170S1) (☛ p. 239)

– Connect the special tool to the pressure regulator of the filling cylinder.

Filling gas - nitrogen

– Adjust the pressure regulator.

Guideline

Gas pressure	10 bar (145 psi)

– Position the damper in the special tool.

✔ The hexagonal part of knurled knob ❹ engages in the female hexagonal section of the filling connector screw.

– Open spigot ❽.
– Fill the damper for at least 15 seconds.

Guideline

Gas pressure	10 bar (145 psi)

Info
Watch the pressure regulator dial.
Ensure that the damper is filled to the specified pressure.

– Screw the filling port shut with tap handle ❹.
– Close spigot ❽ and remove the shock absorber from the special tool.
– Tighten the filling port screw.

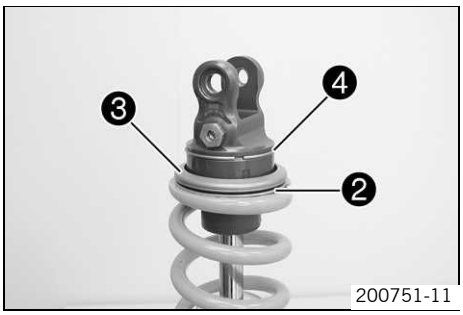
Guideline

Reservoir filling port screw	M5	3.5 Nm (2.58 lbf ft)

Installing the spring

200752-11

– Ensure that adjusting ring ❶ is screwed on with the intermediate washer.



200751-11

– Measure the overall spring length when not under tension.
– Position the spring.

Guideline

Spring rate	
Weight of rider: 65… 75 kg (143… 165 lb.)	69 N/mm (394 lb/in)
Weight of rider: 75… 85 kg (165… 187 lb.)	72 N/mm (411 lb/in)
Weight of rider: 85… 95 kg (187… 209 lb.)	76 N/mm (434 lb/in)

– Mount intermediate washer ❷ and spring retainer ❸.
– Mount ring ❹.

Alternative 1

– Tighten the spring by turning adjusting ring to measurement.

Guideline

Spring preload	9 mm (0.35 in)

Hook wrench (T106S) (☛ p. 236)

Alternative 2

Warning
Danger of accidents Modifications to the suspension settings can seriously alter the vehicle's ride behavior.

– Extreme modifications to the adjustment of the spring elements can cause a serious deterioration in the handling characteristics and overload some components.
– Only make adjustments within the recommended range.
– After making adjustments, ride slowly at first to get the feel of the new ride behavior.

– Tighten the spring by turning the adjusting ring to the measured value determined when it was removed.

Hook wrench (T106S) (☛ p. 236)

– Tighten screw ❺.

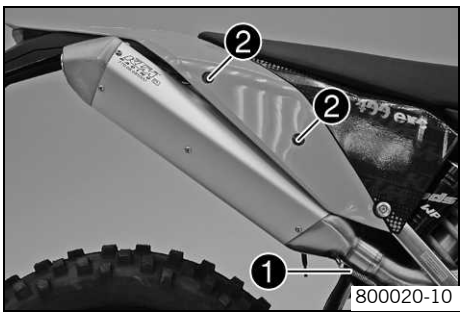
Guideline

Screw, shock absorber adjusting ring	M6	5 Nm (3.7 lbf ft)

Removing main silencer

Warning
Danger of burns The exhaust system gets very hot when the vehicle is driven.

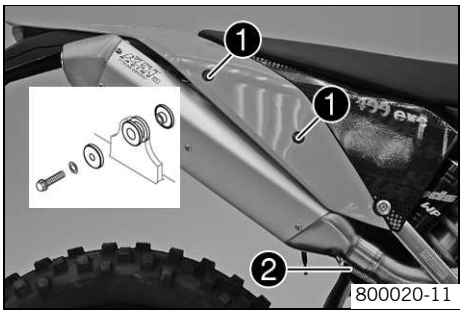
– Allow the exhaust system to cool down. Do not touch hot components.



800020-10

– Disconnect spring ❶.
– Remove screws ❷ and take off main silencer.

Installing the main silencer



800020-11

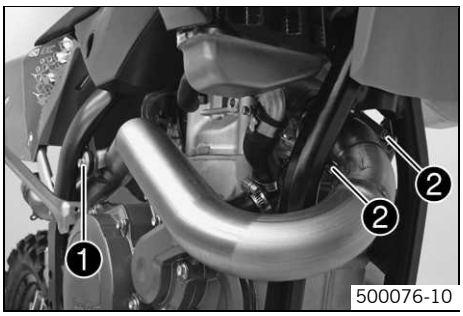
– Mount the main silencer. Mount and tighten screws ❶.
Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Reconnect spring ❷.

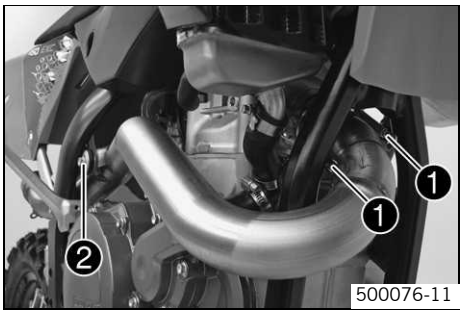
Removing the manifold

– Remove shock absorber. (☛ p. 42)
– Remove the main silencer. (☛ p. 60)
– Remove screw ❶.
– Remove the springs ❷ and take off the manifold.



500076-10

Installing the manifold



500076-11

– Position the manifold and mount the springs ❶.

Spring hooks (50305017000) (☛ p. 228)

– Mount and tighten screw ❷.
Guideline

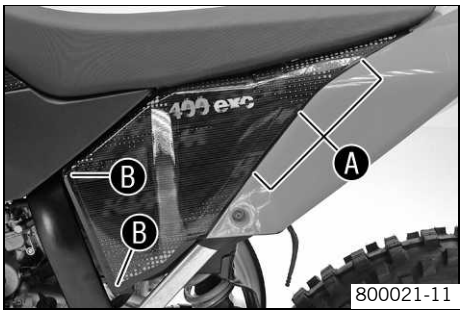
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)

– Install the main silencer. (☛ p. 60)
– Install the shock absorber. (☛ p. 42)

Dismounting the air filter box lid

– Pull off the air filter box lid in area ❹ to the side and remove to the front.

Installing the air filter box lid



– Insert the air filter box lid into the rear area ❹ and clip it into the front area ❸.

Removing the air filter

Note

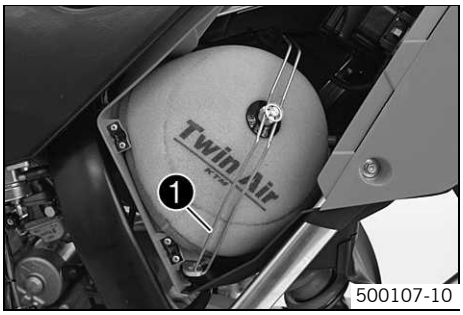
Engine failure Unfiltered intake air has a negative effect on the service life of the engine.

– Never ride the vehicle without an air filter since dust and dirt can get into the engine and result in increased wear.

Warning

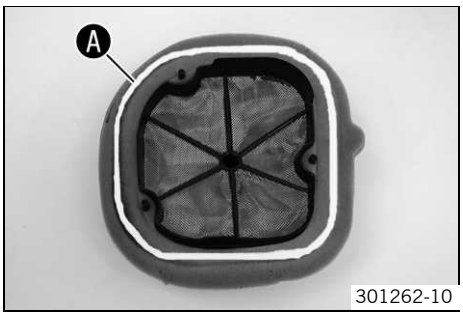
Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.



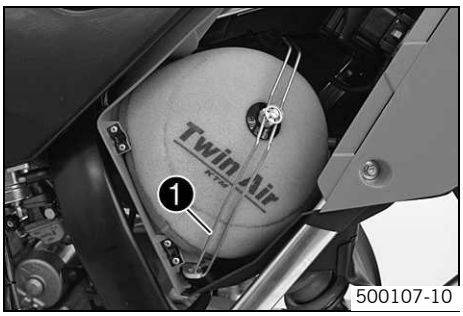
– Dismount the air filter box lid. (☛ p. 61)
– Hang the air filter holder ❶ out to the bottom and swing it to the side. Remove the air filter with the air filter support.
– Remove the air filter from the air filter support.

Installing the air filter



– Mount the clean air filter onto the air filter support.
– Apply grease to the air filter around area ❹.

Long-life grease (☛ p. 226)



– Put in both parts together, position them and fix them with air filter holder ❶.

Info
If the air filter is mounted incorrectly, dust and contamination can enter the engine and can cause damage.

– Install the air filter box lid. (☛ p. 61)

Cleaning air filter

Warning
Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Do not clean the air filter with fuel or gasoline since these substances attack the foam.

– Remove the air filter. (☛ p. 61)
– Wash the air filter thoroughly in special cleaning liquid and allow it to dry properly.

Air filter cleaner (☛ p. 226)

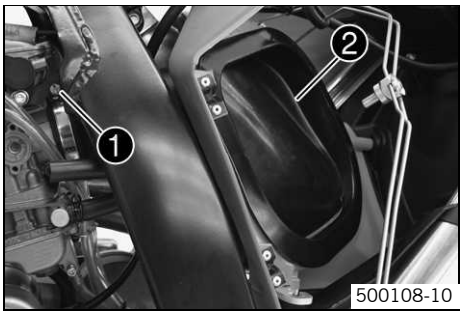
Info
Only squeeze the air filter when drying it out, never wring it out.

– Oil the dry air filter with a high/quality filter oil.

Oil for foam air filter (☛ p. 227)

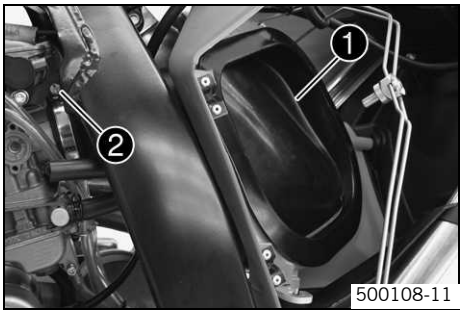
– Clean the air filter box.
– Check carburetor connection boot for damage and tightness.
– Install the air filter. (☛ p. 61)

Removing the carburetor connection boot



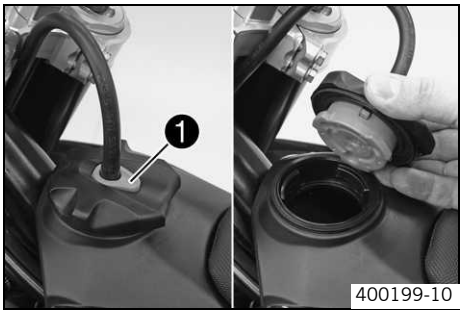
– Remove the air filter. (☛ p. 61)
– Loosen the hose clip ❶. Unhang the carburetor connection boot ❷ from the filter wall and remove it.

Installing the carburetor connection boot



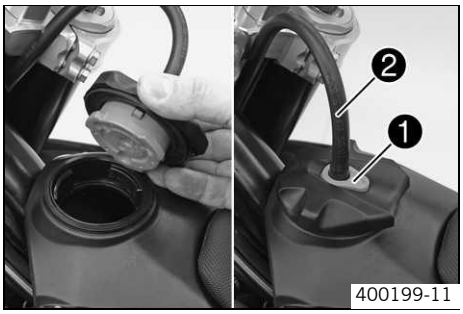
– Position the carburetor connection boot ❶ and hang it into the filter wall. Position the hose clip ❷ and tighten it.
– Install the air filter. (☛ p. 61)

Opening filler cap



– Press release button ❶, turn filler cap counterclockwise and lift it free.

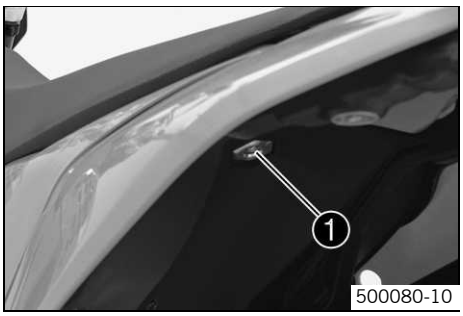
Closing filler cap



– Replace the filler cap and turn clockwise until the release button ❶ locks in place.

Info
Run the fuel tank breather hose ❷ without kinks.

Removing the seat



– Remove screw ❶. Lift up the seat at the rear, pull it back and then remove from above.

Mounting the seat

– Hook in the front of the seat at the collar sleeve of the fuel tank, lower it at the rear and simultaneously push it forward.
– Make sure that the seat is correctly locked in.
– Mount and tighten the screw of the seat fixing.

Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

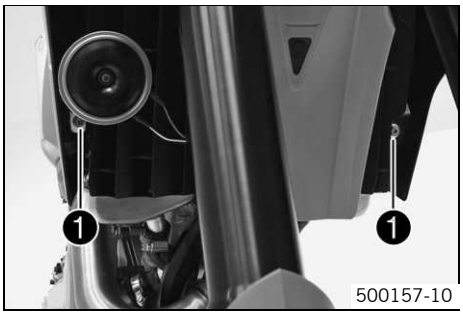
Dismounting the fuel tank

Danger
Fire hazard Fuel is highly flammable.

– Never fill up the vehicle near open flames or burning cigarettes, also make sure the engine is switched off, before refilling. Be careful that no fuel is spilt, especially on hot vehicle components. Clean up spilt fuel immediately.
– The volume of the fuel in the tank increases with increasing temperature, if the fuel tank is overfilled this will result in fuel spillage. See the "Fuel filling" specifications.

Warning
Danger of poisoning Fuel is poisonous and a health hazard.

– Avoid contact between fuel and skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come into contact with fuel. Store fuel in a suitable canister according to regulations and keep it out of the reach of children.



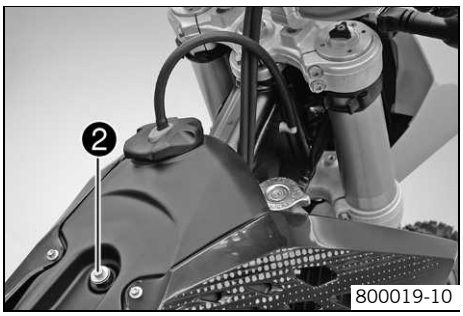
500157-10

– Remove the seat. (☛ p. 63)
– Turn handle ❶ of the fuel tap to the **OFF** position. (Figure 500137-10☛ p. 65)
– Pull off the fuel hose.

Info
Remaining fuel may run out of the fuel hose.

– Remove screws ❶ with collar sleeve.

(all EXC models)
– Hang the horn and horn bracket to one side.



800019-10

– Remove screw ❷ with collar sleeve.
– Remove the tube from the fuel tank vent line.

500067-10

– Pull both spoilers to the side of the radiator bracket ❸ and take the fuel tank away upwards.

Installing the fuel tank

Danger
Fire hazard Fuel is highly flammable.

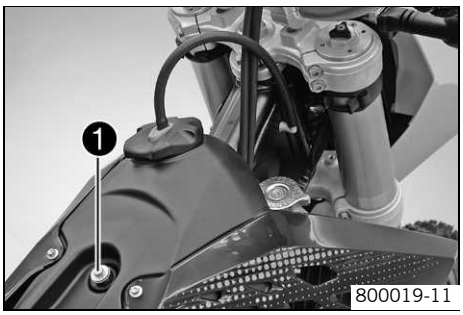
– Never fill up the vehicle near open flames or burning cigarettes, also make sure the engine is switched off, before refilling. Be careful that no fuel is spilt, especially on hot vehicle components. Clean up spilt fuel immediately.
– The volume of the fuel in the tank increases with increasing temperature, if the fuel tank is overfilled this will result in fuel spillage. See the "Fuel filling" specifications.

Warning
Danger of poisoning Fuel is poisonous and a health hazard.

– Avoid contact of the fuel with skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come into contact with fuel.


500067-01

– Position the fuel tank and fit the two spoilers to the side of the radiator fixing.
– Make sure that no cables are trapped or damaged.

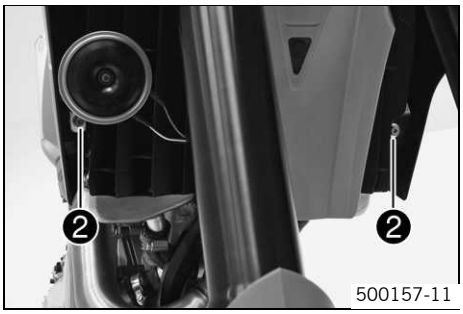


800019-11

– Mount the fuel tank vent hose.
– Mount and tighten ❶ with the collar sleeve.
Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

(all EXC models)
– Position horn with horn bracket.



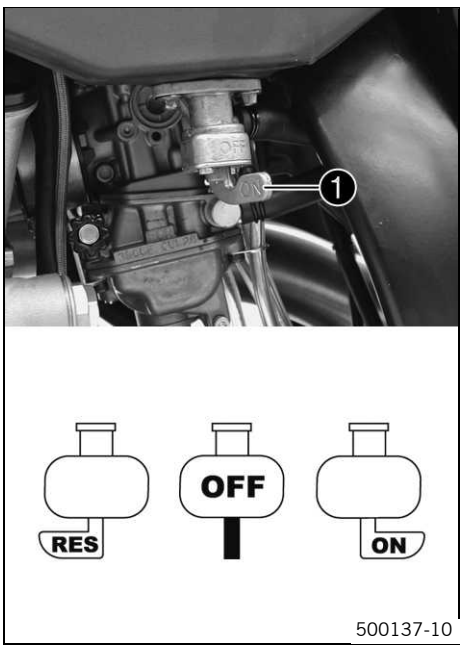
500157-11

– Mount and tighten screws ❷ with the collar sleeve.
Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Connect fuel hose.
– Mount the seat. (☛ p. 63)

Fuel tap

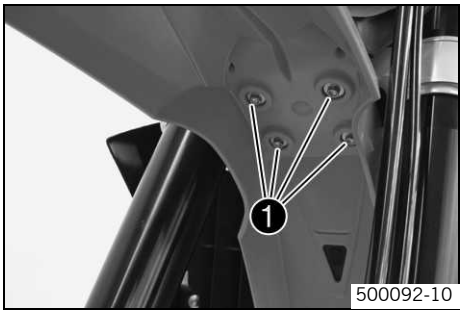


500137-10

The fuel tap is on the left of the fuel tank.
With the tap handle ❶ on the fuel tap, you can open or close the supply of fuel to the carburetor.

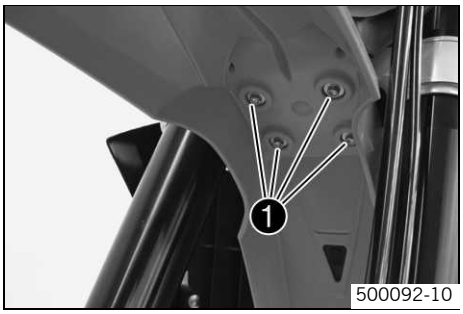
Possible states
- Fuel supply closed **OFF** – No fuel can flow from the tank to the carburetor.
- Fuel supply open **ON** – Fuel can flow from the tank to the carburetor. The fuel tank empties down to the reserve.
- Reserve fuel supply open **RES** – Fuel can flow from the tank to the carburetor. The fuel tank empties completely.

Removing the front fender



– Remove screws ❶. Remove the front fender.
– Pay attention to the location of the distance bushings.

Installing the front fender



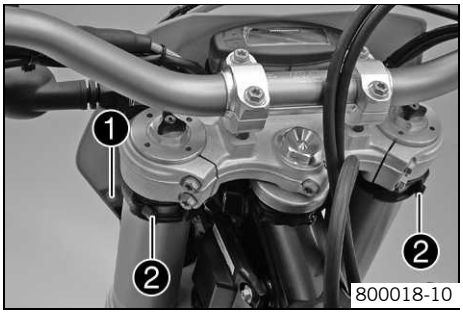
– Ensure that the spacing sleeves are mounted in the fender.
– Position the front fender. Mount and tighten screws ❶.

Guideline

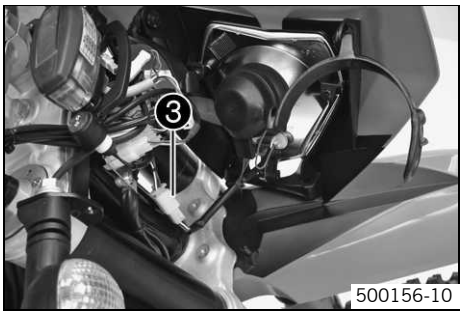
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

Info
Take care with the contact between the holding lugs and the start number plate or headlight mask.

Removing headlight mask with headlight (EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA)

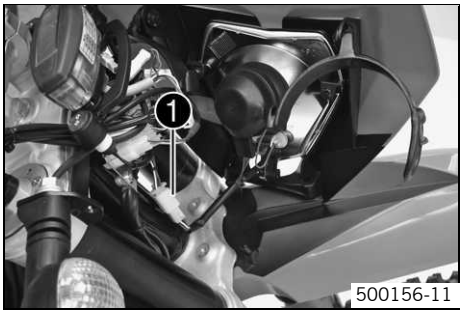


– Switch off all electrical equipment.
– Remove screw ❶ and take off clamp.
– Loosen the rubber band ❷. Push up the headlight mask and swing it forwards.

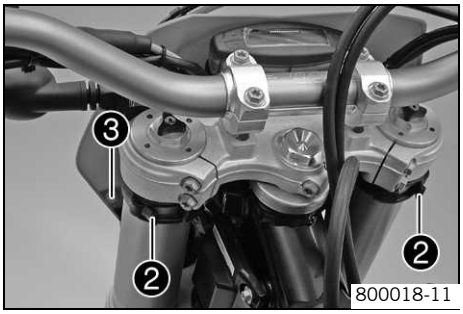


– Pull out the electric plug connector ❸ and remove the headlight mask with the headlight.

Refitting the headlight mask with the headlight (EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA)



– Connect the electric plug connector ❶.

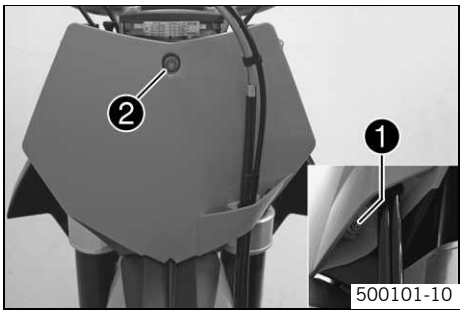


– Position the headlight mask and fix it with the rubber band ❷.

Info
Take care with the contact of the holding lug at the fender.

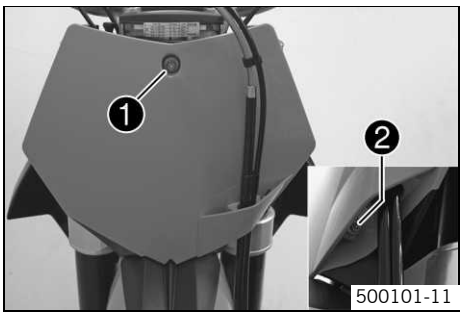
– Position the brake line and cable harness. Put the clamp on, mount and tighten screw ❸.
– Check the headlamp setting. (☛ p. 96)

Removing the start number plate (XC-W USA)



– Remove screw ❶ and take off the clamp.
– Remove screw ❷ with distance bushing. Take off the start number plate.

Installing the start number plate (XC-W USA)



– Position the start number plate. Mount and tighten screw ❶ with the distance bushing.

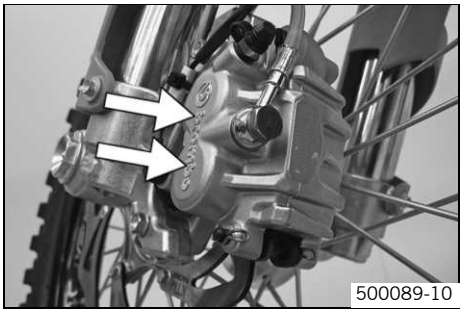
Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

Info
Take care with the contact of the holding lug at the fender.

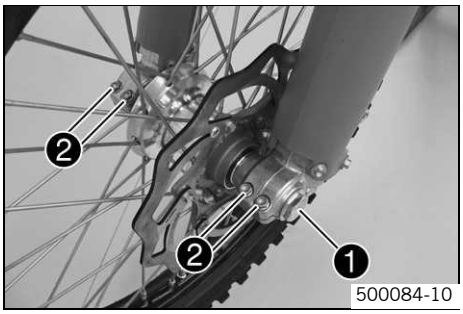
– Position the brake line and cable harness. Put the clamp on, mount and tighten screw ❷.

Removing the front wheel


500089-10

– Jack up the motorcycle. (☛ p. 10)
– Press the brake caliper by hand onto the brake disc in order to retract the brake pistons.

Info
Make sure when retracting the brake pistons that you do not press the brake caliper against the spokes.



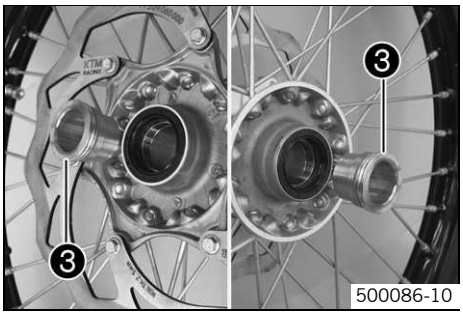
500084-10

– Remove screw ❶.
– Loosen screw ❷.


500085-10

– Holding the front wheel, withdraw the wheel spindle. Take the front wheel out of the fork.

Info
Do not pull the hand brake lever when the front wheel is removed.
Always lay the wheel down in such a way that the brake disc is not damaged.



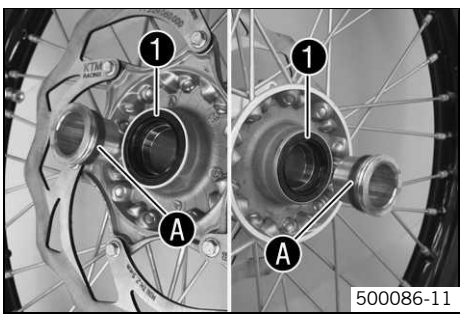
500086-10

– Remove spacing sleeves ❸.

Installing the front wheel

Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.

– Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.

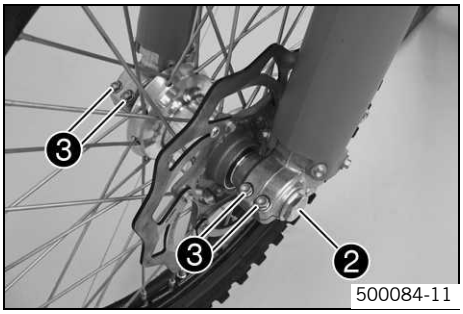


500086-11

– Clean and grease shaft seal rings ❶ and bearing surface Ⓐ of the spacing sleeves.

Long-life grease (☛ p. 226)

– Insert the spacing sleeves.



– Lift the front wheel into the fork, position it, and insert the wheel spindle.
– Mount and tighten screw ❷.

Guideline

Screw, front wheel spindle	M24x1.5	45 Nm (33.2 lbf ft)

– Operate the hand brake lever several times until the brake pads are lying correctly on the brake disc.
– Remove the motorcycle from the work stand. (☛ p. 10)
– Pull the front wheel brake and push down hard on the fork several times to align the fork legs.
– Fully tighten screw ❸.

Guideline

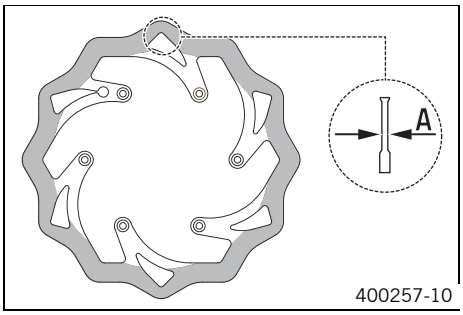
Screw, fork stub	M8	15 Nm (11.1 lbf ft)

Checking the brake discs

Warning

Danger of accidents Reduced braking efficiency due to worn brake disc(s).

– Change the worn brake disc(s) without delay.



– Check the thickness of the front and rear brake discs at several places on the disc to see if it conforms to measurement Ⓐ.

Info

Wear reduces the thickness of the brake disc around the area used by the brake linings.

Brake discs - wear limit	
Front	2.5 mm (0.098 in)
Rear	3.5 mm (0.138 in)

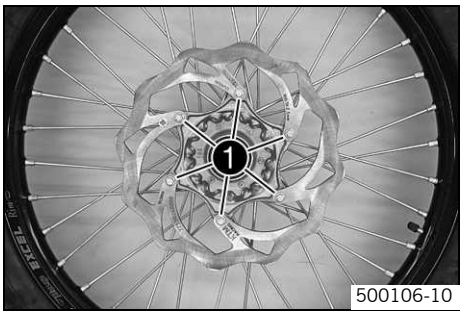
» If the brake disc thickness is less than the specified value:
– Change the brake disc.

– Check the front and rear brake discs for damage, cracking and deformation.

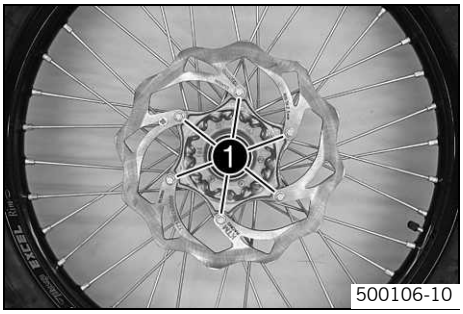
» If the brake disc exhibits damage, cracking or deformation:
– Change the brake disc.

Removing the front brake disc

– Remove the front wheel. (☛ p. 68)
– Remove screws ❶. Take off the brake disc.



Installing the front brake disc



– Clean the contact surface of the brake disc.
– Position the brake disc with the label facing outward. Mount and tighten screws ❶.

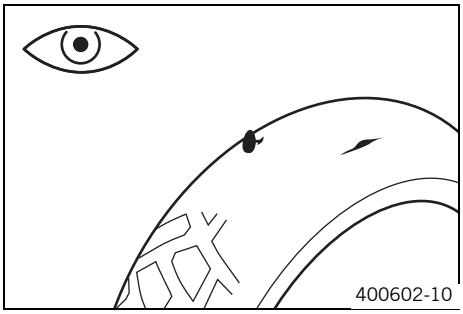
Guideline

Screw, front brake disc	M6	14 Nm (10.3 lbf ft)

– Install the front wheel. (☛ p. 68)

Checking the tire condition

Info
Only mount tires approved and/or recommended by KTM.
Other tires could have a negative effect on ride behavior.
The type, condition and air pressure of the tires all have an important impact on the riding behavior of the motorcycle.
The front and rear wheels must be mounted with tires with similar profiles.
Worn tires have a negative effect on riding behavior, especially on wet surfaces.



– Check the front and rear tires for cuts, run-in objects and other damage.
  » If tires show signs of damage, such as cuts or foreign bodies embedded in the carcass:
    – Change the tire.
– Check the depth of the tread.

Info
Note local national regulations concerning the minimum tread depth.

Minimum tread depth	≥ 2 mm (≥ 0.08 in)

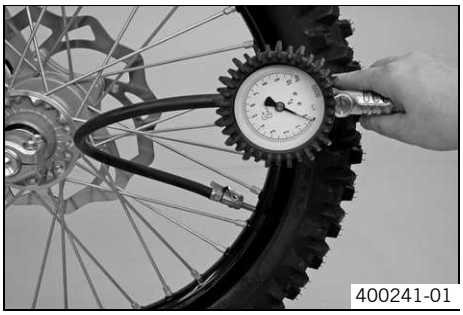
  » If the tread depth is less than the minimum permissible depth:
    – Change the tire.
– Check the age of the tires.

Info
The tire's date of the manufacture is usually part of the tire markings and is indicated by the last four digits of the **DOT** marking. The first two digits indicate the week of manufacture and the last two digits the year of manufacture.
KTM recommends that the tires are changed regardless of the actual wear, at the latest after 5 years.

  » If the tires are older than five years:
    – Change the tire.

Checking tire air pressure

Info
Low tire air pressure leads to abnormal wear and overheating of the tire.
Correct tire air pressure ensures optimal riding comfort and maximum tire service life.



– Remove the dust cap.
– Check tire air pressure when tires are cold.

Tire air pressure off road	
Front	1.0 bar (15 psi)
Rear	1.0 bar (15 psi)

Road tire pressure (all EXC models)	
Front	1.5 bar (22 psi)
Rear	2.0 bar (29 psi)

» If the tire pressure does not meet specifications:
– Correct the tire pressure.

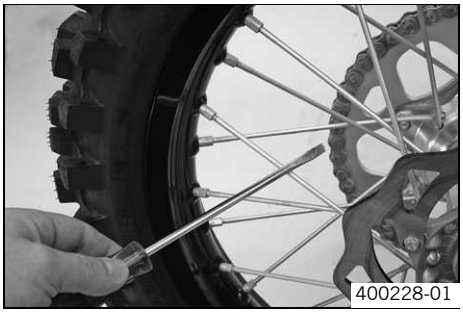
– Mount the dust cap.

Checking spoke tension

Warning
Danger of accidents Instable handling due to incorrect spoke tension.

– Ensure that the spoke tension is correct.

Info
A loose spoke can cause wheel imbalance, which leads to more loose spokes in a short time.
If the spokes are too tight, they can break due to local overload.
Check the spoke tension regularly, especially on a new motorcycle.


400228-01

– Tap each spoke with a screwdriver.

Info
The sound frequency depends on the length and thickness of the spoke.
If there are different sound frequencies in spokes with the same length and thickness, this indicates different spoke tensions.

You should hear a high note.

» If the spoke tension varies:
– Correct the spoke tension.

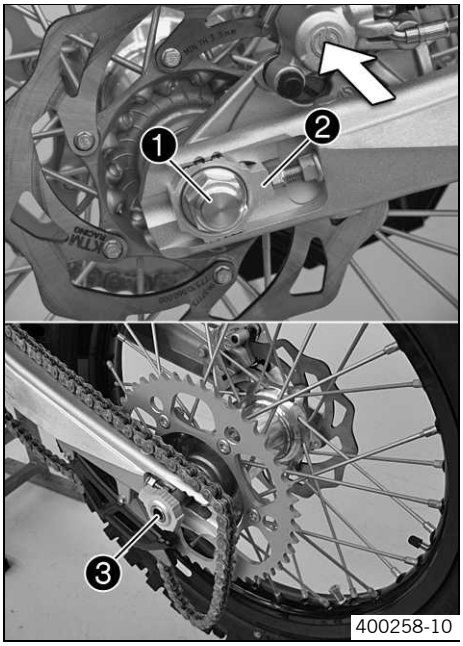
– Check the spoke torque.

Guideline

Spoke nipple, front wheel	M4.5	5... 6 Nm (3.7... 4.4 lbf ft)
Spoke nipple, rear wheel	M5	5... 6 Nm (3.7... 4.4 lbf ft)

Torque wrench with various accessories in set (58429094000) (☛ p. 230)

Removing the rear wheel

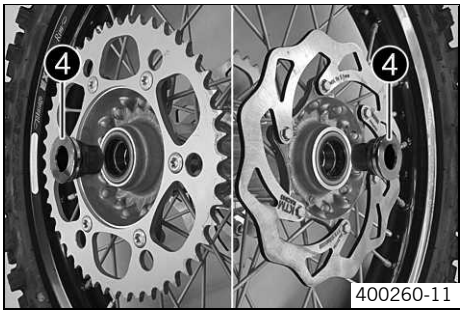


– Jack up the motorcycle. (☛ p. 10)
– Press the brake caliper by hand onto the brake disc in order to retract the brake piston.

Info
Make sure when retracting the brake piston that you do not press the brake caliper against the spokes.

– Remove nut ❶.
– Remove chain adjuster ❷. Withdraw wheel spindle ❸ only enough to allow the rear wheel to be pushed forward.
– Push the rear wheel forward as far as possible. Remove the chain from the rear sprocket.
– Holding the rear wheel, withdraw the wheel spindle. Take the rear wheel out of the swing arm.

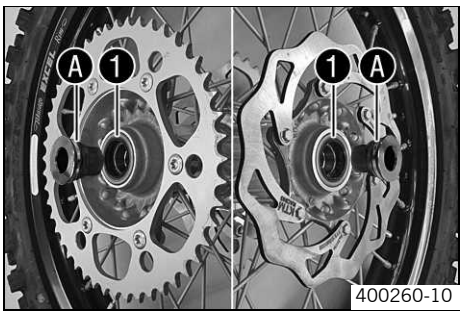
Info
Do not operate the foot brake when the rear wheel is removed.
Always lay the wheel down in such a way that the brake disc is not damaged.



– Remove spacing sleeves ❹.

Installing the rear wheel

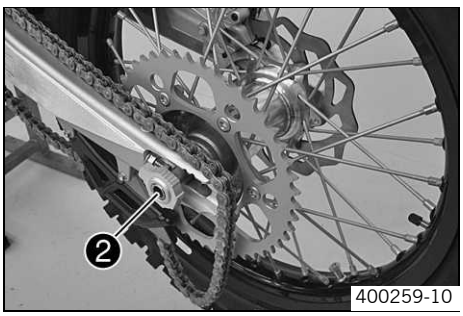
Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.
– Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.



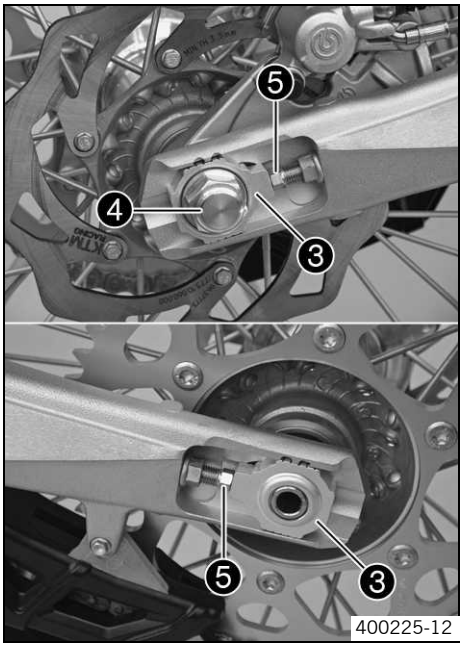
– Clean and grease shaft seal rings ❶ and bearing surface Ⓐ of the spacing sleeves.

Long-life grease (☛ p. 226)

– Insert the spacing sleeves.



– Lift the rear wheel into the swing arm, position it, and insert the wheel spindle ❷.
– Put the chain on.



400225-12

– Position the chain adjuster ❸. Mount nut ❹, but do not tighten it yet.
– Check chain tension when fitting rear wheel. (☛ p. 73)
– Make sure that the chain adjusters ❸ are fitted correctly on the adjusting screws ❺.
– Tighten nut ❹.

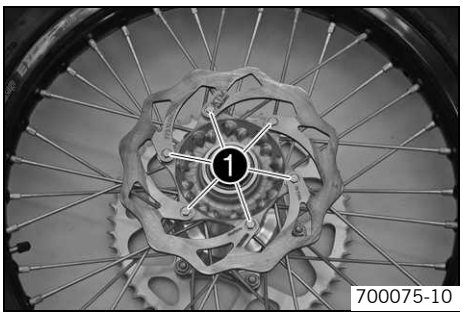
Guideline

Nut, rear wheel spindle	M20x1.5	80 Nm (59 lbf ft)

Info
The wide adjustment range of the chain adjusters (32 mm) enables different secondary transmissions with the same chain length.
The chain adjusters ❸ can be turned by 180°.

– Operate the foot brake lever repeatedly until the brake linings lie on the brake disc and there is a tight spot.
– Remove the motorcycle from the work stand. (☛ p. 10)

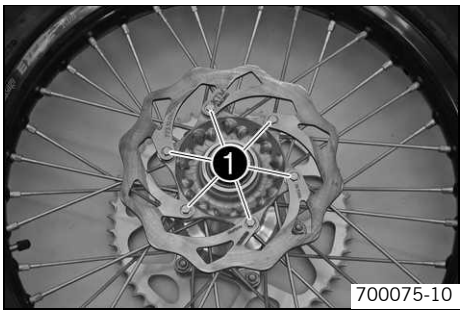
Removing the rear brake disc



700075-10

– Remove the rear wheel. (☛ p. 72)
– Remove screws ❶. Take off the brake disc.

Installing the rear brake disc



700075-10

– Check parts for damage and wear. Replace damaged or worn parts.
– Clean the contact surface of the brake disc.
– Position the brake disc with the label facing outward. Mount and tighten screws ❶.

Guideline

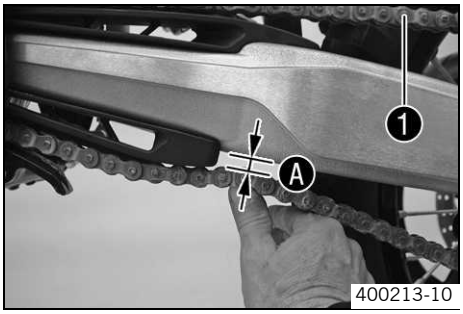
Screw, rear brake disc	M6	14 Nm (10.3 lbf ft)

– Install the rear wheel. (☛ p. 72)

Checking chain tension when fitting rear wheel

Warning
Danger of accidents Danger caused by incorrect chain tension.

– If the chain is over tensioned, the components of the secondary power train (chain, engine sprocket, rear sprocket, bearings in transmission and rear wheel) are under additional load. Apart from premature wear, in extreme cases the chain may snap or the countershaft of the transmission can break. On the other hand, if the chain is loose, it may jump off the engine sprocket or the rear sprocket, causing the rear wheel to lock or damage the engine. Check for correct chain tension and adjust if necessary.



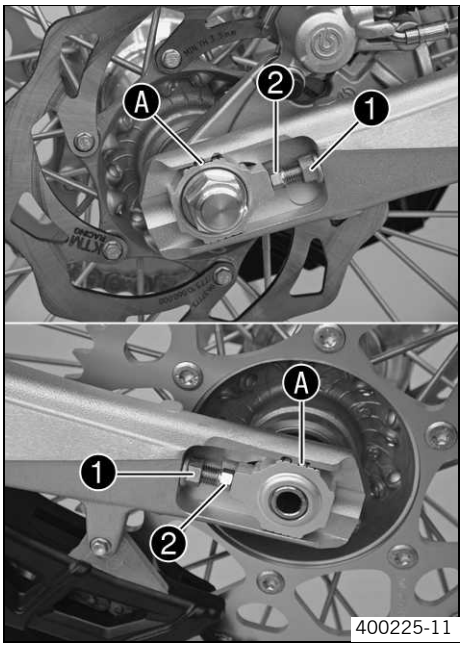
– Make sure that the chain adjusters are mounted correctly on the adjusting screws.
– Push the chain at the end of the chain sliding component upwards to measure the chain tension ❹.

Info
The upper chain section ❶ must be taut.
Chain wear is not always even, so you should repeat this measurement at different chain positions.

Chain tension	8... 10 mm (0.31... 0.39 in)

» If the chain tension does not meet specifications:
– Adjust the chain tension when fitting rear wheel. (☛ p. 74)

Adjusting chain tension - fitting rear wheel



– Loosen nuts ❶.
– Adjust the chain tension by turning the adjusting screws ❷ left and right.
Guideline

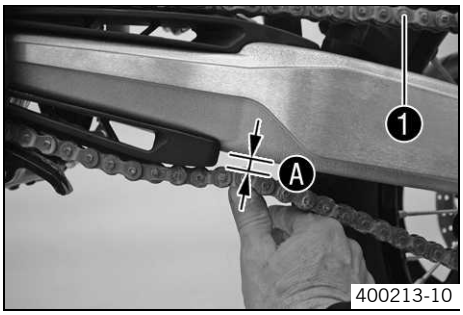
Chain tension	8... 10 mm (0.31... 0.39 in)
Turn the adjusting screws ❷ left and right so that the markings on the left and right chain adjusters are in the same position relative to the reference marks ❹. The rear wheel is then correctly aligned.	

– Tighten nuts ❶.

Checking the chain tension

Warning
Danger of accidents Danger caused by incorrect chain tension.

– If the chain is over tensioned, the components of the secondary power train (chain, engine sprocket, rear sprocket, bearings in transmission and rear wheel) are under additional load. Apart from premature wear, in extreme cases the chain may snap or the countershaft of the transmission can break. On the other hand, if the chain is loose, it may jump off the engine sprocket or the rear sprocket, causing the rear wheel to lock or damage the engine. Check for correct chain tension and adjust if necessary.



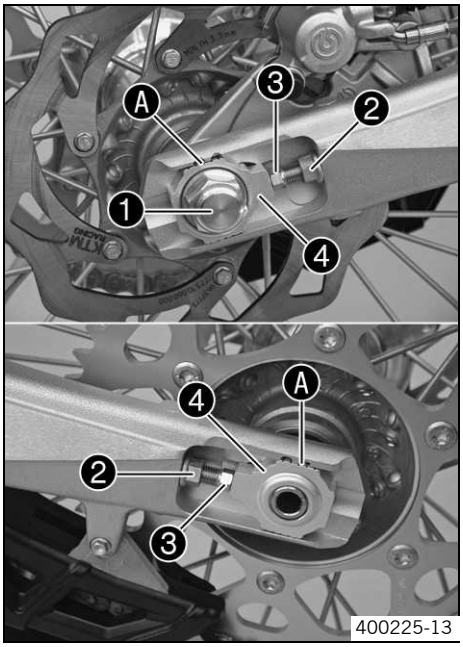
– Jack up the motorcycle. (☛ p. 10)
– Push the chain at the end of the chain sliding component upwards to measure the chain tension ❹.

Info
The upper chain section ❶ must be taut.
Chain wear is not always even, so you should repeat this measurement at different chain positions.

Chain tension	8... 10 mm (0.31... 0.39 in)

» If the chain tension does not meet specifications:
– Adjusting chain tension - after checking. (☛ p. 75)
– Remove the motorcycle from the work stand. (☛ p. 10)

Adjusting chain tension - after checking



400225-13

– Loosen nut ❶.
– Loosen nuts ❷.
– Adjust the chain tension by turning the adjusting screws ❸ left and right.

Guideline

Chain tension	8... 10 mm (0.31... 0.39 in)
Turn the adjusting screws ❸ left and right so that the markings on the left and right chain adjusters are in the same position relative to the reference marks Ⓐ. The rear wheel is then correctly aligned.	

– Tighten nuts ❷.
– Make sure that the chain adjusters ❹ are fitted correctly on the adjusting screws ❸.
– Tighten nut ❶.

Guideline

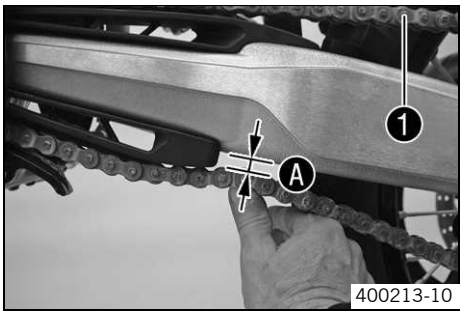
Nut, rear wheel spindle	M20x1.5	80 Nm (59 lbf ft)

Info
The wide adjustment range of the chain adjusters (32 mm) enables different secondary transmissions with the same chain length.
The chain adjusters ❹ can be turned by 180°.

Adjusting the chain tension

Warning
Danger of accidents Danger caused by incorrect chain tension.

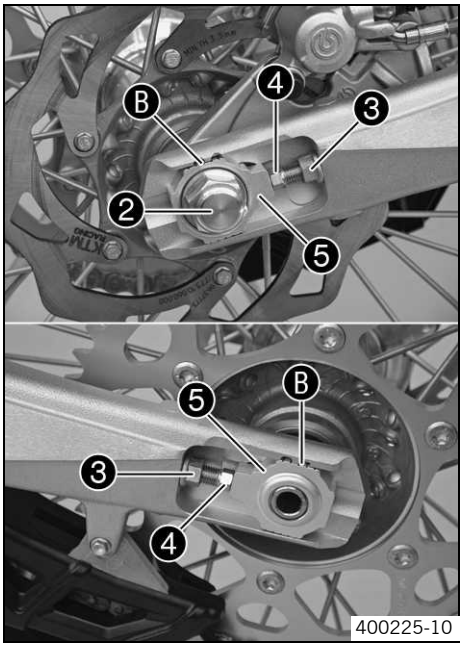
– If the chain is over tensioned, the components of the secondary power train (chain, engine sprocket, rear sprocket, bearings in transmission and rear wheel) are under additional load. Apart from premature wear, in extreme cases the chain may snap or the countershaft of the transmission can break. On the other hand, if the chain is loose, it may jump off the engine sprocket or the rear sprocket, causing the rear wheel to lock or damage the engine. Check for correct chain tension and adjust if necessary.



400213-10

– Jack up the motorcycle. (☛ p. 10)
– Push the chain at the end of the chain sliding component upwards to measure chain tension Ⓐ.

Info
The upper chain section ❶ must be taut.
Chain wear is not always even, so you should repeat this measurement at different chain positions.



– Loosen nut ❷.
– Loosen nuts ❸.
– Adjust the chain tension by turning the left and right adjusting screws ❹.
Guideline

Chain tension	8... 10 mm (0.31... 0.39 in)
Turn the left and right adjusting screws ❹ so that the markings on the left and right chain adjusters are in the same position relative to the reference marks Ⓑ. The rear wheel is then correctly aligned.	

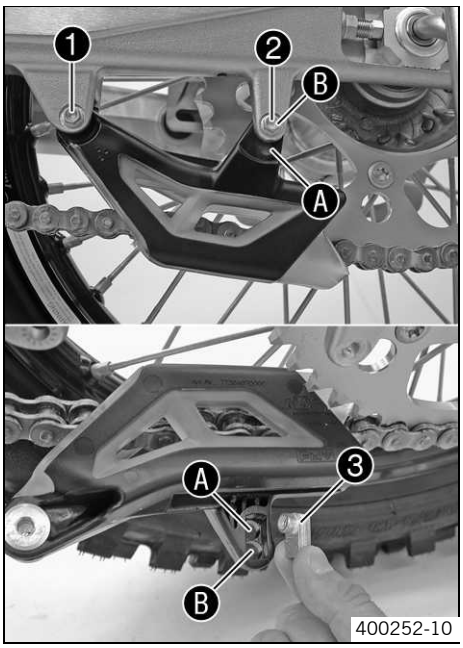
– Tighten nuts ❸.
– Make sure that chain adjusters ❺ are fitted correctly on the adjusting screws ❹.
– Tighten nut ❷.
Guideline

Nut, rear wheel spindle	M20x1.5	80 Nm (59 lbf ft)

Info
The wide adjustment range of the chain adjusters (32 mm) enables different secondary transmissions with the same chain length.
Chain adjusters ❺ can be turned by 180°.

– Remove the motorcycle from the work stand. (☛ p. 10)

Adjusting chain guide



– Remove screws ❶ and ❷. Take off the chain guide.

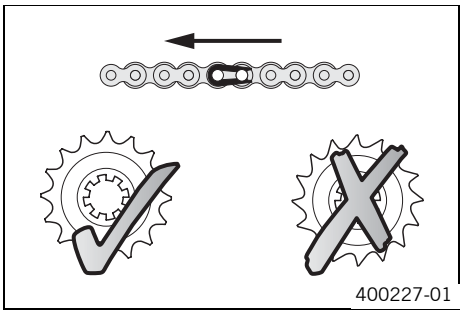
Condition
Number of teeth: ≤ 44 teeth
– Insert nut ❸ in hole Ⓐ. Position the chain guide.
– Mount and tighten screws ❶ and ❷.
Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

Condition
Number of teeth: ≥ 45 teeth
– Insert nut ❸ in hole Ⓑ. Position the chain guide.
– Mount and tighten screws ❶ and ❷.
Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

Checking the rear sprocket / engine sprocket for wear

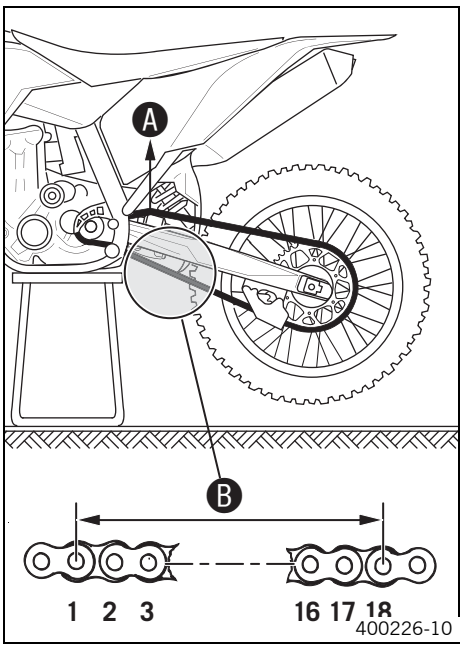


– Check the rear sprocket / engine sprocket for wear.
» If the rear sprocket / engine sprocket are worn:
– Replace rear sprocket / engine sprocket.

Info
When fitting the chain joint, always make sure that the closed side of the joint faces forward (riding direction).
The engine sprocket, rear sprocket and chain should always be replaced together.

– Check that the chain guide is firmly seated and not worn.

Checking chain wear



– Jack up the motorcycle. (☛ p. 10)
– Shift gear to neutral.
– Pull on the upper part of the chain with the specified weight Ⓐ.

Guideline

Weight of chain wear measurement	10... 15 kg (22... 33 lb.)

– Measure the distance Ⓑ of 18 chain links in the lower chain section.

Info
Chain wear is not always even, so you should repeat this measurement at different chain positions.

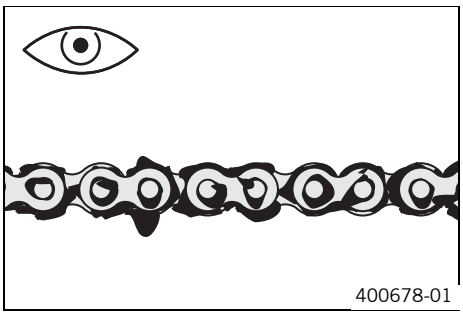
Maximum distance Ⓑ at the longest chain section	272 mm (10.71 in)

» If the distance Ⓑ is greater than the specified measurement:
– Replace the chain.

Info
When you replace the chain, you should also replace rear sprocket and engine sprocket.
New chains wear out faster on old, worn sprockets.

– Remove the motorcycle from the work stand. (☛ p. 10)

Checking for chain dirt accumulation



– Check the chain for coarse dirt accumulation.
» If the chain is very dirty:
– Clean the chain. (☛ p. 77)

Cleaning the chain

Warning
Danger of accidents Oil or grease on the tires reduces their grip.
– Remove oil and grease with a suitable cleaning material.

Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.
– Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.

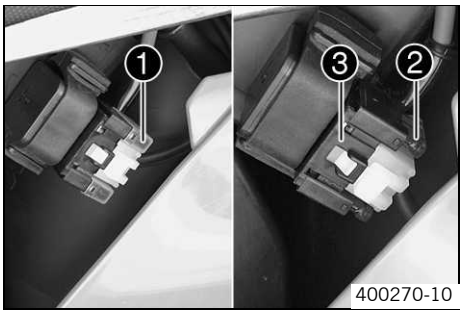
Warning
Environmental hazard Hazardous substances cause environmental damage.
– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
The service life of the chain depends largely on its maintenance.

– Clean the chain regularly and then treat with chain spray.

Chain cleaner (☛ p. 226)
Offroad chain spray (☛ p. 227)

Removing a fuse



– Switch off all power-consuming components and switch off the engine.
– Dismount the air filter box lid. (☛ p. 61)
– Remove the protection cover ❶.

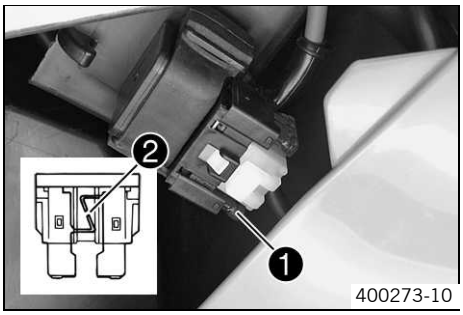
Info
The fuse ❷ is located in the starter relay ❸ under the filter box cover.

– Remove the fuse ❷.

Installing the fuse

Warning
Fire hazard The electrical system can be overloaded by the use of incorrect fuses.

– Use only fuses with the prescribed amperage. Never by-pass or repair fuses.



– Insert the fuse.

Fuse (58011109110)

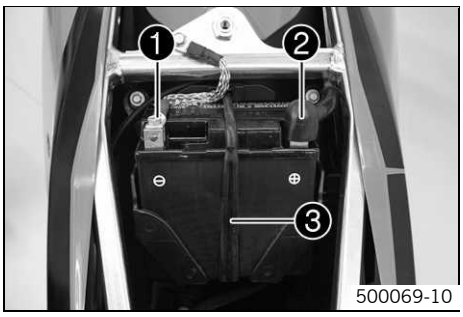
Info
A reserve fuse ❶ is located in the starter relay.
Replace a burned-out fuse ❷ only by an equivalent fuse.

– Replace the protection cover.
– Install the air filter box lid. (☛ p. 61)

Removing the battery

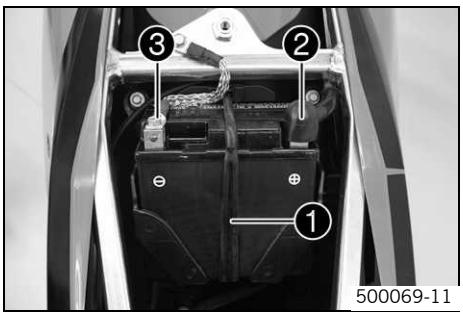
Warning
Risk of injury Battery acid and battery gases cause serious chemical burns.

– Keep batteries out of the reach of children.
– Wear suitable protective clothing and goggles.
– Avoid contact with battery acid and battery gases.
– Keep the battery away from sparks or open flames. Charge only in well-ventilated areas.
– In the event of skin contact, rinse with large amounts of water. If battery acid gets in the eyes, rinse with water for at least 15 minutes and contact a physician.



– Switch off all power-consuming components and switch off the engine.
– Remove the seat. (☛ p. 63)
– Disconnect the negative (minus) cable ❶ of the battery.
– Pull back the plus pole cover ❷ and disconnect the positive (plus) cable of the battery.
– Hang the rubber band ❸ out to the bottom.
– Lift the battery up.

Installing the battery



– Place the battery in the battery holder.

4Ah battery (YTX5L-BS) (☛ p. 203)

– Reconnect the rubber band ❶.
– Attach the plus cable and replace the plus pole cover ❷.
– Attach the minus cable ❸.
– Mount the seat. (☛ p. 63)

Recharging the battery

Warning
Risk of injury Battery acid and battery gases cause serious chemical burns.

– Keep batteries out of the reach of children.
– Wear suitable protective clothing and goggles.
– Avoid contact with battery acid and battery gases.
– Keep the battery away from sparks or open flames. Charge only in well-ventilated areas.
– In the event of skin contact, rinse with large amounts of water. If battery acid gets in the eyes, rinse with water for at least 15 minutes and contact a physician.

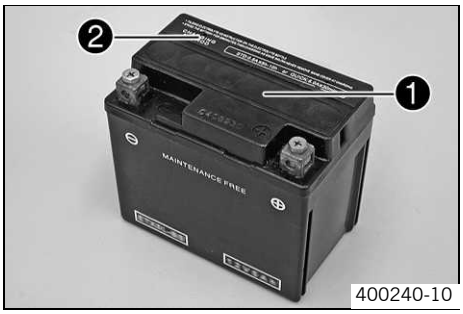
Warning
Environmental hazard Battery parts and acid are harmful to the environment.

– Do not discard batteries with the household trash. Dispose of a defective battery in an environmentally compatible manner. Give the battery to your KTM dealer or to a recycling center that accepts used batteries.

Warning
Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Even when there is no load on the battery, it discharges steadily.
The charge state and the type of charge are very important for the service life of the battery.
Rapid recharging with a high charging current shortens the battery's service life.
If the charging current, charging voltage and charging time are exceeded, electrolyte escapes through the safety valves. This reduces the battery capacity.
If the battery is depleted from starting the vehicle repeatedly, the battery must be charged immediately.
If the battery is left in a discharged state for an extended period, it will become over-discharged and sulfate, destroying the battery.
The battery is maintenance-free, i.e., the acid level does not have to be checked.



– Switch off all power consumers and the engine.
– Remove the seat. (☛ p. 63)
– Disconnect the negative (minus) cable of the battery to avoid damage to the motorcycle's electronics.
– Connect the battery charger to the battery. Switch on the battery charger.

Battery charger (58429074000)

You can also use the battery charger to test the rest potential and start potential of the battery, and to test the generator. With this device, you cannot overcharge the battery.

Info
Never remove lid ❶.
Charge the battery at no more than 10% of the capacity specified on the battery housing ❷.

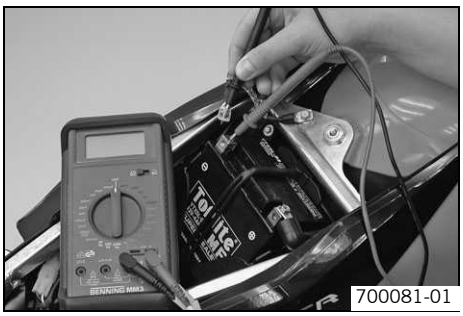
– Switch off the charger after charging. Disconnect the battery.

Guideline

The charge current, charge voltage and charge time must not be exceeded.	
Charge the battery regularly when the motorcycle is not in use	3 months

– Mount the seat. (☛ p. 63)

Checking the closed current


700081-01

– Switch off all power-consuming components and switch off the engine.
– Remove the seat. (☛ p. 63)
– Disconnect the negative (minus) cable of the battery.
– Connect the multimeter between the negative cable and the negative terminal of the battery. Check the closed current.

Maximum closed-circuit current	< 1 mA

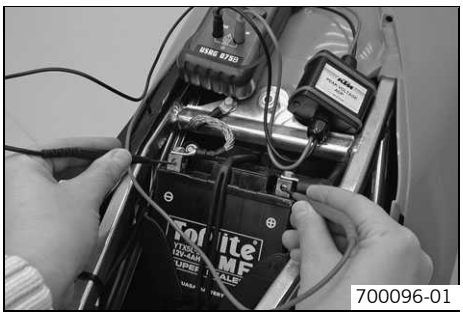
» If the measured value is higher than the specified value:
– Check the plug connections and the cable harness.
– Disconnect and reconnect the power-consuming components one by one from the cable harness, keeping an eye on the closed-circuit current, until you have located the consumer.

Info
Typical power consumers are a defective voltage regulator/rectifier or leakage current in plug connectors.

Checking the charging voltage

Condition
All plug contacts must be free of corrosion and the plug-in connectors must be firmly seated.
The battery must be ready to start but should not be fully charged. If the battery is fully charged, start the engine a number of times.

– Remove the seat. (☛ p. 63)


700096-01

– Connect the special tool to the multimeter. The black measuring lead of the special tool is connected to the negative terminal (ground) of the battery. Place the red measuring lead on the positive terminal.

Peak voltage adapter (58429042000) (☛ p. 229)

– Start the motorcycle for checking. (☛ p. 11)

Info
The measurements must be made immediately after the engine is started.

– Make measurements when there is no load (no electrical power-consuming components switched on).

Charging voltage	
no load at: Idle speed 1,550... 1,650 rpm	13... 15 V

» If the value displayed does not meet specifications:
– Check the voltage regulator. (☛ p. 81)

– Make measurement under load (light switched on, horn and brake operated).

Charging voltage	
under load at: Idle speed 1,550... 1,650 rpm	11... 13 V

» If the value displayed does not meet specifications:
– Check the voltage regulator. (☛ p. 81)

– Make measurement under load (light switched on, horn and brake operated) and with increasing engine speed.

Charging voltage	
under load, rising engine speed to: 8,000 rpm	12... 14 V

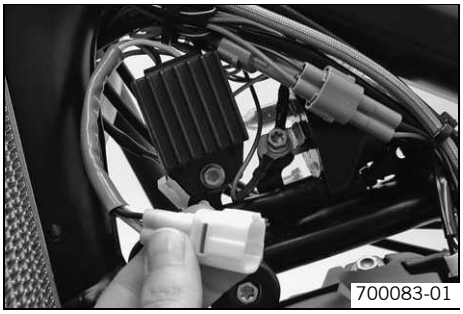
» If the value displayed does not meet specifications:
– Check the voltage regulator. (☛ p. 81)

Checking the voltage regulator

Info
A defective voltage regulator/rectifier can have a variety of effects depending on whether there is no voltage or an excessively high voltage in the circuit. An excessively high voltage shortens the lamp service life.

Condition
All plug contacts must be free of corrosion and the plug-in connectors must be firmly seated.
The battery must be charged or the kickstarter must be used.

– Remove the seat. (☛ p. 63)
– Dismount the fuel tank. (☛ p. 63)


700083-01

– If there is no voltage in the circuit, disconnect the voltage regulator from the circuit.

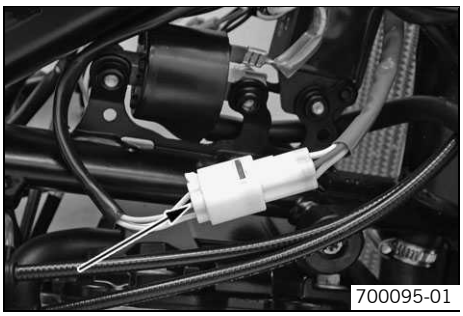
Warning
Material damage Separate the voltage regulator from the electric circuit at idling speed only.
– If no voltage regulator is connected to the electric circuit, run the engine at idling speed only. At higher speeds, the lighting system will be destroyed.

– Start the motorcycle for checking. (☛ p. 11)

Guideline

Idle speed	1,550... 1,650 rpm

» If the power consumers are functioning:
– Change the voltage regulator.
» If there is no current in the circuit after the voltage regulator is changed:
– Check the generator. (☛ p. 188)
– Fault in the switch or wiring harness.


700095-01

– Connect the special tool to the multimeter.

Peak voltage adapter (58429042000) (☛ p. 229)

Info
When using the peak voltage adapter, adjust the measuring range of the multimeter to DCV.

– Remove the fuse. (☛ p. 78)

(EXC EU, EXC AUS, EXC-R SIX DAYS)
– Switch off the light by pushing the light switch into the position •.

(XC-W ZA)
– Switch off the light by pushing in the light switch up to the stop.

(EXC USA)
– Disconnect the plug-in connector from the light switch of the lighting equipment.

– Connect the red measuring lead to the yellow/red cable. Apply the black measuring lead to ground (brown cable).

Info
Do not unplug the plug-in connection for the measurement.

– Start the motorcycle for checking. (☛ p. 11)

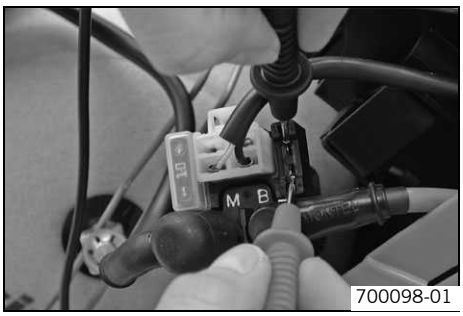
Regulator output voltage	
Ground (brown) - yellow/red	13... 15 V

» If the value displayed does not meet specifications:
– Change the voltage regulator.

Checking the charging current

Condition
All plug contacts must be free of corrosion and the plug-in connectors must be firmly seated.
The battery must be ready to start but should not be fully charged. If the battery is fully charged, start the engine a number of times.

– Remove the seat. (☛ p. 63)
– Dismount the air filter box lid. (☛ p. 61)
– Remove the fuse. (☛ p. 78)



– Connect the measureing leads of the multimeter to the plug contacts of the fuse holder.
– Start the motorcycle for checking. (☛ p. 11)

Info
The measurements must be made immediately after the engine is started.

– Make measurements when there is no load (no electrical power-consuming components switched on).

Charging current	
no load at: Idle speed 1,550... 1,650 rpm	1.2... 1.4 A

» If the value displayed does not meet specifications:
– Change the stator.

– Make measurement under load (light switched on, horn and brake operated).

Charging current	
under load at: Idle speed 1,550... 1,650 rpm	−0.7... −0.5 A

» If the value displayed does not meet specifications:
– Change the stator.

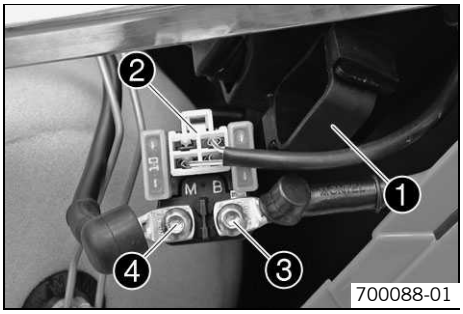
– Make measurement under load (light switched on, horn and brake operated) and with increasing engine speed.

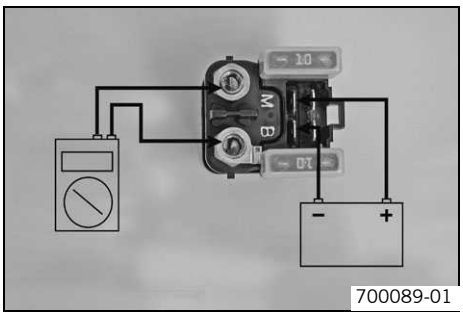
Charging current	
under load, rising engine speed to: 8,000 rpm	−0.1... 0.1 A

» If the value displayed does not meet specifications:
– Change the stator.

Checking the starter relay

– Remove the seat. (☛ p. 63)
– Dismount the air filter box lid. (☛ p. 61)
– Disconnect the negative (minus) cable of the battery.
– Remove the starter relay from the bracket ❶ at the side of the battery.
– Disconnect the plug ❷ from the starter relay.
– Disconnect cables ❸ and ❹ on the starter relay.





700089-01

– Connect the starter relay to a 12 V power supply as shown. Use a multimeter to check the continuity between the clamps.

Info
When a relay switches, you hear a click.

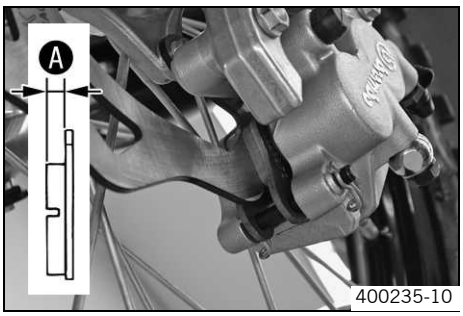
Resistance when starter relay is activated	0 Ω

» If the value displayed does not meet specifications:
  – Change the starter relay.

Checking the front brake linings

Warning
Danger of accidents Reduced braking efficiency caused by worn brake linings.

– Change worn brake linings immediately.



– Check the brake linings for minimum thickness Ⓐ.

Minimum thickness Ⓐ	≥ 1 mm (≥ 0.04 in)

» If the minimum thickness is less than specified:
– Change the front brake linings. (☛ p. 85)

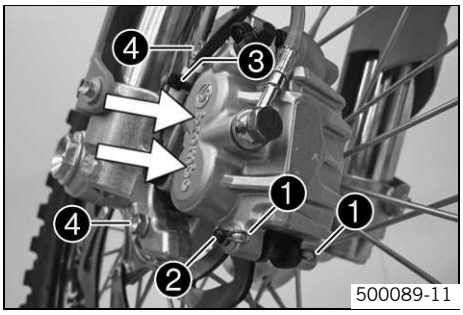
– Check the brake linings for damage and cracking.

» If damage or cracking is visible:
– Change the front brake linings. (☛ p. 85)

Removing front brake linings

Warning
Danger of accident Brake system failure.

– Maintenance work and repairs must be carried out professionally.



– Press the brake caliper by hand onto the brake disc in order to retract the brake pistons.

Info
Make sure when retracting the brake pistons that you do not press the brake caliper against the spokes.

– Remove locking split pins ❶, withdraw bolt ❷, and take out the brake pads.
– Remove cable clip ❸. Remove screws ❹ and take off brake caliper.
– Clean brake caliper and brake caliper support.

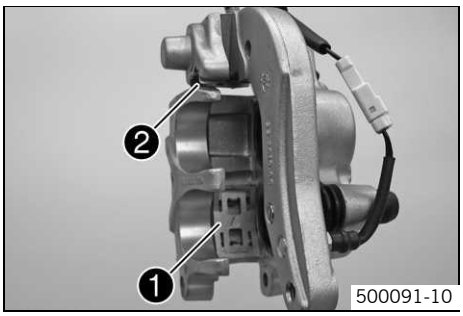
Mounting front brake linings

Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.

– Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.

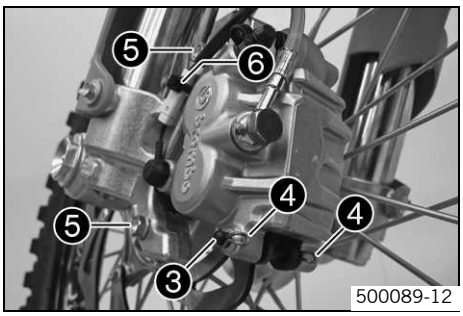
Warning
Danger of accidents Reduced braking efficiency due to use of non-approved brake linings.

– Brake linings available from accessory suppliers are often not tested and approved for use on KTM vehicles. The construction and friction factor of the brake linings and therefore the brake power can differ considerably from the original KTM brake linings. If brake linings are used that differ from the originals, there is no guarantee that they comply with the original license. The vehicle no longer corresponds to the condition at delivery, and the warranty is no longer valid.



– Check the brake discs. (☛ p. 69)
– Check that leaf spring ❶ in the brake caliper and sliding plate ❷ in the brake caliper support are seated correctly.

Info
The arrow on the leaf spring points in the rotation direction of the brake disc.



– Fit the brake pads, insert bolt ❸, and mount locking split pins ❹.
– Position brake caliper, mount and tighten screws ❺.

Guideline

Screw, front brake caliper	M8	25 Nm (18.4 lbf ft)	**Loctite® 243™**

– Mount cable clip ❻.
– Operate the hand brake lever repeatedly until the brake lining presses up against the brake disc and there is a pressure point.

Changing the front brake linings

Warning
Skin irritation Brake fluid can cause skin irritation on contact.

– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.

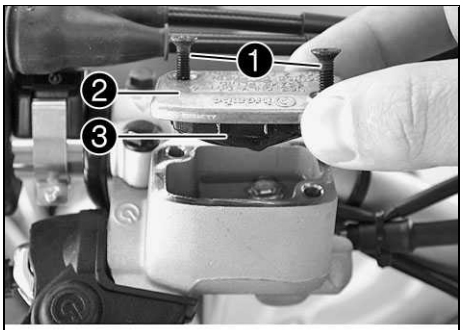
Warning
Danger of accidents Reduced braking efficiency due to old brake fluid.

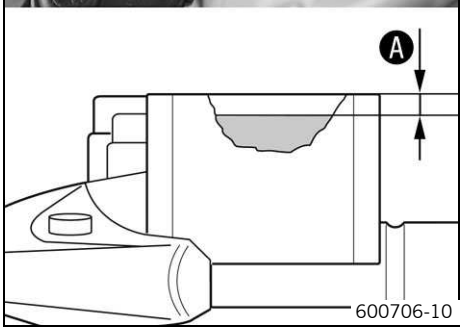
– Change the brake fluid of the front and rear brakes according to the service schedule.

Warning
Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Never user DOT 5 brake fluid! This is based on silicone oil and is colored purple. Oil seals and brake lines are not designed for DOT 5 brake fluid.
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container!





– Remove the front brake linings. (☛ p. 84)
– Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
– Remove screws ❶.
– Remove cover ❷ with membrane ❸.
– Press the brake piston back to its basic position and make sure that no brake fluid overflows from the brake fluid reservoir.
– Mount the front brake linings. (☛ p. 84)
– Add brake fluid to level Ⓐ.

Guideline

Measurement of Ⓐ	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

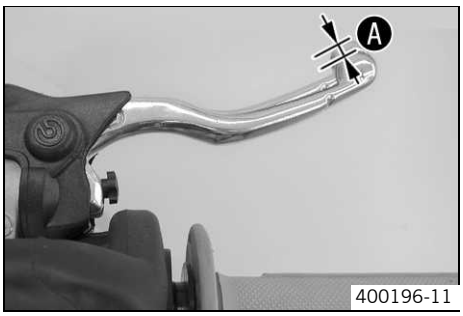
– Position the cover with the membrane. Mount and tighten the screws.

Info
Clean up overflowed or spilt brake fluid immediately with water.

Checking free travel of hand brake lever

Warning
Danger of accidents Brake system failure.

– If there is no free travel on the hand brake lever, pressure builds up on the front brake in the brake system. The front brake can fail due to overheating. Adjust free travel on hand brake lever according to specifications.

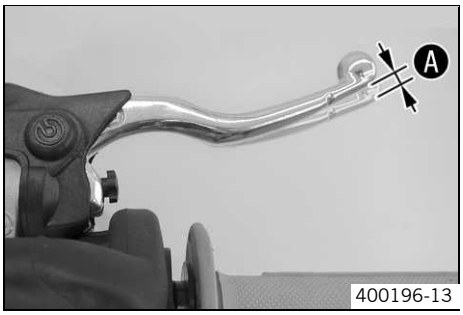


(all XC-W models)

– Push the hand brake lever forwards and check free travel Ⓐ.

Free travel of hand brake lever	≥ 3 mm (≥ 0.12 in)

» If the free travel does not meet specifications:
– Adjust the basic position of handbrake lever. (☛ p. 86)



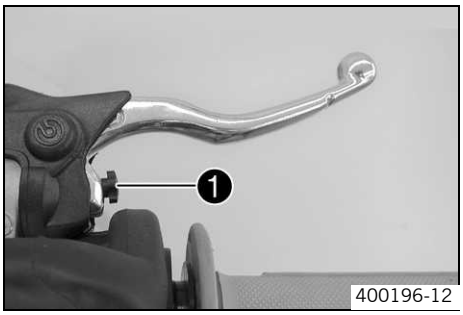
(all EXC models)

– Push the hand brake to the handlebar and check free travel Ⓐ.

Free travel of hand brake lever	≥ 3 mm (≥ 0.12 in)

» If the free travel does not meet specifications:
– Adjust the free travel of the handbrake lever. (☛ p. 86)

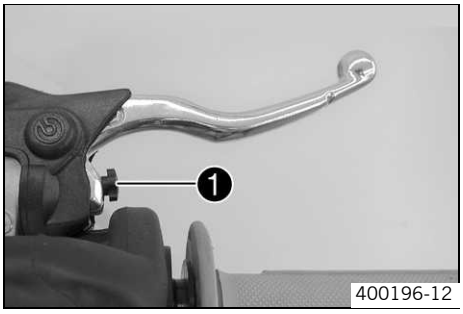
Adjusting basic position of handbrake lever (all XC-W models)



– Check the free travel of the hand brake lever. (☛ p. 86)
– Adjust the basic setting of the handbrake lever to your hand size by turning adjusting screw ❶.

Info
Turn the adjusting screw clockwise to increase the distance between the handbrake lever and the handlebar.
Turn the adjusting screw counterclockwise to decrease the distance between the handbrake lever and the handlebar.
The range of adjustment is limited.
Turn the adjusting screw by hand only, and do not apply any force.
Do not make any adjustments while riding!

Adjusting free travel of handbrake lever (all EXC models)



– Check the free travel of the hand brake lever. (☛ p. 86)
– Adjust the free travel of the handbrake lever with the adjustment screw ❶.

Info
Turn the adjustment screw clockwise to reduce free travel. The pressure point moves away from the handlebar.
Turn the adjustment screw counterclockwise to increase free travel. The pressure point moves towards the handlebar.
The range of adjustment is limited.
Turn the adjusting screw by hand only, and do not apply any force.
Do not make any adjustments while riding!

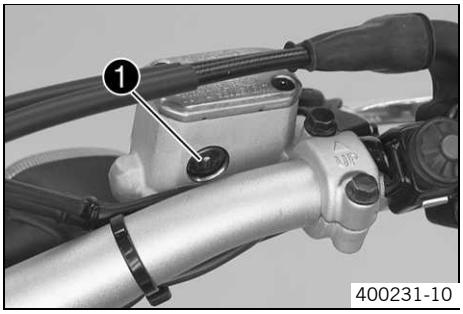
Checking the brake fluid level of the front brake

Warning
Danger of accidents Failure of the brake system.

– If the brake fluid level falls below the **MIN** mark, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and do not continue riding.

Warning
Danger of accidents Reduced braking efficiency due to old brake fluid.

– Change the brake fluid of the front and rear brakes according to the service schedule.



– Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
– Check the brake fluid level in viewer ❶.
  » If the brake fluid is below the **MIN** mark:
    – Add front brake fluid. (☛ p. 87)

Adding front brake fluid

Warning
Danger of accidents Failure of the brake system.

– If the brake fluid level falls below the **MIN** mark, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and do not continue riding.

Warning
Skin irritation Brake fluid can cause skin irritation on contact.

– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.

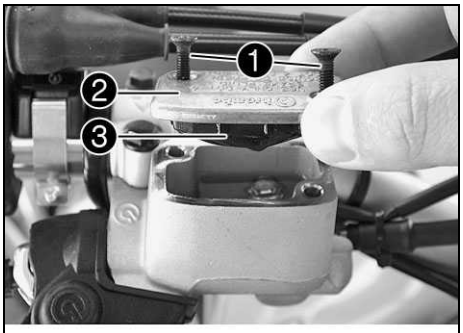
Warning
Danger of accidents Reduced braking efficiency due to old brake fluid.

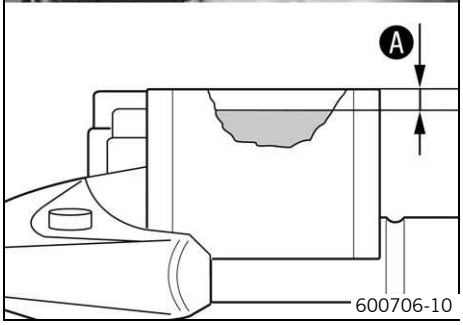
– Change the brake fluid of the front and rear brakes according to the service schedule.

Warning
Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Never user DOT 5 brake fluid! This is based on silicone oil and is colored purple. Oil seals and brake lines are not designed for DOT 5 brake fluid.
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container!





– Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
– Remove screws ❶.
– Remove cover ❷ with membrane ❸.
– Add brake fluid to level Ⓐ.

Guideline

Measurement of Ⓐ	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

– Position the cover with the membrane. Mount and tighten the screws.

Info
Clean up overflowed or spilt brake fluid immediately with water.

Changing the front brake fluid

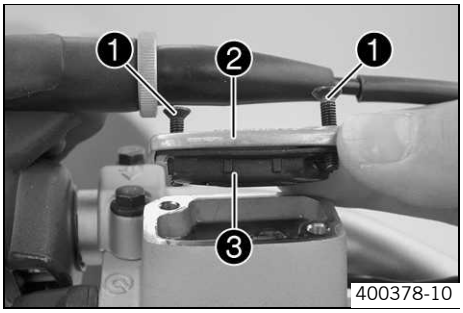
Warning
Skin irritation Brake fluid can cause skin irritation on contact.

– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.

Warning
Environmental hazard Hazardous substances cause environmental damage.

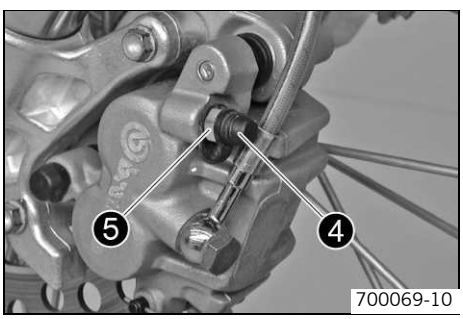
– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Never user DOT 5 brake fluid! This is based on silicone oil and is colored purple. Oil seals and brake lines are not designed for DOT 5 brake fluid.
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container!

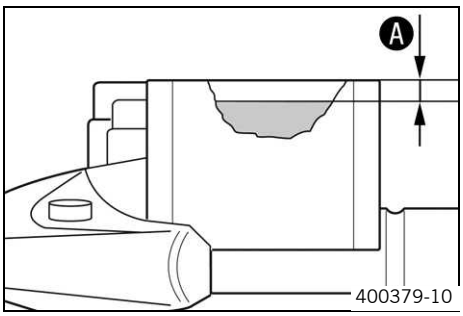


– Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
– Remove screws ❶.
– Remove cover ❷ with membrane ❸.
– Extract the old brake fluid from the brake fluid reservoir with a syringe and add new brake fluid.

Bleed syringe (50329050000) (☛ p. 228)
Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)



– Pull off dust cap ❹ and connect a commercially available suction device (workshop equipment).
– Loosen bleeder screw ❺ and extract the old brake fluid.
– During suction, always ensure that the brake fluid reservoir is filled with a sufficient amount of new brake fluid.
– Tighten the bleeder screw. Remove the suction device and attach the dust cap.



– Add brake fluid to level Ⓐ.

Guideline

Measurement of Ⓐ	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

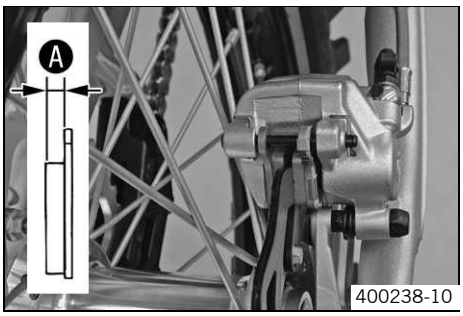
– Position the cover with the membrane. Mount and tighten the screws.
– Activate the hand brake lever until a firm pressure point is reached.

Info
Clean up overflowed or spilt brake fluid immediately with water.

Checking rear brake linings

Warning
Danger of accidents Reduced braking efficiency caused by worn brake linings.

– Change worn brake linings immediately.



– Check the brake linings for minimum thickness Ⓐ.

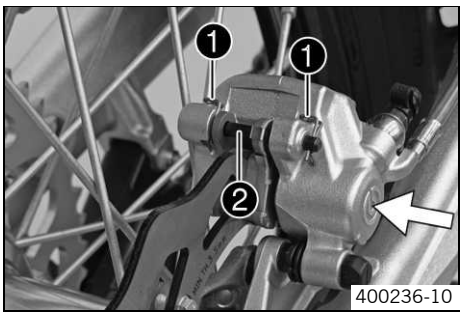
Minimum thickness Ⓐ	≥ 1 mm (≥ 0.04 in)

» If the minimum thickness is less than specified:
– Change the rear brake linings. (☛ p. 90)
– Check the brake linings for damage and cracking.
» If damage or cracking is visible:
– Change the rear brake linings. (☛ p. 90)

Removing rear brake linings

Warning
Danger of accident Brake system failure.

– Maintenance work and repairs must be carried out professionally.



– Press the brake caliper by hand onto the brake disc in order to retract the brake piston.

Info
Make sure when retracting the brake piston that you do not press the brake caliper against the spokes.

– Remove locking split pins ❶, withdraw bolt ❷, and take out the brake pads.
– Clean brake caliper and brake caliper support.

Mounting rear brake linings

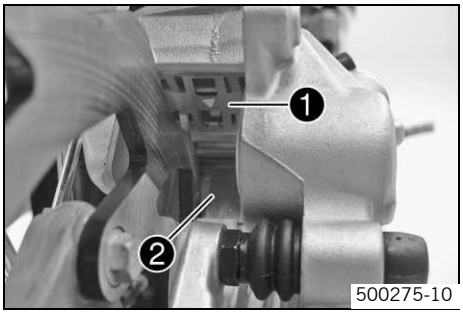
Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.

– Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.

Warning
Danger of accidents Reduced braking efficiency due to use of non-approved brake linings.

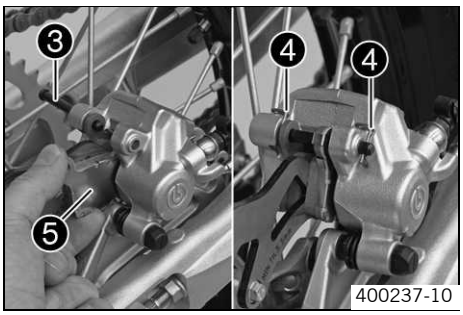
– Brake linings available from accessory suppliers are often not tested and approved for use on KTM vehicles. The construction and friction factor of the brake linings and therefore the brake power can differ considerably from the original KTM brake linings. If brake linings are used that differ from the originals, there is no guarantee that they comply with the original license. The vehicle no longer corresponds to the condition at delivery, and the warranty is no longer valid.

– Check the brake discs. (☛ p. 69)



– Check that leaf spring ❶ in the brake caliper and sliding plate ❷ in the brake caliper support are seated correctly.

Info
The arrow on the leaf spring points in the rotation direction of the brake disc.



– Fit the brake pads, insert bolt ❸, and mount locking split pins ❹.

Info
Make sure that the decoupling plate ❺ is mounted on the piston side of the brake pad.

– Operate the foot brake lever repeatedly until the brake linings press up against the brake disc and there is a pressure point.

Changing the rear brake linings

Warning
Skin irritation Brake fluid can cause skin irritation on contact.

– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.

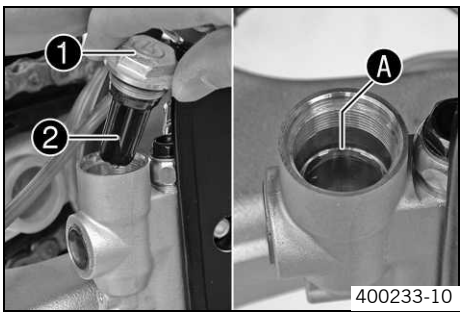
Warning
Danger of accidents Reduced braking efficiency due to old brake fluid.

– Change the brake fluid of the front and rear brakes according to the service schedule.

Warning
Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Never user DOT 5 brake fluid! This is based on silicone oil and is colored purple. Oil seals and brake lines are not designed for DOT 5 brake fluid.
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container!



– Remove the rear brake linings. (☛ p. 89)
– Stand the vehicle upright.
– Remove screw cap ❶ with membrane ❷ and the O-ring.
– Press the brake piston back to its basic position and make sure that no brake fluid overflows from the brake fluid reservoir.
– Mount the rear brake linings. (☛ p. 89)
– Add brake fluid to level Ⓐ.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

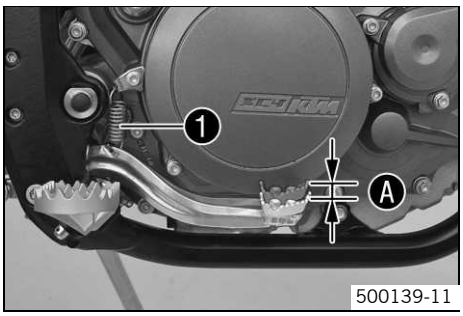
– Mount the screw cap with the membrane and the O-ring.

Info
Clean up overflowed or spilt brake fluid immediately with water.

Checking free travel of foot brake lever

Warning
Danger of accidents Brake system failure.

– If there is no free travel on the foot brake pedal, pressure builds up on the rear brake in the brake system. The rear brake can fail due to overheating. Adjust free travel on foot brake pedal according to specifications.



– Disconnect spring ❶.
– Move the foot brake lever backwards and forwards between the end stop and the foot brake cylinder piston bracket and check free travel Ⓐ.

Guideline

Free travel at foot brake lever	3... 5 mm (0.12... 0.2 in)

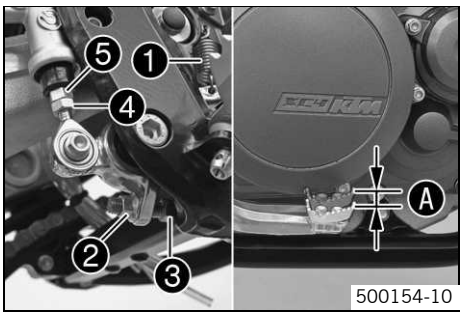
» If the free travel does not meet specifications:
– Adjust the basic position of the foot brake lever. (☛ p. 91)

– Reconnect spring ❶.

Adjusting basic position of foot brake lever

Warning
Danger of accidents Brake system failure.

– If there is no free travel on the foot brake pedal, pressure builds up on the rear brake in the brake system. The rear brake can fail due to overheating. Adjust free travel on foot brake pedal according to specifications.



– Detach spring ❶.
– Loosen nut ❹ and with push rod ❺, turn it back until you have maximum free travel.
– To adjust the basic position of the foot brake lever individually, loosen nut ❷ and turn screw ❸ accordingly.

Info
The range of adjustment is limited.

– Turn push rod ❺ accordingly until there is free travel Ⓐ. If necessary, adjust the basic position of the foot brake lever.

Guideline

Free travel at foot brake lever	3... 5 mm (0.12... 0.2 in)

– Hold screw ❸ and tighten nut ❷.

Guideline

Remaining nuts, chassis	M8	30 Nm (22.1 lbf ft)

– Hold push rod ❺ and tighten nut ❹.

Guideline

Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)

– Attach spring ❶.

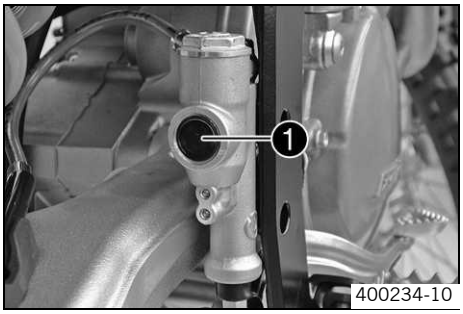
Checking the brake fluid level of the rear brake

Warning
Danger of accidents Failure of the brake system.

– If the brake fluid level falls below the **MIN** mark, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and do not continue riding.

Warning
Danger of accidents Reduced braking efficiency due to old brake fluid.

– Change the brake fluid of the front and rear brakes according to the service schedule.



– Stand the vehicle upright.
– Check the brake fluid level in viewer ❶.
  » When in the viewer ❶ an air bubble is visible:
    – Add rear brake fluid. (☛ p. 92)

Adding rear brake fluid

Warning
Danger of accidents Failure of the brake system.

– If the brake fluid level falls below the **MIN** mark, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and do not continue riding.

Warning
Skin irritation Brake fluid can cause skin irritation on contact.

– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.

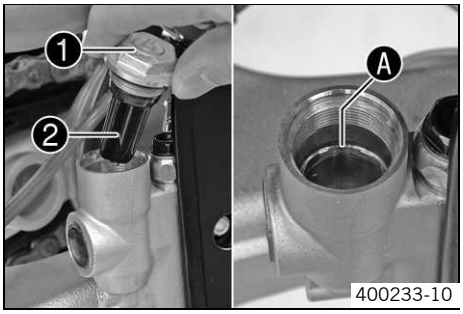
Warning
Danger of accidents Reduced braking efficiency due to old brake fluid.

– Change the brake fluid of the front and rear brakes according to the service schedule.

Warning
Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Never use DOT 5 brake fluid! It is silicone based and purple in color. Oil seals and brake lines are not designed for DOT 5 brake fluid.
Avoid contact between brake fluid and painted parts. Brake fluid is corrosive and will damage painted surfaces.
Use only clean brake fluid from a sealed container!



– Stand the vehicle upright.
– Remove screw cap ❶ with membrane ❷ and the O-ring.
– Add brake fluid to level Ⓐ.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

– Mount the screw cap with the membrane and the O-ring.

Info
Clean up overflowed or spilt brake fluid immediately with water.

Changing the rear brake fluid

Warning
Skin irritation Brake fluid can cause skin irritation on contact.

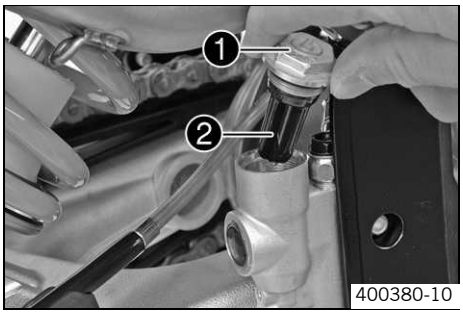
– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.

Warning
Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

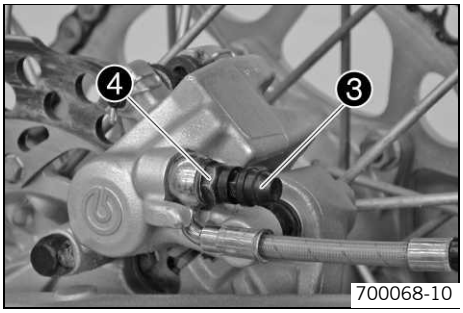
Info

Never user DOT 5 brake fluid! This is based on silicone oil and is colored purple. Oil seals and brake lines are not designed for DOT 5 brake fluid.
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container!



– Stand the vehicle upright.
– Remove screw cap ❶ with membrane ❷ and the O-ring.
– Extract the old brake fluid from the brake fluid reservoir with a syringe and add new brake fluid.

Bleed syringe (50329050000) (☛ p. 228)
Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

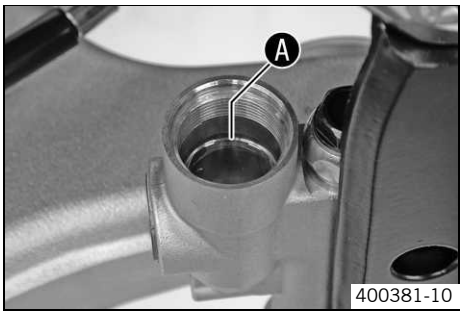


– Pull off dust cap ❸ and connect a commercially available suction device (workshop equipment).
– Loosen bleeder screw ❹ and extract the old brake fluid.

Info

During suction, always ensure that the reservoir is filled with a sufficient amount of new brake fluid.

– Tighten the bleeder screw. Remove the suction device and attach the dust cap.



– Add brake fluid to level Ⓐ.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

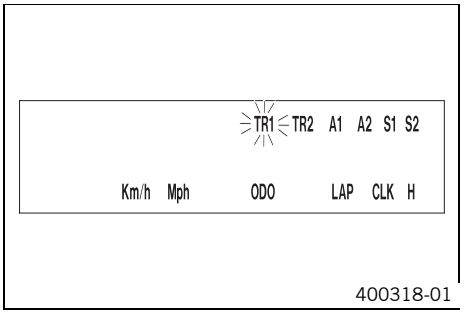
– Mount the screw cap with the membrane and the O-ring.
– Activate the foot brake pedal until a firm pressure point is reached.

Info

Clean up overflowed or spilt brake fluid immediately with water.

Adjusting the speedometer functions

Info
Upon delivery, only the **SPEED/H** and **SPEED/ODO** display modes are activated.



400318-01

Condition
The motorcycle is stationary.

– Press the button briefly and repeatedly until **H** appears at the bottom right of the display.
– Press the button for 3 - 5 seconds.
  ✓ The Setup menu opens and the active functions are displayed.
– Switch to the function you require by briefly pressing the button.
  ✓ The selected function flashes.

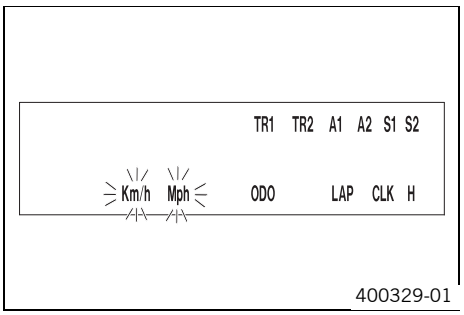
Activating a function
– Press the button +.
  ✓ The icon remains in the display and the display changes to the next function.

Deactivating a function
– Press the button –.
  ✓ The icon disappears from the display and the display changes to the next function.
– Activate or deactivate all functions accordingly.
– Press the button for 3 - 5 seconds.
  ✓ The settings are saved and the Setup menu closed.

Info
If no button is pressed for 20 seconds, or if no impulse comes from the wheel speed sensor, the settings are automatically saved and the Setup menu is closed.

kilometers or miles, setting

Info
If you change the unit, the value **ODO** is retained and converted accordingly.
The values **TR1**, **TR2**, **A1**, **A2** and **S1** are cleared when the unit of measure is changed.



400329-01

Condition
The motorcycle is stationary.

– Press the button briefly and repeatedly until **H** appears at the bottom right of the display.
– Press the button for 3 - 5 seconds.
  ✓ The setup menu is displayed and the active functions shown.
– Press the button repeatedly until the **Km/h**/**Mph** display flashes.

Setting to Km/h
– Press the button +.

Setting to Mph
– Press the button –.
– Press the button for 3 - 5 seconds.
  ✓ The settings are stored and the setup menu closed.

Info
If no button is actuated for 20 seconds or there is no signal from the wheel speed sensor, then the settings are automatically stored and the setup menu closed.

Activating the additional functions

Danger

Voiding of the government approval for road use and the insurance coverage The vehicle is only authorized for operation on public roads in the homologated version.

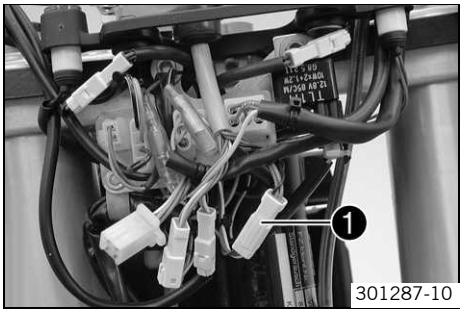
- If the vehicle is modified in any way, it may only be used on designated tracks away from public roads. Advise the vehicle owner and rider of this.
- If you undertake any modifications, please insist on receiving a signed workshop order from your customer in which you inform the customer in writing that these modifications are performed at the customer's own risk and that the vehicle will no longer be approved for use on public roads once modified.

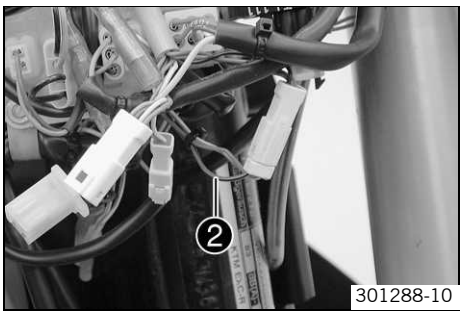
(EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA)

- Remove the headlight mask with the headlight. (☛ p. 66)

(XC-W USA)

- Remove the start number plate. (☛ p. 67)
- Expose connector **CZ** ❶.





- Sever the black/brown cable ❷.
- Insulate both cable ends.

(EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA)

- Refit the headlight mask with the headlight. (☛ p. 66)

(XC-W USA)

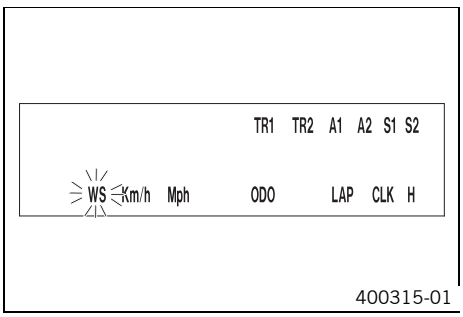
- Install the start number plate. (☛ p. 67)

Setting the wheel circumference

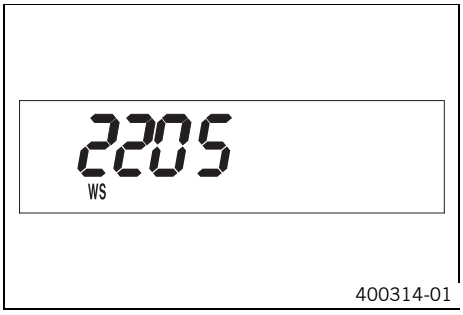
Condition

The motorcycle is stationary.

- Activate the additional functions. (☛ p. 95)
- Press the button briefly and repeatedly until **H** appears at the bottom right of the display.
- Press the button for 3 - 5 seconds.
  - ✓ The setup menu is displayed and the active functions shown.
- Press the button until the **WS** indicator blinks.



- Press the button +.
  - ✓ The wheel circumference is displayed in millimeters.



Enlarging the wheel circumference

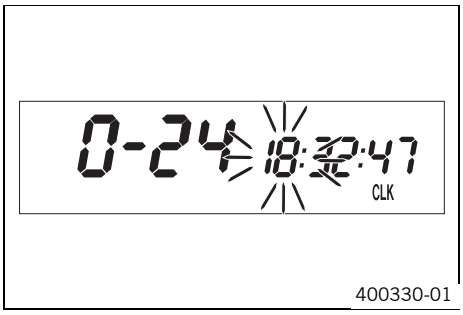
- Press the button +.

Reducing the wheel circumference

- Press the button −.
- Press the button briefly.
- Press the button for 3 - 5 seconds.
  - ✓ The settings are stored and the setup menu closed.

Info
If no button is actuated for 20 seconds or there is no signal from the wheel speed sensor, then the settings are automatically stored and the setup menu closed.

Setting the clock



400330-01

Condition
The motorcycle is stationary.

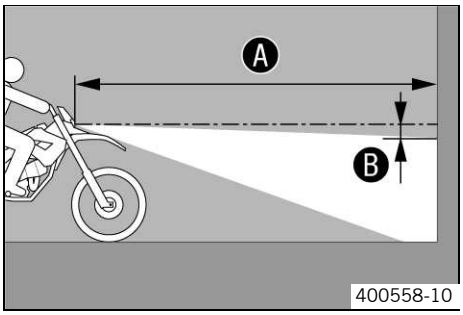
– Press the button briefly and repeatedly until **CLK** appears at the bottom right of the display.
– Press the button for 3 - 5 seconds.
✓ The hour display flashes.
– Set the hour display with the button + and/or button −.
– Press the button briefly.
✓ The next segment of the display flashes and can be set.
– You can set the following segments in the same way as the hours by pressing the button + and the button −.

Info
The seconds can only be set to zero.

– Press the button for 3 - 5 seconds.
✓ The settings are saved and the Setup menu closed.

Info
If no button is pressed for 20 seconds, or if no impulse comes from the wheel speed sensor, the settings are automatically saved and the Setup menu closed.

Checking the headlamp setting (EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA)



400558-10

– Mark a light colored wall at the height of the headlight center with the vehicle on level ground.
– Make another mark at a distance of ❽ under the first mark.
Guideline

Distance ❽	5 cm (2 in)

– Position the motorcycle at a distance of ❹ away from the wall. The driver, in full protective clothing, should now sit on the motorcycle in a normal sitting position (feet on the footrests).
Guideline

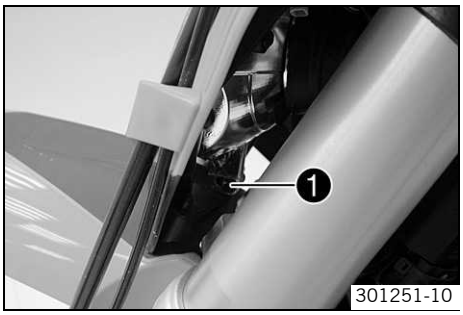
Distance ❹	5 m (16 ft)

– Switch on the low beam. Check the headlamp setting.

The beam cut-off point must be be set to the the lower mark when the motorcycle is operational including the rider.

» If the boundary between light and dark does not meet specifications:
– Adjust the beam width of the headlight. (☛ p. 96)

Adjusting the beam width of the headlight (EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA)



301251-10

– Check the headlamp setting. (☛ p. 96)
– Loosen screw ❶.
– Adjust the light range by swiveling the headlight.
Guideline

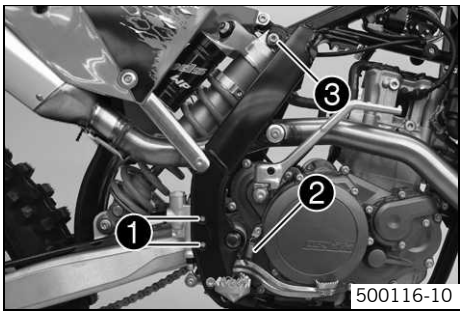
The boundary between light and dark must be exactly on the lower mark for a motorcycle with a rider (mark is applied under: Checking the headlight adjustment).

Info
If you have a payload, you may have to correct the headlight beam width.

– Tighten screw ❶.

Removing the engine

– Drain the coolant. (☛ p. 176)
– Remove the carburetor. (☛ p. 158)
– Remove the engine sprocket. (☛ p. 174)
– Jack up the motorcycle. (☛ p. 10)
– Disconnect the negative (minus) cable of the battery.

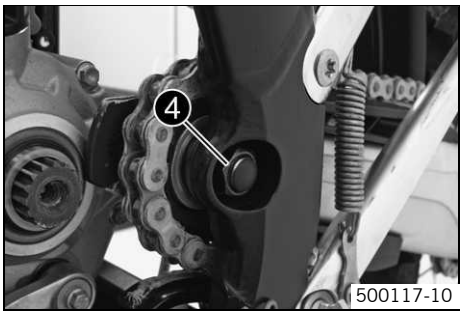


500116-10

– Remove screws ❶. Remove the foot brake cylinder and hang it on one side without tension.

Info
The brake line connection does not need to be disconnected.
To not kink the brake line. Do not damage the bellows on the foot brake cylinder.

– Detach spring ❷ and take if off.
– Prop up the rear wheel. Remove screw ❸.
– Remove nut ❹.

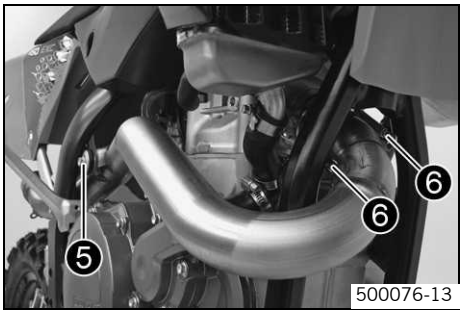


500117-10

– Remove the swingarm pivot. Remove the swingarm, shock absorber and rear wheel together.

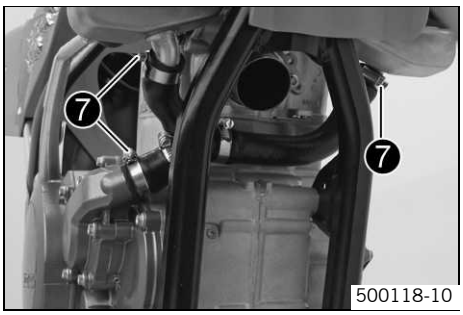
Info
Having an assistant is helpful in this step.
Ensure that the engine is adequately secured and will not fall over.

– Remove the main silencer. (☛ p. 60)
– Remove screw ❺.
– Remove springs ❻ and take off the manifold.



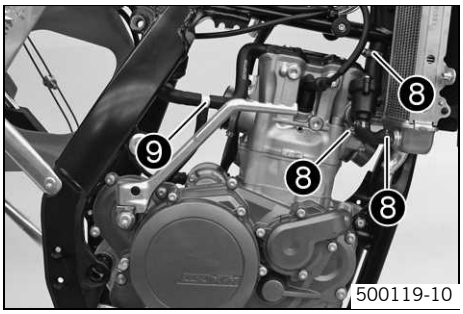
500076-13

– Undo hose clamps ❼. Take off the radiator hoses together.

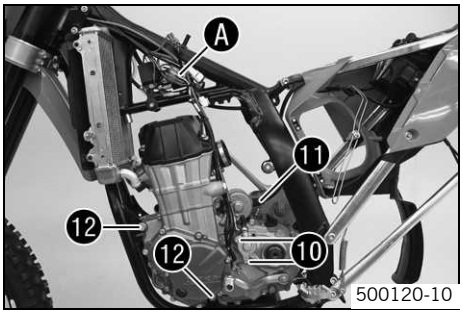


500118-10

– Undo hose clamps ❽. Remove the radiator hoses together along with the thermostat.
– Pull engine vent hose ❾ from the valve cover and engine case.
– Pull off the spark plug connector.



500119-10



500120-10

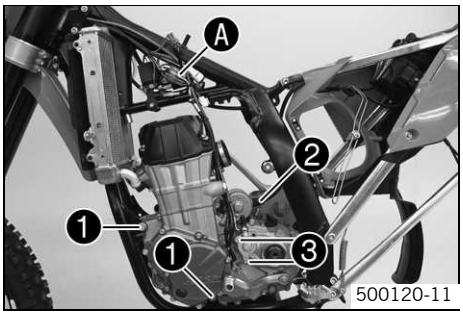
– Remove the cable binder and disconnect all connectors of the engine wiring harness in area ❹.
– Remove screws ❿. Take off the slave cylinder of the clutch and hang it to one side.

Info
To not kink the clutch line.
Do not activate the clutch lever if the slave cylinder of the clutch has been removed.

– Take out the clutch push rod.
– Slide back cover ⓫. Remove the nut from the electrical connection on the starter engine and take off the cable.
– Remove screws ⓬. Lift the engine out of the frame.

Info
Having an assistant is helpful in this step.
Ensure that the engine is adequately secured and will not fall over.
Protect the frame and attachments against damage.

Installing the engine



500120-11

– Position the engine in the frame. Mount screws ❶ but do not tighten them yet.

Info
Having an assistant is helpful in this step.
Ensure that the engine is adequately secured and will not fall over.
Protect the frame and attachments against damage.

– Position the electrical connection on the starter engine. Mount and tighten the nut. Slide on cover ❷.

Guideline

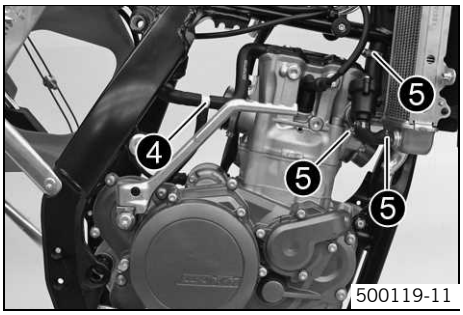
Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)

– Insert the clutch push rod with the small diameter facing the clutch side.
– Position the slave cylinder of the clutch. Mount and tighten screws ❸.

Guideline

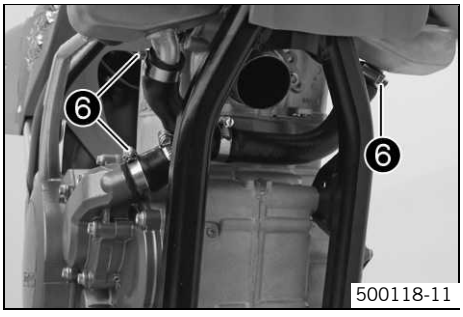
Screw, clutch slave cylinder	M6	10 Nm (7.4 lbf ft)

– Attach all connectors of the engine wiring harness in area ❹.
– Position the connectors, wiring harness and clutch line and fix them with cable binders.



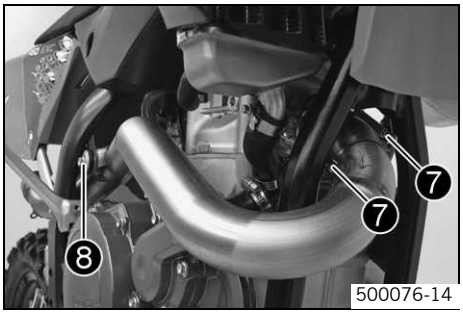
500119-11

– Attach the spark plug connector.
– Attach the engine vent hose ❹ on the valve cover and engine case.
– Attach the cooler hose with the thermostat. Position hose clamps ❺ and tighten.



500118-11

– Attach the cooler hoses. Position hose clamps ❻ and tighten.

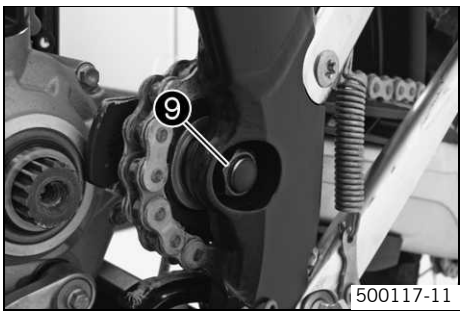


– Position the manifold and mount springs ❼.
– Mount and tighten screw ❽.

Guideline

Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)

– Install the main silencer. (☛ p. 60)



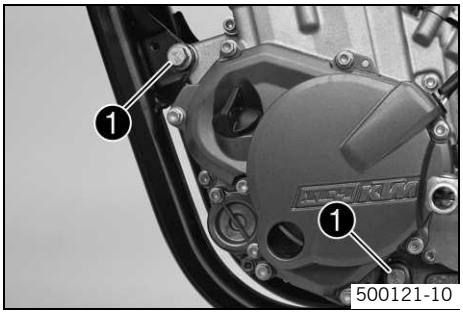
– Position the swingarm, shock absorber and rear wheel together. Insert the swingarm pivot.

Info
Having an assistant is helpful in this step.
Ensure that the engine is adequately secured and will not fall over.

– Mount nut ❾ and tighten.

Guideline

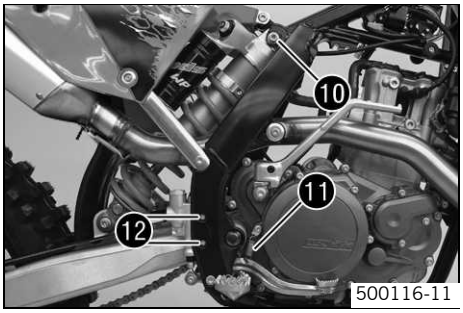
Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)



– Fully tighten screws ❶.

Guideline

Engine attachment bolt	M10	60 Nm (44.3 lbf ft)



– Position the shock absorber. Mount and tighten screw ❿.

Guideline

Screw, top shock absorber	M12	80 Nm (59 lbf ft)	**Loctite® 243™**

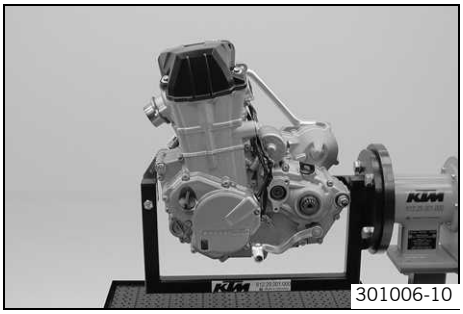
– Reconnect spring ⓫.
– Position the foot brake cylinder. Mount and tighten screws ⓬.

Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Position the bellows on the foot brake cylinder.
– Connect the negative (minus) cable of the battery.
– Remove the motorcycle from the work stand. (☛ p. 10)
– Install the engine sprocket. (☛ p. 174)
– Install the carburetor. (☛ p. 168)
– Refill the coolant. (☛ p. 177)
– Make a short test ride.
– Check the engine for leakage.
– Check the engine oil level. (☛ p. 178)
– Check the gear oil level. (☛ p. 182)
– Check the cooling system for leakage.
– Check the coolant level. (☛ p. 176)

Preparations


301006-10

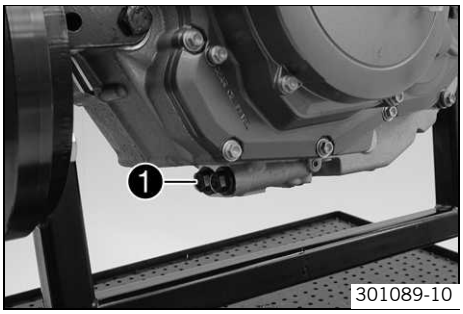
– Mount the special tool on the engine work stand.

Engine bracket (78029002000) (☛ p. 234)
Engine work stand (61229001000) (☛ p. 231)

– Mount the engine on the special tool.

Info
Use a helper or motorized hoist.

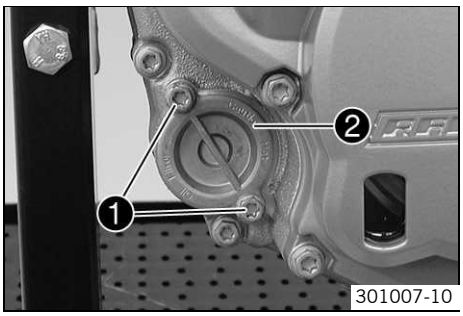
Draining the engine oil



301089-10

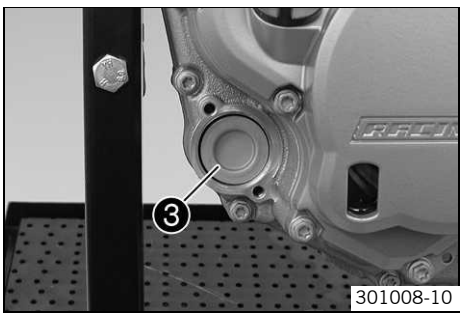
– Remove engine oil plug screen ❶.
– Completely drain the engine oil.

Removing the oil filter



301007-10

– Remove screws ❶. Remove oil filter cover ❷ with the O-ring.

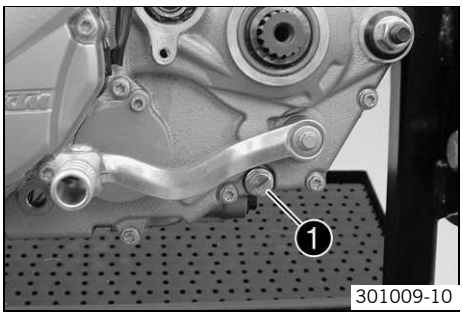


301008-10

– Pull oil filter ❸ out of the oil filter housing.

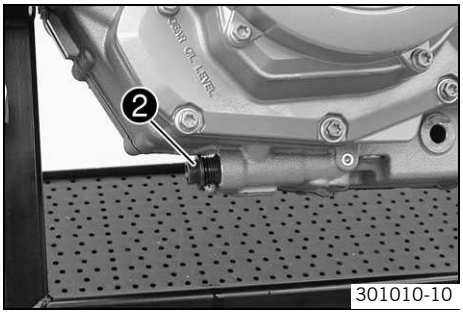
Circlip pliers reverse (51012011000) (☛ p. 229)

Draining the gear oil, removing the gear oil screen



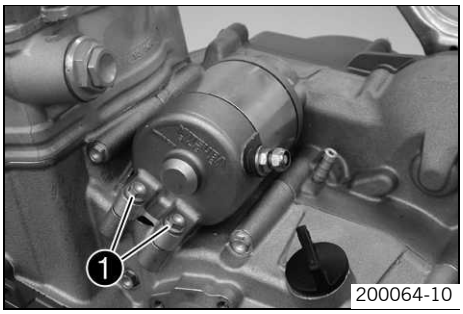
301009-10

– Remove the gear oil drain plug ❶.



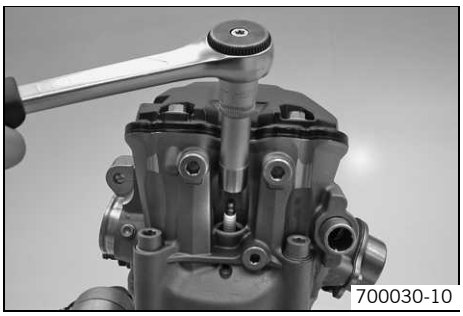
– Remove the gear oil screen plug ❷.
– Completely drain the gear oil.

Removing the starter engine



– Remove screws ❶ and take off the starter engine.

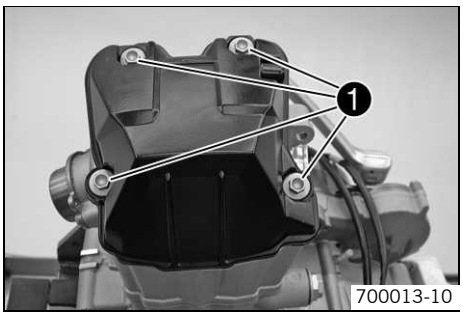
Removing the spark plug



– Remove the spark plug using the special tool.

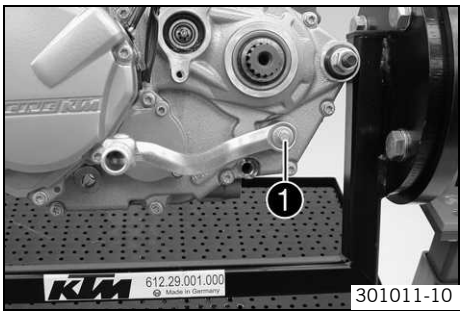
Spark plug wrench (75029172000) (☛ p. 233)

Removing the valve cover



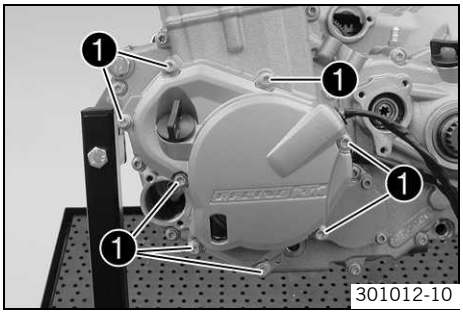
– Remove screws ❶. Take off the valve cover with the valve cover seal.

Removing the shift lever

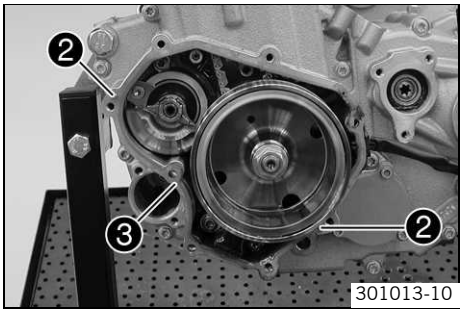


– Remove screw ❶. Take off the shift lever.

Removing the generator cover

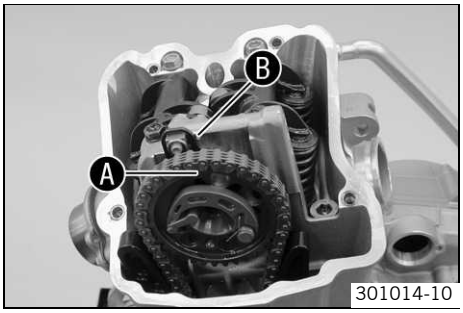


– Remove screws ❶. Take off the generator cover.

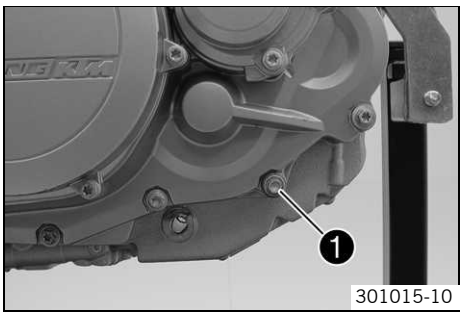


– Remove centering pins ❷. Take off the generator cover gasket ❸.

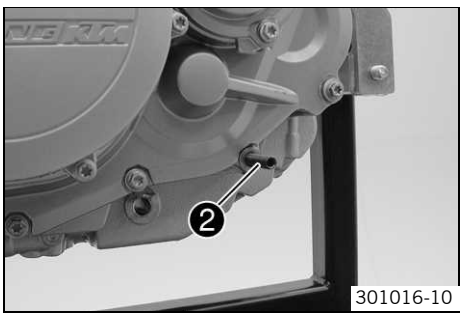
Setting the engine to ignition top dead center



– Align camshaft marking Ⓐ with marking Ⓑ on the cylinder head.



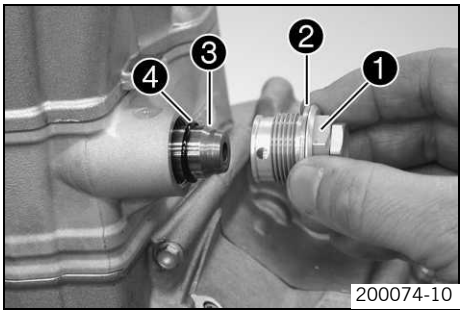
– Remove screw ❶.



– Screw in special tool ❷.

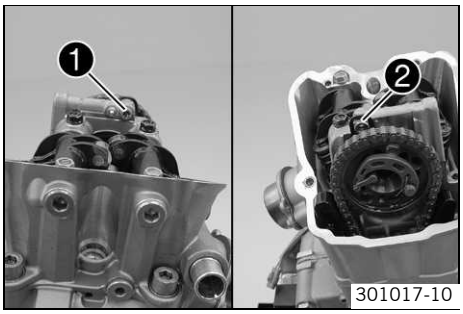
Crankshaft locking bolt (113080802) (☛ p. 228)

Removing the timing chain tensioner

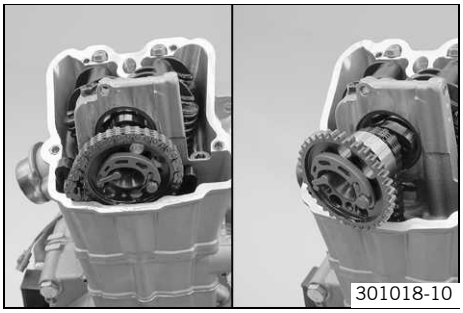


– Remove screw ❶. Take off seal ring ❷.
– Pull out timing chain tensioner ❸. Remove O-ring ❹.

Removing the camshaft

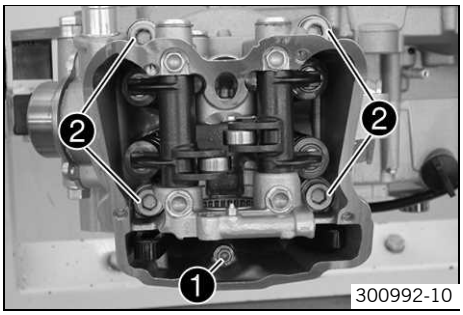


– Remove screw ❶. Take off camshaft bracket ❷.



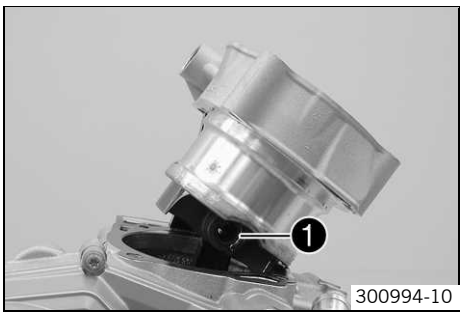
– Pull the camshaft out of the bearing seats. Take the timing chain off of the camshaft gear. Remove the camshaft.

Removing the cylinder head



– Remove screw ❶.
– Alternately loosen screws ❷ and remove them.
– Take off the cylinder head.
– Take off the dowels. Remove the cylinder head gasket.

Removing the piston

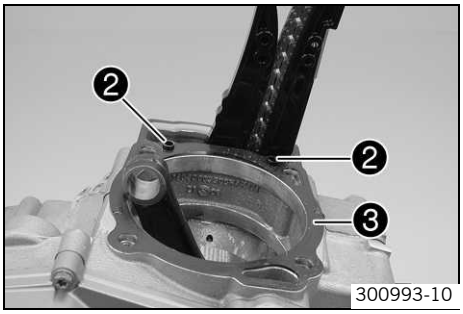


– Slide the cylinder upward.

Info
Slide the cylinder up only as far as necessary to remove the piston pin.

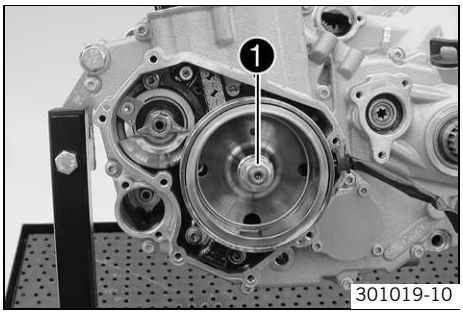
– Remove piston pin retainer ❶.
– Remove the piston pin.
– Take off the cylinder with the piston.
– Slide the piston up and out of the cylinder.

Info
If no further work is necessary on the cylinder and piston, the piston can remain in the cylinder.

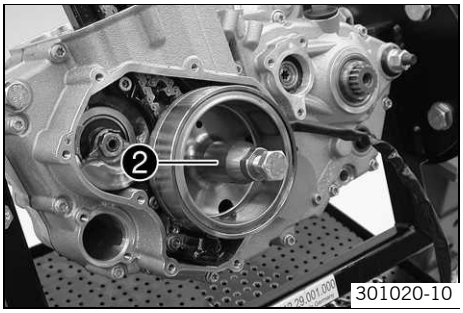


– Remove dowels ❷ and cylinder base gasket ❸.

Removing the rotor



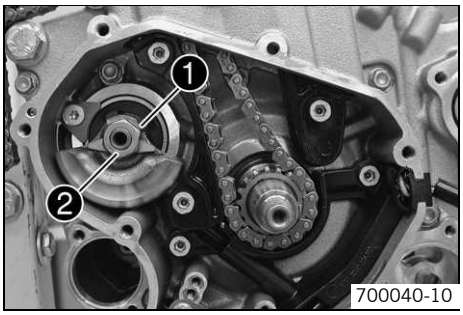
– Remove nut ❶ with the spring washer.



– Attach special tool ❷ to the rotor. Apply counterpressure with the special tool and pull off the rotor by turning in the screw.

Extractor (58012009000) (☛ p. 229)

Removing the balance weight

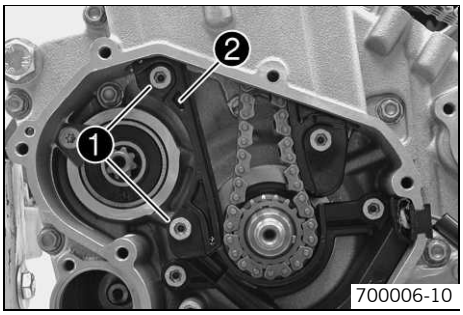


– Bend open lock washer ❶.
– Undo nut ❷ and remove it. Remove the lock washer.

Info
Make sure that the crankshaft is blocked.

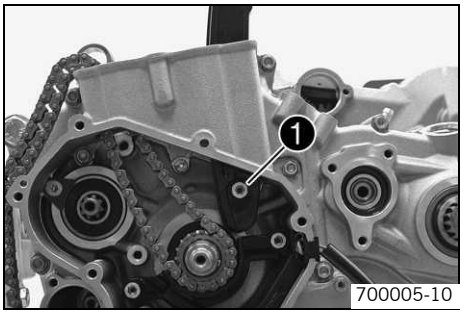
– Take off the balance weight.

Removing the timing chain guide rail



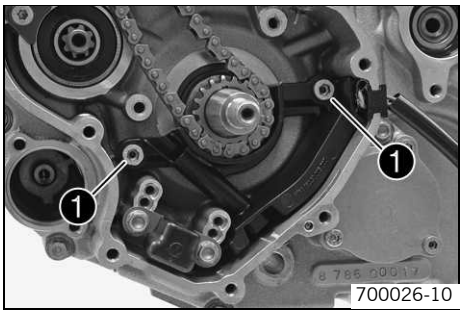
– Remove screws ❶. Remove timing chain guide rail ❷ toward the top.

Removing the timing chain tensioning rail



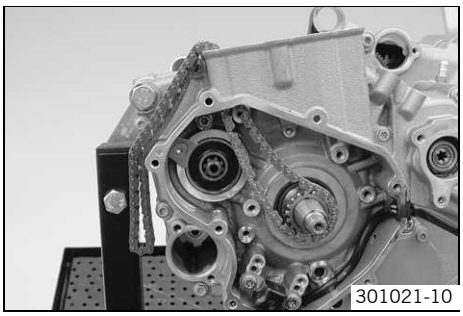
– Remove screw ❶. Remove the timing chain guide rail toward the top.

Removing the timing chain securing guide



– Remove screws ❶. Remove the timing chain securing guide.

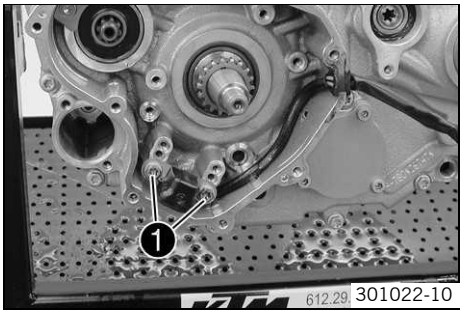
Removing the timing chain



– Take off the timing chain.

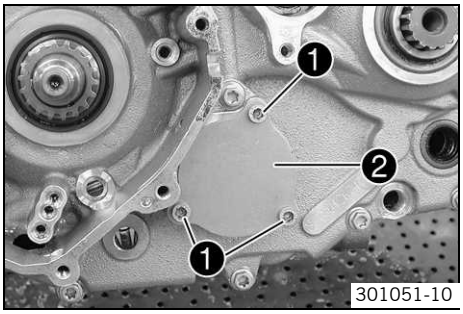
Info
Mark the direction of travel.

Removing the ignition pulse generator

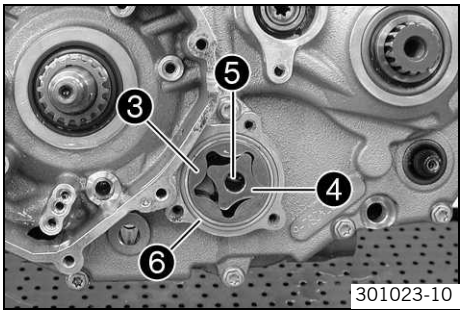


– Remove screws ❶.
– Pull the cable support sleeve out of the engine case. Take off the ignition pulse generator.

Removing the suction pump



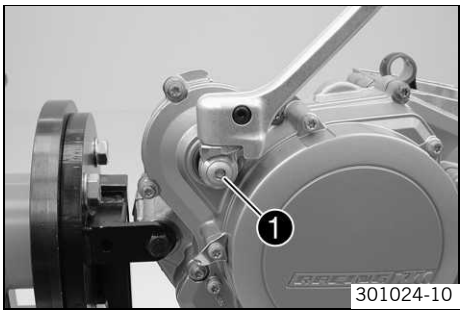
– Remove screws ❶.
– Remove oil pump cover ❷ of the suction pump.



301023-10

– Remove external rotor ❸, internal rotor ❹ and pin ❺.
– Remove O-ring ❻.

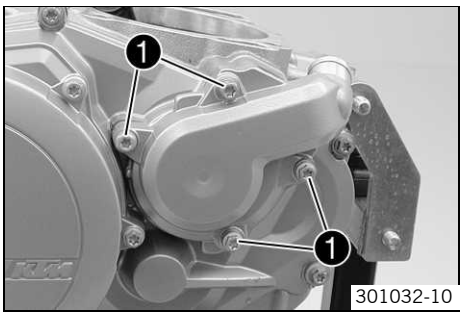
Removing the kickstarter



301024-10

– Remove screw ❶. Take off the kickstarter.

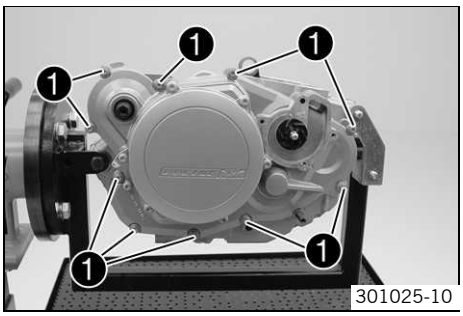
Removing the water pump cover



301032-10

– Remove screws ❶. Take off the water pump cover.
– Take off the water pump cover seal.

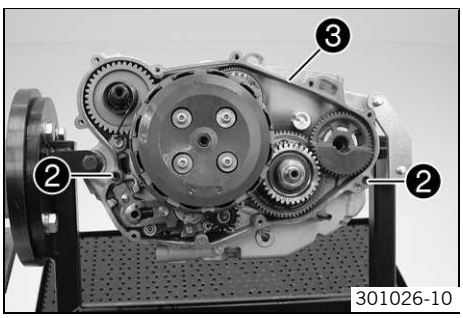
Removing the clutch cover



301025-10

– Remove screws ❶. Take off the clutch cover.

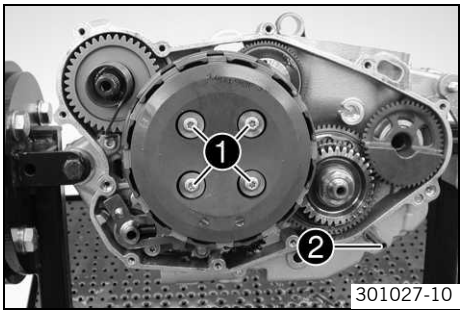
Info
If work is to be performed on the water pump, unscrew the nut of the water pump impeller.



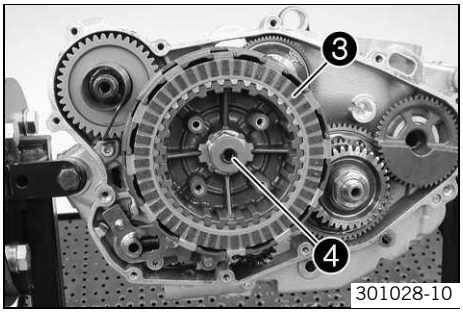
301026-10

– Take out dowels ❷. Take off clutch cover gasket ❸.

Disassembling the clutch disks

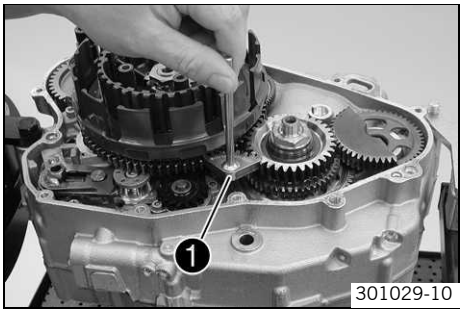


– Unscrew bolts ❶ and remove them with the washers and springs.
– Take off the pressure cap.
– Remove crankshaft location point ❷.



– Completely remove clutch discs ❸.
– Remove clutch pressure piece ❹.

Removing the primary gear nut



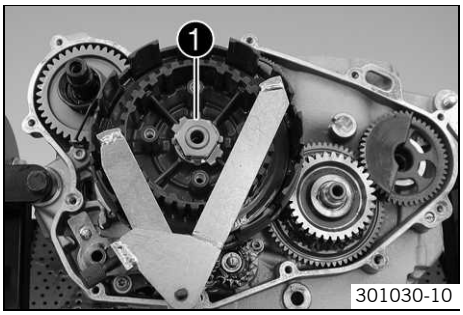
– Block the outer clutch hub and primary gear using special tool ❶.

Gear quadrant (80029004000) (☛ p. 235)

Info
LH thread

– Remove nut.

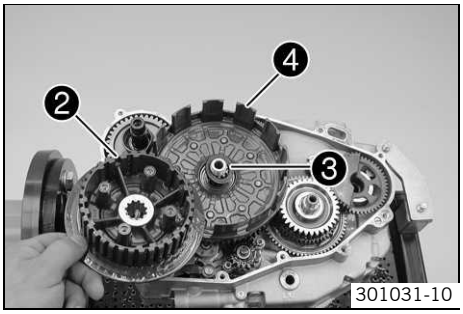
Removing the outer clutch hub



– Bend the lock washer.
– Counterhold the inner clutch hub with the special tool. Loosen nut ❶.

Clutch holder (51129003000) (☛ p. 229)

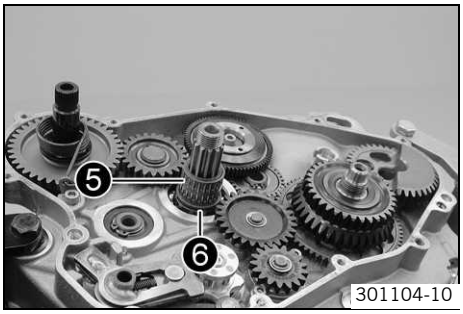
– Remove the nut with the lock washer. Dispose of the lock washer.



– Take off inner clutch hub ❷ and washer ❸.

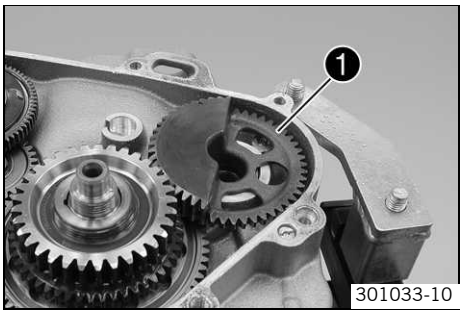
Info
The washer usually adheres to the inner clutch hub.

– Take off outer clutch hub ❹.



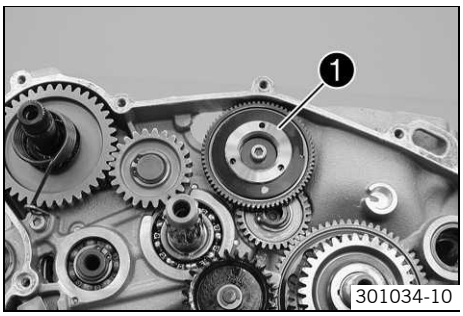
– Take off needle bearing ❺ and collar bushing ❻.

Removing the balancer shaft



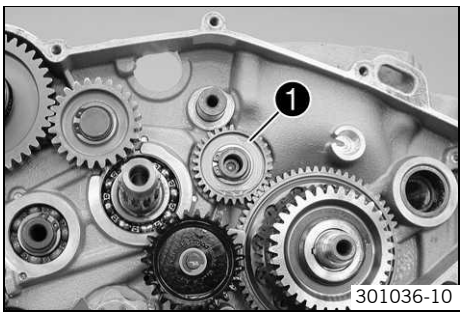
– Pull balancer shaft ❶ out of the bearing seats and remove it.

Removing the torque limiter



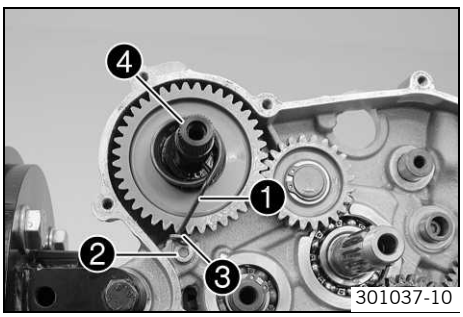
– Remove the screw with the washer. Remove torque limiter ❶.
– Remove the washer.

Removing the starter idler gear



– Remove the lock ring. Take off the washer. Take off starter idler gear ❶.

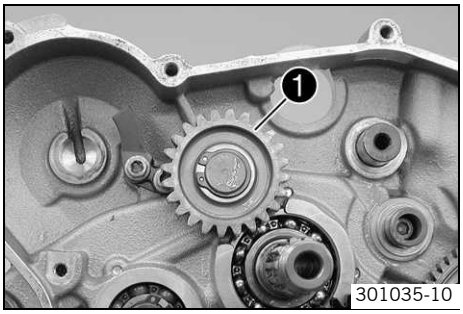
Removing the kickstarter shaft



– Apply counterpressure to kickstarter spring ❶. Remove screw ❷.
– Remove spring hanger ❸. Release tension on the kickstarter spring.
– Turn kickstarter shaft ❹ counterclockwise and pull it out.

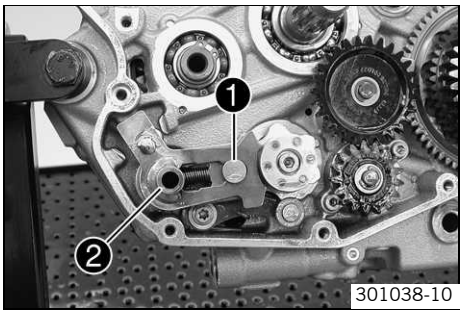
Info
The stop disk of the kickstarter shaft usually sticks to the bearing.

Removing the kickstarter idler gear



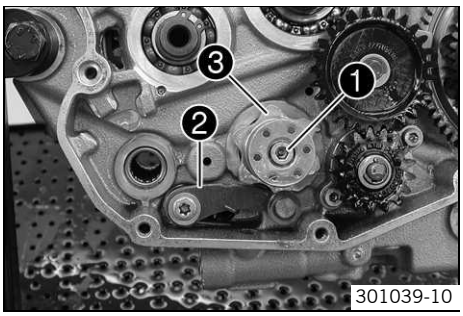
– Remove the lock ring. Take off the washer. Take off kickstarter idler gear ❶.

Removing the shift shaft



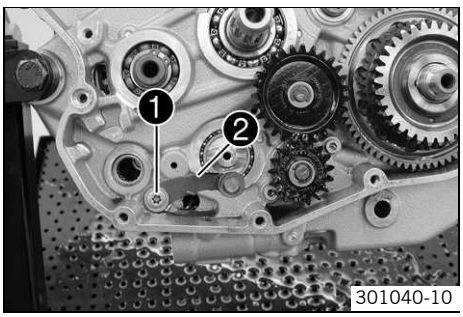
– Press sliding plate ❶ away from the shift drum locating. Remove shift shaft ❷ with the washer.

Removing the shift drum locating



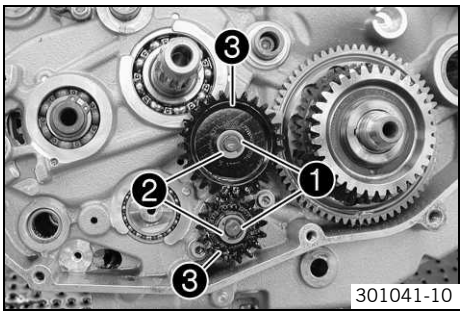
– Remove screw ❶.
– Press locking lever ❷ away from shift drum locating ❸ and take off the shift drum locating.
– Release the locking lever.

Removing the locking lever

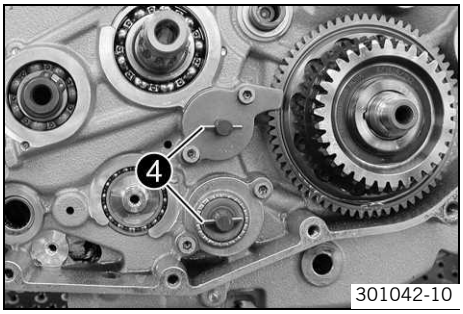


– Undo screw ❶ and take off it together with locking lever ❷, washer, sleeve and spring.

Removing the oil pump gears

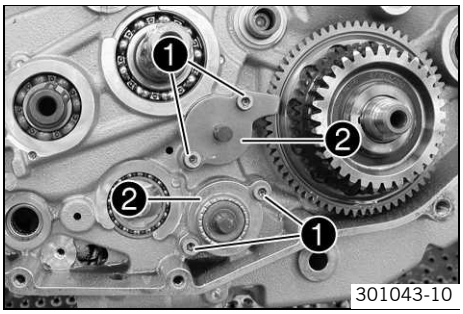


– Remove the shaft locking device ❶.
– Take off washers ❷.
– Take off oil pump gears ❸.

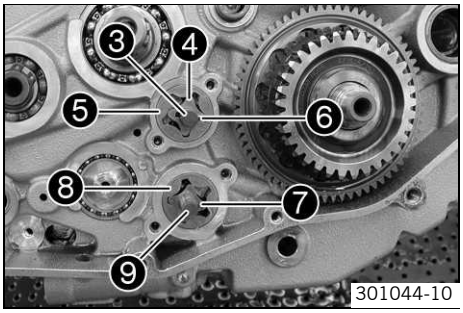


– Remove pins ❹.

Removing the oil pumps

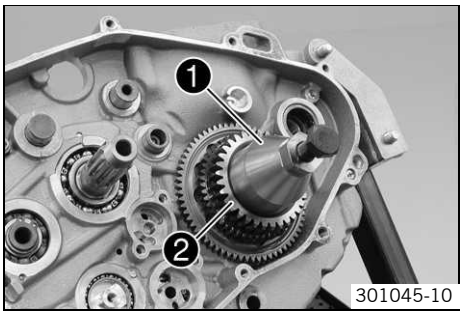


– Remove screws ❶.
– Remove oil pump cover ❷ of the force pumps.



– Remove oil pump shaft ❸ of the gear oil force pump together with internal rotor ❹, external rotor ❺ and pin ❻.
– Remove internal rotor ❼ and external rotor ❽ of the engine oil force pump.
– Remove the pin.
– Push oil pump shaft ❾ inward and take it out of the engine from the ignition side.

Removing the primary gear



– Plug the special tool into the crankshaft.

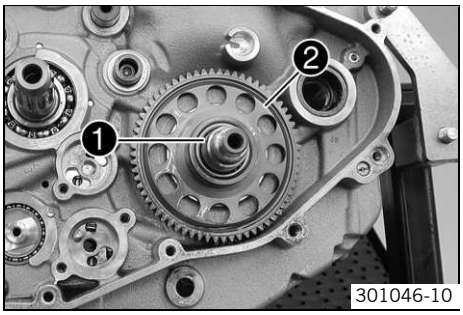
Protection cover (75029090000) (☛ p. 232)

– Screw special tool ❶ on to primary gear ❷.

Extractor (75029021000) (☛ p. 231)

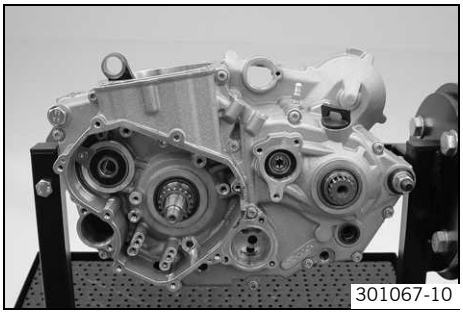
– Counteracting with the special tool, take off the primary gear by taking out the screw.
– Remove the special tools.

Removing the free wheel gear

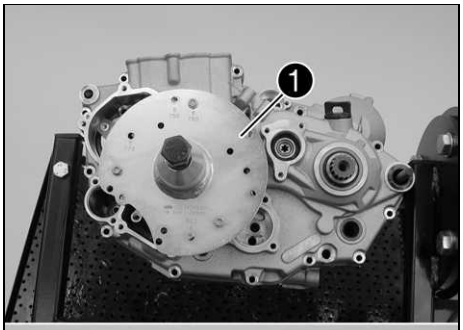


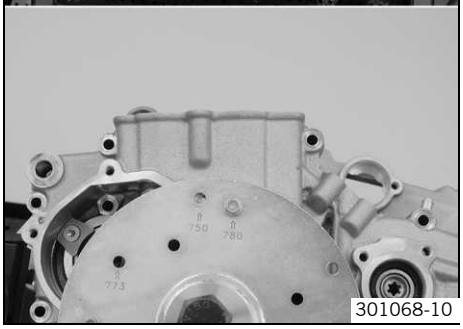
– Remove spring washer ❶.
– Take off free-wheel gear ❷.

Removing the left section of the engine case


301067-10

– Remove all M6 engine case bolts.
– Tilt the left section of the engine case upward and remove the threaded fasteners of the engine holder.





301068-10

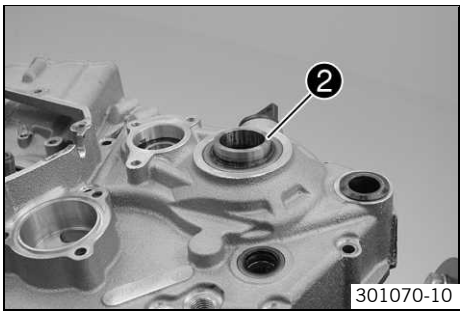
– Mount special tool ❶ with the appropriate bolts.

Extractor (75029048000) (☛ p. 232)

Info
Use the drill hole marked with **780**.

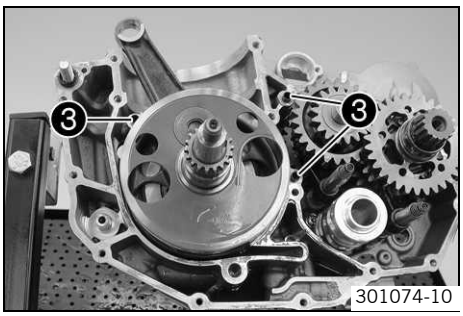
– Take off the section of the engine case.

Info
Do not subject the section of the engine case to any stress.



301070-10

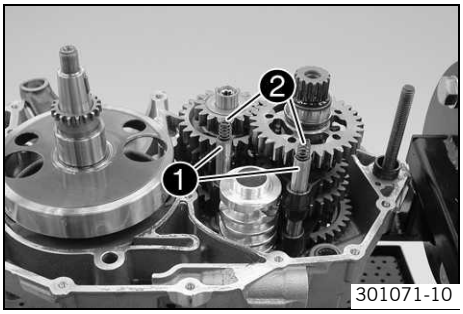
– Remove the special tool.
– Remove distance bushing ❷.
– Take off the left section of the engine case.



301074-10

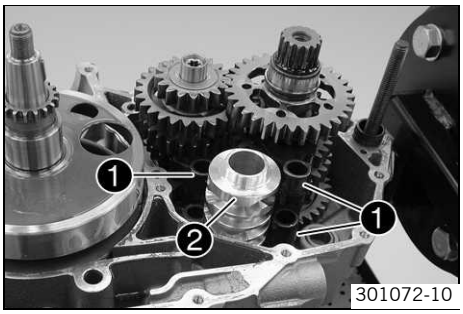
– Remove dowels ❸.

Removing the shift rails



– Remove shift rails ❶ together with top springs ❷ and lower springs.

Removing the shift drum

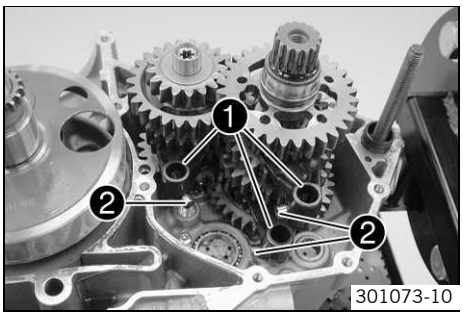


– Swing shift forks ❶ to one side.

Info
Make sure not to misplace the shift rollers.

– Remove shift drum ❷.

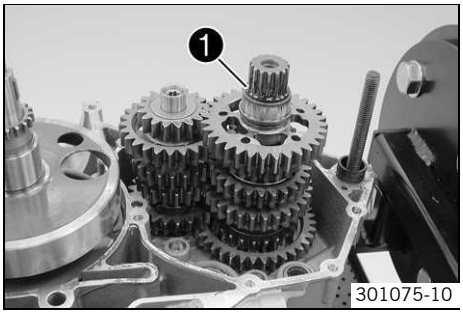
Removing the shift forks



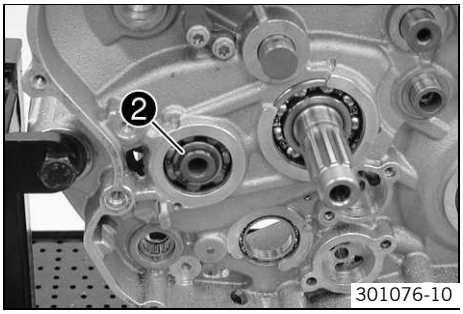
– Take shift forks ❶ out of the shift grooves.

Info
Make sure not to misplace shift rollers ❷.

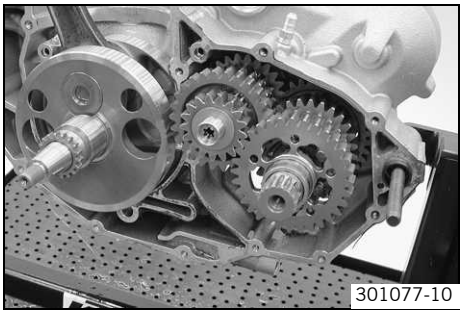
Removing the transmission shafts



– Remove O-ring ❶.



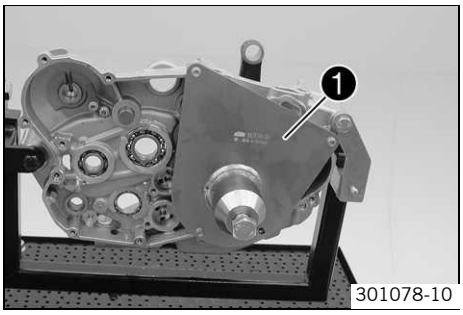
– Secure the engine in an upright position.
– Remove lock ring ❷.


301077-10

– Pull out both transmission shafts together from the bearing seats.

Info
Do not lose the washers.

Removing the crankshaft



301078-10

– Attach the special tool to the crankshaft.

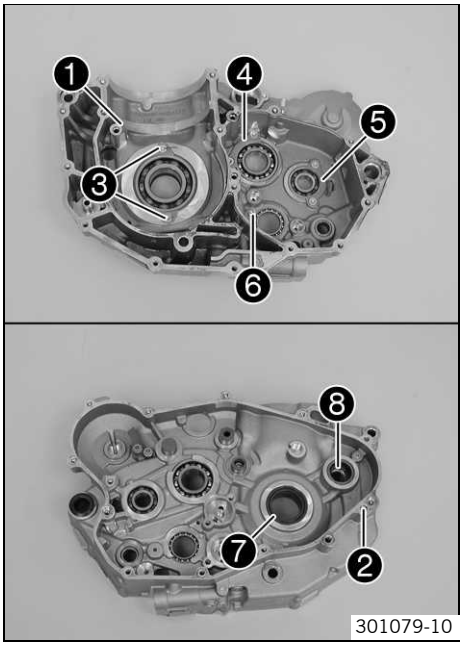
Protection cover (75029090000) (☛ p. 232)

– Mount special tool ❶ onto the engine case with suitable screws.

Removal tool (78029049100) (☛ p. 235)

– Press the crankshaft out of the bearing seat.
– Remove the crankshaft.
– Remove the special tools.
– Take off the right section of the engine case.

Working on the right section of the engine case



– Remove the oil pressure regulator valve. (☛ p. 118)
– Remove all remaining dowels.
– Remove oil jets ❶ and ❷.
– Remove the bearing retainer of crankshaft bearing ❸, main shaft bearing ❹, countershaft bearing ❺ and shift drum bearing ❻.
– Remove the rest of the sealing compound and thoroughly clean the section of the engine case.
– Warm the section of the engine case using an oven.

Guideline

150 °C (302 °F)

– Place the section of the engine case on a flat sheet of wood and knock on the case; the bearings will then fall out of the bearing seats.

Info
Any bearings still remaining in the section of the engine case must be removed with a suitable tool.

– Press out the shaft seal ring ❼ of the crankshaft from the inside to the outside.

Info
Do not press the shaft seal ring from the outside toward the inside, as there is a small collar on the inside.

– Remove shaft seal ring ❽ of the balancer shaft.
– Press the shaft seal ring of the crankshaft from the outside to the inside with the coated sealing lip facing in.

Info
The shaft seal ring must be flush toward the outside.

– Press in shaft seal ring ❽ of the balancer shaft with the open side facing out.

Push-in drift (78029043030) (☛ p. 235)

– Warm up the section of the engine case again.

Guideline

150 °C (302 °F)

– Insert the new cold bearings in the bearing seats of the heated section of the engine case. If necessary, use a suitable press drift from the inside toward the outside. Push all the way to the stop so that they are flush.

Info
When pressing in, ensure that the section of the engine case lies flat in order prevent damage.
Only press in the bearings by way of the outer ring, as otherwise the bearings will be damaged when they are pressed in.

– After the section of the engine case has cooled down, check to ensure that the bearings are firmly seated.

Info
If the bearings are not firmly seated once cooled down, it can be assumed that the bearing races will turn in the engine case at higher temperatures. In this case, the engine case needs to be replaced.

– Position all bearing retainers. Mount and tighten the screws.

Guideline

Locking screw for bearing	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

– Mount and tighten oil jet ❶.

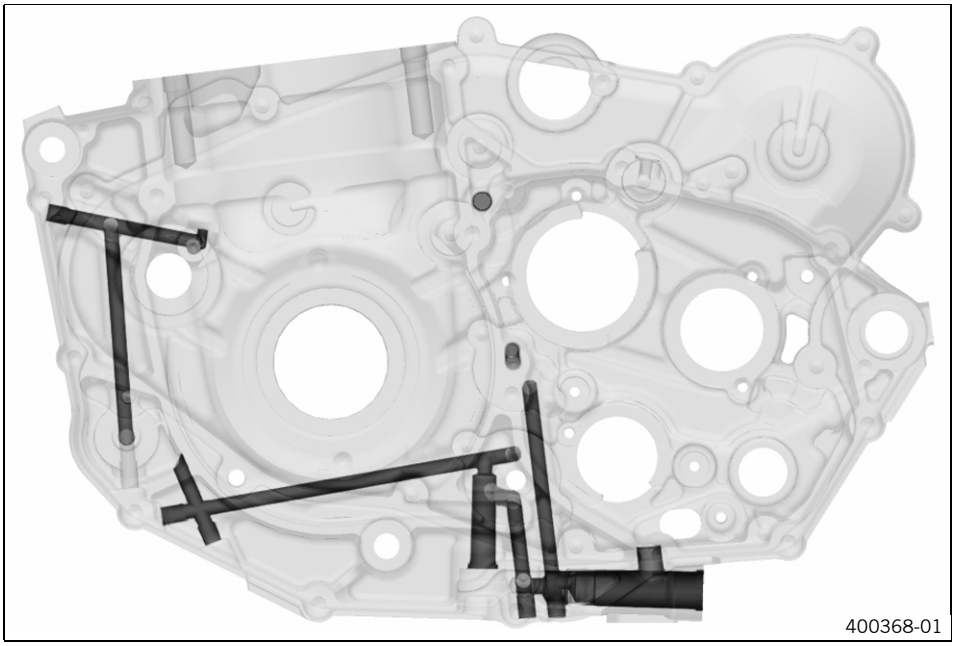
Guideline

Oil jet, piston cooling	M5	2 Nm (1.5 lbf ft)	**Loctite® 243™**

– Mount and tighten oil jet ❷.

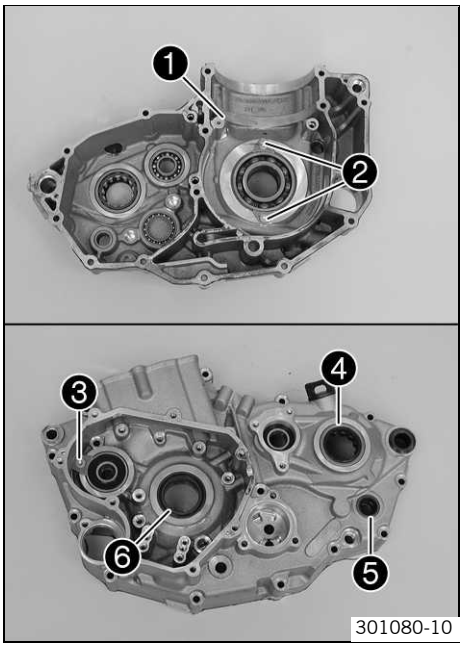
Guideline

Oil jet, conrod lubrication	M6x0.75	4 Nm (3 lbf ft)



– Blow out all oil holes with compressed air and check that they are clear.
– Install the oil pressure regulator valve. (☛ p. 118)

Working on the left section of the engine case



– Remove all remaining dowels.
– Remove oil jet ❶.
– Remove the bearing retainer from crankshaft bearing ❷ and balancer shaft bearing ❸.
– Remove countershaft shaft seal ring ❹ and shift shaft ❺.

Info
The shaft seal ring of crankshaft ❻ can only be removed after disassembly of the crankshaft bearing because there is a small collar on the outside.

– Remove the rest of the sealing compound and thoroughly clean the section of the engine case.
– Warm the section of the engine case using an oven.

Guideline

150 °C (302 °F)

– Place the section of the engine case on a flat sheet of wood and knock on the case; the bearings will then fall out of the bearing seats.

Info
Any bearings still remaining in the section of the engine case must be removed with a suitable tool.

– Press out the crankshaft shaft seal ring ❻ from the inside toward the outside.
– Press in the shaft seal ring from the outside toward the inside, with the open side facing outward.

Info
The shaft seal ring must be flush toward the outside.

– Warm up the section of the engine case again.

Guideline

150 °C (302 °F)

– Insert the new cold bearings in the bearing seats of the heated section of the engine case; if necessary, use a suitable press drift to push them all the way in and make them flush.

Info

When pressing in, ensure that the section of the engine case lies flat in order prevent damage.
Only press in the bearings by way of the outer ring, as otherwise the bearings will be damaged when they are pressed in.

– After the section of the engine case has cooled down, check to ensure that the bearings are firmly seated.

Info

If the bearings are not firmly seated once cooled down, it can be assumed that the bearing races will turn in the engine case at higher temperatures. In this case, the engine case needs to be replaced.

– Position all bearing retainers. Mount and tighten the screws.

Guideline

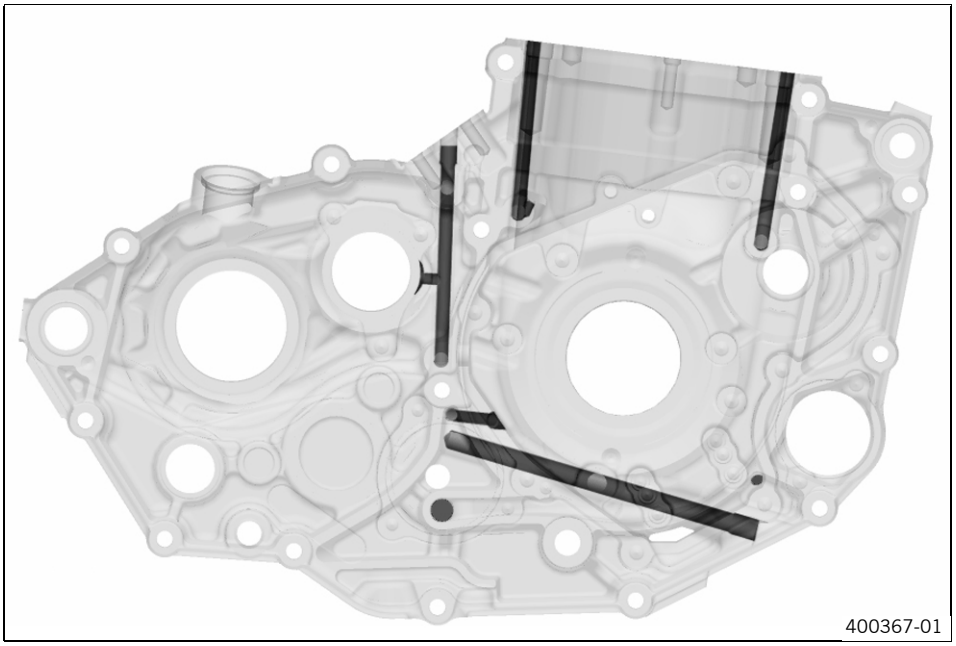
Locking screw for bearing	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

– Press countershaft shaft seal ring ❹ and shift shaft ❺ in flush, with the open side facing inward.
– Mount and tighten oil jet ❶.

Guideline

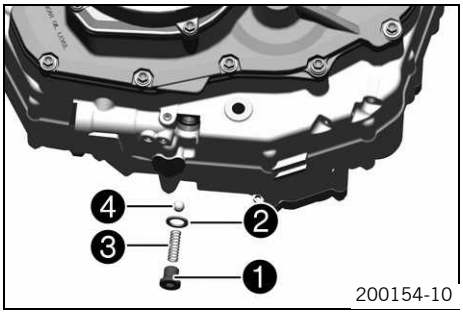
Oil jet, piston cooling	M5	2 Nm (1.5 lbf ft)	**Loctite® 243™**

– Mount the dowels.



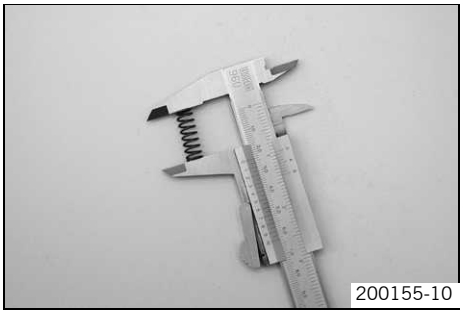
– Blow out all oil holes with compressed air and check that they are clear.

Removing the oil pressure regulator valve



– Remove plug ❶ with sealing washer ❷.
– Remove pressure spring ❸ and ball ❹.

Checking spring length of oil pressure regulator valve

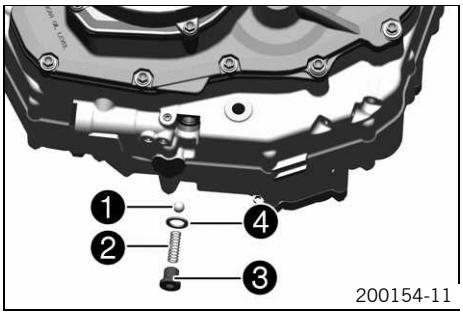


– Remove the oil pressure regulator valve. (☛ p. 118)
– Measure the spring length of the oil pressure regulator valve.

Oil pressure regulator valve	
Minimum length of preload spring	23.5 mm (0.925 in)

» If the measured value does not meet specifications:
– Change the spring.
– Install the oil pressure regulator valve. (☛ p. 118)

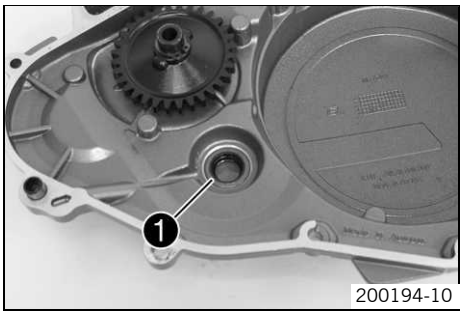
Installing the oil pressure regulator valve



– Insert ball ❶ and preload spring ❷.
– Mount plug ❸ with sealing disc ❹ and tighten.
Guideline

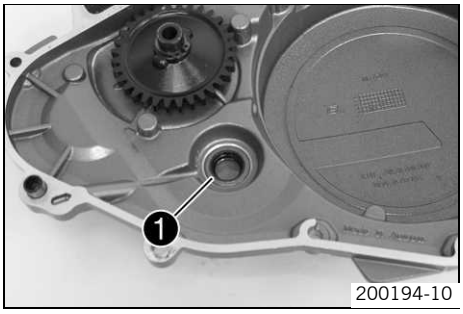
Oil pressure control valve plug	M12x1.5	20 Nm (14.8 lbf ft)

Removing the crankshaft seal ring in the clutch cover



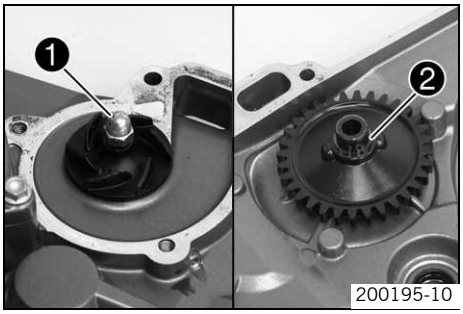
– Remove the crankshaft seal ring in clutch cover ❶.

Fitting the crankshaft seal ring into the clutch cover

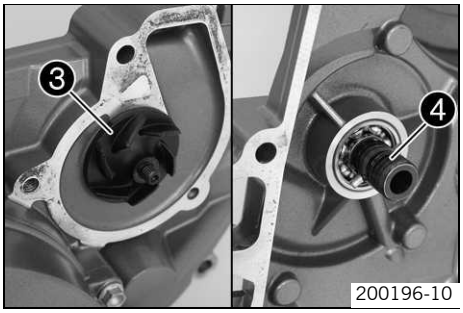


– Press crankshaft seal ring ❶ into the clutch cover with the open side facing inwards until it is flush.
– Grease the sealing lip.

Removing the water pump



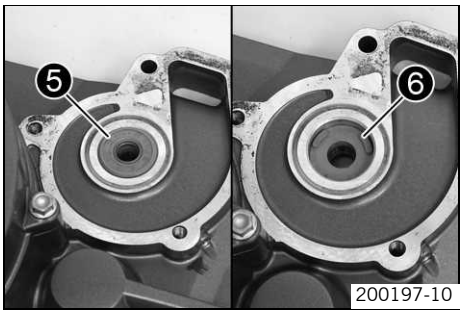
– Remove nut ❶.
– Remove lock ring ❷. Take off the drive wheel.



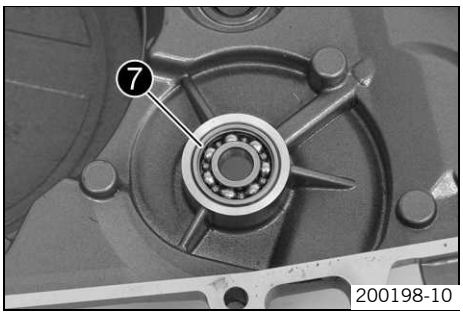
– Take off water pump impeller ❸ and the spacing washer.

Info
If the water pump impeller cannot be detached, then the water pump shaft can be pressed out toward the inside.

– Remove water pump shaft ❹.



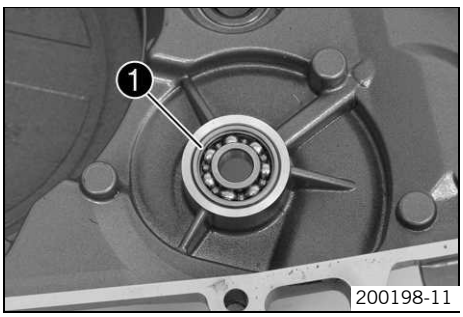
– Remove shaft seal ring ❺.
– Remove shaft seal ring ❻.



– Press out water pump shaft bearing ❼ with an appropriate tool.

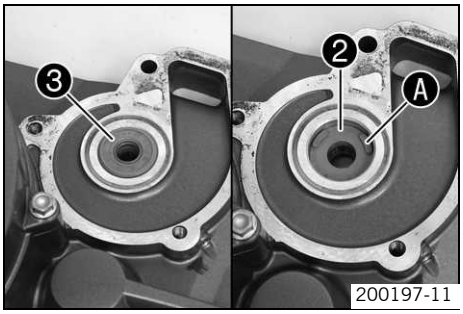
Info
Provide suitable support for the clutch cover while pressing out.

Installing the water pump



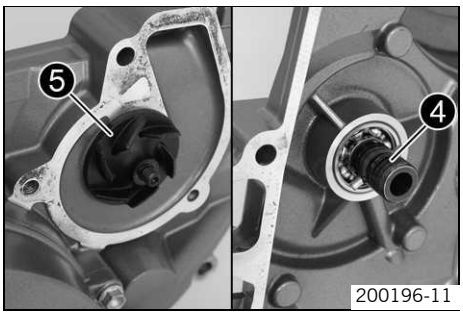
– Press water pump shaft bearing ❶ in flush using the appropriate tool.

Info
Provide suitable support for the clutch cover while pressing in.



200197-11

– Press in shaft seal ring ❷ all the way, with the open side facing inward.
  ✓ The spacers Ⓐ face outward.
– Press shaft seal ring ❸, with the open side facing inward, all the way in toward spacer Ⓐ.

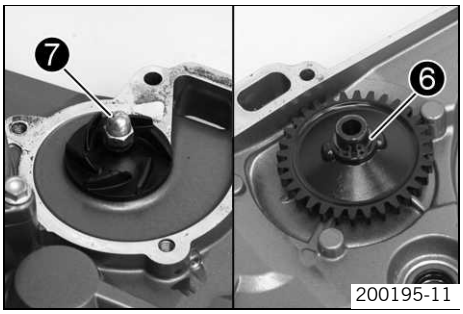


200196-11

– Mount water pump shaft ❹.

Info
Be careful not to damage the shaft seal rings.

– Mount spacing washer and water pump impeller ❺.



200195-11

– Mount the drive wheel. Mount lock ring ❻.
– Mount and tighten nut ❼.

Guideline

Nut, water pump impeller	M6	8 Nm (5.9 lbf ft)	**Loctite® 243™**

Checking the balancer shaft


300352-10

– Check bearing surface of the balancer shaft for pitting corrosion.
  » If there is pitting corrosion:
    – Change the balancer shaft.
– Check the remaining areas of the balancer shaft for damage and wear.
  » If there is damage or wear:
    – Change the balancer shaft.

Removing the timing chain sprocket

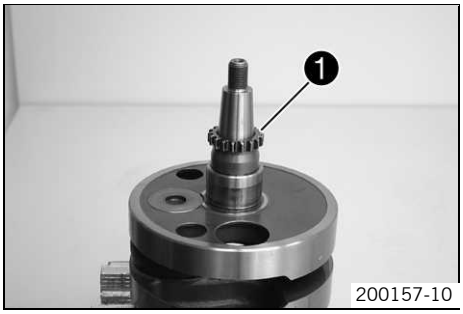
200156-10

– Warm timing chain sprocket ❶ using a blow dryer.
– Pull off the timing chain sprocket.

Info
The timing chain sprocket usually becomes damaged when it is disassembled and needs to be replaced.

Installing the timing chain sprocket

Info
Never clamp the crankshaft with a crankshaft journal in the bench vise and try to hammer on the timing chain sprocket. In such a case, the crank webs will be distorted rendering the crankshaft unserviceable.

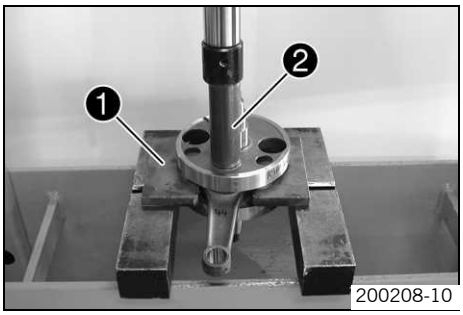


– Warm up the new timing chain sprocket and immediately push it onto the crankshaft.

Guideline

180 °C (356 °F)

Changing the connecting rod, conrod bearing and crank pin



– Position special tool ❶ between the crank webs and place on a press.

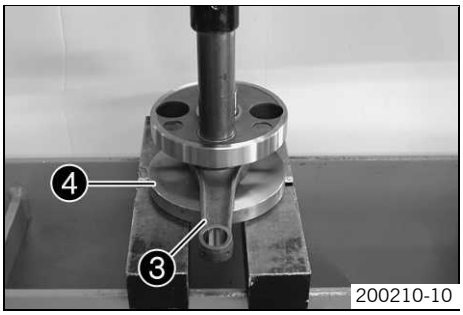
Separator plate (78029009000) (☛ p. 234)

– Press the crank pin out of the upper crank web using special tool ❷.

Pressing device for crankshaft, complete (75029047000) (☛ p. 232)

Info
Hold the lower crank web.

– Remove the connecting rod and bearing.

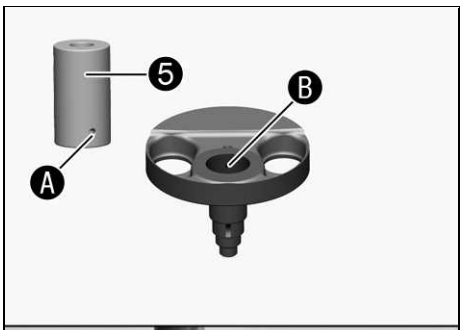


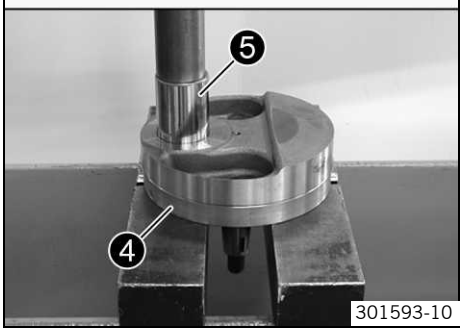
– Place connecting rod ❸ onto special tool ❹ without the bearing.

Insert for crankshaft pressing device (78029008000) (☛ p. 234)

– Press out the crank pin using the special tool.

Pressing device for crankshaft, complete (75029047000) (☛ p. 232)





– Place the crank web onto special tool ❹.

Insert for crankshaft pressing device (78029008000) (☛ p. 234)

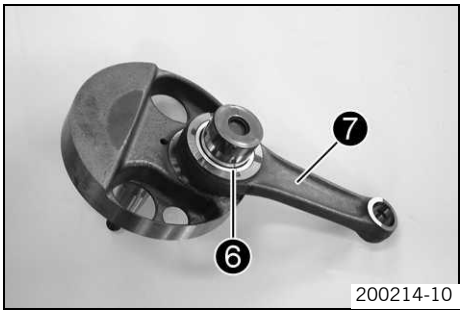
Info
The special tool must be positioned with the flat surface facing downward.

– Press the new crank pins ❺ all the way in.

✓ Oil hole Ⓐ is aligned with oil hole Ⓑ.

✗ If the oil holes are not correctly aligned, the conrod bearing will not be supplied with oil.

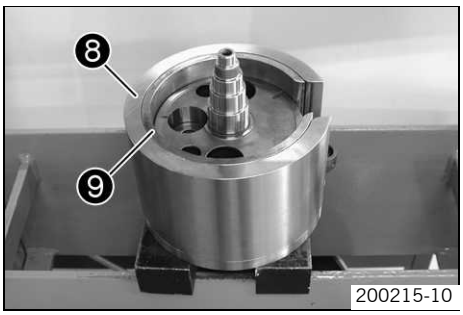
– Use compressed air to check the oil hole is clear.



200214-10

– Mount the new bearing ❻ and connecting rod ❼.

Info
Thoroughly oil the bearing.

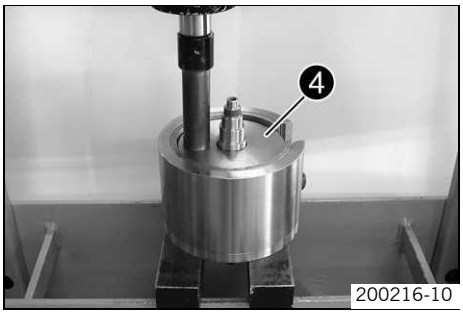


200215-10

– Position special tools ❽ and ❾ on the press.

Pressing device for crankshaft, complete (75029047000) (☛ p. 232)
Insert for crankshaft pressing device (78029008000) (☛ p. 234)

– Insert the crank web with the connecting rod and bearing. Position the second crank web.



200216-10

– Insert special tool ❹.

Insert for crankshaft pressing device (78029008000) (☛ p. 234)

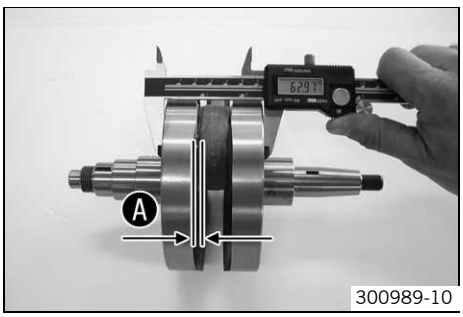
Info
The flat surface of the special tool must face upward.


200209-10

– Press the upper crank web all the way in.

Info
The press mandrel must be positioned over the crank pin.

– Take the crankshaft out of the special tool and check that the connecting rod can move freely.



300989-10

– Crankshaft - measure the outer dimension of the crank web.

Crankshaft - external crank web dimension	63±0.05 mm (2.48±0.002 in)

» If measured value is less than the specification:
  – Correct it so the dimension is equal to the specified value.

– Measure axial clearance Ⓐ between the connecting rod and the crank web.

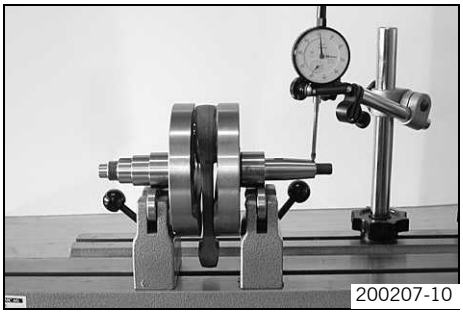
Feeler gauge (59029041100) (☛ p. 230)

Connecting rod - end play of lower conrod bearing	0.40… 0.60 mm (0.0157… 0.0236 in)

» If measured value is less than the specification:
  – Correct it so the dimension is equal to the specified value.

– Check the crankshaft run-out at the bearing pin. (☛ p. 123)

Checking crankshaft run-out at bearing pin


200207-10

– Position the crankshaft on a roller block.
– Turn the crankshaft slowly.
– Check the crankshaft run-out on both bearing pins.

Crankshaft - run-out on bearing pin	≤ 0.16 mm (≤ 0.0063 in)

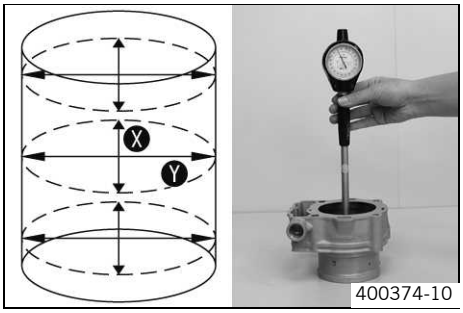
» If the crankshaft run-out at the bearing pin is larger than the specification:
– Align the crankshaft.

cylinder - Nikasil® coating


200158-10

Nikasil® is a surface protection layer for a coating procedure developed by Mahle. The name is derived from the two materials used in this procedure - A layer of nickel into which is embedded the particularly hard silicone carbide.
The most important advantages of the **Nikasil®** coating are very good heat conductivity, resulting in much improved performance, low wear, and a lightweight cylinder.

Checking/measuring cylinder

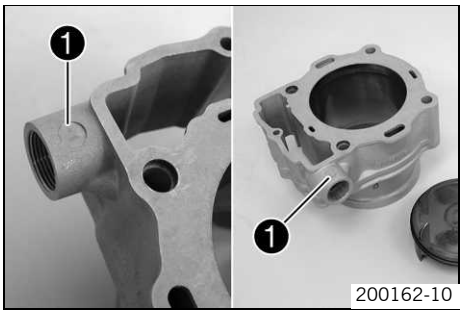


400374-10

– Check the cylinder bearing surface for damage.
» If the cylinder bearing surface is damaged:
– Change the cylinder and piston.
– Measure the cylinder diameter at several locations on the ❎- and ❎-axes using a micrometer to identify oval wear.

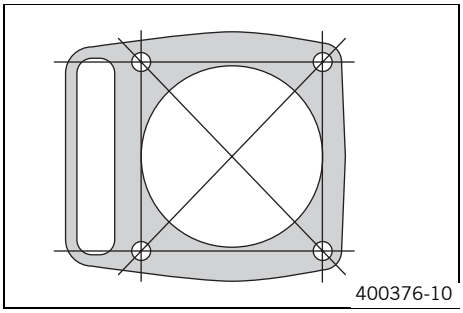
Guideline

Cylinder - drill hole diameter	
Size I	95... 95.012 mm (3.74... 3.74062 in)
Size II	95.013... 95.025 mm (3.74066... 3.74113 in)



200162-10

– Cylinder size ❶ is marked on the side of the cylinder.


400376-10

– Using a straightedge and the special tool, check the sealing area of the cylinder head for distortion.

Feeler gauge (59029041100) (☛ p. 230)

Cylinder/cylinder head - sealing area distortion	≤ 0.1 mm (≤ 0.004 in)

» If the measured value does not meet specifications:
– Change the cylinder.

Checking/measuring the piston


200160-10

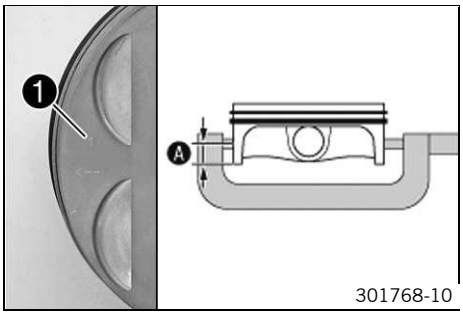
– Check the piston sliding surface for damage.
  » If the piston sliding surface is damaged:
    – Replace the piston and, if necessary, the cylinder.
– Check that the piston rings move easily in the piston ring grooves.
  » If a piston ring exhibits excessive resistance:
    – Clean the piston ring groove.

Tip
An old piston ring can be used to clean the piston ring groove.

– Check the piston rings for damage.
  » If the piston ring is damaged:
    – Replace the piston ring.

Info
Mount the piston ring with the marking facing upward.

– Check the piston pins for discoloration or signs of wear.
  » If the piston pin shows severe discoloration/signs of wear:
    – Replace the piston pin.
– Place the piston pin in the connecting rod and check the seating for play.
  » If the piston pin seating has excessive play:
    – Replace the connecting rod and piston pin.



301768-10

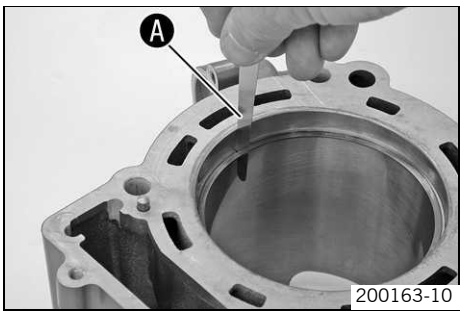
– Measure the piston at the piston skirt, parallel to the gudgeon pin,at a distance of ❹.

Guideline

Distance ❹	7 mm (0.28 in)
Piston - diameter	
Size I	94.93... 94.96 mm (3.7374... 3.7386 in)
Size II	94.94... 94.97 mm (3.7378... 3.739 in)

Info
Piston dimensions ❶ are marked on the piston head.

Checking the piston ring end gap



200163-10

– Remove the piston ring from the piston.
– Place the piston ring in the cylinder and align it with the piston.

Guideline

Under the upper edge of the cylinder	10 mm (0.39 in)

– Measure the end gap with e feeler gauge ❹.

Guideline

Piston ring end gap	
Compression ring	≤ 1 mm (≤ 0.04 in)
Oil scraper ring	≤ 1.2 mm (≤ 0.047 in)

  » If the end gap is greater than the specified measurement:
    – Check/measure the cylinder. (☛ p. 123)
  » If the cylinder wear is within the tolerance range:
    – Change the piston ring.
– Mount the piston ring with the marking facing toward the piston head.

Piston/cylinder - determining the mounting clearance

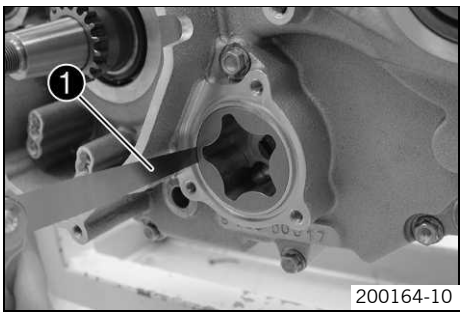
– Check/measure the cylinder. (☛ p. 123)
– Check/measure the piston. (☛ p. 124)
– The smallest piston/cylinder mounting clearance equals the smallest cylinder bore diameter minus the largest piston diameter. The largest piston/cylinder mounting clearance equals the largest cylinder bore diameter minus the smallest piston diameter.

Guideline

Piston/cylinder - mounting clearance	
Size I	0.040... 0.082 mm (0.00157... 0.00323 in)
Size II	0.043... 0.085 mm (0.00169... 0.00335 in)
Wear limit	0.120 mm (0.00472 in)

Checking the oil pumps for wear

Info
Checking of the oil pumps for wear is shown here using the suction pump as an example, but the procedure applies to all oil pumps.

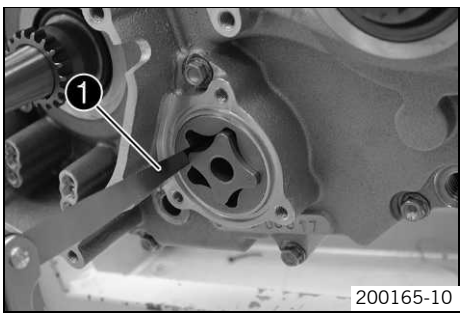


200164-10

– Use feeler gauge ❶ to measure the play between the external rotor and the engine case.

Oil pump	
Clearance between external rotor and engine housing	≤ 0.2 mm (≤ 0.008 in)

» If the measured value does not comply with the specification:
– Replace the oil pump or, as the case may be, engine case.



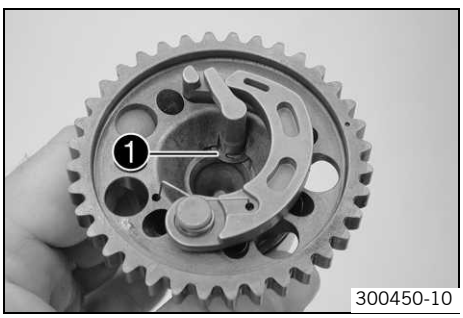
200165-10

– Use feeler gauge ❶ to measure the play between the external rotor and the internal rotor.

Oil pump	
Clearance between external rotor and internal rotor	≤ 0.2 mm (≤ 0.008 in)

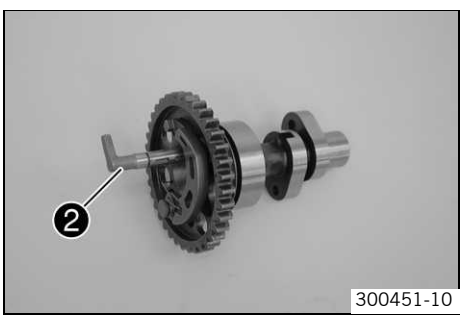
» If the measured value does not comply with the specification:
– Replace the oil pump.

Disassembling the autodecompressor



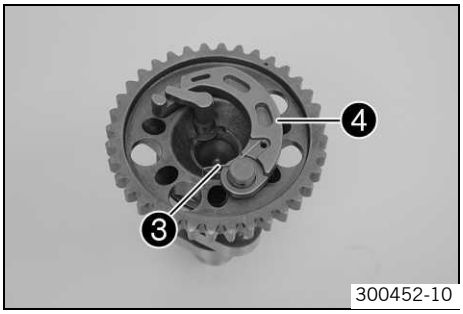
300450-10

– Take lock ring ❶ off of the autodecompressor shaft and dispose of it.



300451-10

– Pull autodecompression shaft ❷ out of the camshaft.

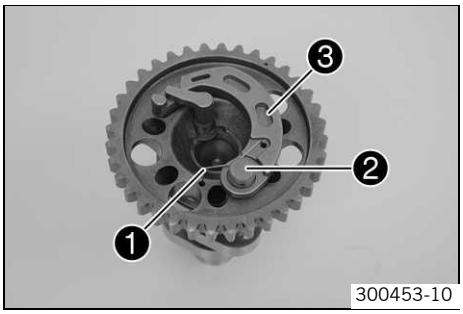


300452-10

– Detach autodecompression spring ❸ and remove it.

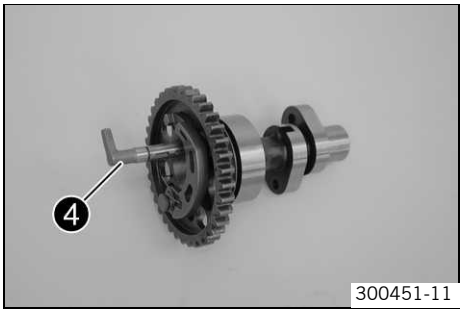
Info
Autodecompression weight ❹ cannot be removed.

Assembling the autodecompressor



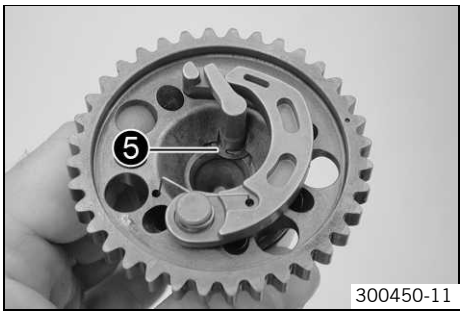
300453-10

– Insert the long prong ❶ of the autodecompression spring in the bore, push the autodecompression spring over bearing bolt ❷ and insert it into the autodecompression weight ❸.



300451-11

– Mount the autodecompression shaft ❹ in the camshaft.



300450-11

– Mount a new lock ring ❺.
– Check for correct functioning.
  » The autodecompression spring does not turn the autodecompression shaft fully back to the stop:
    – Tighten the autodecompression spring or replace it.

Checking camshaft


200206-10

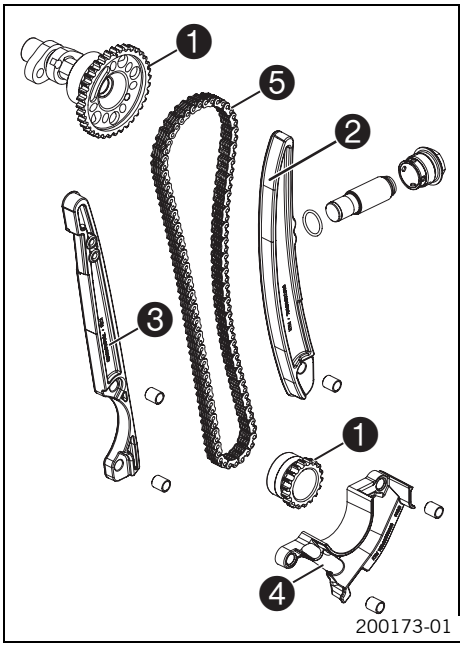
– Check the camshaft for damage and wear.
  » If there is damage or wear:
    – Change the camshaft.
    – If the camshaft surface is damaged, check the oil supply of the camshaft and the rocker arm.
– Measure the cams of the camshaft.

Camshaft - cam height	
Exhaust	33.10... 33.30 mm (1.3031... 1.311 in)
Camshaft - cam height (All 450 models)	
Intake	33.90... 34.10 mm (1.3346... 1.3425 in)
Camshaft - cam height (all 400 models)	
Intake	33.90... 34.10 mm (1.3346... 1.3425 in)
Camshaft - cam height (All 530 models)	

Intake	34.20... 34.40 mm (1.3465... 1.3543 in)

» If the measured value does not meet specifications:
– Change the camshaft.

Checking the timing assembly



200173-01

– Clean all parts well.
– Check the timing chain wheel/timing chain sprocket ❶ for damage and wear.
» If there is damage or wear:
– Replace the timing chain wheel/timing chain sprocket.
– Check the timing chain tensioning rail ❷ for damage and wear.
» If there is damage or wear:
– Replace the timing chain tensioning rail.
– Check the timing chain guide rail ❸ for damage and wear.
» If there is damage or wear:
– Replace the timing chain guide rail.
– Check the timing chain securing guide ❹ for damage and wear.
» If there is damage or wear:
– Replace the timing chain securing guide.
– Check timing chain ❺ for damage and wear.
» If there is damage or wear:
– Replace the timing chain.
– Check the timing chain links for smooth operation. Let the timing chain hang down freely.
» The chain links no longer align in a straight line:
– Replace the timing chain.

Preparing the timing chain tensioner for installation


200171-10

– Fully compress the timing chain tensioner.

Info
This requires considerable force since the oil has to be pressed out. Without pressure, the timing chain tensioner expands fully.


200172-10

– Place 2 spacing washers or similar aids next to the piston of the timing chain tensioner. This should ensure that when pushed down, the piston does not fully withdraw.

Guideline

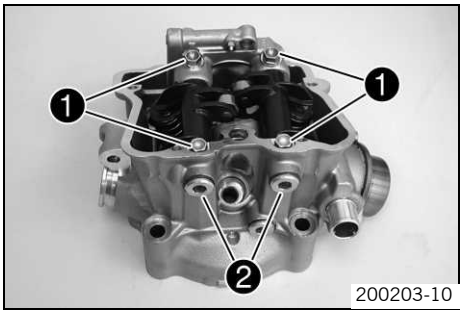
Thickness of spacers	2... 2.5 mm (0.08... 0.098 in)

– Release the timing chain tensioner.
✓ The latching system locks and the piston stops moving.

End position of piston after latching	3 mm (0.12 in)

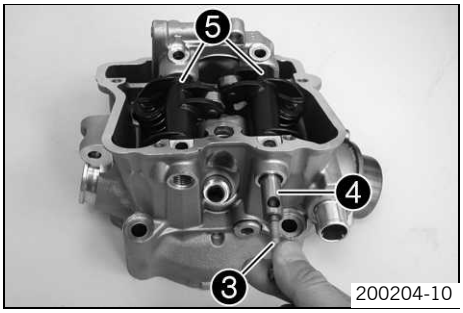
Info
This position is necessary for installation.
If the timing chain tensioner is now pressed in once more and then pulled out maximum halfway (preventing it to come out fully), the latching system locks and the timing chain tensioner can no longer be compacted - this function is necessary to ensure sufficient tension of the timing chain, even at low oil pressure.

Removing the rocker arm



200203-10

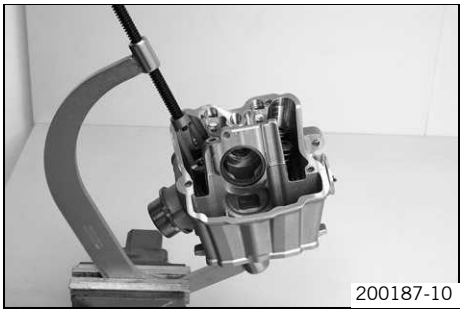
– Remove screws ❶ of the rocker arm shafts. Remove plugs ❷.



200204-10

– Screw a fitting screw ❸ into the rocker arm shafts. Pull out rocker arm shafts ❹.
– Take off rocker arm ❺.

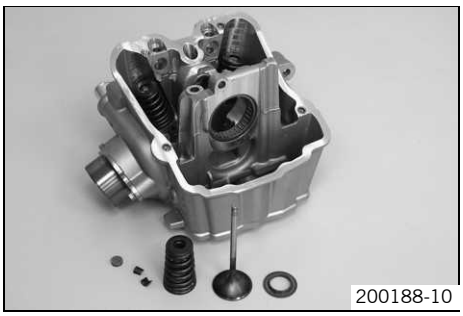
Removing the valves


200187-10

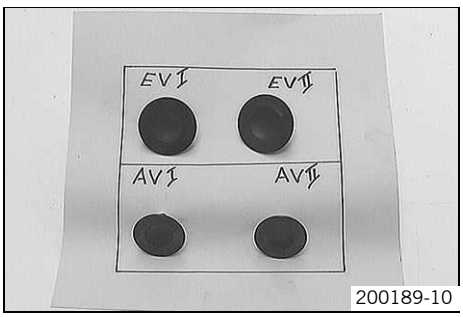
– Take the shims out of the valve spring retainers and set them down according to their installation position.
– Pretension the valve springs using the special tool.

Valve spring compressor (59029019000) (☛ p. 230)
Valve spring mounting device (78029060000) (☛ p. 235)

– Remove the valve keys and release the tension on the valve springs.


200188-10

– Remove the valve spring retainer and valve spring.
– Pull the valve downward out of the valve guide, remove the valve stem seal and valve spring seat.

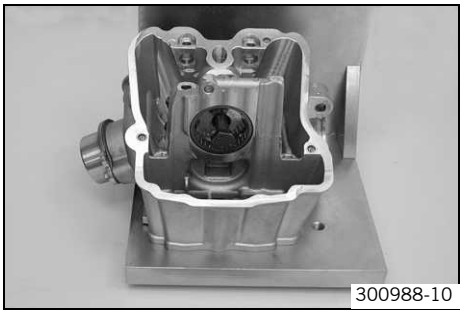


200189-10

– Mark the valve to indicate the installation position.

Info
Place the valve into a box according to the installation position and label the box.

Changing camshaft bearing

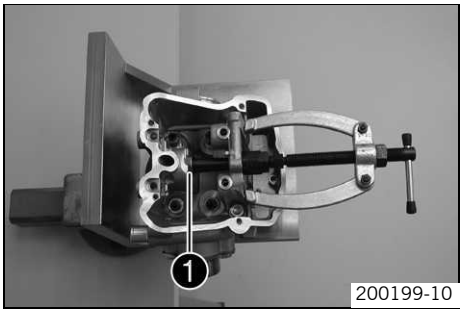

300988-10

– Mount the cylinder head.

Clamping plate (75029050000) (☛ p. 232)

– Remove the camshaft bearing using the special tool.

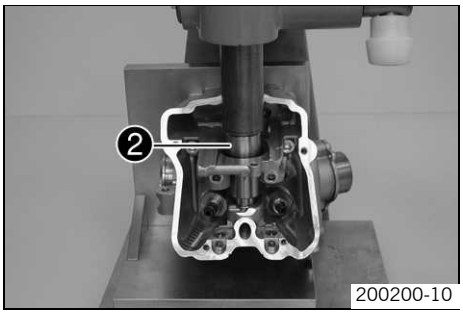
Push-out drift (75029051000) (☛ p. 232)



200199-10

– Remove the small camshaft bearing ❶ using the special tool.

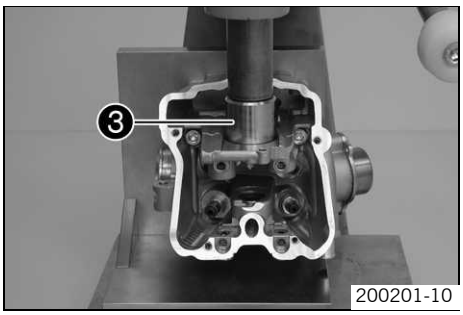
Bearing puller (15112017000) (☛ p. 228)
Insert for bearing puller (15112018100) (☛ p. 228)



200200-10

– Press the small camshaft bearing in until flush using the special tool ❷.

Push-in drift (75029044020) (☛ p. 231)



200201-10

– Press the large camshaft bearing in until flush using special tool ❸.

Push-in drift (75029044010) (☛ p. 231)

Checking valves

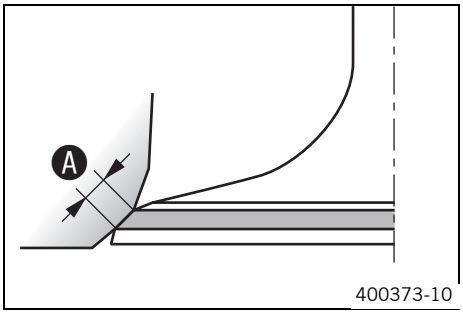
Info
The valve shaft is hard-chrome plated; wear generally appears at the valve guide.


200193-10

– Check the valve plate for run-out.

Valve	
Run-out at valve plate	≤ 0.05 mm (≤ 0.002 in)

» If the measured value does not meet specifications:
  – Change the valve.



– Check sealing seat ❹ on the valve.

Valve	
Intake sealing seat width	2.00 mm (0.0787 in)

Valve	
Exhaust sealing seat width	2.00 mm (0.0787 in)

» If the sealing seat is not centered on the valve seat or deviates from the specification:
– Rework the valve seat.

Checking valve springs

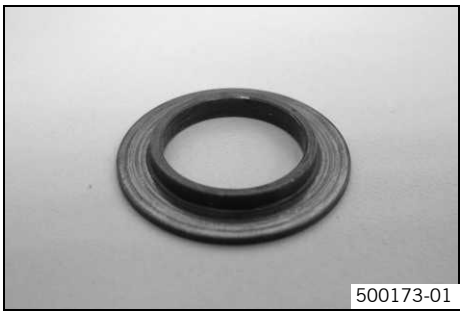
– Check the valve springs for breakage and wear (visual check).
» If the valve spring is broken or worn:
– Change the valve spring.
– Measure the length of the valve springs.

Valve spring	
Intake minimum length (without valve spring seat)	46.5 mm (1.831 in)

Valve spring	
Exhaust minimum length (without valve spring seat)	43.0 mm (1.693 in)

» If the measured value does not meet specifications:
– Change the valve spring.

Checking valve spring seat

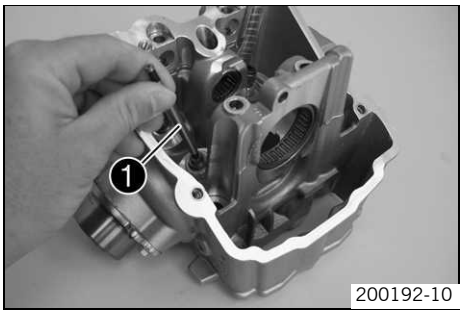


– Check the valve spring seat for breakage and wear (visual check).
» If the valve spring seat is broken or worn:
– Change the valve spring seat.
– Measure the thickness of the valve spring seat.

Valve spring	
Valve spring seat	0.9... 1.0 mm (0.035... 0.039 in)

» If the measured value does not meet specifications:
– Change the valve spring seat.

Checking the cylinder head



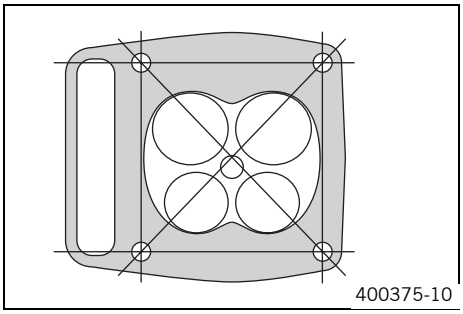
– Check the exhaust valve guides using special tool ❶.

Limit plug gauge (77029026000) (☛ p. 233)

» If the special tool is easy to insert into the valve guide:
– Change the valve guide and valve.
– Check the intake valve guides using the special tool.

Limit plug gauge (59029026006) (☛ p. 230)

» If the special tool is easy to insert into the valve guide:
– Change the valve guide and valve.
– Check the sealing area of the spark plug thread and the valve seats for damage and tearing.
» If there is wear or tearing:
– Change the cylinder head.

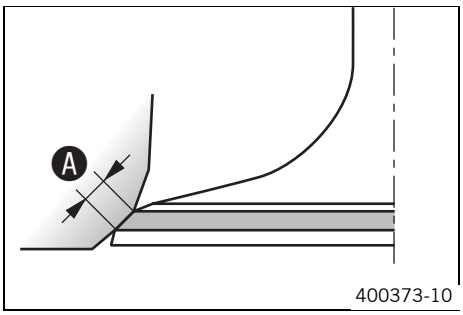

400375-10

– Check the sealing area of the cylinder for distortion using a straight edge and the special tool.

Feeler gauge (59029041100) (☛ p. 230)

Cylinder/cylinder head - sealing area distortion	≤ 0.1 mm (≤ 0.004 in)

» If the measured value does not equal the specified value:
– Change the cylinder head.



400373-10

– Check sealing seat Ⓐ of the valves.

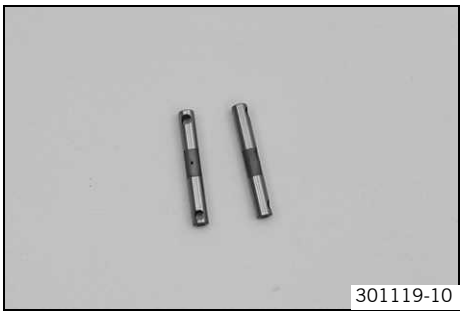
Valve	
Intake sealing seat width	2.00 mm (0.0787 in)

Valve	
Exhaust sealing seat width	2.00 mm (0.0787 in)

» If the measured value does not equal the specified value:
– Machine the valve seat.

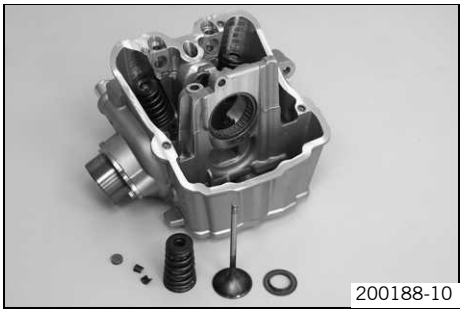
– Blow out all oil holes with compressed air and check that they are clear.

Checking the rocker arm shafts

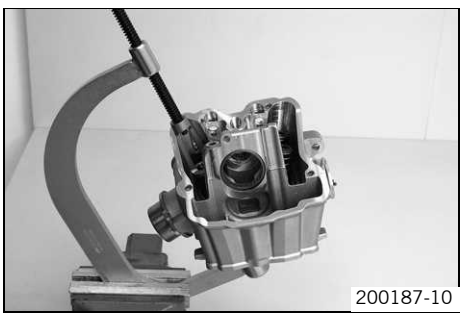

301119-10

– Check the rocker arm shafts for damage and wear.
» If there is damage or wear:
– Change the rocker arm shafts.

Installing valves


200188-10

– Position the valve spring seat. Mount the new valve stem seals.
– Mark the valves according to their position in the engine.
– Mount the springs and spring retainers.


200187-10

– Tension the valve springs with a special tool.

Valve spring compressor (59029019000) (☛ p. 230)
Valve spring mounting device (78029060000) (☛ p. 235)

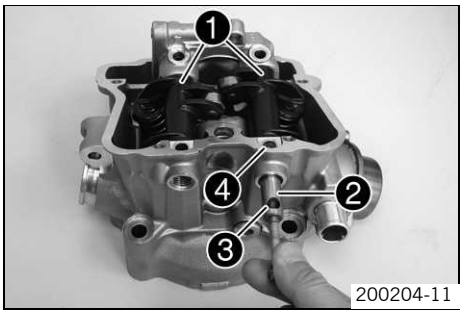

200191-10

– Mount the valve keys.

Info
When mounting the valve keys, check that they are seated correctly; preferably, fix the valve keys to the valve with a little grease.

– Place the shims in the valve spring retainer corresponding to their installation position.

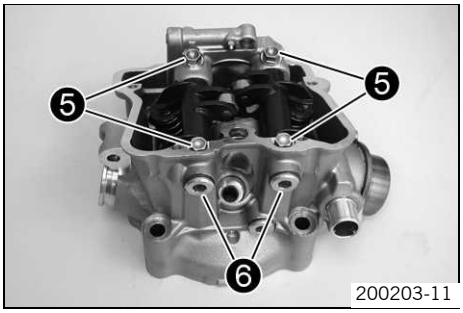
Installing the rocker arm



200204-11

– Position rocker arm ❶ and slide in rocker arm shaft ❷.

Info
Ensure that the tapped hole of the rocker arm shaft is on the outside.
Align bores ❸ of the rocker arm shafts with bores ❹ of the cylinder head.



200203-11

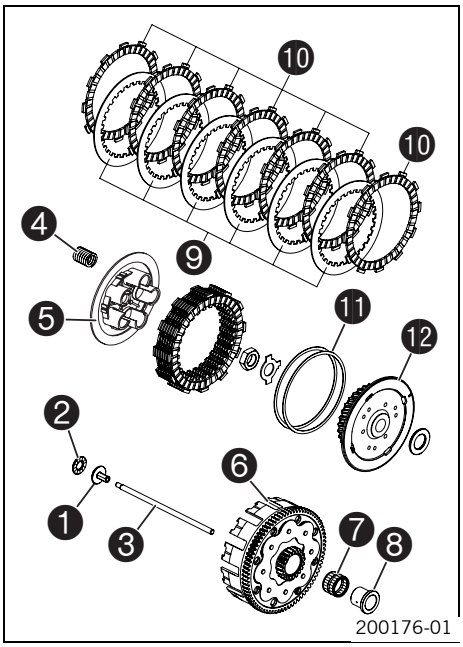
– Mount and tighten screws ❺ of the rocker arm shafts.
Guideline

Screw, rocker arm bearing	M7x1	15 Nm (11.1 lbf ft)

– Mount and tighten plugs ❻.
Guideline

Plug, rocker arm	M14x1.25	20 Nm (14.8 lbf ft)

Checking clutch



200176-01

– Check the pressure piece ❶ for damage and wear.
» If there is damage or wear:
– Change the pressure piece.
– Check axial bearing ❷ for damage and wear.
» If there is damage or wear:
– Change the axial bearing.
– Place push rod ❸ on a level surface and check for run-out.
» If there is run-out:
– Change the push rod.
– Check the length of clutch springs ❹.

Clutch spring - length	43... 44.03 mm (1.69... 1.7335 in)

» If the clutch spring length is less than the specified value:
– Change all clutch springs.
– Check the thrust face of pressure cap ❺ for damage and wear.
» If there is damage or wear:
– Change the pressure cap.
– Check the contact surfaces of the clutch facing discs in outer clutch hub ❻ for wear.

Thrust surface, clutch facing discs in outer clutch hub	≤ 0.5 mm (≤ 0.02 in)

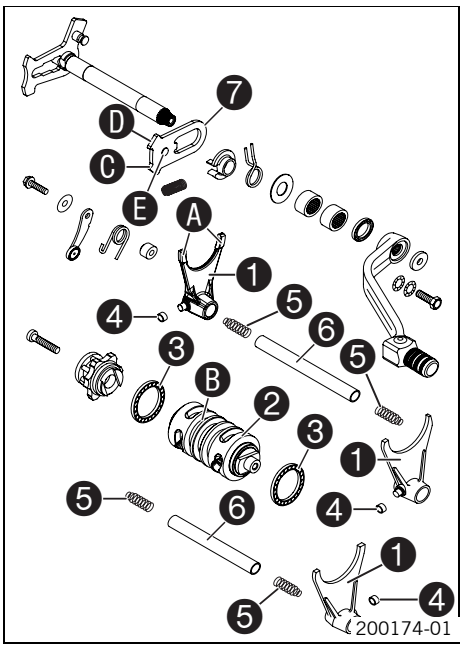
» If the contact surface exhibits significant wear:
– Change the clutch facing discs and outer clutch hub.

– Check needle bearing ❼ and collar sleeve ❽ for damage and wear.
  » If there is damage or wear:
    – Change the needle bearing and collar sleeve.
– Check the intermediate clutch discs ❾ for damage and wear.
  » If the intermediate clutch discs are not even or exhibit pitting:
    – Change all intermediate clutch discs.
– Check clutch facing discs ❿ for discoloration and scoring.
  » If there is discoloration or scoring:
    – Change all clutch facing discs.
– Check the thickness of clutch facing discs ❿.

Clutch facing disc - thickness	
Outer	2.6... 2.7 mm (0.102... 0.106 in)
Innermost	2.9... 3.0 mm (0.114... 0.118 in)

  » If the clutch facing disc does not meet specifications:
    – Change all clutch facing discs.
– Check pretention ring and support ring ⓫ for damage and wear.
  » If there is damage or wear:
    – Change the pretension ring and support ring.
– Check the inner clutch hub ⓬ for damage and wear.
  » If there is damage or wear:
    – Change the inner clutch hub.

Checking shift mechanism



– Check shift forks ❶ for wear on blade Ⓐ.

Shift fork	
Thickness at leaf	4.85... 4.95 mm (0.1909... 0.1949 in)

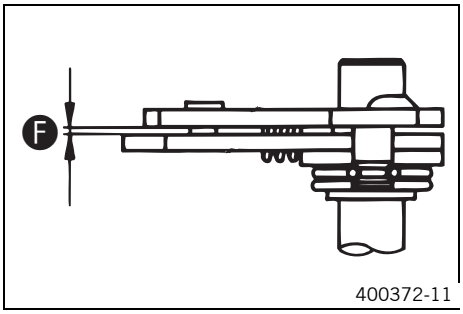
  » If the measured value does not meet specifications:
    – Change the shift fork.
– Check shift grooves Ⓑ of shift drum ❷ for wear.
  » If the shift groove is worn:
    – Change the shift drum.
– Check the seat of the shift drum in grooved ball bearing ❸.
  » If the shift drum is not correctly seated:
    – Change the shift drum and/or the grooved ball bearing.
– Check grooved ball bearing ❸ for smooth operation and wear.
  » If the grooved ball bearing does not move easily or is worn:
    – Change the grooved ball bearing.
– Check shift rollers ❹ for surface damage and cracking.
  » If the shift roller exhibits surface damage or cracking:
    – Change the shift roller.
– Check springs ❺ of the shift rails for damage and wear.
  » If the spring is damaged or worn:
    – Change the spring of the shift rail.
– Check shift rails ❻ for run-out on a lever surface.
  » If there is run-out:
    – Change the shift rail.
– Check the shift rails for grooving, scoring and smooth operation in the shift fork.
  » If the shift rail has grooving, scoring or does not move easily in the shift fork:
    – Change the shift rail.
– Check sliding plate ❼ for wear on contact areas Ⓒ.

» If the sliding plate is worn:
– Change the sliding plate.

– Check return surface ❶ on the sliding plate for wear.
» If there is marked indentation:
– Change the sliding plate.

– Check guide bolts ❷ for firm seating and wear.
» If the guide bolts are loose or worn:
– Change the sliding plate.

– Preassemble the shift shaft. (☛ p. 134)



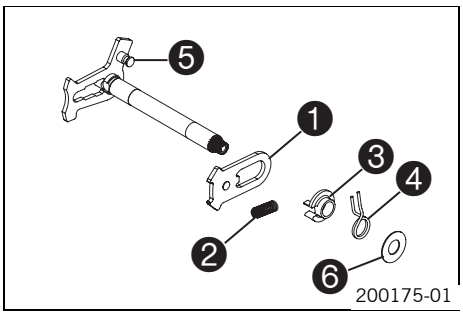
400372-11

– Check clearance ❸ between the sliding plate and the shift quadrant.

Shift shaft - play in sliding plate/shift quadrant	0.4... 0.8 mm (0.016... 0.031 in)

» If the measured value does not meet specifications:
– Change the sliding plate.

Preassembling the shift shaft



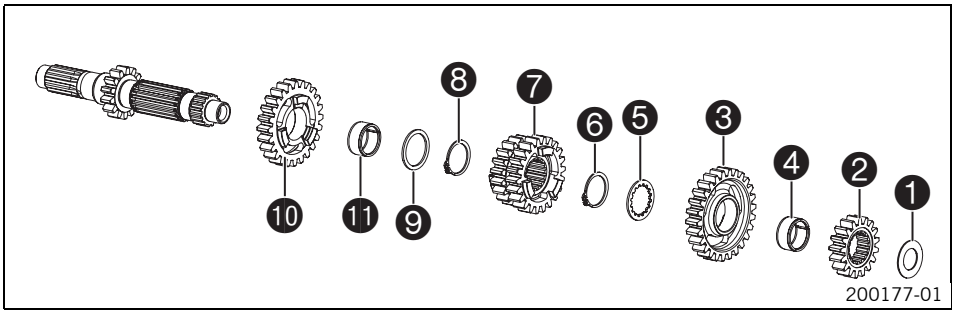
200175-01

– Fix the short end of the shift shaft in a vise.
Guideline

Use vise protectors.

– Mount sliding plate ❶ with the guide pin facing down and attach the guide pin to the shift quadrant.
– Mount preload spring ❷.
– Push on spring guide ❸, push return spring ❹ over the spring guide with the offset end facing upwards and lift the offset end over abutment bolt ❺.
– Mount stop disk ❻.

Dismantling the main shaft



200177-01

– Fix the main shaft in the vise with the geared end facing downwards.
Guideline

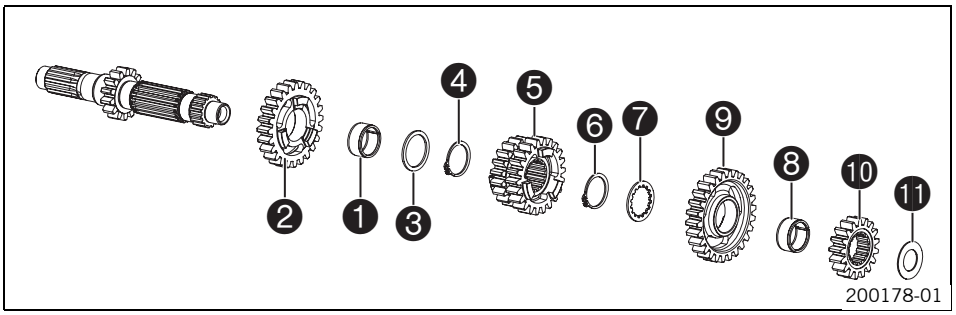
Use vise protectors.

– Remove stop disk ❶ and fixed gear ❷ of the second gear.
– Remove the sixth-gear idler gear ❸.
– Remove the divided needle bearing ❹ and stop disk ❺.
– Remove lock ring ❻.
– Remove the third/fourth-gear sliding gear ❼.
– Remove lock ring ❽.
– Remove stop disk ❾ and the fifth-gear idler gear ❿.
– Remove the divided needle bearing ⓫.

Assembling the main shaft

Info
Use new lock rings with every repair.

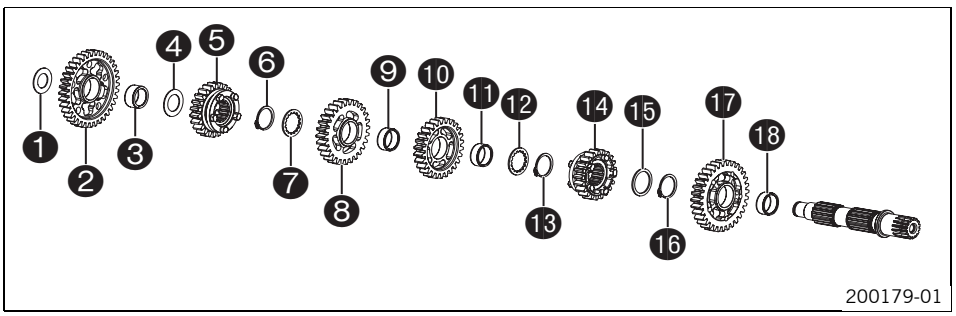
– Carefully lubricate all parts before assembling.
– Check the transmission. (☛ p. 136)



– Secure the main shaft with the toothed end facing downward in the bench vise.
Guideline
Using soft jaws

– Mount split needle bearing ❶, attach 5th gear idler gear ❷ with shift dog facing upward.
– Mount stop disk ❸ and lock ring ❹.
– Attach 3rd/4th gear sliding gear ❺ with the small toothed wheel facing downward and mount lock ring ❻.
– Attach stop disk ❼ and split needle bearing ❽.
– Attach 6th gear idler gear ❾ with the shift dog facing downward.
– Attach 2nd gear fixed gear ❿ with the collar facing downward and stop disk ⓫.
– In conclusion, check all gear wheels for smooth operation.

Dismantling the countershaft



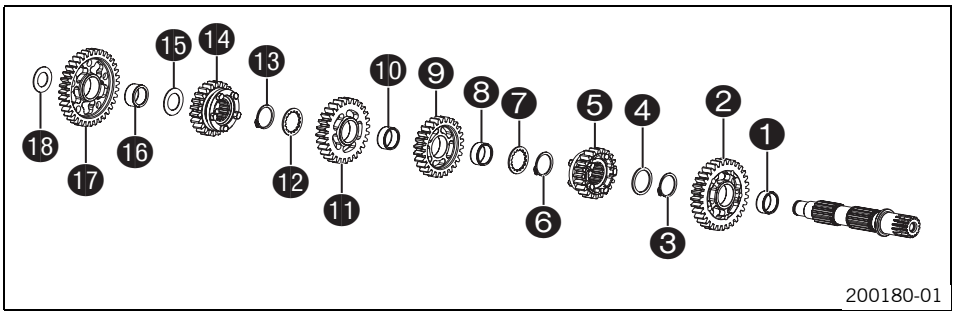
– Fix the countershaft in the vise with the geared end facing downwards.
Guideline
Use vise protectors.

– Remove stop disk ❶ and the first-gear idler gear ❷.
– Remove needle bearing ❸ and stop disk ❹.
– Remove the fifth-gear sliding gear ❺ and lock ring ❻.
– Remove stop disk ❼ and the third-gear idler gear ❽.
– Remove needle bearing ❾ and the fourth-gear idler gear ❿.
– Remove needle bearing ⓫ and stop disk ⓬.
– Remove lock ring ⓭ and the sixth-gear sliding gear ⓮.
– Remove stop disk ⓯ and lock ring ⓰.
– Remove the second-gear idler gear ⓱ and needle bearing ⓲.

Assembling the countershaft

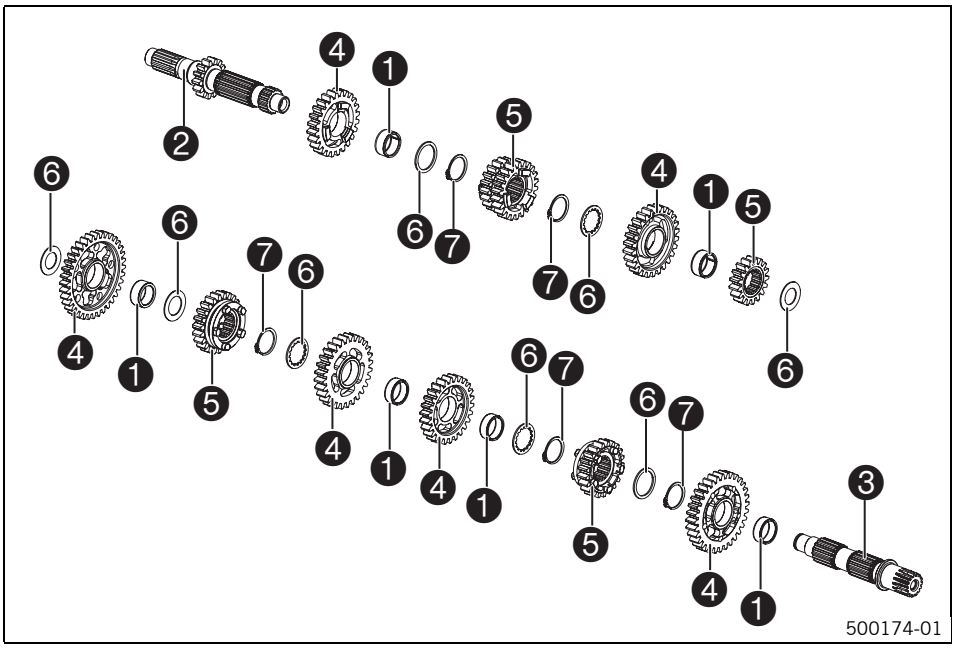
Info
Use new lock rings in every repair job.

– Oil all parts carefully before assembling.
– Check the transmission. (☛ p. 136)



– Fix the countershaft in the vise with the geared end facing downwards.
Guideline
Use vise protectors.
– Mount needle bearing ❶ and the second-gear idler gear ❷ on the countershaft with the protruding collar facing downwards.
– Fit lock ring ❸ and stop disk ❹.
– Mount the sixth-gear sliding gear ❺ with the shift groove facing upwards.
– Mount lock ring ❻ and stop disk ❼.
– Mount needle bearing ❽ and fourth-gear idler gear ❾ with the collar facing upwards.
– Mount needle bearing ❿ and third-gear idler gear ⓫ with the collar facing downwards.
– Mount stop disk ⓬ and lock ring ⓭.
– Mount the fifth-gear sliding gear ⓮ with the shift groove facing downwards and stop disk ⓯.
– Mount needle bearing ⓰, first-gear idler gear ⓱ with the groove facing downwards and stop disk ⓲.
– Finally, check all gear wheels for smooth operation.

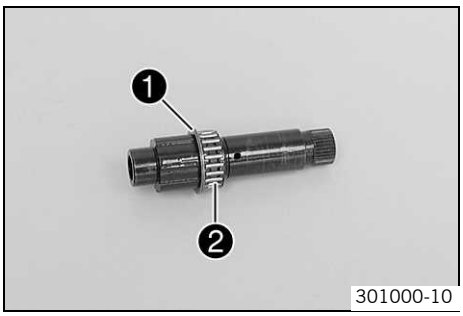
Checking the transmission



– Check the needle bearings ❶ for damage and wear.
» If there is damage or wear:
– Change the needle bearing.

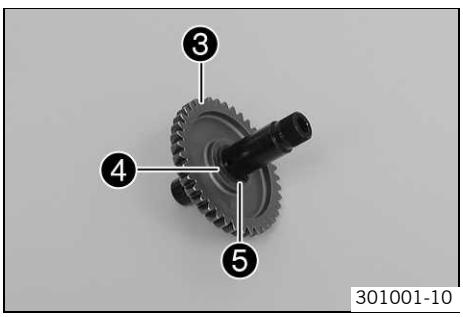
– Check the pivot points of main shaft ❷ and countershaft ❸ for damage and wear.
  » If there is damage or wear:
    – Change the main shaft and/or countershaft.
– Check the tooth profiles of the main shaft ❷ and countershaft ❸ for damage and wear.
  » If there is damage or wear:
    – Change the main shaft and/or countershaft.
– Check the pivot points of idler gears ❹ for damage and wear.
  » If there is damage or wear:
    – Change the idler/solid gear pair.
– Check the shift dogs of idler gears ❹ and solid gears ❺ for damage and wear.
  » If there is damage or wear:
    – Change the idler/solid gear pair.
– Check the tooth faces of idler gears ❹ and solid gears ❺ for damage and wear.
  » If there is damage or wear:
    – Change the idler/solid gear pair.
– Check the tooth profiles of solid gears ❺ for damage and wear.
  » If there is damage or wear:
    – Change the idler/solid gear pair.
– Check solid gears ❺ for smooth operation in the profile of main shaft ❷.
  » If the solid gear does not move freely:
    – Change the solid gear or the main shaft.
– Check solid gears ❺ for smooth operation in the profile of countershaft ❸.
  » If the solid gear does not move freely:
    – Change the solid gear or the countershaft.
– Check stop disks ❻ for damage and wear.
  » If there is damage or wear:
    – Change the stop disks.
– Use new lock rings ❼ with every repair.

Premounting the kickstarter shaft



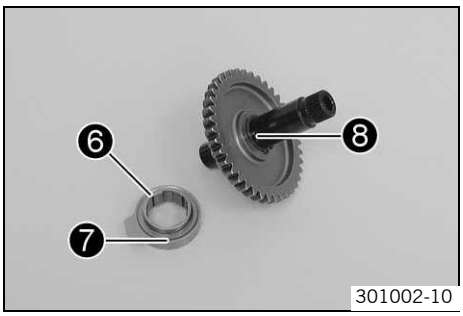
301000-10

– Mount washer ❶ and needle bearing ❷.

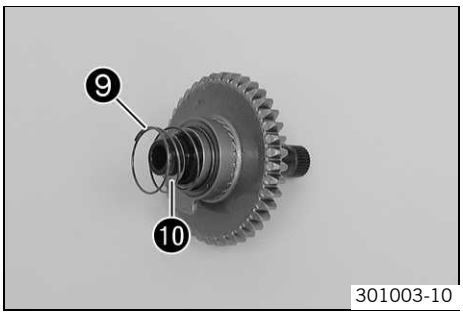


301001-10

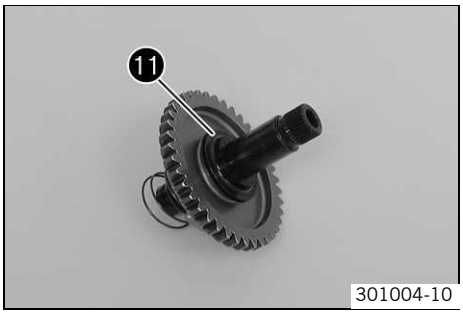
– Mount starter wheel ❸.
– Mount washer ❹ and lock ring ❺.



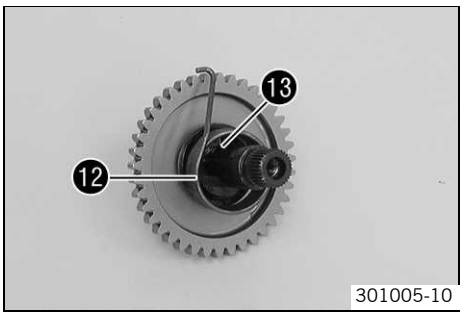
– Mount kickstarter ratchet wheel ❻.
  ✔ Marking ❼ points to drill hole ❽.



– Position spring ❾ and mount washer ❿.

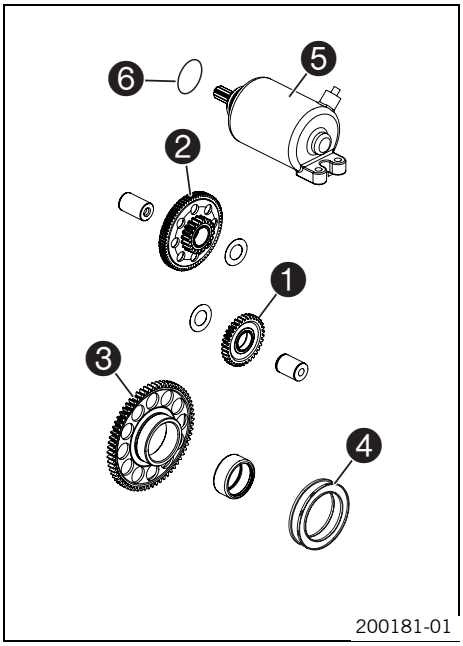


– Mount driving hub ⓫.



– Position kickstarter spring ⓬ and hook it into drill hole ⓭.

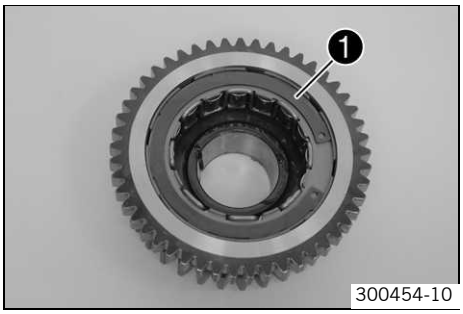
Checking the electric starter mode



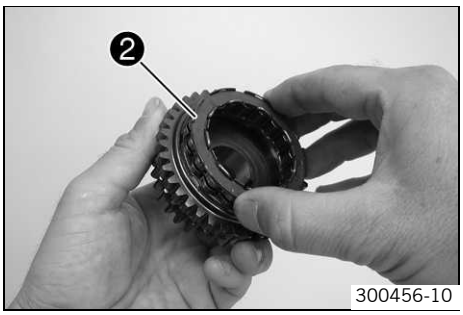
– Check the gear mesh and bearing of starter idler gear ❶ for damage and wear.
  » If there is damage or wear:
    – Change the starter idler gear.
– Check the gear mesh and bearing of torque limiter ❷ for damage and wear.
  » If there is damage or wear:
    – Change the torque limiter.
– Check the gear mesh and bearing of free wheel gear ❸ for damage and wear.
  » If there is damage or wear:
    – Change the free wheel gear or bearing.
– Check free wheel ❹ for damage and wear when it is disassembled.
  » If there is damage or wear:
    – Change the free wheel.
– Checking the gear mesh of starter motor ❺ for damage and wear
  » If there is damage or wear:
    – Change the starter motor.
– Change the O-ring ❻ of the starter motor.

– Connect the negative cable of a 12 volt power supply to the housing of the starter motor. Briefly connect the positive cable of the power supply with the connector of the starter motor.
  » If the starter motor does not turn when the circuit is closed:
    – Change the starter motor.

Removing the freewheel

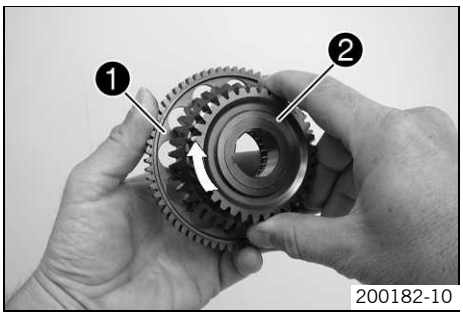


– Press expansion ring ❶ together with suitable pliers and take off.



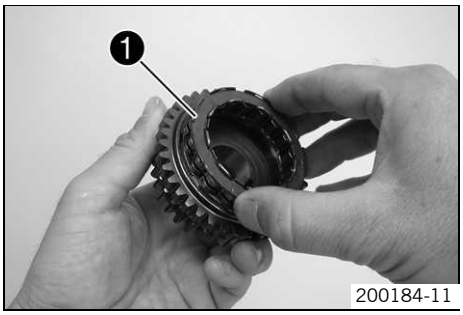
– Take the freewheel ❷ out of the primary gear.

Checking the freewheel



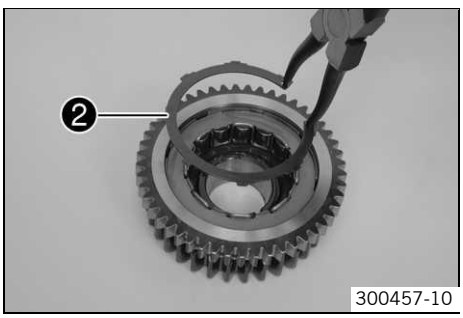
– Insert freewheel gear ❶ into primary gear ❷, turning the primary gear clockwise; do not wedge!
– Check the locking action of freewheel-gear ❶.
  » If the primary gear does not turn clockwise or if it does not lock counterclockwise:
    – Remove the freewheel. (☛ p. 139)
    – Turn the freewheel 180°.
    – Install the free-wheel. (☛ p. 139)

Installing the free-wheel

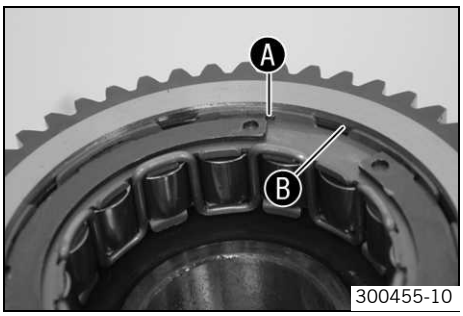


– Oil all parts well.
– Push the freewheel ❶ into the primary gear.

Info
Note the direction of rotation.

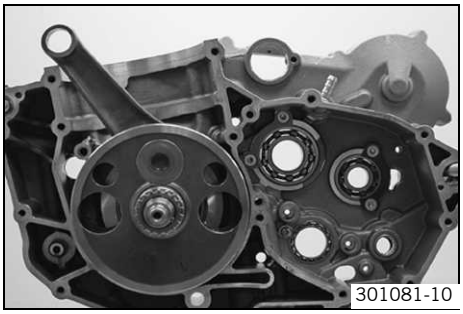


– Mount spreader ring ❷.



– Ensure that all lugs of the spreader ring pass through slots Ⓐ of the free wheel and engage in groove Ⓑ of the primary gear.

Installing the crankshaft


301081-10

– Tighten the right section of the engine case in the engine work stand.
– Heat the inner ring of the crankshaft bearing.

Guideline

80 °C (176 °F)

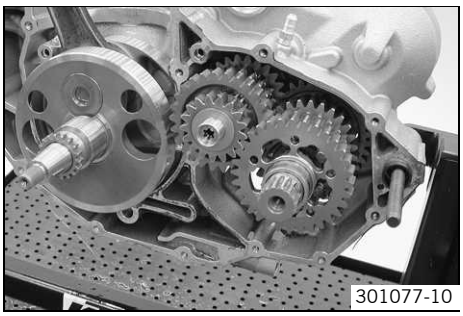
Info
Do not damage the seal ring.

– Mount the special tool on the clutch end of the crankshaft.

Mounting sleeve (78029005000) (☛ p. 234)

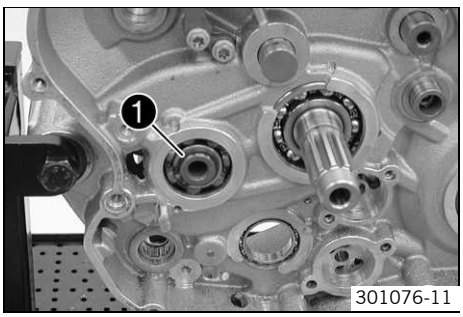
– Push the crankshaft all the way into the bearing seat of the right section of the engine case.
– Remove the special tool.

Installing the transmission shaft


301077-10

– Slide both transmission shafts into the bearing seats together.

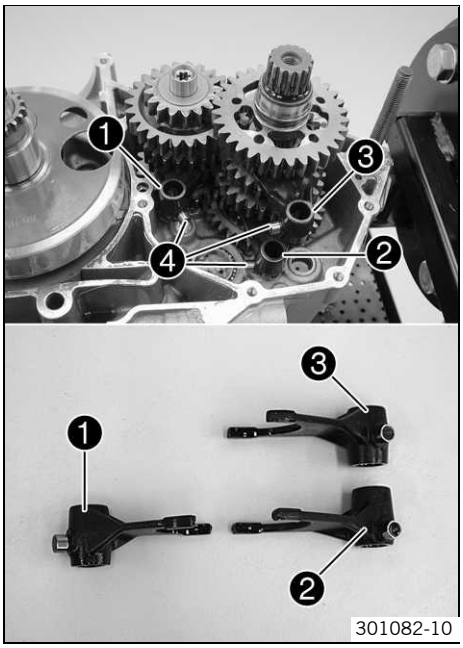
Info
Make sure not to misplace the washers.



301076-11

– Mount lock ring ❶.

Installing the shift forks

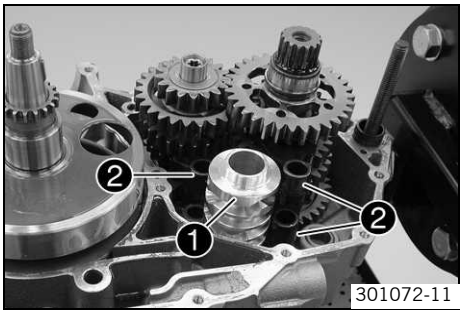


301082-10

– Oil all parts well.
– Shift fork ❶ has a smaller inner diameter. Mount it in the shift groove of the main shaft.
– Mount shift fork ❷ in the lower shift groove of the countershaft.
– Mount shift fork ❸ in the upper shift groove of the countershaft.
– Slide on shift roller ❹.

Info
Fix the shift rollers to the shift forks with grease.

Installing the shift drum

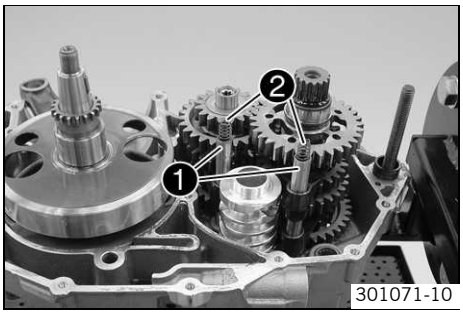


301072-11

– Slide shift drum ❶ into the bearing seat.
– Hang the shift forks ❷ into the shift drum.

Info
Make sure not to misplace the shift rollers.

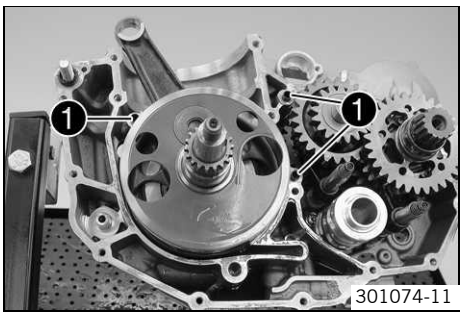
Installing the shift rails



301071-10

– Install shift rails ❶ together with upper springs ❷ and the lower springs.

Installing the left engine case

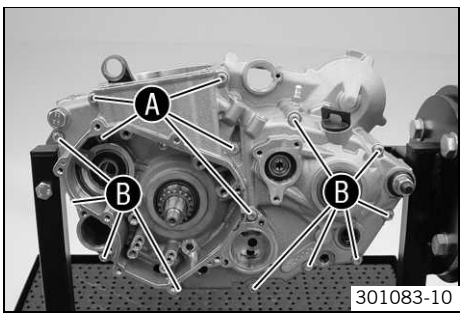


301074-11

– Mount dowels ❶ onto the left section of the engine case.
– Grease the sealing surfaces. Apply the sealing compound to the left section of the engine case.

Loctite® 5910

Info
To prevent sealing compound from entering into the oil holes, dowels ❶ must be mounted first.



301083-10

– Mount the left section of the engine case. If necessary, strike it lightly with a rubber mallet.

Info
Do not use the screws to pull the two sections of the engine case together.

– Mount screws Ⓐ and, once all screws of the left section of the engine case have been mounted, tighten them.

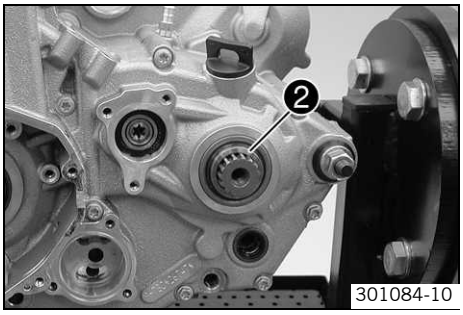
Guideline

Screw, engine housing	M6x75	10 Nm (7.4 lbf ft)

– Mount screws Ⓑ and tighten all screws in a crisscross pattern.

Guideline

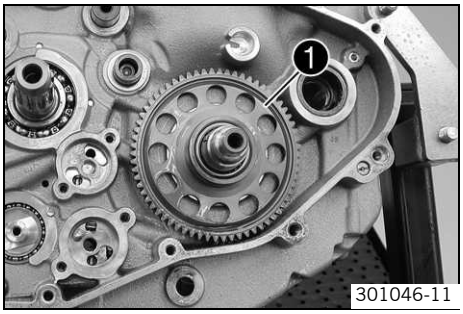
Screw, engine housing	M6x60	10 Nm (7.4 lbf ft)



301084-10

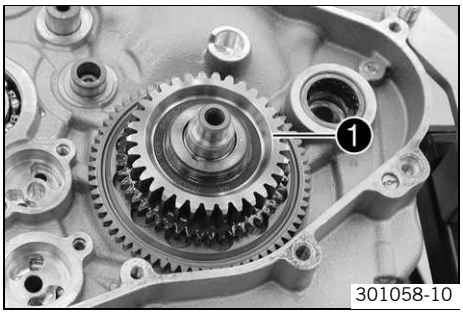
– Mount distance bushing ❷ with the O-ring.

Installing the free wheel gear



– Mount free wheel gear ❶.

Installing the primary gear



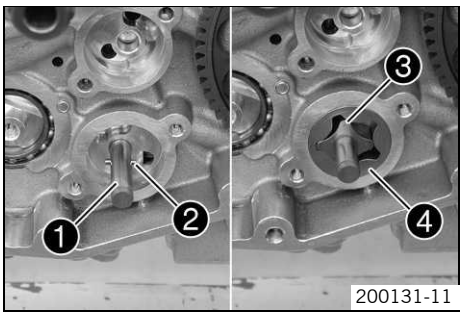
– Mount the spring washer.
– Degrease the cone and thinly apply thread locker to it.

Loctite® 648™

– Mount primary gear ❶.

Info
Turn the free wheel gear back and forth to ease engagement.

Installing the oil pumps



– Oil the oil pump shaft, internal rotor and external rotor before fitting.

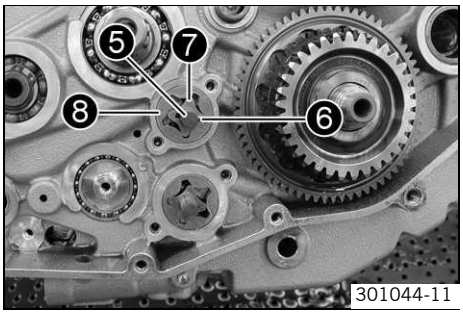
Engine oil (SAE 10W/50) (☛ p. 224)

– Mount oil pump shaft ❶.
– Mount pin ❷ of the engine oil force pump. Slide on the internal rotor with marking ❸ facing outward.

Info
The marking should be visible after installation.

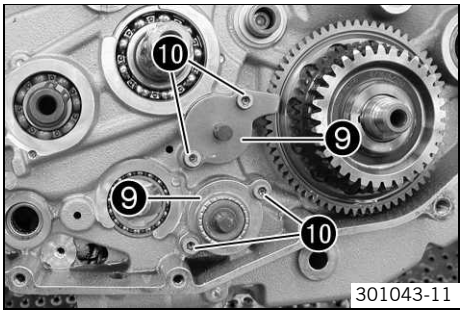
– Mount external rotor ❹ with the marking facing inward.

Info
The marking should not be visible after installation.



– Mount oil pump shaft ❺ of the gear oil force pump with pin ❻ and internal rotor ❼.
– Mount external rotor ❽ with the marking facing inward.

Info
The marking should not be visible after installation.

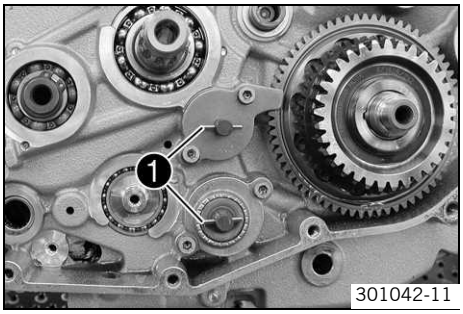


– Position oil pump cover ❾. Mount and tighten screws ❿.

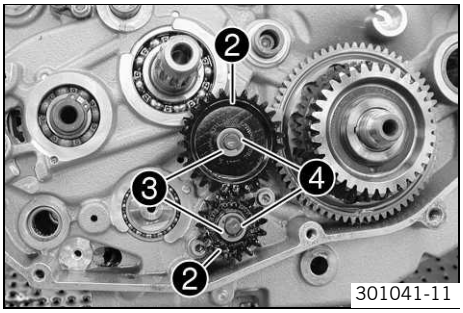
Guideline

Screw, oil pump cover	M5	6 Nm (4.4 lbf ft)	**Loctite® 222**

Installing the oil pump gears



– Insert pins ❶.

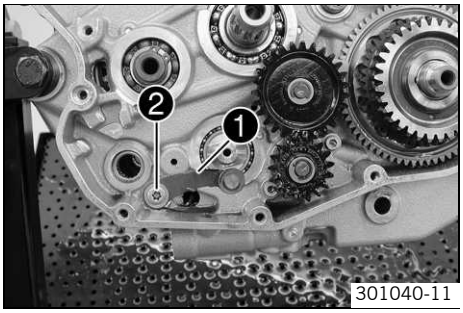


– Position oil pump gears ❷.

Info
Ensure that the pins are seated correctly.

– Position washers ❸.
– Mount shaft retainer ❹.
– Crank the oil pump gears and check that they can be easily moved.

Installing the locking lever

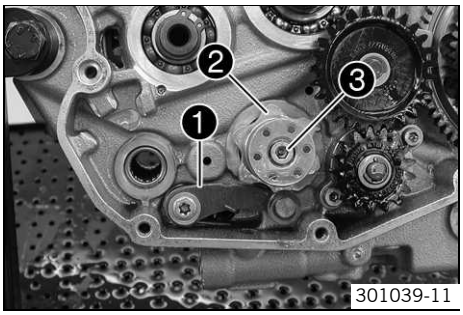


– Mount the locking lever ❶ with washer, sleeve and spring.
– Mount and tighten screw ❷.

Guideline

Screw, locking lever	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

Installing the shift drum locating



– Push locking lever ❶ away from the shift drum locating and position shift drum locating ❷.

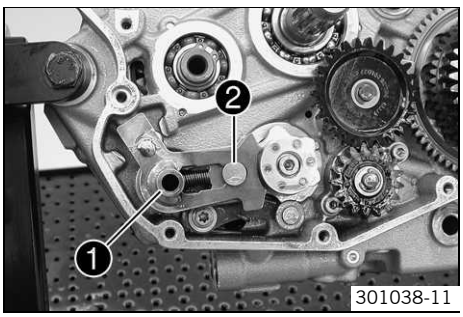
Info
The flat surfaces of the shift drum locating are not symmetric.

– Release the locking lever.
– Mount and tighten screw ❸.

Guideline

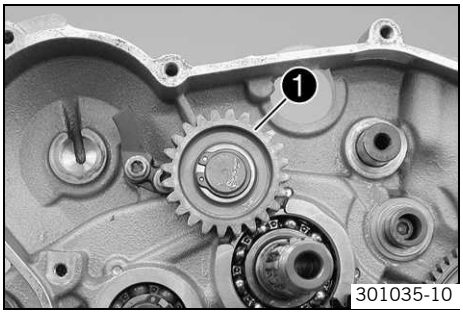
Screw, shift drum locating	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

Installing the shift shaft



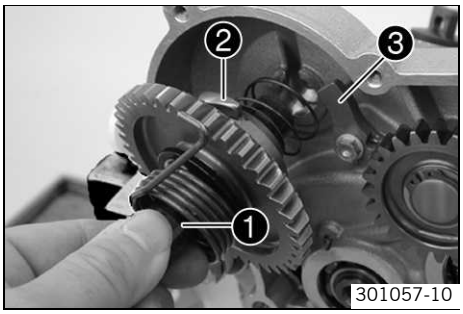
– Slide shift shaft ❶ with the washer into the bearing seat.
– Push sliding plate ❷ away from the shift drum locating. Insert the shift shaft all the way.
– Let sliding plate ❷ engage in the shift drum locating.
– Shift through the transmission.

Installing the kickstarter idler gear



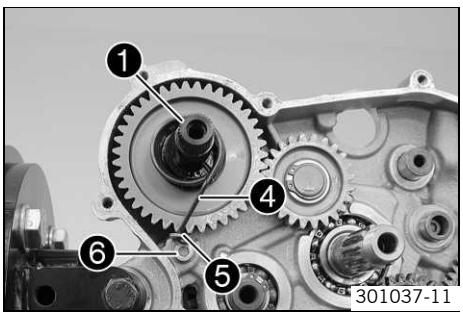
- Slide on kickstarter idler gear ❶ with the collar facing the engine case.
- Slide on the washer. Mount the lock ring.

Installing the kickstarter shaft



- Slide the premounted kickstarter shaft ❶ into the bearing seat.

Info
The kickstarter ratchet wheel ❷ should not be in contact with stop plate ❸.

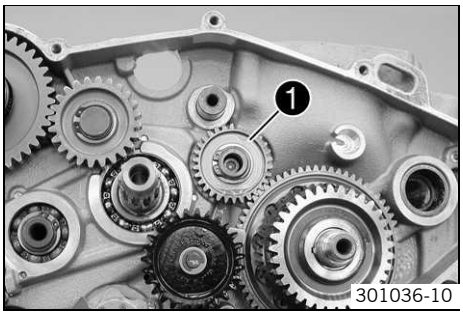


- Turn kickstarter shaft ❶ clockwise all the way.
- Pretension kickstarter spring ❹, and attach and position spring hanger ❺.
- Mount and tighten screw ❻.

Guideline

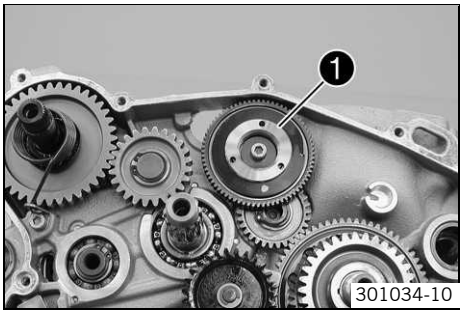
Screw, kickstarter spring hanger	M6	10 Nm (7.4 lbf ft)

Installing the starter idler gear



- Slide on the starter idler gear ❶ with the collar facing the engine case.
- Slide on the washer. Mount the lock ring.

Installing the torque limiter

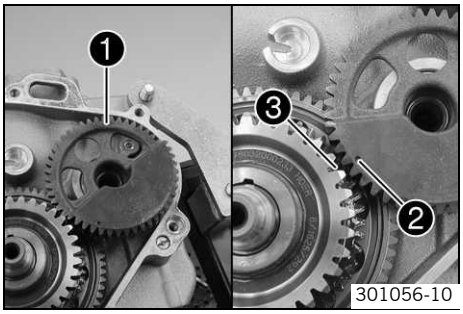


- Position the washer.
- Slide on torque limiter ❶. Mount and tighten the screw with washer.

Guideline

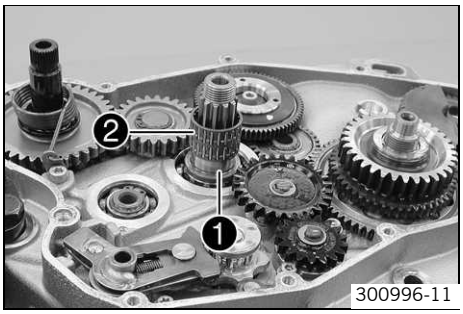
Screw, torque governor	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

Installing the balancer shaft

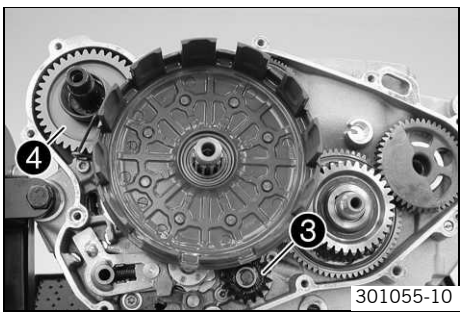


– Push balancer shaft ❶ into the bearing seat. Align marking ❷ on the balance weight with marking ❸ on the primary gear.

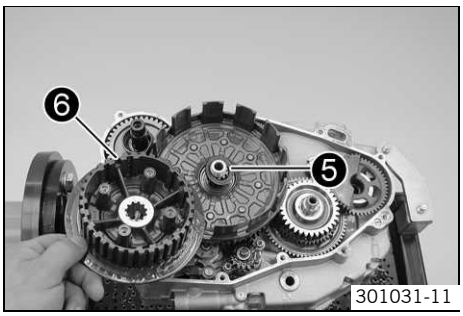
Installing the outer clutch hub



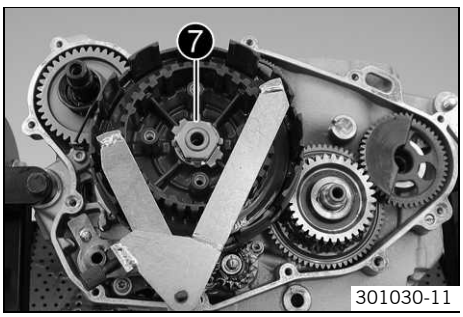
– Mount collar bushing ❶ and needle bearing ❷.



– Slide the outer clutch hub onto the gearbox main shaft. Turn oil pump gear ❸ and kickstarter gear ❹ until the teeth of the outer clutch hub mesh.



– Slide on washer ❺ and inner clutch hub ❻.



– Position the new lock washer and mount nut ❼. Tighten the nut, holding the inner clutch hub with a special tool.

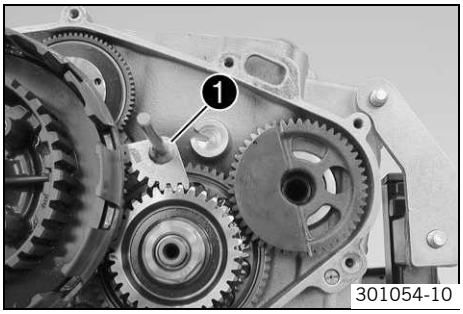
Guideline

Nut, inner clutch hub	M18x1.5	80 Nm (59 lbf ft)

Clutch holder (51129003000) (☛ p. 229)

– Secure the nut with the lock washer.
– Insert the pressure piece.

Installing the primary gear nut



– Block the outer clutch hub and primary gear using special tool ❶.

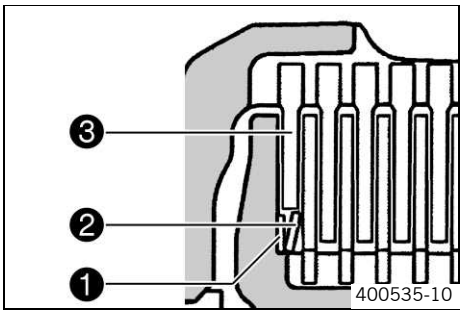
Gear quadrant (80029004000) (☛ p. 235)

– Mount and tighten the nut.

Guideline

Nut, primary gear	M20LHx1.5	100 Nm (73.8 lbf ft)	**Loctite® 243™**

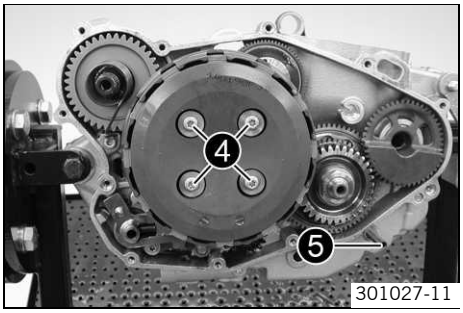
Installing the clutch discs



– Thoroughly grease the clutch facing discs.

Engine oil (SAE 10W/50) (☛ p. 224)

– Insert support ring ❶ into the outer clutch hub.
– Insert pretension ring ❷ with the open side facing outward.
– Position the machined clutch facing disc ❸ with the recess for the pretension ring into the outer clutch hub.
– Beginning with an intermediate disc, alternately insert all other clutch facing discs and intermediate discs into the outer clutch hub.



– Position the pressure cap. Mount screws ❹ with the washers and springs. Tighten the screws in a crisscross pattern.

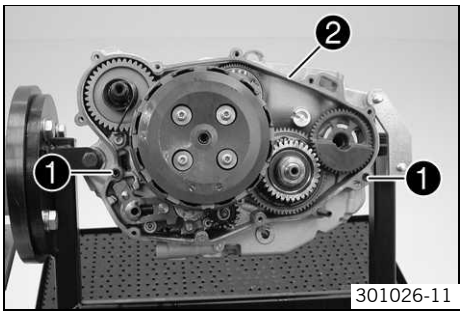
Guideline

Screw, clutch spring	M6	10 Nm (7.4 lbf ft)

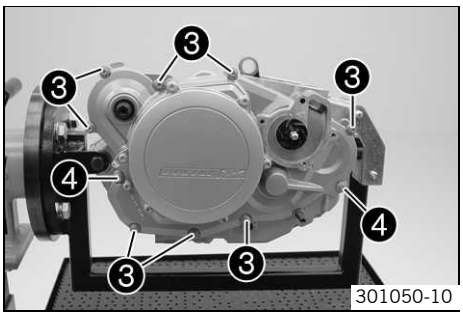
– Set the crankshaft to top dead center and lock it with the special tool ❺.

Crankshaft locking bolt (113080802) (☛ p. 228)

Installing the clutch cover



– Mount dowels ❶. Put clutch cover gasket ❷ in place.



– Mount the clutch cover.

Info
Turn the water pump impeller slightly in order to engage the water pump drive.

– Mount screws ❸ and tighten once all of the clutch cover screws have been mounted.

Guideline

Screw, clutch cover	M6x25	10 Nm (7.4 lbf ft)

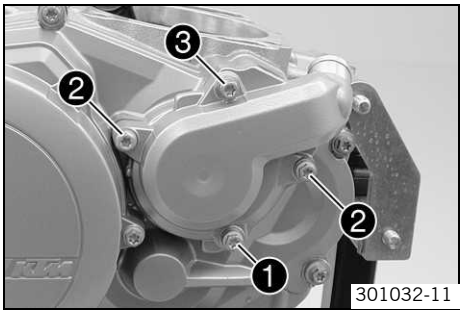
– Mount screws ❹ and tighten all screws in a crisscross pattern.

Guideline

Screw, clutch cover	M6x30	10 Nm (7.4 lbf ft)

Info
Mount the left screw with the seal ring.

Installing the water pump cover



301032-11

– Fit the water pump cover seal.
– Install the water pump cover. Mount screw ❶ with the seal washer and tighten it after all screws of the water pump cover have been mounted.

Guideline

Screw, water pump cover	M6x25	10 Nm (7.4 lbf ft)

– Mount screws ❷ and tighten them after all screws of the water pump cover have been mounted.

Guideline

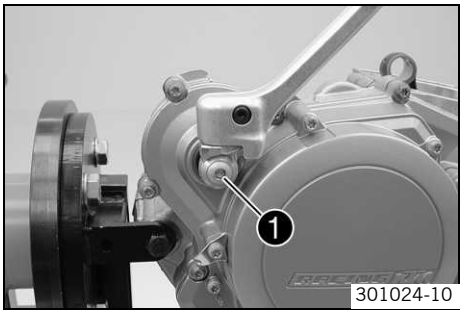
Screw, water pump cover	M6x25	10 Nm (7.4 lbf ft)

– Mount screw ❸ and tighten all screws in a crisscross pattern.

Guideline

Screw, water pump cover	M6x55	10 Nm (7.4 lbf ft)

Installing the kickstarter



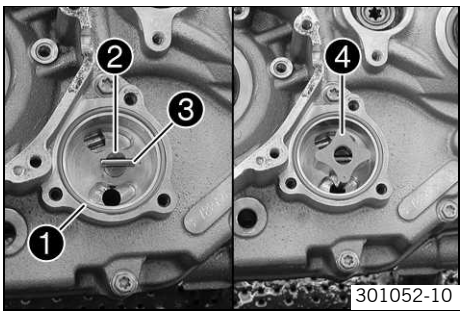
301024-10

– Position the kickstarter. Mount and tighten screw ❶.

Guideline

Screw, kickstarter	M8	25 Nm (18.4 lbf ft)	**Loctite® 243™**

Installing the suction pump



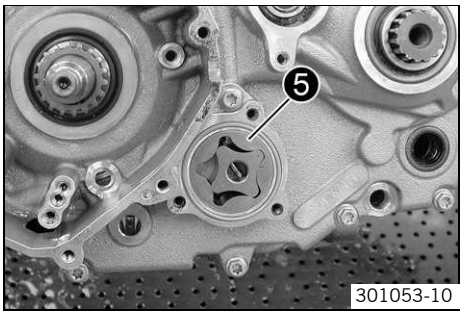
301052-10

– Oil the internal rotor and external rotor before mounting.

Engine oil (SAE 10W/50) (☛ p. 224)

– Insert O-ring ❶.
– Position pin ❸ in oil pump shaft ❷ and slide on the internal rotor.

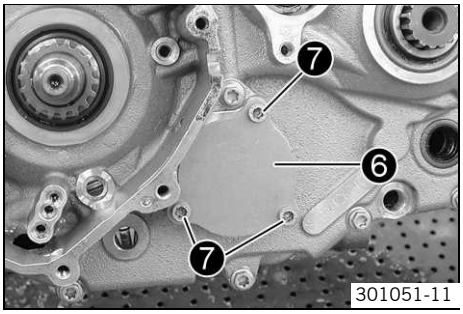
Info
Marking ❹ of the internal rotor faces outward.



301053-10

– Mount the external rotor ❺ with the marking facing inward.

Info
The marking should not be visible after installation.



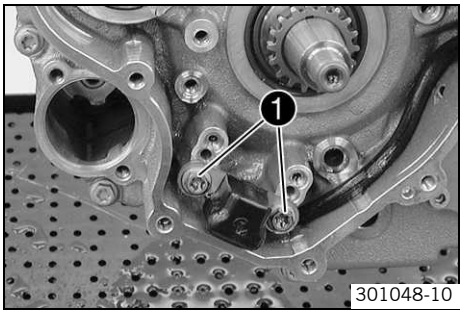
301051-11

– Check that the pin of the suction pump is seated properly.
– Position oil pump cover ❻. Mount and tighten screws ❼.

Guideline

Screw, oil pump cover	M5	6 Nm (4.4 lbf ft)	**Loctite® 222**

Installing the ignition pulse generator



– Position the ignition pulse generator.

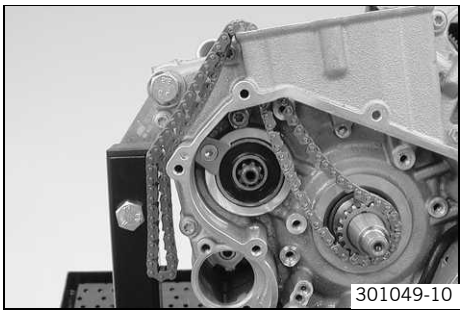
Info
Use the outer drill hole pair.

– Mount and tighten screws ❶.

Guideline

Screw, ignition pulse generator	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

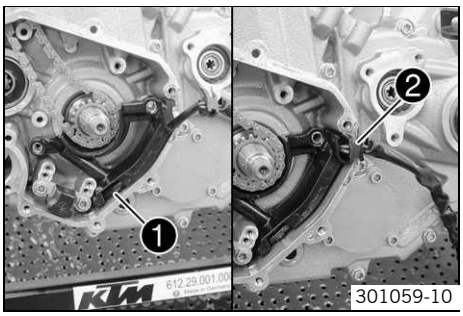
Installing the timing chain



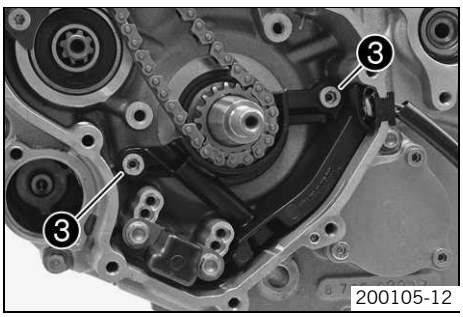
– Thread the timing chain and place it over the timing chain sprocket.

Info
Note the running direction if installing a used timing chain.

Installing the timing chain securing guide



– Position ignition pulse generator cable ❶ in the timing chain securing guide.
– Mount cable support sleeve ❷.

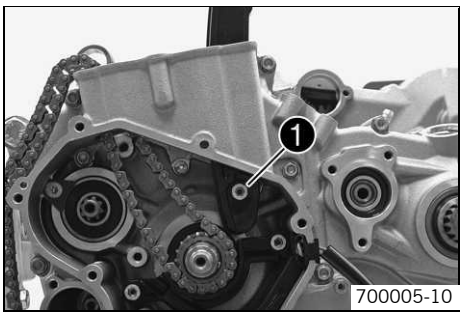


– Position the timing chain securing guide. Mount and tighten screws ❸.

Guideline

Screw, timing chain securing guide	M6	8 Nm (5.9 lbf ft)	**Loctite® 243™**

Installing the timing chain tensioning rail

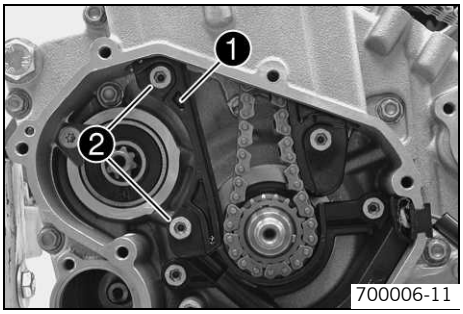


– Thread the timing chain tensioning rail from above. Mount and tighten screw ❶.

Guideline

Screw, timing chain tensioning rail	M6	8 Nm (5.9 lbf ft)	**Loctite® 243™**

Installing the timing chain guide rail

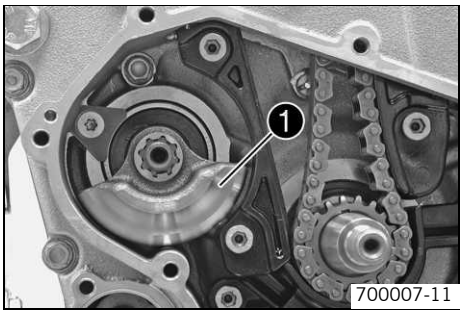


– Thread timing chain guide rail ❶ from above. Mount and tighten screws ❷.

Guideline

Screw, timing chain guide rail	M6	8 Nm (5.9 lbf ft)	**Loctite® 243™**

Installing the balance weight



– Mount balance weight ❶.

Info
The shape of the gearing prevents incorrect mounting of the balance weight.

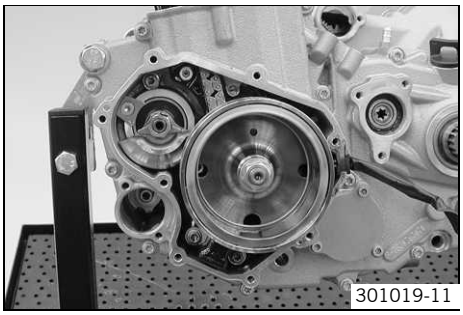
– Mount and tighten the lock washer and nut. Tighten nut.

Guideline

Balancer shaft nut	M10x1	40 Nm (29.5 lbf ft)

– Secure the nut with lock washer.

Installing the rotor



– Ensure that the spring washer is seated properly. Mount the rotor.
– Mount and tighten the spring washer and nut. Tighten nut.

Guideline

Nut, rotor	M12x1	60 Nm (44.3 lbf ft)

Installing the piston

– Move the joints of the compression ring and oil scraper ring so they are offset by 180°.
– Place the oiled piston on the cylinder. Compress the piston rings using the special tool.

Piston ring mounting tool (60029015000) (☛ p. 230)

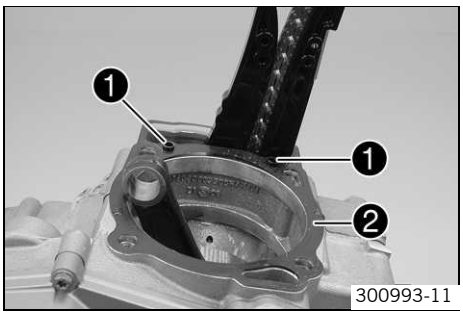
– Tap lightly on the piston ring compressor from above with a plastic hammer so that it lies flush with the cylinder.

✓ The special tool must press the piston rings together properly and lie flush with the cylinder.


200088-01

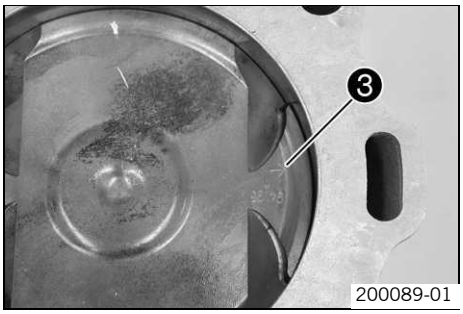
– Carefully tap the piston into the cylinder using the handle of the hammer.

✓ The piston rings should not catch or they will be damaged.



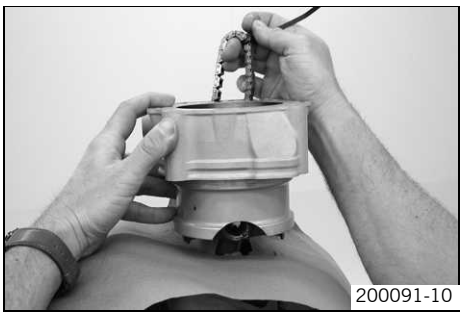
300993-11

– Mount dowels ❶ and put cylinder base gasket ❷ in place.



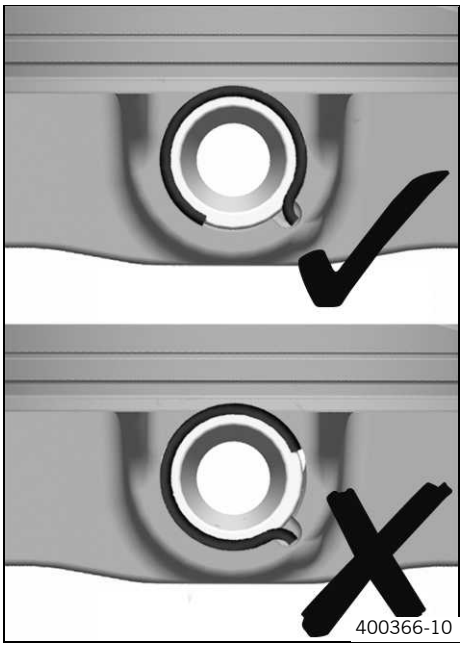
200089-01

– Ensure that piston mark ❸ faces toward the exhaust side.

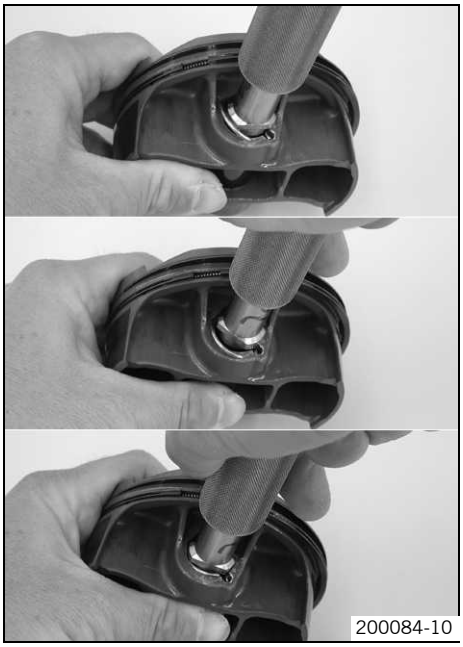

200091-10

– Cover the engine housing opening with a cloth. Thread the timing chain through the chain shaft. Mount the piston pin.

Info
In order to present them more clearly, the following steps will be shown with a removed piston.


400366-10

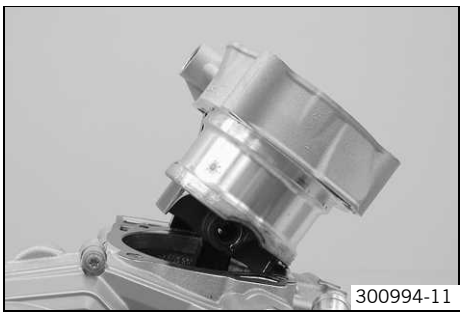
– Position the piston pin retainer.


200084-10

– Insert the special tool and press it forcefully to the piston.
– Turn the special tool counterclockwise, thereby pushing the piston pin retainer into the groove.

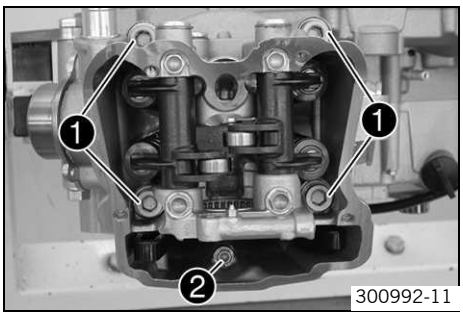
Insert for piston pin retainer (77329030100) (☛ p. 233)

– Ensure that the piston pin retainer is seated properly on both sides.


300994-11

– Remove the cloth. Keep the timing chain held tightly.
– Carefully push the cylinder downward, letting the dowels engage.

Installing the cylinder head



300992-11

– Mount the dowels. Fit the new cylinder head gasket.
– Fit the cylinder head.
– Insert the washers of the cylinder-head bolts.
– Mount cylinder-head bolts❶ and tighten all screws in a crisscross pattern.

Guideline

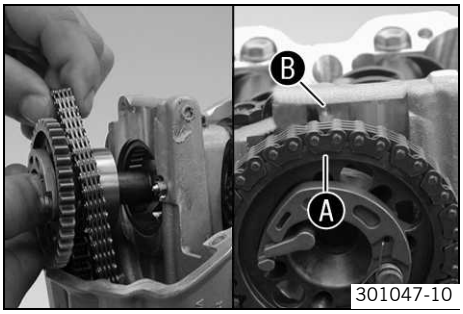
Screw, cylinder head	M10x1.25	Tightening sequence: Tighten diagonally, beginning with the rear screw on the chain shaft. Step 1 10 Nm (7.4 lbf ft) Step 2 30 Nm (22.1 lbf ft) Step 3 50 Nm (36.9 lbf ft)	lubricated with engine oil

– Mount and tighten screw ❷.

Guideline

Screw, cylinder head	M6	10 Nm (7.4 lbf ft)

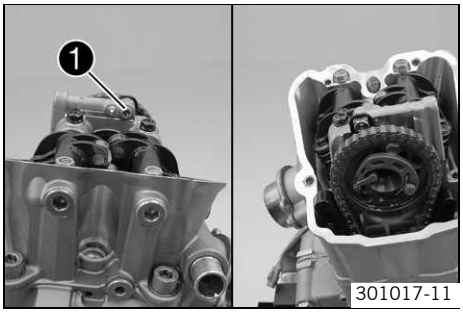
Installing the camshaft



– Wrap the timing chain around the camshaft. Push the camshaft into the bearing seats.

✓ The camshaft ❹ and cylinder head ❸ markings are lined up with each other.

Info
Ensure that the crankshaft is located at top dead center.

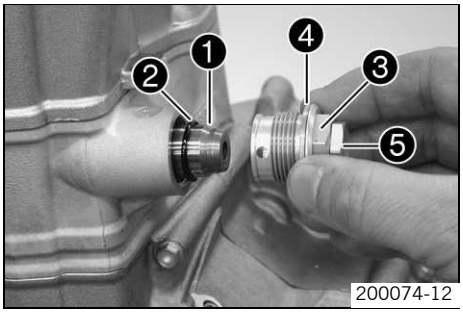


– Position the camshaft support plate. Mount and tighten screw ❶.

Guideline

Screw, camshaft bearing support	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

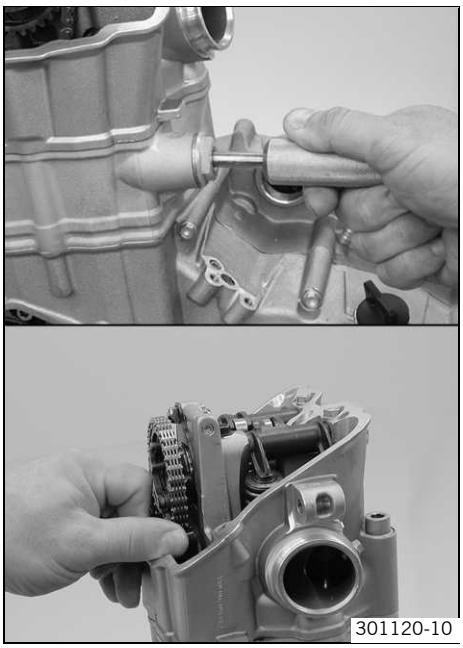
Installing the timing chain tensioner



– Position timing chain tensioner ❶ and insert it with new O-ring ❷.
– Mount and tighten plug ❸ with new seal ring ❹.

Guideline

Plug, timing chain tensioner	M24x1.5	30 Nm (22.1 lbf ft)



– Remove screw ❺ and press the timing chain tensioner toward the timing chain using the special tool.

Release device for timing chain tensioner (77329051000) (☛ p. 234)

✓ The timing chain tensioner unlocks.
– Press the timing chain tensioning rail against the timing chain with your hand.

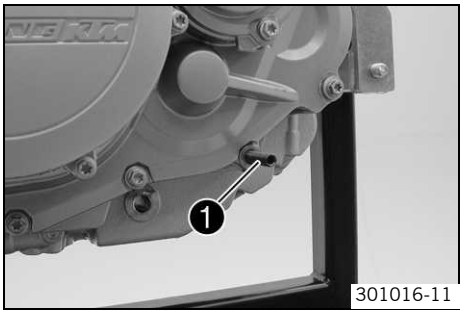
Info
This ensures that the timing chain tensioner is located in the optimal position.

– Mount and tighten screw ❺.

Guideline

Screw, unlocking of timing chain tensioner	M10x1	10 Nm (7.4 lbf ft)

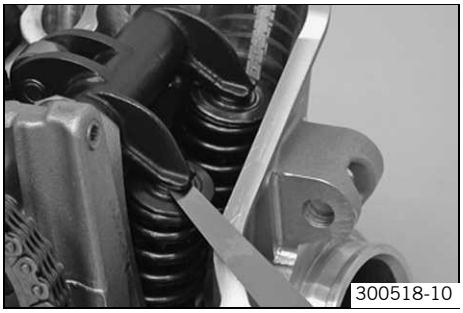
Checking the valve clearance



– Remove special tool ❶.

Crankshaft locking bolt (113080802) (☛ p. 228)

– Crank over the engine repeatedly.
– Set the engine to ignition top dead center. (☛ p. 103)



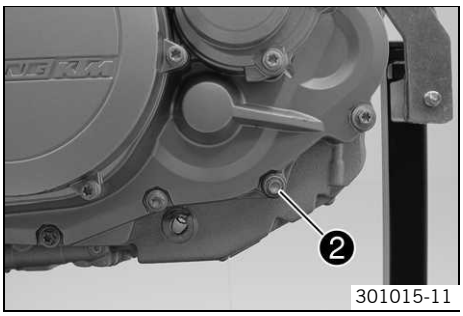
– Check the valve clearance at all valves between the valve and rocker arm.

Guideline

Valve clearance	
Exhaust at: 20 °C (68 °F)	0.12... 0.17 mm (0.0047... 0.0067 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)

Feeler gauge (59029041100) (☛ p. 230)

» If the valve clearance does not meet specifications:
  – Adjust the valve clearance. (☛ p. 154)



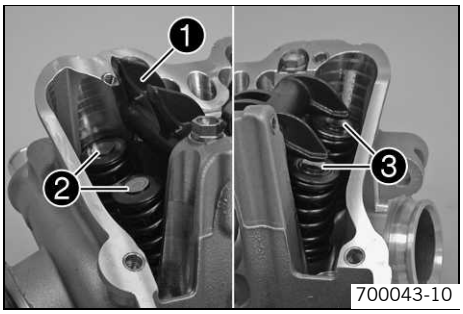
– Remove special tool ❶.
– Mount and tighten screw ❷.

Guideline

Plug, crankshaft location	M8	10 Nm (7.4 lbf ft)

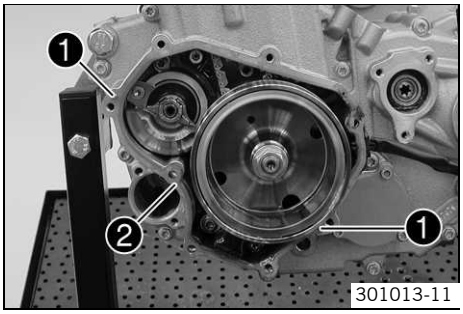
Adjusting the valve clearance

– Remove the timing chain tensioner. (☛ p. 104)
– Remove the camshaft. (☛ p. 104)

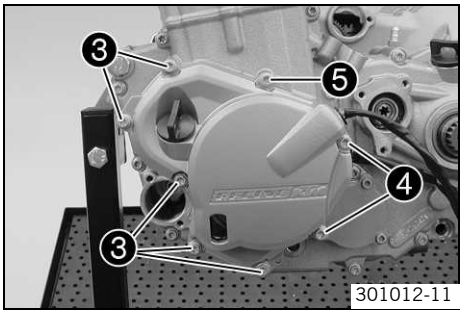


– Raise rocker arm ❶ on the outside.
– Remove shims ❷ and set them down according to the installation position.
– Correct the shims as indicated by the results of the valve clearance check.
– Insert fitting shims ❸.
– Install the camshaft. (☛ p. 153)
– Install the timing chain tensioner. (☛ p. 153)
– Check the valve clearance. (☛ p. 154)

Installing the generator cover



– Mount centering pins ❶. Fit generator cover seal ❷.



301012-11

– Position the generator cover. Mount screws ❸ and tighten them after all screws of the generator cover have been mounted.

Guideline

Screw generator cover	M6x25	10 Nm (7.4 lbf ft)

– Mount screws ❹ and tighten all screws in a crisscross pattern.

Guideline

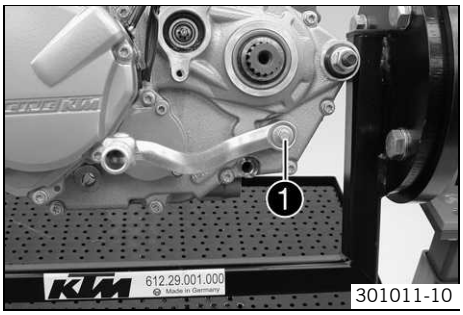
Screw generator cover	M6x40	10 Nm (7.4 lbf ft)

– Mount and tighten screw ❺.

Guideline

Screw, generator cover (through-hole for chain shaft)	M6x25	10 Nm (7.4 lbf ft)	**Loctite® 222**

Installing the shift lever



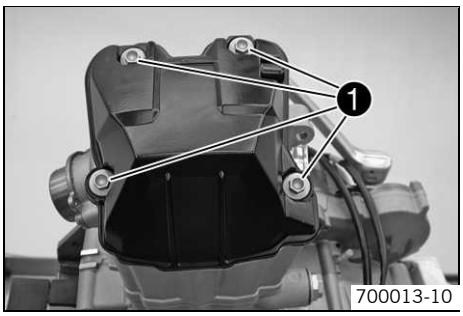
301011-10

– Position the shift lever. Mount and tighten ❶ with the collar sleeve.

Guideline

Screw, shift lever	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

Installing the valve cover



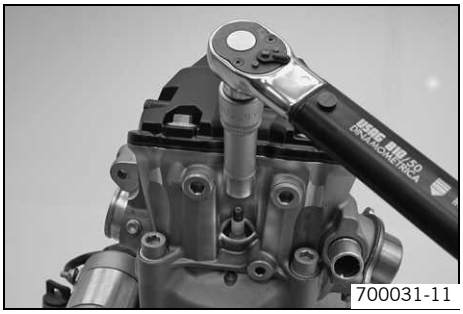
700013-10

– Position the valve cover seal.
– Fit the valve cover. Mount and tighten screws ❶.

Guideline

Screw, valve cover	M6	10 Nm (7.4 lbf ft)

Installing the spark plug


700031-11

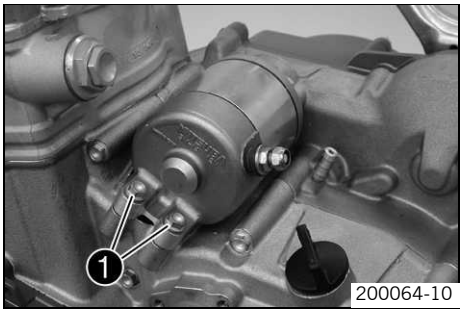
– Fit and tighten the spark plug using a special tool.

Guideline

Spark plug	M12x1.25	15... 20 Nm (11.1... 14.8 lbf ft)

Spark plug wrench (75029172000) (☛ p. 233)

Installing the starter motor



200064-10

– Grease the O-ring. Mount the starter engine.

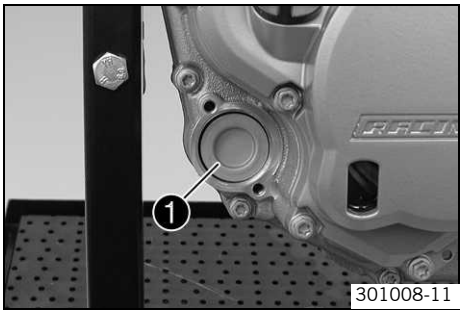
Long-life grease (☛ p. 226)

– Mount and tighten screws ❶.

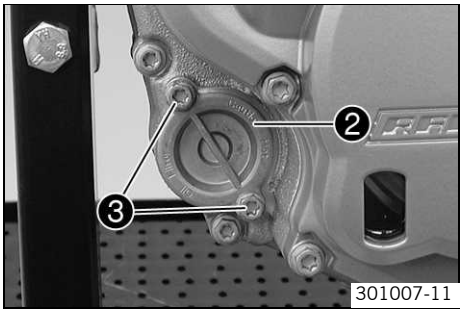
Guideline

Screw, starter motor	M6	10 Nm (7.4 lbf ft)

Mounting oil filter



– Tilt the engine sideways and fill the oil filter housing to about 1/3 full with engine oil.
– Fill the oil filter ❶ with engine oil and place it in the oil filter container.

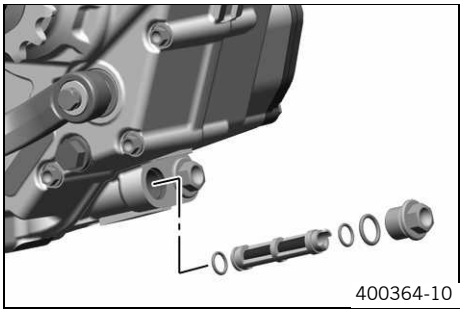


– Lubricate the O/ring of the oil filter cover.
– Refit the oil filter cover ❷.
– Mount and tighten screws ❸.

Guideline

Screw, oil filter cover	M6	10 Nm (7.4 lbf ft)

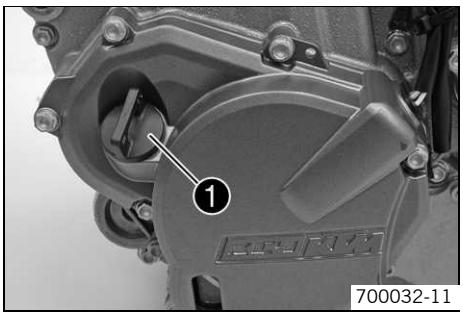
Filling up with engine oil



– Thoroughly clean the plug and engine oil screen.
– Clean the sealing area on the engine.
– Refit the plug of engine oil screen with O-rings and tighten it.

Guideline

Plug, engine oil screen	M17x1.5	20 Nm (14.8 lbf ft)

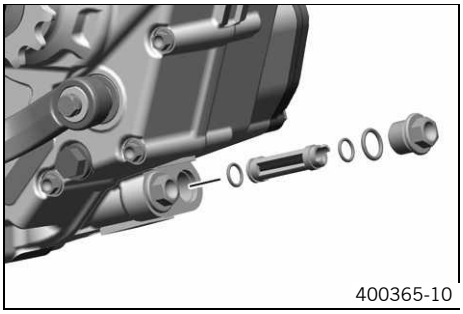


– Remove the screw cap ❶ on the generator cover and fill up with engine oil.

Engine oil	0.60 l (0.63 qt.)	Engine oil (SAE 10W/50) (☛ p. 224)

– Mount and tighten screw cap ❶.

Filling up with gear oil



– Thoroughly clean the plug, gear oil screen and gear oil drain plug.
– Clean the sealing surfaces on the engine.
– Refit gear oil drain plug with seal ring and tighten it.

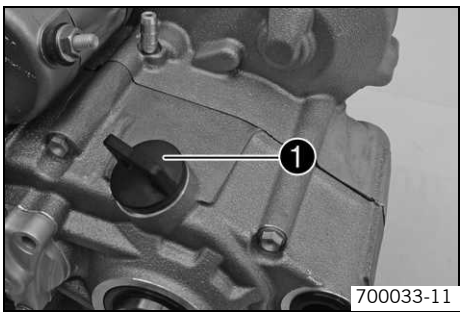
Guideline

Gear oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)

– Refit plug of gear oil screen with O-rings and tighten it.

Guideline

Plug, gear oil screen	M16x1.5	20 Nm (14.8 lbf ft)

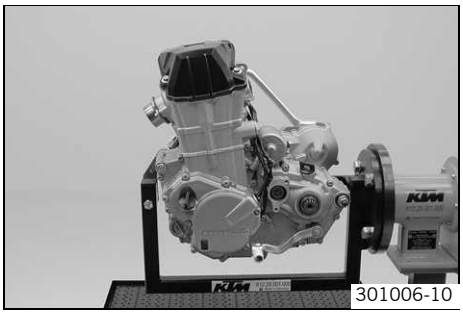


– Remove the screw cap ❶ and fill up with gear oil.

Gear oil	0.90 l (0.95 qt.)	Engine oil (SAE 10W/50) (☛ p. 224)

– Mount and tighten screw cap ❶.

Removing the engine from the work stand



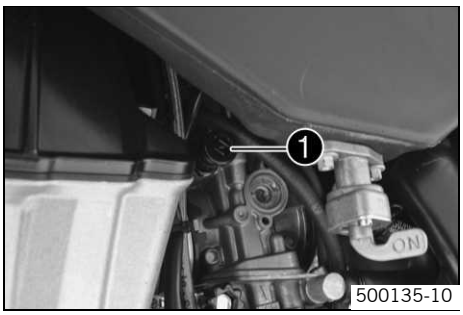
– Remove the screw connection from the special tool.

Engine bracket (78029002000) (☛ p. 234)

– Remove the engine from the work stand.

Info
Use a helper or motorized hoist.

Choke (EXC AUS, XC-W, EXC USA)

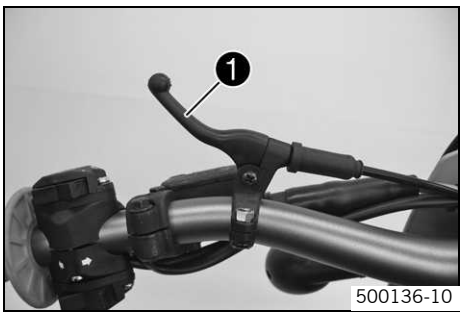


Choke ❶ is fitted on the left side of the carburetor.
Activating the choke function frees an opening through which the engine can draw extra fuel. This gives a richer fuel-air mixture, which is needed for a cold start.

Info
If the engine is warm, the choke function must be deactivated.

Possible states
- Choke function activated – The choke lever is pulled out to the stop.
- Choke function deactivated – The choke lever is pushed in to the stop.

Choke (EXC EU, EXC SIX DAYS)



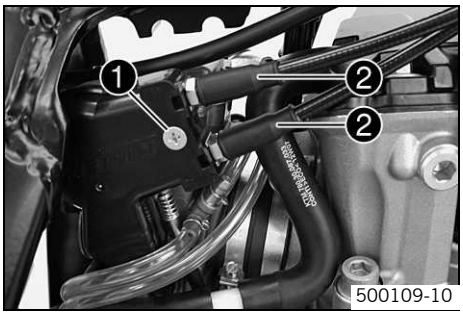
The choke lever ❶ is fitted on the left side of the handlebar.
Activating the choke function frees an opening through which the engine can draw extra fuel. This gives a richer fuel-air mixture, which is needed for a cold start.

Info
If the engine is warm, the choke function must be deactivated.

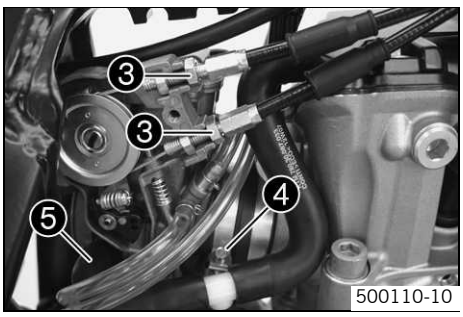
Possible states
- Choke function activated – The choke lever is pulled to the stop.
- Choke function deactivated – The choke lever is pushed back to the stop.

Removing the carburetor

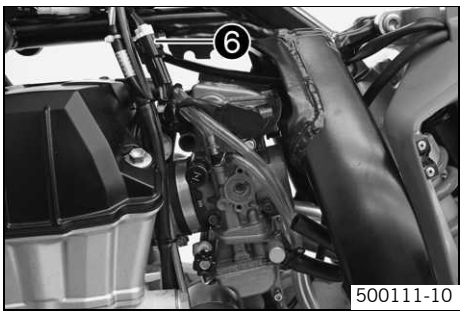
– Dismount the fuel tank. (☛ p. 63)
– Remove the carburetor connection boot. (☛ p. 62)



– Remove screw ❶. Remove the carburetor cover.
– Push back bellows ❷.



– Undo nuts ❸, detach the cables and hang them to one side.
– Loosen hose clip ❹.
– Pull engine vent hose ❺ off of the carburetor.

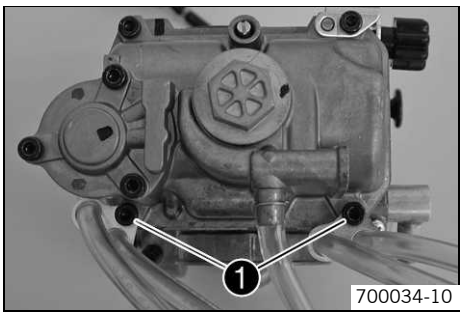


– Unplug the connector ❻ of the throttle valve sensor.
– Unthread the carburetor vent hoses. Pull the carburetor out of the rubber sleeve and remove it.

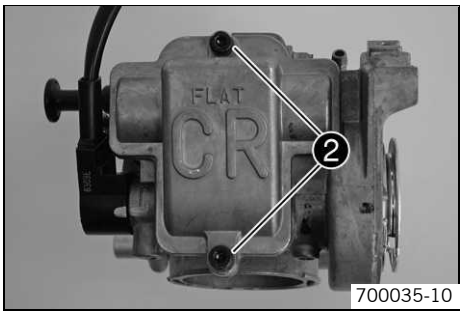
(EXC EU, EXC SIX DAYS)
– Twist out the choke slide and hang it to one side together with the cable.

Disassembling the carburetor

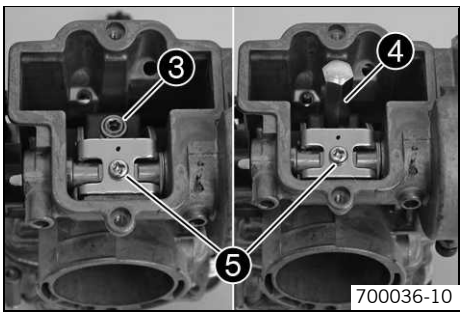
Condition
The carburetor has been removed.



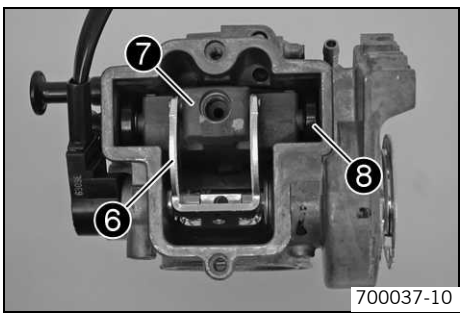
– Remove screws ❶ and detach all vent hoses from the carburetor.



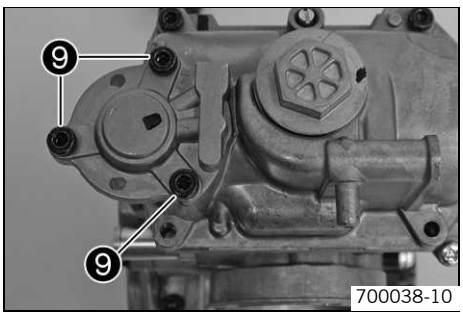
– Remove screws ❷. Take off the throttle slide cover and seal.



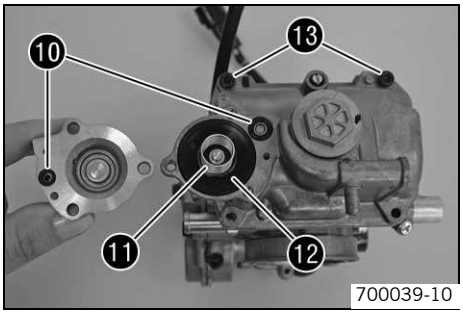
– Remove screws ❸ with the spring and washer and slide stop ❹.
– Pull the jet needle out of the throttle slide.
– Remove screw ❺.



– Pull up throttle slide arm ❻. Take throttle slide ❼ out of the carburetor along with throttle slide roller ❽ and the throttle slide plate.

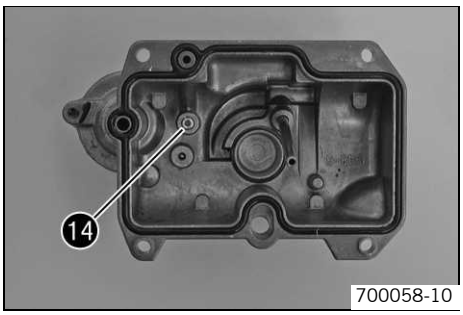


– Remove screws ❾. Take off the accelerator pump cover with the seal ring.



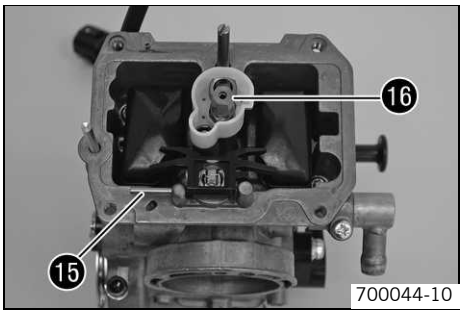
700039-10

– Remove seal rings ❿, spring ⓫ and membrane ⓬.
– Remove screws ⓭ and take off the float chamber body.



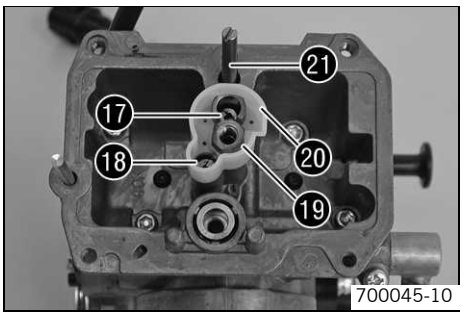
700058-10

– Remove spill jet ⓮ out of the float chamber body.



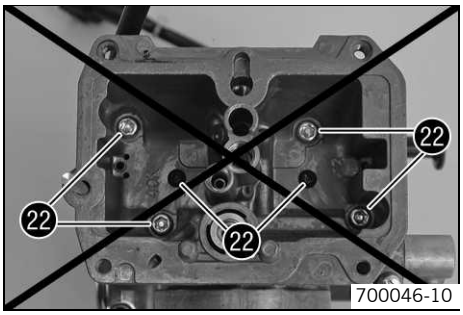
700044-10

– Remove fulcrum pin ⓯. Take off the float and float needle valve.
– Remove main jet ⓰.



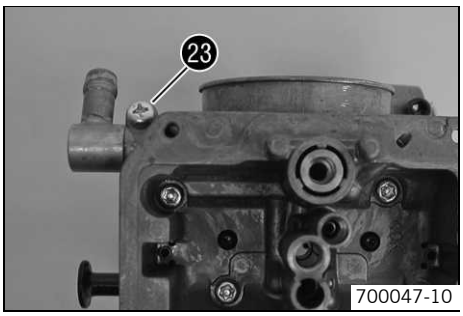
700045-10

– Remove idling jet ⓱, cold start jet ⓲, needle jet ⓳ and buffer plate ⓴.
– Screw in mixture control screw ㉑ to the stop, counting and noting down the number of rotations.
– Remove the mixture control screw with the spring, washer and O-ring.



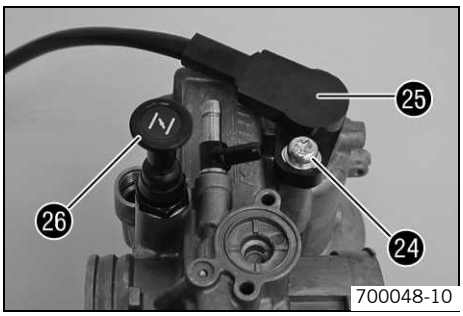
700046-10

– Screws ㉒ should not be removed.



700047-10

– Remove screw ㉓. Pull the hose connector out of the carburetor.

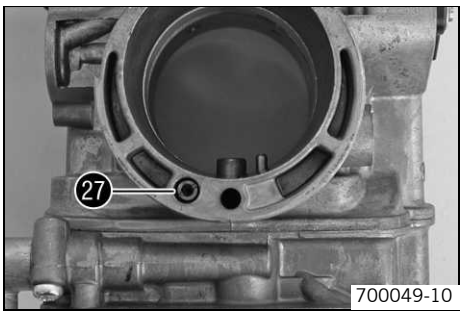


700048-10

– Remove screw ㉔. Take off throttle valve sensor ㉕.

Info
Only remove the throttle valve sensor if necessary. If screw ㉔ is loosened, the throttle valve sensor must be readjusted.

(EXC AUS, XC-W, EXC USA)
– Unscrew choke slide ㉖.



700049-10

– Remove idle air jet ㉗.
– Clean all jets and other parts thoroughly and blow out with compressed air.

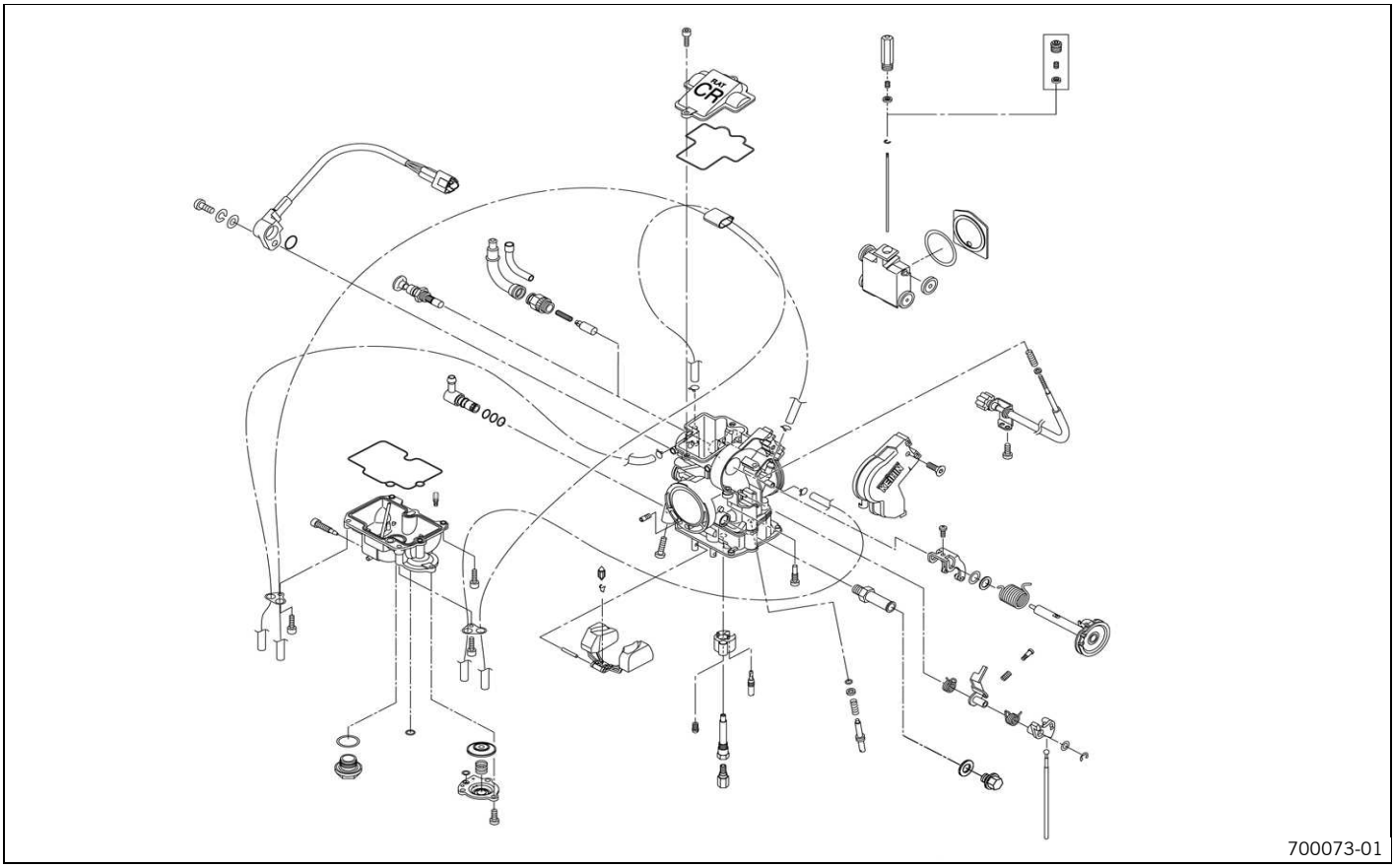
Carburetor cleaner (☛ p. 226)

– Clean the carburetor housing and blow out all channels in the carburetor with compressed air.

Carburetor cleaner (☛ p. 226)

Info
Do not use nitro thinner to clean the carburetor.

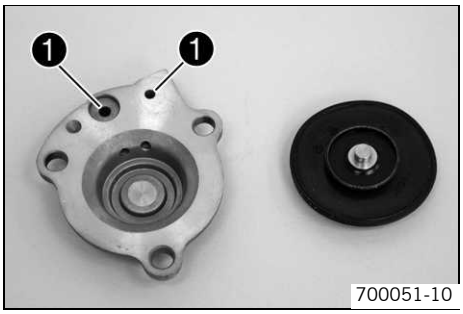
Checking/adjusting the carburetor components


700073-01

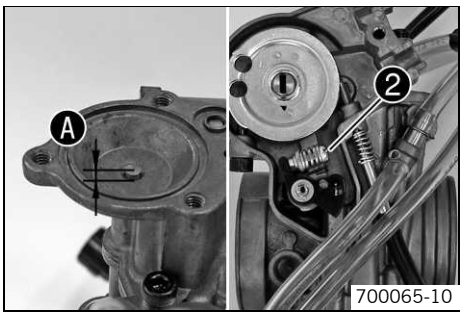
– Disassemble the carburetor. (☛ p. 159)
– Check/adjust the accelerator pump. (☛ p. 162)
– Check the choke slide. (☛ p. 162)
– Check the jet needle. (☛ p. 162)
– Check the throttle slide. (☛ p. 163)
– Check the needle jet. (☛ p. 163)
– Check the float needle valve. (☛ p. 163)
– Check/adjust the float level. (☛ p. 164)

– Check/set the throttle slide opening. (☛ p. 164)
– Check the throttle valve sensor. (☛ p. 164)
– Assemble the carburetor. (☛ p. 166)

Checking/adjusting the accelerator pump



700051-10



700065-10

Condition
The carburetor and accelerator pump have been removed.

– Check the membrane of damage or brittleness.
  » If the membrane is damaged or brittle:
    – Change the membrane.
– Check that the bores ❶ are clear.
  » If the bores are not clear:
    – Clean the bores.

Carburetor cleaner (☛ p. 226)

– Check/set the throttle slide opening. (☛ p. 164)

Info
Adjusting the play of the accelerator pump changes the time at which injection starts and does not influence the injection rate or the intensity of the accelerator pump.

– Check piston rod overhang Ⓐ.

Guideline

Piston rod overhang	0.9... 1 mm (0.035... 0.04 in)

  » If piston rod overhang Ⓐ does not equal the specified value:
    – Correct the piston rod overhang by turning adjusting screw ❷.
– Carburetor - adjust the idle speed. (☛ p. 169)

Checking the choke slide


700050-10

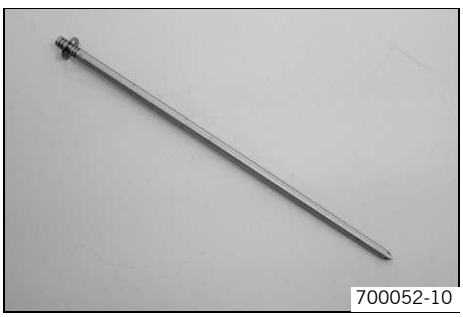
Condition
The choke slide has been removed.

– Check the choke slide for smooth operation.
  » If the choke slide cannot be moved easily or is soiled:
    – Clean the choke slide and check the cable and lever if necessary.

Carburetor cleaner (☛ p. 226)

– Check the plunger of the choke slide for damage and wear.
  » If the piston of the choke slide is damaged or worn:
    – Change the choke slide.
– Check the rubber sleeve and lock.
  » If the rubber sleeve is damaged or brittle, or if the lock does not function:
    – Change the choke slide.

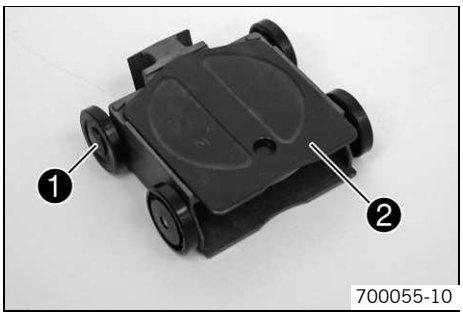
Checking the jet needle


700052-10

Condition
The jet needle has been removed.

– Check the jet needle for bending and wear of the coating.
  » If the jet needle is bent or the coating is damaged or worn:
    – Change the jet needle.
– Check that the needle clip is tight.
  » If the needle clip is not tight:
    – Change the needle clip or the jet needle.

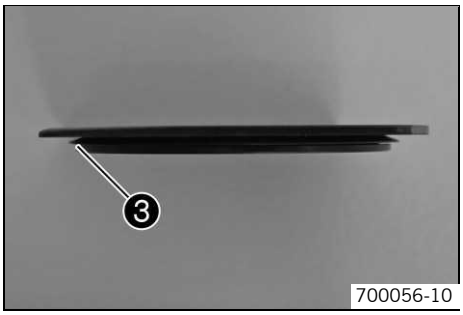
Checking the throttle slide



700055-10

Condition
The throttle slide has been removed.

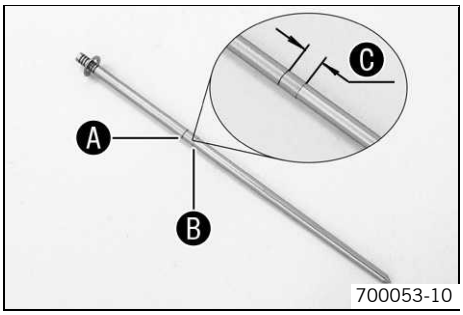
– Check the throttle slide rollers for damage and wear.
  » If the throttle slide rollers do not turn easily, are worn or have flat area:
    – Change the throttle slide.
– Except for throttle slide roller ❶ (removable), all rollers must rest flush against the throttle slide.
  » If the throttle slide rollers are loose:
    – Change the throttle slide.
– Check the coating of the throttle slide and throttle slide plate ❷ for damage and wear.
  » If the coating is damaged or worn:
    – Change the throttle slide.



700056-10

– Check the membrane ❸ of the throttle slide plate for damage, brittleness and correct seating.
  » If the membrane is damaged or brittle:
    – Change the membrane.
– Check that membrane ❸ is correctly seated.
  » If the membrane is not correctly seated:
    – Position the membrane correctly.

Checking the needle jet



700053-10

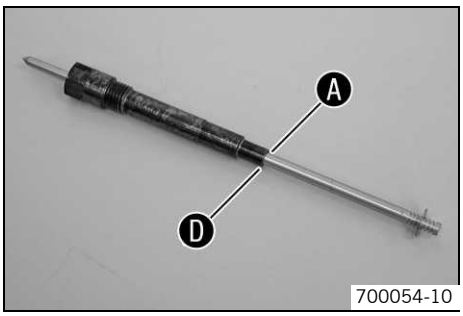
Condition
The needle jet has been removed.

– Use a new jet needle as a gauge. Apply a marking Ⓐ on the jet needle above step Ⓑ at a distance of Ⓒ.

  Guideline

Distance Ⓒ	3 mm (0.12 in)

Info
The marking should come off completely when cleaned away.

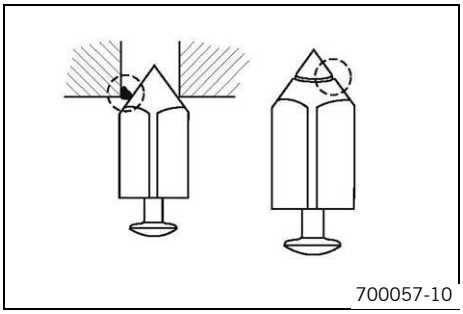


700054-10

– Insert the marked jet needle into the needle jet being tested. Push the two pieces together carefully.
– Check the needle jet.
  » If marking Ⓐ on the jet needle is not visible on top edge Ⓓ of the needle jet:
    – Change the needle jet.

Checking the float needle valve

Condition
The float needle valve has been removed.

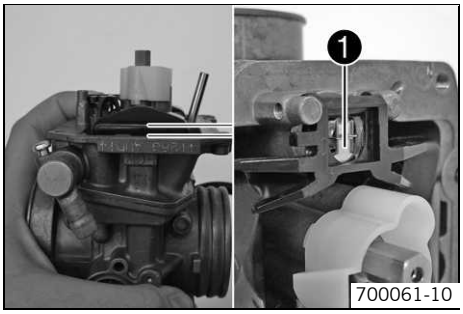

700057-10

– Check the float needle valve and the valve seat for deposits.
  » If deposits are present:
    – Clean the valve seat. Clean or change the float needle valve.

Carburetor cleaner (☛ p. 226)

– Check the float needle valve for wear and the sealing areas of indentations.
  » If the sealing area is damaged or if there is wear:
    – Change the float needle valve.

Checking/adjusting the float level



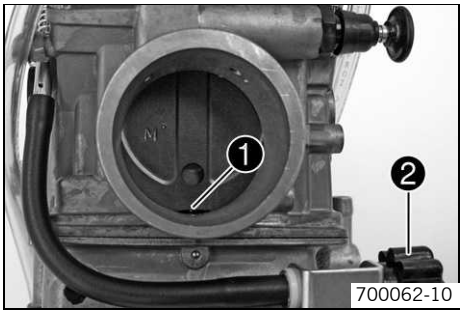
700061-10

Condition
The carburetor and float chamber have been removed.

– Hold the carburetor at a slant, securing the pin against falling out of the float.
– Hold the carburetor at a slant so that the float lies against the float needle valve but does not press it together.
  » In this position, if the edge on the float is not parallel to the sealing area of the float chamber:
    – Adjust the float level by bending float lever ❶.

Checking/setting the throttle slide opening

Info
The basic setting of the throttle slide is used to check the beginning of injection of the accelerator pump and the basic setting of the throttle position sensor.



700062-10

Condition
The carburetor has been removed.

– Check the throttle slide opening using a wire or a drill shank.

Throttle slide opening	1 mm (0.04 in)

  » If the throttle slide opening does not meet specifications:
    – Adjust the throttle slide opening with adjusting screw ❷.

Checking the throttle valve sensor

Info
The value in the figure is an example only!

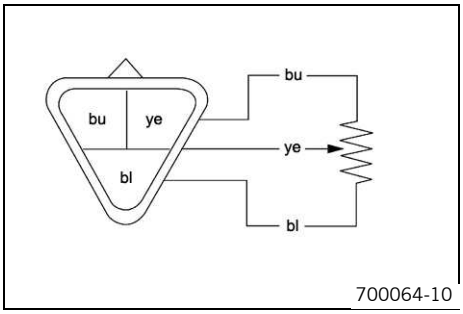
700063-10

Condition
The carburetor has been removed.
Component temperature: 20 °C (68 °F)

– Check/set the throttle slide opening. (☛ p. 164)
– Connect the plus cable of the multimeter to the blue (bu) cable and the ground cable to the black (bl) cable of the throttle position sensor connector. Measure the total throttle position sensor resistance R_{tot}.

  Guideline

Total resistance R_{tot} of the throttle valve sensor	4… 6 kΩ



700064-10

– Connect the plus cable of the multimeter to the yellow (ye) cable and the ground cable to the black (bl) cable of the throttle position sensor connector.
– Slowly open the throttle slide and measure the variable throttle position sensor resistance R_{var}.

Variable resistance R_{var} of the throttle valve sensor (throttle slide fully opened)	3... 4.5 kΩ

» If the value does not increase at a uniform rate:
– Change the throttle position sensor.
» If the value is outside of specifications:
– Adjust the position of the throttle position sensor. (☛ p. 165)

Adjusting the position of the throttle position sensor

Info
The value in the figure is an example.

Condition
The carburetor has been removed.
Component temperature: 20 °C (68 °F)

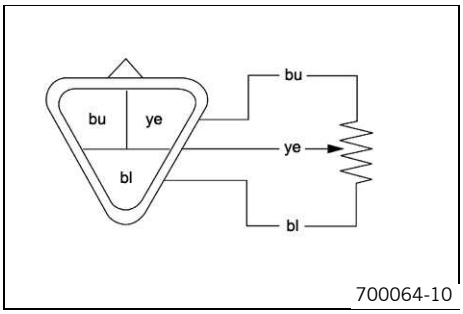
– Check/set the throttle slide opening. (☛ p. 164)

700063-10

– Connect the plus cable of the multimeter to the blue (bu) cable and the ground cable to the black (bl) cable of the throttle position sensor connector. Measure the total throttle position sensor resistance R_{tot}.

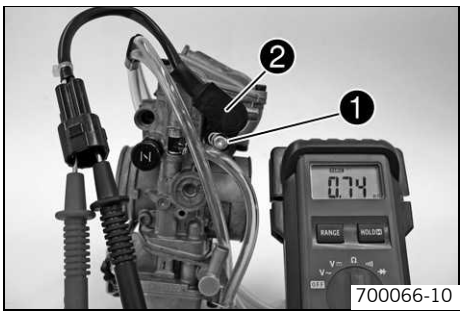
Guideline

Total resistance R_{tot} of the throttle valve sensor	4... 6 kΩ



700064-10

– Multiply the total throttle position sensor resistance R_{tot} by 0.17. The product is the variable throttle position sensor resistance R_{var} for the setting.
– R_{tot} x 0.17 = R_{var} (tolerance ± 0.05 kΩ)



700066-10

– Connect the plus cable of the multimeter to the yellow (ye) cable and the ground cable to the black (bl) cable of the throttle position sensor connector.
– Measure the variable throttle position sensor resistance R_{var}.

Info
The throttle slide must be in the basic position.

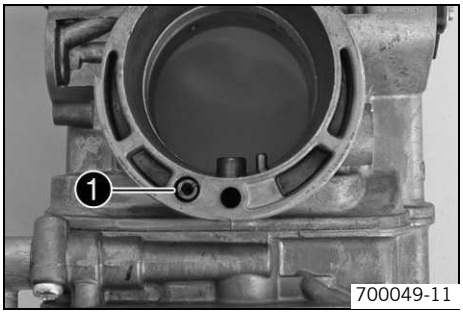
– Unscrew screw ❶. Adjust the throttle valve sensor ❷ by turning to the calculated value.
– Tighten screw ❶.

Guideline

Screw, throttle valve sensor	M5	3.5 Nm (2.58 lbf ft)

– Check the variable throttle position sensor resistance R_{var} again.
» If the measured value is outside of the calculated value:
– Repeat the adjustment procedure.

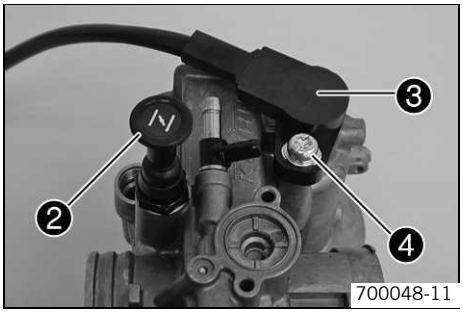
Assembling the carburetor



– Mount and tighten idle air jet ❶.

Guideline

Idle air jet	M4.5x0.75	2 Nm (1.5 lbf ft)



(EXC AUS, XC-W, EXC USA)

– Mount and tighten choke slide ❷.

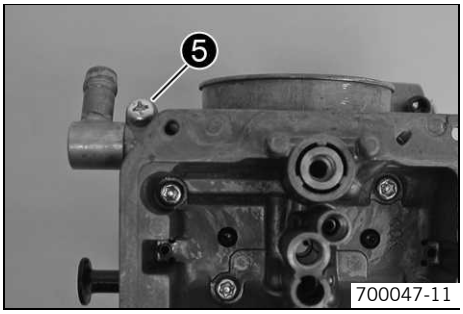
Guideline

Choke slide	M12	2.5 Nm (1.84 lbf ft)

– Position throttle valve sensor ❸. Mount screw ❹ with the spring ring and washer but do not tighten yet.

Info

When installing the throttle valve sensor, ensure that the flat area of the inner clutch hub engages in the recess of the throttle valve sensor.



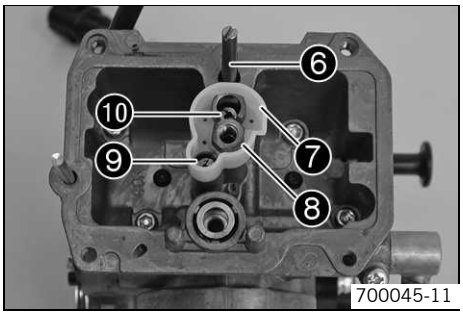
– Position the hose connection. Mount and tighten screw ❺.

Guideline

Screw, hose connection	M4	2 Nm (1.5 lbf ft)	**Loctite® 243™**

Info

The hose connection must be easy to turn when it is mounted.



– Screw in mixture control screw ❻ together with the spring, washer and O-ring to the stop.

Guideline

Mixture control screw	M6x0.5	1 Nm (0.7 lbf ft)

– Unscrew mixture control screw ❻ again by the number of turns that was noted down earlier when it was disassembled or to the specified basic setting.

Guideline

Idle mixture adjusting screw (400 EXC)	
Open	0.75 turn
Idle mixture adjusting screw (530 EXC EU/AUS, 530 EXC SIX DAYS, XC-W ZA)	
Open	1.5 turns
Idle mixture adjusting screw (450 EXC EU/AUS, 450 EXC SIX DAYS, 400 XC-W USA, 450 XC-W USA, 450 EXC USA)	
Open	1.75 turns
Idle mixture adjusting screw (530 XC-W USA, 530 EXC USA)	
Open	2.0 turns

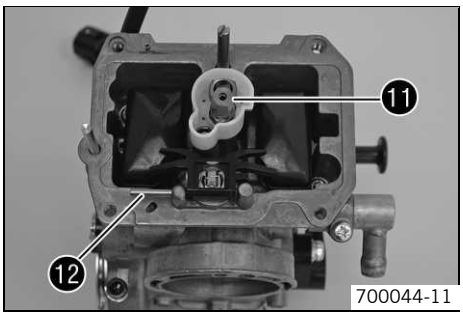
Info

The mixture control screw may be open by no more than 2 turns. If more than two turns are necessary (rich mixture), use a larger idling jet.

– Position buffer plate ❼. Mount and tighten needle jet ❽, cold start jet ❾ and idling jet ❿.

Guideline

Needle jet	M7x0.75	3.5 Nm (2.58 lbf ft)
Cold start jet	M5x0.75	2 Nm (1.5 lbf ft)
Idling jet	M6x0.75	2 Nm (1.5 lbf ft)

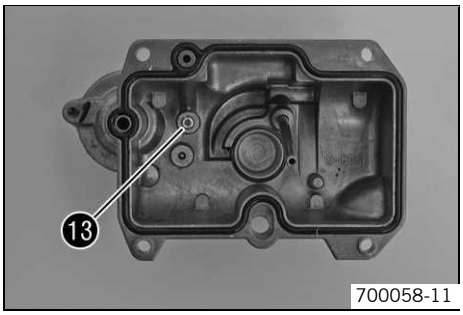


– Mount and tighten main jet ⓫.

Guideline

Main jet	M5x0.75	2 Nm (1.5 lbf ft)

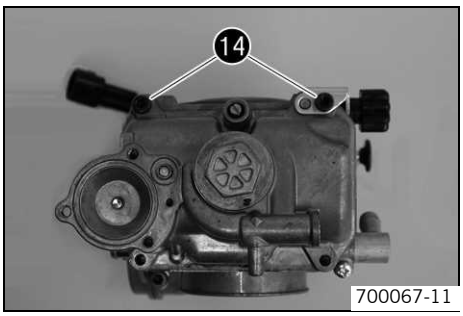
– Position the float and float needle valve, and mount fulcrum pin ⓬.
– Check/adjust the float level. (☛ p. 164)



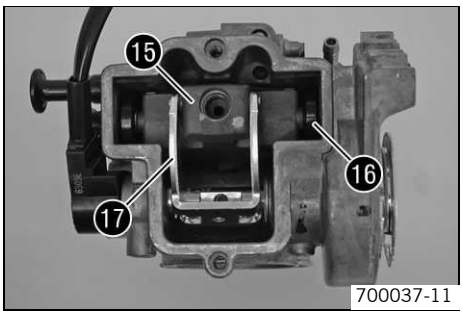
– Mount and tighten leakage nozzle ⓭.

Guideline

Leakage nozzle	M4x0.7	2 Nm (1.5 lbf ft)



– Position the float chamber and adjustment screw.
– Mount screws ⓮ but do not tighten them yet.

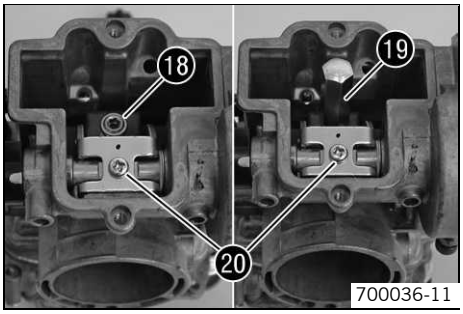


– Insert throttle slide ⓯ with throttle slide roller ⓰ and the throttle slide plate into throttle slide arm ⓱ and position them in the carburetor.
– Position the needle clip on the jet needle.

Guideline

Needle position (XC-W USA)	1st position from top
Needle position (530 EXC USA)	3rd position from top
Needle position (450 EXC EU/AUS, 450 EXC SIX DAYS, XC-W ZA, 450 EXC USA)	4th position from top
Needle position (400 EXC, 530 EXC EU/AUS, 530 EXC SIX DAYS)	5th position from top

– Insert the jet needle.



– Mount and tighten screw ⓲ or slide stop ⓳ with the spring and washer.

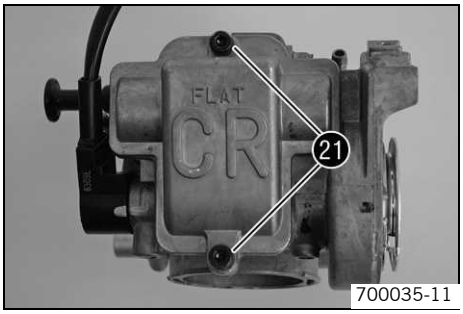
Guideline

Needle screw/slide stop	M8	3.5 Nm (2.58 lbf ft)

– Mount and tighten screw ⓴.

Guideline

Screw, throttle slide arm	M4	2 Nm (1.5 lbf ft)	**Loctite® 243™**

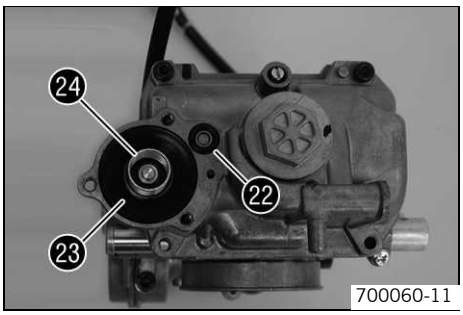


– Position the throttle slide cover with the seal. Mount and tighten screws ㉑.

Guideline

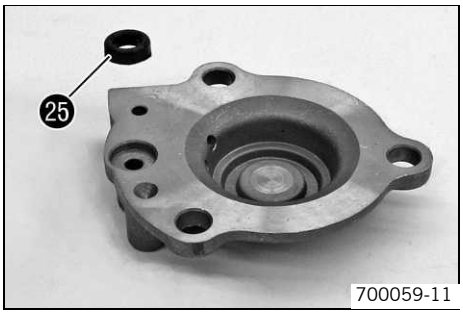
Other screws, carburetor	M4	2 Nm (1.5 lbf ft)

– Check/set the throttle slide opening. (☛ p. 164)

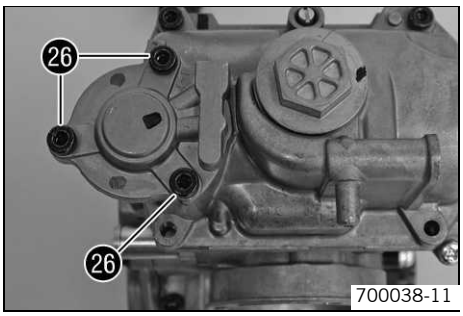


– Check/adjust the accelerator pump. (☛ p. 162)
– Position seal ring ㉒, membrane ㉓ and spring ㉔.

Info
The label on the membrane must be visible when mounted.



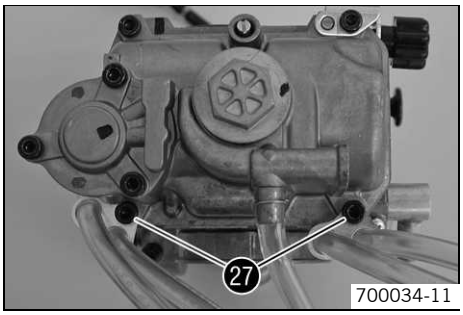
– Position seal ring ㉕ in the accelerator pump cover with the rounded side facing outward.



– Position the accelerator pump cover. Mount and tighten screws ㉖.

Guideline

Other screws, carburetor	M4	2 Nm (1.5 lbf ft)



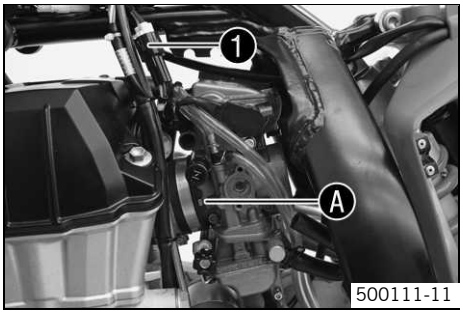
– Position and mount the vent hoses.
– Position the hose holder. Mount the screws ㉗ and tighten all screws in a crisscross pattern.

Guideline

Other screws, carburetor	M4	2 Nm (1.5 lbf ft)

– Adjust the position of the throttle position sensor. (☛ p. 165)

Installing the carburetor



(EXC EU, EXC SIX DAYS)

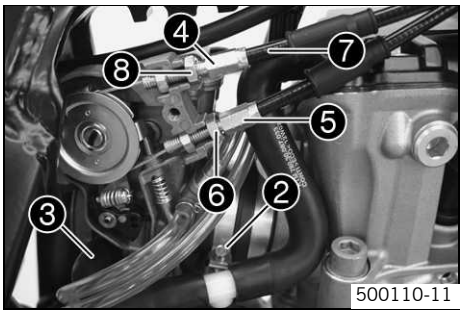
– Mount and tighten the choke slide.

Guideline

Choke slide	M12	2.5 Nm (1.84 lbf ft)

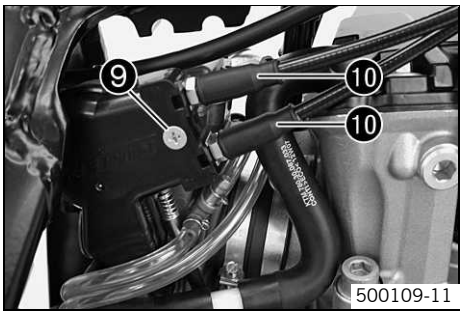
– Insert the carburetor into the rubber sleeve.

Info
Align nose Ⓐ on the carburetor with the notch in the rubber sleeve. The carburetor must be positioned vertically.



500110-11

– Position the carburetor vent hoses.
– Attach connector of throttle valve sensor ❶.
– Position and tighten hose clamp ❷.
– Attach engine vent hose ❸ to the carburetor.
– Connect the cables.
– Check the routing of the throttle cable. (☛ p. 37)
– Move the handlebar to the straight-ahead position.
– Turn adjusting screw ❹ in as far as possible.
– Turn adjusting screw ❺ so that there is play in the throttle cable at the throttle grip.
– Tighten nut ❻.
– Press and hold the throttle grip in the closed setting. Turn adjusting screw ❹ out until there is no play in the cable ❼.
– Tighten nut ❽.



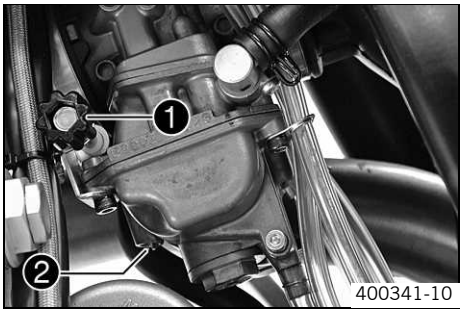
500109-11

– Position the carburetor cover. Mount and tighten screw ❾.
– Push bellows ❿ on. Check the throttle grip for smooth operation.
– Install the carburetor connection boot. (☛ p. 62)
– Install the fuel tank. (☛ p. 64)
– Check the play in the throttle cable. (☛ p. 37)

(EXC EU, EXC SIX DAYS)

– Check the choke cable play. (☛ p. 36)

Carburetor - adjusting idle



400341-10

– Screw in the idle adjusting screw ❷ until it stops and then to the prescribed basic setting.

Guideline

Idle mixture adjusting screw (400 EXC)	
Open	0.75 turn
Idle mixture adjusting screw (530 EXC EU/AUS, 530 EXC SIX DAYS, XC-W ZA)	
Open	1.5 turns
Idle mixture adjusting screw (450 EXC EU/AUS, 450 EXC SIX DAYS, 400 XC-W USA, 450 XC-W USA, 450 EXC USA)	
Open	1.75 turns
Idle mixture adjusting screw (530 XC-W USA, 530 EXC USA)	
Open	2.0 turns

Adjustment tool for mixture control screw (77329034000) (☛ p. 233)

– Run the engine until warm.

Guideline

Warm-up time	≥ 5 min

Danger

Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.

– Adjust the idle speed with adjusting screw ❶.

Guideline

Choke function deactivated – The choke lever is pushed in to the stop. (EXC AUS, XC-W, EXC USA) (☛ p. 158)	
Choke function deactivated – The choke lever is pushed back to the stop. (EXC EU, EXC SIX DAYS) (☛ p. 158)	
Idle speed	1,550... 1,650 rpm

– Turn the idle adjusting screw ❷ slowly until the idle speed begins to fall.
– Note the position and turn the idle adjusting screw slowly counterclockwise until the idle speed falls.
– Adjust to the point between these two positions with the highest idle speed.

Info
If there is a big engine speed rise, reduce the idle speed to a normal level and repeat the above steps.
The extreme sport motorcyclist will set the mixture about ¼ of a turn back from this ideal value (leaner, in a clockwise direction) since the engine becomes hotter in sporting use.
If the procedure described here does not lead to satisfactory results, the cause may be a wrongly dimensioned idling jet.
If you can turn the idle adjusting screw to the end without any change of engine speed, you have to mount a smaller idling jet.
The idle adjusting screw must not be opened more than two turns. If more than two turns are necessary (rich mixture), use a larger idling jet.
After changing the idling jet, start from the beginning with the adjusting steps.

– Adjust the idle speed with adjusting screw ❶.

Guideline

Choke function deactivated – The choke lever is pushed in to the stop. (EXC AUS, XC-W, EXC USA) (☛ p. 158)	
Choke function deactivated – The choke lever is pushed back to the stop. (EXC EU, EXC SIX DAYS) (☛ p. 158)	
Idle speed	1,550... 1,650 rpm

Info
Following extreme air temperature or altitude changes, adjust the idle speed again.

Emptying the carburetor float chamber

Danger
Fire hazard Fuel is highly flammable.

– Never fill up the vehicle near open flames or burning cigarettes, also make sure the engine is switched off, before refilling. Be careful that no fuel is spilt, especially on hot vehicle components. Clean up spilt fuel immediately.
– The volume of the fuel in the tank increases with increasing temperature, if the fuel tank is overfilled this will result in fuel spillage. See the "Fuel filling" specifications.

Warning
Danger of poisoning Fuel is poisonous and a health hazard.

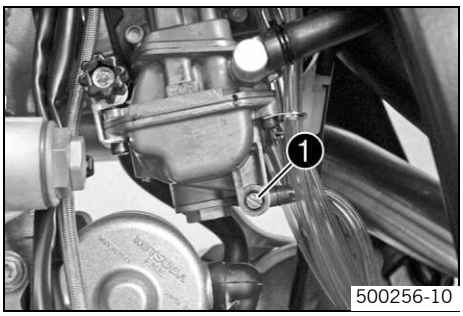
– Avoid contact between fuel and skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come into contact with fuel. Store fuel in a suitable canister according to regulations and keep it out of the reach of children.

Warning
Environmental hazard Improper handling of fuel is a danger to the environment.

– Do not allow fuel to get into the ground water, the ground, or the sewage system.

Info
Carry out this work with a cold engine.

– Turn handle ❶ of the fuel tap to the **OFF** position. (Figure 500137-10☛ p. 65)
✓ No more fuel flows from the tank to the carburetor.



– Direct the hose of the float chamber into a suitable container.

Info
Water in the float chamber results in malfunctioning.

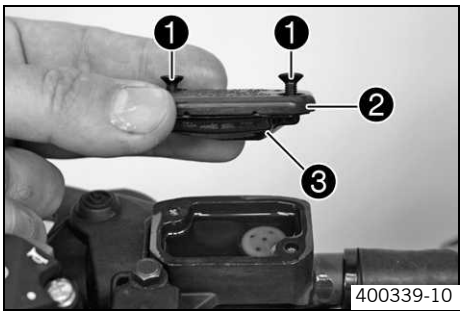
– Undo the screw ❶ (turn it counterclockwise) a few turns and drain the fuel from the float chamber.
– Tighten screw ❶.

Checking fluid level of hydraulic clutch

Warning
Skin irritation Brake fluid can cause skin irritation on contact.

- Avoid contact with skin and eyes, and keep out of the reach of children.
- Wear suitable protective clothing and goggles.
- If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.

Info
The fluid level rises with increasing wear of the clutch lining disc.
Avoid contact between brake fluid and painted parts. Brake fluid is corrosive and will damage painted surfaces.
Use only clean brake fluid from a sealed container!



- Move the clutch fluid reservoir mounted on the handlebar to a horizontal position.
- Remove screws ❶.
- Remove cover ❷ with membrane ❸.
- Check the fluid level.

Fluid level below top edge of container	4 mm (0.16 in)

» If the level of the fluid does not meet specifications:
- Correct the fluid level of the hydraulic clutch.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

- Position the cover with the membrane. Mount and tighten the screws.

Info
Clean up overflowed or spilt fluid immediately with water.

Changing the hydraulic clutch fluid

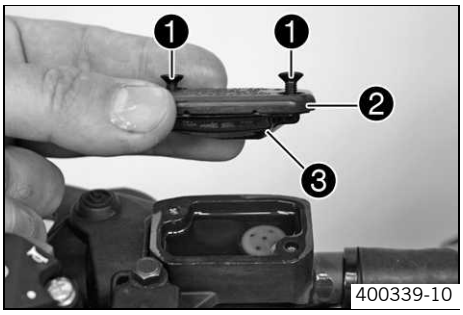
Warning
Skin irritation Brake fluid can cause skin irritation on contact.

- Avoid contact with skin and eyes, and keep out of the reach of children.
- Wear suitable protective clothing and goggles.
- If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.

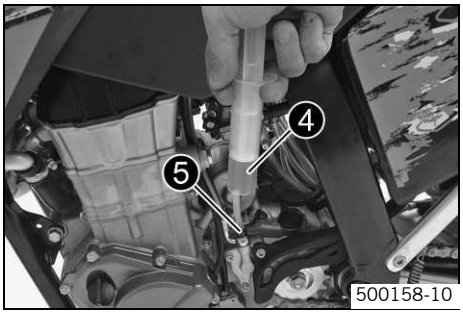
Warning
Environmental hazard Hazardous substances cause environmental damage.

- Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
The fluid level rises with increasing wear of the clutch lining disc.
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container!



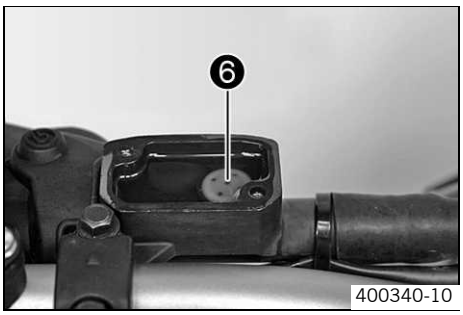
- Move the clutch fluid reservoir mounted on the handlebar to a horizontal position.
- Remove screws ❶.
- Remove cover ❷ with membrane ❸.



– Fill bleeding syringe ❹ with the appropriate hydraulic fluid.

Bleed syringe (50329050000) (☛ p. 228)
Brake fluid DOT 4 / DOT 5.1 (☛ p. 224)

– On the slave cylinder, remove bleeder screw ❺ and mount bleeding syringe ❹.



– Inject the liquid into the system until it escapes from bore hole ❻ of the master cylinder without bubbles.
– To prevent overflow, drain fluid occasionally from the master cylinder reservoir.
– Remove the bleeding syringe. Mount and tighten the bleeder screw.
– Correct the fluid level of the hydraulic clutch.

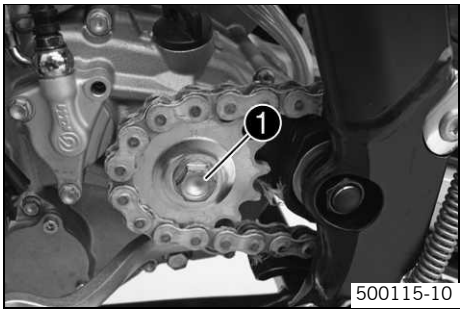
  Guideline

Fluid level under top level of container	4 mm (0.16 in)

– Position the cover with the membrane. Mount and tighten the screws.

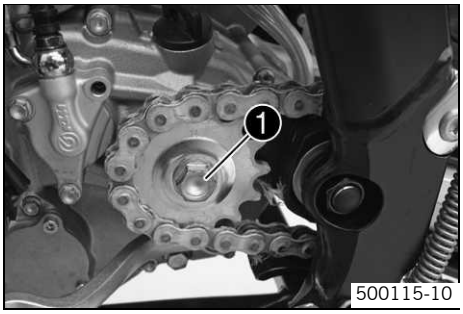
Info
Clean up overflowed or spilt fluid immediately with water.

Removing the engine sprocket



– Remove the engine sprocket cover. (☛ p. 38)
– Activate the rear brake and remove screw ❶ with the spring washer.
– Pull the engine sprocket and chain off of the countershaft. Remove the engine sprocket.

Installing the engine sprocket



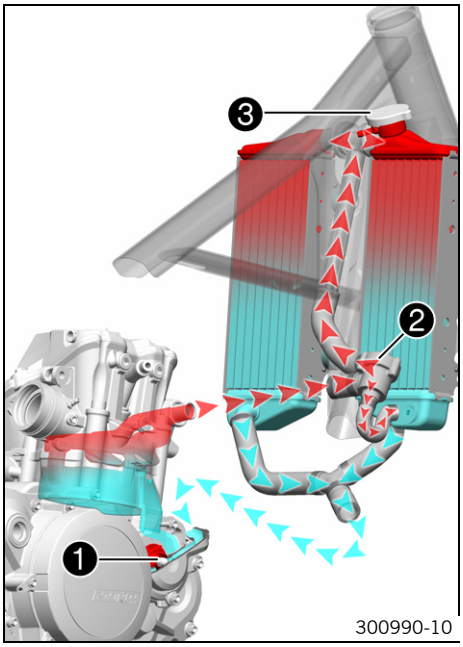
– With the collar facing the engine, mount the engine sprocket in the chain and slide both onto the countershaft.
– Press the rear brake. Fit and tighten screw ❶ with spring washer.

Guideline

Screw, engine sprocket	M10	60 Nm (44.3 lbf ft)	**Loctite® 243™**

– Check the chain tension. (☛ p. 74)
– Install the engine sprocket cover. (☛ p. 38)

Cooling system



Water pump ❶ in the engine circulates the coolant.
The water cycle through the radiator is controlled on the basis of the coolant temperature. The cooling system is subdivided into two circuits. In the warming-up phase, the engine circulates the water through the smaller cooling circuit. This warms up the engine rapidly. Thermostat ❷ warms up and opens the entry to the radiator (large circuit). In this way, the engine temperature can be kept constant.
The pressure resulting from the warming of the cooling system is regulated by a valve in radiator cap ❸. The specified coolant temperature is therefore permissible without danger of function problems.

120 °C (248 °F)

Cooling is effected by the air stream.
The lower the speed, the less the cooling effect. Dirty cooling fins also reduce the cooling effect.

(EXC SIX DAYS, XC-W ZA)

The radiator fan provides extra cooling. It is controlled by a thermoswitch.

Checking the antifreeze and coolant level

Warning

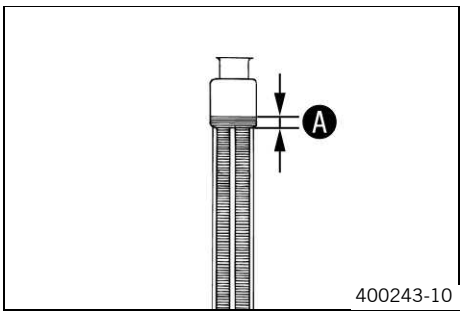
Danger of scalding The coolant gets very hot when the motorcycle is driven and is under high pressure.

– Do not remove any radiator caps/plugs, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of burns, rinse immediately with lukewarm water.

Warning

Danger of poisoning Coolants are poisonous and a health hazard.

– Avoid contact between coolants and skin, eyes and clothing. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If coolant is swallowed, contact a doctor immediately. Change clothes that have come into contact with coolants. Keep coolants out of the reach of children.



Condition

The engine is cold.

– Stand the motorcycle upright on a horizontal surface.
– Remove radiator cap.
– Check the coolant antifreeze.

−25... −45 °C (−13... −49 °F)

» If the coolant antifreeze does not meet specifications:
– Correct the coolant antifreeze.

– Check the coolant level in the radiator.

Coolant level ❹ above the radiator fins.	10 mm (0.39 in)

» If the coolant level does not meet specifications:
– Correct the coolant level.

Alternative 1

Coolant (☛ p. 224)

Alternative 2

Coolant (mixed ready to use) (☛ p. 224)

– Mount the radiator cap.

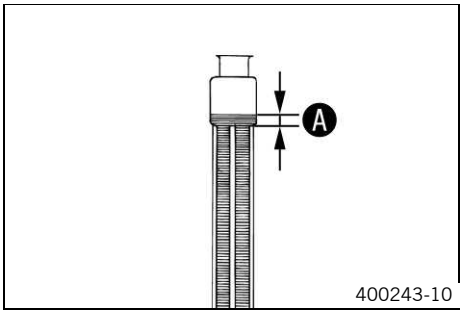
Checking the coolant level

Warning
Danger of scalding The coolant gets very hot when the motorcycle is driven and is under high pressure.

– Do not remove any radiator caps/plugs, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of burns, rinse immediately with lukewarm water.

Warning
Danger of poisoning Coolants are poisonous and a health hazard.

– Avoid contact between coolants and skin, eyes and clothing. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If coolant is swallowed, contact a doctor immediately. Change clothes that have come into contact with coolants. Keep coolants out of the reach of children.



Condition
The engine is cold.

– Stand the motorcycle upright on a horizontal surface.
– Remove radiator cap.
– Check the coolant level in the radiator.

Coolant level ❹ above the radiator fins.	10 mm (0.39 in)

» If the coolant level does not meet specifications:
– Correct the coolant level.

Alternative 1

Coolant (☛ p. 224)

Alternative 2

Coolant (mixed ready to use) (☛ p. 224)

– Mount the radiator cap.

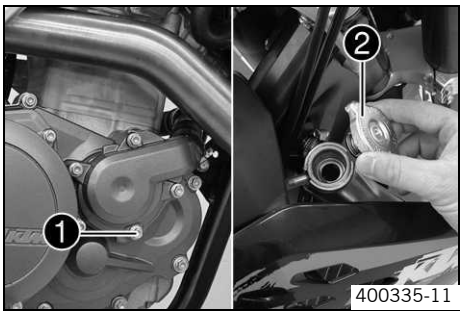
Draining coolant

Warning
Danger of scalding The coolant gets very hot when the motorcycle is driven and is under high pressure.

– Do not remove any radiator caps/plugs, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of burns, rinse immediately with lukewarm water.

Warning
Danger of poisoning Coolants are poisonous and a health hazard.

– Avoid contact between coolants and skin, eyes and clothing. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If coolant is swallowed, contact a doctor immediately. Change clothes that have come into contact with coolants. Keep coolants out of the reach of children.



Condition
The engine is cold.

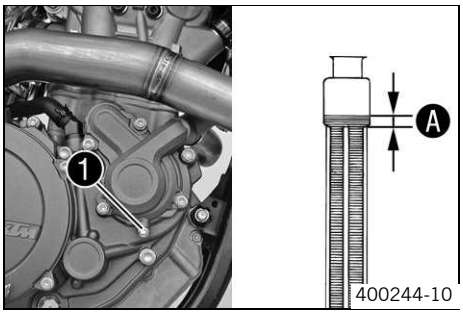
– Stand the vehicle upright.
– Place a suitable container under the water pump cover.
– Remove screw ❶. Remove the radiator cap ❷.
– Completely drain the coolant.
– Mount and tight screw ❶ with a new seal ring.
Guideline

Screw, water pump cover	M6x25	10 Nm (7.4 lbf ft)

Refilling coolant

Warning
Danger of poisoning Coolants are poisonous and a health hazard.

– Avoid contact between coolants and skin, eyes and clothing. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If coolant is swallowed, contact a doctor immediately. Change clothes that have come into contact with coolants. Keep coolants out of the reach of children.



– Make sure that the screw ❶ is tightened.
– Stand the vehicle upright.
– Pour coolant in up to measurement Ⓐ above the radiator fins.

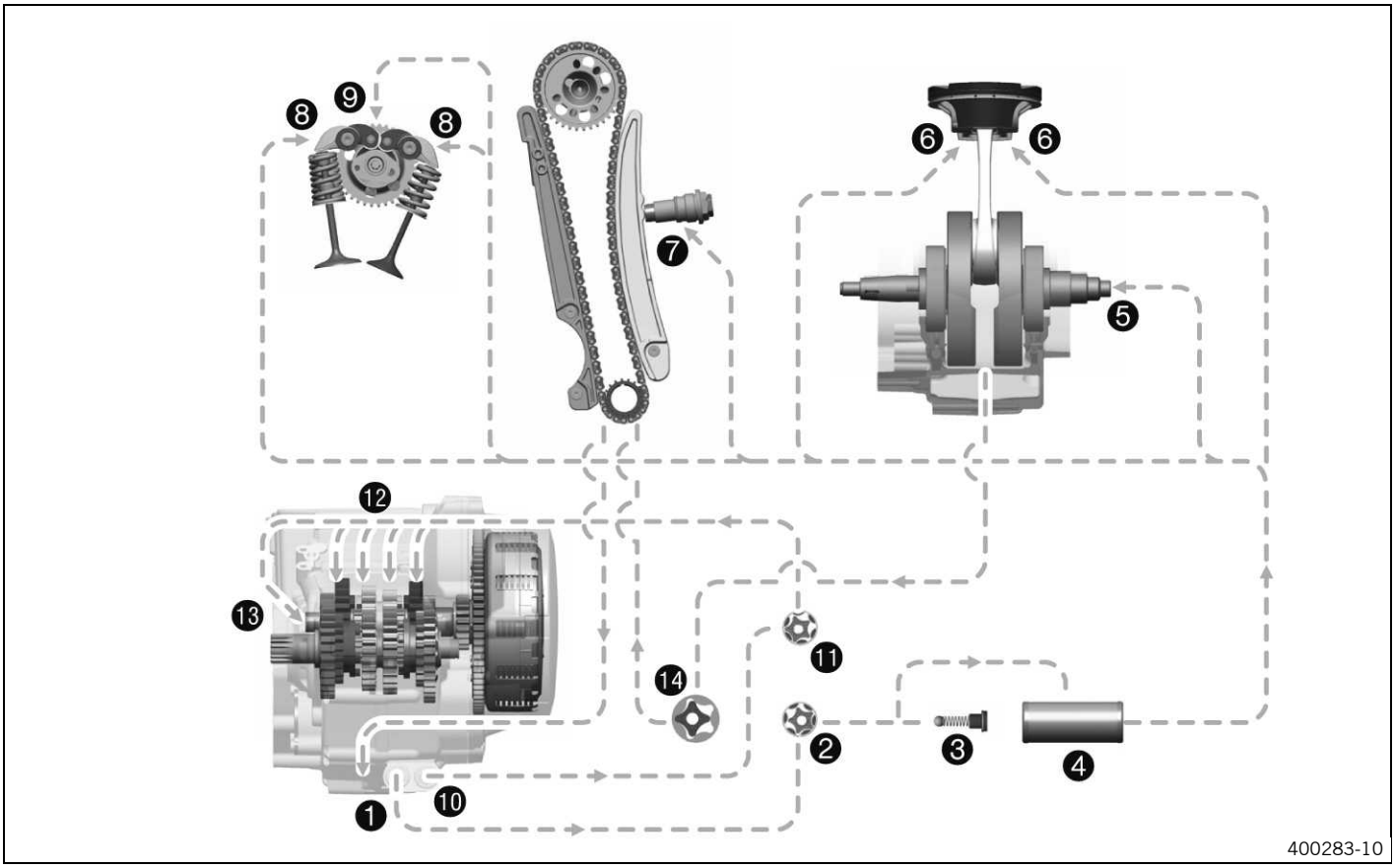
Guideline

10 mm (0.39 in)

Coolant	0.95 l (1 qt.)	Coolant (☛ p. 224)
		Coolant (mixed ready to use) (☛ p. 224)

– Refit the radiator cap.
– Make a short test ride.
– Check the coolant level. (☛ p. 176)

Oil circuit

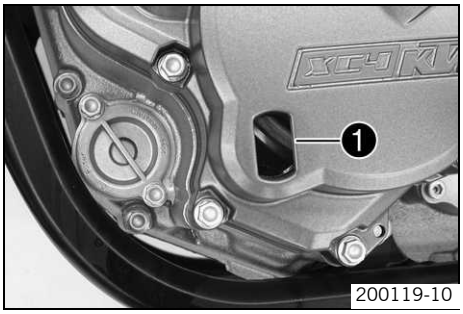


1	Engine oil screen
2	Engine oil force pump
3	Oil pressure regulator valve
4	Oil filter insert
5	Oil jet, conrod lubrication
6	Oil jet, piston cooling
7	Timing chain tensioner
8	Lubrication, rocker arm shaft
9	Oil jet, rocker arm lubrication
10	Gear oil screen
11	Gear oil pump
12	Oil channel, transmission lubrication
13	Lubrication, clutch push rod
14	Suction pump

Checking engine oil level

Info
The engine oil level must be checked when the engine is cold.

– Stand the motorcycle upright on a horizontal surface.



Condition

Engine is cold.

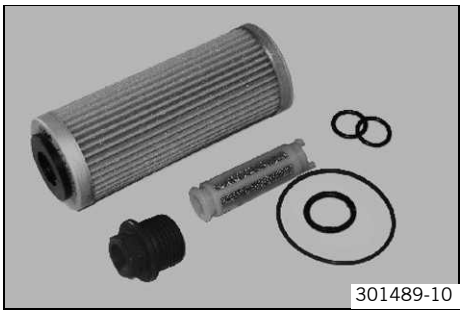
– Check the engine oil level.

The engine oil must be between the halfway mark and the top of the oil level viewer ❶.

» If the engine oil level is below the specified level:

– Top up the engine oil. (☛ p. 181)

Changing engine oil and oil filter, cleaning engine oil screen



– Drain the engine oil and clean the engine oil screen. (☛ p. 179)
– Remove the oil filter. (☛ p. 179)
– Mount the oil filter. (☛ p. 180)
– Fill up with engine oil. (☛ p. 180)

Draining engine oil, cleaning engine oil screen

Warning

Danger of scalding Engine oil and gear oil get very hot when the motocycle is driven.

– Wear suitable protective clothing and protective gloves. If you get scalded, immediately flush the affected areas with lukewarm water.

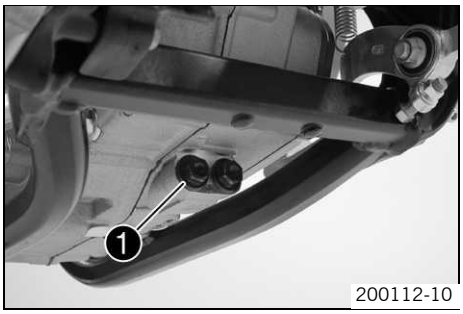
Warning

Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info

Drain the engine oil only when the engine is warm.



– Stand the motorcycle on its side stand on a horizontal surface.
– Place a suitable container under the engine.
– Remove engine oil plug screen ❶.
– Completely drain the engine oil.
– Thoroughly clean the plug and gear oil screen.
– Clean the sealing area on the engine.
– Mount and tighten the plug of engine oil screen ❶.

Guideline

Plug, engine oil screen	M17x1.5	20 Nm (14.8 lbf ft)

Removing the oil filter

Warning

Danger of scalding Engine oil and gear oil get very hot when the motocycle is driven.

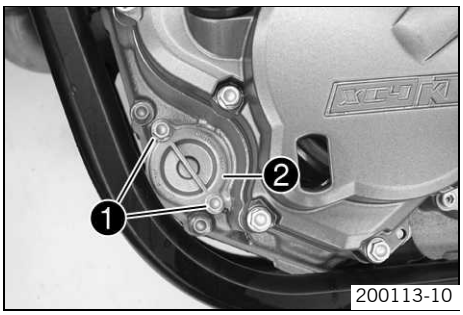
– Wear suitable protective clothing and protective gloves. If you get scalded, immediately flush the affected areas with lukewarm water.

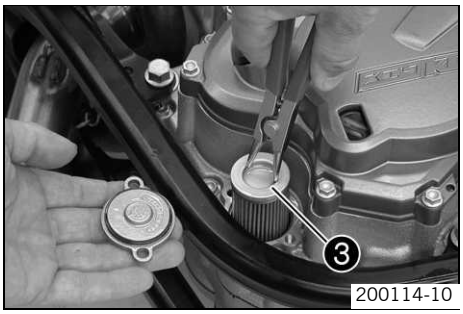
Warning

Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

– Place a suitable container under the engine.
– Remove screws ❶. Remove oil filter cover ❷ with O-ring.



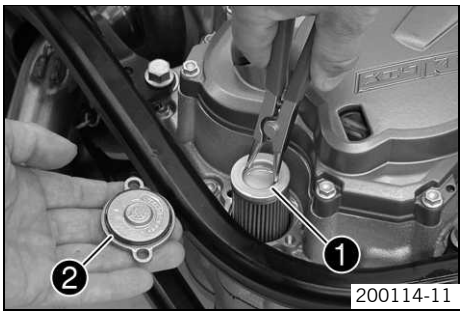


– Pull the oil filter insert ❸ out of the oil filter casing.

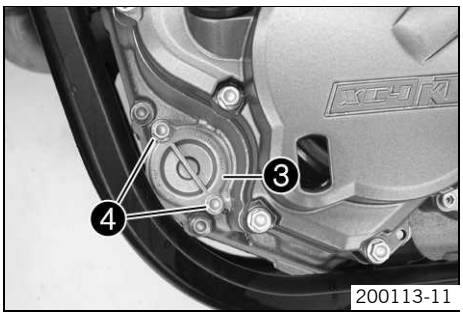
Circlip pliers reverse (51012011000) (☛ p. 229)

– Completely drain the engine oil.
– Thoroughly clean parts and sealing area.

Mounting oil filter



– Lay the motorcycle on its side and fill the oil filter housing to about ⅓ full with engine oil.
– Fill the oil filter ❶ with engine oil and place it in the oil filter container.
– Lubricate the O-ring ❷ of the oil filter cover.



– Refit the oil filter cover ❸.
– Mount and tighten screws ❹.

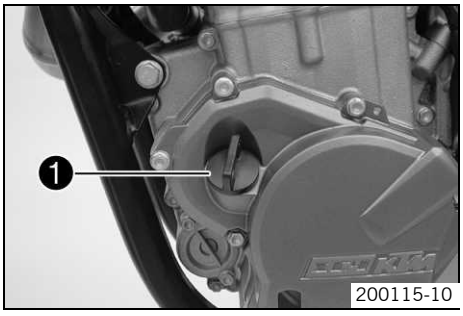
Guideline

Screw, oil filter cover	M6	10 Nm (7.4 lbf ft)

– Stand the motorcycle up.

Filling up with engine oil

Info
Too little engine oil or poor-quality engine oil results in premature wear to the engine.



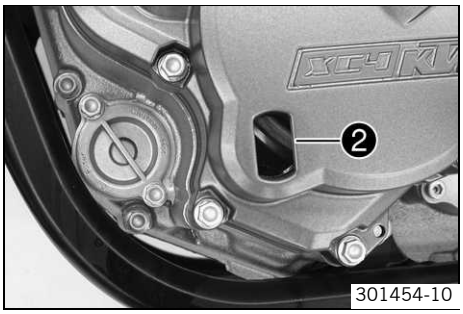
– Remove the screw cap ❶ on the generator cover and fill up with engine oil.

Engine oil (1st partial quantity approx.)	0.35 l (0.37 qt.)	Engine oil (SAE 10W/50) (☛ p. 224)

– Mount and tighten the screw connection on the generator cover.

Danger
Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.



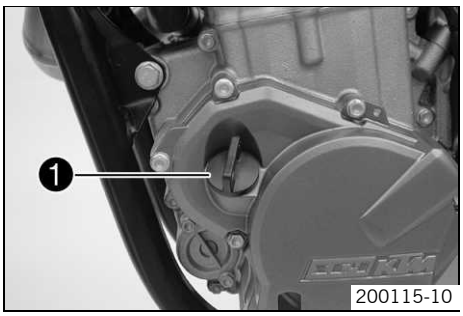
- Start the engine and let it run idle for 30 seconds.
- Stop the engine and check that it is oil-tight.
- Stand the motorcycle upright on a horizontal surface.
- Remove the screw connection on the generator cover.
- Fill in engine oil to the upper half of level viewer ❷.

Engine oil (total filling capacity approx.)	0.60 l (0.63 qt.)	Engine oil (SAE 10W/50) (☛ p. 224)

- Mount and tighten the screw connection on the generator cover.

Topping up engine oil

Info
Too little engine oil or poor-quality engine oil results in premature wear to the engine.



- Remove the screw cap ❶ on the generator cover and fill up with engine oil.

Engine oil (SAE 10W/50) (☛ p. 224)

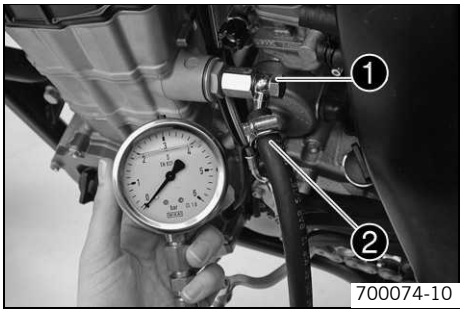
- Mount and tighten screw cap ❶.

Danger
Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

- When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.

- Start the engine and check that it is oil-tight.
- Check the engine oil level. (☛ p. 178)

Checking the engine oil pressure



- Check the engine oil level. (☛ p. 178)
- Remove the chain adjuster release screw.
- Mount and tighten special tool ❶.

Guideline

Oil pressure adapter	M10x1	10 Nm (7.4 lbf ft)

Oil pressure adapter (77329006000) (☛ p. 233)

- Connect pressure gauge ❷ without the t-plate to the special tool.

Pressure testing tool (61029094000) (☛ p. 231)

Danger
Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

- When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.

- Start the engine and let it warm up.
- Check the engine oil pressure.

Engine oil pressure	
Engine oil temperature: 80 °C (176 °F) Engine speed: 1,600 rpm	0.9 bar (13 psi)
Engine oil temperature: 80 °C (176 °F) Engine speed: 6,000 rpm	2.5 bar (36 psi)

» If the measured value is less than the specification:
– Check the oil pumps for wear. Check all oil holes for free flow.

– Switch off the engine.

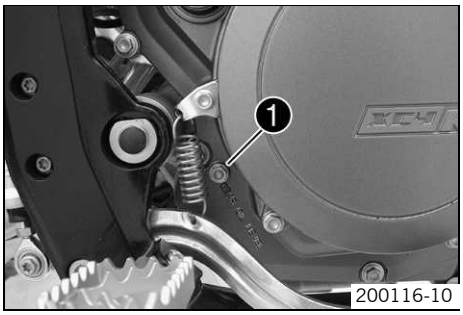
Warning
Danger of burns Some vehicle components get very hot when the machine is driven.
– Wear appropriate protective clothing and safety gloves. In case of burns, rinse immediately with lukewarm water.

– Remove the special tool.
– Mount and tighten the chain adjuster release screw.
Guideline

Screw, unlocking of timing chain tensioner	M10x1	10 Nm (7.4 lbf ft)

Checking the gear oil level

Info
The gear oil level must be checked when the engine is cold.



– Stand the motorcycle upright on a horizontal surface.

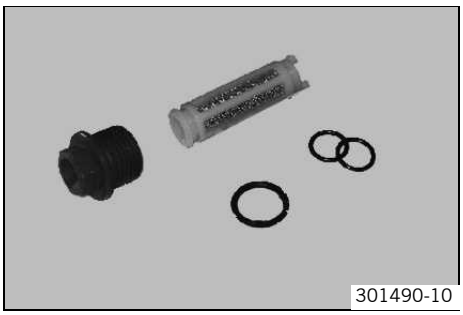
Condition
The engine is cold.
– Remove gear oil level check screw ❶. Stand the motorcycle upright.
– Check the gear oil level.

A small amount of gear oil should flow out.

» If no gear oil flows out:
– Add gear oil. (☛ p. 183)
– Mount and tighten the gear oil level check screw.
Guideline

Screw, gear oil level check	M6	8 Nm (5.9 lbf ft)

Changing gear oil, cleaning gear oil screen



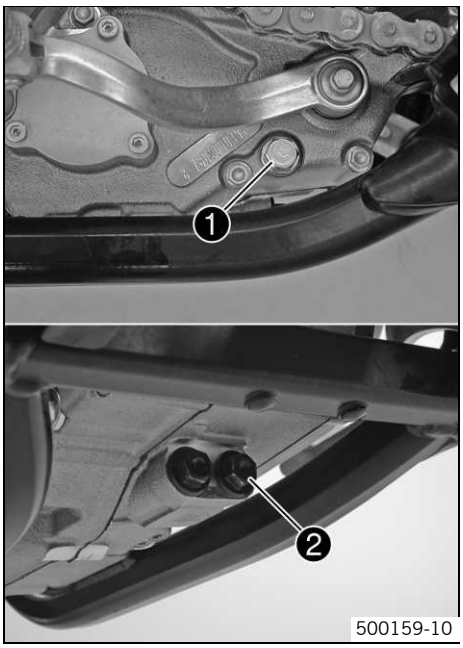
– Drain the gear oil and clean the gear oil screen. (☛ p. 182)
– Fill up with gear oil. (☛ p. 183)

Draining gear oil, cleaning gear oil screen

Warning
Danger of scalding Engine oil and gear oil get very hot when the motocycle is driven.
– Wear suitable protective clothing and protective gloves. If you get scalded, immediately flush the affected areas with lukewarm water.

Warning
Environmental hazard Hazardous substances cause environmental damage.
– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Drain the gear oil only when the engine is warm.



– Stand the motorcycle on its side stand on a horizontal surface.
– Place a suitable container under the engine.
– Remove the gear oil drain plug ❶.
– Plug - remove the gear oil screen ❷.
– Completely drain the gear oil.
– Thoroughly clean the gear oil drain plug with a magnet.
– Thoroughly clean the drain plug and gear oil screen with a magnet.
– Clean the sealing area on the engine.
– Mount and tighten gear oil drain plug ❶ with the seal ring.

Guideline

Gear oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)

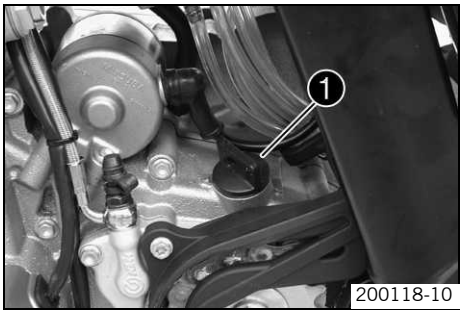
– Mount and tighten the plug of gear oil screen ❷.

Guideline

Plug, gear oil screen	M16x1.5	20 Nm (14.8 lbf ft)

Filling up with gear oil

Info
Too little gear oil or poor-quality oil results in premature wear to the transmission.



– Remove the screw cap ❶ and fill up with gear oil.

Gear oil	0.90 l (0.95 qt.)	Engine oil (SAE 10W/50) (☛ p. 224)

– Mount and tighten screw cap ❶.

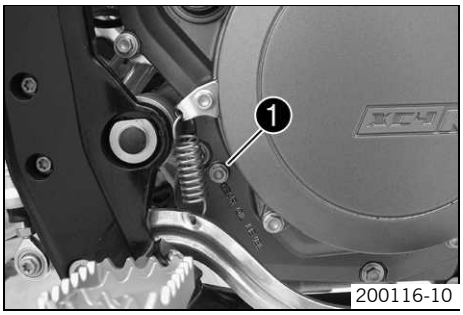
Danger
Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.

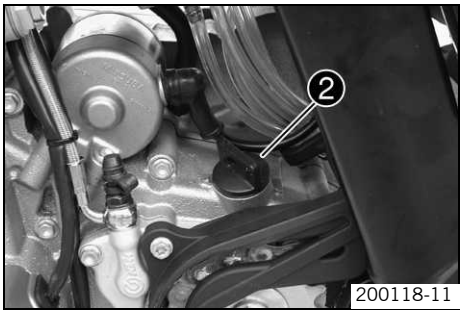
– Start the engine and check that it is oil-tight.
– Check the gear oil level. (☛ p. 182)

Adding gear oil

Info
Too little gear oil or poor-quality oil results in premature wear to the transmission.



– Remove gear oil level check screw ❶.



– Remove screw cap ❷. Stand the vehicle upright.
– Add gear oil until it flows out of the bore of the gear oil level screw.

Engine oil (SAE 10W/50) (☛ p. 224)

– Mount and tighten the gear oil level check screw.

Guideline

Screw, gear oil level check	M6	8 Nm (5.9 lbf ft)

– Mount and tighten screw cap ❷.

Danger

Danger of poisoning Exhaust gases are poisonous and can result in unconsciousness and/or death.

– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in a closed space without an effective exhaust extraction system.

– Start the engine and check that it is oil-tight.

Checking the ignition system

Warning
Risk of injury The ignition system is under high voltage.

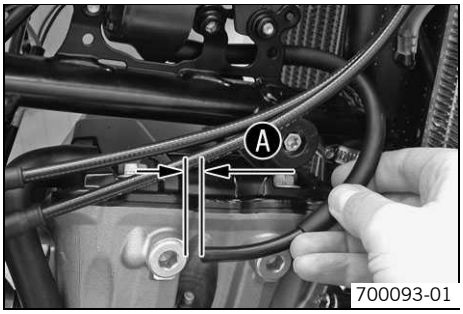
– To avoid the danger of an electric shock, do not touch metal parts and the ends of the connection cable during and immediately after measuring.

Condition
If the battery is not charged, you have to use the kickstarter.
The fuse in the starter relay must be intact and working.

– Shift gear to neutral.

(EXC USA)
– Turn the key in the ignition switch to the position ○.
– Turn the emergency OFF switch to the position ○.

(EXC AUS)
– Turn the emergency OFF switch to the position ○.



– Detach the spark plug connector and remove it from the ignition cable. Hold the free end of the ignition cable at the distance shown Ⓐ from ground.

Guideline

Distance Ⓐ	5 mm (0.2 in)

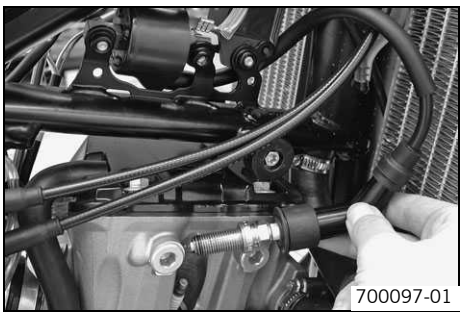
– Press the electric starter button or press the kickstarter robustly through its full range.

Info
Don't open the throttle.

– Check the ignition spark.
» If no ignition spark is visible:
– Check the emergency OFF switch.
– Check the cable harness to the emergency OFF switch.
– Check the short-circuit button.
– Check the ground connection of the CDI controller and ignition coil.
– Check the cable from the CDI controller to the ignition coil.

Info
The CDI controller cannot be tested using simple methods but only using an ignition test stand.

– Check the ignition coil. (☛ p. 186)
– Check the ignition pulse generator. (☛ p. 187)
– Check the generator. (☛ p. 188)
– Check the spark plug connector. (☛ p. 187)
– Change spark plug.



– Reconnect the spark plug connector to the ignition cable. Take out the spark plug and place it in the spark plug connector. Hold the spark plug against ground.
– Press the electric starter button or press the kickstarter robustly through its full range.

Info
Don't open the throttle.

– Check the ignition spark.
» If no ignition spark is visible:
– Change spark plug.

Checking the ignition coil

Condition

All plug contacts must be free of corrosion and the plug-in connectors must be firmly seated.

The battery must be charged or the kickstarter must be used.

– Remove the seat. (☛ p. 63)

– Dismount the fuel tank. (☛ p. 63)

– Remove the spark plug connector.

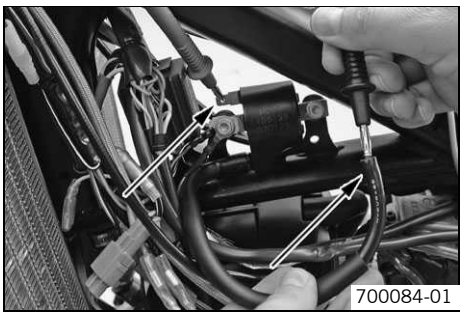

700086-01

– Use a multimeter to measure the primary winding.

Ignition coil - primary winding	
ground - ignition coil input at: 20 °C (68 °F)	0.25... 0.35 Ω

» If the measured value differs from the nominal value:

– Replace the ignition coil.

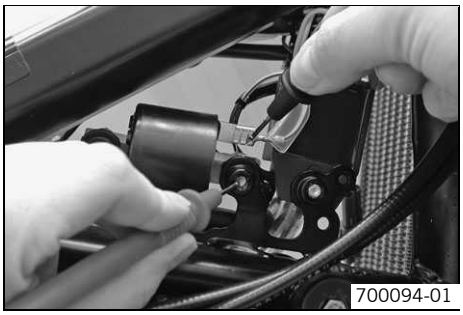

700084-01

– Use a multimeter to measure the secondary winding.

Ignition coil - secondary winding	
ignition coil - ignition coil input at: 20 °C (68 °F)	5... 7.5 kΩ

» If the measured value differs from the nominal value:

– Replace the ignition coil.


700094-01

– Connect the special tool to the multimeter.

Peak voltage adapter (58429042000) (☛ p. 229)

Info

When using the peak voltage adapter, adjust the measuring range of the multimeter to DCV.

(EXC EU, EXC AUS, EXC-R SIX DAYS)

– Switch off the light by pushing the light switch into the position •.

(XC-W ZA)

– Switch off the light by pushing in the light switch up to the stop.

(EXC USA)

– Disconnect the plug-in connector from the light switch of the lighting equipment.

– Start the motorcycle for checking. (☛ p. 11)

– Connect the red measuring lead of the special tool to ground. Connect the black measuring lead to the input of the ignition coil.

Ignition coil	
ground - ignition coil input	190... 210 V

» If the value displayed does not meet specifications:

– Replace the ignition coil.

Checking the spark plug connector

– Use a multimeter to measure the dismounted spark plug connector.

Spark plug connector	
Resistance at: 20 °C (68 °F)	3.75... 6.25 kΩ

» If the value displayed does not meet specifications:
– Change the spark plug connector.

Checking the CDI controller

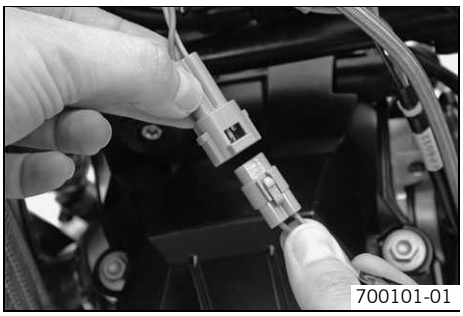
Info
Never check the CDI controller with a conventional measuring device. This may destroy highly sensitive electronic components.

– Check the cables and plug-in connections of the CDI controller. A functional check of the CDI controller can only be performed on an ignition test bench.

Checking the ignition pulse generator

Condition
All plug contacts must be free of corrosion and the plug-in connectors must be firmly seated.
The battery must be charged.

– Remove the seat. (☛ p. 63)
– Dismount the fuel tank. (☛ p. 63)



– Disconnect the electrical plug-in connection between the pick-up and the CDI controller.
– Use a multimeter to measure the resistance of the ignition pulse generator.

Ignition pulse generator coil - resistance	
red - green at: 20 °C (68 °F)	80... 120 Ω
red - ground at: 20 °C (68 °F)	∞

» If the measured value differs from the nominal value:
– Replace the ignition pulse generator.

– Connect the special tool to the multimeter.

Peak voltage adapter (58429042000) (☛ p. 229)

Info
When using the peak voltage adapter, adjust the measuring range of the multimeter to DCV.

(EXC EU, EXC AUS, EXC-R SIX DAYS)
– Switch off the light by pushing the light switch into the position •.

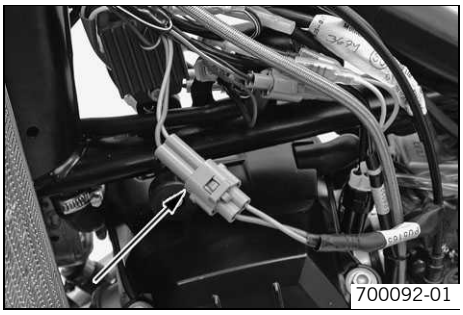
(XC-W ZA)
– Switch off the light by pushing in the light switch up to the stop.

(EXC USA)
– Disconnect the plug-in connector from the light switch of the lighting equipment.

– Connect the red measuring lead of the special tool to the green cable. Connect the black measuring lead to the red cable.
– Press the electric starter button or press the kickstarter robustly through its full range.

Ignition pulse generator coil - output voltage - plug removed	
red - green at: 20 °C (68 °F)	7.5... 8.5 V

» If the value displayed does not meet specifications:
– Replace the ignition pulse generator.


700092-01

– Connect the CDI controller. Connect the red measuring lead of the special tool to the green cable. Connect the black measuring lead to the red cable.
– Remove the spark plug connector.
– Press the electric starter button or press the kickstarter robustly through its full range.

Ignition pulse generator coil - output voltage - plug connected	
red - green at: 20 °C (68 °F)	4... 5 V

» If the value displayed does not meet specifications:
– Replace the ignition pulse generator.

Checking the generator

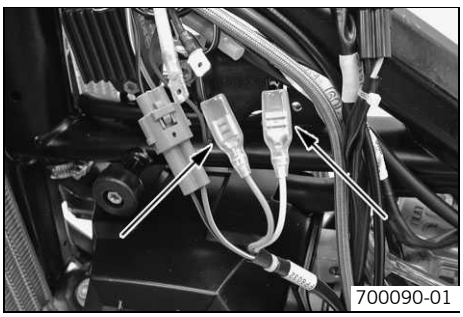
Condition
All plug contacts must be free of corrosion and the plug-in connectors must be firmly seated.
The battery must be charged.

– Remove the seat. (☛ p. 63)
– Dismount the fuel tank. (☛ p. 63)

(EXC EU, EXC AUS, EXC-R SIX DAYS)
– Switch off the light by pushing the light switch into the position •.

(XC-W ZA)
– Switch off the light by pushing in the light switch up to the stop.

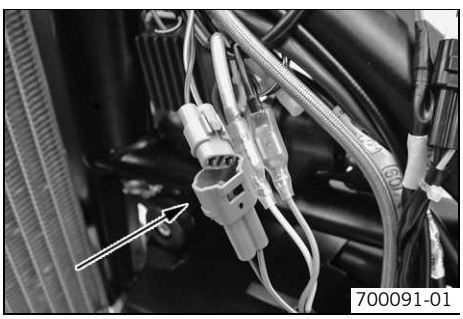
(EXC USA)
– Disconnect the plug-in connector from the light switch of the lighting equipment.


700090-01

– Disconnect the electrical plug-in connectors of the charging coil.
– Use a multimeter to measure the resistance of the charging coil.

Charging coil - resistance	
ground - yellow	0.5... 0.8 Ω
white - yellow	0.13... 0.19 Ω

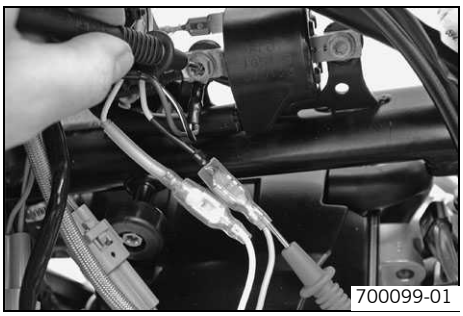
» If the measured value differs from the nominal value:
– Change the stator.


700091-01

– Disconnect the electric plug-in connector of the stator coil.
– Use a multimeter to measure the stator coil.

Stator coil - resistance	
red/black - red/white	12... 18 Ω
ground - red/black	∞

» If the value displayed does not meet specifications:
– Change the stator.


700099-01

– Check the charging coil for voltage between the various cables with connected and disconnected plug connectors.
– Connect the special tool to the multimeter.

Peak voltage adapter (58429042000) (☛ p. 229)

Info
When using the peak voltage adapter, adjust the measuring range of the multimeter to DCV.

– Disconnect the plug of the yellow cable connector. Connect the red measuring lead to the yellow cable. Connect the black measuring lead to ground.
– Pull of the spark plug connector.
– Press the electric starter button or press the kickstarter robustly through its full range.

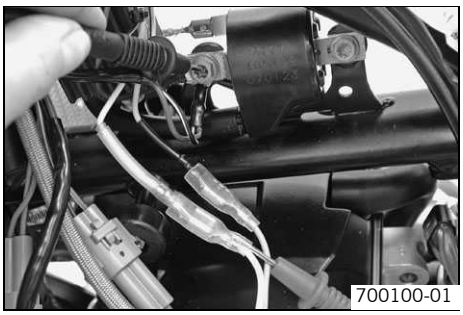
Charging coil / plug removed	
ground - yellow	14... 16 V

» If the value displayed does not meet specifications:
– Change the stator.

– Repeat the measurement with the plug connected. Connect the red measuring lead to the yellow cable. Connect the black measuring lead to ground.
– Pull of the spark plug connector.
– Press the electric starter button or press the kickstarter robustly through its full range.

Charging coil / plug connected	
ground - yellow	11... 13 V

» If the value displayed does not meet specifications:
– Change the stator.


700100-01

– Disconnect the plug of the white cable connector. Connect the red measuring lead to the white cable. Connect the black measuring lead to ground.
– Pull of the spark plug connector.
– Press the electric starter button or press the kickstarter robustly through its full range.

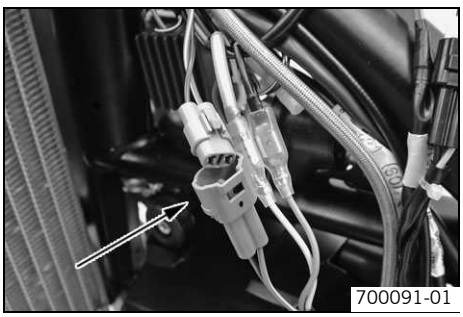
Charging coil / plug removed	
ground - white	14... 16 V

» If the value displayed does not meet specifications:
– Change the stator.

– Repeat the measurement with the plug connected. Connect the red measuring lead to the white cable. Connect the black measuring lead to ground.
– Pull of the spark plug connector.
– Press the electric starter button or press the kickstarter robustly through its full range.

Charging coil / plug connected	
ground - white	13... 15 V

» If the value displayed does not meet specifications:
– Change the stator.


700091-01

– Check the stator coil for voltage with connected and disconnected plug-in connector.
– Connect the red measuring lead of the special tool to the black/red cable. Connect the black measuring lead to the red/white cable.
– Pull of the spark plug connector.
– Press the electric starter button or press the kickstarter robustly through its full range.

Stator coil / plug removed	
red/black - red/white	25... 35 V

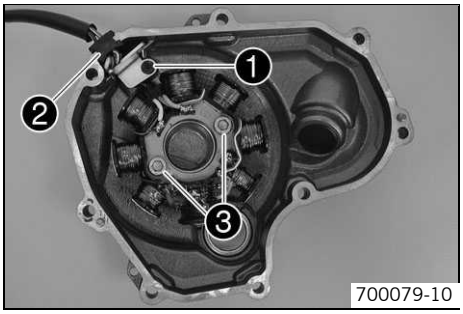
» If the value displayed does not meet specifications:
– Change the stator.

– Repeat the measurement with the plug connected. Connect the red measuring lead of the special tool to the black/red cable. Connect the black measuring lead to the red/white cable.
– Pull of the spark plug connector.
– Press the electric starter button or press the kickstarter robustly through its full range.

Stator coil / plug connected	
red/black - red/white	190... 210 V

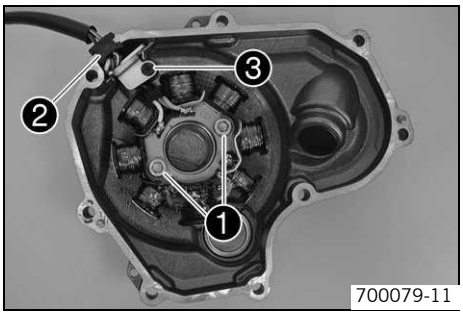
» If the value displayed does not meet specifications:
– Change the stator.

Removing the stator



– Remove the generator cover. (☛ p. 103)
– Remove screw ❶ and retaining bracket.
– Remove cable support sleeve ❷ from the generator housing.
– Remove screws ❸.
– Take the stator out of the generator cover.

Mounting the stator



– Position the stator in the generator cover.
– Fit the screws ❶.
Guideline

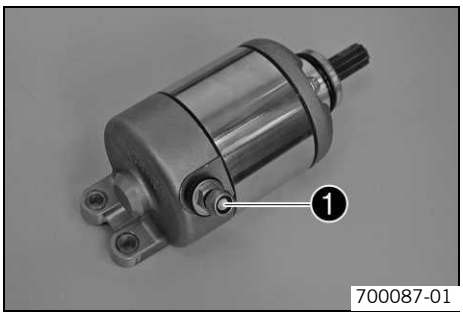
Screw, stator bracket	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

– Position the cable support sleeve ❷ in the generator housing.
– Position the retaining bracket, and fit the screw ❸.
Guideline

Screw, cable holder in generator cover	M4	4 Nm (3 lbf ft)	**Loctite® 243™**

– Install the generator cover. (☛ p. 154)

Checking the starter motor



– Disconnect the negative (minus) cable of the battery.
– Pull back the positive pole cover. Remove the nut from the electrical connection on the starter engine and take off the cable.
– Remove the starter engine. (☛ p. 102)
– Clamp the negative cable of a 12 volt supply to the starter motor housing. Connect the positive cable of the voltage supply briefly to the connection ❶ of the starter motor.
  » If the starter motor does not turn when you close the circuit:
    – Change the starter motor.

Faults	Possible cause	Action
The engine cannot be cranked (electric starter).	Operating error	– Go through the steps of starting the engine. (☛ p. 10)
	Battery discharged	– Recharge the battery. (☛ p. 79) – Check the charging voltage. (☛ p. 80) – Check the closed current. (☛ p. 80) – Check the generator. (☛ p. 188)
	Fuse blown	– Remove the fuse. (☛ p. 78) – Install the fuse. (☛ p. 78)
	Starter relay defective	– Check the starter relay. (☛ p. 82)
	Starter motor defective	– Check the starter motor. (☛ p. 191)
Engine turns but does not start	Operating error	– Go through the steps of starting the engine. (☛ p. 10)
	Motorcycle was out of use for a long time and there is old fuel in the float chamber	– Empty the carburetor float chamber. (☛ p. 170)
	Fuel feed interrupted	– Check the fuel tank breather. – Clean the fuel tap. – Check/adjust the carburetor components. (☛ p. 161)
	Engine flooded	– Clean and dry the spark plug or replace if necessary.
	Spark plug oily or wet	– Clean and dry the spark plug or replace if necessary.
	Electrode distance (plug gap) of spark plug too wide	– Adjust plug gap. Guideline Spark plug electrode gap 0.9 mm (0.035 in)
	Defect in ignition system	– Check the ignition system. (☛ p. 185)
	Short-circuit cable in cable harness frayed, short-circuit button or emergency OFF switch defective	– Check the wiring harness (visual check). – Check the electrical system.
	Plug connector of CDI control device, pulse generator or ignition coil oxidized.	– Clean the plug connector and treat it with contact spray.
	Water in carburetor or jets blocked	– Check/adjust the carburetor components. (☛ p. 161)
Engine has no idle	Idling jet blocked	– Check/adjust the carburetor components. (☛ p. 161)
	Adjusting screws on carburetor distorted	– Carburetor - adjust the idle speed. (☛ p. 169)
	Spark plug defective	– Change spark plug.
	Ignition system defective	– Check the ignition coil. (☛ p. 186) – Check the CDI controller. (☛ p. 187) – Check the spark plug connector. (☛ p. 187) – Check the ignition pulse generator. (☛ p. 187) – Check the generator. (☛ p. 188)
Engine does not speed up	Carburetor running over because float needle dirty or worn.	– Check/adjust the carburetor components. (☛ p. 161)
	Loose carburetor jets	– Check/adjust the carburetor components. (☛ p. 161)
	Ignition system defective	– Check the ignition coil. (☛ p. 186) – Check the CDI controller. (☛ p. 187) – Check the spark plug connector. (☛ p. 187) – Check the ignition pulse generator. (☛ p. 187) – Check the generator. (☛ p. 188)

Faults	Possible cause	Action
Engine has too little power	Fuel feed interrupted	– Check the fuel tank breather. – Clean the fuel tap. – Check/adjust the carburetor components. (☛ p. 161)
	Air filter very dirty	– Clean the air filter. (☛ p. 62)
	Exhaust system leaky, deformed or too little glass fiber yarn filling in main silencer	– Check exhaust system for damage. – Change glass fiber yarn filling of main silencer.
	Valve clearance too little	– Adjust the valve clearance.
	Ignition system defective	– Check the ignition coil. (☛ p. 186) – Check the CDI controller. (☛ p. 187) – Check the spark plug connector. (☛ p. 187) – Check the ignition pulse generator. (☛ p. 187) – Check the generator. (☛ p. 188)
Engine stalls or is popping into the carburetor	Lack of fuel	– Turn handle ❶ of the fuel tap to the **ON** position. (Figure 500137-10☛ p. 65) – Fill up with fuel.
	Engine takes in bad air	– Check rubber sleeves and carburetor for tightness.
Engine overheats	Too little coolant in cooling system	– Check the cooling system for leakage. – Check the coolant level. (☛ p. 176)
	Too little air stream	– Switch off engine when standing.
	Radiator fins very dirty	– Clean radiator fins.
	Foam formation in cooling system	– Drain the coolant. (☛ p. 176) – Refill the coolant. (☛ p. 177)
	Bent radiator hose	– Change the radiator hose.
	Thermostat defective	– Check the thermostat. Guideline Opening temperature: 70 °C (158 °F)
	Defect in radiator fan system (EXC SIX DAYS, XC-W ZA)	– Check the radiator fan fuse. – Check the radiator fan. – Check the thermostat.
High oil consumption	Engine vent hose bent	– Route the vent hose without bends or replace it if necessary.
	Engine oil level too high	– Check the engine oil level. (☛ p. 178)
	Engine oil too thin (low viscosity)	– Change the engine oil and oil filter and clean the engine oil screen. (☛ p. 179)
	Piston or cylinder is worn	– Piston/cylinder - determine the mounting clearance (☛ p. 125)
Battery discharged	The battery does not charge	– Check the charging voltage. (☛ p. 80) – Check the charging current. (☛ p. 82) – Check the generator. (☛ p. 188)
	Undesired power consumer	– Check the closed current. (☛ p. 80)
Speedometer values deleted (time, stop watch, lap times)	The battery in the speedometer is empty.	– Change the battery in the speedometer.

Design	1-cylinder 4-stroke engine, water-cooled
Displacement (all 400 models)	393.4 cm³ (24.007 cu in)
Displacement (All 450 models)	449.3 cm³ (27.418 cu in)
Displacement (All 530 models)	510.4 cm³ (31.147 cu in)
Stroke (all 400 models)	55.5 mm (2.185 in)
Stroke (All 450 models)	63.4 mm (2.496 in)
Stroke (All 530 models)	72 mm (2.83 in)
Bore	95 mm (3.74 in)
Compression ratio (all 400 models)	11.1:1
Compression ratio (All 450/530 models)	11.9:1
Idle speed	1,550... 1,650 rpm
Control	OHC, 4 valves controlled via rocker arm, drive via tooth/wheel chain
Valve diameter, intake	39.5 mm (1.555 in)
Valve diameter, exhaust	31.7 mm (1.248 in)
Valve clearance	
Exhaust at: 20 °C (68 °F)	0.12... 0.17 mm (0.0047... 0.0067 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)
Crankshaft bearing	2 grooved ball bearings
Conrod bearing	Needle bearing
Piston pin bearing	No bearing bushes - DLC-plated piston pins
Pistons	Forged light alloy
Piston rings	1 compression ring, 1 oil scraper ring
Engine lubrication	Pressure circulation lubrication with 2 rotor pumps (engine) / 1 rotor pump (transmission)
Primary transmission	33:76
Clutch	Multidisc clutch in oil bath / hydraulically activated
Transmission ratio	
1st gear	14:36
2nd gear	17:32
3rd gear	19:28
4th gear	22:26
5th gear	24:23
6th gear	26:21
Generator	12 V, 150 W
Ignition	Contactless controlled fully electronic ignition with digital ignition adjustment, type Kokusan
Spark plug	NGK LKAR 8AI - 9
Spark plug electrode gap	0.9 mm (0.035 in)
Cooling	Water cooling, permanent circulation of coolant by water pump
Starting aid	Electric starter / kickstarter

Capacity - engine oil

Engine oil	0.60 l (0.63 qt.)	Engine oil (SAE 10W/50) (☛ p. 224)

Capacity - gear oil

Gear oil	0.90 l (0.95 qt.)	Engine oil (SAE 10W/50) (☛ p. 224)

Capacity - coolant

Coolant	0.95 l (1 qt.)	Coolant (☛ p. 224)
		Coolant (mixed ready to use) (☛ p. 224)

Camshaft - cam height	
Exhaust	33.10... 33.30 mm (1.3031... 1.311 in)
Camshaft - cam height (All 450 models)	
Intake	33.90... 34.10 mm (1.3346... 1.3425 in)
Camshaft - cam height (all 400 models)	
Intake	33.90... 34.10 mm (1.3346... 1.3425 in)
Camshaft - cam height (All 530 models)	
Intake	34.20... 34.40 mm (1.3465... 1.3543 in)
Valve	
Intake sealing seat width	2.00 mm (0.0787 in)
Exhaust sealing seat width	2.00 mm (0.0787 in)
Run-out at valve plate	≤ 0.05 mm (≤ 0.002 in)
Valve spring	
Intake minimum length (without valve spring seat)	46.5 mm (1.831 in)
Exhaust minimum length (without valve spring seat)	43.0 mm (1.693 in)
Valve spring seat	0.9... 1.0 mm (0.035... 0.039 in)
Cylinder/cylinder head - sealing area distortion	≤ 0.1 mm (≤ 0.004 in)
Piston - diameter	
Size I	94.93... 94.96 mm (3.7374... 3.7386 in)
Size II	94.94... 94.97 mm (3.7378... 3.739 in)
Cylinder - drill hole diameter	
Size I	95... 95.012 mm (3.74... 3.74062 in)
Size II	95.013... 95.025 mm (3.74066... 3.74113 in)
Piston/cylinder - mounting clearance	
Size I	0.040... 0.082 mm (0.00157... 0.00323 in)
Size II	0.043... 0.085 mm (0.00169... 0.00335 in)
Wear limit	0.120 mm (0.00472 in)
Piston ring end gap	
Compression ring	≤ 1 mm (≤ 0.04 in)
Oil scraper ring	≤ 1.2 mm (≤ 0.047 in)
Conrod bearing - axial clearance	≤ 1.1 mm (≤ 0.043 in)
Conrod bearing - radial clearance	≤ 0.05 mm (≤ 0.002 in)
Crankshaft - run-out on bearing pin	≤ 0.16 mm (≤ 0.0063 in)
Crankshaft - external crank web dimension	63±0.05 mm (2.48±0.002 in)
Clutch facing disc - thickness	
Outer	2.6... 2.7 mm (0.102... 0.106 in)
Innermost	2.9... 3.0 mm (0.114... 0.118 in)
Clutch spring - length	43... 44.03 mm (1.69... 1.7335 in)
Thrust surface, clutch facing discs in outer clutch hub	≤ 0.5 mm (≤ 0.02 in)
Oil pressure regulator valve	
Minimum length of preload spring	23.5 mm (0.925 in)
Oil pump	
Clearance between external rotor and engine housing	≤ 0.2 mm (≤ 0.008 in)
Clearance between external rotor and internal rotor	≤ 0.2 mm (≤ 0.008 in)
Axial clearance	≤ 0.15 mm (≤ 0.0059 in)
Engine oil consumption	≤ 20 ml/h (≤ 0.68 fl. oz./hr)
Shift fork	
Thickness at leaf	4.85... 4.95 mm (0.1909... 0.1949 in)
Shift shaft - play in sliding plate/shift quadrant	0.4... 0.8 mm (0.016... 0.031 in)
Transmission shaft - run-out	≤ 0.06 mm (≤ 0.0024 in)

Screw, cable holder in generator cover	M4	4 Nm (3 lbf ft)	**Loctite® 243™**
Locking screw for bearing	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Oil jet, piston cooling	M5	2 Nm (1.5 lbf ft)	**Loctite® 243™**
Oil jet, rocker arm lubrication	M5	2 Nm (1.5 lbf ft)	**Loctite® 243™**
Screw, ignition pulse generator	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, locking lever	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, oil pump cover	M5	6 Nm (4.4 lbf ft)	**Loctite® 222**
Nut, water pump impeller	M6	8 Nm (5.9 lbf ft)	**Loctite® 243™**
Screw generator cover	M6x25	10 Nm (7.4 lbf ft)	–
Screw generator cover	M6x40	10 Nm (7.4 lbf ft)	–
Screw, camshaft bearing support	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, clutch cover	M6x25	10 Nm (7.4 lbf ft)	–
Screw, clutch cover	M6x30	10 Nm (7.4 lbf ft)	–
Screw, clutch slave cylinder	M6	10 Nm (7.4 lbf ft)	–
Screw, clutch spring	M6	10 Nm (7.4 lbf ft)	–
Screw, cylinder head	M6	10 Nm (7.4 lbf ft)	–
Screw, engine housing	M6x60	10 Nm (7.4 lbf ft)	–
Screw, engine housing	M6x75	10 Nm (7.4 lbf ft)	–
Screw, exhaust flange	M6	10 Nm (7.4 lbf ft)	–
Screw, gear oil level check	M6	8 Nm (5.9 lbf ft)	–
Screw, generator cover (through-hole for chain shaft)	M6x25	10 Nm (7.4 lbf ft)	**Loctite® 222**
Screw, idler	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, kickstarter spring hanger	M6	10 Nm (7.4 lbf ft)	–
Screw, kickstarter stop	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, oil filter cover	M6	10 Nm (7.4 lbf ft)	–
Screw, shift drum locating	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, shift lever	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, starter motor	M6	10 Nm (7.4 lbf ft)	–
Screw, stator bracket	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, timing chain guide rail	M6	8 Nm (5.9 lbf ft)	**Loctite® 243™**
Screw, timing chain securing guide	M6	8 Nm (5.9 lbf ft)	**Loctite® 243™**
Screw, timing chain tensioning rail	M6	8 Nm (5.9 lbf ft)	**Loctite® 243™**
Screw, torque governor	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, valve cover	M6	10 Nm (7.4 lbf ft)	–
Screw, water pump cover	M6x25	10 Nm (7.4 lbf ft)	–
Screw, water pump cover	M6x55	10 Nm (7.4 lbf ft)	–
Oil jet, conrod lubrication	M6x0.75	4 Nm (3 lbf ft)	–
Plug, oil channel	M7	9 Nm (6.6 lbf ft)	**Loctite® 243™**
Screw, rocker arm bearing	M7x1	15 Nm (11.1 lbf ft)	–
Plug, crankshaft location	M8	10 Nm (7.4 lbf ft)	–
Screw, kickstarter	M8	25 Nm (18.4 lbf ft)	**Loctite® 243™**
Plug, oil channel	M10	15 Nm (11.1 lbf ft)	**Loctite® 243™**
Screw, engine sprocket	M10	60 Nm (44.3 lbf ft)	**Loctite® 243™**
Balancer shaft nut	M10x1	40 Nm (29.5 lbf ft)	–
Screw, unlocking of timing chain tensioner	M10x1	10 Nm (7.4 lbf ft)	–

Screw, cylinder head	M10x1.25	Tightening sequence: Tighten diagonally, beginning with the rear screw on the chain shaft. Step 1 10 Nm (7.4 lbf ft) Step 2 30 Nm (22.1 lbf ft) Step 3 50 Nm (36.9 lbf ft)	lubricated with engine oil
Nut, rotor	M12x1	60 Nm (44.3 lbf ft)	–
Spark plug	M12x1.25	15... 20 Nm (11.1... 14.8 lbf ft)	–
Gear oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)	–
Oil pressure control valve plug	M12x1.5	20 Nm (14.8 lbf ft)	–
Plug, SLS	M12x1.5	20 Nm (14.8 lbf ft)	–
Plug, rocker arm	M14x1.25	20 Nm (14.8 lbf ft)	–
Plug, gear oil screen	M16x1.5	20 Nm (14.8 lbf ft)	–
Plug, engine oil screen	M17x1.5	20 Nm (14.8 lbf ft)	–
Nut, inner clutch hub	M18x1.5	80 Nm (59 lbf ft)	–
Nut, primary gear	M20LHx1.5	100 Nm (73.8 lbf ft)	**Loctite® 243™**
Plug, timing chain tensioner	M24x1.5	30 Nm (22.1 lbf ft)	–

400 EXC

Carburetor type	KEIHIN FCR-MX 39
Carburetor identification number	3900N
Needle position	5th position from top
Idle mixture adjusting screw	
Open	0.75 turn
Pump membrane stop	2.15 mm (0.0846 in)
Main jet	180
Jet needle	OBDYU (OBDTQ)
Idling jet	42
Idle air jet	100
Cold start jet	65 (85)
Leakage nozzle	40
Slide stop	present

400 XC-W USA

Carburetor type	KEIHIN FCR-MX 39
Carburetor identification number	3900W
Needle position	1st position from top
Idle mixture adjusting screw	
Open	1.75 turns
Pump membrane stop	2.15 mm (0.0846 in)
Main jet	180
Jet needle	OBDTQ
Idling jet	42
Idle air jet	100
Cold start jet	85
Leakage nozzle	40

450 EXC EU/AUS, 450 EXC SIX DAYS

Carburetor type	KEIHIN FCR-MX 39
Carburetor identification number	3900I
Needle position	4th position from top
Idle mixture adjusting screw	
Open	1.75 turns
Pump membrane stop	2.15 mm (0.0846 in)
Main jet	180
Jet needle	OBDYU (OBDTQ)
Idling jet	40
Idle air jet	100
Cold start jet	65 (85)
Leakage nozzle	40
Slide stop	present

450 EXC USA

Carburetor type	KEIHIN FCR-MX 39
Carburetor identification number	3900Z
Needle position	4th position from top
Idle mixture adjusting screw	
Open	1.75 turns
Pump membrane stop	2.15 mm (0.0846 in)
Main jet	180
Jet needle	OBDYU
Idling jet	48
Idle air jet	100
Cold start jet	85
Leakage nozzle	40

450 XC-W

Carburetor type	KEIHIN FCR-MX 39
Carburetor identfication number	3900L
Needle position (450 XC-W USA)	1st position from top
Needle position (450 XC-W ZA)	4th position from top
Idle mixture adjusting screw (450 XC-W ZA)	
Open	1.5 turns
Idle mixture adjusting screw (450 XC-W USA)	
Open	1.75 turns
Pump membrane stop	2.15 mm (0.0846 in)
Main jet (450 XC-W USA)	180
Main jet (450 XC-W ZA)	185
Jet needle	OBDTQ
Idling jet	40
Idle air jet	100
Cold start jet	85
Leakage nozzle	40

530 EXC EU/AUS, 530 EXC SIX DAYS

Carburetor type	KEIHIN FCR-MX 39
Carburetor identfication number	3900J
Needle position	5th position from top
Idle mixture adjusting screw	
Open	1.5 turns
Pump membrane stop	2.15 mm (0.0846 in)
Main jet	180
Jet needle	OBDZT (OBDTR)
Idling jet	40
Idle air jet	100
Cold start jet	65 (85)
Leakage nozzle	40
Slide stop	present

530 EXC USA

Carburetor type	KEIHIN FCR-MX 39
Carburetor identification number	3900Y
Needle position	3rd position from top
Idle mixture adjusting screw	
Open	2.0 turns
Pump membrane stop	2.15 mm (0.0846 in)
Main jet	180
Jet needle	OBDZT
Idling jet	48
Idle air jet	100
Cold start jet	85
Leakage nozzle	40

530 XC-W

Carburetor type	KEIHIN FCR-MX 39
Carburetor identfication number	3900M
Needle position (530 XC-W USA)	1st position from top
Needle position (530 XC-W ZA)	4th position from top
Idle mixture adjusting screw (530 XC-W ZA)	
Open	1.5 turns
Idle mixture adjusting screw (530 XC-W USA)	
Open	2.0 turns
Pump membrane stop	2.15 mm (0.0846 in)
Main jet (530 XC-W USA)	180
Main jet (530 XC-W ZA)	185
Jet needle	OBDTR
Idling jet	40
Idle air jet	100
Cold start jet	85
Leakage nozzle	40

Other screws, carburetor	M4	2 Nm (1.5 lbf ft)	–
Screw, hose connection	M4	2 Nm (1.5 lbf ft)	**Loctite® 243™**
Screw, throttle slide arm	M4	2 Nm (1.5 lbf ft)	**Loctite® 243™**
Leakage nozzle	M4x0.7	2 Nm (1.5 lbf ft)	–
Idle air jet	M4.5x0.75	2 Nm (1.5 lbf ft)	–
Screw, throttle valve sensor	M5	3.5 Nm (2.58 lbf ft)	–
Cold start jet	M5x0.75	2 Nm (1.5 lbf ft)	–
Main jet	M5x0.75	2 Nm (1.5 lbf ft)	–
Idling jet	M6x0.75	2 Nm (1.5 lbf ft)	–
Needle jet	M7x0.75	3.5 Nm (2.58 lbf ft)	–
Needle screw/slide stop	M8	3.5 Nm (2.58 lbf ft)	–
Choke slide	M12	2.5 Nm (1.84 lbf ft)	–

Frame	Central tube frame made of chrome molybdenum steel tubing
Fork	**WP Suspension** Up Side Down 4860 MXMA PA
Suspension travel	
Front	300 mm (11.81 in)
Rear	335 mm (13.19 in)
Fork offset (EXC SIX DAYS, XC-W USA, EXC USA)	19 mm (0.75 in)
Fork offset (EXC EU, EXC AUS, XC-W ZA)	20 mm (0.79 in)
Shock absorber	**WP Suspension** PDS 5018 DCC
Brake system	Disc brakes, brake calipers on floating bearings
Brake discs - diameter	
Front	260 mm (10.24 in)
Rear	220 mm (8.66 in)
Brake discs - wear limit	
Front	2.5 mm (0.098 in)
Rear	3.5 mm (0.138 in)
Tire air pressure off road	
Front	1.0 bar (15 psi)
Rear	1.0 bar (15 psi)
Road tire pressure (all EXC models)	
Front	1.5 bar (22 psi)
Rear	2.0 bar (29 psi)
Final drive (400 EXC, 450 EXC EU/AUS, 450 EXC SIX DAYS)	15:45 (13:52)
Final drive (400 XC-W, 450 XC-W)	13:52
Final drive (530 XC-W)	14:52
Final drive (530 EXC EU/AUS, 530 EXC SIX DAYS)	15:45 (14:52)
Final drive (EXC USA)	15:45
Chain	5/8 x 1/4"
Rear sprockets available	38, 40, 42, 45, 48, 49, 50, 51, 52
Steering head angle	63.5°
Wheelbase	1,475±10 mm (58.07±0.39 in)
Seat height unloaded	985 mm (38.78 in)
Ground clearance unloaded	380 mm (14.96 in)
Weight without fuel, approx. (EXC EU, EXC AUS, EXC-R SIX DAYS)	113.9 kg (251.1 lb.)
Weight without fuel, approx. (XC-W USA)	112.2 kg (247.4 lb.)
Weight without fuel, approx. (XC-W ZA)	113 kg (249 lb.)
Weight without fuel, approx. (EXC USA)	114.8 kg (253.1 lb.)
Maximum permissible front axle load	145 kg (320 lb.)
Maximum permissible rear axle load	190 kg (419 lb.)
Maximum permissible overall weight	335 kg (739 lb.)

4Ah battery	YTX5L-BS	Battery voltage: 12 V Nominal capacity: 4 Ah maintenance-free

Lighting equipment

Headlight (EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA)	S2/socket BA20d	12 V 35/35 W
Parking light (EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA)	W5W/socket W2.1x9.5d	12 V 5 W
Indicator lights (all EXC models)	W1.2W/socket W2x4.6d	12 V 1.2 W
Turn signal (EXC EU, EXC AUS, EXC-R SIX DAYS)	R10W/socket BA15s	12 V 10 W
Turn signal (EXC USA)	RY10W/socket BAU15s	12 V 10 W
Brake / tail light (EXC, EXC SIX DAYS, XC-W ZA)	LED	
Brake/tail light (EXC USA)	P21/5W/socket BAY15d	12 V 21/5 W
License plate lamp (EXC EU, EXC AUS, EXC-R SIX DAYS)	W5W/socket W2.1x9.5d	12 V 5 W

Tires

Validity	Front tire	Rear tire
(all EXC models)	**90/90 - 21 M/C 54M M+S TT** Metzeler MCE 6 DAYS EXTREME	**140/80 - 18 M/C 70M M+S TT** Metzeler MCE 6 DAYS EXTREME
(all XC-W models)	**80/100 - 21 51M TT** Bridgestone M59	**110/100 - 18 64M TT** Bridgestone M402
Additional information is available in the Service section under: http://www.ktm.com		

Capacity - fuel

Total fuel tank capacity, approx. (EXC, EXC SIX DAYS, XC-W ZA)	9.0 l (2.38 US gal)	Super unleaded (ROZ 95 / RON 95 / PON 91) (☛ p. 225)
Total fuel tank capacity, approx. (EXC USA, XC-W USA)	9.2 l (2.43 US gal)	Super unleaded (ROZ 95 / RON 95 / PON 91) (☛ p. 225)

Fork part number	14.18.7E.06
Fork	**WP Suspension** Up Side Down 4860 MXMA PA
Compression damping	
Comfort	26 clicks
Standard	22 clicks
Sport	20 clicks
Compression damping	
Comfort	26 clicks
Standard	22 clicks
Sport	20 clicks
Rebound damping	
Comfort	24 clicks
Standard	22 clicks
Sport	22 clicks
Spring length with preload spacer(s)	510 mm (20.08 in)
Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	4.4 N/mm (25.1 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	4.6 N/mm (26.3 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	4.8 N/mm (27.4 lb/in)
Air chamber length	110^{+20}_{-30} mm ($4.33^{+0.79}_{-1.18}$ in)
Spring preload - **Preload Adjuster**	
Comfort	2 turns
Standard	2 turns
Sport	4 turns
Fork length	940 mm (37.01 in)

Fork oil per fork leg	626 ml (21.17 fl. oz.)	Fork oil (SAE 5) (☛ p. 224)

Shock absorber part number	12.18.7E.06
Shock absorber	**WP Suspension** PDS 5018 DCC
Compression damping, low-speed	
Comfort	18 clicks
Standard	15 clicks
Sport	12 clicks
Compression damping, high-speed	
Comfort	2 turns
Standard	1.5 turns
Sport	1 turn
Rebound damping	
Comfort	26 clicks
Standard	24 clicks
Sport	22 clicks
Spring preload	9 mm (0.35 in)
Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	69 N/mm (394 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	72 N/mm (411 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	76 N/mm (434 lb/in)
Spring length	250 mm (9.84 in)
Gas pressure	10 bar (145 psi)
Static sag	35 mm (1.38 in)
Riding sag	105 mm (4.13 in)
Fitted length	411 mm (16.18 in)

Shock absorber oil	Shock absorber oil (SAE 2.5) (50180342S1) (☛ p. 224)

Spoke nipple, front wheel	M4.5	5... 6 Nm (3.7... 4.4 lbf ft)	–
Spoke nipple, rear wheel	M5	5... 6 Nm (3.7... 4.4 lbf ft)	–
Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)	–
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)	–
Screw, ball joint of push rod on foot-brake cylinder	M6	10 Nm (7.4 lbf ft)	–
Screw, front brake disc	M6	14 Nm (10.3 lbf ft)	–
Screw, rear brake disc	M6	14 Nm (10.3 lbf ft)	–
Screw, shock absorber adjusting ring	M6	5 Nm (3.7 lbf ft)	–
Nut, rear sprocket screw	M8	35 Nm (25.8 lbf ft)	**Loctite® 243™**
Nut, rim lock	M8	10 Nm (7.4 lbf ft)	–
Remaining nuts, chassis	M8	30 Nm (22.1 lbf ft)	–
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)	–
Screw, bottom triple clamp (EXC SIX DAYS, XC-W USA, EXC USA)	M8	12 Nm (8.9 lbf ft)	–
Screw, bottom triple clamp (EXC EU, EXC AUS, XC-W ZA)	M8	15 Nm (11.1 lbf ft)	–
Screw, engine brace	M8	33 Nm (24.3 lbf ft)	–
Screw, fork stub	M8	15 Nm (11.1 lbf ft)	–
Screw, front brake caliper	M8	25 Nm (18.4 lbf ft)	**Loctite® 243™**
Screw, handlebar clamp (EXC EU, EXC AUS, EXC USA, XC-W)	M8	20 Nm (14.8 lbf ft)	–
Screw, handlebar clamp (EXC SIX DAYS)	M8	16 Nm (11.8 lbf ft)	–
Screw, side stand fixing	M8	40 Nm (29.5 lbf ft)	**Loctite® 243™**
Screw, subframe	M8	35 Nm (25.8 lbf ft)	**Loctite® 243™**
Screw, top steering stem (EXC SIX DAYS, XC-W USA, EXC USA)	M8	17 Nm (12.5 lbf ft)	**Loctite® 243™**
Screw, top steering stem (EXC EU, EXC AUS, XC-W ZA)	M8	20 Nm (14.8 lbf ft)	–
Screw, top triple clamp (EXC SIX DAYS, XC-W USA, EXC USA)	M8	17 Nm (12.5 lbf ft)	–
Screw, top triple clamp (EXC EU, EXC AUS, XC-W ZA)	M8	20 Nm (14.8 lbf ft)	–
Engine attachment bolt	M10	60 Nm (44.3 lbf ft)	–
Remaining nuts, chassis	M10	50 Nm (36.9 lbf ft)	–
Remaining screws, chassis	M10	45 Nm (33.2 lbf ft)	–
Screw, handlebar support	M10	40 Nm (29.5 lbf ft)	**Loctite® 243™**
Screw, bottom shock absorber	M12	80 Nm (59 lbf ft)	**Loctite® 243™**
Screw, top shock absorber	M12	80 Nm (59 lbf ft)	**Loctite® 243™**
Nut, seat fixing	M12x1	20 Nm (14.8 lbf ft)	–
Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)	–
Nut, rear wheel spindle	M20x1.5	80 Nm (59 lbf ft)	–
Screw, bottom steering head (EXC SIX DAYS, XC-W USA, EXC USA)	M20x1.5	60 Nm (44.3 lbf ft)	**Loctite® 243™**
Screw, top steering head	M20x1.5	10 Nm (7.4 lbf ft)	–
Screw-in nozzles, cooling system	M20x1.5	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Screw, front wheel spindle	M24x1.5	45 Nm (33.2 lbf ft)	–

Cleaning motorcycle

Note

Material damage Damage and destruction of components by high-pressure cleaning equipment.

– Never clean the vehicle with high-pressure cleaning equipment or a strong water-jet. The excessive pressure can penetrate electrical components, socket connects, throttle cables, and bearings, etc., and can damage or destroy these parts.

Warning

Environmental hazard Hazardous substances cause environmental damage.

– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info

If you clean the motorcycle regularly, its value and appearance are maintained over a long period.
Avoid direct sunshine on the motorcycle during cleaning.

– Before you clean the motorcycle, close off the exhaust system to prevent penetration by water.
– First remove coarse dirt particles with a gentle water spray.
– Spray very dirty areas with a normal motorcycle cleaner and then clean with a brush.

Motorcycle cleaner (☛ p. 227)

Info

Use warm water containing normal motorcycle cleaner and a soft sponge.

– After rinsing the motorcycle with a gentle water spray, allow it to dry thoroughly.
– Empty the carburetor float chamber. (☛ p. 170)

Warning

Danger of accidents Reduced braking efficiency due to wet or dirty brakes.

– Clean or dry dirty or wet brakes by riding and braking gently.

– After cleaning, ride the vehicle a short distance until the engine warms up, and then apply the brakes.

Info

The heat produced causes water at inaccessible positions in the engine and on the brakes to evaporate.

– Push back the protection covers on the handlebar instruments to allow water to evaporate.
– After the motorcycle has cooled down, lubricate all moving parts and bearings.
– Clean the chain. (☛ p. 77)
– Treat bare metal parts (except for brake discs and exhaust system) with anti-corrosion materials.

Cleaning and polishing materials for metal, rubber and plastic (☛ p. 226)

– Treat all painted parts with a mild paint polish.

High-luster polish for paint (☛ p. 226)

– To prevent electrical problems, treat electric contacts and switches with contact spray.

Contact spray (☛ p. 226)

(all EXC models)

– Lubricate the steering lock.

Universal oil spray (☛ p. 227)

Storage

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

– Avoid contact between fuel and skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come into contact with fuel. Store fuel in a suitable canister according to regulations and keep it out of the reach of children.

Info

If you want to garage the motorcycle for a longer period, take the following actions.

Info

Before storing the motorcycle, check all parts for function and wear. If service, repairs or replacements are necessary, you should do this during the storage period (less workshop overload). In this way, you can avoid long workshop waiting times at the start of the new season.

– Clean the motorcycle. (☛ p. 208)
– Change the engine oil and oil filter and clean the engine oil screen. (☛ p. 179)
– Check the antifreeze and coolant level. (☛ p. 175)
– Drain the fuel from the tank into a suitable container.
– Empty the carburetor float chamber. (☛ p. 170)
– Check the tire air pressure. (☛ p. 70)
– Remove the battery. (☛ p. 78)
– Recharge the battery. (☛ p. 79)

Guideline

Storage temperature of battery (not in direct sunlight)	0... 35 °C (32... 95 °F)

– The storage place should be dry and not subject to large temperature differences.
– Cover the motorcycle with a porous sheet or blanket.

Info

Do not use non-porous materials since they prevent humidity from escaping, thus causing corrosion.
Avoid running the engine for a short time only. Since the engine cannot warm up properly, the water vapor produced during combustion condenses and causes valves and exhaust system to rust.

Putting into operation after storage

– Remove the motorcycle from the work stand. (☛ p. 10)
– Install the battery. (☛ p. 79)
– Fill up with fuel.
– Check before putting into operation.
– Take a test ride.

Important maintenance work to be carried out by an authorized KTM workshop.

		S3N	S15A	S30A
Engine	Change the engine oil and oil filter and clean the engine oil screen. (☛ p. 179)	•	•	•
	Change the gear oil and clean the gear oil screen. (☛ p. 182)	•	•	•
	Replace spark plug.			•
	Check the valve clearance.	•	•	•
	Check engine mounting screws for tightness.	•	•	•
	Clean spark plug connectors and check for tightness.	•	•	•
	Check that the screws in the shift lever and the kickstarter are tight.	•	•	•
Carburetor	Check carburetor connection boots for cracks and leakage.		•	•
	Check vent hoses for damage and routing without sharp bends.	•	•	•
	Check idle.	•	•	•
Attachments	Check the cooling system for leakage.	•	•	•
	Check the antifreeze and coolant level. (☛ p. 175)	•	•	•
	Check the exhaust system for leakage and looseness.		•	•
	Check the cables for damage, smooth operation and routing without sharp bends.	•	•	•
	Check the fluid level of the hydraulic clutch. (☛ p. 172)	•	•	•
	Clean the air filter. (☛ p. 62)	•	•	•
	Check cables for damage and routing without sharp bends.		•	•
	Check that the electrical equipment is functioning properly.	•	•	•
	Check the headlamp setting. (EXC EU, EXC AUS, EXC SIX DAYS, EXC USA, XC-W ZA) (☛ p. 96)		•	•
Brakes	Check the front brake linings. (☛ p. 84)	•	•	•
	Check the rear brake linings. (☛ p. 89)	•	•	•
	Check the brake discs. (☛ p. 69)	•	•	•
	Check the brake fluid level of the front brake. (☛ p. 87)	•	•	•
	Check the brake fluid level of the rear brake. (☛ p. 91)	•	•	•
	Check brake lines for damage and leakage.	•	•	•
	Check the free travel of the hand brake lever. (☛ p. 86)	•	•	•
	Check the free travel of the foot brake lever. (☛ p. 91)	•	•	•
	Check brake system function.	•	•	•
	Check screws and guide bolts of brake system for tightness.	•	•	•
Chassis	Check shock absorber and fork for leakage and functioning.	•	•	•
	Clean the dust boots of the fork legs. (☛ p. 13)		•	•
	Bleed fork legs. (☛ p. 13)		•	•
	Check the frame and swingarm for damage.		•	•
	Check the swingarm bearing.		•	•
	Check the play of the steering head bearing. (☛ p. 32)	•	•	•
	Check all screws to see if they are tight.	•	•	•
Wheels	Check the spoke tension. (☛ p. 71)	•	•	•
	Check the wheel hubs for damage.		•	•
	Check rim run-out.	•	•	•
	Check the tire condition. (☛ p. 70)	•	•	•
	Check the tire air pressure. (☛ p. 70)	•	•	•
	Check the chain wear. (☛ p. 77)	•	•	•
	Check the chain tension. (☛ p. 74)	•	•	•
	Clean the chain. (☛ p. 77)	•	•	•
	Check the wheel bearing for play.	•	•	•
	Clean and grease adjusting screws of chain adjuster.	•	•	•

S3N: once after three operating hours
S15A: every 15 service hours / after every race
S30A: every 30 service hours

Important maintenance work to be carried out by an authorized KTM workshop. (as additional order)

	Competition use			Hobby use			S15N	S45A	J1A
	S15A	S30A	S45A	S30A	S60A	S90A			
Perform a fork service. (☛ p. 16)							•	•	
Perform a shock absorber service. (☛ p. 43)			•		•				
Grease the steering head bearing. (☛ p. 29)									•
Treat electric contacts with contact spray.									•
Change the hydraulic clutch fluid. (☛ p. 172)									•
Change the front brake fluid. (☛ p. 88)									•
Change the rear brake fluid. (☛ p. 92)									•
Clean the spark arrestor. (EXC USA, XC-W USA)									•
Check wear of clutch discs.	•	•	•	•	•	•			
Check the clutch. (☛ p. 132)		•			•				
Check/measure the cylinder. (☛ p. 123)			•			•			
Change the piston.			•			•			
Check the camshaft. (☛ p. 126)			•			•			
Change the camshaft bearing. (☛ p. 129)			•			•			
Check the valve spring seat. (☛ p. 130)			•			•			
Check the cylinder head. (☛ p. 130)			•			•			
Check the valves. (☛ p. 129)			•			•			
Check the valve springs. (☛ p. 130)			•			•			
Check the radial clearance of the rocker arm rollers.			•			•			
Check the timing-chain tensioner function.			•			•			
Check the balancer shaft. (☛ p. 120)			•			•			
Check the crankshaft run-out at the bearing pin. (☛ p. 123)			•			•			
Change the connecting rod, conrod bearing and crank pin. (☛ p. 121)			•			•			
Change the crankshaft main bearing.			•			•			
Check the transmission. (☛ p. 136)			•			•			
Check the shift mechanism. (☛ p. 133)			•			•			
Check the spring length of the oil pressure regulator valve. (☛ p. 118)			•			•			
Change glass fiber yarn filling of main silencer.		•			•				
Replace foot brake cylinder seals.		•			•				
Check/adjust the carburetor components. (☛ p. 161)		•			•				•

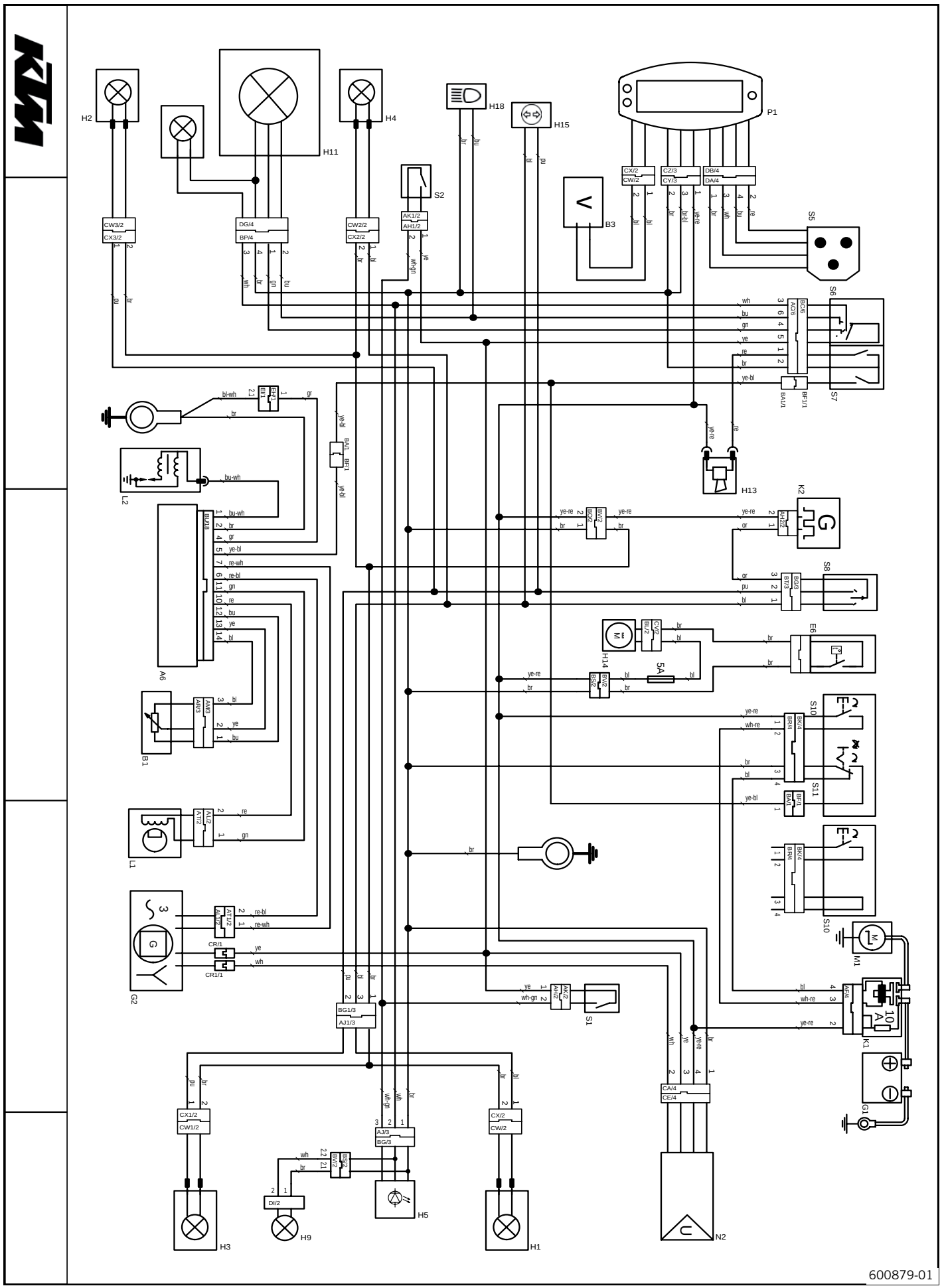
S15A: every 15 service hours / after every race
S30A: every 30 service hours
S45A: every 45 service hours
S30A: every 30 service hours
S60A: every 60 service hours
S90A: every 90 service hours
S15N: once after 15 operating hours
S45A: every 45 service hours
J1A: annually

Important checks and maintenance work to be carried out by the rider.

	NB1A
Check the engine oil level. (☛ p. 178)	•
Check the brake fluid level of the front brake. (☛ p. 87)	•
Check the brake fluid level of the rear brake. (☛ p. 91)	•
Check the front brake linings. (☛ p. 84)	•
Check the rear brake linings. (☛ p. 89)	•
Check and adjust the cables.	•
Bleed fork legs. (☛ p. 13)	•
Clean the dust boots of the fork legs. (☛ p. 13)	•
Clean the chain. (☛ p. 77)	•
Check the chain tension. (☛ p. 74)	•
Check the chain wear. (☛ p. 77)	•
Check the rear sprocket / engine sprocket for wear. (☛ p. 76)	•
Clean the air filter. (☛ p. 62)	•
Check the tire air pressure. (☛ p. 70)	•
Check the tire condition. (☛ p. 70)	•
Check the coolant level. (☛ p. 176)	•
Empty the carburetor float chamber. (☛ p. 170)	•
Check that all operating elements for smooth operation.	•
Check braking.	•
Check all screws, nuts and hose clamps regularly for tightness.	•

NB1A: Depending on conditions of use according to requirements.

Wiring diagram (EXC EU, EXC AUS, EXC-R SIX DAYS)

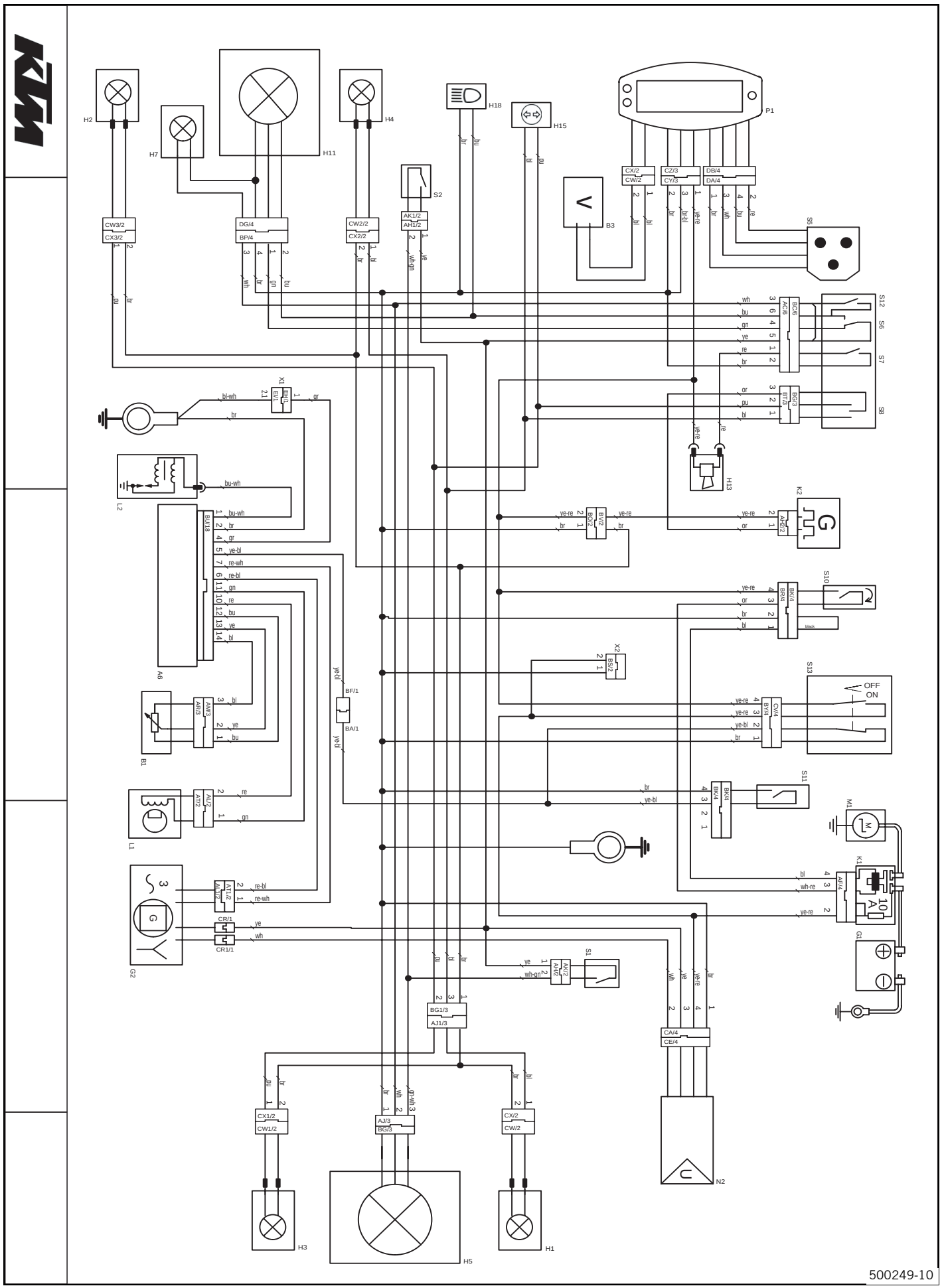


Components	
A6	CDI controller
B1	Throttle position sensor
B3	Wheel speed sensor
E6	Thermoswitch (EXC SIX DAYS)
G1	Battery
G2	Generator
H1	Right rear flasher
H2	Left front flasher
H3	Left rear flasher
H4	Right front flasher
H5	Brake/tail light
H7	Parking light
H9	License plate lamp
H11	Low/high beam
H13	Horn
H14	Radiator fan (EXC SIX DAYS)
H15	Flasher indicator light
H18	High beam indicator light
K1	Starter relay with main fuse
K2	Flasher relay
L1	Pulse generator
L2	Ignition coil
M1	Starter motor
N2	Voltage regulator/rectifier
P1	Speedometer
S1	Rear brake light switch
S2	Front brake light switch
S5	Tripmaster switch (optional)
S6	Light switch
S7	Horn button, short circuit button
S8	Flasher switch
S10	Electric starter button
S11	Emergency OFF switch (EXC-R AUS)
X1	Ignition curve plug connection

Cable colors	
bl	Black
bl-wh	Black-white
br	Brown
br-bl	Brown-black
bu	Blue
bu-wh	Blue-white
gn	Green
gr	Gray
or	Orange
pu	Violet
re	Red
re-bl	Red-black
re-wh	Red-white
wh	White
wh-gn	White-green
wh-re	White-red

ye	Yellow
ye-bl	Yellow-black
ye-re	Yellow-red

Wiring diagram (EXC USA)

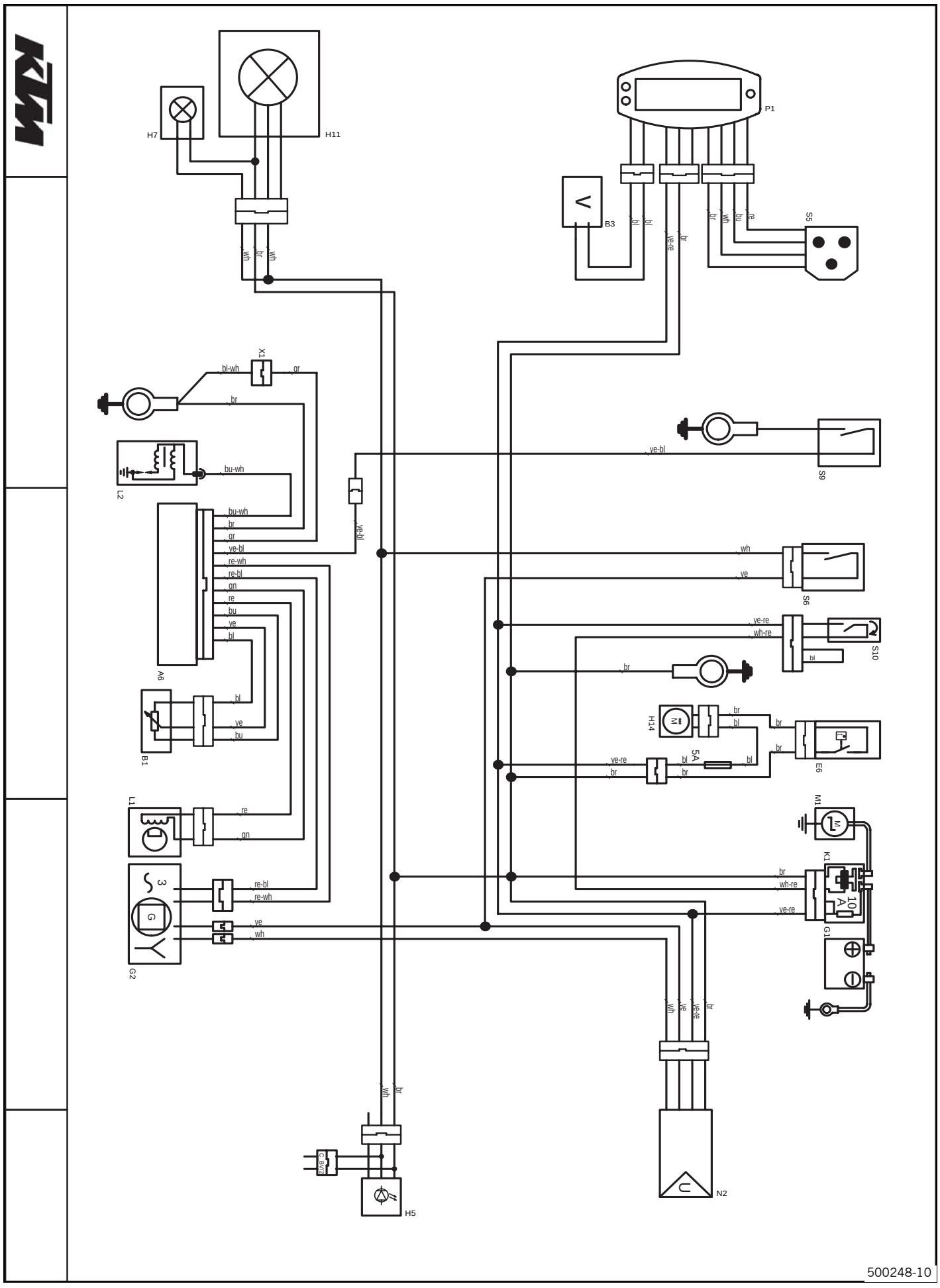


Components	
A6	CDI controller
B1	Throttle position sensor
B3	Wheel speed sensor
G1	Battery
G2	Generator
H1	Right rear flasher
H2	Left front flasher
H3	Left rear flasher
H4	Right front flasher
H5	Brake/tail light
H7	Parking light
H11	Low/high beam
H13	Horn
H15	Flasher indicator light
H18	High beam indicator light
K1	Starter relay with main fuse
K2	Flasher relay
L1	Pulse generator
L2	Ignition coil
M1	Starter motor
N2	Voltage regulator/rectifier
P1	Speedometer
S1	Rear brake light switch
S2	Front brake light switch
S5	Tripmaster switch (optional)
S6	Light switch
S7	Horn button
S8	Flasher switch
S10	Electric starter button
S11	Emergency OFF switch
S12	Headlight flasher button
S13	Ignition switch
X1	Ignition curve plug connection
X2	Radiator fan plug connection (optional)

Cable colors	
bl	Black
bl-wh	Black-white
br	Brown
br-bl	Brown-black
bu	Blue
bu-wh	Blue-white
gn	Green
gr	Gray
or	Orange
pu	Violet
re	Red
re-bl	Red-black
re-wh	Red-white
wh	White
wh-gn	White-green
wh-re	White-red

ye	Yellow
ye-bl	Yellow-black
ye-re	Yellow-red

Wiring diagram (all XC-W models)



500248-10

Components	
A6	CDI controller
B1	Throttle position sensor
B3	Wheel speed sensor
E6	Thermoswitch (XC-W ZA)
G1	Battery
G2	Generator
H5	Brake/tail light (XC-W ZA)
H7	Parking light (XC-W ZA)
H11	Low/high beam (XC-W ZA)
H14	Radiator fan (XC-W ZA)
K1	Starter relay with main fuse
L1	Pulse generator
L2	Ignition coil
M1	Starter motor
N2	Voltage regulator/rectifier
P1	Speedometer
S5	Tripmaster switch (optional)
S6	Light switch
S9	Short circuit button
S10	Electric starter button
X1	Ignition curve plug connection

Cable colors	
bl	Black
bl-wh	Black-white
br	Brown
bu	Blue
bu-wh	Blue-white
gn	Green
gr	Gray
re	Red
re-bl	Red-black
re-wh	Red-white
wh	White
wh-re	White-red
ye	Yellow
ye-bl	Yellow-black
ye-re	Yellow-red

Brake fluid DOT 4 / DOT 5.1

According to
– DOT

Guideline
– Use only brake fluid that complies with the specified standards (see specifications on the container) and that possesses the corresponding properties. KTM recommends **Castrol** and **Motorex®** products.

Supplier
Castrol
– **RESPONSE BRAKE FLUID SUPER DOT 4**

Motorex®
– **Brake Fluid DOT 5.1**

Coolant

Guideline
– Use only suitable coolant (also in countries with high temperatures). Use of low-quality antifreeze can lead to corrosion and foaming. KTM recommends **Motorex®** products.

Mixture ratio

Antifreeze protection: −25… −45 °C (−13… −49 °F)	50 % corrosion inhibitor/antifreeze 50 % distilled water

Coolant (mixed ready to use)

Antifreeze	−40 °C (−40 °F)

Supplier
Motorex®
– **Anti Freeze**

Engine oil (SAE 10W/50)

According to
– JASO T903 MA (☛ p. 240)
– SAE (☛ p. 240) (SAE 10W/50)

Guideline
– Use only engine oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties. KTM recommends **Motorex®** products.

Synthetic engine oil

Supplier
Motorex®
– **Cross Power 4T**

Fork oil (SAE 5)

According to
– SAE (☛ p. 240) (SAE 5)

Guideline
– Use only oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties. KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Racing Fork Oil**

Shock absorber oil (SAE 2.5) (50180342S1)

According to
– SAE (☛ p. 240) (SAE 2.5)

Guideline
– Use only oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties.

Super unleaded (ROZ 95 / RON 95 / PON 91)

According to

– DIN EN 228 (ROZ 95 / RON 95 / PON 91)

Air filter cleaner

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Twin Air Dirt Bio Remover**

Carburetor cleaner

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Carburetor**

Chain cleaner

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Chain Clean 611**

Cleaning and polishing materials for metal, rubber and plastic

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Protect & Shine 645**

Contact spray

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Accu Contact**

High-luster polish for paint

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Moto Polish**

Long-life grease

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Fett 2000**

Lubricant (T158)

Guideline

– KTM recommends **Lubcon®** products.

Supplier
Lubcon®

– **Turmogrease® PP 300**

Lubricant (T511)

Guideline

– KTM recommends **Lubcon®** products.

Supplier
Lubcon®

– **Turmsilon® GTI 300 P**

Lubricant (T159)

Guideline

– KTM recommends **Bel-Ray®** products.

Supplier
Bel-Ray®

– **MC-11®**

Lubricant (T625)

Guideline

– KTM recommends **Molykote®** products.

Supplier
Molykote®

– **33 Medium**

Lubricant (T152)

Guideline

– KTM recommends **Bel-Ray®** products.

Supplier
Bel-Ray®

– **Molylube® Anti-Seize**

Motorcycle cleaner

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Moto Clean 900**

Offroad chain spray

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Chain Lube 622**

Oil for foam air filter

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Twin Air Liquid Bio Power**

Universal oil spray

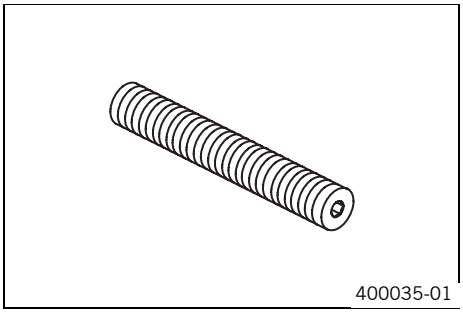
Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

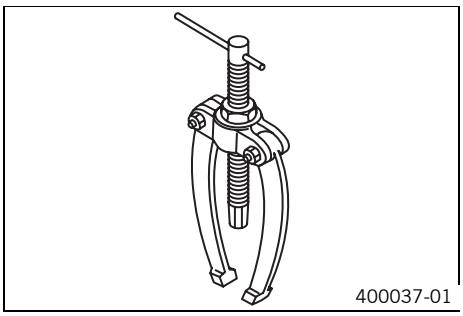
– **Joker 440 Universal**

Crankshaft locking bolt



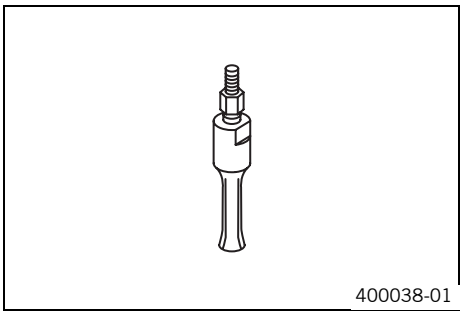
Art. no.: 113080802

Bearing puller



Art. no.: 15112017000

Insert for bearing puller

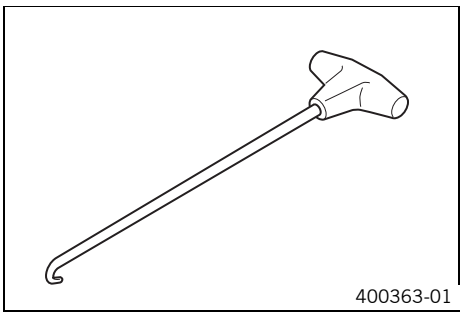


Art. no.: 15112018100

Feature

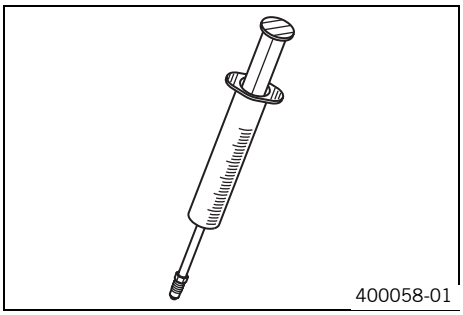
18... 23 mm (0.71... 0.91 in)

Spring hooks



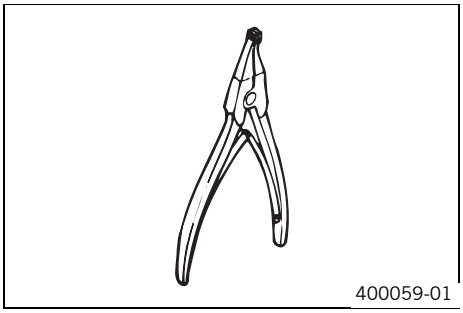
Art. no.: 50305017000

Bleed syringe



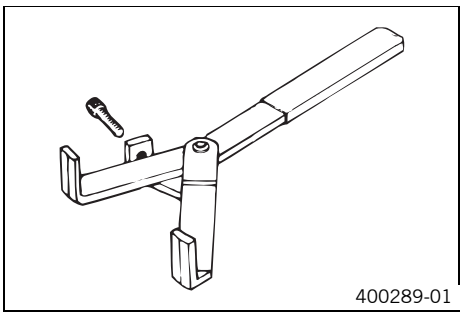
Art. no.: 50329050000

Circlip pliers reverse



Art. no.: 51012011000

Clutch holder

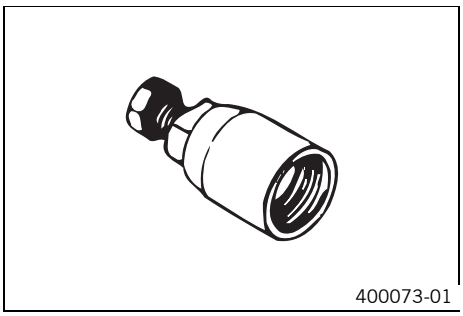


Art. no.: 51129003000

Work stand

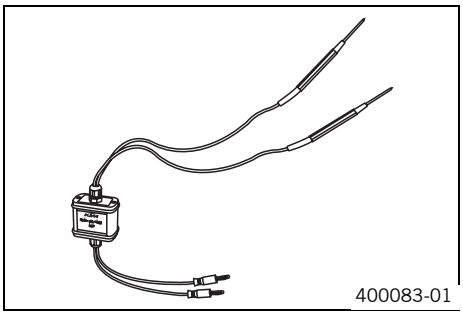
Art. no.: 54829055000

Extractor



Art. no.: 58012009000

Peak voltage adapter



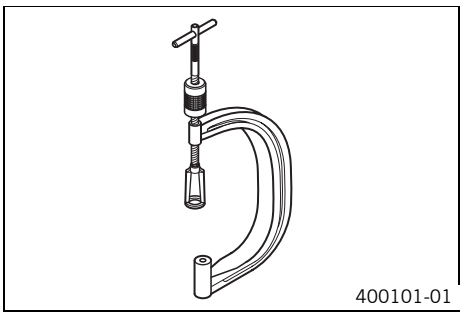
Art. no.: 58429042000

Torque wrench with various accessories in set


200910-10

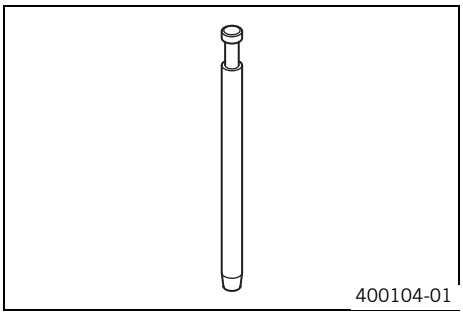
Art. no.: 58429094000

Valve spring compressor


400101-01

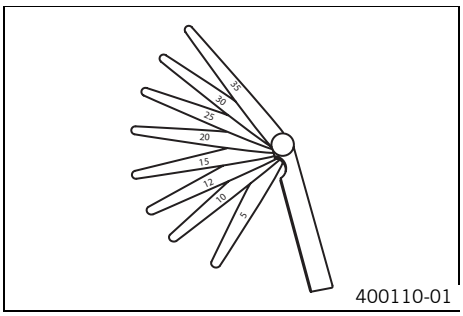
Art. no.: 59029019000

Limit plug gauge


400104-01

Art. no.: 59029026006

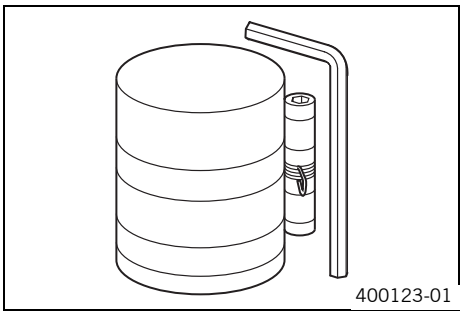
Feeler gauge



400110-01

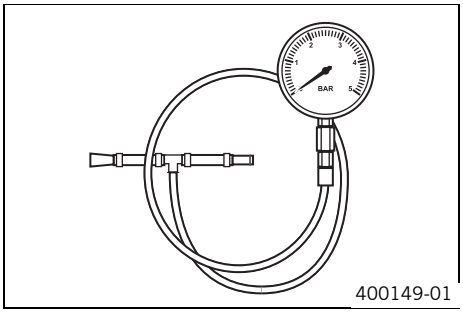
Art. no.: 59029041100

Piston ring mounting tool


400123-01

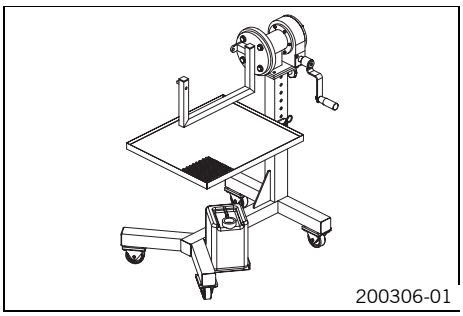
Art. no.: 60029015000

Pressure testing tool



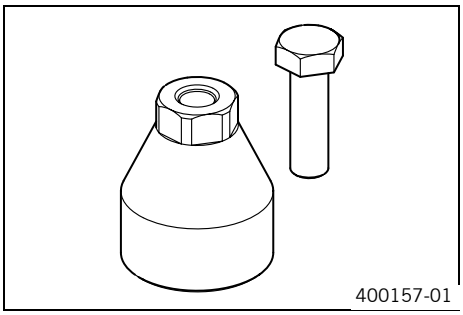
Art. no.: 61029094000

Engine work stand



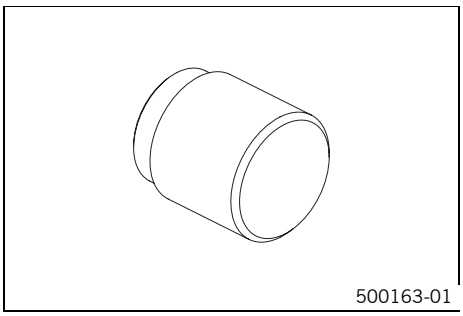
Art. no.: 61229001000

Extractor



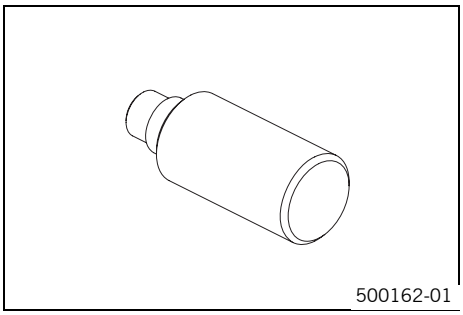
Art. no.: 75029021000

Push-in drift



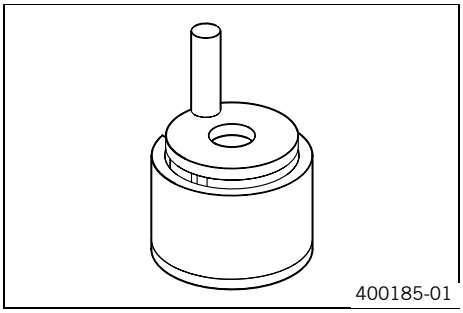
Art. no.: 75029044010

Push-in drift



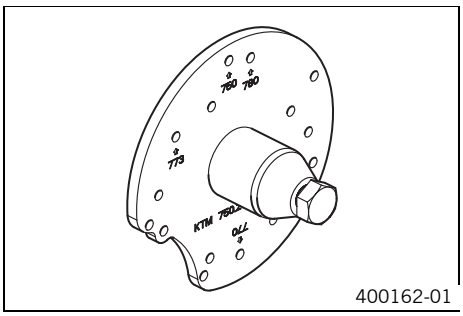
Art. no.: 75029044020

Pressing device for crankshaft, complete


400185-01

Art. no.: 75029047000

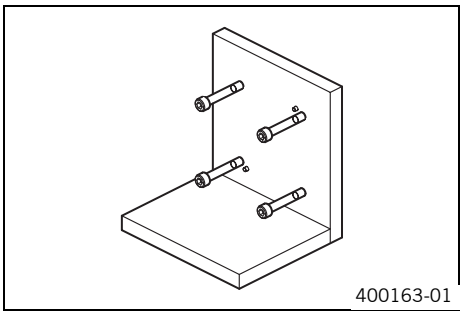
Extractor



400162-01

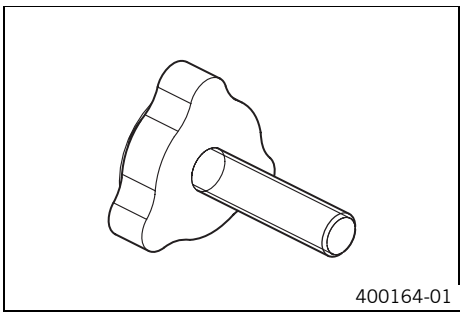
Art. no.: 75029048000

Clamping plate


400163-01

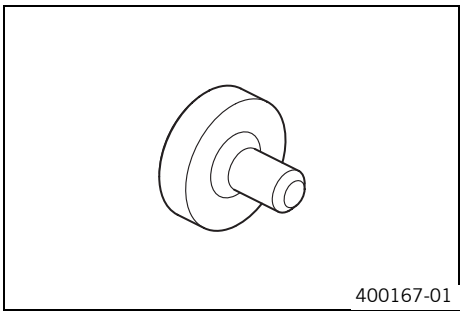
Art. no.: 75029050000

Push-out drift


400164-01

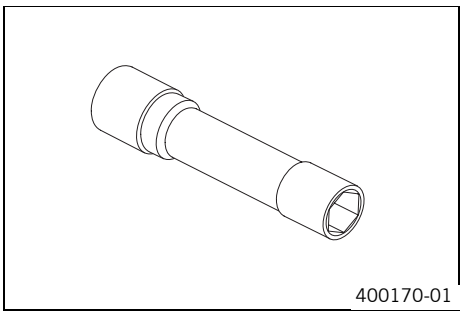
Art. no.: 75029051000

Protection cover


400167-01

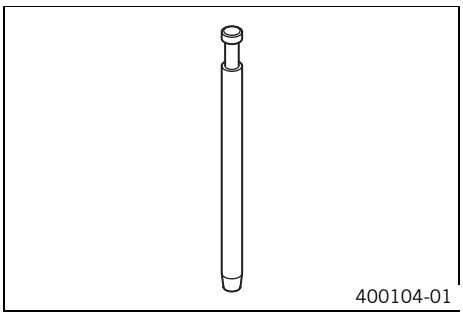
Art. no.: 75029090000

Spark plug wrench



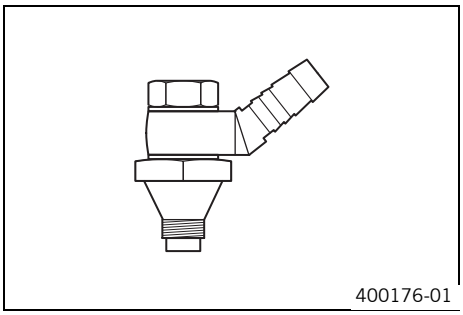
Art. no.: 75029172000

Limit plug gauge



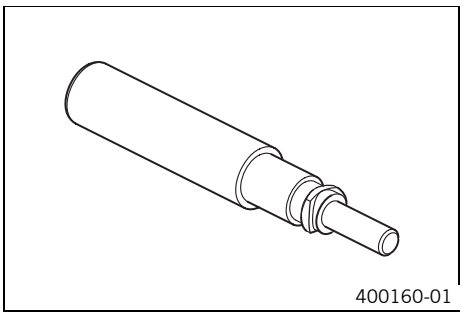
Art. no.: 77029026000

Oil pressure adapter



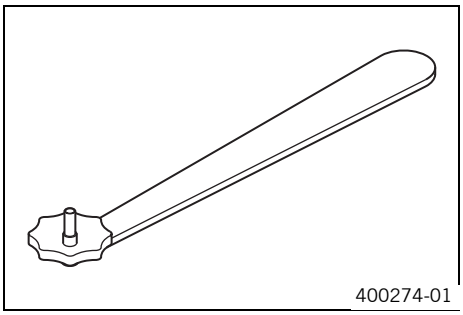
Art. no.: 77329006000

Insert for piston pin retainer



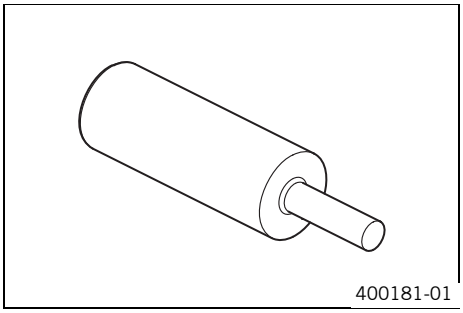
Art. no.: 77329030100

Adjustment tool for mixture control screw



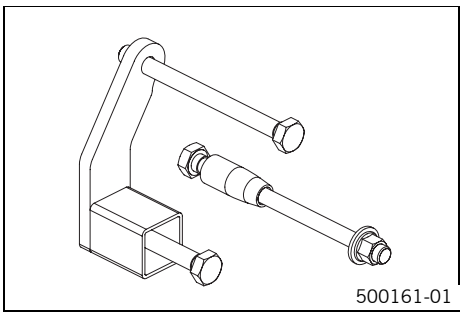
Art. no.: 77329034000

Release device for timing chain tensioner



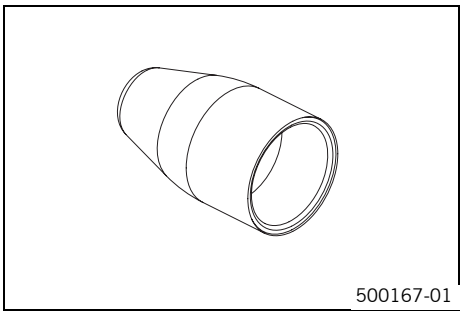
Art. no.: 77329051000

Engine bracket



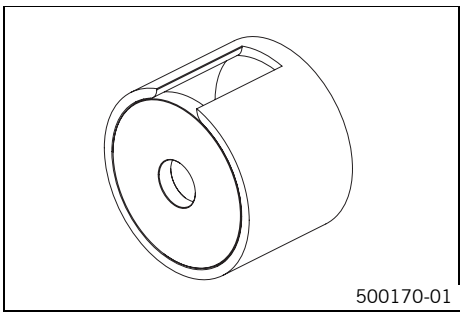
Art. no.: 78029002000

Mounting sleeve



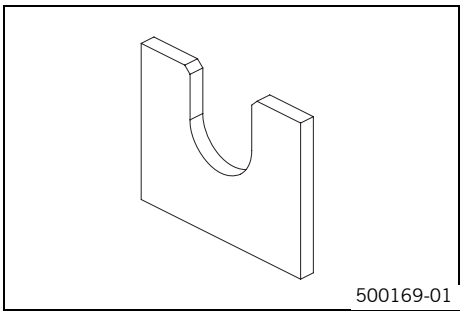
Art. no.: 78029005000

Insert for crankshaft pressing device



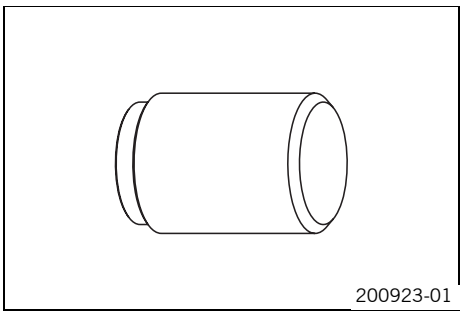
Art. no.: 78029008000

Separator plate



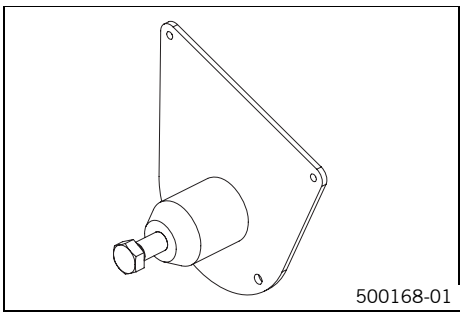
Art. no.: 78029009000

Push-in drift



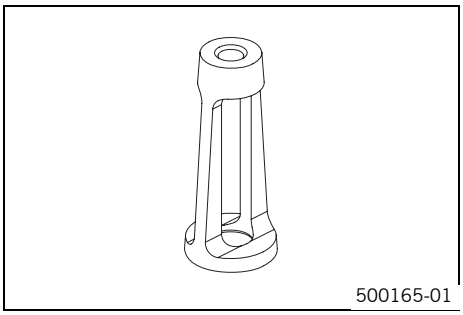
Art. no.: 78029043030

Removal tool



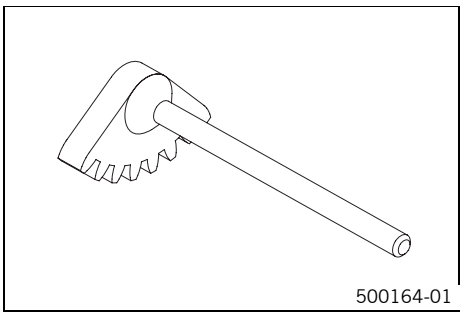
Art. no.: 78029049100

Valve spring mounting device



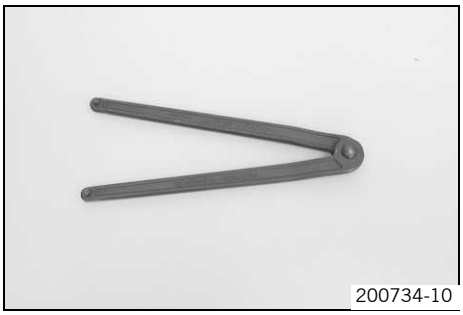
Art. no.: 78029060000

Gear quadrant



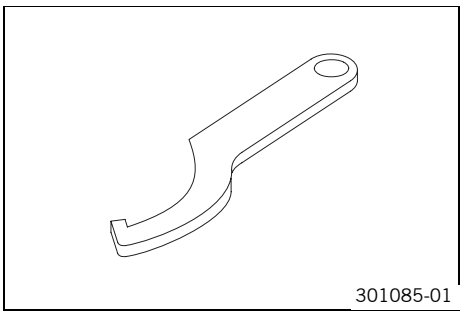
Art. no.: 80029004000

Pin wrench



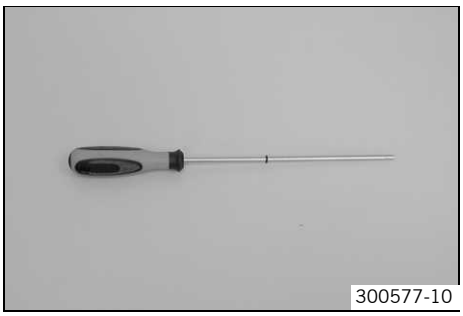
Art. no.: T103

Hook wrench


301085-01

Art. no.: T106S

Depth micrometer


300577-10

Art. no.: T107S

Mounting sleeve

200788-10

Art. no.: T1204

Calibration pin


200790-10

Art. no.: T1205

Pressing tool


200583-10

Art. no.: T1206

Pressing tool


200585-01

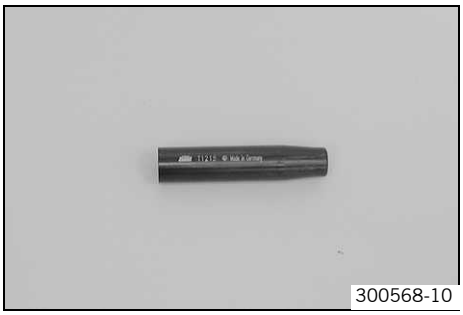
Art. no.: T1207S

Centering sleeve


200777-10

Art. no.: T1214

Mounting sleeve


300568-10

Art. no.: T1215

Disassembly tool


200816-10

Art. no.: T1216

Protecting sleeve


200635-10

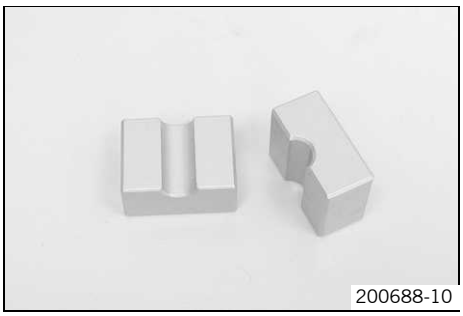
Art. no.: T1401

Clamping stand


200733-10

Art. no.: T14015S

Clamping stand


200688-10

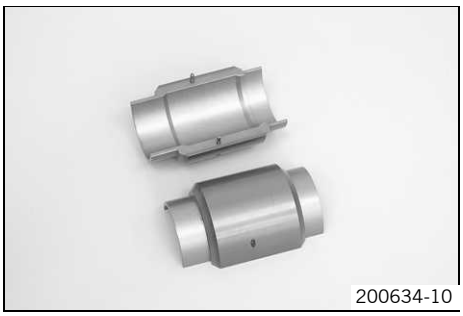
Art. no.: T14016S

Gripping tool


200639-10

Art. no.: T14026S1

Assembly tool


200634-10

Art. no.: T1402S

Open-end wrench


200640-10

Art. no.: T14032

Clamping stand


200637-10

Art. no.: T1403S

Press drift

200789-10

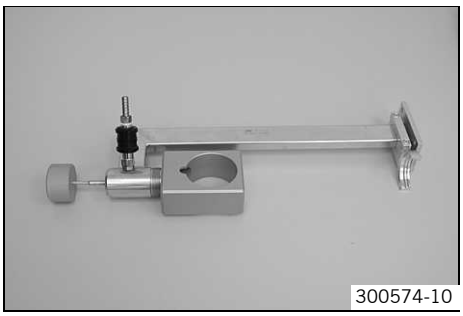
Art. no.: T1504

Assembly tool


200791-10

Art. no.: T150S

Nitrogen filling tool


300574-10

Art. no.: T170S1

JASO T903 MA

Different technical development directions required a new specification for 4-stroke motorcycles – the JASO T903 MA Standard. Earlier, engine oils from the automobile industry were used for 4-stroke motorcycles because there was no separate motorcycle specification. Whereas long service intervals are demanded for automobile engines, high performance at high engine speeds are in the foreground for motorcycle engines. With most motorcycles, the gearbox and the clutch are lubricated with the same oil as the engine. The JASO MA Standard meets these special requirements.

SAE

The SAE viscosity classes were defined by the Society of Automotive Engineers and are used for classifying oils according to their viscosity. The viscosity describes only one property of oil and says nothing about quality.

3206064en

03/2009 Photo: Mitterbauer

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